CHINA AND MEXICO IN THE GLOBAL MOTOR INDUSTRY: COMPETITION OR COMPLEMENTARITY?

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ABSTRACT

The emergence of China as a global economic player is one of the most extraordinary events in world development over the last three decades. The increasing Chinese presence in world markets has severely intensified the levels and dimensions of competition, posing serious competitive threats in both developing and developed countries. The thesis analyses the interactions and impacts of China's global expansion on Mexico's motor industry, a capital intensive sector with high-technology segments. In both China and Mexico this industry is a key sector, considered high priority for these countries' economic and social development. Despite this, detailed and comprehensive studies of China's impacts on Mexico's motor industry and their interactions were marginal or non-existent.

Therefore, this study focused on competition in Mexico's domestic market, attraction of Foreign Direct Investment, competition in the U.S. market, as well as investment and production networks within Mexico, and the role of both China and Mexico in the motor industry's global division of labour. A taxonomy of impacts and channels of interaction in the bilateral relationship was applied. Furthermore, this thesis proposes an alternative methodology for assessing the 'competitive threat' of China on the different product segments of Mexico's motor industry, in a more systematic and qualitative way.

The research findings showed that the interactions between Mexico and China in the motor industry's global competitive arena are much more complex than the simple idea of "competitive threat" or "national competition". It also involves complementary forces, and a variety of functional interconnections through firms' global production networks. Results also demonstrate the differentiated impacts among the diverse product/segments of the industry. In addition, unlike other domestic manufacturing sectors, Mexico's motor industry has strengths, especially in the export segment, that allow it to maintain its competitive position in bilateral trade with China. Despite China's increasing competitive power in the global market, Mexico's case shows that complementary factors with China could be enhanced to find a win-win situation.

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ABBREVIATIONS

AMIA	Asociación Mexicana de la Industria Automotriz
AAMA	American Automobile Manufacturing Association
ACEA	European Automobile Manufacturers Association
ANPACT	Asociación Nacional de Productores de Autobuses, Camiones y Tractocamiones
CATARC	China Automotive Technology & Research Centre
CCPIT	China Council for the Promotion of International Trade
CECHIMEX	Centro de Estudios China-Mexico
CEPAL	Comisión Económica para América Latina y el Caribe
CKD	Completely Knocked Down
CNIMME	Consejo Nacional de la Industria Maquiladora y Manufacturera de Exportación
DRC	Research Department of Industrial Economy
ECLAC	Economic Commission for Latin America and the Caribbean
EIU	Economist Intelligence Unit
EVI	Electric Vehicles International
FAW	First Automobile Works
FDI	Foreign Direct Investment
FTA	Free Trade Agreement
GDL	Global Division of Labour
GDP	Gross Domestic Product
GMC	General Motors Corporation
GML	Giant Motors Latinoamérica
GPN	Global production Networks
GVC	Global Value Chains
HS	Harmonised Commodity Description and Coding System
IDB	Inter-American Development Bank
IDL	International Division of Labour
IDS	Institute of Development Studies
INA	Industria nacional de Autopartes
INEGI	Instituto de Estadística, Geografía e Informática

IMF	International Monetary Fund
IRSC	Institute for Regional Studies of the Californias
JV	Joint Venture
M&A	Merger and Acquisition
MAGIC	Module to Analyse the Growth of International Commerce
MOFCOM	Ministry of Commerce of People's Republic of China
MVMA	Motor Vehicle Manufacturers Association
NAFTA	North American Free Trade Agreement
NDIL	New International Division of Labour
OAAI	Office of Aerospace and Automotive Industries
OECD	Organisation for Economic Cooperation and Development
OEM	Original Equipment Manufacturers
OICA	International Organization of Motor Vehicle Manufacturers
PEF	Poder Ejecutivo Federal
PRC	People's Republic of China
PROMEXICO	Mexico's Promotion Agency for Trade and Investment
RCA	Revealed Comparative Advantage
SAE	Society of Automotive Engineers of China
SAIC	Shanghai Automotive Industry Corporation
SEZs	Special Economic Zones
TNC	Transnational Corporation
UNCOMTRADE	United Nations Commodity Trade Statistics Database
UNCTAD	United Nations Conference on Trade and Development
UNIDO	United Nations Industrial Development Organization
USDOC	United States Department of Commerce
USGAO	United States General Accounting Office
USITC	United States International Trade Commission
WCO	World Customs Organisation
WTO	World Trade Organisation
VW	Volkswagen Corporation

1. CHAPTER ONE

INTRODUCTION

> "When China wakes, it will shake the world" (Napoleon Bonaparte).[1]

> "As the balance of world market and economic power shifts from West to East, China will emerge as the key location in the battle for dominance of the 21st century's global auto industry" (Jullens, *et al*., 2012).

'A spectre is haunting the world – the spectre of China'.[2] The emergence of the People's Republic of China – hereafter referred to as China - as a global economic player is one of the most extraordinary events in world development over the last three decades. In a broader context, the rise of the Middle Kingdom and its impact on a global scale has resulted in the term 'The Chinese Century' being used (Shenkar, 2005). During this period, China's economic growth has been impressive, registering a Gross Domestic Product' (GDP) annual average rate of around 10%. It has become the world's largest exporter and manufacturer of goods, the biggest energy user, and one of the major recipients of Foreign Direct Investment (FDI). China is now the world's second biggest economy, displacing Japan in 2010. The International Monetary Fund (IMF, 2012) estimates that by 2017 China will overtake the United States in terms of world GDP calculated at Purchasing Power Parity, although its per capita income would still be much smaller than the average in advanced economies. With 1.3 billion people, China is the world's most populated country, accounting for 20% of the globe's total. Over these last three decades, China's two historic transformations, from a rural-agricultural society to a urban-industrial one, and from a command economy to a market-based one, have not only yielded impressive economic results but in the social sphere these have also been remarkable (The World Bank, 2012). According to the same source, the poverty rate fell from more than 65% to less than 10%, lifting some 500 million people out of poverty.

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[1] Saying attributed to Napoleon Bonaparte in 1816-1817 after reading accounts of Lord McCartney's trip to Beijing in the 1790s (Kristof and Wudunn, 1994).

[2] Paraphrasing Marx and Engels (1975) in their *Manifesto of the Communist Party*.

The internal exceptional achievements of the Chinese economy, however, have caused contradictory and polemic reactions externally. In particular, by becoming the ‘factory of the world’, China has begun to be seen as a serious competitive threat in both developing and developed countries. In fact, the increasing Chinese presence in world markets, especially for certain manufactured goods, has severely intensified the levels and dimensions of competition. This condition is pointed out by Kaplinsky (2005) who states that, in the past, many low-income countries were able to increase their exports at the expense of workers in the high-income importing economies, but now, given the high inter-penetration of markets, developing countries find themselves in increasing competition with each other. An effect of this process – Kaplinsky argues -, is that the continued growth in manufactured exports by an important number of low-income countries is not viable under such circumstances. Thus, the ‘China Price’ is being felt in both developed and developing markets. An additional tendency is that although China competitive strengths started in labour-intensive and low-technology products, by now they are increasingly competing in more technology- and skill-intensive ones.

In the political arena, some consider that China’s global rise will pose a military threat to the West, and undermine support for democracy and human rights around the world (Peerenboom, 2007). In this sense, given the pre-conceived notion of ‘China Threat’, China is painted not only as unreformed Communist but as an ugly Capitalist as well (Leung, 2005). As a consequence of these perceptions, a collective ‘China Syndrome’ has induced fears about China’s increasing competitiveness among a diversity of economic, social and political agents (government officials, politicians, entrepreneurs, labour unions) in both developing and developed economies (Lall and Albaladejo, 2004; Shenkar, 2005; Fishman, 2005; Kaplinsky, 2005; Peerenboom, 2007). In many cases, different forms of protectionism have been the answer, provoking trade disputes among countries. Paradoxically, and simultaneously, amidst this conflictive scene countries and firms have reinforced their trade ties, investments, and production networks with China, taking advantage of low prices or production costs. Either using China as source of imports, as an export destination or as a production base, this process has contributed to the extension and deepening of the global division of labour.

In a kind of Schumpeterian view of ‘creative destruction’ (Schumpeter, 1970), China’s global emergence has revolutionised the worldwide competitive structure. This extraordinary event has been highlighted by specialists on the topic. Within this perspective, Chinese firms are starting to disrupt global competition by implementing a strategy of cost innovation, thus breaking the established rules of the game (Zeng and Williamson, 2007). Along the same lines, and related to the rise of the ‘Asian Drivers’ framework, this process is visualised as ‘critical disruption’ to the global economy and political order which is reshaping the world’s current status, presaging a new ‘Global-Asia’ era (Kaplinsky and Messner, 2008). Through its extraordinary achievements during the last three decades, China has shown the world that not only ‘the South, but the East also exists’.[3]

1.1. China’s (Re) Emergence in the Global Economy

From the early sixteenth century until the early nineteenth century, China represented the world’s largest economy (Maddison, 2001; The World Bank, 2012). Chinese GDP in 1820 was nearly 30% higher than that of Western Europe and its Western Offshoots combined (Maddison, 2001). Nevertheless, between the 1840s and 1940s, the Chinese economy collapsed. Per capita GDP in 1950 was less than three quarters of the 1820 level and its total GDP was less than a twelfth of that of Western Europe and the Western counterparts. The period of China decline coincided with commercial penetration by foreign powers and the Japanese attempt at conquest, but there were also internal forces which contributed to China’s retrogression (ibid).

Maoist China: the Creation of the People’s Republic of China

After a long period of wars since the end of Qing dynasty in 1911, a new society was created with the establishment of the People’s Republic of China (PRC) on

[3] Paraphrasing Mario Benedetti’s (2000), “The South also exists”.

October 1, 1949. Under a Communist ideology and the leadership of Mao Zedong, Chairman of the Party, the government sought to control all aspects of social and economic activity (Guthrie, 2006; Baker, 2007). During the period of Maoist China, several major stages can be identified (Thoburn, 2010a): a) Agrarian reform (1948-1952); b) Agricultural collectivisation (1957); c) The Great Leap Forward (1957-1958); d) The Great Famine (1960); and e) The Cultural Revolution (1966-1976). Mao's ruling period of almost thirty years ended with his death in 1976. Until this time, under a poorly functioning command system China's economy was crippled, with a backward industrial sector, inadequate allocation of resources, rigid and stultifying bureaucracy, and isolation from the rest of the world (Guthrie, 2006; Baker, 2007).

Reform Period and 'Open Doors' Policy

In 1978 the process of economic reform in China got under way under the new leader Deng Xiaoping. The new government recognised that access to world markets and a freeing-up of domestic trade were necessary factors for development. By commenting 'it does not matter what the colour of the cat is, as long as it catches mice', Deng proposed a reform process of 'groping for stones to cross the river' (Baker, 2007: 141-142). According to Nolan (2005), China's approach to the reform was deeply influenced by the disasters the country had experienced since the middle of the nineteenth century, the massive famine after the 'Great Leap Forward' and the acute suffering during the Cultural Revolution.

China's style of reform process, away from the planned economy of the Maoist period, contrasts sharply with the reform path of the former USSR, a 'transition orthodoxy' policy (Nolan, 2005). It has been recognised that the success of the economic reform path of the past three decades has derived from its particular gradualist 'nature' (Nolan, 2005; Guthrie, 2006; Yueh, 2007). Instead of adopting the 'transition orthodoxy' policy promoted by the World Bank, China followed an experimental and evolutionary approach, under an authoritarian political system (Nolan, 2005). Nevertheless, some analysts argue that despite this gradualist path of China's transition to a market economy, reforms have also been radical and deep, given the following factors (Guthrie, 2006): a) the central government has driven reforms forward through several key policies that have allowed China to engage fully in the global economy; b) a policy of economic decentralisation has been adopted giving incentives for local development to local officials and creating competition among localities; and c) the government has reformed industrial organisations without privatisation, but at the same time it has allowed a private economy to emerge from below.

The central features of the development model after the reforms are the following (Guthrie, 2006; Gao, 2006, cited by Gereffi, 2009): a) The reliance on the market as the driving mechanism behind economic growth; b) The transformation of incentives in agricultural activity; c) A policy of economic decentralisation, giving incentives for regional development and creating competition among localities; d) An aggressive strategy of FDI attraction; e) The opening of the domestic market to the outside world; f) The facilitation of the development of a private economy; g) The use of low-cost labour to participate in the global economy; h) The beginning of a process that would address the economic burden that the social security system posed for Chinese enterprises; and i) The valuation of economic growth and upgrading, even at the expense of social stability.

At the same time that China was implementing the domestic reforms that transformed the economy in the 1980s and 1990s, a deepening of the 'open doors' policy aimed at integration into the global economy was deployed. Among the main actions was the construction of new institutions both domestically and internationally, the development of new industrial policies, and the adoption of aggressive trade and export strategies. Of particular significance was the creation of 'Special Economic Zones' (SEZs) (i.e. Pudong, Shenzhen), which allowed domestic and foreign firms to take advantage of specific tax incentives and other types of policy goals in targeting particular kinds of investment in China (Guthrie, 2006).

Before 1978 China's trade was driven by import needs and no FDI was allowed between 1949 and 1978, except some from the ex-USSR (Thoburn, 2010a). The economic reforms included access for foreign investment which had hitherto been banned. Thus, in 1979 a new Law of the People's Republic of China on Chinese-Foreign Equity Joint Ventures was promulgated (Guthrie, 2006; Baker, 2007). From the late 1970s China started attracting DFI particularly from Hong Kong, and initially mainly confined to SEZs in the Southern regions. The Chinese state strictly controlled the access of foreign investors to its domestic market (Thoburn, 2010a). Through this FDI policy China aimed at earning foreign exchange, generating employment, building forward and backward linkages, and obtaining technology transfer. From the 1980s onwards China became a strong exporter of labour-intensive manufactured goods, using its Hong Kong contacts as a 'window of the world' (ibid) and the increasing attraction of FDI into China was one of the vital factors for this success. In a relatively short period of time China became one of the top FDI destinations in the world.

'Go Global' Strategy

If the first stages of the 'Open Door' policy of the planned economy were founded on the attraction of FDI and on the parallel 'export-push' strategy, investing abroad is proving to be a turning point in the new Chinese expansion policies (Bellabona and Spigarelli, 2007). In 2000 China officially initiated a 'Go Global' strategy to promote its outward FDI, signifying the change in the government's approach from one with tightly restricted capital outflows to one of encouragement for Chinese firms to invest abroad (OECD, 2008). According to Bellabona and Spigarelli (2007), the same strategic motivations for the 'opening' have evolved and matured in time, with gradual progression. From the exclusive dynamics of political interests, the Chinese state has moved to pursuing economic and commercial targets. Through the 'Go Global' policy, the government now aims at raising the country's profile to a global standard, conquering new outlet markets for local productions, and , above all, rapidly acquiring skills, advanced technologies and intangible value assets (i.e. skills and trademarks) (ibid). Thus, besides its success in opening the economy and attracting inward FDI, China has rapidly becoming a significant source of outward FDI.

This policy has been a lever for the emergence and strengthening of Chinese transnational corporations (TNCs) (Mathews, 2006; Bellabona and Spigarelli, 2007; Pradhan, 2009; Williamson and Zeng, 2009). A change in the motives of Chinese outward FDI during the last decade has been reported, diversifying from the traditional market and natural resource-seeking modalities to strategic asset acquisitions (through M&A), intended to enhance their technological and innovative capability (Pradhan, 2009). Some of the high-profile Chinese TNCs are Lenovo in the personal computer business, Huawei in the telecommunications network equipment, and Geely, which recently acquired Volvo, in the motor vehicle sector. These emerging TNCs, also called 'Dragon Multinationals', are considered to be serious international players in the global economic scene (Mathews, 2006). Their accelerated internationalisation and the strategic organisational innovations' characteristics are framed within the complex global forces of economic integration. For some analysts, the continued emergence of Chinese TNCs is expected to have a powerful, disruptive impact on the structure of the global competitive arena (Williamson and Zeng, 2009).

China's Accession to the World Trade Organisation

2001 marked another leap forward in the path of China's integration into the global economy, a historic milestone, as phrased by Nolan (2005). For trade and economic analysts, China's accession to the World Trade Organisation (WTO) in December of that year represented an extraordinary event for diverse reasons. At the time, China was the world's sixth-largest economy, with a population of 1.3 billion, and reflecting a unique political and economic system consisting of a hybridisation of planned economy and free-market principles (Cass, *et al.,* 2003). Likewise, the implications of China's entry into the WTO for the world economy, the international trading system, and the United States were enormous (Lardy, 2002). According to this author, China's economy and international trade were so vast that the expansion of economic output and trade resulting from its membership was likely to notoriously affect the growth of global trade and thus the pace of expansion of global output. This move was also considered a landmark event for the following reasons (ibid): a) China's membership committed it to comply with the principles and rules of the international trading system; b) China's WTO commitments were a lever that its reform-oriented leadership could use to complete the transition to a more market-oriented economy; and c) China's commitment to open markets to increased investments in telecommunications, financial, and distribution services was genuinely revolutionary.

Although China achieved a great degree of openness to foreign trade in manufactures prior to its accession to the WTO in 2001, the implications of its membership for the world trading system and networks have been enormous (Lardy, 2002). Besides the immense impacts within China such as the pressures for economic reforms and industrial restructuring, WTO accession gave it a further impulse in its international integration process and also increased its competitive presence in several world market segments (Lardy, 2002; Bhattasali, *et al.*, 2004; Kaplinsky, 2005; Yueh, 2007). In fact, China's accession to WTO provoked deep concerns among both developing and developed countries. The former feared increasing competition in their domestic and export markets as well as in the attraction of FDI. The latter were worried about losing an important number of unskilled jobs due to massive imports of cheap manufactured goods.

Although during the initial stages of participation in world markets China's competition was mainly in labour-intensive and low-technology products, over the years the technological level of its products has steadily increased. China had committed to compete in more technology-skill-intensive goods (Shafaeddin, 2004; Lall and Albaladejo, 2004). In this sense, some analysts have observed that although low labour cost is certainly a major factor, it is not the only source of China's success. Other factors that are pointed out are: the strengthening of manufacturing and processing capabilities, technological progress, improving infrastructure, and suitable social and human environments (Lin, 2003; Lu, 2004; Kaplinsky, 2005). In terms of innovation capability, more recently it has been suggested that Chinese TNCs will fundamentally change the global competitive game through a strategy of cost innovation (Zeng and Williamson, 2007). This strategy consists of: a) Chinese companies are starting to offer customers high technology at low cost; b) The emerging Chinese competitors are presenting customers with an unmatched choice of products in what used to be considered standardised, mass-market segments; and c) Chinese companies are using their low costs to offer specialty products at dramatically lower prices, turning them into volume business (ibid). This disruption of global competition, it is argued, will initiate the transition to a new economic structure with changes in the division of labour between regions, reorganisation of TNCs, and new alliances among companies and countries over the next decade.

Unique Factors behind China's Economic Success

In summary, the factors behind China's economic success in its reforms are considered unique. The key reforms included are: a) Pragmatic and effective market-oriented reforms; b) Balancing growth with social and macroeconomic stability; c) Decentralisation and interregional competition in attracting investment, developing infrastructure, and improving the local business environment; d) Domestic market integration by dismantling regional barriers to the movement of goods, labour, and capital and the establishment of a single national market; and e) Steady integration with the global economy (The World Bank, 2012).

1.2. China as 'Asian Driver of Global Change'

Globalisation has accelerated a number of vital transformations in several dimensions of the contemporary world: economical, social, cultural, political, technological, and territorial, among others. In recent years, two relevant trends have been widely recognised (Schmitz, 2006): a) the global economy is increasingly interconnected; and b) power is shifting from the West to the East, in particular to China. These trends and their implications have led to the emergent notion of '*Asian Drivers'*.

Succinctly, 'Asian Drivers' are the new dynamic and generally large Asian economies, especially China and India, which are playing an increasingly important role as global producers. They are likely to have a significant impact on the global economy, derived not only from their size, but also from their distinctive public and private actors (IDS Asian Drivers Team, 2006; Schmitz, 2006; Kaplinsky and Messner, 2008). Likewise, in terms of global governance, the rise of China and India as drivers of global change is considered to be altering the relationship between industrialised and developing countries causing noteworthy impacts on this matter (Humphrey and Messner, 2006a). Given the radical transformation this group of countries is likely to induce, its emergence is seen as a critical 'disruption' to the global and political order, heralding a new 'Global-Asia' era (Kaplinsky and Messner, 2008).

The 'Asian Drivers' phenomenon has brought new issues for development and policy processes (Kaplinsky and Messner, 2008). First, the depth and reach of their impacts challenge both developed and developing countries. Second, the variety of impacts presents threat and opportunities simultaneously, thus provoking competitive and complementary, as well as direct and indirect, impacts. Third, their successful experience provides new policy roles for other developing countries, at variance with the traditional "Washington Consensus".

Six major reasons are pointed out as to why the Asian Drivers are likely to pose major challenges to developed and developing economies (Kaplinsky and Messner, 2008): a) The huge size of their economies; b) These economies markedly embody different combinations of state and capitalist development compared with the industrialised world; c) They combine low incomes and low wages with significant innovative potential; d) China and India are associated with very different forms of regional integration; e) The economic rise of China and India results in large-scale changes in important global governance arenas; and f) The huge natural resource hunger and energy needs of China and India will, in the future, serve to place the issue of sustainability squarely back on the agenda of global politics and development policies.

A related notion to that of 'Asian Drivers' is the initiative of *'Anchor Countries',* which are defined as "developing countries whose size gives them the potential to play important roles in regional and global governance, both positively and negatively" (Humphrey and Messner, 2006b: 2). The 'Anchor Countries' are considered to be significant partners for developing countries. This group of countries, although heterogeneous, is mainly defined by the size of their economy, population, territory and their political influence and participation in global dialogue. Besides China and India in East and South Asia, the notion of "Anchor Countries" also includes South Africa in Africa, Russia in Central Europe, and Brazil and Mexico in Latin America, among others (ibid).[4]

Undoubtedly, at present China is the Asian Driver with major impacts on the global economy. As pointed out above, the emergence of China as a global economic player is seen as a factor that is changing the balance of world power and leading to global restructuring. In this regard, Shenkar (2005: 1) emphasises, "the impact of a rising China on the countries of the world – both developed and developing – will be enormous, and so will be the need to develop strategies and responses to meet the challenge". However, following the sign of the present process of globalisation, China represents, simultaneously, challenges and opportunities. On one side, it is a major competitor for many countries in the domestic and global markets and, on the other, from the demand side, it has played a dynamic role as an engine of world economic growth. On this twofold implication, Kaplinsky (2005) raises a highly suggestive point: while the improvement in the global distribution of income arises mainly as a result of the very rapid economic growth in China, it is also considered as a major cause for squeezing the income of low-wage economy exporters of manufactures leading to a declining terms of trade with the main consuming regions of the world.

1.3. The Competitiveness Obsession of Nations

After almost two decades of intense academic, business and political debate over the 'competitiveness' of nations, the issue is still very much alive. One of the most influential intellectual stances on the subject was formulated by Paul Krugman (1994 and 1996), arguing that nations, unlike corporations, do not compete with each other in the global marketplace. When taken to the public policy standpoint, Krugman (1994: 44) goes further: "competitiveness is a meaningless word when applied to national economies. And the obsession with competitiveness is both

[4] Other related concepts are that of *BRICs*, integrated by Brazil, Russia, India and China. Likewise, the so-called *BRICSAMs* include South Africa and Mexico besides the BRICs (Agarwal, 2008). Very recently, an international consultancy firm "predicted" that Mexico is closer to become the next BRICs country (Global Auto Industry, 2012).

wrong and dangerous”. He warned that any nation’s obsession with competitiveness could skew domestic policies and threaten the international economic system, leading to a serious risk of trade conflicts. If on top of these elements – following Henderson’s (2002) idea about research on economic development given contemporary circumstances - the existence of an analytic disjuncture of being state-centric in its assumptions and analyses is added to the equation, then it could be argued that the ‘competitiveness obsession’ of nations becomes not only wrong and dangerous, but perhaps fatal.

Almost immediately after the publication of Krugman’s work, it received rather heated responses from prominent economists, academics and other professionals: Lester C. Thurow, Clyde V. Prestowitz (Jr.), Rudolf Scharping, Stephen Cohen, and Benn Steil (*Foreign Affairs,* 1994). The responses had a common ground: a) competitiveness is an essential concern for nations; b) domestic economies must compete successfully in the global economy in order to move to higher levels of productivity and income; c) the level of prosperity of national economies depends to a large extent on productivity and to a lesser extent on the international competitiveness of their companies; d) one of the main problems is the static approach adopted; among other arguments. Likewise, other authors argued that – although often misused and mostly ill-defined - the concept of competitiveness properly used is relevant for analysing and understanding the distribution of wealth, both nationally and globally (Reinert, 1995). Moreover, Reinert pointed out that, although under different titles, the term competitiveness addresses issues which have been central in public policy for around 500 years.

More recently, the topic of national competitiveness has been tackled from the perspective of policy decision-making and the construction of indices, ranking international competitiveness as well as in assessing the competitive performance of countries at international scale (Lall, 2001; Lall and Albaladejo, 2004). In particular, Lall (2001) discusses two issues of Krugman’s arguments: first, whether ‘national competitiveness’ has a valid economic definition; and, second, – if it does, – whether competitiveness ‘strategy’ is justifiable. Lall (ibid) concludes that as an economic issue, when market failures exist, free markets cannot allocate resources optimally and countries can improve their position by intervening to remedy these failures. Thus, the aim of a government's competitiveness strategy is to help countries to realise or build dynamic comparative advantage. The author (ibid: 1504) adds that "selective strategies *do* work under specific circumstances, and the rewards in terms of growth and dynamic competitiveness are enormous".

Regardless of the final conclusions of this apparently endless academic controversy, governments all over the world are still obsessed with their national competitiveness. As Harris (2003) underlines when discussing the agenda of the nation-states and global economic integration, the old order fashioned economies according to political geography, not according to global markets; and he adds (ibid: 239), "trade remains, even if in a qualified fashion, an instrument of state power and of the ancient rivalries". Under globalisation, this author remarks, the process is governed by the economics of global markets rather than by the politics of national states. Paradoxically, this clinging to the idea of nations competing with each other in the world market is kept in a moment when the actual origin and the 'nationality' of products and capitals as well as the boundaries of firms are becoming increasingly blurred and 'fuzzy' (Harris, 1983 and 2003; Ietto-Gillies, 2002; Dicken, 2003). In large part, this difficulty in identifying the nationality or place of origin of goods and corporations is due to the increasing globalisation process and the conformation of complex and specialised transboundary production networks of interlinked firms.

Based on different experiences worldwide, there is no doubt that the emergence of China as a major player/competitor in the global economy in the 1990s has been a catalytic factor spurring on the competitive obsession of nations. Amazingly, fears about China's increasing competitiveness are manifested among governments, as well as economic and social agents, in both developing and developed countries. A clear example of this situation is the reaction in the United States, the world's largest economy and market. In fact, there have been a significant number of trade disputes between the United States and China, ranging from implementation of obligations that were made where China joined the WTO, China's exchange rate policy, lax trade law enforcement, and alleged subsidies to industrial producers (Tang, 2009). Critics claim that China's currency policy is a major cause of the large U.S. trade imbalance with China and the loss of numerous U.S. jobs. Nevertheless, while the Obama administration has pushed China to appreciate its currency, it has also encouraged it to continue purchasing U.S. Treasury securities, which totalled US$ 847 billion as of July 2010 (Morrison and Labonte, 2010). According to figures of the USDOC (2012), the bilateral U.S. trade deficit with China rose to US$ 295.5 billion in 2011, 40% of the U.S. total. As a result, administrators and Members of Congress are desperately aiming to achieve more balance in U.S.-China trade relations.

Concerns about job losses in the U.S. economy have been manifested for years. For example, a study prepared for the U.S.-China Economic and Security Review Commission reported that between 1989 and 2003, the rise in the United States' trade deficit with China caused the displacement of production that supported 1.5 million jobs. The number of jobs opportunities lost each year grew rapidly during the 1990s, and accelerated after China entered the WTO in 2001 (Scott, 2005). Very recently, in January 2012, the Alliance for American Manufacturing, which includes manufacturers and United Steelworkers, claimed that about 1.6 million U.S. jobs in the automotive parts industry were threatened by the 'unfair, predatory and protectionist' trade practices of China in the auto parts sector. The Alliance requested federal action to protect the recovery of the U.S. motor industry (Alliance for American Manufacturing, 2012). In this sort of trade disputes, the risk of protectionism is always present. As Jagdish Bhagwati (2009) recently highlighted:

> "To understand this paradox, consider that labour union lobbies and their political friends have decided that the ideal defence against competition from the poor countries is to raise their costs of production by forcing their standards up, claiming that competition with countries with lower standards is 'unfair'. 'Free but fair trade' becomes an exercise in insidious protectionism that few recognise as such".

In summary, Krugman's treatment of competitiveness raised some significant elements for the discussion of national (and international) competitiveness, provoking an intense wave of controversies on the issue. According to Krugman (1994: 41), thinking and speaking in terms of competitiveness poses three real dangers: a) it could result in the wasteful spending of government money on enhancing national competitiveness; b) it could lead to protectionism and trade wars; and c) it could result in bad public policy on a spectrum of important issues. These arguments both augment and obscure the discussion on the national economy's productivity and trade performance in world markets. On the one hand, Krugman's claims warn about the dangers of becoming obsessive about national competitiveness, in terms of justifying protectionist measures leading to trade disputes, as well as about governments embarking in inefficient and erroneous public policy. On the other hand, due to his idea of the meaningless of the competitiveness concept when applied to national economies, these arguments overshadow and underestimate its relevance in terms of defining a competitiveness strategy within economic policy, aiming at strenghthening dynamic comparative advantages.

In fact, a justification for nation states to be involved in competitiveness issues is that the concept is bound up with the population's quality of life (Planas and Preston, 2010). In this regard, Aiginger (2006) underlines that the definition of competitiveness as the ability of a country to create welfare not only contradicts any attempt to focus primarily on low costs (price competitiveness), but also sidelines definitions focusing on external balance and market share. In addition, some authors (Hay, 2012: 464) have argued that Krugman's treatment of competitiveness "led him to fail to recognise, and inadvertently to reinforce, a rather different and more virulent obsession of policy-makers – that with cost competitiveness." Hay (ibid) points out that policy-makers have long since ceased viewing the competition between nations as analogous to that between corporations, but they seem yet to realise the dangers of viewing the dynamics of competition in all markets for goods and services as analogous to that for cheap consumer goods.

1.4. The 'China Syndrome': Mexico's Obsession

From December 2000 to the end of 2003, Mexico's *maquiladora*[5] industry lost 900 plants and 260,000 jobs, around a quarter and a fifth of the total, respectively. This situation represented a major setback for Mexico since the *maquiladora* industry is a key sector within the Mexican economy. At present, this activity accounts for more than 50% of Mexico's total exports and 30% of formal manufacturing employment. It is, perhaps, the best example of the Mexican economy in terms of globalisation and international integration. For particular sectors, mostly based on labour-intensive operations, such as textiles, clothing, footwear, home appliance, telephone equipment, and electronic segments, the situation was critical.

As most of these jobs were lost to China through the relocation of plants or market competition, the 'China threat' became Mexico's obsession. Around 45% of the assembly plants that migrated from Mexico were relocated to China (Ornelas, 2007). As *The Economist* (2003: 49) pointed out at that time, "The 'sucking sound' of jobs going south that Ross Perot, an American presidential candidate, feared would be consequence of NAFTA is now being heard from the east by Mexicans". By challenging head-on the *maquiladora* system's comparative advantage, China had begun eating Mexico's lunch (Rosen, 2003).

[5] The *Maquiladora* system was created in 1965 as part of the Border Industrialisation Programme (González-Aréchiga and Barajas, 1989). A *maquiladora* is a factory or assembly plant operated in Mexico under a preferential tariff scheme. Under the *maquiladora* programme, equipment, machinery, supplies and raw materials can be imported temporarily into Mexico duty-free; products are assembled and/or manufactured on the Mexican side and exported back to the Unites States for further processing and selling. Before NAFTA, *maquiladoras* were required to export all the production out of Mexico but after the starting operations of the free trade agreement, that condition was eliminated. In November 2006, the Mexican government (PEF, 2006) issued a decree combining the *Maquiladora* Programme with the PITEX Programme (Temporary Imports Programme to Produce Export Goods), an additional export promotion scheme created in 1990. The new export promotion scheme is called IMMEX (Manufacturing Industry, Maquiladora and Export Services Programme). *Maquiladoras* are also known as 'in-bond' or 'twin' plants. The concept originated from Spanish 'maquiladora', place where the miller's fee is paid; and 'maquila', portion received by the miller in return for milling one's grain (Houghton Mifflin Company, 2009).

Much of Mexico's obsession had competition in third markets as a source, particularly in the United States. The U.S. is a key market to Mexico since it represents around 80% of its total export destination. In 2003, China displaced Mexico as the second-largest supplier of goods to the U.S. market, behind Canada. After a period of sustained growth due to the operation of NAFTA in 1994, U.S. imports from Mexico have observed a slump since 2001, surpassing the value levels of 2000 only until 2004-2005. Conversely, U.S. imports from China presented a dynamic growth, more than doubling the value from 2001 to 2005. In the case of Mexico, the underlying factors behind this tendency was a combination of China's increasing competition and the recession of the U.S. economy since the end of 2000, which was exacerbated by the 9/11 factor.

Two events and changes linked to NAFTA operation and U.S. trade treaties simultaneously enabled China to escape the recessive effects of the U.S. economy (Sahling and Finley, 2004), and also eroded Mexico's competitiveness: first, China's accession to the WTO in December 2001; and second, the activation of NAFTA's Article 303 on January 1, 2001. In the first event, the United States lowered the duties levied on manufactured exports from China – in a similar way to what had happened with other Central American countries in 2000 -, enhancing the competitiveness of those exports within the Unites States. Before NAFTA, China was the U.S.'s principal source of textiles and apparel products. After NAFTA, Mexico obtained a special tariff treatment in these products, which enabled Mexico to become the number one supplier in the American economy. In the second event, when this NAFTA rule came into effect, it made *maquiladora* operations more difficult, more costly and more uncertain in Mexico, since the Article 303 outlawed tariff rebates for imports from non-NAFTA countries (Gruben, 2004). As a result, firms importing from Asia for assembly in Mexico and subsequent export to the United States – a traditional practice of special relevance for the electronics industry, for example – found that, under the new rule, operations were more expensive, and firms began relocating, or moving their operations abroad. These are some of the factors why Mexico began losing competitiveness in low-wage/low-skill operations against China and other Central American countries.

The favourite explanation for China's competitiveness in world markets is its abundance of unskilled and cheap labour force. In 2002, China's hourly compensation costs[6] were US$ 0.57, only 2.08% of those in the U.S. ($27.37) and 10.2% of Mexico's ($5.59). Nevertheless, China has been steadily upgrading its technology and skill-intensive of exported goods. Comparatively, labour costs in China have been rising faster. By 2008, China's hourly compensation costs increased to US$ 1.36, against $ 6.47 in Mexico and $ 32.78 in the United States (Banister and Cook, 2011).

The increasing presence of China in the international markets and the growing fears about its 'competitive threat' provoked a number of reactions and opinions among diverse governmental, businessman, politicians, and other social agents both inside and outside Mexico. Most of the public opinions were defensive and of a reactive character against China, although some expressed a more conciliatory position by highlighting the potential benefits of entering into a phase of cooperation with China (Table 1.1). During China's first years of having joined the WTO, most of the information regarding its negative impacts on Mexico came from anecdotal and press reports. It was not until the middle of the 2000s when more analytical studies on the subject were released. These studies showed increasing competition from China in the domestic and U.S. markets, as well as in the attraction of FDI, in particular in the textile/clothing and the electronics manufacturing chains (Dussel Peters 2005a, 2005b, 2009 and 2010a). Specifically, in the electronics industry Dussel Peters (2005a and 2009) reported losses between 2001 and 2003 of more than 45,000 jobs, US$ 3.2 billion in exports, and 514 million in FDI by companies that outsourced their activities to China and/or outsourced their production lines to that country.

[6] Compensation costs include: a) direct pay (all payments made directly to the worker, before payroll deductions of any kind); b) social insurance expenditures (employer payments to secure entitlement to social benefits for employees); and c) labour-related taxes (net of subsidies).

Table 1.1. Public Opinion about China's Global Emergence and Impacts on Mexico

"The 'giant sucking sound' Ross Perot used to talk about is back, only this time it is not Mexico sucking away American jobs. It is China sucking away Mexico's jobs". (William Greider, Journalist, *The Nation,* 31st December, 2001).

"It is not clear whether or not China is actually competitive. Perhaps it is, but perhaps its current success is based on the fact that they do not respect a series of rules that other countries, such as Mexico, do respect." (Mexico's President Vicente Fox at the Asia Pacific Cooperation Summit, 22nd October, 2002, Presidencia de la República).

"China is on the minds of every manager, politician, worker, housewife and youngster of this country. Mexico seldom has faced such a formidable rival that so clearly threatens our welfare." (MEXICO*NOW* Magazine's Editor, Year 1, No. 2, January-February, 2003).

"Mexico has nearly lost the battle on low-skilled, labour-intensive industries, where it simply cannot compete with China on labour costs and will likely continue losing market share". (Merrill Lynch report, cited by Juan Forero, *The New York Times,* 3rd September, 2003).

"China and Mexico are competing for the same markets. The question is not whether Mexico is losing the U.S. market, but rather how we can establish a strategic relationship with China to penetrate that market together". (Speech of Luis Ernesto Derbez, Mexico's Foreign Minister, at IDB Conference in Washington, D.C. *IDBAmerica*, October 2004).

"The ubiquitous 'Made in China' stamp, found on everything from toys to textiles to statues of Our Lady of Guadalupe, has become the incarnation of the single greatest perceived threat to Mexico's economic prosperity – and a symbol of the pitfalls of globalization". (Farrel, D., A. Puron and J. Remes, Analysts, The *McKinsey Quarterly, No. 1, 2005).*

"Our common destiny lies in the fact that they can be our manufacturing centre to export to the world, while we can be their platform to supply the American continental market". (Simón Levy Dabbah, academician and current chairman of LatinAsia, reported by *Global Automotive Industry,* March 2006).

"My message is that Americans and Mexican alike should not fear the economic rise of China. China presents an opportunity, not threat, to the NAFTA partners". (Daniel Griswold, Director of the Centre for Trade Policy Studies at the Cato Institute, 15th November, 2006).

"Protection won't do any good. To protect is like taking an aspirin, it has instant effects, but it does not last long because we all are in the globalisation bandwagon". (Yin Hengmin, People's Republic of China Ambassador in Mexico, reported by *El Sol de Mexico,* 22nd February, 2008.

"In a world where subpar growth and high rates of joblessness are likely to remain for some time, China is exporting large doses of unemployment to the rest of the world – not just to the United States bit also Europe, Latin America, India, Mexico, and South Africa". (Fred Bergsten, Op-ed in Foreign Policy, Peterson Institute for International Economics, 14th April, 2010).

Source: Own elaboration.

In the Latin American region, it seems that China's 'Angel' face and 'Helping Hand' (Santiso, 2007; Bláquez-Lidoy, Rodríguez and Santiso, 2007) did not reach Mexico, since practically all the studies concluded that this country was the most negatively affected by China's competition, given the similarity of their export structures. Because of this, Mexico emerged as the exception case or the paradigmatic example (Blázquez-Lidoy, Rodríguez and Santiso, 2007; Paus, 2008; Gallagher and Porzecanski, 2008). According to Gallagher and Porzecanski (2010), Mexico tops everyone's list of nations under threat from China. Arguing that China's competitive threat has increased over time, these authors reported that 83% of Mexican exports to the United States, and 99% of Mexico's manufacturing exports to the rest of the world were under threat from China by 2006. In 2004, the chairman of Mexico's National Iron and Steel Industry Chamber (CANACERO) declared that China did not represent any risk for the domestic iron and steel industry (Infolatina, 2004). Interestingly, seven years later, CANACERO denounced a process of de-industrialisation and job losses in the sector mainly derived from increasing Chinese import penetration, and demanded governmental protection (Mendes de Paula and Cervera, 2011). In 2003 China not only displaced Mexico as the second largest supplier to the U.S. market; it also became Mexico's second trading partner due to increasing imports from the former.

In general, amid similarities and differences, the China-Mexico relationship seems to be a paradoxical one in many respects. Firstly, although China and Mexico established trade contact in 1565 through the 'China's Nao', there was a long distancing period between them (Oropeza, 2010). Only until December 1899 did both countries formalise diplomatic relationships. At the beginning of the twentieth century, China and Mexico interrupted their relationship due to their internal social and political movements. Mexico officially recognised the People's Republic of China in 1972 behind the United Nations Organisation (UNO). Secondly, despite this political recognition, Mexico was the last of the 141 members of the WTO to sign a bilateral agreement with China to clear its admission to the organisation in 2001. Likewise, up to the present, Mexico has not granted China the status of market economy. Thirdly, China and Mexico started a process of trade liberalisation and export-oriented strategies, following a period of pursuing an import substitution model, almost at the same time. Nevertheless, the results and implications for national development and industrial upgrading have been substantially different, making it difficult for Mexico to compete with China in world markets (Shafaeddin and Pizarro, 2007; Shafaeddin and Gallagher, 2008; Gereffi, 2009; Gallagher and Porzecanski, 2010); whereas Mexico was the 'champion of liberalisation', China followed a 'neo-developmental' model (Shafaeddin and Gallagher, 2008). Fourthly, for some observers, the collision between Mexico and China was imminent, since the former, after NAFTA came into operation in 1994, began pursuing an economic strategy that was more Asian than Latin American. As a consequence, by transforming itself into a platform for low-cost exports mainly to the U.S. market, Mexico became 'the China of Latin America' (Johnson, 2002). Both counties are also considered 'outliers' in their respective regions, Mexico in Latin America and China in East Asia, due to their differentiated performance in relation to their neighbours' (Lall, *et al.,* 2004). Nevertheless, it is noted that although both countries are dynamic exporters – which makes them similar – they differ in behaviour and implications. Finally, as a Mexican contribution to the Chinese transition, the new impetus to the SEZs programme, one of China's most successful strategies in its process of global integration and competitiveness after the 'open doors' policy, was inspired by Mexico's *maquiladora* programme (Ley, 2010). After visiting Mexico's border towns in 1985, Jiang Zemin, at that time Shanghai's Mayor, proposed the new course of China's SEZs (ibid). Years later, Jiang Zemin became the Communist Party General Secretary and, subsequently, China's President.

In conclusion, it could be argued that the conjunction and synchrony of cyclical and structural factors – the U.S. economic recession, increasing competition from China, the changing NAFTA and trade rules, and Mexico's internal factors (lack of reforms, increasing labour costs, lack of infrastructure, etc.) – led to Mexico's loss of competitiveness in the global market, especially in the United States, its major export destination. The U.S. recession of 2000-2003, along with increased Chinese competition, were the catalyst factors that made the structural transformation of the Mexican economy in the light of increased international competition clear: Mexico was no longer competitive in low-wage/labour intensive production segments. Even further, the whole of Mexico's industrialisation and export-oriented model was put into question.

1.5. China's Global Emergence and Mexico's Motor Industry

If the present age is set to be called 'The Chinese Century', China's motor industry is certainly playing an outstanding role in it. China has become the epicentre of the global motor industry, positioning itself as the world's largest motor vehicle producer and market since 2009. According to some analysts, 2009 is likely to be viewed as the year in which the baton of leadership in the global auto industry passed from the Unites States to China (Perkowski, 2009). Recent forecasts predict annual vehicles sales of 30 million in China by the end of this decade; this would represent around 40% of the world's total motor-vehicle sales (Global Automotive Industry, 2012b). Practically every single global automaker and parts producer has established production facilities in Chinese territory. China is now becoming part of the global production networks of the major TNCs and plays an important role in reshaping the industry's global division of labour. In addition, the Chinese motor industry has developed its own domestic firms and brands, experiencing an increasing international presence. China's government has set a plan to triple the exports of vehicles and auto parts, reaching a value of US$ 85 billion by 2015 (Haley, 2012).

2009 was a year of radical transformation of the global motor industry, marking the end of an era. The 2008-2009 financial crisis, the 'Great Recession', severely impacted the global motor industry (KPMG, 2008; UNCTAD, 2009; Sturgeon and Van Biesebroeck, 2009; Haugh, *et al*., 2010). This event caused and accelerated profound restructuring in the industry's concentration of capital as well as in the geography of production worldwide. Not only had the United States lost its primacy as the world's number one auto market to China but General Motors, one of the U.S. economy's icons and, - according to Peter Drucker (1972), the company that had become the model for modern large–scale corporations across the world -, was forced to file for bankruptcy only one year after having commemorated its 100th anniversary. Paradoxically, it was China's booming motor market and the ties with Chinese auto partners that became Detroit's lifeline, helping the U.S. automakers to weather stagnant domestic sales caused by the financial crisis.[7] In November 2010, SAIC Motor Corporation, GM's Chinese partner, bought a US$ 500 million stake in GM's initial public offering after the bankruptcy (Automotive New Europe, 2010). Since 2010 China has become GM's biggest market worldwide, which has helped the U.S. company to recover the crown as the world's top-selling automaker in 2011. Toyota had dethroned GM as the world's biggest carmaker in 2008, a position the latter held for nearly eighty years. For other U.S. firms, China's motor industry also represented an important way-out of the crisis. For Ford, for instance, China is playing an increasingly significant role in its global strategy. In addition, in March 2010, the Chinese firm Geely acquired Ford's Volvo division in a US$ 1,800 million-transaction, which helped the firm's capitalisation.

For some observers, China's growing participation in the global market means a new round of predatory global competition in the auto industry (Becker, 2006). In this view, China is seen as a 'tsunami', hitting motor vehicle markets around the world (Baker, 2007) resulting in high unemployment in Central/Eastern Europe and some Latin American countries, including Mexico (Lee and Anderson, 2006). Other analysts have arrived at more cautious conclusions. Donnelly (2008), for example, argues that it is obvious that China is well on its way to being an extremely potent force in the global motor industry, but at present domestic automakers are not yet adequately prepared to competitively penetrate the developed countries' markets. Before this happens, the author considers that the Chinese auto industry needs to deal with serious technical and organizational problems. Regarding the competitive pressures from the Chinese motor industry on developing countries, Noble (2006) concluded that, up to present, the impact has been modest and is unlikely to increase greatly in the short-to-medium term. Interestingly, this author points out that the study of the motor industry suggests a different and rather more bullish interpretation, particularly when it comes to China. In his analysis, two important issues are highlighted. First, the trends in the

[7] See the arguments of Fitz-Gerald (2009) in this regard.

car and auto parts sector present a startling contrast to developments in textiles and electronics assembly, where Chinese firms have grabbed market share from other developing countries and established a dominant position in the world economy. The central argument is that industrial characteristics account for most of the difference: the motor industry is far larger, and much of it is skilled-labour and capital intensive. Second, the increasing concentration of China on compact cars and commercial vehicles could significantly depress prices of those vehicles in the developing countries to which they are initially being exported, with consequences that are both positive (access to lower cost inputs for poor households and small local businesses) and negative (heightened competition for local firms, increasing congestion). The impact of even this mixed blessing, however, is likely to be small.

This trend of China's increasing participation in the world motor industry is pushing global competition even further. Given the position and role played in the global car industry, China's ascendant phase is perceived in Mexico as a direct threat not only in its domestic market, but in third markets, particularly in the United States, as well as in the attraction of FDI. Despite the significance of the motor industry in Mexico's economy and the growing concern about China's competitive threat, up to now specific or comprehensive studies on the above subjects have been non-existent or rather marginal. Most of the information has been of anecdotal and press character. A few exceptions are a recent study by Álvarez (2007) and Álvarez and García (2011), with an exploratory analysis of the China-Mexico competition in the U.S. market; and the studies reported by Gachuz (2009) and Dussel Peters (2012a), both analysing the prospects for China-Mexico cooperation in this industry.

Nowadays, the existing studies on the subject are rather aggregated in sectoral and geographical levels, with different time-frames and diverse analytical methods. These characteristics have made it difficult to arrive at definitive conclusions. On the one hand, some analysts argue that Mexico's motor industry, in particular the auto parts segment but also motor-vehicles, will become increasingly vulnerable to Chinese competition in the short and medium terms. These arguments are based on trends such as the increasing technological upgrading of Chinese automakers, China's great capacity for attracting FDI, its increasing internationalisation and competition for efficiency-seeking FDI, which are affording Chinese firms great potential to compete in global markets (Lall and Albaladejo, 2004; Dussel, 2005a, 2005b, 2012a and 2012b; Frischtak, 2004; Devlin, Estevadeordal and Rodríguez-Clare, 2006; Phillips, 2007). On the other hand, in contrast to the above, another group of analysts argue that auto parts have a strong competitive position, having a solid foundation for a long-run presence in the region. The arguments are based on the technological upgrading, best practice management skills, and constant innovation and competition on the basis of product quality, which makes them internationally competitive (Gerber and Carrillo, 2002); in addition, the preferences of final assemblers are to maintain regional supply networks in order to develop Just-in-Time relationships with their primary suppliers (Sargent and Matthews, 2004, 2008a, 2008b and 2009). At a more general level, other analysts consider that China represents a strategic opportunity for Mexico to diversify its sources of FDI and technological upgrading in the automotive industry (Gachuz, 2009; Dussel Peters, 2012a).

Based on the aforementioned analysis, several pertinent factors justify a research project on China's global emergence and its implications for Mexico's motor industry:

a) Nowadays there is no specific, detailed and comprehensive study on the motor industry's complex interactions and impacts between China and Mexico in a global perspective.

b) In both China and Mexico the motor sector represents a 'key-pillar' industry in their process of national economic development and internationalisation strategies.

c) In comparative sectoral terms, the motor industry is substantively different from others such as garments and electronics, in which Chinese firms have established a dominant position at international level. Unlike the latter, the former is a skilled-labour, capital intensive industry with high technology segments, presenting – therefore - technical, organisational and marketing specificities. In this sense, the motor industry is at the frontier of China's global competitive evolution.

d) Given the complexity, specificities and variability of processes and effects of China's global expansion and the 'Asian Drivers' phenomenon, specialists have underlined the need for focusing on country and sector/industry specific research (IDS Asian Drivers Team, 2006; Kaplinsky, 2006; Jenkins, 2009; Lederman, Olarreaga and Perry, 2009).

e) On a more general level, historically the motor industry has played a pivotal and revolutionary role in pioneering changes to the social organisation, technologies and geographies of production (Hudson, 1994). Likewise, there is little systematic empirical work on the effects of globalisation on the motor industry (Sturgeon and Florida, 2000).

1.6. Research Aims and Objectives

Based on the background analysis and the posing of the research problem, the general objectives of the research project are as follows:

General Objective

- To understand the interactions, and assess the impacts, of China's global expansion on Mexico's motor industry.

Particular Objectives

- To identify the different channels of interaction between China's and Mexico's motor industries, especially in trade and investment flows and patterns as well as other specific forms of connections linked to global production networks.

- To analyse the impact of China's emergence in the global market on Mexico's attraction of motor foreign direct investment.
- To perform an in-depth analysis of the structure and evolution of bilateral trade in the motor industry, and undertake an evaluation of the impacts of Chinese import penetration in Mexico's domestic market.
- To carry out a detailed analysis of the competitive position of China's motor industry *vis-à-vis* Mexico in the U.S. market, assessing the degree of the competitive threat and identifying the specific automotive products/segments affected.
- To identify and provide a comprehensive account of the presence and characteristics of Chinese motor industry-related operations in Mexico, in particular those linked to China's inward foreign direct investment, technical-manufacturing and technological associations, as well as global production networks.
- To provide some insights into the China-Mexico interaction in the international motor industry within the broader globalisation process and the changing division of labour.

Research Questions

The following general enquires are proposed to be answered:

- Does China represent a direct competitive threat to Mexico in the global motor industry, a capital-intensive sector with high technology segments?
- Is it possible to simultaneously find competition and complementary forces in the China-Mexico motor industry's interaction?

<u>International Market Integration and Global Investment Attraction</u>

- To what extent is China competing with Mexico as a destination of global motor investment?

- Is China substituting or diverting FDI flows from Mexico in the automotive sector?
- If so, what production segments of the industry are most likely to be affected?

<u>China-Mexico Bilateral Trade and Domestic Market Competition</u>

- What is the structure and evolution of the China-Mexico bilateral trade in the motor industry?
- Does the bilateral trade present some type of specialisation or complementary pattern between China and Mexico?
- Does the motor industry's bilateral trade between China and Mexico follow the same pattern as other manufactured sectors?
- What is the degree of competition and penetration in Mexico's domestic market of Chinese automotive products?

<u>China-Mexico Competition in the U.S. Motor Market</u>

- Is China a direct competitive threat to Mexico in the U.S. motor industry's market?
- What is the degree of China's competitive threat in the U.S. market?
- In what particular products/segments of the motor value-chain does China most strongly threaten Mexico?
- Do China and Mexico play a complementary role with particular specialisations in the U.S. market?

<u>Chinese Inward Foreign Investment and Global Production Networks</u>

- How significant is China's inward foreign investment in Mexico's motor industry at present?
- What are the main modes, drivers and motives of Chinese corporate strategies in Mexico's automotive industry?

- Are the Chinese automotive companies operating in Mexico displacing domestic automotive firms?

<u>China and Mexico in the Motor Industry's Global Division of Labour</u>

- Do China and Mexico currently play a specialised role in the global division of labour?

1.7. Outline of the Thesis

The thesis is developed in nine chapters. The introductory section, *Chapter One*, contextualises the research problem and presents the research justifications and central objectives. *Chapters Two* and *Three*, respectively, set out the theoretical framework and the research methodology. *Chapter Four* depicts the evolution and recent trends in both China's and Mexico's motor industries and their positioning in the sector's global division of labour.

From *Chapter Five* to *Chapter Eight*, the core section of the research is set out, presenting the empirical findings according to the different type of channel interactions between China and Mexico in the motor industry. *Chapter Five* presents the China-Mexico interaction in the context of international market integration and global investment attraction. *Chapter Six* tackles the China-Mexico bilateral trade relationship and domestic market competition. In *Chapter Seven*, the third-markets interaction is addressed, focusing on China's competitive threat to Mexico in the U.S. motor market. *Chapter Eight* documents and analyses the modalities and trends of automotive-related operations of Chinese firms in Mexico, with special reference to FDI and the formation of global production networks. Finally, in *Chapter Nine* the major findings and concluding remarks of the research as a whole are presented. Some key implications for policy as well as for further research are also depicted in this section.

2. CHAPTER TWO

THEORETICAL/CONCEPTUAL FRAMEWORK

> "China's rapid integration into the global economy...will initiate transition to a new economic structure with changes in the division of labour between regions, reorganisation of multinational firms, and new alliances among companies (and countries) over the next decade.
> All companies, workers, and governments have to find their new role if they are to survive and prosper as the global map is redrawn" (Zeng and Williamson, 2007: ix).

This chapter expounds the theoretical and conceptual framework and key categories on which the study is based. An overview of recent and earlier theoretical discussion regarding the globalisation process and its implications for the nature of competition (among firms and countries), trade tendencies and the changing global division of labour is depicted. Due to their significance in this globalising context, in particular for emerging countries as new players in the world economy, the topics of global production networks and global value chains are also described and discussed.

Given the research topic and its dimensions, the study cannot be approached from a single theoretical framework. In this sense, regarding the most appropriate theoretical framework for understanding the "Asian Drivers" phenomenon, of which China plays a central role, specialists underline that "….it is evident that this will necessarily be interdisciplinary, multidisciplinary and contextual, for the problems are too complex to be reduced to a single discipline, and the world is too heterogeneous for a single theoretical framework" (IDS Asian Drivers Team, 2006: 8). In this research, emphasis will be given to the economic development dimension of the process within a set of compatible theoretical categories.

As above sketched out, the research's key conceptual categories are globalisation, competition, cooperation, global division of labour, global production networks/global value chains. The fundamentals rationale for using these categories is as follows. First, The China-Mexico interaction has conventionally been considered as a 'competitive threat' relationship or under a merely 'competition' framework. This leads to the need for discussing two important approaches in the literature: a) Krugman's (1994 and 1996) claim that countries do not compete with each other the way corporations do, the 'competitiveness obsession of nations'; and b) the depiction about the increasing and simultaneously appearance of competition and cooperation forms among firms and nations under the 'new economy', process known as 'co-opetition' (Nalebuff and Brandenburger, 1996). Second, the global division of labour is the broad framework and dimension for a better understanding China's re-emergence in the world economy. Third, given the complex levels of technical, organisational, policy intervention and manufacturing linkages in the motor industry worldwide, the categories of global production networks and global value chains help to explain these processes in a more comprehensive way.

2.1. Globalisation, Competition and Trade

Due to its transcendental impacts and transformations caused in the economy and society, globalisation is, perhaps, the *zeitgeist* of the present age.[8] Nevertheless, there are not only different, but opposite views about the globalisation process. The skeptics argue that globalisation is a myth relying on the accumulation of isolated facts removed from context (Hirst and Thompson, 1999; Rugman, 2000). Despite this anti-globalisation position, an almost generalised idea is the following: it is the most transcendental force of change in restructuring the world today (McGrew, 1992; Mittelman, 1995; Castells, 1996; Giddens, 2000; Ietto-Gillies, 2002; Held and McGrew, 2003; Dicken, 2003).

[8] *Zeitgeist* is originally a German expression that means "the spirit of the age". It describes the intellectual and cultural climate of an era (Wikipedia: http://en.wikipedia.org/wiki/Zeistgeist).

Globalisation is a multidimensional process. Although the economic dimension of this process has attracted more attention, it also comprises deep social, political, technical, cultural, and institutional transformations. Spurred by technological innovations, globalisation is considered a qualitative different stage in the development of capitalism. Likewise, it is a complex, paradoxical and heterogeneous phenomenon. As some analysts emphasise, globalisation is highly uneven in its scope and highly differentiated in its consequences (McGrew, 1992); and there is neither a single predetermined trajectory nor a fixed endpoint (Dicken, 2003). McGrew (1992:3) sketches a comprehensive definition of globalisation:

> "Globalisation refers to the multiplicity of linkages and interconnections between the states and societies which make up the modern world system. It describes the process by which events, decisions, and activities in one part of the world can come to have significant consequences for individuals and communities in quite distant parts of the globe. Globalisation has two distinct dimensions: scope (or stretching) and intensity (or deepening). On the one hand, it defines a set of processes which embrace most of the globe or which operate worldwide; the concept therefore has a spatial connotation. Politics and other social activities are becoming stretched across the globe. On the other hand it also implies the intensification in the levels of interaction, interconnectedness or interdependence, between the states and societies which constitute the world community. Accordingly, alongside the stretching goes a deepening of global processes."

In the economic dimension, globalisation means increasing international integration of production and trade, creating new patterns of geographical specialisation and global production networks (Castells, 1996; Harris, 1986; Ietto-Gillies, 2002; Held and McGrew, 2003; Dicken, 2003; Kaplinsky, 2005). Taking the competition issue, states and firms find themselves now in a new and more complex scenario. Globalisation has induced the emergence of a new "competitive era" (Petrella, 1996). As a consequence, the increasing and deepening process of economic integration and interdependency is leading to the structural transformation of firms and nations and the rivalry between states and the rivalry between firms in the global arena has become far more intense (Stopford, *et al.,* 1991; Dunning, 2000).

Competition is the basis of growth under a capitalist market and as such, it is continually pressing firms to restructure and relocate production; during slump and stagnation these pressures upon particular sectors and firms become severe (Harris, 1983). Despite the extraordinary growth of large transnational corporations, which have led to the increasing centralisation of capital at global scale, competition has not been reduced but increased by the advances of all forms of organisation (Sayer and Walker, 1994). According to Dicken (2003: 200), two features of competition in today's world are: a) it is increasingly global in its extent; and b) it is extremely volatile.

But, interestingly – and paradoxically -, this new scenario for firms and nations also involves the opposite pole of competition: cooperation. This revolutionary mindset has been called *co-opetition* (Nalebuff and Brandenburger, 1996). To firms, this scenario has meant the creation of diverse forms of strategic alliances, join-ventures, and other association arrangements. For nations, it meant the establishment of economic unions, and free trade areas, among others.

2.1.1. Competition and Firms

Michael H. Best (1990) made the distinction between the "Old" and the "New Competition". According to Best, the "New Competition" is based upon different production and organisational concepts led by business enterprises. The New Competition is transcending the traditional Taylorist-Fordist legacy of mass production, hierarchical, and rigid structure. To Best (1990: 251) "The old competition is about Big Business, which means managerial hierarchy, scientific management, and either vertical integration or 'arm's length' market-oriented supplier relations."

Four dimensions distinguished the New Competition from the Old one (Ibid: 11): a) organization of the firm; b) types of coordination across phases in the production chain; c) organisation of the sector; and d) patterns of industrial policy. A key feature in the New Competition is the need for strategic action within each dimension.

In relation to the organisation of the firm, Best (1990) introduces the idea of the *Collective Entrepreneur*. He argues that the entrepreneurial firm, as distinct from the hierarchical firm of Chandler and Oliver Williamson, builds on the idea of Schumpeterian competition. In this regard, one of the key features of the entrepreneurial firm is its strategic orientation (Ibid: 11): a strategically oriented firm chooses the terrain on which to compete; a hierarchical firm takes the terrain as given. Thus, the entrepreneurial firm does not seek to maximise profits simply by minimising costs but seeks strategic advantage on the basis of Schumpeterian innovation in product, process or organisation. Another key feature is its flexibility in the organisation of production. This is a fundamental condition to be able to adjust a firm's competitive strategy depending upon the strengths and weakness of its competitors at any point in time. Also, the increasing volatility of the business environment has led firms to a search for more flexible forms of organisation (Buckley, 2000).

Regarding coordination in the production chain, Best (1990: 14-15) uses the concept of *Consultative Coordination.* Under this structure, the organisation links micro production units into large production chains. As a result, in the New Competition inter-firm coordination transcends the traditional market dichotomy, comprising consultative coordination or cooperation amongst mutually interdependent companies each of which specialises in distinct phases of the same production chain. On a larger scale, global value chains and global production networks are developed.

In terms of sectoral coordination, the New Competition includes "a variety of inter-firm practices and extra-firm agencies such as trade associations, apprenticeship programmes, labour education facilities, joint marketing arrangements, and regulatory commissions, each of which facilitates inter-firm cooperation" (Ibid: 17). This leads to simultaneous forms of *Competition and Cooperation*, providing common services and shaping complementary investment strategies. According to Best, what distinguishes the New Competition from the Old Competition is not an awareness of the paradox of competition – the market imperfectness – but the institutional capacity to turn the paradox to advantage.

Finally, in relation to the patterns of industrial policy, Best (1990: 19) argues that combining competition and cooperation amongst firms has wide implications for public policy: "It suggests that the task of industrial (including antitrust) policy is not to establish an ideal as defined by the neoclassical theory of perfect competition but to administer the paradox: cooperation alone can ensure that commitments are made to the long-term infrastructural development of a sector; competition alone can ensure that business enterprises remain innovative and responsive to new challenges and opportunities".

An interesting issue raised by the New Competition approach is about the relevance of the firm's size. According to this view, it is misleading to define the New Competition in terms of the size of the firm being necessary to understand the distinctions between intra- and inter-firm relations. In this sense, the common element to both large and small firms is *networking*.

On the one hand, the global corporation, as an organisational form, is a response to the New Competition (Best, 1990). But – the author argues – the new set of organisation imperatives limit what a division or wholly owned subsidiary can competitively produce abroad. The resolution of these contradictory features (the limits to expansion by direct production and ownership in other markets and the strategic need to be in an insider position in each of these markets) is altering the form of foreign investment. This has led to the development of global networking in the form of international consortia, cross-licensing agreements, and joint-ventures.

On the other hand, regarding small firms, Best (1990: 257) argues that the New Competition has opened new possibilities for them to be internationally competitive. This is particularly feasible when some conditions have competitive force, such as design or product-led strategies, closeness to the customer, consultative parent-supplier relations, and inter-firm networks which foster enterprise specialisation.

2.1.2. Competition and Nations

From the perspective of nations, it is also recognised that globalisation has changed the nature of competition (Boyer and Drache, 1996; Drache, 1996; Petrella, 1996; Scott, 1998; Stopford *et al.,* 1991; Vietor, 2007). Some of the resulting key trends are the following: a) states are now competing more for the means to create wealth within their territory than for power over more territory, reflected in an increasing concern from governments towards national competitiveness. Nations compete for the attraction of capital, technology and access to new markets; b) the emergence of new forms of global competition amongst firms also affects how states compete for wealth; c) in this competitive environment, governments provide distinctive advantages to firms; d) globalisation is eroding one of the basic foundations of the nation-state, the national market, which is being replaced by a global market; e) the new global order exposes more countries than ever to the global business, rendering its 'sovereignty' more fragile than ever; f) the emergence of a number of developing countries as global competitors; g) the increasing globalisation of production and trade has led to increasing integration of nations in both functional (*de facto*) and formal (*de jure*) forms; and h) the changing geopolitics of production, competition and regional interdependence is creating a new geography of economic and political relationships, squeezing the nation-state between two forces: supranational and local-regional. It is worth pointing out, however, that while these tendencies and forces do not mean the "end of the nation-state" – as posed by Kenichi Ohmae (1995), for example - they do have relevant impacts on its structure and its role in the economy.

Some analysts argue that globalisation is levelling the playing field for competition worldwide, allowing more people, firms and countries to participate and interconnect in the global economy (Friedman, 2005). According to this author, globalisation, levered by the technological revolution, is shrinking and flattening the world.

In terms of the sources of national competitiveness, it has also been argued that the globalisation process and the increasing mobility and transnationality of companies' operations have made inadequate the traditional trade theories of comparative advantages (Ietto-Gillies, 2002; Venables, 1998; Drache, 1996). The central arguments for this are: a) firms are less dependent than ever on the endowment factors in their home nation; b) trade liberalisation and technical progress are making activity increasingly mobile, enabling firms to split their production between locations and making it easier for them to supply distant consumers; and c) in a world dominated by transnational corporations, the aggregate advantages of domestically based firms does not necessarily coincide with the advantages of the nation-state.

Based upon the classical Ricardian theory of comparative advantage, and assuming that countries differ in their factor endowments, the Heckscher-Ohlin model (H-O) states that each country will export those goods whose production is relatively intense in the country's abundant factor and import those that are intensive in the factors it lacks. Other basic assumptions of the model are no scale economies, full access to technology, perfect competition, international factor immobility, no artificial barriers to trade, etc. (Berry, *et al.,* 1993; Lall, 1998). According to this model, trade among countries would result in an increased international specialisation of production.

To some analysts, the empirical evidence raises serious doubts that factor endowments model, as expressed by the H-O theorem, is a sufficient explanation for trade and consider it not only incomplete but also too static (Berry, *et al.,* 1993). Likewise, other tendencies, some of them associated to recent changes in the world economy, pose additional questions to this model (Venables, 1998: 2):

a) a striking feature of the spread of industry to the developing world is its geographical concentration; and b) the Heckscher-Ohlin theory is, unsurprisingly, not good at explaining the location of industry across areas where factor endowments are broadly similar (as much of Western Europe) or within which factors of production are highly mobile (the USA).

Regarding the particular case of the manufacturing exports' pattern by developing countries, Lall (1998: 55) points out some weaknesses of the H-O explanatory model: a) growing exports by developing countries of complex industrial products; b) the enormous concentration of export activity in the developing world, with a few countries dominating both simple and complex manufactured exports; and c) large, often increasing differences in the 'technology content' of exports. The model neglects critical factors such as learning, increasing returns, externalities, linkages and cumulative effects. Lall concludes that emerging trade and location patterns in the developing world are explained by market imperfections and government policies to overcome them.

During the last two decades, alternative models such as the so-called 'New Trade Theory' and 'New Economic Geography' (or Geographical Economics) have been developed to explain trade and location. These models introduce new categories such as scale economies, imperfect competition, transportation costs, and agglomeration externalities, amongst others (Krugman, 1993 and 1996; Venables, 1998; Fujita, Krugman and Venables, 1999). The New Trade Theory gave emphasis to develop formal mathematical models of trade in the presence of increasing returns and imperfect competition. Paradoxically, this theory also gives importance to historical factors.   It is argued that a pattern of specialisation can be established as a result of accident or some initial difference in countries' resources, and then get locked in by the cumulative advantages that go with large scale (Krugman, 1993).

When talking about forces affecting geographical concentration, Krugman (1998) emphasises the existence of 'centripetal' forces – those promoting geographical concentration – and 'centrifugal' forces –those leading geographical dispersion.

Linkages (market-size effects), thick labour markets and pure external economies are 'centripetal' forces, while immobile factors, land rents and pure external diseconomies are 'centrifugal' forces. In this model, cumulative causation and spatial agglomeration are key elements. Thus, one of the major implications is that the spread of industry will be geographically concentrated, tending to spread to just a few countries at once.

An interesting conclusion is drawn from this theory regarding a nation's cycle of development. The model predicts that industrialisation will take the form of sequential and rapid industrialisation by countries in turn, as industry spreads from its initial location to new ones. Economic growth does not take the form of smooth convergence of all countries in the world economy, but there are groups of countries with different development levels. When considering multiple industries that vary in their characteristics, Fujita, Krugman and Venables (1999) argue that countries typically develop through the production of certain goods, then move "upscale" as they cede those sectors to the nations that come after. This process of international economic development has been called the 'flying geese' pattern (Fujita, 2007). This conclusion is similar to the 'stages' approach to comparative advantage developed by Balassa (1983) in the early 1980s. According to this approach, the structure of exports changes with the accumulation of physical and human capital moving up the 'ladder of development'. With countries progressing on the comparative advantage scale, their exports can supplant the exports of countries that graduate to a higher level. Interestingly, Fujita (2007) has argued that the 'flying geese' process of economic development in East Asia that started in the early 1960s, since the mid-1990s East Asia's economies as a whole started being transferred from the previous monopolar system (dominated by Japan) to a multi-cored system.

But Krugman's theoretical propositions have not been immune to criticism. In particular, some analysts consider that the New Economic Geography "is neither new, nor is it geography" (Martin, 1999: 65). Others have criticised this approach from the modelling foundations used to explain reality (Sayer, 2004). From the perspective of the New Trade Theory, Ietto-Gillies (2002: 148-153) points out the existence of tensions and contradictions in the new paradigm. Two examples of these are: a) the main element of tension has to do with the contradiction between theories that predict clusters and agglomeration and the reality of multinational corporations that spread their activities wide; and b) some of the contradictions and problems are due to the fact that a theory, which is basically rooted into geography and space, is being fitted into a framework related to nations and different regulatory regimes.

Ietto-Gillies (2002: 154-157) concludes that the real world seems to exhibit a lower degree of agglomeration than the one predicted by the new trade theories. This conclusion is based on transnational corporations' advantages of operating across different regulatory regimes and the ability to exploit the differences across nation-states. This situation may affect the location structure of economic activity as well as its agglomeration pattern. Finally, another conclusion is that "the forces leading to multinationality cannot – or not fully – be assimilated into centripetal and centrifugal forces and core-periphery because they favour the *spread* across different regulatory regimes and thus different nations-states" (Ibid: 157).

Regarding Krugman's (1994 and 1996) polemic proposition about the senseless idea of the competitiveness of nations, Ietto-Gillies (Ibid) poses that, although she does not agree with the notion that international trade is a zero-sum game for nation-states, it is relevant to have a clear demarcation between competitive advantages of companies and comparative advantages of nations. This argument is based on the effects arising from the non coincidence between ownership and territoriality of the internationalisation via transnational corporations (TNCs), as compared to uninational corporations (UNCs). Thus – the author emphasises -, in a world of UNCs the geographical scope of competitive and comparative advantage coincide since companies' competitive advantages are forged in the same territorial context as the nations' comparative advantage. On the other hand, in a world of TNCs firms forge their competitive advantages on the basis of cross-country activities, rather than just having activities in a single country. This leads Ietto Gilles (2002: 180) to the conclusion that it has become increasingly more problematic to analyse international trade on the basis of: (a) location bound and static advantages; and (b) models that do not take account of the multi- and transnationality of operations of companies.

In a kind of intermediate position, other observers agree with Krugman's claim that countries do not compete with each other the way corporations do and also that, under certain circumstances, trade is a positive-sum game. Nevertheless, it is considered that his general conclusions are "false and misleading" (Siebert, 2006: 137). Siebert's main argument is Krugman's neglect of the phenomenon of international mobility of factors of production, in particular capital, technology and highly-skilled labour. According to Siebert (2006), the increasing international availability of these production factors influences the productivity of the immobile domestic factors of production. As a consequence – he argues -, in order to increase their factor endowment and rise their productivity of their immobile domestic factors, countries compete internationally for the mobile factors of production. This is in contrast to traditional trade theories where factor endowments are treated as given and where their differences are only exploited. Thus, for this author locational competition is an important concept to explain the international division of labour. In essence, "it refers to the competitiveness of a location in its capacity to attract within its borders mobile factors of production or to hold on to them" (Siebert, 2006: 138). An important conclusion of this analyst is that increased factor mobility reduces the government's capacity to manoeuvre. This poses relevant implications in terms of policy intervention's effectiveness.

In a similar line of discussion, Lall and Weiss (2005) argue that given current competitive global conditions (existence of scale economies, technological gaps, externalities and agglomeration effects, endogenous technical change, immobile factors domestically and mobile ones abroad, large firms with market power, etc.), the "*competitive threat"* of nations exists. Specifically, they underline that (Ibid: 4) "there remain benefits from specialisation and trade remains a non-zero sum game, but the *realisation* of the benefits depends on the ability to each economy to create (or attract) competitive capabilities and to move into activities that offer the best opportunities for growth, technological development and beneficial spillovers".

2.2. The Global Division of Labour

To some specialists, perhaps the most extraordinary and impressive feature of modern economies compared to old is their remarkable division of labour (Sayer, 1995). In this regard, Sayer (Ibid: 55) stated that “capitalism has an advanced division of labour in which specialization, fragmentation, interdependence and internationalisation have been taken to unprecedented extremes”. Thus, the highly complex kaleidoscopic structure emerged from the global division of labour (Dicken, 2003) has corroborated the inadequacy of traditional concepts or categories for analysing the contemporary world economic geography such as core-semiperiphery-periphery, North-South, Industrialised-Semiindustrialised, etc. (Mittelman, 1995; Castells, 1996; Hoeschele, 2002). For some analysts, the increasing participation and integration of newly industrialising countries into the global economy meant the ‘end of the Third World’ (Harris, 1986).

In the theoretical field, however, established approaches of economic development and international trade have not been of much help in explaining or anticipating recent global shift in the dispersal of manufacturing capacity from developed to developing countries, for example (Schaeffer and Mack, 1997). As a consequence, these theories are being questioned and revised, and new theories are being constructed and proposed. Several analysts agree that the theoretical perspective of the division of labour is a central concept in social and economic thought, it provides an axis for analysing the complexity of contemporary industrial economy, and it supplies a valuable tool for examining the geography of capitalism as well as the opportunities and challenges of the globalisation process (Sayer and Walker, 1994; Mittelman, 1994 and 1995; Garnsey, 1981). Nevertheless, the division of labour is one of the most neglected categories in contemporary political economy and social theory, being used rather as a secondary analytical element (Sayer and Walker, 1994).

But, as in other theoretical fields, the category *division of labour* presents problems of conceptualisation and ambiguity (Sayer, 1995), differences of interpretations and its implications (Jenkins, 1984) as well as epistemological discrepancies in the analysis (Garnsey, 1981). It is acknowledged that the concept of division of labour has its origins in the work of Adam Smith at the end of the eighteen century (Smith, 1976). By using the example of a pin-making factory, Smith stated that division of labour, which arises from a propensity of human nature to exchange, is the great cause of its increased powers. This process of task specialisation, rather than having each individual worker perform all the steps required for the manufacture of the product, meant enormous increases in efficiency, productivity and health. The increasing productivity has the following sources (Scott, 2006: 3): the simplification of tasks to be carried out, the reductions in work set-up times, and the improvements in the capacity of managers to supervise and control the pace of work. In addition, in a more long-run perspective, the division of labour also helps to promote mechanisation and automation of the production process (Ibid).

In its most basic conception, "division of labour refers to situations in which individuals undertake different specialised type of work and hence become dependent on one another" (Sayer, 1995: 44). Although there are a variety of divisions of labour (between firms, between mental and manual workers, based on gender or age, etc.), in terms of the purpose of this study it is important to identify three of them, following the works of Massey (1984), Sayer (1995), Coffey (1996), Morgan and Sayer (1998), and Scott (2006): technical, social, and spatial. The *technical division of labour* involves the fragmentation and specialisation of work tasks within the individual firm or unit of production; this division of labour is planned and controlled by the owner. The *social division of labour* involves the fragmentation and specialisation of work tasks between different firms; in a general sense, it refers to the specialisation of functions performed by individuals in society (factory worker, teacher, etc.). The *spatial division of labour* – in a broad sense – implies the specialisation of production by geographic areas, and manifests itself at various spatial scales. The spatial or territorial division of labour may combine the technical and social divisions of labour. In this regard, Morgan and Sayer (1998: 33) make two appreciations: a) the hierarchical spatial division corresponds roughly to the technical division, where regions are characterised by their different roles within corporate technical divisions; and b) sectoral spatial division of labour corresponds to a situation in which regions are distinguished primarily by their role in different parts of the social division of labour.

Precisely, when the conception of the spatial division of labour at international scale is applied, with its resulting national specialisation and trade patterns, the notion of *international division of labour* arises. This has been particularly associated with the work of David Ricardo. In the early nineteen century Ricardo extended and gave a spatial connotation to Smith's notion of division of labour through the development of his classical theory of international trade based on the countries' *comparative advantage.* However, as the process of the world economy evolved during the last two centuries, the theoretical foundations, the functional characteristics, the geographical scope, and the developmental implications of the classical theory of international trade, among other aspects, came under severe examination. To a great extent, this circumstance has been induced by the increasing process of worldwide international integration and the most recent phenomenon of globalisation. As Sayer (1995: 55) observes, capitalism itself has been responsible for accelerating, deepening and extending the division of labour far beyond anything previously experienced.

Up to the present, by reviewing the different classifications regarding international divisions of labour, a typology of four different international divisions of labour can be depicted by using an historical perspective. Major contributions came from Walton (1985), Henderson (1989), Coffey (1996), Mittelman (1995), Dicken (2003), and Scott (2006). The typology is discussed in the following paragraphs.

Pre-Classical International Division of Labour

The first type is called Pre-Classical International Division of Labour (PCIDL). This phase dates back to the early period of European colonisation. Colonial regions were incorporated as new material suppliers and consumes for the economies of industrialising European states. In particular, this division of labour was characterised by the extraction of raw material and primary products (mainly minerals and agricultural produce) from the "periphery" often by the forcible application of labour (i.e. slavery). Besides being the centre of mercantile and military control over the entire system, the “core” units themselves engaged in primary and petty-commodity production, and traded largely with other “core” units. According to Walton (1985: 3), in a primitive way, this international division of labour – also called “Pre-Traditonal” - was geographical and functional, down to the dismantling of rustic manufacture in the colonies and the imposition of expensive finished goods from Europe.

Classical International Division of Labour

The second type, the Classical International Division of Labour (CIDL), which characterised most of the nineteenth century and the first half of the twentieth century, observed the expansion of industrial production in the “core” and of asymmetric flows of manufactured and resource commodities between core and periphery; the latter continued specialising in primary products. In this second type, whose high point coincided with the phase of ‘classical’ imperialism, the extraction of surplus from the periphery was largely via the sphere of circulation (Henderson, 1989). From a political-economic perspective, the CIDL – also labelled “Traditional International Division of Labour - and the consequent pattern of exchange between core and periphery largely involved western European and later, North American colonialist states and their current or former colonies (Coffey, 1996). According to international trade theory, this CIDL and its related trade flows, was the result of the respective ‘comparative advantage’ of the nations involved (Ibid, 1996). Thus, the bulk of world trade in this phase was shaped in substantive terms by the geographical distribution of Ricardian endowments (Scott, 2006). This theory also emphasises the beneficial effects of this specialisation pattern for the trading nations.

By the 1930s, this second type of international division of labour involved a process of industrialisation within the periphery (the underdeveloped countries) under the impulse of a national capitalist class, foreign enterprise or the association of both (Walton, 1985). The logic of this was to capture and develop the local market for manufactured goods and, later, to implement the strategy of import substitution. In fact, the CIDL started to recede as colonialism crumbled and a group of Third World countries politically more independent appeared in the world arena after the Second World War (Scott, 2006). By then, a wave of severe critiques of the theoretical foundations of the CIDL began to be displayed by distinguished academics, specialists and policy-makers. Among these, Singer and Prebisch stand out, arguing that the terms of international trade between manufacturers and primary products were necessarily unequal as a consequence of the contrasting effects of technical progress in the North (the rich countries) and the South (the poor countries). The analysis and discussions assembled by these personages evolved into an elaborate and politically militant theory of dependency and unequal development (Ibid). According to Walton (1985), the CIDL was less geographical and more functional than the previous one, with the advanced countries still providing a large share of capital goods and competitively or through joint ventures seeking for the consumer market of the periphery.

The New International Division of Labour

The third type, The New International Division of Labour (NIDL), emerged with its characteristic features during the mid-1960s. This new phase in the international division of labour is characterised by an increasing process of internationalisation of productive capital. Foreign direct manufacturing investment not only increases in the core economies themselves, but it also flew in a significant scale from the core to the periphery. This trend of increasing industrialisation of "Third World" countries in which export platforms to developed countries were established, led to the emergence of the so-called "Newly Industrialising Countries" (NICs), including Hong Kong, Taiwan, Singapore, South Korea, and India in Asia, as well as Brazil and Mexico in Latin America. Because of these evolving trends, this group of "advanced" Third World countries was labelled the "semi-periphery" of the world economy. In addition, the wave of export-led industrialisation in the periphery was associated with a simultaneous closure of domestic manufacturing facilities in the core economies ('deindustrialisation'). In general terms, the NIDL advocates sought to explain the shift of manufacturing from developed to developing countries with fragmentation of production and the transfer of low-skill jobs, while the bulk of R&D activities was retained at the core areas of capitalism (Mittelman, 1995). A relevant role in this process was given to the transnational corporations through the expansion of branch plants operations and international subcontracting activities. The exploitation of cheap labour force in Third World countries – it was argued – was one of the driving forces behind the strategies of transnational corporations.

Among the major exponents of the theory of the NIDL are the German scholars Fröbel, Heinrichs, and Kreye (1981). In essence, by new international division of labour, considered a qualitative new development in the world economy, they meant the tendency which (Fröbel *et al.*, 1981: 45): a) undermines the traditional bisection of the world into a few industrialised countries on the one hand, and a great majority of developing countries integrated into the world economy solely as raw material producers on the other; and b) compels the increasing subdivision of manufacturing process into a number of partial operations at different industrial sites throughout the world. Other characteristics of the NIDL were: a) the export-oriented industrialisation process in developing countries was not only highly dependent on foreign companies but also extremely fragmented; b) the world market factories were industrial enclaves with no connection to the local economy except for their utilisation of extremely cheap labour and occasionally some local inputs; c) the pool of labour force of this factories was basically unskilled; and d) there was no technology transfer. From the perspective of the process of valorisation and accumulation of capital, three preconditions were considered decisive for this new development (Ibid: 34-35): a) the development of a world-wide reservoir of potential labour-power; b) the development and refinement of technology and job organisation made it possible to decompose complex production processes into elementary units such that even unskilled labour could be easily trained in quite a short period of time to carry out these rudimentary operations; and c) the development of a technology (in transport and communications) rendered industrial location and the management of production itself largely independent of geographical distance. Finally, to this line of thought, the perspectives and implications of the NIDL for development worldwide were rather pessimistic. They conclude that the implications were structural unemployment in developed countries, on the one hand, and continued and deepening underdevelopment in Third World countries, on the other. Increasing dependence and uneven development were foreseen.

In the same way as the NIDL theory attracted much attention among scholars and was considered a better explanation of the phases of capitalist development at that time, it was also the target of severe criticisms during the following years. Robin Cohen (1988: 227) underlines three limitations and omissions in the NIDL approach. First, conceptual problems, arguing that the variety of meanings attaching to the phrase 'division of labour' makes it difficult to understand what precise phenomena are under investigation. Second, historical gaps, maintaining that NIDL theorists have ignored or misconceived the historical evolution and successive phases of the international division of labour. And third, empirical omissions, observing that NIDL theory tends to concentrate attention exclusively on the growth of the manufacturing sector in the periphery at the expense of other growth points in the global economy, which are better reflected by measuring movements of labour, rather than movements of capital. Considering that historical patterns established by prior international divisions of labour are so much part of contemporary reality, Cohen asserts that the distinction between the "new" and "old" international division of labour is not a very useful one. Based on this clarification, he proposed to use the expression "the *Changing International Division of Labour*". [9]

The NIDL thesis attracted great attention from the different Marxist perspectives: the dependency school, world-systems analysis, and the internationalisation of capital. In this regard, Jenkins (1984) made an excellent contribution by discussing the divisions over the NIDL within the Marxist perspectives. According to Jenkins (Ibid: 28-29), interpretations of the NIDL can be divided into three broad groups: a) those which emphasise the sphere of exchange or circulation; b) those which focus the sphere of production; and c) those which are

[9] Based on the form of capital hegemonic in each phase of the changing international division of labour, Cohen (1988) identifies four sequential phases: the *mercantile, industrial, imperial and transnational.* He points out that while clear differences exist between each period in the form of labour deployed, there is also a sense of historical continuity rather than rupture.

based on an analysis of the circuits of capital in the internationalisation of capital. Each of these interpretations has different implications for the NIDL.

The interpretation emphasising the sphere of circulation is represented by two converging views: the one focusing on the changes in the world market for labour and for production sites as the determining factor in bringing about the NIDL (Neo-Smithian view); and the one arguing that the NIDL is a consequence of a fall in the rate of profit in the developed countries which leads capital to relocate to areas in which wages are lower and the working class weaker (Neo-Ricardian view). Among the main implications of this approach, is that this NIDL merely reinforces the Third World's dependent integration into the world economy. Simultaneously, it is argued that the NIDL has also negative consequences in the core areas such as unemployment and crises. The implications of the production-oriented approach are quite in contrast compared to the circulation-oriented approach: the spread of capitalism is reducing the dependence of the Third World on the developed countries; and that the NIDL represents not only a change in the form of subordinate integration of the Third World into the world economy, but rather a major change in substance. A central argument in Jenkins' (1984: 40) analysis is that neither an exchange-oriented approach nor an exclusive emphasis on the productive side provides an adequate basis for a Marxist examination of the NIDL. He suggests that Marx's analysis of the internationalisation of capital and its circuits represents a more theoretical foundation since it emphasises the unity of production, distribution and exchange. A key implication for the NIDL from an ontological and methodological point of views is posed by Jenkins (1984: 46): "….there is no single emerging pattern which characterises the integration of Third World countries into the international division of labour. It is possible to identify different patterns both between and within branches and between and within countries".

No less severe turned out to be the limitations of the NIDL approach observed by Henderson (1989), derived from a study of the semiconductor industry. By associating the NIDL theory with the dependency paradigm, Henderson underlined some key characteristics of it: un-dialectical, ahistoric, and fatalistic.[10] It is un-dialectical because it assumed that all the key decisions were taken by the owners of corporate capital in the 'centre', which looked inadequate; and it is ahistoric and fatalistic, because it assumed that the early phases of the NIDL would continue to be permanent and typical features of centre-periphery relationships. In particular, Henderson (1989: 20-23) notices the following limitations: a) the analysis suffers, like much neo-Marxist development theory, from the fact that it posits a capital-logic approach to uneven development. As a result, its work tends to replicate the theoretical error of devaluing the role of nation-states, classes, and other social forces in the development trajectories of particular countries; b) its implied notion of 'determination' since it appears to operate with a mechanistic and discredited concept of the 'superstructure-as-a-reflection-of-the-base' variety spun at the global level; c) its insufficient sensitivity to the empirical specificities of 'development' (a tendency to undervalue the impact and development of production facilities by particular industrial branches or firms in specific territorial units; and d) by failing to focus on the history of productive operations of particular firms and industrial branches in particular locations, it misses the fact that rather than being one international division of labour, a number of related spatial divisions of labour may be emerging within certain industrial branches. By the end of the 1980s, Henderson concluded that the historical details of the globalisation process posed serious explanatory problems for the NIDL thesis. As the world economy has continued to evolve – he added -, it was being rendered obsolete by history.

Despite the salient contributions of the NIDL theory for the understanding of earlier phases of the internationalisation of capital, by the end of the 1980s and the beginning of the 1990s, an increasing number of factors related to the changing character and deepening of the globalisation process, announced a transformation beyond the NIDL.

[10] As pointed out by Peter Worsley in the foreword of Jeffrey Henderson's book (1989).

Global Division of Labour

The fourth type, the Global Division of Labour (GDL), is the most recent manifestation of the analysed phenomenon and is still much in flux. Although there is no unique, consensual or refined definition of what constitutes the GDL, a number of new trends lead to the conviction that the essence of the NIDL is been superseded. For instance, according to Dicken (2003: 9) a new GDL implies "a highly complex, kaleidoscopic structure involving the fragmentation of many production processes and their geographical relocation on a global scale in ways that slice through national boundaries". This newer phase of the IDL's emphasis on the complexity and constantly changing functional and territorial patterns seems to be some of the key features of the GDL. These characteristics are also underlined by Castells (1996) by arguing the emergence of a global economy of "variable geometry" which tends to dissolve the historical economic geography. As he argued, the global economy is deeply asymmetric, but not in the simplistic form of a centre, semi-periphery and periphery, or North and South. To Castells, these trends are leading to new patterns of IDL. At the core of this transformation is the emergence of the so-called informational or knowledge-based economy and the network society. The global economy has the capacity to function as a single unit in real time at universal scale (Ibid).

In fact, the ascendancy of the "new economy" is considered one of the most relevant components driving forward new directions in the international division of labour (Scott, 2006). Scott observes that an essential characteristic of this emerging system is that it is made up of dense localised intra-cluster divisions of labour embedded in widely extended inter-cluster interrelationships at global scale. The outcome is an expanding mosaic of interrelated regional economies at various levels of scale and development (Ibid: 43). This conclusion is supported by other analysts of the changing IDL. Mittelman (1995: 274), for instance, argues that "the GDL involves the restructuring among world regions including their constituent units, notably states and export networks. This approach focuses on the interpenetration of global processes, regional dynamics and local conditions". In his formulations, Mittelman notes major aspects of an integrated and yet disintegrating world order, today marked by the persistence of the nation-state system and a challenge from different types of non-state actors.

Some analysts consider the fourth phase of the IDL rather as an extension of the third one (NIDL) and not as a clear break with it. This is the case of Coffey (1996), for whom this new phase uses the terms “New NIDL” or “NEWER-IDL”. Coffey (1996: 43) identifies four more recent processes that have begun to take on increasing significance, overlaying but not necessarily displacing – he argues -, the original dimensions of the NIDL: a) firms from developed countries have increasingly begun to exploit the comparative advantages of less developed countries without needing to resort to foreign direct investment (through subcontracting activities, for example); b) an increasing share of the activities relocated from the core to peripheral or semi-peripheral economies involves the provision of services rather than the manufacturing of goods; c) some of the less developed countries that were amongst the original destination for foreign direct investment by core nations have developed to the point that their own firms have begun to engage in outward foreign direct investment channelled towards countries that are even less advanced; and d) an increasing level of outward foreign direct investment by firms in advanced nations is destined for other core economies. An interesting conclusion of Coffey is in relation to the role and power of multinational companies. He points out that, in contrast to the past where multinational corporations largely regulated the IDL, in the “NEWER-IDL”, although it still playing a key role, the IDL is the outcome of complex interactions between the competitive strategies of multinational companies and the economic and trade policies of national governments.

Other increasingly distinctive characteristics of the GDL are the following: a) a growing number of regions in developing countries not only carry out capital-intensive and high-technology manufacturing operations, but they also perform R&D activities; and b) emphasis have changed from the overwhelmingly role of the transnational corporation during the NIDL phase, to the organisation in global networks of production and global value chains amongst large companies and small firms.

2.3 Global Production Networks and Global Value Chains

Global Production Networks and Global Value Chains can be considered complementary conceptual and analytical categories to those of Competition, Trade and International Division of Labour when analysing the roles of industries, firms and nations in a dynamic and changing global economy. Based on the analysis of recent trends in the international division of labour and industrial organisation, *networking* seems to be amongst the key characteristics. The rise of the 'network society' (Castells, 1996) and the emergence of the 'virtual corporation' (Davidow and Malone, 1993) are a few examples of this trend. In analytical terms, networks are considered the foundational unit of study for the understanding of the global economy and the resulting new geographical patterns, rather than individuals, companies or nation-states (Dicken, *et. al.,* 2001; Dicken, 2003). A concise concept of *network* is "the processes connecting 'actors 'or 'agents' (firms, states, individuals, social groups, etc.) into *relational structures* at different organisational and geographical scales" (Dicken, 2003: 14).

The intensification of the processes of globalisation and competition have played a relevant role in the conformation and increasing complexity of international production networks (Sturgeon, 2001; Henderson, 2002; Ernst and Kim, 2002). Two key categories relevant to this study arise from these tendencies: *Global Production Networks (GPN)* and *Global Value Chains (GVCs).* It is worth noting that there is a great diversity and overlapping definitions of the concepts of value chains and production networks (Gereffi, *et al.*, 2001; Henderson, *et al.,* 2002; Hess and Wai-Chung, 2006; Kaplinski and Morris, 2001), so only some of the most relevant to the study will be reviewed here. Although both concepts have a lot in common, Sturgeon (2001: 10) makes a very important distinction: "… a chain maps the vertical sequence of events leading to the delivery, consumption and maintenance of goods and services…while a network highlights the nature and extent of the inter-firm relationships that bind sets of firms into larger economic groups".

According to some analysts, the GPN framework derives from a variety of approaches linked to value chain analysis (Hess and Wai-Chung, 2006). Among some of the most influential historical precursors are the value chain framework in strategic management, the actor-network analysis, and the global commodity/value chain framework. The latter approach, in particular the global value chain developed since the mid-1990s, has a great deal of affinity and complementary with the GPN.

According to their supporters, the GVC approach presents several virtues contributing to a better understanding of the shape and trajectories of global economic integration. Some of these virtues and advantages are the following: a) from a general level, this approach shifts the focus from production alone to the whole range of activities from design to marketing, tackling the governance issue as well, which is, how chains are organised and managed (Gereffi, *et al.*, 2001); b) the possibility of transcending the limitations of relying only on macro-level statistics such as trade and investment (Sturgeon, 2001). Here it is important to analyse the role of personal and firm-to-firm relationships, smaller-scale studies of national economies, as well as industry-level analysis of economic activity of cross-border economic integration. In the same line of thoughts, Kaplinsky and Morris (2001) underscore that the value chain approach represents both a heuristic framework (descriptive construct for the generation of data) as well as an analytical tool (explanatory-oriented structure). In particular these authors pose the following advantages of the GVC approach: a) it overcomes a number of important weaknesses of traditional sectoral analysis which tends to be static and suffers from the weaknesses of its own bounded parameters; b)it is useful for new producers – including poor producers and poor countries – who are trying to enter global markets in a manner which would provide for sustainable income growth; c) it is useful as an analytical tool in understanding the policy environment which provides for the efficient allocation of resources within the domestic economy; and d) its primary use as an analytical tool for understanding the way in which firms and countries participate in the global economy.

In terms of GVC governance, which refers to the key actors in the chain that determine the inter-firm division of labour and shape the capacities of participants to upgrade their activities, two types of structures have been identified (Kaplinsky and Morris, 2001; Gereffi, 2001): producer-driven chains and buyer-driven chains. In the former, key producers in the chain, particularly large transnational firms which command vital technology, have substantial control over the backward and forward linkages, coordinating and taking responsibility for helping the efficiency efforts of their suppliers and customers. This is characteristic of capital and technology intensive industries, such as automobiles, aircraft, semiconductors, etc. In the latter, large buyers with core competencies in branding and marketing are the driving actors in setting up these value chains. They increasingly organise, coordinate and control the production, designing and marketing activities to target consumer markets in developed and developing countries, and in the transition economies (UNIDO, 2004). These chains are typical for labour-intensive industries and are highly relevant for developing countries. Examples of these chains are textiles, garments, footwear, etc. Recently, some developing countries, which traditionally tend to be only part of labour-intensive, buyer-driven chains, have started moving to producer-driven ones (Ibid). The leveraging channels to foreign partners in GVCs take a variety of forms, ranging from traditional foreign direct investment, to newer forms such as joint ventures, subcontracting, co-production, licensing agreements, and strategic partnerships, amongst others. Finally, due to the major transformations in the global economy linked to the technological revolution, and specifically to the Internet, Gereffi (2001) identifies the emergence of a third form of governance during the middle of the 1990s. Gereffi poses the idea that the Internet has the potential to transform both buyer-driven and producer-driven GVCs.

As mentioned earlier, GVC approach is complemented by the GPN one. GPN approach focuses on how a key company's production network is organised, how it is dispersed across firms and borders, and how technology is transferred among network participants (UNIDO, 2004). The GPN exponents argue that this approach – particularly those from the so-called 'Manchester School' (Hess and Wai-Chung, 2006) - intends to overcome the limitations of both the GVC and earlier GPN analysis (Henderson, *et al.,* 2002; Henderson, 2002). According to this line of thought, one of the major weaknesses of the 'chain' approach is its conceptualisation of production and distribution processes as being essentially vertical and linear. Conversely –they argue – such processes are highly complex network structures in which there are intricate horizontal, diagonal and vertical links. Thus, a more elaborated conceptual framework of GPNs is (Henderson, *et. al.,* 2002: 445-446):

> "Production networks – the nexus of interconnected functions and operations through which goods and services are produced, distributed and consumed – have become both organisationally more complex and also increasingly global in their geographic extent. Such networks not only integrate firms (and parts of firms) into structures which blur traditional organisational boundaries –through the development of diverse forms of equity and non-equity relationships – but also integrate national economies (or parts of such economies) in ways which have enormous implications for their well-being. At the same time, the precise nature and articulation of firm-centred production networks are deeply influenced by the concrete socio-political contexts within which they are embedded. The process is especially complex because while the latter are essentially territorially specific (primarily, though not exclusively, at the level of the nation state) the production networks themselves are not. They 'cut through' state boundaries in highly differentiated ways, influenced in part by regulatory and non-regulatory barriers and local socio-cultural conditions, to create structures which are 'discontinuously territorial'."

Based on this proposition – and although accepting that the GPN does not represent a totalising framework capable of comprehending the enormous complexities of economic globalisation -, it is nevertheless considered a more advanced analytical framework for understanding the changing international distribution of production and consumption than previous approaches (Henderson, *et al.,* 2002; Henderson, 2002; Dicken, 2003). A distinctive feature of this framework is its analytical disjuncture from former state-centred approaches which tends to overplay macroeconomic rationales and the role of the nation-state as the most important scene of economic and social development (Henderson, 2002; Robinson, 2004). Because of increasing fragmentation of production with globalisation, the analytical framework needs to understand the dynamics of uneven development in a multiple-scale view: transnationally, nationally and sub-nationally. The reason behind the term 'global' in the concept of GPN obeys precisely because the terms 'international' and 'transnational' derive from essentially state-centric theories. In the same way, the use of 'network' rather than 'chain' reflects to the fact that the metaphor of chain gives the impression of an essentially linear process of activities that ultimately result in a final commodity rather than one in which the flows of materials, semi-finished products, design, production, financial and marketing services are organised vertically, horizontally and diagonally in complex and dynamic configurations. Finally, it is argued that the preference of the term 'production' instead of 'commodity' derive from the recognition that the latter does not capture adequately the post-fordist forms of activity that characterise many of the industries today, on the one hand, and because it places the analytical emphasis on the social processes involved in producing goods and services and reproducing knowledge, capital and labour power, on the other (Henderson, *et al.,* 2002).

In methodological terms, the GPN approach directs attention to (Henderson, *et al.,* 2002: 447): a) the networks of firms involved in R&D, design, production and marketing of a given product, and how these are organised globally and regionally; b) the distribution of corporate power within those networks, and changes therein; c) the significance of labour and the processes of value creation and transfer; d) the institutions – particularly government agencies, but also in some cases trade unions, employer associations and NGOs – that influence firm strategy in the particular locations absorbed into the production chain; and e) the implications of all these for technological upgrading, value-adding and capturing, economic prosperity, etc. for the various firms and societies absorbed into the networks. The GPN framework comprises three conceptual categories on which its architecture is raised: Value (creation, enhancement and capture), Power (corporate, collective and institutional) and Embeddedness (territorial and network). Likewise, it includes four conceptual dimensions which give 'energy' to the above categories: Firms, Sectors, Networks and Institutions. In synthesis, the technique of mapping a GPN provides the possibility of visualising the economic and social agents as well as highlighting the structural and spatial dimension of networks, sectors, and the linkages between them. It also allows visualising the GPN's implications for development in different places within the GPNs' territorial reach, and the main agents responsible for these implications (Henderson, *et al.,* 2002: 457).

From the perspective of the challenges facing the GPN approach, some analysts argue there are several: ontological, epistemological, and methodological (Hess and Wai-Chung, 2006). Regarding the ontological challenges, these are mainly related to the integration of both the material and socio-cultural dimensions. The epistemological challenges are linked to the fact that the GPN framework in economic geography owes its theoretical foundations much more to economic sociology and network analysis than to orthodox economics, as well as the broadening of the GPN framework to incorporate varieties of capitalism into its analytical orbit. For its part, the methodological challenge derives from the underdeveloped of its methodological foundations. There is a lack of a systematic set of methodological tools to operationalise the framework.

Finally, in terms of developing countries' participation into the GPNs and GVCs in a positive way, the perspectives seem to be of rather relative optimism, compared to fatalistic views such as the NIDL, for example. For instance, some recent studies concluded that being part of GVCs and GPNs can result in welfare gains for producers and consumers; likewise, production globalisation through the spreading of GVCs and GPNs stimulates industrial specialisation according to dynamic comparative advantages (UNIDO, 2004). For their part, Ernst and Kim (2002: 1428) conclude "that there is cause for cautious optimism: network participation may provide new opportunities for effective knowledge diffusion to local firms and industrial districts in developing countries, provided appropriate policies and support institutions are in place that enable local suppliers to exploit the opportunities and pressures that result from network participation." Kaplinsky and Morris (2001) arrive at similar conclusions. Recognising that the manufacturing of components linked and coordinated on a global scale has opened significant opportunities for developing countries and regions, they underline the simultaneously heterogeneous and complex distributional pattern emerging from the globalisation process, having both winners and losers. The authors emphasise the need to manage the mode of insertion into the global economy.

2.4. Conclusions

In this chapter, the literature review relevant to the research topic is carried out. It presents a broad theoretical framework that includes the major conceptual bases and categories linked to the process of globalisation, competition, division of labour, and networks in which countries and firms are embedded. While some are more elaborated theoretical bodies, others might be defined better as a framework than a theory; the latter is the case of globalisation. From another perspective, some theories are categorised as macro-level approach since they tackle the world or global system as a whole (i.e. international division of labour) while others are more meso-level in scope (i.e. a firm's production network).

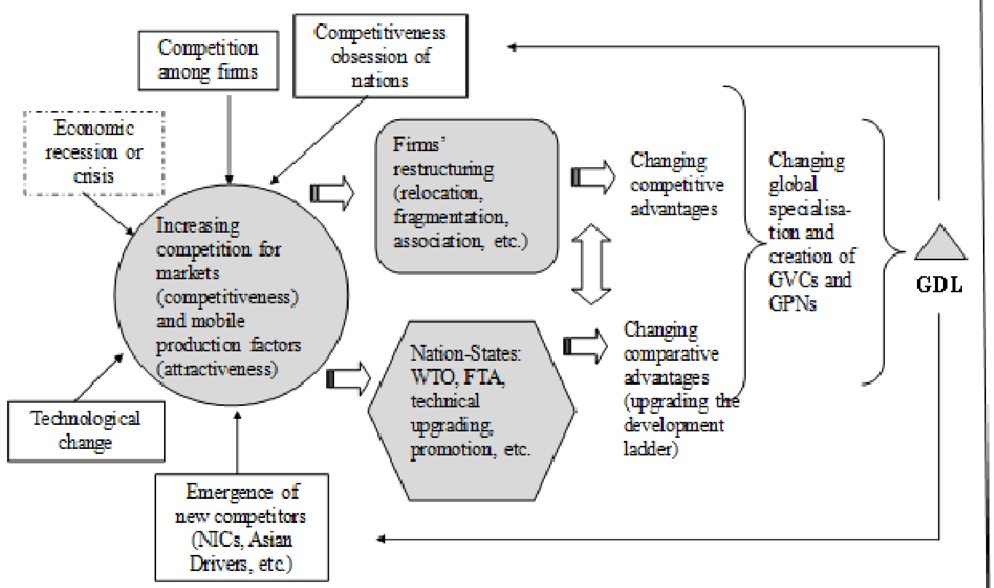
It is worth underlining that for a more complete understanding of the evolution and interactions between China and Mexico in the motor industry, a comprehension of the roles these countries play in the broader sector's global division of labour and their specific insertion into global production networks and chains is required. In particular, China's global (re)emergence in the global economy has to be seen as part of a deepening global division of labour's process, a new wave of integration of 'transition' economies during the last three decades, which is generating a changing geography of production at a global scale. In this broad and complex process, *globalisation*, and the derived forces driving the world economy, has to be considered a *conditionin*g and not a *determining* factor.

The literature review shows that there is no agreement on the globalisation concept, origin, causes, effects, and reach. For the purpose of this study, an ongoing debate is held on the role, future and bargaining power of the nation-state, the influence, impact and reach of TNCs, as well as the prospects for developing and emerging countries successfully engaging in high-value added production networks and value chains. In this research, emphasis will be given to the economic development dimension of globalisation, conceived as a complex and paradoxical process. Of particular interest are those aspects related to trade, FDI, and economic integration, including *de jure* integration, the elimination of trade and investment barriers through formal agreements between or among nations, as well as *de facto* integration, derived from functional linkages, intra or inter-firm, through the operation of global production networks and global value chains.

Despite that this study considers China and Mexico as units of analysis and their interactions in the motor industry, a sectoral approach, a fundamental precept is to go beyond the bilateral-type relationship and national economies on the one hand, and to overcome the limitations of traditional static sectoral analysis, on the other. The central idea is to adopt a broader analytical framework intending to understand the modes in which countries and firms participate and interact in the global economy and the changing division of labour. Under this view, relational networks as the foundational unit of analysis and the dynamic linkages between productive activities and firms provide a more comprehensive understanding of the global economy (Dicken, et al., 2001; Kaplinsky and Morris, 2001).

In Figure 2.1, a synthesised sketch of the theoretical framework is presented. It illustrates the dynamic and complex interconnections between major processes and structures (globalisation, competition and global division of labour) and key development actors (firms and nation-states). Along with this sort of horizontal interconnections, there also are vertical and diagonal interrelationships and networks. The basic foundation of this framework is that the increasingly complex global division of labour, manifested in a variety of global production networks and global value chains, is the outcome of a growing process of globalisation and the exacerbation of competition which is now global in scope. Under this scenario, firms are aggressively competing in the world market by enhancing their competitive advantages; on the one hand, nation-states are developing strategies by changing and enhancing dynamic comparative advantages to "compete" globally through the attraction of mobile production factors (capital, etc.). In both cases, firms and nation-states are developing networking structures: global production networks and global value chains the former, and free trade areas, the latter, for example. As nations become more specialised for global production, the global economy becomes more integrated. With changing competitive advantages of firms and comparative advantage of nations, there is a changing role of countries and regions in the global division of labour. In a dialectic way, the changing global division of labour and its increasing complexity produce strong impacts on macro processes and structures as well as in the meso and micro-entities.

Figure 2.1. Theoretical Framework: Major Interconnections Among Globalisation, Competition and Global Division of Labour



Source: Own elaboration.

In summary, for the purpose of this research, and based on the above discussion, it could be said that while countries do not compete with each other in a strict sense the way corporations do in the global market ('market competition'), countries do compete each other globally to attract mobile factors of production ('locational competition') through investments in infrastructure, education and labour training, incentives, and setting a favourable business climate, among other factors. In this sense, it is possible to talk about the 'competitiveness' of firms and the 'attractiveness' of nations. In this context, countries (China and Mexico) are considered as *territorial production and export bases*. In addition – following Kaplinsky (2005) -, the world is experiencing a rapidly changing global specialisation which in turn is forcing rapid adjustments inducing anxiety and having significant distributional impacts. These trends have relevant implications for global competition and the resulting international division of labour.

As an evolving process, the implications of the GDL are not yet fully understood. For the purpose of this study, nevertheless, the following considerations are being taken into account: a) IDL is a dynamic, constantly changing historical process; b) IDL has no 'deterministic' or 'fatalistic' outcomes or patterns; and c) IDL is not the outcome of unilateral strategies of the big transnational corporations or the world's powerful nations. It has emerged historically and largely unintentionally out of a myriad of decisions made by governments and firms (Sayer and Morgan, 1987). As emphasised by Morgan and Sayer (1988: 264) regarding the NIDL thesis, there is an "underestimation of the extent to which the international division of labour is structured not only by corporate spatial divisions of labour of multinationals but by competition between, and different patterns of specialisation among, a large number of separate firms, many of which have significant degrees of spatial monopoly in certain countries".

3. CHAPTER THREE

THE RESEARCH METHODOLOGY

> "China is now a part of us all" (Alvin & Heidi Toffler, 2006: 331).

> "Noted economist Joseph Stiglitz once said that all economic theories could be drawn from a car. And China is proving the truth of his statement as the huge auto industry helps drive strong economic growth." (People's Daily, 2003).

Although scientific research follows a formal sequential path during the phases of planning, design and implementation, the whole process is not uni-directional and mechanistic. Thus, in contemporary research the practice of a back-and-forth movement among the different phases of the research process is recognised (Blaikie, 2011; Bryman, 2012; Grix, 2010). Likewise, despite having a solid planning phase, sometimes unforeseen events force to make changes and adjust the research plan and design as the investigation proceeds. In this research project, during 2008 two unforeseen events along the fieldwork phase obliged to make temporal and functional adjustments. One was a process or deep reorganisation of BANCOMEXT (Mexico's External Trade Bank) within Mexico's federal administrative structure. BANCOMEXT, which after that process came to be transformed into PROMEXICO (Trade and Investment Promotion Agency), was the Mexican agency supporting the formal arrangements of interviews with key actors of the motor sector in China and the United States. The second event was the global financial crisis, which by the middle of 2008 was being widely felt, and some auto companies were not totally open to discuss their views and future perspectives. Fortunately, the core of the changes during this process was rather of time-framing and logistics, and they did not essentially modify the research problem and aims.

The academic reasons for undertaking research on this topic are related to the aspiration of contributing to knowledge in this particular field as well as to public decision-making process. Given the Chinese background of this thesis' author, personal motives are also involved. This chapter depicts the main elements of the methodological framework and project's research design. It provides information on how the empirical implementation of the research is carried out, including specific description of the methods, the data type and sources used, as well as data reduction and analysis.

3.1. Research Design

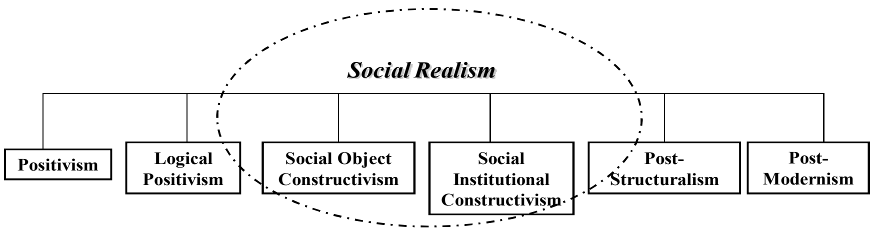
A constant feature in the evolution of the field of Social Sciences is the seemingly endlessly controversies over philosophical, theoretical and methodological issues (Blaikie, 2003; Sayer 1992 and 2006). These controversies are particularly rough around the theory of knowledge: *epistemology*. Accordingly, epistemology is defined as the philosophical study of the nature, sources, and limits of knowledge (Moser, Mulder and Trout, 1998: 4). Based on this premises, some analysts argue that if the aim of social science is to provide knowledge, then epistemology becomes unavoidable (Rosenberg, 1995). Given this rich and intense background - as Blaikie (2003) suggests -, social inquiry has lost its innocence and social researchers must now face up and deal with a range of divergent choices in methods and research strategies. Although ontology is the starting point of all research (Grix, 2010), epistemology plays a key role in the design of the research process, becoming the cornerstone in it. Epistemology not only classifies the different claims to knowledge but it also ranks them (Cameron, 2006).

Given the theoretical/conceptual framework and study nature, this research will work within the assumptions of the 'Depth Realist' ontology and the 'Neo-realism' epistemology. The main principles of the Depth realist ontology are (Blaikie, 2011: 93): a) Reality consists of three domains ranging from what can be observed (*empirical* domain), through what exists independently of the observer (*actua*l domain), to an underlying domain of structures and mechanisms that may not be readily observed (*real* domain); b) Reality is stratified and has ontological depth; and c) Unlike natural structures, social structures are less enduring and do not exist independently of the activities they influence or social actors' conceptions of what they are doing in these activities. The main principles of the Neo-realism ontology are (Ibid: 94): a) Knowledge of the causes of observed regularities is derived from the structures and/or mechanisms that produced them; b) The discovery of these structures and/or mechanisms may necessitate the postulation or selection of entities and process that go beyond surface appearances; and c) This view of causation allows for the possibility that competing or cancelling mechanisms may be operating when no event or change is observed.

In terms of contemporary research paradigms, the versions of 'Social Realism', also known as 'Critical Realism', are designed to replace both Positivism and Critical Rationalism (Blaikie, 2011). The research paradigm/approach of social realism is then coherent with the above ontological and epistemological assumptions. Two additional factors favoured the adoption of Social Realism as research paradigm. On the one hand, its affinity with political economy and dialectical historical materialism approaches. On the other, social realism has been already applied in several research projects in the areas of economic geography, regional and urban development, development economics and industrial restructuring, topics closely linked to the research interests (i.e. Morgan and Sayer, 1988; Pratt, 1994; Fleetwood, 1999).

According to the analysis of the epistemological stance of the research, it bridges from logical positivist economics to a kind of socially constructed institutionalist political economy. In this sense, based on the ontological and epistemological foundations of critical realism, it appears that this approach condenses elements of the various stances in an intelligent way. Figure 3.1 shows the position of Social Realism (Critical Realism) within the range of major epistemological stances. As Sayer (2006: 2) claims, in the philosophy of natural science, realism offered a third way between empiricism and positivism on the one hand, and the relativism on conceptions of science as a cumulative foundationalist enterprise on the other. The analysis of *causation* is highly relevant and is one of the most distinctive features of realism. According to Sayer (2006 and 1992), objects are, or are part of, structures. ‘Structure’ suggests a set of internally related elements whose causal powers, when combined, are emergent from those of their constituents. In that sense, causation is not understood on the model of regular successions of events, and hence explanation need not depend on finding them, or searching for putative social laws. Explanation, then, depends on identifying causal mechanisms and how they work, and discovering if they have been activated and under what conditions. Explaining why a certain mechanism exists involves discovering the nature of the structure or object which possesses that mechanism of power. In sum, when looking at causal factors, critical realism deals with the understanding of *necessity* rather than regularities between distinct objects and events.

Figure 3.1. Position of ‘Social Realism’ (Critical Realism) within the Range of Epistemological Stances



Source: Own elaboration.

Two other major components of the epistemology’s trilogy –as presented by Cameron (2006) -, are *teleology* and *agency.* In terms of teleology, the approach of critical realism presents some claims regarding causality and prediction (Sayer, 2006; Sayer, 1992; Danermark *et al.*, 2002): Firstly, critical realism rejects determinisms and generalisations that intend to produce fixed and uniformed outcomes. Secondly, the account of causal powers does not imply any determinism; it is necessary to make sense of causation by abandoning determinism that assumes that what happens in the world is wholly pre-determined. Thirdly, because events are not pre-determined before they happen but depend on contingent conditions, the future is open. Fourthly, in the ‘open systems’ of the social world, the same causal power can produce different outcomes, according to its spatio-temporal relations with other objects (the context). Fifth, because of the open systems, the social sciences cannot make predictions in the proper sense of the word; consequently, causal conditions must be analysed as tendencies.

Regarding the relationship structure-agency, there is a big debate even within the same line of critical realism. But in general terms, there is a stance in relation to this conflictive issue. Paul A. Lewis (2002) underlines the following aspects: a) critical realists seek to avoid the polar extremes of voluntarism and determinism. Social structure and agency are held to be recursively related, so neither agency nor structure can be reduced to the other; b) the structure-agency relationship must be understood as an intrinsically historical or 'tensed' process in which social structures and actors stand in temporal relations of priority and posterior towards one another; c) all social activity takes place within the context provided by a set of pre-existing social structures. The fact that social structure pre-exists and is therefore ontologically irreducible to the current exercise of human agency implies that it enjoys a certain degree of autonomy from the latter, exerting its own, emerging causal influence on it (this is the hallmark of causal efficacy; d) the ontological distinction between actors and social structure enables critical realists to argue that the two may possess very different properties; e) social and political events are generated by a complex causal nexus that involves both the efficient causation of actors and the material causation of social structure; f) a particular causal factor may on occasion dominate events. The existence of otherwise of a dominant causal influence at a particular point in time can be ascertained only ex posteriori through empirical research.

In terms of the whole research process, it seems to be a general agreement about the need for having a clear connection and coherence between the ontological and epistemological bases and the practical research work (Blaikie, 2003; Danermark *et al*., 2002; Grix, 2004; Sayer, 1992). Interestingly, it is recognised among analysts that critical realism is ontologically bold and epistemologically cautious (Danermark *et al.,* 2002: 204; Sayer, 2004: 1780; Lopez and Potter, 2001: 9). By this conception it is meant critical realism's ontology does not exclude any method *a priory*, but the choice of method should be guided by the central research aims. It is warned, however, that this practice must not follow simple pragmatist methods, but coherence between the ontological conditions and the identified necessary empirical procedures. In this sense, considering that method is a practical matter, compared to positivism and interpretivism, critical realism endorses or is compatible with a relatively wide range of research methods, depending on the nature of the object of study and the purpose and expectations of the enquiry (Sayer, 1992 and 2006). Thus, the methods must suit the object of investigation as well as the purpose of it. In the midst of this dilemma, some authors have proposed a new approach called *"critical methodological pluralism"* (Danermark *et al.,* 2002). This approach consists of a mix of methods but taking into account the ontological and epistemological dimensions. It also put forward the idea of overruling the methods dichotomies, as that of quantitative *vs* qualitative or extensive *vs* intensive.

Literature on research methodology underlines that addressing complex problems, such as those related to the 'Asian Drivers', requires heterodox mix of methods (IDS Asian Drivers Team, 2006; Schmitz, 2006). This approach fits in with the epistemological foundations of "critical methodological pluralism", as mentioned above. Based on these reflections, in terms the research strategies this project is applying a combination of the inductive with the retroductive approaches. The inductive strategy is mainly aimed at describing characteristics, nature and network of regularities of socioeconomic processes. For its part, the retroductive strategy is aimed at explaining the real underlying structure or mechanism(s) that is/are responsible for producing the observed regularity, and identifying the context in which this happens (Blaikie, 2011). Given the significant descriptive, but limited scope of the inductive strategy, it can be complemented with the explanatory and understanding role of the constructionist version of the retroductive strategy (Ibid). In terms of data collection and sources, this study will also use 'mix methods', combining and complementing quantitative and qualitative data sources.   Specialists in this topic have argued that the collection of qualitative field data, when used in combination with macro-level statistics, can lead to a more fine-grained understanding of global scale economic patterns and trade (Sturgeon, 2001).

Finally, the unit of analysis is the complex China-Mexico interaction in the global motor industry. Although is possible to separate the particular components of this complex relationship (China, Mexico, and the motor industry), what is important is the outcome of the interaction among the three elements. Linked to this complex unit of analysis is the level of it. Given that the China-Mexico interaction in the motor industry is framed in its global dimension, the scope of analysis is of macro-level character, combining a sectoral approach (motor industry) and a cross-national analysis (China and Mexico), including some comparative and assessment elements. In this regard, it is recognised that industry-level analysis of economic activity, especially one that uses a 'value-chain' approach, work well in studies of cross-border economic integration, because it takes a significant but still manageable slice of the global economy as its object of study (Sturgeon, 2001).

3.2. Research Sites: The Fieldwork

As pointed out above, the complex China-Mexico interaction in the global motor industry represented the research's core unit of analysis. Based on this, and considering time and budgeting restrictions, the research's fieldwork comprised three main sites: China, Mexico and the United States (Figure 3.2). Taking advantage of being at a British academic institution, additional research activity was carried out in the United Kingdom.

Although the purpose of the fieldwork is to gather different kind of information and data (primary, secondary and tertiary), the main aim in this case was to carry out semi-structured interviews with the motor industry's key actors. At the time of the fieldwork, practically all the major global automakers and auto components have production facilities in both China and Mexico, either as wholly-owned operations, as in the latter, or under JVs, as in the former. The reason for including the United States as research site is the significant presence and leading role that

U.S. motor companies (automakers and auto parts firms) play in both Mexico and China. Decisions taken in Detroit have enormous implications for the operation and evolution of the respective car industries in Mexico and China. In fact, the motor industry has been considered a classic illustration of a ‘producer-driven’ global value chain in which large manufactures, generally TNCs, play the central roles in coordinating production networks (Gereffi, 1999 and 2001; Kaplinsky and Morris, 2001; UNCTAD, 2010a).

Figure 3.2. Research Sites: Fieldwork

Source: Own elaboration.

Within the selected countries, fieldwork was focused as follows: Mexico: a) Mexico City and Hermosillo, Sonora; b) China: Shanghai; c) United States: Detroit Metropolitan Area, and d) United Kingdom: London. In Mexico, auto companies have their General Offices in the capital city, Mexico, D.F. and its surrounding area. In China, Shanghai is one of the country’s major motor ‘clusters’ with presence of some of the major foreign and domestic automakers. As is well known, Detroit represents the core of the U.S. motor industry, and where the U.S. ‘Big Three’ have their global Head Offices. Hermosillo, in the northern state of Sonora, functioned as the research headquarters. As Ford Motor Company and a network of global suppliers are located there, this place was also used for developing interviews and deepening in methodological issues.

The central activity in these places is to have interviews with key actors of the motor sector in these countries: companies' CEOs and executives; trade and sector associations; government officials; industry analysts; and academicians, among others. A description of this process will be performed in the following section.

3.3. Research Methods: Data Collection and Sources

A research design provides a framework for the collection and analysis of data (Bryman, 2012). The choice of method of selection of data from its source is an essential part of every research design. In recent years, social researchers have become more eclectic in their choice of methods (Blaikie, 2011). In order to answer different types of research questions, passing from description to understanding and assessment, the project design contemplated the use of mix methods in the research, quantitative and qualitative. In this sense, data used in the analysis were of three types: primary, secondary and tertiary. Secondary data basically consisted of 'hard' statistics; primary data was collected through the method of 'semi-structured interview' to 'key' actors; and tertiary data was based on social artefacts (documents, etc.). Secondary sources provided quantitative information; primary sources basically produced qualitative information; and tertiary, a combination of both. A succinct description of this type of data and their sources is depicted in next paragraphs.

Primary Data

Primary data was basically obtained through semi-structured and focused interviewing with 'key' actors of the motor industry in China, Mexico as well as at global level. These selected 'key' or relevant actors were those with privileged information and influence on the organisation's decision-making process. Besides corporative agents, among this group of relevant actors, governmental officials, academics and consultancy agents were also included. Specialists on the subject call this process 'elite interviewing' (Marshall, 1995). The semi-structured interview is a research method that allows more flexibility in tackling a topic with the interviewees (Bryman, 2012). By using this method the aim was to obtain more qualitative, in-depth and detailed information on relevant issues. It was very important to have information about past experiences, trends, as well as personal views on how the different actors explain and understand events and patterns in the motor industry in its implications for China and Mexico. The main topics included in the 'interview guide' were current sectoral conditions, competitive tendencies, location and investment decision's logic, cooperation potential, networks and associations, competitive forces, technological change and labour-skill factors, sectoral regulation and policies, among others. Depending on the interviewee specific position in the whole motor sector activity (firm executive, governmental policy-making, etc.), the emphasis on the subjects was differently treated.

In an initial phase, interviews in China (Shanghai) and the Unites States (Detroit) were formally contacted through PROMEXICO' Offices of Foreign Representation. In Mexico, official and personal contacts were used to set up the interviews. A total of 32 interviews were conducted in the selected sites: 19 in Mexico, 7 in China, 5 in the USA and 1 in the U.K. (Appendix 3.1). In terms of the interviewees' specific activity area, the distribution was as follows: auto firms' executives, 8; government officials, 8; industry association's managers, 5; academics and private sector analysts, 5; international development agencies and business promoters, 3; consultants, 2; and labour unions' representatives, 1. All the interviews were carried out in the interviewees' offices.

Secondary Data

The use of quantitative data in the construction of indexes and the examination of statistical tendencies was another important tool for complementing the empirical analysis. The quantitative information used through the different chapters can be classified into three set of data sources, according to their significance in the analysis: a) The United Nations Commodity Trade Statistics Database (UN COMTRADE); b) The Module for the Analysis of Growth in International Commerce (MAGIC) developed by ECLAC (The Economic Commission for Latin America and the Caribbean); and c) Other Sources. Most of these data sources and sets are of high quality in terms of their original source, geographical coverage, standardisation, and updating process. In general the time-frame used in the analysis was from 1990 to 2010, last date currently available.

The UN COMTRADE Database

This database is currently the largest depository of international trade data, containing more than 1.7 billion data records for 45 years of information provided for over 170 reporter countries. Data provides trade flows by commodities on yearly bases, specifying the reporter and partner countries. Commodities are reported under the Harmonised Commodity Description and Coding System (HS) and the Standard International Trade Classification (SITC). The data received by United Nations Statistics Division from the reporter countries are subsequently transformed into a standard format with consistent coding and valuation using the UN/OECD CoprA internal processing system.

This database was the a basic source of information for the analysis of trade flows and patterns at international level as well as in the China-Mexico bilateral trade relationship carried out in Chapter Six. It is worth mentioning that the UN COMTRADE Database contains data up to 6-digit code level of the HS. The 6-digit code was used in the analysis, which gives a significant level of disaggregation of the automotive products when comparing specialisation patterns, for example. This 6-digit code level was the base for the construction of a “Motor Cluster”, integrated by 108 products. The main characteristics of this ‘motor cluster’ will be described in the next section.

The MAGIC Programme Database

This database was originally developed by the ECLAC subregional headquarters in Mexico for post-trade analysis of the competitiveness of exports in the United States’ market. MAGIC employs import data based on customs values provided by the United States Department of Commerce (USDOC). The data are organised according to the HS are aggregated from the 2- to 10-digit levels. The programme contains annual data on U.S. imports and exports by product and country from 1990 to 2010. One of the advantages of the MAGIC programme is that automatically performs a series of calculations to analyse the competitiveness of products and countries within international trade.

This data base was a fundamental source for the analysis of trade trends, specialisation patterns, and China's competitive threat carried out in Chapter Seven. The 6-digit level of the HS for the 108 products the 'motor cluster' was used, in order to make it compatible with the CONTRADE data base.

Other Sources

Additional sources were used to cover information needed in the analysis of topics related to GDP and FDI at international comparative level. In these cases, IMF and UNCTAD, respectively, were the main data sources. In relation to specific country-level macroeconomic indicators for Mexico and China, INEGI (Mexico's National Institute of Statistics, Geography and Informatics) and the Ministry of Economy were the major sources for the former, and MOFCOM (China's Ministry of Foreign Commerce) for the latter.

Regarding specific motor industry's data, at international comparative level the basic sources were OICA (The International Organisation of Motor Vehicle Manufacturers), WARDSAUTO and Automotive News. For individual countries, AMIA, INA and ANPACT were consulted in Mexico's case, and the China Association of Automobile Manufacturers (CAAM) and China Automotive Technology & Research Centre (CATARC), the Society of Automotive Engineers of China, and FOURIN, in China's case. Both data at international and national levels of macroeconomic and motor industry indicators were mostly used in analysis performed in Chapters Four, Five and Eight.

Tertiary Data

As is well known, tertiary data comprise a wide and heterogeneous set of sources. Among these are reports and documents from governmental, private, social organisations or academic institutions, as well as magazines, newspapers and virtual outputs (Internet resources) (Blaikie, 2011; Bryman, 2012). In this research, tertiary data was used as content and background analysis, complementing both qualitative and quantitative information used in several chapters. Most of the sources are specialised or closely related to the motor industry and its diverse segments (motor vehicles, auto parts, etc.).

Given the limited nature of official data on automotive Chinese operations in Mexico, tertiary sources represented an alternative to cover these shortcomings. In particular, these sources were of great significance in Chapter Eight's analysis. Several reasons explain the limited scope of data on the Chinese motor industry's operations in Mexico: a) Chinese investment in automotive-related operations in Mexico is a rather recent phenomenon and there is no systematic statistics compilation on the subject; b) FDI data reported by the National Registration Office for Foreign Investment (RNIE) tends to be of preliminary character since the FDI movements reported by companies to this office present an important backlog in relation to the dates they were actually developed (Secretaría de Economía, 2011); c) Chinese automotive FDI's figures are underestimated since a large amount of these investments are carried out through other countries' foreign subsidiaries making it difficult to have an accurate registration (PROMÉXICO, 2010a); and d) in Mexico, updated statistics on production, sales, exports, investment, auto companies and assembly plants are mainly provided by the respective national association (AMIA, ANPACT, INA, etc.), considering only the information of their formal members; most of the Chinese companies or joint ventures operating in Mexico are not formally affiliated to these organisations yet. In the case of Chinese sources, some caution is also suggested in using official outward FDI figures (Davies, 2010; Sauvant *et al*, 2011).[11] Given the above shortcomings, an exhaustive daily-basis review of alternative automotive sources was carried out in order to identify the trends.

[11] In particular, Davies (2010: 2) underlines that both elements of overestimation and underestimation could be found. On the one hand, to the extent that outward FDI (OFDI) is used to inject funds into special purpose entities that then return money to China as inward FDI to take advantage of fiscal incentives, such as "round-tripping, the official total may be overestimated. On the other hand, official figures may also be underestimated. While most OFDI is from SOEs, a large and unknown proportion is from enterprises that are owned by non-state entities. While SOEs are constrained to go through the official approval process and so be recorded as making OFDI, non-state entities are more likely to evade approval. Where local OFDI approval is available, it may not always result in projects being included in national data.

3.4. Data Reduction and Analysis Methods

An essential part of the project's research design was the selection or creation of methods to be used to reduce and analyse data. These methods were used to transform both qualitative and quantitative data into specific coding of categories or variables, in order to organise and simplify their analysis. The most representative methods used in this thesis, such as indexes construction, cluster-framework analysis, typology classification, and interaction/impact matrix/taxonomy, will be described below.

The Motor Industry 'Cluster'

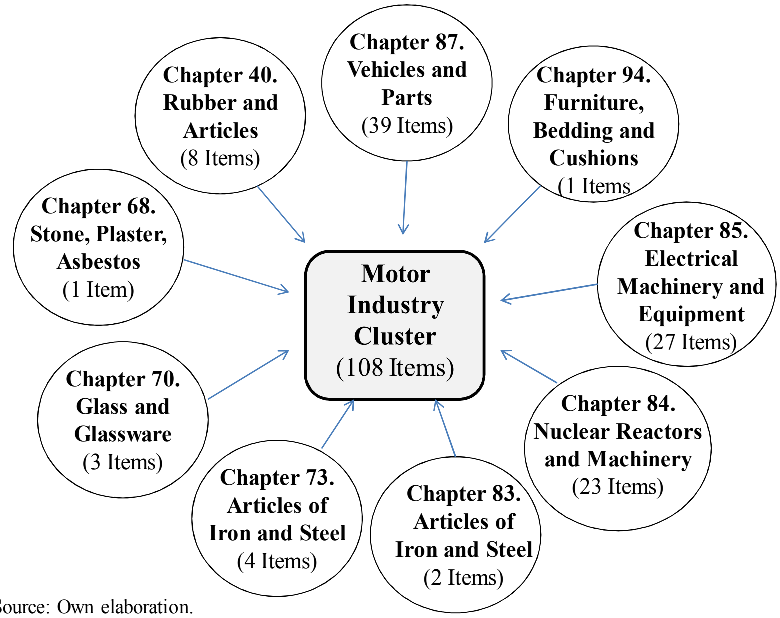
The motor industry represented a central element in the research's unit of analysis. In this sense, based on the research aims and questions, this analysis unit required a conceptual and methodological definition. The motor industry is a highly complex and diversified sector (Bhaskar, 1989; Maxton and Wormald, 2004; Kaplinsky, 2005; Klier and Rubesntein; 2008; ACEA, 2010), being estimated that around 15,000 auto parts are assembled to integrate a motor vehicle (Klier and Rubesntein, 2008). The basic functional division of the motor industry is between 'motor vehicles' and 'auto parts' or 'components'. Each of these aggregated product-level can also be subdivided in other categories: motor vehicles in automobiles and commercial vehicles; and auto parts in major and minor components, and so on. Thus, in aiming to avoid the high aggregated level and generalisation degree of most of the previous analyses, an extended motor industry 'cluster' was especially constructed for this study. This wide-ranging cluster structure will enhance the trade flows, specialisation patterns, and competitive threat analysis.

The motor industry cluster was integrated by 108 automotive items, at 6-digit code level, selected from the Harmonised Commodity Description and Coding System (HS). The HS is an international standardised system developed by the World Customs Organisation (WCO), which is arranged in 6-digit codes allowing all participants countries to classify traded goods on a common basis.[12] In this sense, the 6-digit code level of the HS is the nomenclature adopted by the two major databases used in this project, the UN COMTRADE and the MAGIC Programme, allowing to work with homogeneous and standardised 'products'. Other sources, such as the Trade Map (UNCTAD-WTO), the Harmonised Tariff Schedule of the United States (USITC), and the Office of Aerospace and Automotive Industries (OAAI), were also consulted to crossing or complementing information.

The designed motor industry cluster is an extended version in the sense that the 108 automotive items/products included were selected from different chapters of the HS, and not only from chapter 87, which traditionally includes motor vehicles, parts and accessories. Then, besides chapter 87, items from chapters 40, 68, 70, 73, 83, 84, 85, and 94 were incorporated (Appendix 3.2 and Figure 3.3). The objective in the construction of this 'cluster' was to closely approximate the core of the motor industry by excluding certain transport equipment-related items, such as bicycles, motorbikes, railway, aircraft and vessels. Given that this motor industry cluster is an *ad hoc* design for this study, its structure and classification is not an 'official' one, and its value aggregation, for example, could differ from these sources.

[12] Beyond the 6-digit level, countries are free to introduce national distinctions for tariffs and many other purposes.

Figure 3.3. Motor Industry Cluster



Source: Own elaboration.

Technological Complexity Classification in Motor-Vehicle Value Chain: A Typology

As underlined above, the motor industry is a highly complex and diversified sector. Its technological complexity has been increasing over time since new production systems and technical advances have been constantly incorporated into the vehicle. A motor vehicle development, from design to production logistics, takes up to 5 years. Engine design can take even longer. Their product cycle, or the time that motor vehicles are kept in production, comprises up to 7 years (ACEA, 2010). In particular, during the last few decades the complexity of motor vehicles has reached unprecedented levels due to the development of flexible electronics-based automation technologies, the introduction of complex information processing in the product mix-model assembly, as well as the use of new and lighter materials (Kaplinsky, 2005). Electronics is at the vehicle technological frontier. The car is moving increasingly from being a mainly mechanical engineering system to one based on electronics and electric power (Maxton and Wormald, 2004). According to these authors, practically all subsystems are already under the command of electronic control units (ECUs), consisting of sensors, logic circuits (hardware), control algorithms (software), actuators and man-machine interfaces. As a result, the value of electronically controlled systems in a vehicle has rapidly rising from 10% in 1990, 22% in 2000, to 40% by 2010 (Ibid: 139).

The increasing technological complexity of the motor vehicles has been considered as one of the underlying factors of the industry's globalisation (Kaplinsky, 2005). This is also related to the 'fragmentation' prospects of the motor industry on a global scale. The intensity of fragmentation, conceptualised as the relocation of processes or functions across countries,[13] differs by industry, depending on the following factors (Lall, Albaladejo and Zhang, 2004): a) The technological 'divisibility' of the production process; b) The factor intensity of the process; c) The technological complexity of each process; and c) The value-to-weight ratio of the product. According to these analysts, compared to other sectors, such as garments or electronics, in the motor industry fragmentation is more constrained. The core of the argument is that while this industry has individually separate and distinct processes, of which several are labour-intensive, most require considerable local technological capabilities, components and services to be undertaken efficiently and competitive. In addition, many components are heavy, making their processing suitable for relocation in proximate rather than in distant areas (Ibid). The above reflections on the increasing technological complexity and diversity of the motor industry is highly relevant for this research project, particularly in terms of the analysis of trade tendencies and the assessment of the scope and degree of the competitive threat in the sector.

This study intended to avoid aggregated analysis and over-generalisations by developing detailed and specific research at product, sectoral and country levels. Given the motor industry's technological complexity and diversity, the literature review on this subject revealed the inadequacy of current methodologies or

[13] The process of 'fragmentation' has also been labelled 'segmentation', 'production sharing', 'integrated production', 'outward processing', and 'vertical integration' (Lall, Albaladejo and Zhang, 2004).

analytical schemes when aiming at having a more comprehensive and detailed view and assessment of the industry, as posed in this research. As a whole, the motor industry is classified as medium-high or medium technology sector. Table 3.1 presents some of the most representative and traditionally used methodologies regarding the technological intensity classification of products or exports, with special reference to the motor industry.

All these methodologies and functional classifications sketched in Table 3.1 are very useful for some analytical purposes and have been applied in different studies. Perhaps the methodology most commonly used in the literature related to technological level or structure of manufactures is that developed by Sanjaya Lall (2000). Nevertheless, as this classification was based on a 3-digit SITC level, the data do not allowed capturing all aspects of technological upgrading, presenting some limitations, as Lall noticed in his document (ibid: 340): a) This level of aggregation puts together activities at different levels of technological complexity under the same category; b) It does not distinguish quality differences within given categories; c) It does not indicate the process involved in making a product in different locations; and d) Export values do not show technological upgrading over time within product categories.[14] Even at the 4-digit SITC level of disaggregation, several limitations arise, as in the case of measuring fragmentation (Lall, Albaladejo and Zhang, 2004: 411): a) It is difficult to distinguish meaningfully 'final products' from 'parts and components' by suing SITC categories; b) SITC data combine parts and components of different products; c) Many components are not included under the SITC labels for the final products and come under different headings. For example, auto products do not include components such as automotive electronics, batteries, tyres, plastics, paints, and so on, which appear under separate headings; d) Trade data do not show different stages of manufacture of a given product (under the same SITC heading) in different countries; and e) Imports of parts and components may be used for other purposes than fragmented production, such as domestic-oriented industries or by firms outside integrated systems.

[14] Although considering it useful, Gary Gereffi (2008) has also pointed out the limitations Lall's (2000) methodology, arguing that the data is not sufficiently detailed for having a clear idea of the technology intensity involved in the processes by which products are made.

Table 3.1. Selected Methodologies for Classifying the Technological Intensity of Products/Exports with Special Reference to the Motor Industry

Author/Source	Methodology/Functional Classification
UNCTAD (1996)	Classification of exports into five broad categories considering the mix of different skill, technology, capital and scale requirements at the final product stage: 1) Primary commodities; 2) Labour-intensive and resource-based industries, 3) Low-to-medium level; 4) Medium-to-high level (*(Motor Industry)*; and 5) High level.
OECD (1996)	Four major levels of industrial R&R intensity: 1) High technology; 2) Medium-high technology *(Motor Vehicles);* 3) Medium-low technology; and 4) Low technology.
Lall (2000)	Four major classifications for manufactured products: 1) Resource-based manufactures; 2) Low-technology manufactures; 3) Medium technology manufactures *(Automotive Products)*; and 4) High technology manufactures. A 3-digit SITC level was used.
McAlinden and Andrea (2002)	Division into eleven major motor-vehicle component systems: 1) Engine; 2) Drivetrain; 3) Body structure; 4) Interior & exterior (trim); 5) Steering and suspension; 6) Fuel delivery; 7) Engine electrical; 8) Exhaust & emission; 9) Brakes, wheels & tires; 10) Climate/HVAC; and 11) Chassis electrical.
Maxton and Wormald (2004)	Division into five major motor-vehicle component systems: 1) Body; 2) Chassis; 3) Driveline; 4) Electrical power; and 5) Command, control and communication. Although these major subsystems are disaggregated into more detailed sets of functional areas, specific functions, and individual components, the technological level of each of these items is not specified.
Nag, Banerjee and Chatterjee (2007)	Division of 82 items at 6-digit level of the HS into seven Groups: 1) Rubber and Glass component; 2) Iron and Steel component; 3) Engines and its parts; 4) Auto-component I; 5) Auto-component II; 6) Auto-component III; and 7) Vehicles.
Klier and Rubenstein (2008)	Division into six major motor-vehicle component systems: 1) Powertrain; 2) Chassis; 3) Electronics; 4) Exterior; 5) Interior; and 6) Generic.
VanNieuwkuyk (2009)	Division into twelve major motor-vehicle component systems: 1) Powertrain, Drivetrain; 2) Electrical/Lighting; 3) Exterior/Exterior trim; 4) Fluid Handling; 5) Interior & Seating; 6) Materials & Carpet; 7) Wheels, Tires & Suspension; 8) Exhaust/Emissions; 9) Frame, Body and Doors; 10) Climate/HVAC; 11) Glass; and 12) Multimedia, Navigation & Display.
Murphy (2011)	Division into sixteen major motor-vehicle component systems: 1) Engine; 2) Body & Structural; 3) Electronics & Electrical; 4) Interior; 5) Transmission; 6) Axles, Driveshafts & Components; 7) Climate Control & Engine Cooling; 8) Suspension; 9) Braking; 10) Steering; 11) Wheels & Tires; 12) Fuel system; 13) Passenger restraints; 14) Audio & Telematics; 15) Exhaust; and 16) Body glass.

Source: Own elaboration.

Regarding the specific functional classifications of the motor industry, most of them have based their aggregation criteria on major motor-vehicle systems. Although these classifications are useful in analysing trade patterns and competition, and could give some clues on different skill and technological levels content in each system and subsystems (Klier and Rubenstein, 2006 and 2008), they do not explicitly present a disaggregated technological level by specific items and subsystems. Thus, despite that the functional classification based on the motor-vehicle systems has the advantage of including a wide variety of parts and components, other than the chapter 87 of the HS, it suffers from some of the shortcomings found in the methodologies discussed above, such as putting together activities at different levels of technological complexity under the same category, or not distinguishing quality differences within given categories, etc.

This thesis proposed an alternative methodology for assessing in a more systematic, detailed and qualitative way, the 'competitive threat' of China on the different product segments of Mexico's motor industry as well as specialisation patterns. Specialisation in the motor industry has increasingly become segment specific, so a detailed data set for analysis in needed. This methodological tool was also intended at combining the quantitative with the qualitative approach to the competitive threat assessment. The methodological scheme was based on the technological complexity level of products/segments within the motor industry's value chain. The proposed methodology used as reference previous studies on the general approach to value chain analysis as well as specific applied value-chain studies to the case of the motor industry and major auto systems (Booz-Allen & Hamilton and INFOTEC, 1987; Kaplinsky and Morris, 2001; Veloso and Kumar, 2002; Humprey and Memedovick, 2003; Maxton and Wormald, 2004; Schmid and Grosche, 2008; Klier and Rubenstein, 2008; UNCTAD, 2010a). The methodology tried to overcome the limitations of previous studies by using more detailed product categories of the HS, as suggested by Lall (2000). Based on the concept of value-chain and the structure of major auto systems and subsystems, the product classification relied on the available disaggregated code-level data (6 digits). In the process of classifying each of the 108 motor items within the different categories and subcategories of technological complexity, the advice of automotive specialists (one in international sourcing and the other in foreign trade) consulted during the fieldwork phase, was taken into consideration. The classification process involved focuded interviewing and several meetings with the auto specialists during a six-month period, discussing and placing the 108 items into the different categories of high to low technological intensity. Although there is always some degree of subjectivity in the categorisation process, this typology is based on technical knowledge, representing a first exercise in the aim of improving the methodological tools for analysing specialisation trade patterns and competitive threat in the motor industry.

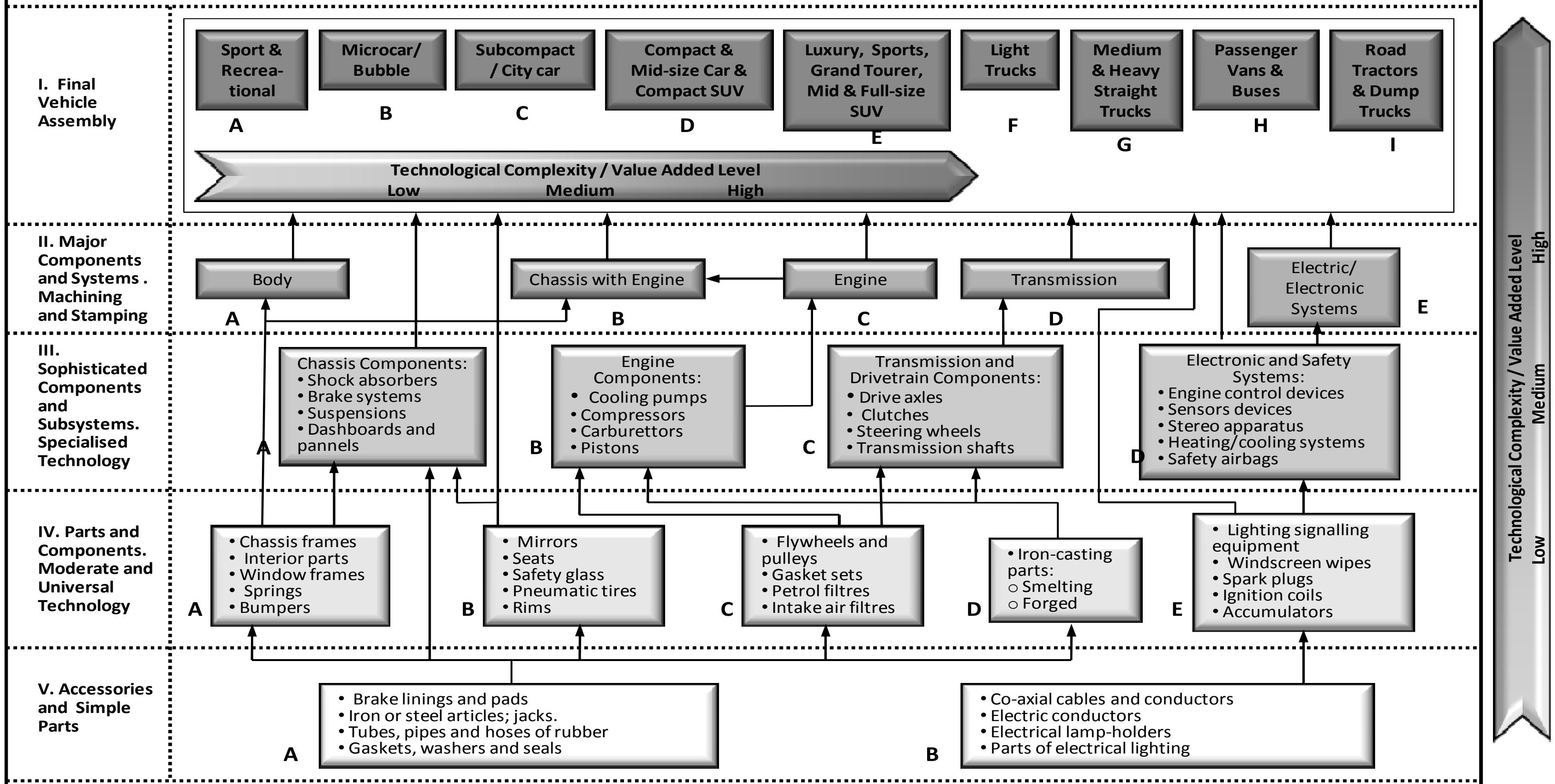
The methodology classifies the 108 products included in the motor industry "cluster", at 6-digit level of the Harmonised System (HS), into five Categories and 25 Subcategories of different technological complexity within the motor-vehicle value chain. For its part, each subcategory also contains specific automotive products.[15] Ranging from high to low complexity level, the major categories are:

I. Finished Vehicles;
II. Major Components and Systems. Machining and Stamping;
III. Sophisticated Components and Subsystems. Specialised Technology;
IV. Parts & Components. Moderate and Universal Technology; and,
V. Accessories and Simple Parts.

This methodology also considers the fact that, within the category of "Finished Vehicles", a differentiated technological complexity exists. This is the case, for instance, of the low end-smallest cars, such as sport & recreational, microcars/bubble, and subcompacts, compared to compact, mid-size cars, compact SUVs, luxury and full-size SUVs. Figure 3.4 displays the typology of technological complexity in the motor-vehicle value chain, and Table 3.2 lists the 108 motor industry's items according to the typology of categories of technology complexity.

[15] As far as possible, the typology's product classification try to be consistent with the following hierarchy (Klier and Rubenstein, 2008: 18): a) *Parts* are typically small, individual pieces of metal, rubber, or plastic stamped out, cut, or molded into distinctive shapes, such as knobs and levers; b) *Components* are several parts put together into recognisable features, such as radios and seat covers; c) *Modules* are several components combined to make functional portions of a motor vehicle, such as instrument panels and seats; and d) *Systems* are groups of components that are linked by function into major units of motor vehicles, such as interiors and engines.

Figure 3.4. Technological Complexity in Motor-Vehicle Value Chain : A Typology and Mapping



Source: Own elaboration

Table 3.2. Motor Industry “Cluster” by Technological Complexity Level in the Motor-Vehicle Value Chain	
Product Code	**Product Description**
I.	***Final Vehicle Assembly***
I.A. Sport & Recreational	
870310	Snowmobiles, golf cars and similar vehicles
I.B. Microcar/Bubble	
870321	Automobiles w reciprocating piston engine displacing not more than 1000 cc
I.C. Compact/City Car	
870322	Automobiles w reciprocating piston engine displacing >1000 cc to 1500 cc
870331	Automobiles with diesel engine displacing not more than 1500 cc
I.D. Compact, Mid-size Car & Compact SUV	
870323	Automobiles w reciprocating piston engine displacing >1500 cc to 3000 cc
870332	Automobiles with diesel engine displacing more than 1500 cc to 2500 cc
I.E. Luxury, Sports, Grand Tourer, Mid&Full-size SUV	
870324	Automobiles with reciprocating piston engine displacing >3000 cc
870333	Automobiles with diesel engine displacing more than 2500 cc
870390	Automobiles nes including gas turbine powered
I.F. Light Trucks	
870421	Diesel powered trucks with a GVW not exceeding five tonnes
870431	Gas powered trucks with a GVW not exceeding five tonnes
I.G. Medium & Heavy Straight Trucks	
870422	Diesel powered trucks w a GVW exc five tonnes but not exc twenty tonnes
870423	Diesel powered trucks with a GVW exceeding twenty tonnes
870432	Gas powered trucks with a GVW exceeding five tonnes
870490	Trucks nes
I.H. Passenger Vans & Buses	
870210	Diesel powered buses with a seating capacity of nine persons
870290	Buses with a seating capacity of more than nine persons nes
I.I. Road Tractors & Dump Trucks	
870120	Road tractors for semi-trailers
870410	Dump trucks designed for off-highway use

Table 3.2. Motor Industry "Cluster" by Technological Complexity Level in the Motor-Vehicle Value Chain (continued)	
Product Code	**Product Description**
I.	***Major Components. Machining and Stamping***
II. A. Body	
870710	Bodies for passenger carrying vehicles
870790	Bodies for tractors, buses, trucks and special purpose vehicles
II.B. Chassis with Engine	
870600	Chassis fitted w engines for the vehicles of headings Nos. 87.01 to 87.05
II.C. Engine	
840731	Engines, spark-ignition reciprocating, displacing not more than 50 cc
840732	Engines, spark-ignitions reciprocating, displacing 50 cc but not more 250 cc
840733	Engines, spark-ignition reciprocating displacing 250 cc to 1000 cc
840734	Engines, spark-ignition reciprocating displacing more than 1000 cc
840790	Engines, spark-ignition type nes
840820	Engines, diesel, for the vehicles of Chapter 87
840890	Engines, diesel nes
II.D. Transmission	
870840	Transmissions for motor vehicles
II.E. Electric/Electronic Systems	
II.	***Sophisticated Components, Systems and Subsystems. Specialised Technology***
III.A. Chassis Components	
870831	Mounted brake linings for motor vehicles
870839	Brake system parts nes for motor vehicles
870880	Shock absorbers for motor vehicles
III.B. Engine Components	
840991	Parts for spark-ignition type engines nes
840999	Parts for diesel and semi-diesel engines
841330	Fuel, lubricating or cooling medium pumps for int. comb. piston engines
841459	Fans nes
841490	Parts of vacuum pumps, compressors, fans, blowers, hoods
870891	Radiators for motor vehicles

Table 3.2. Motor Industry "Cluster" by Technological Complexity Level in the Motor-Vehicle Value Chain (continued)	
Product Code	**Product Description**
III.C. Transmission and Drive Train Components	
848310	Transmission shafts (including camshafts and crankshafts) and cranks
870850	Drive axles with differential for motor vehicles
870860	Non-driving axles and parts for motors vehicles
870893	Clutches and parts for motor vehicles
870894	Steering wheels, steering columns and steering boxes for motor vehicles
III.D. Electronic and Safety Systems	
841520	Automotive air conditioners
851180	Electrical ignition or starting equipment used for internal combustion engines; nesoi
852721	Radio reception apparatus for motor vehicles
852729	Radiobroadcast receivers for motor vehicles, not capable of operating without outside power, nesoi
870895	Safety airbags with inflated system
I.	***Parts and Components. Moderate and Universal Technology***
IV.A&B. Minor Body & Chassis Parts	
401110	Pneumatic tire, new of rubber for motor cars, including station wagons and racing cars
401120	Pneumatic tires, new of rubber for buses or lorries
401310	Inner tubes, of rubber for motor cars, etc., buses or lorries
700711	Safety glass toughened (tempered) f vehicles, aircraft, spacecraft/vessel
700721	Safety glass laminated for vehicles, aircraft, spacecraft or vessels
700910	Rear-view mirrors for vehicles
732010	Springs, leaf and leaves therefor, iron or steel
732020	Springs, helical, iron or steel
732090	Springs, iron or steel, nes
830120	Locks of a kind used for motor vehicles of base metal
870810	Bumpers and parts for motor vehicles
870821	Safety seat belts for motors vehicles
870829	Parts and accessories of bodies nes for motor vehicles
870870	Wheels including parts and accessories for motor vehicles
940120	Seats of a kind used for motor vehicles
IV.C&D. Minor Engine and Transmission Parts	
842123	Oil or petrol-filters for internal combustion engines
842131	Intake air filters for internal combustion engines
842199	Parts for filtering or purifying mchy & apparatus for liquids or gases, nes
848350	Flywheels and pulleys, including pulley blocks
848490	Gasket sets consisting of gaskets of different materials
870892	Mufflers and exhaust pipes for motor vehicles

Table 3.2. Motor Industry "Cluster" by Technological Complexity Level in the Motor-Vehicle Value Chain (continued)	
Product Code	**Product Description**
IV.E. Minor Electronic Parts	
850710	Lead-acid electric accumulators of kind used for starting piston engines
850720	Lead-acid electric accumulators nes
850730	Nickel-cadmium storage batteries
850740	Nickel-iron storage batteries
850780	Storage batteries, nesoi
850790	Parts of electric accumulators, including separators therefor
851110	Spark plugs
851120	Ignition magnetos, magnetos-generators and magnetic flywheels
851130	Distributors and ignition coils
851140	Starter motors
851150	Generators and alternators
851190	Parts for electrical ignition or starting equipment used for internal combustion engines; parts for generators
851220	Lighting or visual signalling equipment nes
851230	Sound signalling equipment
851240	Windscreen wipes, defrosters and demisters
851290	Parts of electrical lighting, signalling and defrosting equipment
853910	Sealed beam electric lamp units
853921	Tungsten halogen electric filament lamp
854430	Ignition wiring sets & other wiring sets used in vehicles, aircraft etc
IV.A&B. Accessories and Simple Parts	
400912	Tubes, pipes and hoses of vulcanized rubber, reinforced (brake hoses)
400922	Tubes, pipes and hoses of vulcanized rubber, not reinforced (brake hoses)
400932	Tubes, pipes and hoses of vulcanized rubber, exc hard rubber, reinforced
400942	Tubes, pipes and hoses of vulcanized rubber, exc hard rubber, reinforced/otherwise
401693	Gaskets, washers and other seals of vulcanized rubber other than hard rubber
681310	Asbestos brake linings and pads
732690	Articles, iron or steel, nes
830230	Mountings, fittings&similar articles of base metal f motor vehicles, nes
842541	Built-in jacking systems of a type used in garage
842542	Jacks & hoists nes hydraulic
842549	Jacks; nesoi
842691	Lifting or handling machinery designed for mounting on road vehicles
853641	Relays for a voltage not exceeding 60v (signaling flashers)
853661	Electrical lamp-holders, for a voltage not exceeding 1,000 volts

Table 3.2. Motor Industry "Cluster" by Technological Complexity Level in the Motor-Vehicle Value Chain (continued)	
Product Code	**Product Description**
854420	Co-axial cable and other co-axial electric conductors
854441	Electric conductors, for a voltage not exceed 80 V, fitted w connectors
854520	Carbon or graphite brushes
870899	Motor vehicle parts nes
871690	Trailer and other vehicle parts nes
Source: Own elaboration based on the Harmonised Commodity Description and Coding System (HS).	

Quantitative Indexes

As part of the research methods used in the analysis, some basic indexes were applied to quantitatively measure the expression or evolution of particular categories or variables. Especially, the indexes were used to analyse competitive threat tendencies and trade specialisation patterns. These are depicted below.

The Revealed Comparative Advantage Index

The *Revealed Comparative Advantage* Index (*RCA)* measure was based on the traditional Balsassa's Index (1965). The simplest formula is as follows:

$$RCA_{ij} = \frac{X_{ij}/X_j}{X_{wj}/X_w}$$

Where:

X_{ij} , X_{wj} are values of country i's and world exports of product j, respectively;

X_{wj} , X_w are values of total world trade in j and world total trade, respectively.

RCA indices use the trade pattern to identify the sectors in which an economy has a comparative advantage, by comparing the country of interest's trade profile with the world average (ESCAP, 2010). The index measures a specific product's share in the country's total exports relative to a share of this product in the world trade. $RCA > 1$ implies that the country has comparative advantage in that product.[16] In theoretical models, comparative advantage is expressed in terms of relative prices evaluated in the absence of trade; since these are not observed, in practice comparative advantage is measured indirectly (Ibid). Thus, *RCA* index provides a basis for assessing a country's export potential (Mikic, 2005).[17] Although *RCA* is a measure of the relative cost of a particular product/industry compared to other products produced in that country, whereas international competitiveness is in relation to the same product produced in other countries, *RCA* is often used as an approximation to international competitiveness, as applied in related analysis in the literature (Shafaeddin, 2004; Jenkins, 2008; Gallagher, Moreno-Brid and Porzecanski, 2008).

The *RCA* index has some limitations, however (Shafaeddin, 2004; ESCAP, 2010). First, given that the index is affected by anything that distorts the trade pattern (e.g. trade barriers), it does not show to what extent the gain in market share has been due to comparative advantage and to what extent due to subsidiasing export, dumping, etc. Second, it does not make clear whether a country also has advantage in production of an item or only in assembly operation, as the data on export show output rather than value added. Nevertheless, despite these shortcomings, this index is still of significant use in tracing out national competitive advantages (Shafaeddin, 2004; Mikic, 2005; Jenkins, 2008).

[16] In his original article, Balassa (1965: 103) pointed out that "It is suggested that 'revealed' comparative advantage can be indicated by the trade performance of individual countries in regard to manufacturing products, in the sense that the commodity pattern of trade reflects relative costs as well as differences in non-prices factors. For one thing, comparative advantage would be expected to determine the structure of exports; for another, under the assumption of uniformity in tastes and a uniform incidence of duties in every industry within each industry, export-import ratios would reflect relative advantages."

[17] Other authors (Shafaeddin, 2004) have used this index as a measure of *revealed competitive advantage.*

Given the nature and bases of the *RCA* approach, in the literaure the index has also been used for determining the degree of trade specialisation (Laurse, 1998; Lall and Albaladejo, 2004; Lall and Weiss, 2005a; Mikic, 2005; Widgrén, 2005; Gallagher, Moreno-Brid and Porzecanski, 2008; Hernández and Romero, 2009). The Balassa measure of *RCA* is sometimes referred to as the Specialisation Index by some authors, and the terms have been used interchangeably here. Besides being applied in the literature, an important reason for equating the *RCA* index with that of specialisation is the fact that the MAGIC Programme, the data source for the U.S. motor imports from China and Mexico, precisely uses *RCA* as substitutive measure of trade specialisation (Hernández and Romero, 2009). In this way, the *Specialisation index* applied in the analysis of China and Mexico in world trade in Chapter Six, using UN COMTRADE data, is comparable with the *Specialisation* index in the U.S. market, calculated in Chapter Seven, and based on the MAGIC database.

The *RCA* index was used in Chapter Six to calculate the degree of export specialisation of both China and Mexico's motor industries' in world trade. In Chapter Seven, the index had several uses, adapting the formula to include import values based on U.S.-specific data rather than on global data.[18] On the one hand, it was applied to identify the products in which China and Mexico were competitive in the U.S. motor market through the Static Index of Competitive Threat. On the other, it was employed to estimate the *RCA/Specialisation* of China and Mexico's participation in the U.S. motor imports both at aggregated level and by category of technological complexity of the different motor 'cluster' items, at 6-digit HS code.

<u>The Static and Dynamic Indexes of Competitive Threat</u>

In order to analyse the trends of China's competitive threat to Mexico in the U.S. motor market, two indexes were applied: the *Static Index of Competitive Threat* (SICT) and *the Dynamic Index of Competitive Threat* (DICT). This methodology was developed by Rhys Jenkins (2008), presenting several advantages over other indices used in previous analysis regarding China's competitive threat. This

[18] Several studies have used import data to estimate *RCA* or specialisation. See, for example, Shafaeddin, 2004; Mikic, 2005; Hernández and Romero, 2009; and Gallagher and Porzecanski (2010).

author argues that most of export similarity indexes[19] – and its related measures – present serious limitations, making them potentially misleading indicators of the severity of the competitive threat to different countries and of changes in competition over time (Ibid).

The fundamental argument in Jenkins's methodology is the following: "The extent to which a country faces a competitive threat from China depends not on the overall similarity of its export structure to that of China, but rather on the proportion of its total exports accounted for by products in which China is globally competitive…The higher the share of a country's exports made up of such products, the greater the extent of the threat from China" (2008: 1358).

Under this premise, the *Index of Competitive Threat* (ICT) is defined as follows:

$$ICT = 100 * \sum i\, X_i$$

where $i = 1,\ldots.m$, which includes all products in which China is competitive.
X_i = share of product *i* in total Mexican exports to U.S.

In calculating the *Static Index of Competitive Threat* (SICT), having a $RCA > 1$ is used to identify those products in which China is competitive. From the perspective of the present study, the SICT refers to the proportion of U.S. automotive imports from Mexico in which China has a RCA > 1 in ths U.S. market. This gives a static indicator of the extent to which Mexico's exports (U.S. imports from Mexico) are likely to be under threat from China, referred as the SICT. The 6-digit level of the HS classification for 108 automotive products was applied, using the MAGIC programme database, for the periods 1990-2001 and 2001-2010.

[19] The Export Similarity Index (ESI) is designed to measure the degree of similarity between the export profiles of two economies. The more similar the export profiles are, the more likely that economies are competitors in global markets. High similarity indices may also indicate limited potential for inter-industry trade with a regional trading arrangement (ESCAP, 2010). The ESI is the sum over export categories of the smaller of the sectoral export shares (as a percentage) of each country under sudy.

The second approach, the *Dynamic Index of Competitive Threat* (DICT), identifies those products in which China is competitive as all those in which U.S. motor imports from China (China's exports to the U.S.) are growing more rapidly than U.S. total motor imports from the world. The DICT then refers to the share of those products in U.S. imports of motor products from Mexico. This exercise is somewhat similar to the 'competitive threat' technique developed by Lall and Albaladejo (2004) and Lall and Weiss (2005a) described below. The indices also distinguish between the competitive threat which a country faces from China and vice versa (Jenkins, 2008). To calculate the DICT, the annual average growth rate (AAGR) of the 108 motor product's imports for the periods 1990-2001 and 2001-2010 was considered. In correlation with the SITC analysis, these years cover the periods before and after China's entry into the WTO.[20] The DICT include the rates for total U.S. automotive imports from the world and U.S. auto imports from China and Mexico.

The main advantages of the SICT and the DICT over the ESI and related measures are the following (Jenkins, 2008: 1364-1365): a) they distinguish between the threat that China poses to another country from the threat that the other country poses to China, rather than conflating them into one measure; b) they are not biased by differences in the value of exports from the two countries concerned, or by differences in the commodity concentration of their exports; c) since they measure the proportion of a country's exports accounted for by products in which China is internationally competitive, the meaning of a particular value of the index is easy to understand, which is not the case with some of the other indeices; d) they identify very clearly the key products in which a country faces competition from China; and e) they are relatively economical in terms of

[20] Of course, the periods established for the analysis can be decomposed into shorter number of years. Besides using 2001 as a turning point before and after China's entry into the WTO in the whole period 1990-2010, the idea was to have a long-term perspective of the trends rather than a short-term one, in order to avoid conjunctural disruptions, such as the years 2000-2002 and 2008-2009, where global economic recession and financial crisis affected production and trade tendencies. Other similar studies have used periods of a decade or longer in the analysis. See, for instance, Lall and Albaladejo (2004), Lall and Weiss (2005a), and Mesquita-Moreira (2007).

data requirements and complexity of calculation once *RCAs* and changes in world market shares for China have been obtained.

The 'Competitive Threat' Technique

In addition, in order to have a more specific image of China's competitive threat to Mexico in the U.S. motor market, the use of the SICT and the DICT was complemented by the 'competitive threat' technique developed by Lall and Albaladejo (2004) and Lall and Weiss (2005a). This technique has the merit of providing some additional and more specific competitive interactions between China and another country in export markets - Mexico in the U.S. market in this case. Thus, instead of having only a single figure of percentage and value of exports under threat from China, this technique identifies other categories, such as 'direct' and 'partial' threat, among others. This matrix of competitive threats and interactions is presented in Figure 3.5.

Lall and Albaladejo (2004) and Lall and Weiss (2005) point out that there is no accepted methodology for quantifying a "competitive threat" with trade data. Based on the business literature, these authors (Ibid) used relative market shares as common measure of competitive performance: there is a 'competitive threat' is China gains export market share and the other country loses. The intensity of the threat is given by the extent of the relative change. Given that the aim is to look at the competitiveness in the U.S. market, as in the cases of the SICT and DICT, in this exercise, the AAGR of U.S. imports from China and Mexico at 6-digit level of the HS classification for 108 automotive products was calculated, using the MAGIC programme database, for the periods 1990-2001 and 2001-2010.

It is worth mentioning that these authors (Ibid) caution on the difficulty of inferring *causal* relationships from relative export and market share data to the competitive impact of Chinese entry. As partial solution they suggest to examine combinations of market share changes for China and its competitors to infer the direction of the impact.[21]

[21] Lall and Weiss (2005a) indicate that only detailed fieldwork can show direct *causal* relationships for the competitive impact of Chinese entry.

Figure 3.5. Matrix of Competitive Interactions between China and Another Country in Export Markets			
		Chinese Export Market Shares	
		Rising	**Falling**
Other Country's Export Market Shares	**Rising**	*A. No Threat*: Both China and the other country have rising market shares and the latter in gaining more than China. *B. Partial Threat*: Both are gaining market share but China gaining faster than the other country.	*C. Reverse Threat*: No competitive threat from China. The threat is the reverse, from the other country to China.
	Falling	*D. Direct Threat*: China gains market share and the other country loses; this may indicate causal connection unless the other country was losing market share in the absence of Chinese entry.	*E. Mutual Withdrawal:* Both parties lose shares in export markets to other competitors.
Source: Lall and Weiss (2005a).			

Matrix of Interaction Channels and Competitive/Complementary Impacts

Given the research scope and objectives, some methodological tools derived from the Asian Drivers' impacts approach (Schmitz, 2006; Kaplinsky and Messner, 2008) was also applied in the research. Under this approach, a variety of potential interactions and impacts is possible to expect of the economic and trade relationships between countries (opportunities and threats/competition and complement). This analytical framework provides qualitative and quantitative information about potential China's impacts on Mexico's automotive industry in several variables. Figure 3.6 displays the adapted matrix of potential interaction channels and impacts between China and Mexico relationship in the motor industry. Through this matrix, three types of interactions and impacts were identified, each one having different implications and focus: a) *Interaction Channels*, with emphasis in trade and FDI; b) *Competitive and Complementary Impacts*; and c) *Direct and Indirect Impacts*. The thesis' chapters in which these interactions and impacts were mostly analysed are indicated in the matrix's quadrants.

Figure 3.6. Matrix of Interaction Channels and Impacts

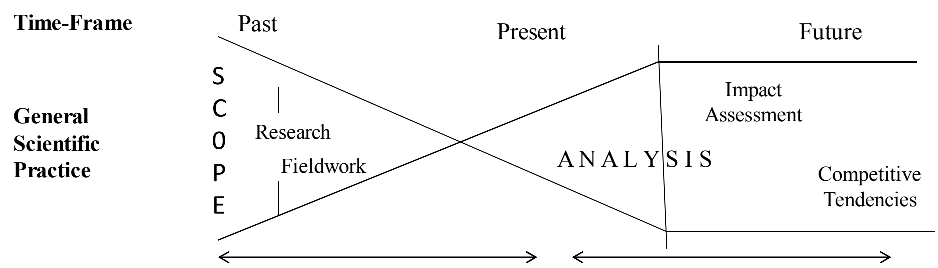
Channels	**Impact**	**Direct**	**Indirect**
Trade	Competitive	Chapter 6	Chapter 7
	Complementary		
FDI	Competitive	Chapter 8	Chapter 5
	Complementary		

Source: Adapted from Schmitz (2006); and Kaplinsky and Messner (2008).

3.5. Conclusions

This project's research design has adopted a heterodox mix of methods, fitting in with the epistemological foundations of 'critical methodological pluralism'. Some new and detailed methodological instruments for better understanding competitive threat trends and trade specialisation patterns in the motor industry were designed. These analytical tools allowed having a more comprehensive quantitative and qualitative view and assessment of competitive threat impacts, for example. Figure 3.7 shows a schematic view of the research design process, highlighting the major phases, scope, methods and categories.

Figure 3.7. Research Design Process: A Schematic View



Research Approach	• Sectoral Approach	• Cross-national/ Comparative	• Impact Assessment
Analysis Level/Unit	• Macro-level • Global motor industry • Global division of labour	• China-Mexico interaction • Motor industry bilateral relationship	• Competitive threat • Impact assessment
Research Site (Fieldwork)	• USA (Detroit) • Mexico (Mexico City and Hermosillo)	• China (Shanghai)	• U.K. (London)
Research Strategies	• Inductive	• Inductive/Retroductive	
Methods and Data Collection	• Content analysis • Data (quantitative)	• Semi-structured and focused interviewing (qualitative data)	• Motor 'cluster', typology, mapping, matrixes, indexes

Source: Own elaboration based on Bradshaw, Wood and Williamson (2001).

4. CHAPTER FOUR

CHINA AND MEXICO IN THE GLOBAL MOTOR INDUSTRY

> "The world's most populous nation will drive the globalization of the industry into the next stage, vastly transforming today's automotive landscape" (Spitzer, 2005).[22]

> "China doesn't just want to learn how to make GM cars. It wants to be GM and put GM out of business". (Friedman, 2005: 422).

> "Italy-born, Mexico-built, China-sold Fiat 500 epitomises auto globalisation". (Ciferri, 2011).

At the dawn of the 21st century the global motor industry is experiencing fundamental changes, being in the midst of a deep restructuring process. At least, two major forces are inducing this scenery. On the one hand is the advent of the so-called 'Second Automobile Revolution' (Freyssenet, 2009) which is being fuelled by the combination of a move towards alternative energies and driving modes, and the emergence of global motor markets leaded by the BRICs.[23] On the other is the global financial crisis of 2008-2009, which severely hit the motor industry worldwide. Simultaneously, the 'epicentre' of the global motor industry was shifting from West to East, especially to China. In 2009, in the midst of the worst economic crisis since the 'Great Recession' in the 1930s, China became the world's largest automotive producer and market.

As pointed out in the introductory chapter, China's emergence in the global motor industry was not only a matter of concern for developed economies, but for the developing as well. Mexico, with an important motor industry, highly integrated

[22] Richard D. Spitzer, Accenture's global automotive managing partner (Accenture, 2005: 1).

[23] Other authors have posed different views about the 'stages' or 'revolutions' in the motor industry's evolution. Womack et al, (1990) put forward a revolutionary leap with the advent of 'Lean Manufacturing' replacing the 'Fordist' mass production system. In like manner, Maxton and Wormald (2004) postulate that the motor industry is at the edge of a 'Fourth Revolution', based on profound changes in the production function and in the whole system of relationships in the industry.

into global markets, was among them. Although Mexico and China share some similarities in the development of their automotive industry, particularly in their first stage when governments tried to establish a strong "national" industry by applying protectionist measures and import substitution strategies, the path followed by each country during the last three decades has been a rather divergent one. Perhaps the convergence factor in the recent period is the increasing role these countries are playing in the global automotive arena.

As in the case of their national development models, the motor industry in China and Mexico also presents paradoxes. According to some analysts, "For a vision of the fate Chinese policymakers hope to avoid, all one need do is look to Mexico" (Thun, 2006: 217). Chinese policymakers tried to avoid the denationalization of the motor industry, as happened in Mexico and other developing countries such as Brazil and Thailand.

Nowadays, Mexico and China's motor industries present very different economic, technical and political environments. Also, they have contrasting conditions in terms of industry structure, ownership of capital, destination of production/exports and installed capacity. Table 4.1 shows a general comparative view of the motor vehicle industry and the national economy in both countries.

The objective of this chapter is to present a general analysis of China and Mexico's position in the global motor industry, as well as their industries' structure, evolution and main tendencies. As background, a succinct examination of the changing geography and global division of labour in this industry will be carried out.

Table 4.1. The Motor Industry in China and Mexico: A General Comparative View		
Concept	**China**	**Mexico**
The National Economy		
Total population (2011)	1.34 billion	113.7 million
Area (Sq. Km)	9,596,961	1,964,375
Gross Domestic Product (GDP) (2011, US Dollars)	7,928.1 billion	1,154.8 billion
GDP per capita (2011, US dollars)	5,413.6	10,153.3
GDP (purchasing parity power-PPP) (2011, current international dollars)	11,299.9 billion	1,661.6 billion
GDP per capita at PPP (2011, current international dollars)	8,382.0	14,609.7
The Motor Industry		
Motor-vehicle production (2011, Units)	18,418,876	2,680,037
Motor-vehicle domestic sales (2011, Units)	18,510,000	909,026
Motor-vehicle exports (2011, Units)	849,000	2,143,883
Motor-vehicle exports as % of total production	4.6 %	80.0 %
Total export value of motor products (2010, US dollars)	62,780 million	67,905 million
Number of motor-vehicle manufacturers companies	150[1]	25
Number of auto parts companies	25,000[2]	1,100

[1]Only registered vehicle manufacturers.
[2]Of this total, only 10,000 companies are officially registered.
Source: Own elaboration based on diverse sources.

4.1. The Changing Motor Industry's Global Division of Labour

By the middle of the 1980s, an idea about the geographical redistribution of the world motor industry and the resulting international division of labour began to emerge: the new labour-saving automated technologies, flexible systems of production, and "just-in-time" practices –among other trends-, would re-concentrate motor production at the final markets of the developed countries (Altshuler, *et al.,* 1984; Jones and Womack, 1985; Estall, 1985; Schoenberger, 1987; and Sanderson, et. al. 1987). According to this approach, the new wave of technological innovation had set the auto industry on a new path and in a different direction of that predicted by the 'dispersionist' approaches, Vernon's (1966) 'product-life cycle' and the static-NIDL's thesis (Fröbel, Heinrichs and Kreye, 1980) among them. As a consequence, the future prospects for the participation of developing countries in the car industry's global division of labour were considered only marginal. Even by the early 2000s, despite accepting that globalisation has changed the worldwide geography of motr production, there was a persistent conclusion that this industry remains overwhelmingly concentrated in the developed countries (see, for instance, Sturgeon and Florida, 2000; and ILO, 2000).

Nevertheless, contrary to these analysts' auguries, the trend towards the location of manufacturing activities in this sector to developing countries continued to ascend. For example, in 1950 the United States concentrated 76% of world motor vehicle production; by the year 2011 this share had fallen below 11%. Even though Japan captured a considerable proportion of this redistribution, at present new producing countries concentrate around two thirds of total production, when some decades ago this group of countries had not reached more than 5%. Considering the 'Pioneer Producing Countries', more than 70% of auto production worldwide is carried out outside their borders. It is worth noting that besides the traditional NICs, during the second half of the 1990s a 'second layer' of new producing countries (the 'Post-Wall Producing Countries') emerged in the worldwide scenario: China, Turkey, Thailand, Malaysia, Slovakia, and Czech Republic (Tables 4.2 and 4.3; Figure 4.1).

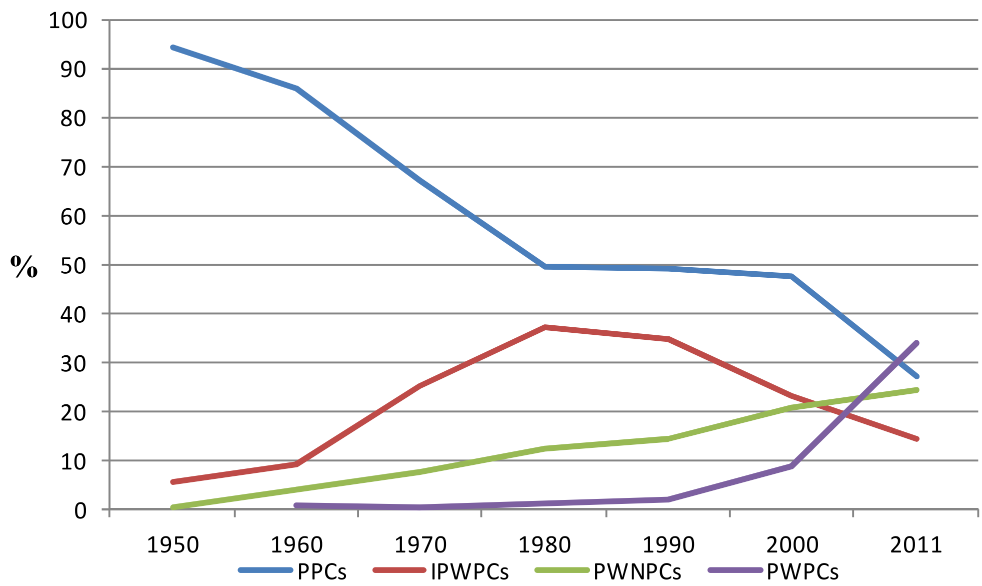
Table 4.2. Geographical Distribution of Worldwide Motor Vehicle Production, 1950-2011 (Units)				
Group/Country	**1950**	**1960**	**1970**	**1980**
Pioneer Producing Countries (PPCs)	***9,968,690***	***14,182,526***	***19,988,536***	***19,515,596***
Canada	387,726	397,739	1,159,504	1,323,999
France	357,552	1,369,210	2,750,086	3,378,433
Germany	306,034	2,055,127	3,842,247	3,878,553
Italy	127,847	644,633	1,854,252	1,611,856
United Kingdom	783,672	1,810,700	2,098,498	1,312,914
United States	8,000,859	7,905,117	8,283,949	8,009,841
Inter and Post-War Producing Countries (IPWPCs)	***572,607***	***1,521,126***	***7,518,715***	***14,542,513***
Australia	126,721	326,250	473,790	364,109
Austria	2,169	12,658	7,191	15,261
Belgium	248	256	272,433	259,966
Czechoslovakia	31,424	73,684	169,920	233,112
Japan	31,597	481,551	5,289,157	11,042,884
Netherlands		19,339	79,219	112,881
Russia	362,895	494,994	916,118	2,199,200
Sweden	17,553	112,394	310,887	315,100
Post-War New Producing Countries (PWNPCs)	***46,516***	***622,976***	***2,200,421***	***4,827,807***
Argentina		89,338	219,599	288,917
Brazil		133,078	416,089	1,165,174
East Germany	9,200	76,000	181,000	214,000
India	14,688	51,126	82,766	113,326
Mexico	21,575	49,807	189,986	490,006
Poland		36,400	118,000	430,500
South Africa		113,097	297,573	404,766
South Korea			28,819	123,135
Spain	253	58,209	536,026	1,181,659
Taiwan				132,580
Yugoslavia	800	15,921	130,563	283,744
Post-Wall Producing Countries (PWPCs)	***000***	***21,000***	***137,700***	***418,339***
China		15,400	70,000	222,288
Czech Republic				
Hungary		5,600	9,200	13,500
Indonesia				
Iran				
Malaysia				
Pakistan				
Philippines				
Portugal				
Romania			33,500	114,734
Slovak Republic				
Slovenia				
Thailand				
Turkey			25,000	67,817
Ukraine				
Vietnam				
Other Countries	***4,631***	***140,712***	***ND***	***ND***
WORLD TOTAL	***10,577,813***	***16,488,340***	***29,845,372***	***39,304,255***

Table 4.2. Geographical Distribution of Worldwide Motor Vehicle Production, 1950-2005 (Units) (Continuation)			
Group/Country	**1990**	**2000**	**2011**
Pioneer Producing Countries (PPCs)	***24,135,914***	***27,860,063***	***21,649,007***
Canada	1,920,565	2,961,636	2,134,893
France	3,768,993	3,348,361	2,294,889
Germany	4,976,552	5,198,000	6,311,318
Italy	2,120,850	1,738,315	790,348
United Kingdom	2,565,957	1,813,894	1,463,999
United States	9,782,997	12,799,857	8,653,560
Inter and Post-War Producing Countries (IPWPCs)	***17,119,560***	***13,436,481***	***11,587,894***
Australia	384,095	347,122	224,193
Austria	20,006	141,026	152,505
Belgium	385,263	1,033,294	562,386
Czechoslovakia	242,000		
Japan	13,486,796	10,140,796	8,398,654
Netherlands	151,132	267,319	73,151
Russia	2,040,000	1,205,581	1,988,036
Sweden	410,268	301,343	188,969
Post-War New Producing Countries (PWNPCs)	***7,045,145***	***12,140,857***	***19,575,155***
Argentina	99,639	339,632	828,771
Brazil	914,671	1,681,517	3,406,150
East Germany			
India	364,181	801,360	3,936,448
Mexico	820,558	1,935,527	2,680,037
Poland	365,000	504,972	837,132
South Africa	405,000	357,364	532,545
South Korea	1,321,630	3,114,998	4,657,094
Spain	2,053,350	3,032,874	2,353,682
Taiwan	382,000	372,613	343,296
Yugoslavia	319,116		
Post-Wall Producing Countries (PWPCs)	***879,767***	***5,099,230***	***27,222,384***
China	509,242	2,069,069	18,418,876
Czech Republic		455,492	1,199,834
Hungary	8,525	137,398	202,800
Indonesia		292,710	837,948
Iran		277,985	1,648,505
Malaysia		282,830	540,050
Pakistan		31,500	163,060
Philippines		41,840	51,730
Portugal	26,000	246,724	192,242
Romania	94,000	78,165	335,232
Slovak Republic		181,783	639,763
Slovenia		122,949	174,119
Thailand		411,721	1,478,460
Turkey	242,000	430,947	1,189,131
Ukraine		31,255	104,654
Vietnam		6,862	45,980
Other Countries	***ND***	***ND***	***29,728***
WORLD TOTAL	***49,180,386***	***58,536,631***	***80,064,168***

Notes: South Africa's data for 1990 is estimated; Romania's and Portugal's figures for 1990 correspond to 1991; Turkey's figures for 1979 and 1990 correspond to 1971 and 1991, respectively.
Source: Own elaboration based on MVMA, AAMA and OICA's data.

Table 4.3. Geographical Distribution of Worldwide Motor Vehicle Production by Country Group, 1950-2011 (%)							
Group of Countries	**1950**	**1960**	**1970**	**1980**	**1990**	**2000**	**2011**
Pioneer Producing Countries (PPCs)	94.2	86.0	67.0	49.6	49.1	47.6	27.0
Inter and Post-War Producing Countries (IPWPCs)	5.4	9.2	25.2	37.0	34.8	23.0	14.5
Post-War New Producing Countries (PWNPCs)	0.4	3.8	7.4	12.3	14.3	20.7	24.4
Post-Wall Producing Countries (PWPCs)		0.9	0.4	1.1	1.8	8.7	34.0
Other Countries		0.1					0.1
WORLD TOTAL	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Source: Own elaboration based on MVMA, AAMA and OICA's data.							

Figure 4.1. Geographical Distribution of Worldwide Motor-Vehicle Production by Country Group, 1950-2011 (%)



Own elaboration based on Table 4.3.

The changing geography of the motor-vehicle value chain has been driven by the following developments (Kaplinsky, 2005: 146): a) Scale economies are growing, particularly in knowledge - and design-intensive activities; b) Production technologies and product design are becoming more complex; c) The sector is now dominated by eleven mega-corporations, each with an extensive global reach; d) Markets are growing most rapidly in low-income economies; and e) many low-income and emerging economies have targeted the sector for industrial promotion. Certainly, as Kaplisnky (Ibid) suggests, in the context of the factors driving the globalisation of the motor industry, a number of centralising, centripetal and centrifugal tendencies are simultaneously at work. In this regard, some analysts argue that despite the fact that the industry has become more globally integrated, it has rather developed a strong regional scale of integration (Sturgeon, Van Biesebroeck and Gereffi, 2008; Sturgeon, et al., 2009). Nevertheless, regionalisation of production and sales by TNCs might be also seen as part of global strategies. The tendency towards the geographical dispersion of production in the industry is increasing. Even in exports, emerging countries are gaining position at global level, showing significant export potential (Peridy and Abedini, 2008). Based on UNCOMTRADE data (2012), Mexico, Korea, China, Spain, Czech Republic, Poland and Thailand are among the largest automotive export-countries, accounting for a quarter of the world's total by 2010. In addition, the recent financial crisis accelerated the trends towards greater significance of the motor industry in emerging economies (Sturgeon and Van Biesebroeck, 2010).

Based on recent trends, it seems that there has been a process of widening and deepening of the global division of labour in the automotive industry. The globalisation process - seen as the increasing integration of production, trade and capital at global scale – has pushed this phenomenon even further. It has been recognised that the collapse of the 'iron' and 'bamboo' curtains at the beginning of the 1990s brought the globalisation process to unpredictable levels, incorporating the last frontiers of the global economy and representing one of the most dramatic signs of the emergence of a new world order (Castells, 1996; Harris, 2003; Becker, 2006).

The trends in the motor industry seem to contain most of the key characteristics of the globalisation process: multidimensional, complex, dialectic and paradoxical. For instance, at the same time that Detroit – known as 'Motor City' (Motown) – is losing its position as assembly capital in North America, new automotive spaces with the sobriquet of 'Detroits' are emerging around the world: 'Detroit South' (Mexico), 'Detroit East' (Central Europe), 'Detroit North' (Russia), and 'Detroit Far East' (China). In this regard, in a recent article a business analyst declared that "clearly, the old Detroit as Motor City is history" (Maynard, 2006). Paradoxically, during the financial problems and slumps of the major U.S. carmakers (General Motors and Ford) by the middle-2000s, both Detroit's Mayor and Michigan's Governor turned to Japan – to Toyota and Honda in particular – seeking support for attracting investment to regenerate job losses in the auto sector (Maynard, 2006; McElroy, 2005). During the 2008-2009 global financial crisis, China's huge and growing market as well as the Sino-US JVs seemed to have been the salvation platform.

And yet, the pressures and turmoil in the car industry are increasing. Overcapacity, growing costs, tougher competition in prices and new competitors are inducing a constant restructuring of automakers and a changing relationship with suppliers (Sturgeon and Florida, 2000; Humphrey and Memedovic, 2003; Kaplinsky, 2005; Becker, 2006; Sturgeon, Van Biesebroeck and Gereffi, 2008). For some companies and producing countries, a relatively new player in the global competitive arena is causing a serious additional concern: China. For some observers, China's growing participation in the world market means a new round of predatory global competition in the car industry (Becker, 2006). Paradoxically, it is now a developing country, and not the traditional capitalist powers, the Unites States, Germany or Japan, that is the source of this competition, and is perceived as the symbol of the hidden risks of globalisation.

Although 'division of labour' suggests a collaborative and a stable distribution of complementary work, it is not a passive phenomenon (Harris, 1983; Sayer, 1995; Mittelman, 1994). Its dynamic character produces rivalries and tension amongst the involved agents as a consequence of increased competition. Thus, the changing global division of labour within the automotive industry has been a source of competitive tensions amongst firms, workers and countries – the latter considered 'territorial production bases' regardless of the national origin of firms producing in such territories. As underlined in the introductory chapter, this trend has led towards a kind of 'competitiveness obsession' of nations (Krugman, 1994). Thus, as presaged by Jonathan Mantle (1995) in 'Car Wars', despite the fact that in the global market the individual firm and nation have been superseded by interdependent interests and many-layered blocks of capital, the increasing competition in the global automotive industry will lead to economic conflict between nations in the 21st century.

4.2. China and Mexico in the Global Motor Industry's Development Ladder

One of the key actors in the changing geography of the global motor industry is China. With 1% of world's total production in 1990, by 2011 the Middle Kingdom accounted for 23%. Paradoxically, in the MIT's 5-millionn dollar 5 year study on the future of the automobile industry (Womack, Jones and Roos, 1990), when discussing the prospects of worldwide diffusion of *lean production* techniques as the means for achieving world-class manufacturing skills without massive capital investments in developing countries, an interesting conclusion was reached: China was the anomaly in East Asia. By 1990, the Chinese car industry was considered to be focused inward, pursuing a combination of extremely mass production in its two volume-production complexes in Changchun and Hubai on the one hand, and inefficient low-quality craft production in about a hundred additional vehicle-manufacturing spread around China, on the other.[24] According to the MIT project, this disastrous combination gave China the distinction of having the world's largest motor-vehicle industry in terms of employment (more than 1.6 million workers) and one of the smallest in terms of output (a projected 600,000 units in 1990) (Ibid: 268-269). The high inefficiency and resulting significant diseconomies of scale in the large majority

[24] The number of motor vehicle manufacturers in China rose from about 20 in the 1960s to 60 in the 1970s, and peaked at about 125 in the early 1990s (Harwit, 1995: 25; Harwit, 2001: 661).

of Chinese plants produced the most fragmented motor vehicle industry in the world (Harwit, 1995; Thun, 2004).

Strikingly, if Japan was considered the worldwide car industry's "shining star" during the 1960s and 1970s, and so South Korea during the 1980s and 1990s due to their spectacular growth, China followed a similar path from the middle of the 1990s to present. From 1990 to 2011, China's automotive output grew at an average annual rate of 64.4 per cent, while the world's average was only 2.2 per cent (Table 4.2). In that period of 21 years, China's production increased more than 35 times, passing from over half a million vehicles to more than 18.4 million. As stated earlier, at present China ranks as the world's number one motor vehicle producer and market. Practically every single global automaker and parts producer has established production facilities in Chinese territory. China is now becoming part of the global production networks of the major TNCs and is playing a relevant role in reshaping this industry's global division of labour.

Thus, from the perspectives of both companies and nation-states intending to develop their "national" automotive industries, this trend of increasing participation of China in the world car market is pushing global competition even further. Given the position and role played in the global car industry, Mexico is perceiving China's ascendant phase as a direct threat not only in its domestic market, but in third markets – particularly in the Unites States -, as well as in the attraction for foreign investment. China's scaling in the worldwide ranking of automotive production is shown in Figure 4.2. Ranking in 13th position in 1990, China scaled to 8th in 2000, 4th in 2005, reaching the 1st place in 2009, position kept to present. In Mexico's case, although it appeared within the thirteen largest automotive producers since 1980, ranking in the 11th place, its position has swung from the 12th position in 1990 to 9th in 2000 and falling again at 11th in 2005. Since then, Mexico has escalated several steps, reaching the 8th position worldwide by 2011.

The recent global financial crisis had differentiated effects on China and Mexico. While world auto production registered an annual negative growth of -3.7 and -

12.8% in 2008 and 2009, respectively, China grew at 5.2 and 48.3% during the same years. For its part, Mexico performed relatively well in 2008 with a growth of 4.6%, but in 2009 production drastically fell, registering -28.0% in relation to the previous year. That year, the United States and Japan had an output drop of -34.3 and -31.5, respectively.

Figure 4.2.Worldwide Motor-Vehicle Production: Country Ranking 1980-2011

Rank	1980	1990	2000	2005	2009	2011
1	Japan	Japan	USA	USA	**China**	**China**
2	USA	USA	Japan	Japan	Japan	USA
3	Germany	Germany	Germany	Germany	USA	Japan
4	France	France	France	**China**	Germany	Germany
5	USRR	Italy	Spain	S. Korea	S. Korea	S. Korea
6	Italy	Spain	Canada	France	Brazil	India
7	Canada	Russia	S. Korea	Spain	India	Brazil
8	U. K.	Canada	**China**	Canada	Spain	**Mexico**
9	Spain	U. K.	**Mexico**	Brazil	France	Spain
10	Brazil	S. Korea	U. K.	U. K.	**Mexico**	France
11	**Mexico**	Brazil	Italy	**Mexico**	Canada	Canada
12	Poland	**Mexico**	Brazil	India	Iran	Russia
13	S. Africa	**China**	Russia	Russia	U. K.	Iran

Source: Own elaboration based on MVMA, AAMA, and OICA's data.

4.3. Structure and Evolution of China's Motor Industry

Background and Development Phases

After the triumph of Chairman Mao Zedong in 1949, the new government of the PRC decided to develop a motor industry for the purposes of transporting rural products and the military (Gallagher, 2006). In achieving this industrialization goal, China relied heavily on its ally, the Soviet Union, for technical assistance. As a result, the first motor-vehicle manufacturing plant was set up in 1953 in the city of Changchun, under the name of First Auto Works (FAW). A few years later, in 1958, Shanghai Automotive Assembly Plant – now Shanghai Automotive Industry Corporation (SAIC) – started operations, producing the 'Phoenix' passenger car. Thus, the Soviet Union transferred the first motor industry knowledge and hard technology to China (Ibid). But, these developments suddenly stopped after the Sino-Soviet conflict and split in 1960. Since then, and from the following two decades, China lacked the technological capabilities to develop its car industry. During the 'Great Leap Forward' (1958-1960) and the 'Third Front' campaigns, the industry was atomised and dispersed (Harwit, 1995; Gallagher, 2006). Production of passenger cars practically ended during the 'Cultural Revolution' (1966-1971) due to the lack of investment in the sector (Gallagher, 2006). This stunted development was the state of China's the motor industry at the end of the 1970s.

From the perspective of market opening and the transition of development model of the Chinese automotive industry, three stages have been identified (Song and Yu, 2005: 171-172):

1) *Self-sufficiency Stage (before the 1980s)*. In this stage, from the founding of new China in 1949 to the 1980s, the technical and production capabilities of local firms were developed by "reverse engineering". Cars were mainly produced by copying existing models as no ties existed between Chinese and foreign enterprises whose products were imitated. During this period, exchanges between domestic and foreign firms were unidirectional and closed. The domestic car industry failed to overcome the many technological bottlenecks, especially in core technologies.

2) *Joint Venture Stage since the Beginning of the 1980s.* As China adopted its reform and opening up policy, its car industry entered a new development phased by attempting to introduce advanced technologies. However, developed countries, especially Japan, were not interested in China's efforts to introduce new technology. Therefore, from the beginning, the government had to resort to high tariffs and non-tariff protection measures and develop the industry by establishing joint ventures. The interactive learning relationship was established on this basis and it, in turn, pushed forward technological and product upgrading of local components and parts producers. Nevertheless, the production capacity of the Chinese side in the joint venture automakers did not improve a great deal, particularly in

the areas of product development, technological innovation and brand marketing.

3) *The Transformation of the Auto Industry after WTO Accession – Dependent Development.* Song and Yu (2005) argue that regardless of whether or not domestic enterprises have the ability to compete with multinationals within China, there will be a trend for market opening and strategic adjustment of multinationals and domestic firms for a number of years. First, domestic firms may have more competitive advantages. Second, if they do not currently have any competitive advantages, these firms have the potential to catch up with multinationals in the future. When compared with Chinese firms, TNCs enjoy early-mover advantages as reflected in their brands and models, technologies and management. In terms of price, the reduction of tariffs and abolition of non-tariff measures after China's WTO accession have led to a sharp fall in the prices of Chinese auto products.[25] On the other hand, regarding technology, China would lose the possibility of developing car models based on the local market. From the perspective of the strategic adjustments of TNCs and domestics enterprises after China's WTO accession, changes in their relative competitive edges and the fostering of their learning and adapting to new circumstances, dependence of local enterprises on TNCs has deepened.

Automotive Policy

Although with divergent perspectives on the final outcomes and policy reach, analysts of China's motor industry agree that the Chinese state has played a central role, intervening heavily in the sector's development process (Harwit, 1995 and 2001; Moore, 2002; Holweg, Luo and Oliver, 2005; Thun, 2006; Gallagher, 2006; Chin, 2010).

[25] Song and Yu (2005: 157) estimated that in 2004 auto price in China's domestic market were about 1.25-3.45 times the price paid on world markets.

As a top government priority throughout the post-Mao era, the automotive industry developed within a highly protectionist framework (Harwit, 1995 and 2001; Moore, 2002). But even though after Mao's death in 1976 – year in which the Cultural Revolution officially ended –, an accelerated degree of interaction with foreign motor vehicle companies was evident, it was only after the mid-1980s that central leaders recognised the need for acquiring advanced technology and to rationalise the industry in order to overcome the inefficiency problems and to reach international production standards (Harwit, 1995; Thun, 2006).

The preferred governmental mechanism for achieving this goal was the promotion of cooperation with foreign manufacturers under the form of joint ventures (Harwit, 1995; Holweg, Luo and Oliver, 2005; Thun, 2006). The establishment of JVs with state-owned enterprises was a condition for foreign manufacturers to enter to operate in China. Foreign participation had the limit of 50 percent ownership. Local content requirements were also stipulated (40 per cent in the first year of production, increasing to 60 and 80 per cent in the second and third years, respectively). The Chinese also kept control of distribution networks for the jointly-manufactured vehicles (Harwit, 1995 and 2001; Gao, 2002; Holweg, Luo and Oliver, 2005). The first JV was established in 1983 between Beijing Jeep Co. of Beijing Automotive Industry and American Motors, which was subsequently taken over by Chrysler. The second one was established in 1985 between Shanghai Volkswagen, involving Shanghai Automotive Industry Co. and Volkswagen AG. Another joint venture was Guangzhou Peugeot, in 1985 (Harwit, 1995; Holweg, Luo and Oliver, 2005).

In 1994, under the *Automotive Industry Development Policy*, the automotive industry was officially named a 'Pillar Industry' of the national economy. The goal was to develop the sector as one of the internationally competitive 'national champions' by 2010 (Moore, 2002; Holweg, Luo and Oliver, 2005). The main policy objectives of the 1994 Automotive Policy were: open up domestic and foreign markets; promotion of large scale production; concentration of the industry eliminating small scale-dispersed operations; encouragement of independent product development; encouragement of the establishment of R&D

activities, among others. In the consolidation objective, the Chinese government targeted a so-called 'Big Three, Mini Three' (*San Da, San Xiao* – three big firms and three smaller firms) structure and it intended to focus most of its own energies and investment on those six companies (Gallagher, 2006).[26] Despite these actions, however, industry analysts concur about having mixing or disappointing results. By early 2000s, JVs had satisfied domestic passenger car needs, but price and quality problems have left the industry open to some challenges in a free market post-WTO world (Harwit, 2001; Moore, 2002). Likewise, the industry's consolidation into a fewer big firms was not realized (Gallagher, 2006).

To adapt to changes in the Chinese motor industry to China's economic boom since the late 1990s, and to face the challenges emerging in the sector after China's joined the WTO in 2001, a new *Automotive Industry Development Policy* was released in 2004 (Holweg, Luo and Oliver, 2005; Gallagher, 2006). The main objectives of this new policy were: promotion of a harmonious development of the automotive and associated industries; driving industrial structural adjustment; enhancing economy of scale and concentration of the industry; encouragement of self-reliant product development and local brand development; fostering the development of local suppliers globally competitive; and become one of the major global auto production countries and to export in big volume. Other relevant aspects are: insisting on the principle of combining technology transfer and self-reliant product development; encouraging the formation of big automotive groups (with 15 per cent market share) or alliances; supporting the establishment of R&D centres in automotive enterprises for improving independent product innovation capabilities; Chinese shareholder in whole car assembly enterprises must be no less than 50 per cent, but not applying to exportation-targeted projects. According to Holweg, *et al.* (2005), the fundamental difference between the 2004 automotive policy in relation to the 1994 one, is that the former offers *encouragement and strategic direction* rather than *regulation*. In this sense, these authors point out

[26] Since 1988 - somehow emulating the United States' auto industry -, a scheme of 'Big Three, Little Three' had been proposed. According to this plan, China's main vehicle manufacturers would be the FAW in Changchun, the Second Auto Works in Hubei, and the Shanghai vehicle factory, which by then had formed the JV with VW. The three minor players would be the JV companies of Beijing Jeep, Guangzhou Peugeot, and the Tianjin Automotive Corporation which had a licensing agreement with Japan's Daihatsu Motor Company (Harwit, 1995: 36-37).

that this move "indicates a significant change in the role of the Chinese government in economic matters, as the government is now committed to using *market* forces to influence the industry's future, rather than *government-prescriptive* policies" (Holweg, *et al.,* 2005: 16).

Given China's aspiration in the global economy, avoiding its entrance into the WTO was almost an impossible task. As Thun (2006: 5) underlines, "Accession to the WTO represented not only a dramatic change in the formal rules of the game, but also recognition on the part of (at least) some Chinese leaders that the very nature of the game itself was changing"; and he adds (Ibid: 5-6), "Not joining the WTO would both prevent China from fully participating in global production networks – and the country clearly had a great deal to gain – and make it more difficult for Chinese firms to develop the competitive ability that would allow them to carve out high-value added pieces of such networks". Thus, after China's entrance into the WTO, a number of steps to open up the market, including tariff reductions and eliminating local content requirements were carried out. For example, tariffs for passenger cars will fall to 26 per cent this year (2006), whereas during the 1990s the range between 80-100 per cent; overall average will be cut to 10 per cent by this year (Table 4.4).

China's entry into the WTO brought about new challenges to the automotive industry. TNCs and Chinese automakers have all made dramatic adjustments to their development strategies (Harwitt, 2004; Song and Yu, 2005). In general terms, the basic strategy of TNCs after China's entry into the WTO has been to invest or expand their investments in China, and continually bring out new products, introduce whole series of products to the country, as well as lower car prices. On the other hand, Chinese companies have all opted for the strategy of entering into joint ventures or importing new models. Even if Chinese firms start independent development and have their own brands, they are still ready to enter into joint ventures with multinationals (Song and Yu, 2005). As a result, China's automotive industry began to grow at accelerated pace, both in terms of production and marketing. The size of the market and the new conditions under the WTO terms has meant an additional and powerful motive for foreign firms to import cars and trucks made outside China (Holweg, *et al.,* 2005; Harwitt, 2004).

Table 4.4. Major Changes in China's Motor Industry Under the WTO Agreement

Key Issue	Before WTO	After WTO
Import tariffs	200% in 1980s; 80-100% in 1990s on passenger cars; as low as 9% on some other vehicles.	Reduced to 25% for passenger cars by July 2006. Overall average cut to 10% by 2006.
Import quotas	Quotas vary by year on number and value of imported vehicles; 27,000 vehicle imports licenses issued in 1999.	Raised limit to $6 billion worth of imports on accession, 15% annual growth until elimination in 2005.
Local content requirements	40% in first year of production, increasing to 60%, 80% in second and third years, respectively. Various incentives to speed use of domestic parts suppliers.	Elimination of local content requirements on accession.
Import arrangements rights	Foreign enterprise cannot directly import vehicles.	Import rights granted within 3 years of accession.
Distribution, retail, after sales service	Cars manufacturers must use Chinese distribution to sell their vehicles (limited to wholesaling through joint ventures), and domestic firms to service them.	Distribution, sales and service rights for foreign firms phased in over three years.
Finance	Chinese consumers have difficulty financing vehicle purchase using domestic bank loans. Foreign, non-bank financial institutions prohibited for providing financing.	Non-bank foreign firms can provide unrestricted auto financing on accession.
Foreign Investment	Strict requirement for foreign companies to establish their operations as joint ventures with state-owned enterprises. Foreign equity could not exceed 50%.	Foreign companies can own no more than 50% of an enterprise, but not applying to exportation-targeted projects.
Source: Elaboration based on Harwit (2001: Table 4: 663), Gao (2002: Exhibit 3: 148), and Holweg, *et al.* (2005: Appendix B: 68).		

The recent financial crisis also induced the implementation of new policy actions. In particular, the *2009 Automotive Industry Revitalisation Plan,* aimed at stimulating the sector, included the following objectives (Stewart, et al, 2012): a) Growth in the production and sales of autos with a goal of selling more than 10 million autos in 2009 and a achieving an average annual growth rate of 10% in three years; b) Increasing auto consumption with a reasonable system of taxes and fees, and creating an infrastructure to support electric autos; c) Optimising the market demand structure, so that passenger cars of 1.5L or less account for 40% or more of demand, with passenger cars of 1.0L or less account for 15% or more of the market; heavy trucks will account for 25% of all trucks; d) Formation of two or three large auto enterprises with production and sales exceeding 2 million vehicles and four or five enterprises with production and sales volume exceeding 1 million vehicles. The number of enterprises accounting for 90 percent of market share shall be reduced from 14 to 10 or less; e) Increasing the market share of Chinese brand autos to 40 percent for passenger autos. Exports of Chinese brand passenger cars shall account for 10 percent of the volume of automobiles produced and sold; f) Increasing the production capacity for new-energy automobiles to 500,000, including purely electric, chargeable hybrid electric, and ordinary hybrid electric autos. The sales volume of such vehicles should account for 5 percent of the total sales volume of passenger cars; g) Increasing research and development in assembled vehicles so that main sedan products satisfy the requirements of developed countries and so that the technical level of new-energy autos reaches an advanced international level; h) Realising "technological independence" in product areas such as key spare parts in the engine transmissions, steering systems, braking systems, drivetrain systems, suspension systems, and vehicle control systems and advancing the technological level of new-energy vehicle parts so that they are globally competitive. As observed, the Revitalisation Plan not only intended to help Chinese automakers to overcome the economic slump, but also to enable them to leapfrog to the next stage of technological development, focusing on ne-energy vehicles, and gain competitive advantage in domestic and global markets.

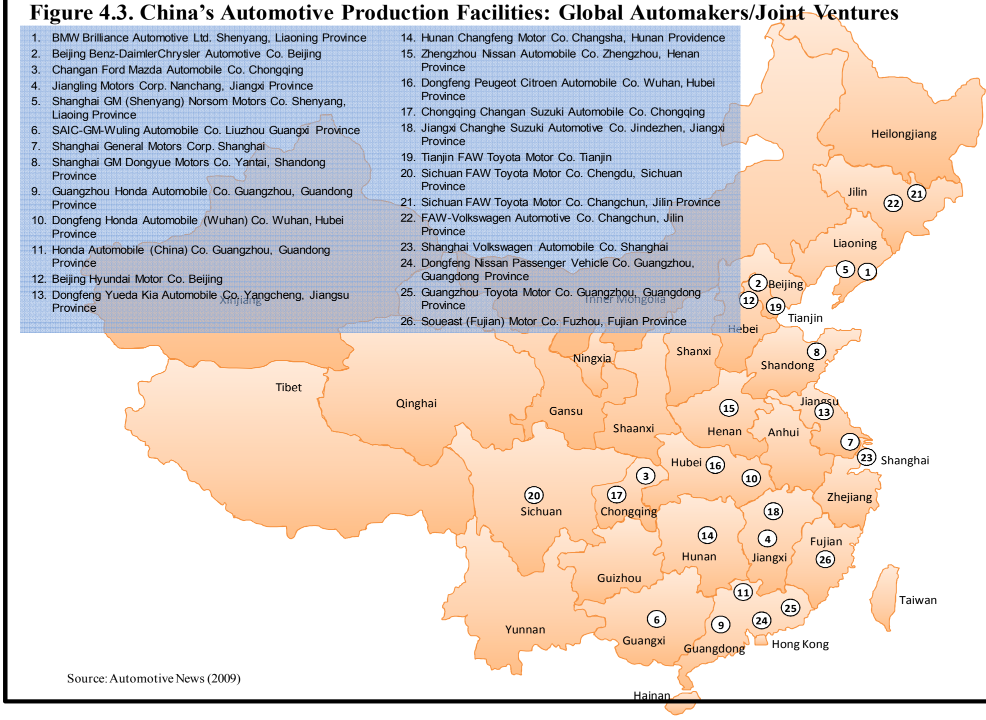
More recently, in March 2011, the National People's Congress approved the *12^th^ Five-Year Economic and Social Development Plan*, the blueprint for China's economy from 2011 through 2015. In this plan, 7 new 'strategic and emerging' industries were identified (APCO, 2012): biotechnology, new energy, high-end equipment manufacturing, energy conservation and environmental protection, new materials, next-generation IT, and clean-energy vehicles. Thus, new-energy vehicles, hybrid and electric, are part of these selected group of strategic sectors towards the future. The 12th Five-Year Plan sets out two core sets of goals for the Chinese motor industry (Stewart, 2012): a) To improve domestic automakers' capability to produce entire vehicles in addition to parts, and it aims to develop an independent indigenous capacity to produce key components; and b) The plan places particular focus on new-energy vehicles, and it identifies the production of such hybrid and electric vehicles as the key means by which China will be able to develop the technology to leapfrog over its competitors and become a global player in world auto market. Under this plan, other specific programmes for the development of the new-energy vehicle policies have been implemented: The *'863– Plan – Project for EVs* (2011-2015) and the *New Energy Vehicle Industry Development Plan* (2011-2010). China plans to invest more than US$ 18 billion over the next 10 years to become the world's leading producer of electric and hybrid vehicles and their components.

Industry Structure and Recent Developments

The Chinese auto industry is comprised of between 130 and 150 vehicle manufacturing companies (Ernst & Young, 2005; Russo, et al., 2009). Among these, three types of producers can be identified (Holweg, et al., 2005): a) JVs between local Chinese vehicle manufacturers and TNCs; b) five large domestic groups that, either in addition to their JVs with foreign firms or independently, manufacture and sell cars (Beijing Automotive Industry, Chongqing Changan Automobile, Dongfeng Motor, China FAW Group, and SAIC Motor); and c) a large base of small manufacturers which mainly produce economy vehicles for the low-end market (Chery, Zhejiang Geely, Hafei, etc.). It is worth pointing out, however, that despite these different types of producer groups, automakers do not work in an independent way. Rather, a complex partnership structure and highly complicated network relationships have developed among them. Figures 4.3 and 4.4 display the location of the major global automakers/JVs and domestic automakers' production facilities, respectively.

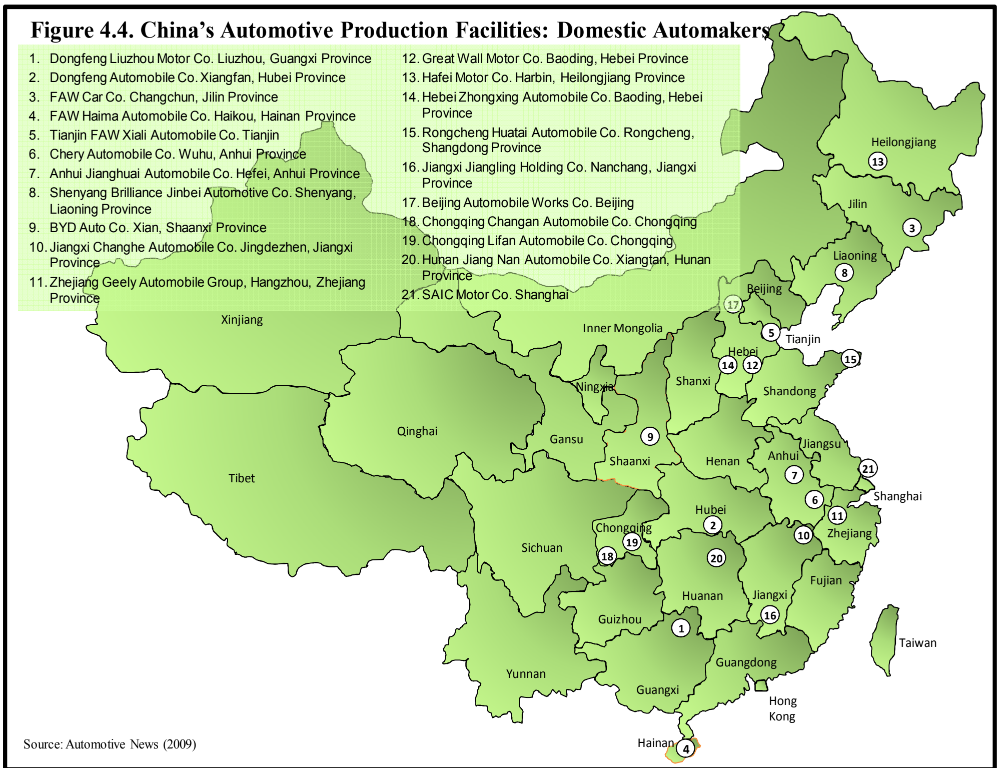
In relation to China's auto-parts industry, this segment has expanded rapidly since the early 2000s. It is estimated the existence of around 25,000 companies (KPMG, 2009; Haley, 2012). Of this total, the number of auto-parts firms officially registered with the Chinese government rose from 4,205 in 2000 to 10,331 in 2008, and they employed 1.9 million people. Other 15,000 are non-registered operating firms (KPMG, 2009). Despite improvements, this segment remains highly fragmented and polarized (Haley, 2012). Since 2004 the government has allowed 100% foreign ownership of auto-parts companies. In 2009, more than 70 of the top 100 global auto parts firms had manufacturing operations in China. Accounting for only 23% of all autoparts firms in China, foreign companies dominate in terms of value and also operate higher up in the value chain. Around 65% of auto parts exports from China are carried out by wholly-owned enterprises (35%) and Sino-Foreign JVs (30%) (Haley, 2012). A small number of Chinese groups, such as Wanxiang, are establishing themselves as independent auto parts companies. Given the increasing FDI and government support, at present China's auto parts industry is in a transition period into higher-value added manufacturing, aiming to become a world-class competitor.

Figure 4.3. China's Automotive Production Facilities: Global Automakers/Joint Ventures



Source: Automotive News (2009)

Figure 4.4. China's Automotive Production Facilities: Domestic Automakers



Source: Automotive News (2009)

China's automotive industry has been highly dominated by the JV operations between Chinese firms and TNCs. Among the most important ones are FAW-Volkswagen Automotive Corporation, SAIC-General Motors, Guangzhou-Honda Automobile Corporation, Beijing-Hyundai Motor Corporation, Dongfeng-Nissan Corporation, Dongfeng-Peugeot Citroen Automobile Corporation, Tianjin FAW-Toyota Motor Corporation, and Dongfeng Yueda-Kia Automobile Corporation. The major Sino-Foreign JVs are presented in Figure 4.5. Although traditionally Sino-Foreign JVs were dominated by China's largest state-owned enterprises (SOEs), very recently this pattern has started to change. Smaller and independent Chinese automakers are also forming JVs with foreign partners. For example, in May 2010 BYD and Daimler AG formed a US$ 95 million JV, BYD Daimler New Technology, to design and manufacture electric vehicles (EVs) (Automotive News Europe, 2012). In the same line of EVs, Great Wall Motors, one of China's major private companies, signed an agreement with CODA Automotive to jointly design and build an economy-class EV that will be aimed at Chinese, U.S. and European markets (China Economic Net, 2012a). Likewise, Chery Automobile

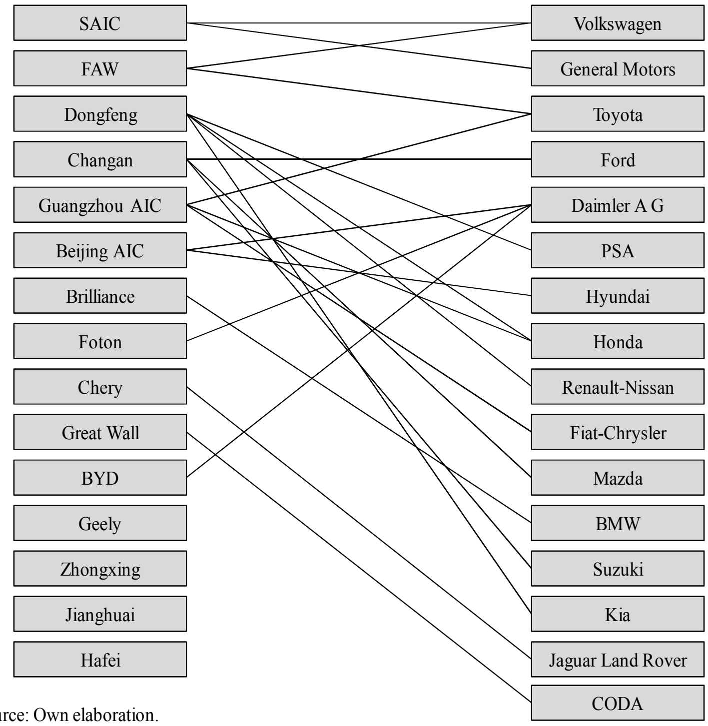
Co. finalised a JV agreement with Jaguar Land Rover (JLR), owned by India's Tata. The US$ 2.8 million JV will manufacture Jaguars, Land Rovers and new JV-branded vehicles and engines, set up R&D facilities, and sell vehicles produced by the JV (Automotive News, 2012a). This recent wave of Sino-Foreign JVs marks not only the inclusion of small-independent and private Chinese automakers in this sort of operations, but also a new type of linkages between emerging-countries TNCs.

The dynamic changes in China's motor industry, particularly after the 1990s, were reflected in its economic indicators. The figures on investment, production and sales are impressive. According to data from China Automobile Industry Yearbook (CCPIT, 2007; DRC-SAE-VW Group China, 2010), total investment in automotive-related activities[27] jumped from 413.6 million *renminbi* (RMB) in 1980, to 4,129 million RMB in 1990, and 17,874.8 million RMB in 2000. In 2008, this amount reached 77,230 million RMB, around US$ 11,300 million. During these years China also became the largest attractor of FDI in the motor industry. As it will be analysed in Chapter 5, during the period 1983-1998 the Chinese motor industry received US$ 20,366.0 million, 4,000 during 1998-2001, and from 2001 to 2011, almost US$ 32,500 million.

Production and sales have grown exponentially. With 18.5 million motor-vehicles produced and sold in 2011, China accounted for almost a quarter of the world's total in both categories.[28] On the other hand, vehicle exports have not followed the same pace of growth than production and sales. Although export volumes have substantially increased from a very low base in the 1980s and 1990s, reaching nearly 850,000 in 2011, this figure still very low in relation its potential, representing less than 5% of total production (Table 4.5). It is clear that, up to now, China's domestic market is the main focus of automotive operations. As discussed and analysed in more detail in chapters 5, 6 and 7, is in the auto parts segments where China is rapidly gaining global competitive positioning.

[27] It includes the segments of automobiles, refitted automobiles, motorbikes, vehicle engines and accessories.
[28] Calculation based on figures from OICA and Ward's.

Figure 4.5. Major Sino-Foreign Joint Ventures in the Motor Industry, 2012



Source: Own elaboration.

In correlation with JVs dominance, global brands account for 70% of China's light-vehicles market, with Chinese brands reaching 30%. Conversely, in the commercial-vehicle segment, Chinese brands dominate the market, concentrating around 95% of domestic sales (Dunne, 2012). Based on 2011 figures for passenger vehicles, VW is the top selling brand, with 13.6% of domestic market share, followed by Toyota, Nissan and Hyundai, with 6.5%, 6.4% and 5.9%, respectively. GM's Buick and Chevrolet also have an important share of sales, with nearly 10% between both brands (Table 4.6). Among the domestic brands, Chery (4.3%), BYD (3.4%), Great Wall (2.8%) and JAC (1.7%) stand out.

A similar situation is observed in the production side, where the JVs are the top manufactures of passenger vehicles, while Chinese firms dominate the manufacturing of the commercial segment (Table 4.6). The largest JVs dominate the production figures. Shanghai General and Motors and Shanghai Volkswagen account for around a fifth of China's total production of passenger vehicles. FAW

Volkswagen is another significant manufacturer, with 8.3%. Of the domestic firms, Chery, BYD, Geely Group, and Great Wall, as a whole participate with 15% of the market.

Table 4.5. Production, Sales and Exports in China's Motor Industry, 1980-2011 (Units)

Year	Production	Sales	Exports
1980	140,950	n.a	726
1985	443,337	n.a.	1,659
1990	509,242	n.a.	4,431
1995	1,434,788	1,441,779	17,747
2000	2,069,069	2,091,305	27,136
2005	5,668,163	5,814,276	32,460
2006	7,566,233	7,076,817	89,935
2007	8,885,461	8,819,133	208,617
2008	9,233,290	9,330,366	245,917
2009	13,648,553	13,618,095	105,949
2010	18,264,667	18,061,936	544,900
2011	18,418,876	18,510,000	849,000

n.a.: Not available.
Source: Own elaboration based on Ward's (2001); OICA (2012); just-auto (2012); CCPIT, 2007; DRC-SAE-VW Group China, 2010

The counterpart of domestic sales for several of the small, independent and local government-supported Chinese automakers is the export market. Some of these are China's most dynamic motor vehicle exporters, with a deliberate strategy of internationalization. In the race to be globally competitive and to catch up faster with technological capabilities, Chinese automakers have deployed a variety of strategies. These go from hiring engineering service and design firms, buying bankrupt companies, forming JVs with global suppliers, to acquiring luxury and worldwide-recognized auto brands. In March 2010, for instance, Geely acquired Volvo Corporation from Ford in a US$ 1,800 million-transaction.

Table 4.6. Top Brand Sales and Manufacturers in China's Domestic Market, 2011

Rank	Brand Sales	Units	%	Manufacturers	Units	%
1	Volkswagen	1,777,623	13.6	Shanghai GM	1,207,445	9.8
2	Toyota	848,317	6.5	Shanghai VW	1,178,421	9.6
3	Nissan	835,217	6.4	FAW VW	1,017,802	8.3
4	Hyundai	770,705	5.9	Beijing Hyundai	743,888	6.1
5	Buick	645,829	4.9	Dongfeng Nissan	658,368	5.4
6	Chevrolet	618,244	4.7	Chery	629,386	5.1
7	Honda	593,212	4.5	FAW Toyota	528,270	4.3
8	Chery	556,235	4.3	BYD	449,425	3.7
9	Kia	459,938	3.5	Geely Group	435,476	3.5
10	BYD	448,484	3.4	Dongfeng Yueda Kia	431,265	3.5
11	Great Wall	365,075	2.8	Changan Ford Mazda	419,520	3.4
12	Ford	323,285	2.5	Dongfeng PSA	405,935	3.3
13	Audi	305,920	2.3	GAC Honda	368,788	3.0
14	Suzuki	302,147	2.3	Great Wall Motor	365,952	3.0
15	FAW	273,520	2.1	GAC Toyota	272,526	2.2
16	BMW	234,241	1.8	Dongfeng Honda	253,854	2.1
17	Citroen	230,679	1.8	TAIC FAW Xiali	253,633	2.1
18	Mazda	225,433	1.7	FAW Car	239,141	1.9
19	Skoda	220,009	1.7	Changan Suzuki	219,889	1.8
20	JAC	217,201	1.7	Jianghuai Autom.	218,352	1.8
P-V Total		**13,074,298**	**75.0**	**P-V Total**	**12,270,438**	**72.3**
1	Wuling	1,209,006	24.5	SAIC-GM-Wuling	1,192,411	24.6
2	Changan	646,908	13.1	Changan Group	646,329	13.3
3	Dongfeng	575,531	11.7	Beiqi Foton	492,334	10.1
4	Foton	525,883	10.7	DFAC	353,719	7.3
5	Jinbei	305,340	6.2	Brilliance Jinbei	297,584	6.1
6	JAC	208,304	4.2	Dongfeng Yuan	234,731	4.8
7	FAW	137,992	2.8	Jianghuai Autom.	201,544	4.2
8	JMC	127,006	2.6	Jiangling Motors	178,238	3.7
9	Great Wall	121,736	2.5	Great Wall Motors	120,110	2.5
10	Hafei	117,933	2.4	Hafei Motors	115,772	2.4
C-V Total		**4,928,749**	**25.0**	**C-V Total**	**4,853,206**	**27.7**

P-V: Passenger Vehicles.
C-V: Commercial Vehicles.
Source: Elaboration based on LMC Automotive (2012).

In 2011 Chery exported 160,000 vehicles to more than 64 countries. In like manner, Great Wall exported 83,000 units. The core of exports is destined to developing countries (Southeast Asia, Middle East, North Africa, Eastern Europe, and Latin America), competing in the low-end market segments. Great Wall has established assembly facilities in Bulgaria, Egypt, Indonesia, Iran, Malaysia, Philippines, Russia, Senegal, Venezuela and Vietnam. For its part, Chery has located assembly operations in Argentina, Brazil, Egypt, Iran, Malaysia, Russia and Ukraine, Uruguay, and Venezuela. Automotive specialists consider that due to technical and organizational shortcomings, is going to take a few more years for Chinese firms to substantially penetrate the developed-country markets (Donelly, 2008; Yang, 2012).

Among the factors 'pushing' Chinese domestic automakers to internationalise is the increasing fierce domestic competition with a surge in the number of models available in China and excess production capacity (Russo, et al., 2009b). This process is causing a decrease in demand for some Chinese automakers' brands, squeezing domestic profit margins. An explanation for overcapacity among domestic manufacturers is the fact that many Chinese provinces are trying to develop their own automotive sectors. In order to do so, investment plans are generally financed by state-owned banks regardless of commercial criteria (Ernst & Young and EIU, 2005). Paradoxically, the central government has used foreign firms to control local governments (Thun, 2004 and 2006), since the latter's idea of having their own car industry has caused inter-provincial rivalry and local protectionism, leading to inefficiency problems for both domestic and foreign joint ventures.

In fact, the sector's excess capacity has been a source of concern among industry executives and government official for some years. It is estimated that production capacity in China will probably rise 15% in 2012 and 20% in 2013, outpacing the expected 4% annual increase in demand (Automotive News, 2012b). In this regard, aiming at limiting overcapacity and improving the strength of domestic automakers, China's National Development and Reform Commission (NDRC) and the Ministry of Commerce formulated recently a policy guideline to restrict foreign investment in automotive manufacturing. The new policy took effect on January 30, 2012, replacing rules from 2007 (China Economic Net, 2012b). China's government will continue to encourage FDI in more fuel-efficient vehicles, manufacturing of engines and other key components, as well as R&D in key technologies. According to auto specialists, this new policy may have important impacts on the flows of FDI since it might be more difficult for automakers to get approval for new plants in the future, unless they have an investment in new-energy vehicles (Automotive News, 2011a).

4.4. Structure and Evolution of Mexico's Motor Industry

Background and Development Phases

Mexico's automotive industry has undergone a radical transformation during the last three decades. Since the beginning of the industry in the mid-1920s to 1980, its structure and orientation was influenced by industrial policies following an import substitution strategy (Bennett and Sharpe, 1985; CEPAL, 1992; Ramirez de la O, 1998; Tuman, 2003). With the purpose of serving the domestic market – particularly after the 1962 Automotive Decree -, a number of wholly-owned transnational corporations started manufacturing activities competing in a closed environment. Nevertheless, due to the 1982 economic crises, the Mexican government was forced to change towards a more open and export promotion policy. After liberalising the economy and establishing more flexible FDI rules, Mexico was being increasingly integrated into the automotive global production systems through new investments (CEPAL, 1992; Shaiken, 1994). The new export plants combined high–tech production segments, highly skilled labour force and flexible work norms. This trend about Mexico being a potential site for high-tech and advanced production in the car industry attracted the attention of some analysts who argued the changing nature of the current international division of labour in this industry at that time (Shaiken, 1994). The signing of a North American Free Trade Agreement (NAFTA) between Mexico, the United States and Canada - which came into effect on 1 January 1994 - deepened Mexico's integration into the global motor industry, specially within the North American market ad production base (Carrillo, 2004; Studer, 2004; Tuman, 2003; Ramirez de la O, 1998). As a consequence of this process of Mexico's integration into the global automotive industry, the country's sector has become more specialised for the international markets.

The development phases of Mexico's motor industry can be depicted as follows:[29]

1) *The Emergence of the Industry and Assembly Stage (1908-1962).* This phase was characterised by the import of completely build vehicles (1908-1924) and subsequently assembly activities with imported parts or complete knock down kits (CKD) were developed through license agreements or by subsidiaries of foreign companies (1925-1962). A new regulatory framework developed in 1924 imposed steep tariffs on imported vehicles while cutting prevailing duties on parts imports, as a first step toward implementing a policy of import substitution. This policy induced automakers to invest in Mexico in order to avoid tariffs. The first assembly plant in Mexico was set up by Ford Motor Company in 1925, being followed by General Motors which initiated operation in 1935. A few years later, in 1938, Chrysler entered the Mexican market through a license arrangement with Fábricas Auto-Mex. Eventually, Chrysler acquired the Mexican company.

2) *The Import Substitution Industrialisation (ISI) (1962-1969).* Given the absence of 'backward' linkages with local suppliers and the increasing deficit in the sector's balance of payments, in 1962 the government issued the first *Automotive Decree* aiming at nationally integrating the structure of production. Under the Decree regulations, 60% of all parts used in domestically produced vehicles were required to come from Mexican suppliers. In addition, foreign investment in auto parts operations was limited to 40%. The post-1962 structure of Mexico's motor industry reflected the dominance of U.S., Japanese and German automakers. Nissan and VW started manufacturing operations in Mexico during the 1960s. Vehicle production increased during this phase but, despite some advances, trade imbalances persisted, and domestic component firms had problems to achieve economies of scale, producing expensive and low-quality parts. Mexican-owned

[29] The first five phases are mainly based on the works of Tuman's (2003), and complemented with Bennett and Sharpe (1985), CEPAL (1992), and Moreno Brid (1996).

companies which had previously assembled cars through licenses agreements were gradually displaced by foreign-owned subsidiaries.

3) *The Exhausting of ISI (1970-1982).* Government efforts during the decade of the 1970s focused on imposing higher tariffs on imports, stronger domestic content requirements, and export incentives. By 1972, all automakers were required to balance automotive parts imports with exports. Nevertheless, the initial move to export promotion was largely a failure since it was cheaper for foreign firms to supply their home plants with components imported from other developed countries. The 1977 Automotive Decree intended to promote exports through strict regulation of balance-of-payments mechanisms. This time, the international environment of the late 1970s, such as the impact of the 1974 oil crisis and the penetration of Japanese imports into the U.S. market, induced foreign automakers to consider Mexico as export platform, in particular of auto parts and engines. During this period GM and Ford started investing in *maquiladora* auto parts plants in northern Mexico. The effects of the 1977 Auto Decree were diverse. On the one hand, in order to meet export requirements, the major TNCs made substantial investments in engine and *maquiladora* plants. On the other hand, the industry continued to experience a worsening trade deficit.

4) *Restructuring and Export Promotion (1982-1993).* Derived from the deep economic crisis of the Mexican economy in 1982, the government was forced to abandon the ISI model and initiated a process of liberalisation of the economy. This policy change had very significant implications for the structure and operation of the motor industry. In 1983 a new Automotive Decree was released, having as major objectives the industry's rationalisation and the strengthening of the export-orientation. The new policy limited the number of models per company and prohibited the production of 8-cylinder engines; also, the minimum domestic content for each vehicle was raised to 60%, but each firm was allowed to compensate for local content with higher ratio of exports to total production. After this period of crisis, the composition of the finished vehicle sector changed. Firms with weak financial position were forced out of the market (i.e. Renault and VAM); the others entered a process of restructuring and modernisation. By the

mid-1980s, Ford, GM, Chrysler and VW had embarked in substantive investments in technologically advanced and export-oriented car plants. In addition, by the early 1990s the government also liberalised automotive trade, allowing importing a greater number of different model from abroad. In summary, after an initial period of adjustment, the industry experienced growth and recovery. Production increased and the share of exports in relation to total production went from 11% to more than 50% in the period 1983-1993.

5) *NAFTA and Regional Integration (1994-2007).* Mexico, the United States and Canada formed the NAFTA in 1994, formalising a process of regional integration and the creation of a free trade area. Under NAFTA, tariffs on goods traded in North America were reduced, and domestic content rules as well as restrictions on FDI were eliminated. As in the period after the 1982 economic crisis, NAFTA and regional integration had important impacts on the motor industry's structure and operation (Tuman, 2003). First, trade liberalisation led to economic restructuring, hitting inefficient-small and medium auto parts firms. In the finished vehicle plants restructuring was also felt. Second, as duties had been reduced on imports, automakers eliminated certain product lines in Mexico and replaced them with vehicle imports from the United States or other countries. Simultaneously to this process, Mexico's motor industry received significant amounts of FDI for the setting up of new car and engine plants, or increasing installed capacity, mostly destined for export markets. New automakers initiated operations in this period: Honda, Mercedes Benz and BMW. Third, motor vehicle and auto parts production and exports have significantly grown. And, fourth, NAFTA has resulted in a high level of integration in the North American motor industry.

6) *Post-NAFTA Phase: 2007–to Present.* It could be argued that a new development phase of Mexico's motor industry began to emerge from the second half of the 2000s. However, until now this new phase does not represent a radical change from the previous one, but it does contain differentiated characteristics. Some of these new characteristics are the following: a) New automotive players are entering the Mexican market. Other European and Asian automakers are

setting up manufacturing operations. This is the case of Fiat, Audi, Mazda and some Chinese firms (Foton and JAC Motors); b) Derived from the 2008-2009 financial crisis, Mexico is playing a key role as manufacturing centre of new-efficient, technologically advanced, subcompact and medium-size cars; c) In the auto parts segment new global players are also arriving to Mexico's motor industry, since new assembly operations are bringing their own supplier's network; d) There is a tendency for a diversification of the export markets, especially towards some countries of Latin America, Europe and Asia; e) Increasingly, the auto parts *maquiladora* industry is becoming of third and fourth generation; and f) At small scale, but new 'Mexican' automakers are emerging. On the one hand are the sport brands such as Mastretta and Vehizero; on the other, commercial vehicle firms such as Giant Motors and Spartak, for example. What attract attention in the case of the latter is that these new Mexican auto firms are operating through technological association with Chinese counterparts. In this sense, it seems that Chinese motor companies, through investment in assembly plants, global *maquiladoras* and auto parts, as well as technological associations are significantly shaping this new development phase of Mexico's motor industry.

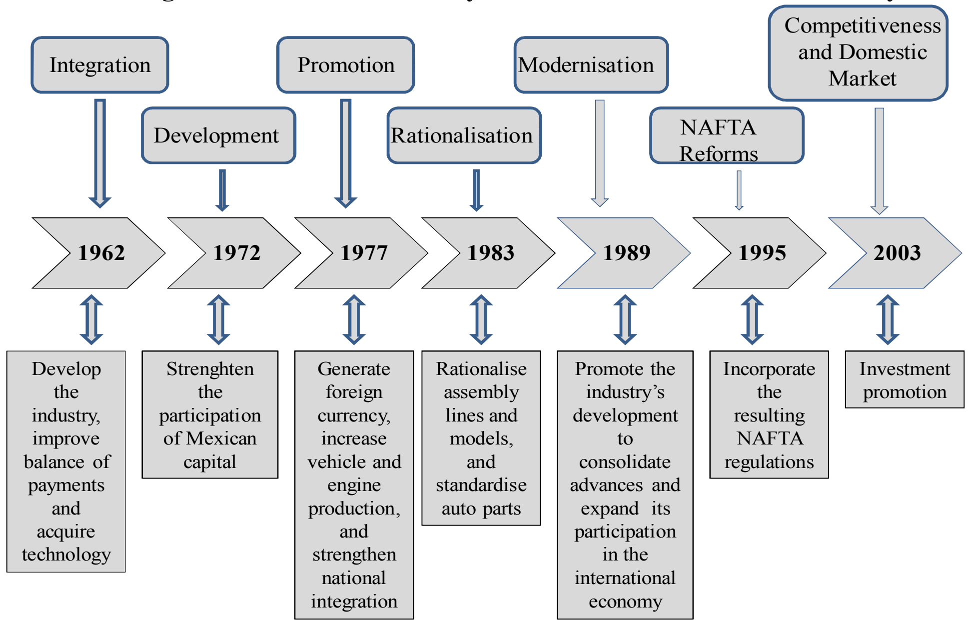
Automotive Policies and the Motor Industry's Development

Given the significance of the motor industry in the Mexico's national economic development, the government has established specific programmes for its promotion and consolidation. As reflected in the industry's development phases, formal implementation of these programmes has been carried out through 'Automotive Decrees' aimed at regulating the structure and evolution of Mexico's motor industry, the final assembly and the auto part segment (production, sales, FDI, trade, etc.) (Moreno Brid, 1996). From 1962, the year that the first automotive policy was issued, six Automotive Decrees have been released: 1962, 1972, 1977, 1983, 1989 and 2003. In 1995 some modification were carried out to incorporate the NAFTA regulations. Likewise, in November 2009, the 2003 Decree was modified to accommodate to the new market situation after the financial crisis, facilitating the registration or renovation as light vehicle producers to auto firms (Presidencia de la República, 2009).

The central aim of the 1962 Auto Decree was to develop a 'national' motor industry, strengthening local manufacturing capabilities through a process of import substitution. By the end of the 1970s emphasis was placed on trade balance and export promotion; by the 1980s a process of market liberalisation was initiated. In the 1990s, with the signing of NAFTA, trade barriers in the sector were gradually eliminated, marking the end of Mexico's trade protectionist policies in the motor industry (Moreno Brid, 1996; Mortimore and Vergara, 2004). Under the NAFTA framework, tariffs, domestic content rules and restrictions on foreign investment were eliminated. Some of the main provisions were as follows: a) Elimination of tariffs on all automotive goods by 2003; b) New rules-of-origin and regional-content requirement of 62.5 percent for cars and specific components and 60 percent for other parts, to be reduced by 2004 to 52.5 percent and 50 percent, respectively; c) In January 1994, Mexico's import quota on new automobiles - which limited a firm's imports to 15 percent of its annual production - was eliminated; d) Restrictions on foreign direct investment in the Mexican automotive parts industry – which had previously limited foreign ownership to 49 percent – where phased out in 1999; e) Treatment of Mexican-produced vehicles as 'domestic' under the U.S. corporate average fuel economy (CAFE).

In a zigzagging course, from 1962 to the early 1990s government policies were moving from pursuing a 'national' industry to a globally (regionally) integrated one. In rather inconsistent policy actions, along this timeline Auto Decrees pursued the industry's 'integration', 'development', 'promotion', 'rationalisation', 'modernisation', and 'competitiveness' (Figure 4.6).

Figure 4.6. Timeline of Policy Decrees in Mexico's Motor Industry



Source: Own elaboration based on Mexico's Ministry of Economy (2011).

During the mid-1990s, Mexico's motor industry was viewed as one of the most successful cases in industrial restructuring (Moreno Brid, 1996). Certainly, government automotive policies played an important role, but they only explain part of the equation. Rather, as Moreno Brid suggested (ibid: 30), the success in establishing an internationally competitive motor industry is only partially explained by automotive policies since "this development was not due entirely to an imposition upon the transnational corporations by the Mexican government, but the resulted from corporations' interests, given the competitive context which then prevailed worldwide, and the Big Three's urgent need to respond to Japanese competition".

The increasing process of international integration has produced a more specialised role of Mexico's motor industry al global level, in particular in the North American region. The changing automotive policy since the 1962 Decree and the following three decades practically marked the end of a national dream: the manufacture of a motor vehicle which in content and design is 100% Mexican, the 'Mex-Car'. As discussed above, during recent years, a kind of *renaissance* in the design and manufacture of 'Mexican' brands is emerging. This time, this trend is not the deliberated outcome of automotive policies, but the initiative of private entrepreneurs.

Although not specifically designed for the motor industry, the policy of 'Free Trade Agreements' (FTAs) has positively impacted this sector in attracting FDI. Mexico has a network of 12 FTAs covering 44 countries (Table 4.7). According to Mexico's Ministry of Economy (2012a), this is a unique opportunity for international commerce and investment because it gives strategic access to a potential market of over one billion consumers which represents over 60% of the world's GDP.

Table 4.7. Mexico's Network of Free Trade Agreements (2012)

Treaty	Country	In Force Since
NAFTA	United States and Canada	1 January, 1994
FTA-G3	Colombia and Venezuela[1]	1 January, 1995
FTA Mexico-Costa Rica	Costa Rica	1 January, 1995
FTA Mexico-Bolivia	Bolivia	1 January, 1995
FTA Mexico-Nicaragua	Nicaragua	1 July, 1998
FTA Mexico-Chile	Chile	1 August, 1999
FTA-UEM (TLCUEM)	European Union	1 July, 2000
FTA Mexico-Israel	Israel	1 July, 2000
FTA Mexico-Northern Triangle	El Salvador, Guatemala and Honduras	14 March, 2000 with El Salvador and Guatemala. 1 June, 2001 with Honduras
FTA Mexico-AELC	Iceland, Norway, Liechtenstein and Switzerland	1 July, 2001
FTA Mexico-Uruguay	Uruguay	15 July, 2004
FTA-Unified	Costa Rica, El Salvador, Guatemala, Honduras y Nicaragua	Pending
EAA Mexico-Japan[2]	Japan	1 April, 2005
TIA Mexico-Peru[3]	Peru	30 January, 2012[4]

[1]Since November 19, 2006, Venezuela does not participate.
[2]Economic Association Agreement.
[3]Trade Integration Agreement.
[4]Issued in the Federal Official Gazette (DOF).
Source: Mexico's Ministry of Economy (2012a); and Presidencia de la República (2012).

Structure and Recent Evolution

The position and significance of the motor industry's value chain in Mexico's economy is unquestionable: it contributed with 20.3% of manufacturing GDP, 28.4% of manufacturing exports, 22% of FDI and around 15% of manufacturing employment (BBVA, 2012; Romero, 2011). At present, most of the major global automakers and auto parts firms have operations in Mexico. In 2011 Mexico ranked in 8th place among the leading producing countries worldwide. Its production capacity is supported on low operation costs, high productivity of labour, supply chain and privileged geographical location, among other factors. Mexico's motor industry, both the finished-vehicle and auto parts segment, is highly export-oriented. Exports account for more than 80% of total production.

The industry is comprised of 25 OEM firms producing light and commercial vehicles and around 1,100 auto parts companies. OEM firms are overwhelmingly dominated by foreign capital. In the auto parts segment, 70% of firms are of foreign capital and 30%, national. Of total auto parts companies, 345 are Tier-1 and the rest are Tier-2, Tier-3 as well as input suppliers. Including distribution and service centres, Mexico's motor industry generates over a million jobs. The final-vehicle assembly segment employs around 60,000 people and the auto parts, 550,000 (INA, 2010). Tables 4.8 and 4.9, and Figures 4.7 and 4.8, present the list and location of the major companies and plants operating in Mexico's passenger and commercial-vehicle segments.[30] The list also includes the new investment projects announced or in which plants are under construction.

[30] It is important noting that companies included in the lists are mainly those officially affiliated to the major motor vehicle associations in Mexico: AMIA for passenger-cars and ANPACT for commercial vehicles. As discussed in Chapter 8, this left out small or emerging companies, some Chinese operations among them.

Table 4.8. Major Automakers and Plants in Mexico's Passenger Vehicle Segment (2012)

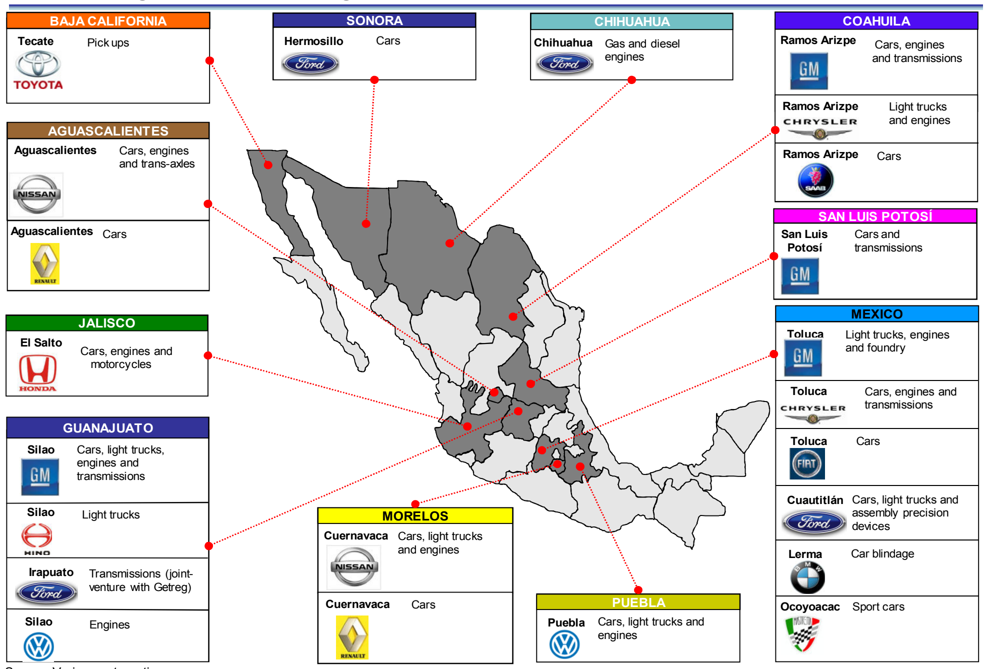
Company	City	State	Start-up Operations	Product/Brand
Chrysler	Saltillo	Coahuila	1981	Ram trucks
	Saltillo	Coahuila	1981	Engines
	Toluca	Mexico	1968	Journey
Chrysler-Fiat	Toluca	Mexico	2011	FIAT 500
	Toluca	Mexico	2011	Freemont
	Saltillo	Coahuila	2013	Ducato
Ford	Cuautitlán	Mexico	1932 2010	Closed in 2007 for retooling Reopening with the 'New Fiesta'
	Hermosillo	Sonora	1986	Fusion, Millan, and MKZ, including the hybrid versions.
	Chihuahua	Chihuahua	1983	Engines
	Irapuato	Guanajuato	2010	Transmissions in JV with Getrag
General Motors	Ramos Arizpe	Coahuila	1979	SRX, Captiva, Monza, Sonic
	Silao	Guanajuato	1992	Escalade EXT, GM Sierra, Avalanche, Silverado
	Toluca	Mexico	1935	Engines
	San Luis Potosí	San Luis Potosí	2007	Aveo
	Toluca	Mexico	2012	Engines
Honda	El Salto	Jalisco	1995	Accord (stop in 2007)
			2007	CR-V
Mazda	Salamanca	Guanajuato	2013	Mazda 2, Mazda 3, and engines
Nissan	Aguascalientes	Aguascalientes	1982	Sentra, Tilda HB, Versa
	Aguascalientes	Aguascalientes		Engines
	Cuautla	Morelos	1966	Trucks, Frontier, Tsuru, NV 200
	Aguascalientes	Aguascalientes	2013	Car base on platform B
Toyota	Tecate	Baja California	2004	Tacoma
Volkswagen	Puebla	Puebla	1964	New Beetle, Bora, Jetta, Sportwagen and heavy trucks
	Silao	Guanajuato	2013	Engines
Volkswagen-Audi	Not determined	Not determined	2016	Q5 SUV

Source: Own elaboration based on AMIA and other automotive sources.

Table 4.9. Major Automakers in Mexico's Commercial Vehicle Segment (2012)			
Company	**City**	**State**	**Product**
Daimler-Mercedes Benz	Saltillo-Ramos Arizpe	Coahuila	Tracto-tucks
	García	Nuevo León	Buses
	Santiago Tianguistengo	Mexico	Heavy trucks and tracto-tucks
DINA	Ciudad Sahagún	Hidalgo	Buses
Giant Motors	Ciudad Sahagún	Hidalgo	Light trucks and buses
Hino	Silao	Guanajuato	Light Trucks
Isuzu	San Martin Tepetlixpan	Mexico	Light Trucks
Kenworth	Mexicali	Baja California	Tracto-trucks
Navistar-International	Escobedo	Nuevo León	Tracto-tucks and heavy-trucks
Scania	El Marqués	Querétaro	Buses
Volvo	Tultitlán	Mexico	Buses and heavy trucks
Volkswagen-MAN	El Marqués	Querétaro	Buses, trucks
Source: Own elaboration based on ANPACT and other automotive sources.			

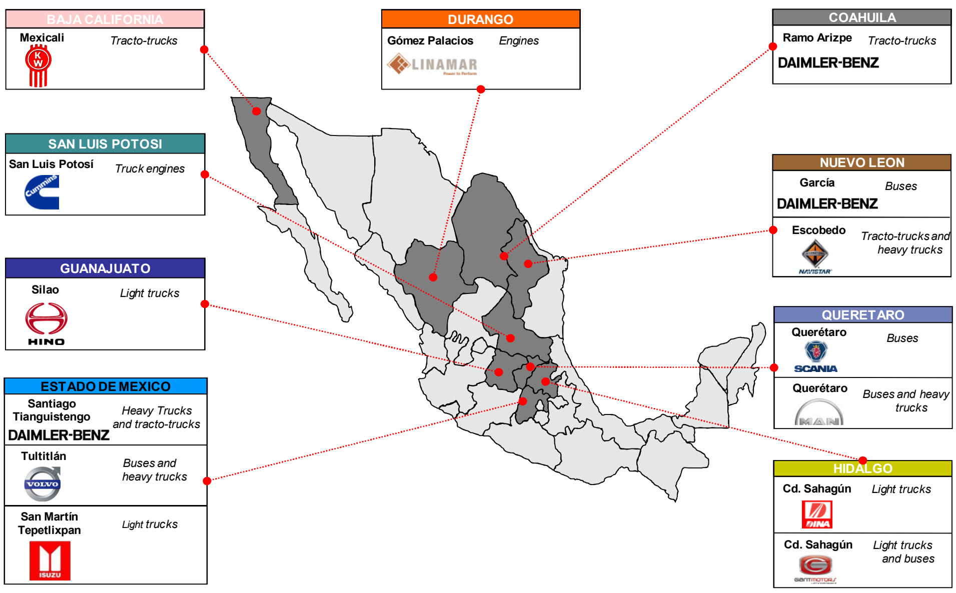
Table 4.10 shows figures on production, sales and exports in Mexico's motor industry from 1980 to 2011. As observed, the export market drives production trends. Exports reached a record level of 2.14 billion units in 2011. 80% of motor-vehicle production is exported, in the same proportion to the United States. While production also reached a record level of 2.7 million units, representing five times that of 1980, sales have registered stagnation since the middle-2000s.

Figure 4.7. Mexico's Light-Vehicle Production Facilities, 2011



Source: Various automotive sources

Figure 4.8. Mexico's Commercial Vehicle Production Facilities, 2011



Source: Various automotive sources

Despite Mexico's car industry being hard hit by the financial global crisis, in 2010 the sector showed an outstanding recovery. In 2009 Mexico's vehicle output decreased nearly 30% in relation to 2008. The auto parts segment lost 125,000 jobs from January 2008 to December 2009 (INA, 2010). Nevertheless, in 2010 motor vehicle production registered a growth of 50%. Exports of vehicles and auto parts also presented substantive increases. Production and exports are expected to continue growing in the next years due to the sizeable investments carried out by TNCs during the period 2010-2012, of around US$ 10 billion. Production capacity is estimated to reach 4.5 million units by 2014 (El Semanario, 2012).

Table 4.10. Production, Sales and Exports in Mexico's Motor Industry, 1980-2011 (Units)

Year	Production	Sales	Exports
1980	488,331	663,043	18,245
1985	457,029	389,825	58,423
1990	819,055	548,804	276,869
1995	934,717	188,591	781,082
2000	1,922,889	902,372	1,434,110
2005	1,684,238	1,162,158	1,186,346
2006	2,045,518	1,177,100	1,536,768
2007	2,095,245	1,144,305	1,613,313
2008	2,167,944	1,068,736	1,661,403
2009	1,561,052	777,385	1,223,333
2010	2,342,282	846,881	1,859,182
2011	2,680,037	909,026	2,143,879

Source: Own elaboration based on AMIA and INEGI.

Mexico is shifting from manufacturing low-end small cars to more technology and value added vehicles, while importing small cars. At present a variety of models are exclusively produced in Mexico by foreign automakers for the world market: PT Cruiser (Daimler-Chrysler); Fusion, Zephyr and Milan (Ford); Rendevouz (General Motors); Sentra and Tsuru (Nissan); New Beatle, Bora and

Jetta (Volkswagen). Likewise, global auto parts companies have developed production networks in Mexico. Several of them, such as Delphi, Yazaki, Valeo, Lear, Visteon and Siemens have established R&D centres in Mexican territory (Carrillo, 2004).

Traditionally, Mexico's motor industry has been dominated by the so-called U.S. 'Big Three', plus Nissan and Volkswagen. These five automakers account for 93% of total production and exports, and 75% of domestic sales (Table 4.11). The other three, with less time in the Mexican market, have been steadily increasing their share in these lines. Nowadays, Mexico is one of the most open and competitive markets around the world. Models in the market jumped from 58 in 1995, 360 in 2006 to more than 500 in 2010 (Ornelas, 2006; INA, 2010). According to AMIA, although Mexico exports around 80% of its annual production, it also imports around 60% of total domestic sales, basically small-compact cars.

Table 4.11. Production, Sales and Exports of Light-Vehicles by Automaker in Mexico's Motor Industry, 2011 (Units)

Company	Production	Sales	Exports
Chrysler	279,869	80,557	266,117
Fiat	58,903	2,965	56,979
Ford	462,462	86,586	449,925
General Motors	544,202	171,397	443,237
Honda	45,390	33,442	36,429
Nissan	607,087	223,465	411,660
Toyota	49,596	47,388	49,549
Volkswagen	510,041	127,795	429,987
Other	--	135,432	--
Total	2,557,550	909,026	2,143,883

Source: AMIA.

Finally, despite the advances and the positive prospects of Mexico's motor industry, it seems to be a general agreement among policymakers, analysts and businessman that Mexico needs to improve some crucial areas in order to increase the sector's competitiveness in the whole value-chain (ATKEARNY, 2007; Romero, 2011; Dussel Peters, 2012). These areas are mainly related to low levels of investment in R&D, both public and private, limiting technological innovation; structural deficiencies in the auto parts and motor vehicle industry inputs production segment; concentration of export market in the U.S.; high infrastructure costs; among other aspects.

4.5. Conclusions

During the past two decades, the world motor industry has experienced a number of fundamental transformations, deepening the globalisation process. Along with increasing technological complexity and organisational re-engineering, a substantial change in the global geography of the industry is taking place. New producing countries and growing markets in developing economies have been integrated into the global production and distribution system. The recent global financial crisis accelerated the trends towards greater significance of this industry in emerging economies. It is possible to argue that the motor industry's emerging global division of labour is a qualitatively different one from that of the early 1990s.

Within this process of the motor industry's deepening globalisation and changing division of labour, both China and Mexico are playing an increasing significant role. Both countries are key players in the strategies and global production networks of the world's larger automakers and suppliers. Nevertheless, their role in the global division of labour presents a differentiated character. Nowadays, China's huge and dynamic domestic markets is the major driving force behind foreign investment, while Mexico is being manly used as export platform, especially for the North American market.

In terms of the motor industry's evolution within the national economies, although Mexico and China share some similarities in the development of the industry, particularly in their first stage when governments tried to establish a strong "national" industry by applying protectionist measures and import substitution strategies, the path followed by each country during the last three decades has been a rather divergent one. In China, governmental policies were more 'pragmatic' in pursuing the sector's modernization, promoting JVs –with limits in foreign ownership - to acquire advanced technology and rationalise the industry. For its part, eventually Mexico liberalised the motor industry as a way of being international competitive and attractive as investment location. Besides the size of the industry and market, perhaps the major difference between China's and Mexico's motor industries is the existence in the former of a very important segment of domestic manufactures producing their own brands. Some of them are trying to catch up with international standards, and have initiated a process of transnationalisation of their operations.

China's motor industry main advantages are their enormous and growing domestic market, low production costs, and the tendency towards technological innovation and value chain upgrading. Particularly, recent policy measures are aimed at converting China as the world centre of new-energy vehicles. For its part, Mexico's advantage and strengths in the global automotive industry rely on its outstanding geographical location, the relatively low operation costs, qualified and skill labour force, logistics and service development. In addition, Mexico has signed 12 FTAs with access to 44 countries which facilitate international trade. The resulted combination of governmental policies and the strategies followed by the major TNCs in the coming years will reshape China's and Mexico's roles in the motor industry's global division of labour.

5. CHAPTER FIVE

THE CHINA-MEXICO AUTO INTERACTION 1: INTERNATIONAL MARKET INTEGRATION AND GLOBAL INVESTMENT ATTRACTION

> "Automakers are moving as quickly as possible to countries with lower labour costs. China in particular is a behemoth......Now that China has lower costs than Mexico, the industry is moving east instead of south." (Øvreberg, 2005).

> "China is not Mexico's main competitor in attracting global automotive investment flows. Rather, the southern U.S. states of Alabama, Indiana, Mississippi, and Texas represent the major threat."[31]

One of the major concerns in developing countries during the last decade has been the issue of diversion or competition from China in the attraction of FDI. In these countries it has been common to find government leaders, policymakers, entrepreneurs and analysts claiming that China has negatively affected FDI flows from TNCs into their economies. Although this topic has received less attention compared to trade issues, several empirical studies have been elaborated to analyse the "China effect" on Latin America's FDI attraction. However, to date, these studies have either produced contrasting results (Jenkins, 2009), or they have not been statistically conclusive (Bittencourt et al., 2011), or they present significant heterogeneity across Latin American subregions and countries (Lederman, Olearraga and Perry, 2009). While some studies concluded the existence of competitive effects, other found complementary impacts to investment flows in Latin America. These contrasting conclusions have been explained by Jenkins (2009: 52) by underlining that "these studies differ in terms of methodology, time period, and countries covered and level of aggregation making it difficult to compare their results." Despite these contrasting,

[31] Official from Mexican Ministry of Economy. Personal interview. Mexico City. 13th December, 2007.

inconclusive and heterogeneous results, a major - and almost unanimous - conclusion derived from the analyses is that Mexico appears as Latin America's most adversely affected country by FDI competition and substitution effects, especially after China's accession into the WTO in 2001 (Dussel Peters, 2005a and 2005b; Devlin, Estevadeordal and Rodríguez-Clare, 2006; García-Herrero and Santabárbera, 2007; Jenkins and Dussel Peters, 2007; De la Cruz, Boncheva and Ruiz-Porras, 2008; Hogenboom, 2008; Jenkins, Dussel Peters and Mosquita Moreira, 2008; Gallagher and Porzecanski, 2008; Jenkins, 2009; Chantasasawat et al., 2008 and 2010). At aggregated level, for example, through an econometric analysis García-Herrero and Santabárbera (2007: 148) estimated that when Chinese inward FDI increases by US$ 100 million, Mexican inward FDI is reduced by 29 million. According to this study, among the fundamental factors behind this situation is Mexico's similar export structure to China's as well as direct competition for efficiency-seeking FDI, in which the former has been losing competitiveness in world markets and global foreign investment attraction. This trend induced analysts to highlight the multi-cited event of the *maquiladora's* 'massive' migration from Mexico during the period 2000 to 2003-2004: 'the giant sucking sound from the East' (Greider, 2001; The Economist, 2003). Based on data from INEGI (2010), between December 2000 and December 2003 Mexico's *maquiladora* sector lost 900 plants and 260,000 jobs, around a quarter and a fifth of the totals, respectively; in one year, from 2000 to 2001, *maquiladora* exports decreased US$ 8.1 billion. In the same way, annual FDI inflows into the *maquiladora* activity dropped by about one third, from US$ 3 billion in 2000 to 2 billion in 2003, falling to about the same level they had reached in 1998 (UNCTAD, 2004: 61).

Although not exclusively so, the relocation of FDI and plants from Mexico's *maquiladora* industry was largely attributed to fiercer competition from Asia, especially from China[32] (Rosen, 2003; Villarreal, 2003; Dussel Peters, 2005a;

[32] Recognising the relevance of China's competition in the *maquiladora* downturn during that period, several studies have underlined the incidence of other factors such as the recession in the U.S. economy, the appreciation of the peso, changes in Mexico's tax regime for *maquiladoras,* the loss of certain tariff benefits as a result of the NAFTA, and the lack of internal macroeconomic reforms, among others (Gerber and Carrillo, 2002; USGAO, 2003; Quintin, 2004; Mollick and Wvalle-Vázquez, 2006).

Cornejo, 2005; Carrillo and Plascencia, 2007; Jenkins and Dussel Peters, 2007; Sargent and Matthews, 2009). Estimations of the quantity of assembly plants relocating to China range between a third and a half of the total number of lost *maquilas.* A more complete examination of the geographical destination of 450 *maquiladora* plants for the period 2001-2003 reports that 44.4% went to China, 17.8% to other Asian countries, 15.6% returned to the United States, 13.3% went to Central America and the Caribbean, and 8.9%, to Eastern Europe (Ornelas, 2007). According to some analysts, Chinese competition represents one of the primary factors contributing to the first major contraction in the history of the *maquiladora* program, since China took over the role of the global economy's premier location for export processing zones' activity during the 1990s (Sargent and Matthews, 2009).

Nevertheless, despite the consensus regarding the negative impacts on Mexico at aggregated level derived from China's increasing competition and FDI attraction, there still some key gaps on the subject, such as the identification and assessment of sectoral or regional impacts. A common assumption is the homogeneity of the China effect across sectors, which is considered another challenge for the existing literature (Cravino, Lederman and Olearraga, 2007a). One of the few studies tackling FDI substitutability and complementarities within industries between China and Latin America found out that although there is some weak evidence of inflows of FDI into LAC's manufacturing sector being substituted for FDI into China's manufacturing sectors, these effects were not statistically robust (Cravino, Lederman and Olarreaga, 2007a, 2007b and 2009). More precisely, among the major limitations found in most of the studies carried out so far are related to the time period of the analyses, the geographical scale of data aggregation, and the absence or marginal knowledge of the specificities of sectoral diversity which are not identified at aggregated level. Based on this, further and deeper analysis on the subject, especially on the impact on particular countries and sectors where FDI diversion is most likely to occur, is suggested (Jenkins, 2009; Jenkins and Dussel Peters, 2007; Jenkins, Dussel Peters and Mesquita Moreira, 2008).

In Mexico's case, as in other Latin American countries, systematic academic studies on specific bilateral sectoral impacts of China's competition for FDI are rather limited. As depicted above, most of the information came from anecdotal and press evidence mainly linked to the *maquiladora* and relocation and job losses during the 2000-2003 period. For particular industrial sectors, the situation was critical for the textile, clothing, footwear, home appliance, telephone equipment, and electronics segments, most of which are labour-intensive. For instance, the relocation was reported of 85% of shoe manufacturers' operations to China by 2003. In like manner, large corporations such as Sony, NEC, VTech, On Semiconductor and makers of Kodak X-ray film have moved their factories. IBM and Microsoft moved projects worth around US$1 billion to Asia (ECLAC, 2004a: 182). More recently, analytical academic research has been developed by Dussel Peters (2005a, 2005b, 2009 and 2010a) on the implications for Mexico of China's emergence in the textile/clothing and the electronics global manufacturing chains. In terms of economic effects, in the electronics industry Dussel Peters (2005a and 2009) reported the loss of more than 45,000 jobs (21,217 direct and 23,880 indirect) between 2001 and 2003; US$ 3.2 billion in exports; and 514 million in FDI by companies that outsourced their activities and/or their production lines to China.

Given the relevance of the motor industry for both China's and Mexico's economies, the issue of actual and potential confrontation in the world capital market has acquired great attention among governmental agents, entrepreneurs, labour unions and analysts. These automotive agents' fears about Chinese competition are well founded. According to UNCTAD's *World Investment Prospects Survey* (2010b), for several years China has ranked at the top of the most attractive economies for the location of FDI; and, as mentioned, in the automotive sector China positioned as the world's largest producer and market in 2009, becoming a highly dynamic industry. Nevertheless, up to now, no comprehensive study on the China-Mexico competition for global motor FDI has been found in the literature. At a general level, some auto analysts have tried to extrapolate the implications for Mexico of this process. The argument is that given automotive companies' limited resources, they need to choose where to invest;

and, as they follow a global approach when planning their world-manufacturing footprint, the growth of Asian markets looks extremely attractive. In this sense – it is deduced - for every dollar invested in Asia there are, for example, possible 10 to 30 cents that are not invested in other emerging markets such as Mexico or South America (Ornelas, 2006: 18).

Based on existing analyses on the subject, an interesting controversy and inconclusive discussion on the implications for Mexico can be found. On the one hand, some analysts argue that Mexico's motor sector, in particular the auto parts segment, will become increasingly vulnerable to Chinese competition in the near and medium terms. These arguments are based on trends such as the increasing technological upgrading of Chinese automakers, China's great capacity for attracting FDI and its encouragement for outward FDI, which is giving local firms enormous potential to compete in global markets (Dussel Peters, 2005a, 2005b, 2010a and 2012b); likewise, although Mexico is seen at present to be relatively solid in the automotive competitive arena, due to the increasing internationalisation of Chinese firms and competition for efficiency-seeking FDI, Mexico's car industry may not be immune to such pressures (Devlin, Estevadeordal and Rodríguez-Clare, 2006; Frischtak, 2004); the production of simple auto parts, such as harnesses, could be relocated to China in the near future, given the product's size and life-cycle reduction which makes transport costs relatively unimportant (Carrillo, 2007). On the other hand, in contrast to the above, another group of analysts argue that auto parts hold a strong competitive position, having a solid foundation for a long run presence in the region. The arguments are based on the technological upgrading, best practice management skills, and constant innovation and competition on the basis of product quality, which makes them internationally competitive (Gerber and Carrillo, 2002); in addition, the preferences of final assemblers to maintain regional supply networks in order to develop Just-in-Time relationships with their primary suppliers (Sargent and Matthews, 2004, 2008a, 2008b and 2009). At a more general level, other analysts consider that China represents a strategic opportunity for Mexico to diversify its sources of FDI in the motor industry (Gachuz, 2009; Dussel Peters, 2012a).

Against this background, the main objective of this chapter is to assess the impact of China's emergence on Mexico's attraction of motor FDI. In this sense, the key questions are: Is China substituting or diverting FDI flows from Mexico in this sector? To what extent is China competing with Mexico as a destination of global automotive investment? If so, which production segments are most likely to be affected?. It is important to point out that deficiencies in reliable, updated and standardised data on FDI flows, particularly at sectoral and bilateral levels, represent a fundamental shortcoming for research in this area (Jenkins and Dussel Peters, 2007; García-Herrero and Santabárbera, 2007; Dussel Peters, 2009). Therefore, in order to overcome these limitations, diverse data sources will be used and organised in an appropriate systematic mode. The analysis and discussion will also rely significantly on information gathered through personal interviews carried out with a variety of automotive actors in Mexico, China, the United States, and the United Kingdom.

5.1. Evolution of Motor FDI in China and Mexico

5.1.1. China's Motor FDI

China's attraction of FDI during the last fifteen to twenty years has been impressive. Within this process, the development of China's motor industry played a crucial role (Harwit, 1995; Thun, 2006; Gallagher, 2006; Chin, 2010). As observed in previous chapters, China based the modernisation of its motor-vehicle sector on the attraction of FDI through the consolidation of JVs between automobile SOEs and leading auto TNCs. In fact, the automotive industry is one of China's industries in which FDI arrived earliest. Motor FDI formally entered China in 1983, marked by the establishment of Beijing Jeep Automobile Co. LTD (MOFCOM, 2002).

The arrival of motor FDI in China has been divided into three phases (Tang, 2009; McKinsey Global Institute, 2003): the fisrt took place between the mid-1980s and late 1990s, and was a period of limited foreign participation, where China's market was dominated by three foreign joint ventures —VW's JV with SAIC, and with FAW, in addition to PSA Peugeot Citroen's JV with Dongfeng; from the late

1990s to 2001, the second phase was of growing foreign participation, when GM and Honda entered the market; and in the third phase, after China's accession to the WTO in December 2001, other foreign automakers also entered the market. During the first wave, from 1983 to 1998, China received US$ 20.4 billion of FDI in the auto sector with 466 foreign-funded enterprises (MOFCOM, 2002). It was not until the third wave, however, that FDI flows started to accelerate, attracted by the large domestic market. From 2002 to 2009, in half the time than the first wave, China obtained the same amount (US$ 19.2 billion). If the announced investments for the period 2010-2011 are considered, in only a decade, China received more than US$ 30 billion of FDI in the auto sector (Table 5.1). Based on the information available, China's auto industry captured between 3% and 10% of the world's total FDI in the motor industry during the period 2003-2011. In fact, taking into consideration the total worldwide investments announcements (foreign and domestic) by major automakers, some specialised sources have estimated that China accounted for nearly half and two thirds of the auto industry's global investment in new production capacity during 2009 and 2010, respectively (Faria, 2011).[33]

Besides FDI in the OEM segment, after the recession of the first half of the 2000's, and given producers' increasing costs, China's amounts of FDI in auto components started soaring. Most of the global auto parts firms tried to set up assembly facilities in China. Among this trend, for example, General Motors shifted its worldwide electronics purchasing unit to Shanghai from the United States to place it at the hub of China's electronics industry (Sherefkin and La Reau, 2006). The slowdown in FDI flows after 2005 has been explained as a consequence of hyper-competition and overcapacity in China's automotive market, which led the major global automakers to diminishing investment and paying more attention to adjustment and integration (MOFCOM, 2005). Nevertheless, although auto FDI flows suffered the adverse effects in the short-term, it kept a growing pace in the medium and long terms. As observed in table 5.1, the global financial crisis of mid-2007-2009, which severely hit the

[33] Figures presented by Faria are substantially higher since they contain investment announcements both derived from FDI and domestic firm's projects.

automotive activity of most countries and companies, China attracted a substantive share of total worldwide auto FDI (4 to 5%). In fact, as already pointed out, in 2009 China became the world's largest automotive producer and market. Regarding the proportion of auto FDI in China's total inward FDI, after a significant increase from the early years of 2000's, reaching a peak in 2004 with 5.3%, during the second half of that decade this figure went down to levels of 2.0 to 2.5 a year.

Table 5.1. FDI in China's Motor Industry (million dollars)

Year/ Period	China's Auto FDI	World's Total Auto FDI (WTAFDI)[1]	China's Auto FDI as % of WTAFDI	China's Total Inward FDI (CTIFDI)	China's Auto FDI as % of CTIFDI
1983-1998	20,366.0	n.a			
1998-2001	4,000.0	n.a			
2000	634.9[2]	n.a.		40,715.0	1.6
2001	872.3[2]	n.a.		46,878.0	1.9
2002	1639.2[2]	n.a.		52,746.0	3.1
2003	2,003.0	61,726.0	3.2	53,505.0	3.7
2004	3,200.0	53,511.0	6.0	60,630.0	5.3
2005	3,407.9	53,610.0	6.4	72,406.0	4.7
2006	2,141.0	50,388.0	4.2	72,715.0	2.9
2007	1,800.9	60,330.0	3.0	83,521.0	2.2
2008	2,667.1	65,515.0	4.0	108,312.0	2.5
2009	2,294.7	48,515.0	4.7	95,000.0	2.0
2010	5,439.1[3]	61,763.0	8.8	105,735.0	5.1
2011	6,380.0[3]	62,370.0[4]	10.2	116,011.0	5.5

[1] It includes automotive OEM and automotive components.
[2] FDI contractual value.
[3] Announced investments.
[4] Own annualised estimation based on data from January-April 2011 period.
Source: Own elaboration based on MOFCOM (several years); UNCTAD (several years); McKinsey Global Institute, 2003; Faria (2010 and 2011); Carvalho et al. (2010) for 2004 China's FDI; and diverse automotive sources.

Based on the information gathered related to investment announcements by the major automakers operating in China, during 2010 and 2011 auto FDI flows expanded dynamically. Expectations about China's vehicle market reaching annual sales of 40 million units by 2020, more than double 2011 figures, is inducing assemblers to further increase production capacity (Sedgwick, 2011). For instance, in its effort to become the world's biggest automaker, Volkswagen and its JVs are planning to invest US$ 19.0 billion through 2016; in the same way, Nissan and Dongfeng announced an expansion plan of US$ 7.8 billion by 2015 (Automotive News China, 2011b and 2011c).

5.1.2. Mexico's Motor FDI

In Mexico's case, TNCs of the auto sector have dominated the industry from the beginning (CEPAL, 1992; Durán, Dussel and Tanimura, 1997; Mortimore, 2000; Tuman, 2003; Carrillo, 2004). Ford established assembly operations in the 1920s, and GM and Chrysler during the 1930s. The U.S. "Big-Three" dominated the market for several decades, with Nissan and VW joining them during the 1960s. As in the 1970s and early 1980s, most of the previous auto FDI was made with the aim of overcoming trade barriers. The operation of FDI in Mexico's car industry has been regulated through 'Automotive Decrees'. From the first Auto Decree in 1962 to present, government policies have been shifting from an active interventionist and protectionist position towards a more export promotion and liberalisation-oriented one. The export-oriented auto FDI wave began in the early 1980s, being strengthened during the 1990s after NAFTA came into effect in 1994. Throughout this period, the traditional automakers, as well as new-entrant ones (Mercedes-Benz, BMW and Honda), carried out significant investments to modernise production facilities and building new plants to integrate Mexico's motor industry on a North American regional basis. Along with this wave, considerable FDI of global component firms also arrive. Therefore, from 1994 to 2001, Mexico received US$ 10.8 billion in FDI (Table 5.2).

With the exception of some *maquiladoras* of the auto parts segment,[34] unlike auto FDI previous to the 1980s, the new wave has been largely efficiency-seeking, mainly intended to serve the U.S. market. The restructuring process after the U.S.

[34] It has been reported that GM and Chrysler opened harness export- plants (*maquiladoras*) in the period 1978-1979 in Mexico (Carrillo and Hinojosa, 2001).

economic recession of 2000-2003 brought more investment to Mexico in order to lower production costs. Thus, in the period 2002-2009 auto FDI attracted to the country reached US$ 14.65 billion. In fifteen years, from 1994 to 2009, Mexico received a total of US$ 25.5 billion.

Table 5.2. FDI in Mexico's Motor Industry (million dollars)

Year/ Period	Mexico's Auto FDI	World's Total Auto FDI (WTAFDI)[1]	Mexico's Auto FDI as % of WTAFDI	Mexico's Total Inward FDI (MTIFDI)	Mexico's Auto FDI as % of MTIFDI
1994	1,050.0	n.a.			
1995	1,252.0	n.a			
1996	767.0	n.a.			
1997	1,281.0	n.a.			
1998	603.0	n.a			
1999	2,389.0	n.a.			
2000	1,798.1	n.a.		18,110.0	9.9
2001	1,702.8	n.a		29,858.6	5.7
2002	1,335.3	n.a.		23,921.5	5.6
2003	1,385.4	61,726.0	2.2	18,538.3	7.5
2004	3,190.3	53,511.0	6.0	24,817.9	12.9
2005	2,297.4	53,610.0	4.3	24,275.8	9.5
2006	1,728.9	50,388.0	3.4	19,953.2	8.7
2007	2,021.2	60,330.0	3.4	30,514.3	6.6
2008	1,332.2	65,515.0	2.0	26,564.9	5.0
2009	1,361.1	48,515.0	2.8	15,829.2	8.6
2010	3,907.0[2]	61,763.0	6.3	19,792.1	19.7
2011	7,746.0[2]	62,370.0[4]	12.4	19,513.0[3]	39.7

[1] It includes automotive OEM and automotive components.
[2] Announced investments.
[3] Own annualised estimation based on data from the period January-April 2011.
[4] Banco de México's estimation (Banco de México, 2011).
Source: Own elaboration based on Mexico's Secretaría de Economía (2011); UNCTAD (several years); Faria (2010 and 2011); BBVA (2012); and diverse automotive sources.

Nevertheless, despite the fact that Mexico's motor industry being hard hit by the global financial crisis in 2009, which increased competition and raised costs for automakers, this seemed to have provoked a new and higher FDI wave into Mexico's auto industry. Between 2010 and 2011, nearly US$ 12 billion-investment in expansion capacity and 'green field' plants, both from motor vehicle assemblers and auto parts firms, were announced. ProMexico, Mexico's Trade and Investment Promotion Agency, estimated FDI of around US$ 4.5 billion in the motor industry in 2011 (Paredes, 2012). According to companies' sources, these investments will materialise through 2012-2014. During this post-crisis phase, new automakers are also entering the Mexican market (Fiat, Mazda and Foton).[35] Although significant, Mexico's share of the world's total auto FDI has been lower than that of China, but the proportion of auto FDI in total inward FDI is greater for the former. Mexico's major motor projects of the period 2009-2011 from both automakers and auto suppliers are outlined in Tables 5.3 and 5.4.

As a consequence of the financial crisis, production and domestic sales in Mexico's motor industry fell by 30% in 2009. Nevertheless, in the aftermath of this great recession, Mexico emerged notably strengthened as production and export base for the international markets. The changing demand preferences for smaller and more fuel-efficient vehicles have located Mexico as one of the best export platforms for global consumers. In the case of Nissan, with its new US$2 billion factory at Aguascalientes, the firm would nearly double its Mexican production to 1.3 million vehicles per year, compared to 1.0 million in Japan (AFP, 2011). Among the new models to be produced and exported from Mexico are the Fiesta (Ford), Aveo and Sonic (GM), Fiat 500 and Ducato (Chrysler-Fiat), New Beetle (VW), Micra and Versa (Nissan), and Mazda 2 (Mazda). Moreover, the automakers' announced plans will attract new auto parts companies to set up factories in Mexico. In the same way, substantial amounts of investment have been announced by the steel industry to supply the new auto manufacturing operations, such as Nippon Steel & Ternium and Posco, with almost US$ 1 billion altogether. From a production capacity of 1.3 million units of Mexico's auto industry in 1994, and 2.1 million in 2003, with the new investments projects production is expected to reach 4.5 million vehicles by 2014.[36]

[35] Announced investments for over US$ 1 billion from several Chinese automakers (FAW-Salinas Group, Geely, Changan and ZX Auto) have not been included since they are not confirmed or have been postponed. These cases are analysed in detail in Chapter 8.

[36] Figures on production capacity were reported by McKinsey Global Institute (2003) and ECLAC (2004b), for 1994 and 2003, respectively. For 2014, estimation from Mexico's Ministry of Economy reported by *El Semanario* (2012).

Table 5.3. Major Automakers' FDI Projects in Mexico's Motor Industry, 2009-2011			
Company	**Location**	**Project Characteristics**	**Start-up Date**
Chrysler (USA)	Saltillo, Coahuila	Assembly plant for the new generation of V6 Pentastar engines ('Centenario' Plant) to be used in the Dodge, Jeep and Ram vehicles. Investment of US$570 million and the generation of 900 jobs. Annual production capacity of 440,000 units.	2010
	Saltillo, Coahuila	Plant expansion at Saltillo's truck plant to manufacture the new Dodge Ram's cabin chassis. Investment amount of US$370 million.	2010
Chrysler-FIAT (USA-Italy)	Toluca, Estado de México	New production line for the manufacturing of the electric minicar FIAT 500 ("Cinquencento"), as part of the strategic alliance Chrysler-FIAT. The car will be exclusively produced at Chrysler's plant at Toluca, with production capacity of 100,000 units a year. Investment of US$550 million generating 1,200 jobs. The car will be exported to the U.S.A. and South America.	2011
	Toluca, Estado de México	Production of the Fiat Freemont, a new cross-utility vehicle. The car will be manufactured at Chrysler's plant at Toluca along with the Fiat 500 and the Dodge Journey.	2011
	Saltillo, Coahuila	Expansion at Chrysler's facilities in Saltillo to assemble a Ram branded version of the Fiat Ducato commercial van. Annual production capacity will be 400,000 units a year, aimed towards the U.S. market. Investment of US$570 million and the generation of 500 jobs.	2013
Daimler-Mercedes Benz (Germnay)	García, Nuevo León	A new production line expansion at the Bus Division plant. Investment of US$10 million.	2012
	Saltillo, Coahuila	Truck plant expansion to manufacture the Sterling Cabins, including a painting area. US$37 million will be invested in the project, hiring 450 new employees.	2011
	Saltillo, Coahuila	New assembly truck plant with an investment of 300 million dollars. In addition, suppliers will invest US$150 million. The plant will exclusively produce Freighliner Cascadia Class 8 to be sold in Mexico and exported to The U.S.A. and Canada.	2009
Foton (China)	Coatzacoalcos, Veracruz	Investment of US$370,000 dollars in an assembly plant to produce agricultural tractors. By mid-2010 Foton announced a plan for a new investment to build light trucks. Initial investment of 15 million dollars, increasing up to 250 million in further stages of production, reaching an annual capacity of 50,000 units	2009-2010

Table 5.3. Major Automakers' FDI Projects in Mexico's Motor Industry, 2009-2011 (continued)			
Company	**Location**	**Project Characteristics**	**Start-up Date**
Ford (USA)	Hermosillo, Sonora	Expansion investment (US$1,500 million) for the new generation of the mid-size car Fusion-Mondeo. Plant annual capacity will be increased to 500,000 units. 2,000 new jobs will be generated.	2011-2012
	Cuautitlán, Estado de México	Plant retooling project to manufacture the 'Fiesta', a new generation of subcompact car. Investment of US$1,000 million adding 2,000 jobs. The car will be exported to North and South America.	2010
	Chihuahua, Chihuahua	Diesel engine plant, the first industrial building adapted for these types of machines in all of Latin America. Investment of US$838 million; annual production capacity of 200,000 engines to be exported to U.S. and Great Britain. Generation of 1,100 jobs.	2010
	Irapuato, Guanajuato	Assembly plant for the assembly of last generation transmissions (6DCT250) in JV with Getrag. Investment of US$500 million and the creation of 1,200 jobs.	2010
General Motors (USA)	Ramos Arizpe, Coahuila	US$500 million-investment to manufacture the new subcompact Chevrolet Sonic. The Sonic will replace the Chevy. The project plans to produce 70,000 units a year by 2013. 400 jobs will be created. Production is aimed at Mexican and Latin American markets.	2012-2013
	Villa de Reyes, SLP	US$300 million-dollar investment to expand production platform and assemble the Aveo subcompact car. 1,850 jobs will be generated.	2012
	Toluca, Estado de México	Investment of US$540 million in an engine plant to produce two low-emission models of 4-cylinder engines. 500 jobs will be created.	2011-2012
	Ramos Arizpe, Coahuila	Investment of US$500 million to expand production facilities. 285 million for the production of an 8-cylinder efficient engine. 215 million for the manufacture of a new-generation vehicle. 400 jobs will be generated.	2011-2012
	Villa de Reyes, SLP	New transmission-assembly plant for use in the U.S. Volt. Investment amount of US$300 million, generating 600 jobs. Yearly annual capacity of 300,000 units.	2009
Hino (Japan)	Silao, Guanajuato	A US$10 million-investment assembly plant to manufacture the Series 500 trucks (Rangers). Annual production capacity of 1,200 vehicles.	2009-2010

Table 5.3. Major Automakers' FDI Projects in Mexico's Motor Industry, 2009-2011 (continued)			
Company	**Location**	**Project Characteristics**	**Start-up Date**
Honda (Japan)	Celaya, Guanajuato	Assembly plant of a fuel-efficient subcompact vehicle with an annual capacity of 200,000 units. Investment of US$800 million and the generation of 3,200 jobs. Vehicles will be sold in the Mexican and North American markets.	2014
	El Salto, Jalisco	Investment of US$200 million for plant retooling of the Honda CR-V. Annual capacity increased to 50,000 units adding 700 jobs.	2009
Hyundai (Korea)	Mexico's central region	Light truck assembly plant with an initial investment of US$11 million. Production is intended to be exported to Latin America.	2012-2103
MAN (Germany)	Querétaro	US$10 million-dollar investment to transfer operations from Puebla to Querétaro as part of a strategy to integrate a new company. MAN purchased 100% of VW Trucks and Buses in 2009. The plant will produce 4,300 trucks and 260 hybrid buses a year.	2011
Mazda (Japan)	Salamanca, Guanajuato	Assembly plant in JV with Sumitomo Corp. with a yearly capacity of 140,000 cars. Manufacture of the small compact Mazda 2, the compact Mazda 3 and engines mainly to serve the South and Central America markets. Investment of US$500 million generating 3,000 jobs.	2013
Nissan (Japan)	Aguascalientes, Aguascalientes	Manufacturing complex to produce a car based on the platform B with an investment of US$2,000.0 million. The complex includes a supplier park. In the initial phase, the plant will have a manufacturing capacity of 175,000 vehicles a year and 3,000 jobs will be created. Production is expected to reach 400,000 units, destined to the U.S., Mexican and Latin American markets.	2013
	Aguascalientes, Aguascalientes	Development of 'UV' Platform to produce three new low-cost subcompact models, including the March (Micra), Versa and a 'multipurpose'. Total investment of US$1,050 million, including the supplier's network. March's annual production will be 60,000 units, reaching a combined volume of 300,000.	2011-2013
	Cuernavaca, Morelos and Aguascalientes, Aguascalientes	US$328 million-dollar investment to produce new models. 160 million will be allocated to manufacture the Nissan NV200, 'The Taxi of Tomorrow', for New York City, and the rest to the production of the multipurpose vehicle based on the V platform at Aguascalientes.	2013
	Mexicali, Baja California	Establishment of an automotive design centre. Investment of US$10 million dollars.	2010-2015

Table 5.3. Major Automakers' FDI Projects in Mexico's Motor Industry, 2009-2011 (continued)			
Company	**Location**	**Project Characteristics**	**Start-up Date**
NAVISTAR (USA)	Escobedo, Nuevo León	Investment of US$25 million to establish two new production lines for the ProStar truck model	2010
Polaris (USA)	Apodaca, Nuevo León	Assembly plant of ATVs and SUVs. Investment of US$60 million generating 500 jobs. The company relocated production from Wisconsin to Mexico.	2011-2012
Toyota (Japan)	Tijuana, Baja California	Announcement of the opening of a new production line as parts of its consolidation process at Baja California's plant where the 'Tacoma' is assembled. Currently Toyota is analysing the possibility of investment in a second plant in Mexico.	2012
Volkswagen (Germany)	Silao, Guanajuato	Assembly of a new-generation gasoline engines whose main destination will be VW assembly plants in Puebla and Chattanooga, Tennessee, in the U.S. At a later stage, plans are to produce diesel engines. With an investment of US$550 million and the creation of 700 jobs, the plant will have an annual capacity of 330,000 engines.	2013
	Puebla, Puebla	Production of the redesigned 'New Beetle 2012 with an investment of US$400 million. Annual production capacity of 100,000 units and the creation of 2,000 jobs.	2011
	Puebla, Puebla	New assembly line and a stamping area to manufacture the 2011 Jetta 6th Generation, the 'Bicentenary' edition. Investment of US$1,000 million, including the design and tooling used by suppliers. Annual capacity of 430,000 units. 90% of production is destined for exports markets.	2010
VW-Audi	Central Mexico	New assembly plant to manufacture the Q5 premium SUV for the global markets. The project considers a US$ 2.0 billion-investment, with an initial capacity of 150,000 units a year.	2016

Source: Own elaboration based on diverse automotive sources.

Table 5.4. Major Auto Parts' FDI Projects in Mexico's Motor Industry, 2010-2011		
Company	**Project Characteristics**	**Start-up Date**
Airtemp	Investment of US$23.5 million to produce auto components in Puebla. Generation of 600 jobs.	2012
Alpha Corp.	Alpha is set to spend US$40 million to build a new factory in the state of Jalisco to produce door handles.	2013
BorgWarner	New production facility in Ramos Arizpe, Coahuila, to manufacture fuel-efficient turbochargers. 185 people will be employed.	2012
Bosch	Investment of US$55 million to modernise machinery and tooling in Mexico's 13 plants.	2011-2012
CVG	Investment of US$50 million by Commercial Vehicle Groups (CVG) in Saltillo, Coahuila. The plant produces pneumatic suspension seats and floor systems for the Freightliner truck. 510 jobs are expected to be created.	2011-2012
Daido Metal Co.	Initial investment of US$30 million for the construction of a new manufacturing plant in the state of Jalisco for production of automobile bearings to supply Japanese and foreign vehicle manufacturers. 400 new jobs.	2012
Delphi	New assembly plant by Delphi Packard in Durango to manufacture automotive harnesses. Investment of US$11 million expecting to hire 2,000 employees.	2012
Delphi	Establishment of a new technical centre in Ramos Arizpe, Coahuila, to manufacture electrical components. Investment of US$20 million and the generation of 700 jobs.	
Denso Corp.	Building of a new plant in Silao, Guanajuato, investing US$57 million. The plant will manufacture heating, ventilation and air conditioning (HVAC) units. The firm expects to employ more than 400 people by 2015.	2013
Exedy Corp.	Investment of US$20 million in the state of Aguascalientes. The new plant will produce clutch packs and torque convertors which are incorporated into automatic transmissions. 75 new jobs.	2012
Gemini-OKE	JV between Gemini and OKE to produce auto parts for export markets. Investment of US$15 million and the creation of 150 jobs.	2011
Hitachi Chemical	Expansion of its plant at Monte Morelos, Nuevo León, to increase the production of disk brake pads to 10 million units per year. Investment of US$18.5 million and the creation of 100 jobs.	2011-2102
Jatco	Investment of US$200 million in Aguascalientes to renovate its production lines where Continuous Variable Transmissions (CVT) for autos with high ecological performance is manufactured.	2011
Johnson Controls	US$75 million-investment for the renovation of its motor vehicle's battery recycling centre at Ciénega de Flores, Nuevio León.	2012
Kiriu	Expansion of the production capacity by installing the second casting line at Lerma, Estado de México. Investment of US$37.5 million.	2010-2011

Table 5.4. Major Auto Parts' FDI Projects in Mexico's Automotive Industry, 2010-2011 (continued)

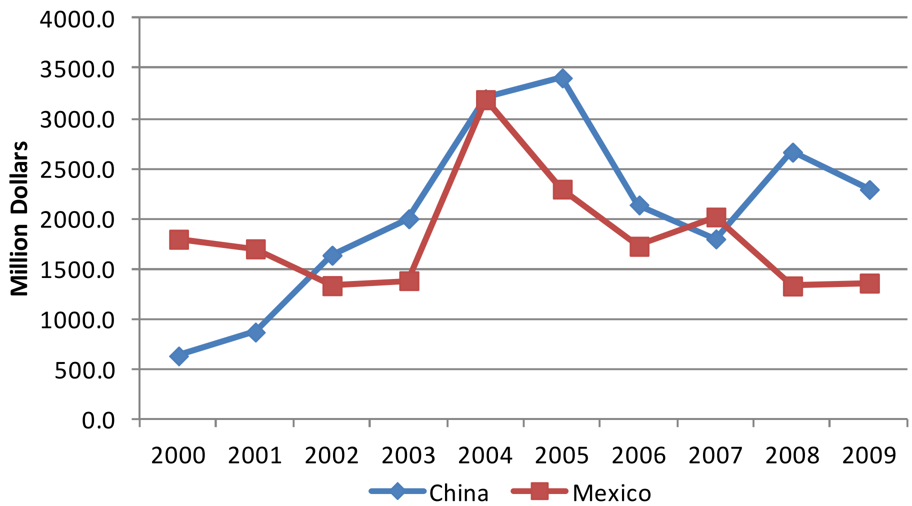
Company	Project Characteristics	Start-up Date
Linamar Corp.	Linamar invested US$120 million to expand production facilities in the production of components and systems used in the power train and transmissions. 800 jobs were generated.	2011
Magna	Magna International is building a new state-of-the-art facility in San Luis Potosí to produce stamped and welded assemblies for various automakers. The company plans to invest more than US$100 million to build the plant expecting to employ 700 people at full capacity.	2012
Nippon Sheet Glass	Investment of US$15 million for the construction of a new plant to expand production capacity of automotive windshield in Mexicali, Baja California. 160 new jobs were expected to create.	2010-2011
Nippon Steel and Ternium	Investment of US$405 million to produce high grade and high quality galvanised and galvan-nealed steel sheets for the auto industry. Annual output will be 400,000 metric tons.	2013
Pirelli	New assembly plant located in Silao, Guanajuato, to manufacture high-performance tires for cars and light trucks with and investment of US$250 million. The plant will reach an annual capacity of 5 million units by 2015 and will generate 750 jobs. Production is destined for the Mexican, the U.S. and Canadian markets.	2012
Posco	Posco (Pohang and Steel Company) will invest US$300 million in a second plant at Altamira, Tamaulipas, to produce high quality galvanised steel for the auto industry. 300 jobs will be created.	2013
RSB	RSB Transmissions' investment of US$20 million in Guanajuato. Generation of 500 jobs.	2011
Shaeffler Group	Expansion of its engine's parts production facilities at Irapuato, Guanajuato. Investment of US$120 million in the next 5 years.	2012-2015
Steel Technologies	Steel Technologies LLC, a JV between Mitsui and Nucor, will build a steel-processing plant to supply automakers. Investment of US$80 million.	2012
Thyssenkrupp	Investment of US$28 million in Puebla to install a new auto parts production line.	2012
TI Automotive	New plant to produce blown-molded plastic fuel tank systems. Investment of US$30 million and creation of 200 jobs.	2011
TRW	Investment of US$50 million to establish its third plant in Querétaro. The plant will produce ABS brake systems to supply Volkswagen Brazil. Creation of 400 new advanced manufacturing jobs.	2011-2012
Yamashita Rubber	Establishment of a new manufacturing plant for suspension parts and plastics in Zacatecas. Investment of US$12.5 million and generation of 125 jobs.	2011
Yusa	New plant in Zacatecas to produce suspension's plastic parts to supply Honda. Investment of US$100 million.	2012

Source: Own elaboration based on diverse automotive sources.

5.1.3. China's and Mexico's Comparative Evolution in Motor FDI

When contrasting the evolution of auto FDI in China and Mexico for a comparable period of time (2000-2009), it seems that – keeping the proportions - both countries follow a similar path, closely linked to the world economic cycle (Figure 5.1). As argued above, given Mexico's integration into the North American motor industry, Mexico's auto FDI evolution is more closely connected to the Unites States' economic cycle than China's. In Mexico's case, a U.S. economic stagnation provokes a declining in exports; but when the major automakers, U.S. and non-U.S., decide to reorganise their global operations, a new wave of investment takes place, as was the trend during the recessions of 20001-2003, 2005 and 2008-2009.[37] Investment announcements in Mexico during 2009-2011 will mainly be reflected by 2013-2104.

Figure 5.1. Evolution of Motor FDI in China and Mexico, 2000-2009



Source: Own elaboration based on MOFCOM (several years) and Secretaría de Economía (2011).

[37] During 2006, collectively GM and Ford planned to cut 60,000 jobs in the United States as part of their restructuring process (Maynard and Peters, 2006). By then, an operative loss of $2,496 dollars for each auto produced in the United States for GM was reported, while manufacturing a car in Mexico was only a quarter of the U.S. cost. Likewise, Ford reported an operative loss of $590 dollars for each car produced in the United States, but its Hermosillo plant in Mexico was ranked as the world's number one in productivity (Cantera, 2006).

A possible deduction resulting from the available comparable information is that China's dynamic development of its automotive industry and powerful magnet in attracting FDI has not stopped, or negatively changed, the tendency of Mexico's inward FDI in the motor industry. Taking the period 2002-2009, exactly after China entered the WTO and accelerated its global expansion, the annual average of inward FDI in the auto sector was US$ 2.4 billion for China and US$ 1.8 billion for Mexico. Although China's motor sector had an average value that was much higher than Mexico's, the latter registered an important increase in relation to the period 1994-2000, when it obtained a value of US$ 1.5 billion, even with the 'NAFTA effect'.

In summary, it could be argued that during recent years, Mexico's motor industry has substantially increased its production capacity, escalated its position among the top-ten worldwide producing and exporting countries, and has become the number one supplier of automotive products in the U.S. market. Likewise, the forecasts of auto specialists estimate that Mexico's share of North American auto production will increase to 19% over the next decade, from an average of 12% from 2000 to 2009 (Black, 2010). Looking at these achievements from the perspective of the China-Mexico interaction in the global automotive arena, a major explanation for these trends might be the different entry motive of auto TNCs in China and Mexico. Until recently, as reported by a comparative study, auto FDI entry motives in China were 100% market-seeking, while in Mexico the proportion was 70% efficiency-seeking and only 30% market-seeking (McKinsey Global Institute, 2003). According to this source, among the major factors driving the level of FDI in the auto sector in China are sector market potential, import and FDI barriers. In Mexico's case, location (proximity to the U.S. market combined with a qualified and relatively low labour cost), macroeconomic conditions associated to the growth in the U.S. economy, and governmental policies. In particular, the signing of NAFTA and other FTAs entailed a reduction in tariffs and local content requirements; also, the limit on FDI in auto components was lifted. From a more broad perspective, it could be argued that these entire features may also be associated to the different role China and Mexico play in the global motor division of labour.

5.2. China and Mexico in the Global Capital Market: The Vision of Automotive Actors

The trends mentioned above lead to the question of China-Mexico competition for global auto FDI. Based on the interviews held with diverse automotive actors during the fieldwork carried out for this research, this issue was considered to be more complex than it appears, taking the view that it needs to be qualified given the different facets it presents. An almost unanimous opinion was that China does not compete with Mexico for auto FDI, at least not in a direct way, nor in the short or medium terms. Likewise, a mixing situation of opportunities and threats in the China-Mexico interaction was identified. As one automotive researcher[38] pointed out: "Does China compete with Mexico? It depends where you stand within the industry". For instance, some aspects of major concern for different agents are: a) Governments: economic development, job creation, national industrial protection, etc.; b) Companies: trade, investment, competition, profits; c) Congressmen: national security, military issues, constituency demands; d) Labour unions: job security, increasing wages and improving working conditions. Thus, depending on the role, business interests, or the people they represent, the perception of China's impacts differs.

According to the same interviewee, automakers have different strategies depending on their business and market position. The announcement of Chrysler's intentions, for example, of importing small cars made by Chery from China to the United States originated from the fact that it did not have a small vehicle for the North American market at that time and needed to source it from Chery. So, Chrysler is in a particular situation regarding the range of cars it can offer.[39] By contrast, Ford and GM are in a different position. Both have their own small car produced in the North American region's plants and do not have to import them from a JV in China. These trends are shared by a TNC's Senior Economist,[40] who corroborated that GM and Ford have no plans for importing cars to the U.S. from

[38] Automotive Analysis Division, University of Michigan Transportation Research Institute (UMITRI). Personal interview. Ann Arbor (Detroit), Michigan, U.S.A. 27th August, 2008.

[39] After the failure of the association with Chery, through its strategic alliance with Fiat in 2009, Chrysler is intending to widen the range of cars offered in the region.

[40] Personal interview. Detroit, Michigan, U.S.A. 27th August, 2008.

China in the short and medium terms. And he added, "Chrysler is a different case. Given its present situation, this automaker is functioning more as a distributor in order to obtain profits".

With regard to assessing if a firm is threatened by competitors, a thought expressed a Mexican auto parts TNC's executive operating in China[41] was, "it depends on the specific value-chain link where the company is located". This Mexican firm manufactures structural components for light and commercial trucks: chassis structures, suspension structures, body structures, customised side rails, heavy trucks frames, bus frames, and steel fuel tanks. According to this executive, his firm considers it does not have competition in Mexico from Chinese firms as the product is a component which is difficult to transport and to export.

In the same line of corporate strategies, an automotive TNC's Manager in charge of emerging-market sourcing,[42] elucidated a fundamental issue for a company's decision-making process in a global competitive environment. For this executive, from the OEM's perspective, a decision has to be made on: a) investment ('green field' plants or expansion); or b) sourcing (imports). The decision depends on several factors: foreign currency rate; size of domestic market; logistics/distance; production costs, and so on.

Regarding investment decisions, the major factor in China now is the huge size of the domestic market. For Mexico, domestic market is also important, but a more relevant issue is to consider Mexico as an export base of motor vehicles. Because of China's market potential, and despite some undesirable regulations, foreign automakers have decided to enter China through JVs. In the same auto executive's opinion, market size has given the Chinese government a strong negotiation factor with TNCs. In this sense, particularly in terms of investment in new motor vehicle capacity, he concluded that there is no competition between China and Mexico. However, a decisive factor is what the market prospects are in both countries.

[41] Personal interview. Shanghai, China. 12th May, 2008.
[42] Personal interview. Dearborn (Detroit), Michigan, U.S.A. 28th August, 2008.

On the other hand, regarding components sourcing, the interviewee argued that there is a direct competition between China and Mexico in particular segments, since it is easier to outsource components than complete vehicles. In China, he argued, overheads (indirect production costs) are competitive. For instance, energy prices are low due to governmental subsidies, although labour costs present an increasing tendency.

Another key issue in automaker's decision-making process is the question of Off-shoring *vs* Near-shoring. For U.S.-based companies, near-shoring includes the United States and Mexico, and off-shoring refers to countries outside the region. Finally, the Detroit-based executive pointed out that in small, simple auto components, Honduras, Dominican Republic, and Costa Rica could become Mexico's competitors in the future due to governmental promotion and economic incentives, among other factors. A related strategy linked to global location of production and sourcing is that of *regionalisation* of the global division of labour. Rather than competing on a global basis, original equipment suppliers, especially Tier-1s, regionalise their operations to source the assembly plants. In interview, a manager of a global Tier-1 supplier[43] pointed out that his company has plants in Mexico (Monterrey, N.L.) to supply North America, and also in China to supply Chinese, and other Asian markets.

A Professor from Shanghai's Fudan University[44] raised two relevant points in the discussion held with him. One was about the nature of competition, linking the categories of countries and companies. He argued that "there is no direct competition between Mexico and China in the automotive industry because the former does not have a 'Mexican' car." Mexico is mainly a production and export base for international companies, and it does not produce its own brand-name cars. In contrast, China's motor industry is a different story, the interviewee added, since there are an important number of domestic automakers producing their own-branded vehicles. The second point was about China becoming an export platform to world markets. In this regard, the interviewee considered that

[43] Personal interview. Southfield (Detroit), Michigan, U.S.A. 25th August, 2008.
[44] China Centre for Economic Studies, Fudan University. Personal interview. Shanghai, China. 16th May, 2008.

only in a period of ten years China would be exporting motor vehicles to the U.S. and European markets in substantive quantities. For Chinese suppliers, it will take 20 years to be internationally competitive.

From the perspective of the actors from Mexico's government who were interviewed,[45] an optimistic view prevailed in that China does not represent a direct threat for Mexico's motor industry, especially in the short and medium terms.[46] At most, they recognise that in the China-Mexico relationship there are both threats and opportunities. A high-ranked Mexican official declared that in the short-run, China was not Mexico's competitor, neither in the domestic market nor in the international level (third markets). He further asserted that "China is not Mexico's main competitor in attracting global automotive investment flows. Rather, the southern U.S. states of Alabama, Indiana, Mississippi, and Texas represent the major threat."[47] Nevertheless, the same government agent recognised that if Mexico remains static, with no strategic actions (economic policy, infrastructure improvement, R&D investment, etc.) in the medium term (ten years) China might be a threat to Mexico.

An additional topic that emerged during the interviews, along with competition, was complementarity/cooperation between the auto industry of China and Mexico. In particular, governmental agents emphasised the beneficial impacts of potential Chinese FDI and the creation of jobs through JVs in the auto industry. The Ministry of Economy expected to have over $ 1 billion-dollar investment from Chinese automakers during the period 2008-2011, for projects intended to serve the domestic market and, subsequently, for export to Latin America and the United States. The complementarity side of the China-Mexico auto interaction was even highlighted by Mexican automakers that have recently started operations with Chinese companies, through technological associations or licensing. This is

[45] There was an opinion coincidence on this matter during the personal interviews among Mexico's different government agencies' personnel in Mexico City. This was the case of Mexico's Ministry of Economy and ProMexico, the main governmental institutions for the country's industrial and export promotion.
[46] This view was also shared by independent economic analysts. Personal interview. Mexico City. 20th August, 2008.
[47] Personal interview. Mexico City. 13th December 2007.

the case, for example, of Giant Motors Latinoamérica (GML) which signed a technological association with FAW to assemble small and medium-size trucks. An Executive Director[48] of a Mexican automaker in technological association with a Chinese firm pointed out that the arrival of Chinese automakers in Mexico's domestic market, or the development of technological associations with Mexican companies, was increasing competition in the domestic market among firms, especially in the small-car or light and medium commercial vehicle segments.

5.3. Auto Parts, *Maquiladora* Industry and China's Competition

Much of the discussion and concerns in Mexico about China's competition was highly related to the *maquiladora* industry's downturn in the early 2000's, the "sucking sound from the East".[49] As underlined in the introduction to this chapter, according to INEGI's data, between December 2000 and December 2003 Mexico's *maquiladora* sector lost 900 plants and 260,000 jobs, approximately a total quarter and fifth, respectively. Despite the fact that the topic has attracted great attention among governmental, entrepreneurial, academic and the media circles, the most publicised information has been rather general, in particular for the motor industry and its different production segments. In this regard, a more sectoral-especific analysis would help to clarify and understand the trends – and prospects – of China's threat to Mexico's automotive sector, and especially the auto parts segment. It is necessary to find out how hard the sucking sound from the East actually hit Mexico's motor industry. Therefore, an examination of the evolution of the auto parts *maquiladoras* in Mexico during the critical period of the first decade of the 21st century is presented below.

The auto parts segment has been a lever for the development of the *maquiladora* industry, especially since the late 1970s and early 1980s. Most of the foreign auto

[48] Personal interview. Mexico, City. 20th June, 2011.

[49] An interesting paradox in this case, which clearly shows the deepening of the globalization process as well as the lack of attachment to 'national' identity on the part of capital, is that, according to a new report, of the 350 *maquilas* that migrated from Mexico by 2002, 60% was Mexican-owned, and the large majority relocated to China (Marichal, 2002).

parts companies function within this programme. As mentioned in Chapter 4, almost all the global auto parts companies operate in Mexico, having positioned among the top-100 largest *maquiladora* employers. Lear Corporation, Yazaki, Delphi, Denso, Takata, TRW, Bosch, and Johnson Controls are some examples.

Tables 5.5 to 5.7 show some basic figures on the number of plants and employees in Mexico's *maquiladora* industry by sector, from 1990 to 2006.[50] As observed, in 1990 the automotive sector had 156 plants, behind the electric & electronics accessories, garment & textiles, and furniture segments, with 9.1% of the total number of plants. Nevertheless, it was the second largest *maquiladora* employment generator with almost 105,000 employees, accounting for almost one-fifth of the total. The auto segment was only exceeded by the electric & electronics accessories segment which concentrated 25.7% of total *maquiladora* employment. After a period of relatively slow growth from 1990 to 1995, during the second half of the 1990s the auto parts segment registered a dynamic pace, and expansion only stopped at the end of the 2000, as happened with the whole *maquiladora* industry. Although several studies have underlined the joint incidence of several factors such as the recession in the U.S. economy, the appreciation of the peso, changes in Mexico's tax regime for *maquiladoras,* the loss of certain tariff benefits as a result of the NAFTA, and the lack of internal macroeconomic reforms (Gerber and Carrillo, 2002; USGAO, 2003; Quintin, 2004; Mollick and Wvalle-Vázquez, 2006), China's competition has received much attention as major cause of the *maquiladora* downturn during that period.

The differentiated sectoral impact of the *maquiladora* crisis can be observed in Table 5.7, where an index of the year 2000=100 is calculated. The hardest hit sector in terms of loss of plants and employment were garments & textiles, electric & electronics accessories, leather & shoes, and toys and sports articles.

[50] On November 23, 2006, the Mexican government merged the *Maquiladora* and PITEX programmes into a new regime to promote exports. The new programme was named the Manufacturing Industry, Maquiladora and Export Services Program or IMMEX. Due to this reorganisation, specific data on the *maquiladora* industry is no longer published. Available data is up to December 2006. The full data set of *maquiladora* employment and plants for the period 1990-2006 is presented in Appendix 5.1.

Some of these sectors lost between 30% and 50% of the production establishments and employment from the end of 2000 to 2003-2004. As reported in several studies, these *maquiladoras* are mostly labour-intensive operations. Among the less affected were machinery, automotive, and other manufactures such as medical equipment, for instance. These activities represent segments with relatively higher technology levels and more capital intensive. In fact, the auto parts *maquiladora* sector lost less than 5% of its employment which was recovered by 2003 and the number of plants was not affected. By 2006, the automotive segment strengthened its position within the *maquiladora* industry, operating 312 plants and becoming the largest employer with 22.6% of the total. By looking at the *maquiladora* sectors that had not recovered the lost ground by 2005-2006 (garments & textiles, electric & electronics accessories, leather & shoes, and toys and sports) it is clear that Mexico had lost competitiveness in the labour intensive, low-productivity, *maquiladora* segments.

It is necessary to explore what factors explain the evolution of the auto parts *maquilas*, which seem to have satisfactorily eluded the Chinese threat. Various arguments have been put forward on this topic. One is related to the technological level and managerial capabilities of *maquiladora* plants. Gerber and Carrillo (2002) argue that 30-40% of auto parts firms are either within the so-called "third-generation" *maquilas* which develop R&D and product design, or are at the technology and management frontiers of their industry. Through this innovation process, companies compete on the basis of product quality rather than on prices. The authors warn that technological sophistication does not guarantee a competitive firm, but being at the frontier of their industry and competing in the international market, they are more likely to succeed in the long run. They conclude that auto parts manufacturing have a solid foundation for a long run presence in the region (Ibid).

Another explanation for the relatively successful evolution of the *maquila* auto parts industry is posed by Sargent and Matthews (2004, 2008a, 2008b and 2009). These authors recognise that the competitiveness of Mexico's *maquila* auto parts producers does not appear to be as threatened as the other major segments.

Although Sargent and Matthews (Ibid) recognise that a considerable number of *maquilas* in the automotive sector have already made the transition into a higher value-added model, a key elements of their argument are the locational and proximity factors. In fact, they question, and consider open to debate, the assumption that proximity-dependent *maquilas* utilise technology-intensive production systems or that Mexico has an advantage over China in knowledge-intensive, high-complexity Export Producing Zones' segments (Ibid). Thus, one of the major explanations for the competitive position of automotive *maquilas* is that auto assemblers in North America continue to follow regional supply strategies and require producers to supply intermediate goods on a Just-in-Time basis. In a concise way, Sargent and Matthews (2004: 2016) state that "the *maquiladora* option allows firms serving North American markets to supply final assemblers on a just-in-time (JIT) basis, to respond rapidly to shifting consumer demand, to provide customized rather than standardized products, and to minimize transportation costs for hard-to-ship items". Finally, these analysts consider that recent events such as the revaluation of the Chinese currency, increased transportation costs, and rising wage rates are all weakening China's comparative advantage; and this could provoke a new investment wave into Mexico.

Table 5.5. Employment by Sector in Mexico's *Maquiladora* Industry, 1990-2006 (Annual Average)

Sector	1990	1995	2000	2001	2006
Number of Employees					
Food	7,862	7,730	10,165	9,461	11,211
Garments& Textiles	42,464	99,476	282,755	268,033	169,490
Leather & Shoes	7,238	7,587	8,887	7,725	5,800
Furniture	24,224	35,807	60,897	59,904	58,504
Chemicals	6,565	12,754	26,571	23,997	36,502
Automotive	104,487	137,220	237,787	226,618	271,647
Machinery	5,018	6,799	14,180	15,714	20,413
Electric & Electronic Equipment	51,891	67,269	104,648	92,253	127,614
Electric & Electronic Accessories	114,610	167,164	337,471	297,914	261,139
Toys & Sports Articles	10,298	9,527	14,765	12,640	8,080
Other Manufactures	48,956	69,193	143,694	140,993	179,611
Services	22,824	27,738	49,412	43,691	52,124
Total	*446,437*	*648,264*	*1,291,232*	*1,198,943*	*1,202,135*
Percentages (%)					
Sector	**1990**	**1995**	**2000**	**2001**	**2006**
Food	1.8	1.2	0.8	0.8	0.9
Garments& Textiles	9.5	15.3	21.9	22.4	14.1
Leather & Shoes	1.6	1.2	0.7	0.6	0.5
Furniture	5.4	5.5	4.7	5.0	4.9
Chemicals	1.5	2.0	2.1	2.0	3.0
Automotive	23.4	21.2	18.4	18.9	22.6
Machinery	1.1	1.0	1.1	1.3	1.7
Electric & Electronic Equipment	11.6	10.4	8.1	7.7	10.6
Electric & Electronic Accessories	25.7	25.8	26.1	24.8	21.7
Toys & Sports Articles	2.3	1.5	1.1	1.1	0.7
Other Manufactures	11.0	10.7	11.1	11.8	14.9
Services	5.1	4.3	3.8	3.6	4.3
Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

Source: Own elaboration with data from CNIMME and INEGI.

Table 5.6. Number of Plants by Sector in Mexico's *Maquiladora* Industry, 1990-2006 (Annual Average)

Sector	1990	1995	2000	2001	2006
Number of Plants					
Food	45	58	81	79	42
Garments& Textiles	277	466	1,088	1,074	484
Leather & Shoes	47	58	62	59	25
Furniture	219	264	391	390	302
Chemicals	75	102	154	148	179
Automotive	156	166	246	267	312
Machinery	38	38	47	57	74
Electric & Electronic Equipment	102	118	159	167	170
Electric & Electronic Accessories	370	392	558	565	423
Toys & Sports Articles	32	42	60	56	34
Other Manufactures	264	325	508	530	454
Services	79	100	237	238	311
Total	*1,703*	*2,130*	*3,590*	*3,630*	*2,810*
Percentages (%)					
Sector	**1990**	**1995**	**2000**	**2001**	**2006**
Food	2.6	2.7	2.3	2.2	1.5
Garments& Textiles	16.3	21.9	30.3	29.6	17.2
Leather & Shoes	2.7	2.7	1.7	1.6	0.9
Furniture	12.9	12.4	10.9	10.7	10.7
Chemicals	4.4	4.8	4.3	4.1	6.4
Automotive	9.1	7.8	6.9	7.3	11.1
Machinery	2.3	1.8	1.3	1.6	2.6
Electric & Electronic Equipment	6	5.6	4.4	4.6	6
Electric & Electronic Accessories	21.7	18.4	15.5	15.6	15.1
Toys & Sports Articles	1.9	2	1.7	1.5	1.2
Other Manufactures	15.5	15.3	14.1	14.6	16.1
Services	4.6	4.7	6.6	6.6	11.1
Total	*100*	*100*	*100*	*100*	*100*

Source: Own elaboration with data from CNIMME and INEGI.

Table 5.7. Employment and Plants by Sector in Mexico's *Maquiladora* Industry, 1990-2006 (2000 = 100)

Sector	1990	1995	2000	2001	2006
Number of Employees (2000 = 100)					
Food	77.3	76.0	100.0	93.1	110.3
Garments& Textiles	15.0	35.2	100.0	94.8	59.9
Leather & Shoes	81.4	85.4	100.0	86.9	65.3
Furniture	39.8	58.8	100.0	98.4	96.1
Chemicals	24.7	48.0	100.0	90.3	137.4
Automotive	43.9	57.7	100.0	95.3	114.2
Machinery	35.4	47.9	100.0	110.8	144.0
Electric & Electronic Equipment	49.6	64.3	100.0	88.2	121.9
Electric & Electronic Accessories	34.0	49.5	100.0	88.3	77.4
Toys & Sports Articles	69.7	64.5	100.0	85.6	54.7
Other Manufactures	34.1	48.2	100.0	98.1	125.0
Services	46.2	56.1	100.0	88.4	105.5
Total	*34.6*	*50.2*	*100.0*	*92.9*	*93.1*
Number of Plants (2000 = 100)					
Sector	**1990**	**1995**	**2000**	**2001**	**2006**
Food	55.6	71.6	100.0	97.5	51.9
Garments& Textiles	25.5	42.8	100.0	98.7	44.5
Leather & Shoes	75.8	93.5	100.0	95.2	40.3
Furniture	56.0	67.5	100.0	99.7	77.2
Chemicals	48.7	66.2	100.0	96.1	116.2
Automotive	63.4	67.5	100.0	108.5	126.8
Machinery	80.9	80.9	100.0	121.3	157.4
Electric & Electronic Equipment	64.2	74.2	100.0	105.0	106.9
Electric & Electronic Accessories	66.3	70.3	100.0	101.3	75.8
Toys & Sports Articles	53.3	70.0	100.0	93.3	56.7
Other Manufactures	52.0	64.0	100.0	104.3	89.4
Services	33.3	42.2	100.0	100.4	131.2
Total	*47.4*	*59.3*	*100.0*	*101.1*	*78.3*

Source: Own elaboration with data from CNIMME and INEGI.

5.4. "Near-shoring" versus "Off-shoring": Recent Trends in a Global Competitive Market

In recent years, a trend for locating or relocating primary production or manufacturing closer to a centre of gravity of a company's demand, known as "near-shoring" seems to be replacing "off-shoring" practices (de Juan, León and Löhner, 2008; Timberlake et al, 2009; Sirkin, Zinser and Hohner, 2011). The "near-shoring" process, also labelled "reverse globalization",[51] is highly linked to China's changing business environment as well and recent transformations in the global economy. Although it will vary from industry to industry, depending on the labour content, transportation costs, China's competitive strengths, and the strategic needs of individual firms, a sizeable reallocation of global manufacturing is expected over the next five years (Sirkin, Zinser and Hohner, 2011). Interestingly, the actual and potential impacts of this process are of great relevance for Mexico and its current and future economic, investment and trade interactions with China.

Several specialized consultancy firms agree that China's "low cost" manufacturing cycle is coming to an end and that a combination of economic forces is eroding its cost advantage as an export platform for the North American market (de Juan, León and Löhner, 2008; Timberlake et al, 2009; Sirkin, Zinser and Hohner, 2011; Roland Berger, 2011). Among the main factors impacting China's advantages are: a) increasing risk for foreign companies (economic redevelopment; incentives shift); b) workforce becoming unstable (shrinking workforce; reduced migration to cost; labour unrest and strikes; labour law revisions); and c) losing cost advantage (rising wages; increasing inflation; exports; rising production and transport costs) (Roland Berger, 2011). In labour costs, for example, wage and benefits increase 15 to 20% a year (Sirkin, Zinser and Hohner, 2011; Roland Berger, 2011),[52] and hourly labour rates have jumped from US$ 0.60 in 2002 to US$ 1.8 in 2009 (Roland Berger, 2011). In the

[51] "Near-shoring" sometimes has been called "On-shoring" or "Re-Shoring".

[52] It is estimated that wage increases will slash China's labour-cost advantage over low-cost states in the U.S., from 55% today to 39% in 2015, when adjusted for the higher productivity of U.S. workers (Sirkin, Zinser and Hohner, 2011: 3).

particular case of the China's motor industry, some company managers have reported increases in worker's wages from 24,500 yuan (US$ 3,929) a year in 2003 to 49,000 yuan (US$ 7,858) in 2010. It is expected that manufacturing-working wages will double by 2015 from the levels of 2009-2010 (Shirouzu, 2011). Another factor affecting China's economic competitiveness has been the escalation in oil prices, consequently increasing the cost of transport. Crude oil soared from US$ 28 in 2003 to US$ 147 in 2008. As a result, the cost of shipping a standard 40-foot container has more than tripled since the early 2000's (Goel et al., 2008).

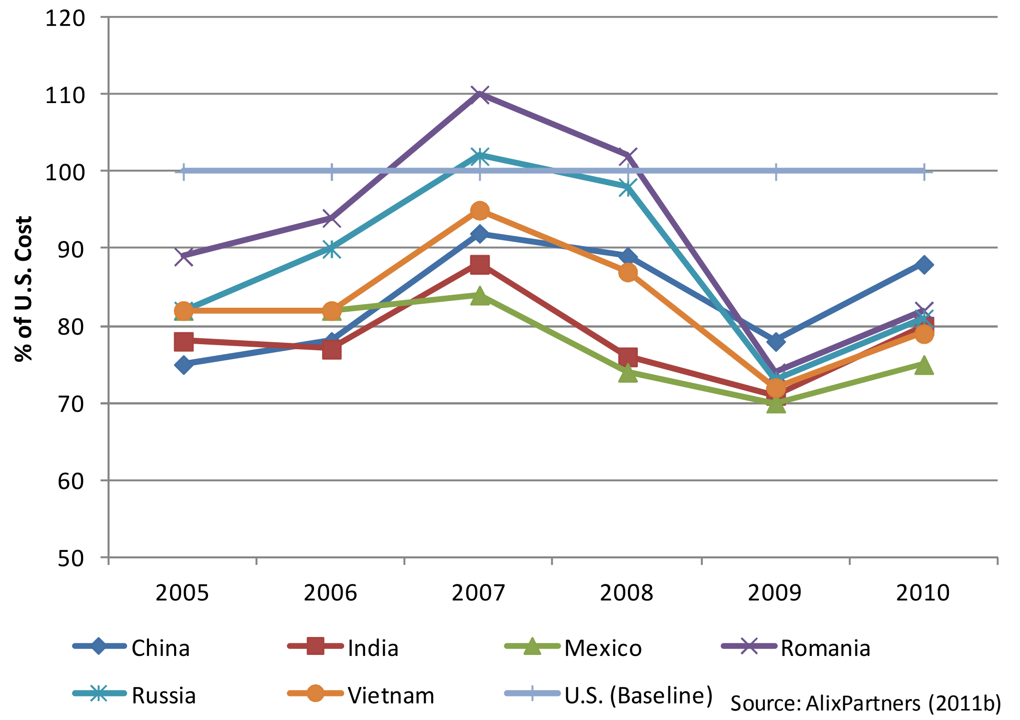
According to an AlixPartners' survey (2011a), the top reasons for "near-shoring" are: a) lower freight costs; b) lower inventory or in-transit cost; c) improved speed to market; d) time zone advantages for easier management coordination; and e) improved cultural alignment. An almost unanimous conclusion of "near-shoring" analysis is that Mexico emerges as the big winner in terms of supplying North America (de Juan, León and Löhner, 2008; Fitz-Gerald, 2009; Sirkin, Zinser and Hohner, 2011; AlixPartners, 2011a). When it comes to global manufacturing, Mexico has been labelled "The New China" (Eyerdam, 2009; Fitz-Gerald, 2009) or considered a privileged "sweet spot" in the globalisation landscape (de Juan, León and Löhner, 2008). According to AlixPartners (2011a), Mexico has emerged as the top choice among companies considering relocating their already off-shored operations closer to North America. Mexico fulfils the attracting factors for near-shoring, highlighting geographical proximity to the U.S. market, low transportation costs, FTAs, favourable exchange rate, relatively low and stable labour costs, and protection of intellectual property.[53]

In terms of costs, according to AlixPartners' U.S. Manufacturing-Outsourcing Cost Index, from 2007 to 2010 Mexico ranked as the low-cost country (LCC) for the U.S. market (AlixPartners, 2011b). Since 2007, the competitive landscape for outsourcing has been in favour of Mexico, some locations in Europe (Romania, Russia), and several locations in Asia (Vietnam, India), other than China.

[53] It is worth pointing out that, according to the survey results, although security risks are a clear concern among companies, relatively few have actually experienced supply chain disruption in Mexico and appear moderately optimistic about the future in this matter.

AlixPartners' study (2011b) concluded that while Asian LCC will likely be more impacted than Mexico, China may experience particular negative pressure on landed costs due to wage inflation, exchange-rate pressures, and higher freight rates.

Figure 5.2. Manufacturing-Outsourcing Cost Index
Composite Index 2010



One of Mexico's major advantages over China is proximity to the U.S. market, which not only save time and costs, but allows companies to practice JIT. Goods shipped from Mexico can reach much of the United States in one or two days, as opposed to bwtween nineteen and thirty-three days from China (de Juan, León and Löhner, 2008). Another factor is the recent trend in labour costs. Since 2005 the cost of manufacturing goods from Chin has risen by 40%; wages have increased by 218% compared to 25% in Mexico (Global Auto Industry, 2011). Given the rapid wage increases in China during the past five to six years, they are now almost the same as the wage rates in Mexico. According to some sources, by 2010 Chinese workers were earning only two-thirds of what their Mexican counterparts earned. It is estimated that by 2015, the fully loaded cost of hiring Chinese workers will be 25% higher than the cost of using Mexican workers (Sirkin, Zinser and Hohner, 2011). In the particular case of the motor industry, it has been reported that by 2010, the rising wages in Chinese auto plants almost matched the US$7 an hour all-in-cost, including benefits, of Mexican plants; if the US$1,200 to $2000 per-car cost to ship vehicles across the Pacific is added, the balance plays in Mexico's favour (Welch, 2010).[54]

In terms of the type of products most suitable for near-shoring from Mexico are (de Juan, León and Löhner, 2008): a) products with significant logistics costs (high volume-to weight or volume-to-value ratios); b) products that require responsive supply chains; c) large bulky products with significant labour content; and d) products that require significant managerial involvement. The motor industry, both auto assembly and a large number of auto components, fit within the above categories. In fact, during the last three to four years Mexico has benefited from relocation processes of motor vehicle and components plants from the U. S. and Canada.

5.5. Conclusions

This chapter aimed to assess the implications of China's emergence on Mexico's attraction of motor FDI. Previous studies on this subject have not reached a general agreement. Based on the analysis of limited data on total motor (vehicle assembly and auto parts) FDI inflows for China and Mexico, as well as on the opinion of diverse automotive agents, although not totally conclusive, it could be argued that China does not compete for FDI with Mexico in the motor sector, at least not in a direct-general way. A deduction resulting from the available comparable information is that China's dynamic development of its motor industry and powerful magnet in attracting FDI has not stopped or significantly changed the tendency of inward FDI in the Mexican motor industry. Obviously,

[54] Even with the recent negotiations between automakers and labour unions in the USA, labour rates in Mexico looks highly attractive. At present, automakers in Mexico pay $4 to $5 an hour, whereas for the Detroit 3 is $28 an hour, for the so-called transplants, $15 to $20, and for Detroit's new Tier-2 workers, $14 an hour (Chappell, 2012).

the size of China's economy and domestic market is so large that makes difficult to Mexico to avoid negative competitive or diverting effects in the motor industry's global FDI attraction. Based on the opinions gathered during the personal interviews held with auto companies' and industry associations' executives, as well as governmental officials, it could be argued that, up to now, only in certain component segments China is substituting FDI from Mexico, presenting an increasing competition. This is particularly the case of the electronics, and engine and chassis parts segments. At most, following García-Herrero and Santabárbera (2007: 148), "the results should be read in terms of a counterfactual: had Chinese inward FDI not been so strong, Mexico could have attracted more FDI than it actually did".

The analysis carried out in this chapter endorses some authors' claims on the need to develop further and deeper analysis on particular countries and sectors where FDI diversion is most likely to occur, avoiding generalisations and the homogeneity of the 'China effect' (Cravino, Lederman y Olearraga, 2007; Jenkins, 2009; Jenkins and Dussel, 2007; Jenkins, Dussel Peters and Mesquita Moreira, 2008). The issue is more complex than a simple-competitive relationship between two countries, so it needs to be qualified. This qualification has to be done from at least from two perspectives when analysing competition; first, recognising the heterogeneity of the automotive sector's production segments regarding technical requirements, amount of capital, product size, etc., and the specific value-chain link where the company is located; second, identifying/understanding the stances held by different agents of the motor industry (companies, governments, etc.). This qualification represents some sort of technical division of labour and a social division of labour, respectively, within the motor sector. Governments try to attract FDI and protect its domestic market, while automotive firms compete against each other to capture a larger market share, and conceiving the countries as territorial production and export bases connected through global production networks. In this kind of country-sector combination, the resulting set of interrelationships becomes quite complex.

When contrasting the evolution of auto FDI in China and Mexico for a comparable period of time (2000-2009), it seems that both countries follow a similar path, closely linked to the world economic cycle. In Mexico's case, auto FDI evolution is more closely connected to the Unites States' economic cycle than China. During the last years Mexico's auto industry substantially increased its production capacity; escalated positions among the top-ten worldwide producing and exporting countries; became the number one supplier of automotive products in the U.S. market; and increasing its share in the North American auto production. Looking at these achievements from the perspective of the China-Mexico interaction in the global automotive arena, a major explanation for these trends might be the different entry motives of auto TNCs in China and Mexico: auto FDI entry motive in China was 100% market-seeking, while in Mexico the entry motive was mainly efficiency-seeking. From a broader perspective, these entire features may also be associated to the different roles China and Mexico play in the motor global division of labour. This will be depicted in more detail in chapters 6 and 7 through the analysis of trade flows of autos and components and other manufacturing interactions.

The results of this analysis, although limited and partial, contrast with the generalised and almost unanimous conclusion in the literature that Mexico is Latin America's most adversely affected country by FDI competition and substitution. Among the fundamental arguments is that behind this situation is Mexico's similar export structure to China's as well as direct competition for efficiency-seeking FDI, in which the former has been losing competitiveness in world markets and global foreign investment attraction. The evidence in the case of the motor sector does not seem to fit with this proposition.

Regarding the issue of competition and complementarity, the motor sector presents a diversity of dimensions. In the same way as countries compete and complement each other, so do the automakers in a kind of unity and struggle of opposites. A case in point is the Sino-Foreign JVs. Besides quality and environmental gaps as well as low prices, one of the main reasons why Sino-Foreign JVs do not export much from China is because TNCs do not want to compete with their own brands in their own countries. This situation is preventing China to become an extensive export platform for the world markets. The nature of competition also adopted different meaning depending on the social actor involved. From the academic perspective, there is no direct competition between Mexico and China in the motor industry because the former does not have a 'Mexican' car. Mexico is mainly a production and export base for international companies, and it does not produce its own brand-name cars. From a governmental point of view, "China is not Mexico's main competitor in attracting global automotive investment flows. Rather, the southern U.S. states of Alabama, Indiana, Mississippi, and Texas represent the major threat".[55]

Through investment decisions based on several factors such as foreign currency rate; size of domestic market; logistics/distance; production costs and so on, auto firms, especially the largest TNCs, shape the structure of the industry at global scale. Through their decisions on the location of production and sourcing, these companies can regionalise their technical division of labour, deciding on off-shoring or near-shoring. From the study of China's and Mexico's motor industry, two differentiated factors in automakers' investment decisions stand out: location for Mexico and domestic market size for China. Mexico's experience shows that geography still matters under globalisation. As for China's, this bring out the issue of the role of the State. Given China's market potential, and despite some undesirable regulations, foreign automakers have decided to enter China through JVs. Market size has given the Chinese government a strong negotiation factor with TNCs. In this sense, particularly in terms of investment in new motor vehicle capacity, there is no competition between China and Mexico. However, the market prospects in both countries are decisive issues.

Finally, this chapter's findings also show the changing character of competitive advantage of countries in a short period of time. With the economic recession of 2000-2003 and the migration of certain *maquiladora* segments, it became evident that Mexico was no longer competitive in labour intensive operations. China was

[55] Opinion of an official from Mexicos' Ministry of Economy. Personal interview. Mexico City. 13th December, 2007.

the shelter for most of these production units, becoming the "world's factory". Nevertheless, during the last few years, a combination of economic forces is fast eroding China's competitive advantage, moving to sector with higher technology levels. On the other hand, recent trends towards practicing "near-shoring" in the North American market, implying the abandonment of "off-shoring" from Asia, is opening a new perspective for Mexico as a major player in this process, not only for the relocation of investment and production capacity from North America, but also in the economic and investment relationship with China. Under this trend, the dual process of competition and complementarity between China and Mexico arises again. By taking advantage of Mexico's manufacturing base and location respect to the North and South American markets, Chinese companies may locate their production operations in Mexico to complement each other in exporting to the United States.

6. CHAPTER SIX

THE CHINA-MEXICO AUTO INTERACTION 2: BILATERAL TRADE AND DOMESTIC MARKET COMPETITION

> "The arrival of cars manufactured in China is a watershed for the Mexican automotive industry. Some see it with distrust and others want to participate in it." (Martínez, 2007).

> "China's auto parts *maquiladora* industry represents a sizeable threat to Mexico, since it is estimated that it will reach a market penetration in half the time than Japan's." (Suro-Rodríguez, 2003).[56]

Regarding the China-Latin America trade interaction and its impacts, two major topics derived from the direct bilateral trade relationship have recently acquired significance in the discussion: the implications of Latin America's export boom to China (China as export market) on the one hand, and China's penetration in the region's domestic markets (China as import source), on the other. Within this the discussion, it has been suggested that while the former topic has received some attention in the literature, the latter has rather been marginalised. Given the heterogeneity and differentiated pattern of the implications and impacts of the growing trade relationship between Latin America and China, the limited country-specific investigations which address these issues on a comprehensive way, as well as the underestimation in most current studies of China's impacts, there is, however, agreement on the need of to carry out detailed specific reserach at the product, sectoral, regional and country levels of China's impacts on this subject (Paus, 2008; Jenkins, 2009; Lederman, Olarreaga and Perry, 2009).

In the case of Mexico specifically, despite important advances, precise and detailed studies on the impacts of China's trade interaction on Mexico have been limited. Early analyses focused on the China-Mexico relationship from an historical and diplomatic perspective. On the other hand, more recent research has

[56] Desc Automotriz's Chairman. Reported by Anónimo (*El Economista,* 2003).

emphasised bilateral trade patterns and structure rather than the impacts on the domestic economy. From the literature depicted above on the China-Latin America trade relationship, a generalised conclusion is that Mexico represents a "paradigmatic" example (Blázquez-Lidoy, Rodríguez and Santiso, 2007: 52) or an "exception" case in all the studies (Paus, 2008: 5). According to Gallagher and Porzecanski (2010: 8), Mexico tops everyone's list of nations under direct threat from China. While it is considered that export structure of most of Latin America is more complementary than competitive with that of China, the similarity between Mexico's export structure and that of the Asian giant makes it a direct competitor in world and domestic markets.[57] In general, Mexico is the only country in Latin America whose comparative advantage had been moving in the same direction as China's comparative advantage (Lederman, Olarreaga and Perry, 2009). As a consequence, particularly after 2001, Mexico's trade balance with China has presented a growing deficit, of US$ 46.3 billion in 2011, according to Mexican sources. Unlike most Latin American countries, Mexico has not been able to take advantage of the region's export boom to China. The China-Mexico bilateral trade is mostly based on imports from China, which became Mexico's second largest trading partner in 2003. Whereas China's share of Mexico's total exports is only 1.7%, the share of imports reaches 15%.

Studies of China's impacts on Mexico's domestic market and production structure of specific sectors-products in Mexico have been even more limited. In the toy industry, for example, the president of the Toy Industry Mexican Association (AMIJ), have declared that Chinese imports with undervalued prices, along with smuggling, piracy, and the economic crisis, have reported hit the industry badly. The number of firms affiliated to the AMIJ has fallen from 320 in 1991 to 78 in 2011, a decrease of 75% (Patiño, 2011). It is estimated that between 35 and 65% of this industry's product is imported (Delgado, 2011). Recently, in a more detailed study, the National Chamber of the Iron and Steel Industry (CANACERO) reported that between 2007 and 2010 Mexico's metallurgical sector observed a drop of 6.1% in its production value and the loss of 135,000 jobs, mostly attributed to increased Chinese imports and competition (Mendes de

[57] The China-Mexico competition in the U.S. market is the subject of analysis in Chapter 7.

Paula and Cervera, 2011). The study points out that metallurgics imports from China went from representing 1.7% of Mexico's production value in the sector in 2000 to 35.4% in 2010.[58] Before this situation, the CANACERO has asked for defensive measures, arguing a process of de-industrialisation in Mexico.

During the last few years, more comprehensive studies have been carried out, in particular into the yarn-textile-garment and the electronics sectors (Dussel Peters, 2005a, 2005b, 2009 and 2010). Although not only attributed to Chinese competition, Dussel Peters reported the loss of more than one third of employment in the yarn-textile-garment commodity chain during the period 2000-2005. Likewise, in the electronics sector (PC chain) China increased its share in the Mexican market from 4.01% to 29.09% between 2000 and 2003. As a consequence of China's competition, Mexico's electronics sector lost more than 45,000 (direct and indirect) jobs during the same period (Dussel Peters, 2005a, 2005b and 2009). According to analysts and other governmental and business sources, if the illegal Chinese products introduced to Mexico were taken into account, as well as their "triangulation" though U.S. ports, China's final impact could be worse (Dussel Peters, 2009; Jenkins, 2009). By the mid-2000s, Mexico's Ministry of Economy estimated that almost 60% of the apparel domestic market was covered through illegal channels (smuggling, stolen goods and products with tax evasion) (Arellano, 2006). In the toy industry, the AMIJ calculates that illegal toy market in Mexico equals the US$ 2,000 million-value of the national formal segment (Patiño, 2011). Likewise, at the end of 2011, the Chairman of Mexico's Employers Confederation (COPARMEX) declared that formal entrepreneurs lose up to 40% in original equipment' sales due to competition with piracy and smuggling, especially regarding goods of Chinese origin (González, 2011).

Based on the examination of the literature, no special or detailed studies on the China-Mexico bilateral trade relationship in the motor industry, or on the impacts of China's import penetration in this activity, have been performed. Against this background, the main objective of this chapter is to analyse in detail the structure

[58] Nevertheless, the study seems not having explicitly considered other relevant causes affecting the sector's evolution, such as the economic crisis, for example.

and evolution of the China-Mexico bilateral trade in the motor industry. In addition, an approximation to the impacts derived from China's import penetration in the sector will be addressed. Important questions to ask are: What is the structure of the China-Mexico bilateral trade in the auto industry?; Is there some type of specialisation pattern or complementarity between China and Mexico?; Does China-Mexico bilateral trade in the motor industry follow the same pattern than other manufactured sectors?; And, What is the degree of Mexico's domestic market competition of Chinese automotive products?

It is worth noting that, as in the case of FDI, there are important discrepancies between Mexican and Chinese official statistics on bilateral trade, which pose problems for making more "objective" analysis of the China-Mexico relationship. Most of these statistical problems have been associated to differences in the registration codes of the Harmonised System, the 'triangulation' flows of goods into Mexico through the United States and Hong Kong, particularly the former, as well as illegal imports (smuggling) (Dussel Peters, 2005c; Morales, 2009 and 2010). More specifically, among the major bilateral discrepancy sources are the following (Morales, 2009): a) divergences between exports FOB and imports CIF; b) differences in the registration times and dates between the exit of goods (exports) and the arrival (imports); c) exports being registered according to the destination country without determining if subsequently they are re-exported to a third country; d) imports being registered according to their country of origin without considering the precedence; e) human errors in the classification of goods and/or registry of the trade flows' value or volume; and f) illegal trade. Given these discrepancies in the China-Mexico bilateral trade statistics, in this chapter, the data analysed will be provided by the *UN COMTRADE Database* for both China and Mexico, as reporter countries.

6.1. *RCA* and Specialisation of China and Mexico in World Motor Trade

As tendency, during the last two decades the world motor industry not only presented a dynamic growth but also had an outstanding transformation in structure and the geography production and trade. New producing and trading countries appeared in the global scene; among them Mexico, since the 1980s, and China, since the 1990s. In terms of trade, by 2010 Mexico ranked as the fourth-largest exporter of automotive products, and China positioned itself in seventh place. Together, these two countries account for almost 10% of total world motor exports, while in the early 1990s they only registered over 3% (Table 6.1 and Figure 6.1). Although by 2010 the traditional largest developed exporting countries such as Germany, Japan and the USA were still the leaders, their share of total motor exports has decreased. Besides Mexico and China, other emerging countries have escalated in the export list, in particular Czech Republic, Poland and Thailand.

Table 6.1. Total World Motor Exports. Major Exporting Countries, 1992-2010 (Million Dollars)

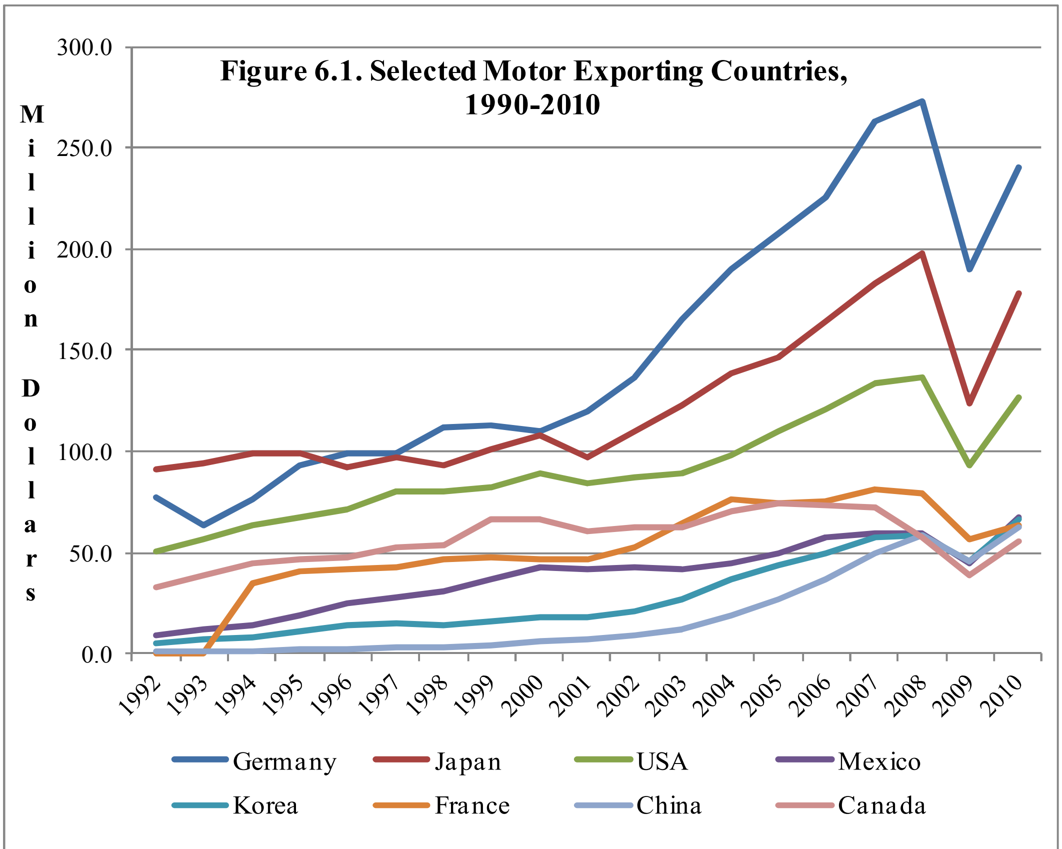
Country	1992	%	1995	%	2001	%	2005	%	2010	%
Germany	77,118	23.9	92,960	16.8	120,074	17.2	208,010	18.1	240,170	17.6
Japan	90,813	28.2	99,384	18.0	97,017	13.9	146,712	12.8	177,696	13.0
USA	50,651	15.7	67,796	12.2	83,856	12.0	110,141	9.6	126,362	9.3
Mexico	*9,760*	*3.0*	*19,397*	*3.5*	*41,573*	*5.9*	*49,713*	*4.3*	*67,905*	*5.0*
Korea	5,451	1.7	11,708	2.1	18,476	2.6	43,888	3.8	66,166	4.9
France	n.a.	0.0	41,112	7.4	47,093	6.7	74,923	6.5	63,304	4.6
China	*1,050*	*0.3*	*2,588*	*0.5*	*6,916*	*1.0*	*27,236*	*2.4*	*62,780*	*4.6*
Canada	33,404	10.4	46,987	8.5	60,721	8.7	74,035	6.4	55,565	4.1
Spain	17,882	5.6	25,327	4.6	30,985	4.4	48,650	4.2	49,796	3.7
U. K.	17,305[1]	5.4	25,252	4.6	27,482	3.9	45,762	4.0	46,682	3.4
Belgium	n.a.	0.0	n.a.	0.0	30,922	4.4	46,085	4.0	42,241	3.1
Italy	n.a	0.0	23,585	4.3	23,678	3.4	37,967	3.3	40,392	3.0
Czech R.	n.a.	0.0	2,365	0.4	8,070	1.2	19,587	1.7	31,666	2.3
Poland	n.a.	0.0	1,562	0.3	5,978	0.9	18,891	1.6	29,796	2.2
Thailand	584	0.2	1,354	0.2	3,863	0.6	11,319	1.0	26,214	1.9
TOTAL	*322,095*	*100.0*	*553,519*	*100.0*	*700,050*	*100.0*	*1,148,188*	*100.0*	*1,363,017*	*100.0*

[1]1991; n.a.: Not available.
Source: Own elaboration based on UN COMTRADE Database.

In order to have a clearer image of China's and Mexico's participation in world motor trade, and taking into consideration the product's differentiated technical specifications, exports can be divided into two broad categories: motor-vehicles and auto parts.[59] Under this classification, the ranking reallocation throws up interesting results. In motor vehicle exports, by 2010 Mexico stands in fifth place

[59] Of the 108 automotive items included in the "cluster" for this research, 19 correspond to "Motor-Vehicles" and 89 to "Auto Parts" (See Methodology in Chapter 3).

with an export value of US$ 67.9 billion, representing 5.5% of world's total (Table 6.2). On the other hand, compared to total motor exports, China loses position accounting for less than 1%, although it increased the absolute value of exports and registered a dynamic pace of growth, especially over the past decade.



Source: Own elaboration based on UN COMTRADE Database.

When analyzing the auto parts export segment, a new arrangement in the country ranking takes place: by 2010 China appears in fourth position and Mexico in seventh. With less than 1% of the world's total auto parts exports in 1992, in 2010 China concentrated 8.2%, with a value of US$ 56.4 billion. Mexico, on the other hand, although losing world share during the last decade, it has kept its position in the world ranking (Table 6.3). Besides China, in this segment of auto parts new emerging countries are entering into the list of top-exporting countries, particularly Czech Republic, Poland, Hungary and Thailand.

Table 6.2. World Motor-Vehicle Exports. Major Exporting Countries, 1992-2010 (Million Dollars)

Country	1992	%	1995	%	2001	%	2005	%	2010	%
Germany	49,251	26.6	57,926	20.0	76,574	20.4	124,809	20.8	142,446	21.1
Japan	59,739	32.3	52,108	18.0	59,067	15.7	89,148	14.9	103,634	15.3
USA	18,827	10.2	23,070	8.0	25,010	6.7	43,823	7.3	54,963	8.1
Canada	23,343	12.6	34,075	11.8	42,222	11.3	49,587	8.3	37,917	5.6
Mexico	*3,966*	*2.1*	*9,382*	*3.2*	*21,929*	*5.8*	*21,639*	*3.6*	*36,981*	*5.5*
Korea	2,831	1.5	8,304	2.9	13,213	3.5	29,206	4.9	34,977	5.2
Spain	11,899	6.4	16,968	5.9	19,930	5.3	293,948	4.9	31,210	4.6
U. K.	7,902[1]	4.3	12,236	4.2	13,269	3.5	26,769	4.5	29,081	4.3
Belgium	n.a.		n.a.		23,505	6.3	32,521	5.4	27,710	4.1
France	n.a.		19,678	6.8	24,918	6.6	40,823	6.8	26,416	3.9
Czech R.	838[1]	0.4	923	0.3	3,092	0.8	6,741	1.1	13,125	1.9
Italy	n.a.		10,376	3.6	9,187	2.4	11,826	2.0	13,034	1.9
Thailand	32	0.0	98	0.0	1,911	0.5	5,171	0.9	12,893	1.9
Poland	n.a.		847	0.3	1,894	0.5	7,005	1.2	11,662	1.7
Turkey	127	0.1	433	0.1	1,678	0.4	7,698	1.3	10,467	1.5
Slovakia	n.a.		95	0.0	1,773	0.5	3,847	0.6	9,368	1.4
Brazil	1,659	0.9	1,120	0.4	2,641	0.7	7,195	1.2	6,914	1.0
Argentina	284	0.2	674	0.2	1,539	0.4	2,039	0.3	6,595	1.0
China	*64*	*0*	*146*	*0.1*	*153*	*0.0*	*1,866*	*0.3*	*6,425*	*0.9*
India	172	0.1	272	0.1	164	0.0	1,337	0.2	5,536	0.8
TOTAL	*184,939*	*100*	*289,498*	*100.0*	*375,095*	*100.0*	*598,610*	*100.0*	*676,393*	*100.0*

[1] 1993; n.a.: Not available.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.3. World Auto Parts Exports. Major Exporting Countries, 1992-2010 (Million Dollars)

Country	1992	%	1995	%	2001	%	2005	%	2010	%
Germany	27,867	20.3	35,033	13.3	43,500	13.4	83,202	15.0	97,724	14.2
Japan	31,074	22.7	47,275	17.9	37,950	11.7	57,564	10.0	74,063	10.8
USA	31,824	23.2	44,726	16.9	58,846	18.1	66,318	12.1	71,339	10.4
China	986	0.7	2,442	0.9	6,763	2.1	25,370	4.6	56,355	8.2
France	n.a.	0.0	21,434	8.1	22,175	6.8	34,101	6.2	36,888	5.4
Korea	2,621	1.9	3,404	1.3	5,263	1.6	14,682	2.7	31,189	4.5
Mexico	5,793	4.2	10,015	3.8	19,644	6.0	28,074	5.1	30,923	4.5
Italy	n.a.	0.0	13,209	5.0	14,491	4.5	26,141	4.8	27,359	4.0
Spain	5,983	4.4	8,359	3.2	11,055	3.4	19,255	3.5	18,586	2.7
Czech R.	n.a	0.0	1,443	0.5	4,978	1.5	12,846	2.3	18,542	2.7
Poland	n.a.	0.0	715	0.3	4,084	1.3	11,887	2.2	18,135	2.6
Canada	10,061	7.3	12,912	4.9	18,499	5.7	24,448	4.4	17,649	2.6
U.K.	9,403[1]	6.9	13,016	4.9	14,213	4.4	18,993	3.5	17,601	2.6
Belgium	n.a.	0.0	n.a.	0.0	7,417	2.3	13,564	2.5	14,531	2.1
Hungary	614	0.4	881	0.3	5,731	1.7	11,520	2.1	13,684	2.0
Thailand	552	0.4	1,256	0.5	1,952	0.6	6,148	1.1	13,321	1.9
TOTAL	137,155	100.0	264,022	100.0	324,956	100.0	549,578	100.0	686,624	100.0

[1]1993. n. a.: Not available.
Source: Own elaboration based on UN COMTRADE Database.

The tendencies shown above indicate that China and Mexico present a different path in terms of their role in world motor exports. While for China auto parts represents the bulk of total automotive exports (90%), for Mexico the motor-vehicle segment is the most important one (55%). In terms of the *RCA* of China and Mexico in world motor trade, the indices for the analysed years show a manifest superiority of Mexico over China. By 2010, for instance, while Mexico registered a substantive *RCA* in motor-vehicles and auto parts exports, with and index of 2.762 and 2.275, respectively, China did not, reaching an index of 0.091 and 0.783, in the same order (Table 6.4). Some conclusions can be drawn from the brief analysis on China's and Mexico's motor export trends. Firstly, both China and Mexico are gaining position in worldwide automotive exports. Secondly, although from a lower absolute base, China's growth pace in automotive exports is higher than Mexico's. Thirdly, nowadays Mexico presents a much higher degree of *RCA* at the aggregate level in world automotive exports (in both vehicles and parts) than China's. Finally, there is a differentiated specialisation pattern: China in auto parts and Mexico in motor vehicles.

Table 6.4. China's and Mexico's Motor *RCA* Index in World Trade, 1992, 2001 and 2010

Country/ Export Segment	Period (million dollars)						*RCA* Index[1]		
	1992	%	2001	%	2010	%	1992	2001	2010
China									
Motor Vehicles	64	6.1	153	2.2	6,425	10.2	0.015	0.009	0.091
Auto Parts	986	93.9	6,763	97.8	56,355	89.8	0.312	0.478	0.783
Total Automotive Exports	1,050	100.0	6,916	100.0	62,780	100.0	0.142	0.227	0.440
Mexico									
Motor Vehicles	3,967	40.6	21,929	52.7	36,982	54.5	1.713	2.256	2.762
Auto Parts	5,793	59.4	19,644	47.3	30,923	45.5	3.372	2.333	2.275
Total Automotive Exports	9,760	100.0	41,573	100.0	67,905	100.0	2.419	2.291	2.517

[1]A country has revealed comparative advantage in a specific sector or segment when the Index value is > 1.
Source: Own elaboration based on UN COMTRADE Database.

6.2. China-Mexico Total Bilateral Trade

Substantial economic interaction between China and Mexico began after the late 1990s and early 2000s. From the initial marginal trade relationship, in 2003 China displaced Japan and became Mexico's second largest trade partner, behind only the United States (Table 6.5). In 1990 trade with China was less than 1 percent of Mexico's total, with a value of only US$ 24.8 million; in 2003 the Mexico-China trade exceeded the US$ 10,000 and by 2011, the value reached US$ 58,213.2 million, accounting for 8.3% of Mexico's worldwide trade.

Regarding China-Mexico bilateral trade, although the pace of growth was similar during the different periods analysed (1992-2001 and 2001-2010), absolute growth of trade value registered a strong boost after 2001, when China joined the WTO (Table 6.6). As pointed out in the introductory section of this chapter, important discrepancies in bilateral trade sources between China and Mexico exist. According to Chinese sources, total bilateral trade with Mexico reached US$ 24.7 billion in 2010. Of this value, 17.9 billion correspond to exports and 6.9 billion for imports. On the other hand, based on Mexican sources, total bilateral trade with China reached US$ 49.8 billion, of which 4.2 billion correspond to exports and 45.6 billion to imports. The major discrepancy is in China's export value in relation to Mexico's import value, with a difference of 155% between them. Despite the discrepancies in the trade value reported for both countries, a similar AAGR between 26 and 28% for exports and between 21 and 28% for imports are registered (Table 6.6).

Another characteristic of the China-Mexico bilateral relationship is the high significance of imports from China in Mexico's total trade. The increasing import penetration of Chinese products has produced a huge trade imbalance for Mexico, the largest deficit with a trading partner. Based on Chinese sources, in 2010 China had a surplus of nearly US$ 11 billion while, according to Mexican sources, Mexico had a trade deficit with China of US$ 41.4 billion (Figures 6.2 and 6.3). That same year, the ratio of Mexican imports from China relative to Mexican exports to China was 11:1. Despite this, it is worth pointing out that during recent years, from 2008 to 2010, Mexican exports to China have doubled their value, presenting AAGR three times higher than imports.[60]

Finally, this growing trade imbalance and domestic market penetration of Chinese products have caused a tense environment in the China-Mexico bilateral relationship. To some analysts, the situation could become worse in the short term as a result of trade disputes within the WTO as well as other controversies such as illegal Chinese imports (Dussel Peters, 2009).

Table 6.5. Mexico's Major Trade Partners, 1990-2011 (Million Dollars)

Year	USA	Japan	Canada	China	Total
1990	59,651.7	2,799.8	639.0	24.8	77,602.3
1991	69,283.1	3,513.6	1,358.1	205.0	91,541.1
1992	82,868.5	4,170.8	2,067.3	450.8	110,255.7
1993	88,145.5	4,615.2	2,774.0	431.2	117,198.6
1994	106,435.6	5,777.0	3,103.5	541.8	140,163.1
1995	119,018.5	4,973.3	3,439.3	736.4	151,993.6
1996	147,316.6	5,382.7	3,980.1	963.2	185,472.5
1997	174,933.2	5,349.9	4,272.9	1,389.5	220,045.0
1998	195,209.1	5,088.6	4,007.2	1,808.8	242,912.4
1999	223,899.3	6,029.4	6,292.6	2,095.3	278,336.6
2000	273,749.0	7,580.7	7,586.0	3,190.1	340,578.6
2001	250,213.2	9,532.0	7,502.5	4,412.1	327,176.2
2002	248,454.4	10,542.8	7,471.6	6,928.3	329,724.9
2003	249,654.0	8,767.6	7,162.3	10,375.0	335,312.3
2004	275,348.7	11,773.9	8,619.0	15,360.2	384,808.2
2005	302,110.2	14,547.8	10,403.8	18,831.9	436,052.5
2006	342,110.4	16,889.2	12,552.4	26,125.6	505,977.2
2007	363,973.6	18,280.0	14,469.7	31,687.8	555,277.5
2008	387,172.3	18,394.3	16,580.0	36,801.4	602,768.8
2009	297,312.3	13,011.7	15,678.9	34,744.6	464,005.2
2010	383,364.8	16,941.0	19,308.1	49,805.3	599,619.9
2011	449,068.4	18,747.4	20,333.0	58,213.2	700,424.1

Source: Own elaboration based on Mexico's Ministry of Economy (2012b).

[60] In fact, based on Mexican sources in Table 6.13, for 2011 this ratio decreased to 8.75: 1.

Table 6.6. China-Mexico Total Bilateral Trade, 1992-2010
(Million Dollars)

Year	Chinas as Reporter Country				Mexico as Reporter Country			
	Total Trade	Exports	Imports	Balance	Total Trade	Exports	Imports	Balance
1992	271.7	157.7	114.0	43.8	449.5	47.2	402.3	-355.1
1993	280.5	155.7	124.8	30.9	456.8	2.4	454.5	-452.1
1994	295.3	201.5	93.9	107.6	599.7	100.4	499.4	-399.0
1995	389.6	195.1	194.5	0.6	557.1	37.0	520.1	-483.1
1996	518.3	221.1	297.2	-76.1	962.2	202.6	759.6	-557.1
1997	597.8	413.5	184.3	229.2	1,431.1	141.6	1,289.4	-1,147.8
1998	836.7	689.2	147.5	541.7	1,807.1	192.3	1,614.8	-1,422.6
1999	950.9	791.7	159.2	632.4	2,046.0	126.3	1,919.8	-1,793.5
2000	1,823.5	1,335.2	488.3	847.0	3,188.0	310.2	2,877.9	-2,567.7
2001	2,551.5	1,790.2	761.3	1,028.9	4,411.6	384.8	4,026.8	-3,642.0
2002	3,978.6	2,863.7	1,115.0	1,748.7	6,927.3	653.7	6,273.6	-5,619.9
2003	4,943.8	3,267.0	1,676.7	1,590.3	10,374.5	974.3	9,400.2	-8,425.9
2004	7,112.6	4,972.8	2,139.8	2,832.9	14,847.2	473.7	14,373.4	-13,899.7
2005	7,7763.0	5,537.7	2,225.3	3,312.4	18,831.9	1,135.6	17,696.3	-16,560.8
2006	11,430.7	8,823.6	2,607.1	6,216.5	26,126.4	1,688.1	24,438.3	-22,750.2
2007	14,983.0	11,717.7	3,265.3	8,452.3	31,638.7	1,895.0	29,743.7	-27,848.6
2008	17,556.7	13,866.5	3,690.3	10,176.2	36,735.1	2,044.8	34,690.3	-32,645.6
2009	16,180.9	12,299.0	3,881.9	8,417.1	34,736.8	2,207.8	32,529.0	-30,321.2
2010	24,747.8	17,872.7	6,875.2	10,997.5	49,803.4	4,195.9	45,607.5	-41,411.6
AAGR								
1992-2010	26.8	28.3	24.1		28.1	26.6	28.3	
1992-2001	30.8	27.5	20.9		25.7	23.4	25.9	
2001-2010	25.5	25.9	24.6		27.4	27.0	27.5	

Source: Own elaboration based on UN COMTRADE Database.

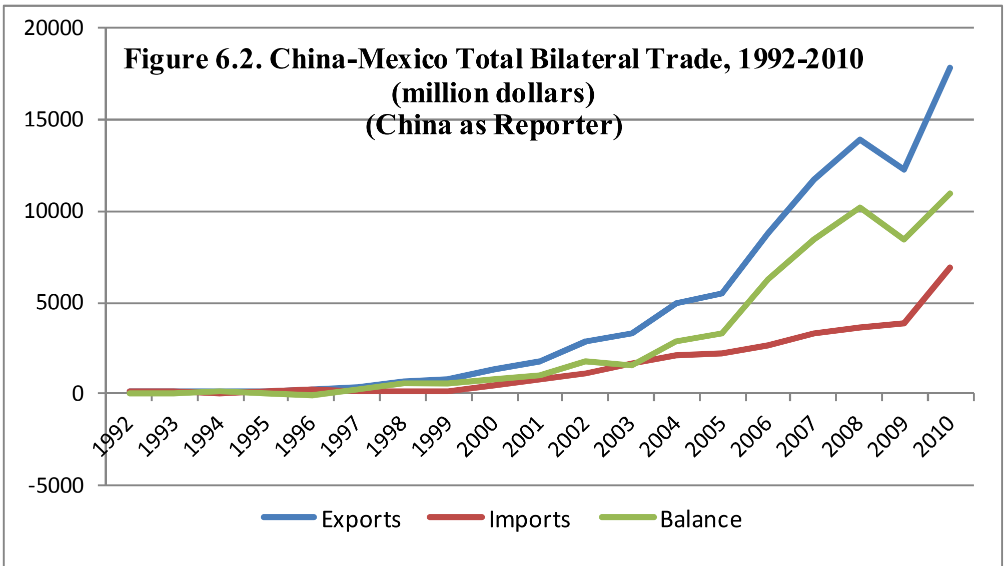


Figure 6.2. China-Mexico Total Bilateral Trade, 1992-2010 (million dollars) (China as Reporter)

Source: Own elaboration based on Table 6.6.

Figure 6.3. Mexico-China Total Bilateral Trade, 1992-2010 (million dollars) (Mexico as Reporter)

Source: Own elaboration based on Table 6.6.

6.3. China-Mexico Bilateral Motor Trade

6.3.1. Significance and Evolution of Bilateral Motor Trade

It is pertinent to discuss the relevance of the motor industry in the China-Mexico bilateral trade, and how the China-Mexico bilateral motor trade has evolved in relation to the growth pace of total trade between the two nations. Tables 6.7 and 6.8 show, respectively, China's and Mexico's share of motor bilateral trade in their total trade. As observed in the tables, motor trade plays and increasing important role in total bilateral trade for both countries. Based on Chinsese official figures (China as reporter country), from constituting less than 1% of China's total commercial transactions in the early 1990s, in 2010 automotive trade represented 8% of total bilateral trade with Mexico with a value of nearly US$ 2.0 billion; motor exports were 6% and imports, a significant 13.1%. In terms of the pace of growth, in all the periods analysed (1992-2010, 1992-2001 and 2001-2010), China's total auto trade with Mexico, as well as auto exports and imports, registered AAGR twice as a much as the ones obtained in total bilateral trade; for motor imports, the AARG were even higher.

Despite the fact that Mexico's figures on motor bilateral trade with China seem to have evolved erratically throughout the 1990s, it appears that these became stabilised from the year 2000. According to Mexican official figures (Mexico as reporter country), by 2010, Mexico's motor trade with China represented around 6% of total bilateral trade, reaching a value of US$ 2.9 billion. In relative terms, this figure is lower than China's, but to Mexico auto exports represent almost 17% of total exports. Despite that the value of Mexico's automotive imports from China is more than double that of China's imports from Mexico, for the latter it only represents 4.8% of total bilateral imports. In Mexico's case, motor exports have been more dynamic than the rest of bilateral trade. However, it is important noting that during the recent period of 2001-2010, both auto exports and imports registered higher AAGR than total bilateral trade. This trend was particularly powerful during the last few years, overcoming the global financial crisis of 2008-2009 by 2010.

Table 6.7. China-Mexico Motor Trade in Total Bilateral Trade, 1992-2010
(Million Dollars)
(China as Reporter Country)

Year	Total Trade (TT)	Motor Trade (MT)	% MT/ TT	Total Exports (TE)	Motor Exports (ME)	% ME/ TE	Total Imports (TI)	Motor Imports (MI)	% MI/ TI
1992	271.7	0.7	0.3	157.7	0.7	0.4	114.0	0.0	0.0
1993	280.5	0.6	0.2	155.7	0.6	0.4	124.8	0.0	0.0
1994	295.3	0.8	0.3	201.5	0.7	0.3	93.9	0.1	0.1
1995	389.6	1.7	0.4	195.1	1.3	0.7	194.5	0.4	0.2
1996	518.3	5.6	1.1	221.1	5.4	2.4	297.2	0.2	0.1
1997	597.8	22.7	3.8	413.5	7.5	1.8	184.3	15.3	8.3
1998	836.7	37.4	4.5	689.2	12.5	1.8	147.5	24.9	16.9
1999	950.9	38.4	4.0	791.7	17.2	2.2	159.2	21.2	13.3
2000	1,823.5	58.9	3.2	1,335.2	32.0	2.4	488.3	26.9	5.5
2001	2,551.5	75.6	3.0	1,790.2	33.8	1.9	761.3	41.8	5.5
2002	3,978.6	130.0	3.3	2,863.7	62.4	2.2	1,115.0	67.7	6.1
2003	4,943.8	201.1	4.1	3,267.0	98.8	3.0	1,676.7	102.3	6.1
2004	7,112.6	315.4	4.4	4,972.8	184.1	3.7	2,139.8	131.3	6.1
2005	7,763.0	340.6	4.4	5,537.7	218.7	3.9	2,225.3	121.9	5.5
2006	11,430.7	706.1	6.2	8,823.6	435.0	4.9	2,607.1	271.2	10.4
2007	14,983.0	912.4	6.1	11,717.7	610.0	5.2	3,265.3	302.4	9.3
2008	17,556.7	1,061.6	6.0	13,866.5	772.2	5.6	3,690.3	289.4	7.8
2009	16,180.9	1,025.8	6.3	12,299.0	680.9	5.5	3,881.9	344.9	8.9
2010	24,747.8	1,971.1	8.0	17,872.7	1,073.9	6.0	6,875.2	897.2	13.1
AAGR									
1992-2010	26.8	51.8		28.3	47.3		24.1	73.0	
1992-2001	30.8	68.3		27.5	47.7		20.9	108.4	
2001-2010	25.5	38.6		25.9	41.3		24.6	35.9	

Source: Own elaboration based on UN COMTRADE Database.

Table 6.8. China-Mexico Motor Trade in Total Bilateral Trade, 1992-2010
(Million Dollars)
(Mexico as Reporter Country)

Year	Total Trade (TT)	Motor Trade (AT)	% MT/ TT	Total Exports (TE)	Motor Exports (AE)	% ME/ TE	Total Imports (TI)	Motor Imports (AI)	% MI/ TI
1992	449.5	32.3	7.2	47.2	2.2	4.6	402.3	30.1	7.5
1993	456.8	31.5	6.9	2.4	0.0	1.4	454.5	31.5	6.9
1994	599.7	5.3	0.9	100.4	0.2	0.2	499.4	5.1	1.0
1995	557.1	11.3	2.0	37.0	0.4	1.1	520.1	10.9	2.1
1996	962.2	18.8	1.9	202.6	2.6	1.3	759.6	16.2	2.1
1997	1,431.1	61.8	4.3	141.6	20.2	14.3	1,289.4	41.5	3.2
1998	1,807.1	101.0	5.6	192.3	26.1	13.6	1,614.8	74.9	4.6
1999	2,046.0	84.8	4.1	126.3	2.3	1.8	1,919.8	82.5	4.3
2000	3,188.0	106.8	3.3	310.2	23.0	7.4	2,877.9	83.8	2.9
2001	4,411.6	142.3	3.2	384.8	30.7	8.0	4,026.8	111.6	2.8
2002	6,927.3	256.8	3.7	653.7	48.1	7.4	6,273.6	208.7	3.3
2003	10,374.5	379.6	3.7	974.3	95.4	9.8	9,400.2	284.1	3.0
2004	14,847.2	627.5	4.2	473.7	63.8	13.5	14,373.4	563.7	3.9
2005	18,831.9	923.3	4.9	1,135.6	93.3	8.2	1,7696.3	830.0	4.7
2006	26,126.4	1,442.8	5.5	1,688.1	251.8	14.9	24,438.3	1,191.0	4.9
2007	31,638.7	1,665.5	5.3	1,895.0	274.0	14.5	29,743.7	1,391.5	4.7
2008	36,735.1	1,877.3	5.1	2,044.8	234.6	11.5	34,690.3	1,642.7	4.7
2009	34,736.8	1,767.5	5.1	2,207.8	254.4	11.5	32,529.0	1,513.1	4.7
2010	49,803.4	2,875.2	5.8	4,195.9	703.6	16.8	45,607.5	2,171.6	4.8
AAGR									
1992-2010	28.1	26.7		26.6	35.5		28.3	25.3	
1992-2001	25.7	16.0		23.4	30.3		25.9	14.0	
2001-2010	27.4	35.1		27.0	36.8		27.5	34.6	

Source: Own elaboration based on UN COMTRADE Database.

In Mexico's case, in terms of the position of automotive trade in relation to other economic sectors in the bilateral relationship, by 2010 the more significant role is in the export segment, ranking in third place with 16.8% of total exports to China (Table 6.9), behind ores and mineral fuels. Although they have a lower share of total imports, automotive products are located in fourth place, only behind electronic equipment, nuclear reactors and electrical machinery, apparatus and appliances. As observed in Table 6.9, Mexico's bilateral trade with China is highly concentrated in a few products. Based on 2010 figures, five items concentrate 80% of total exports; and three accounts for 87% of total imports. Only one, electrical and electronic equipment concentrates nearly 50% of total imports from China that same year. An apparently paradox is that Mexico's trade structure presents great similarity to China's, especially in manufacturing goods (Dussel Peters, 2009).

Table 6.9. Major Export and Import Products in Trade with China, 2010 (Mexico as Reporter Country)

Commodity Code	Product	Value (US$ Million)	%
	EXPORTS		
26	Ores, slag and ash	1,028.1	24.5
27	Mineral fuels, oils, distillation products	724.3	17.3
87[1]	Automotive products	703.6	16.8
74	Cooper and articles thereof	619.0	14.8
85	Electrical, electronic equipment	299.4	7.1
84	Nuclear reactors, boilers, machinery, etc.	197.8	4.7
29	Organic chemicals	180.3	4.3
TOTAL		*4,195.9*	*100.0*
	IMPORTS		
85	Electrical, electronic equipment	21,755.5	47.7
84	Nuclear reactors, boilers, machinery	10,675.5	23.4
77	Electrical machinery, apparatus and appliances	7,309.2	16.0
87[1]	Automotive products	2,171.6	4.8
90	Optical, photo, technical, medical	2,065.8	4.5
95	Toys, games and sport requisites	1,353.0	3.0
39	Plastics and articles thereof	1,023.4	2.2
TOTAL		*45,607.5*	*100.0*

[1] The value of commodity code 87 includes the items classified under the "cluster" of 108 automotive products. It not includes items such as bicycles and motorbikes, but it may include some electrical and rubber items used in the automotive industry, for example. For this reason, the automotive segment as used here is different from the 87 commodity code.
Source: Own elaboration based on UN CONTRADE Database.

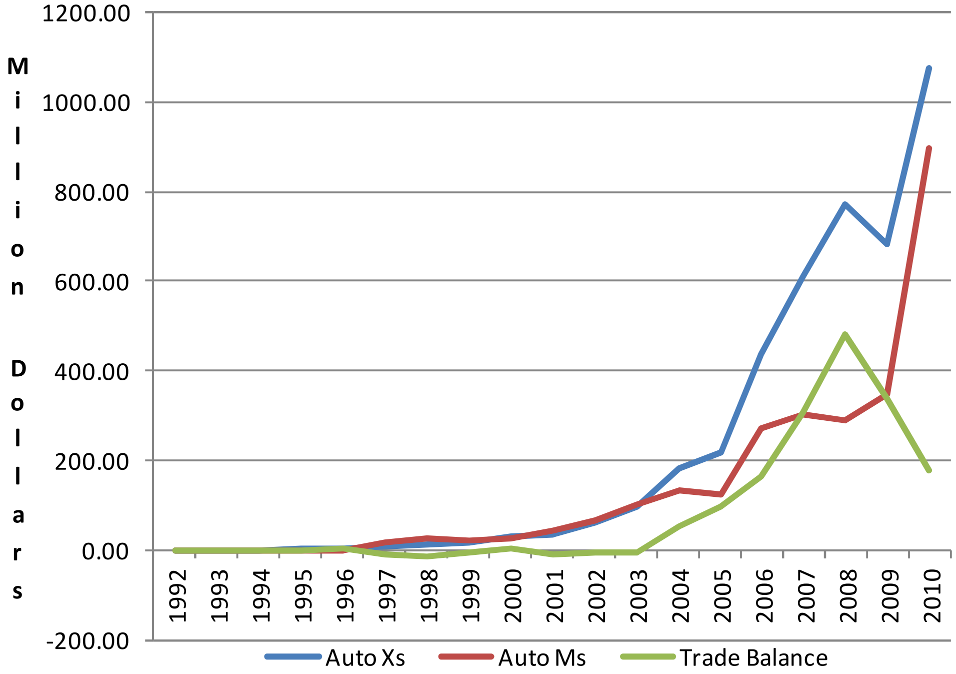
As in the case of total bilateral trade, Mexico's motor sector also presents a negative trade balance with China (Table 6.10; Figures 6.4 and 6.5). Based on Mexico as reporter country in UNCOMTRADE figures, in 2010 this sector's trade deficit was US$ 1.4 billion, although in relative terms the proportion seems to be decreasing in recent years. In fact, whereas the ratio of imports to exports in Mexico's total bilateral trade with China was 30.3:1.0 in 2004, 17.0:1.0 in 2008 and 10.9:1.0 in 2010, the ratio for motor trade was 8.8:1.0, 7.0:1.0 and 3.1:1.0, respectively (Table 6.11).

Table 6.10. China-Mexico Motor Trade Balance, 1992-2010 (Million Dollars)

Year	China as Reporter Country			Mexico as Reporter Country		
	Motor Exports	Motor Imports	Trade Balance	Motor Exports	Motor Imports	Trade Balance
1992	0.7	0.0	0.7	2.2	30.1	-27.9
1993	0.6	0.0	0.6	0.0	31.5	-31.4
1994	0.7	0.1	0.5	0.2	5.1	-4.9
1995	1.3	0.4	0.9	0.4	10.9	-10.5
1996	5.4	0.2	5.2	2.6	16.2	-13.6
1997	7.5	15.3	-7.8	20.2	41.5	-21.3
1998	12.5	24.9	-12.4	26.1	74.9	-48.8
1999	17.2	21.2	-4.0	2.3	82.5	-80.2
2000	32.0	26.9	5.1	23.0	83.8	-60.8
2001	33.8	41.8	-8.0	30.7	111.6	-80.9
2002	62.43	67.7	-5.3	48.1	208.7	-160.6
2003	98.8	102.3	-3.5	95.4	284.1	-188.7
2004	184.1	131.3	52.8	63.8	563.7	-499.9
2005	218.7	121.9	96.9	93.3	830.0	-736.7
2006	435.0	271.2	163.8	251.8	1,191.0	-939.3
2007	610.0	302.4	307.7	274.0	1,391.5	-1,117.5
2008	772.2	289.4	482.8	234.6	1,642.7	-1,408.2
2009	680.9	344.9	336.0	254.4	1,513.1	-1,258.7
2010	1,073.9	897.2	176.8	703.6	2,171.6	-1,468.0

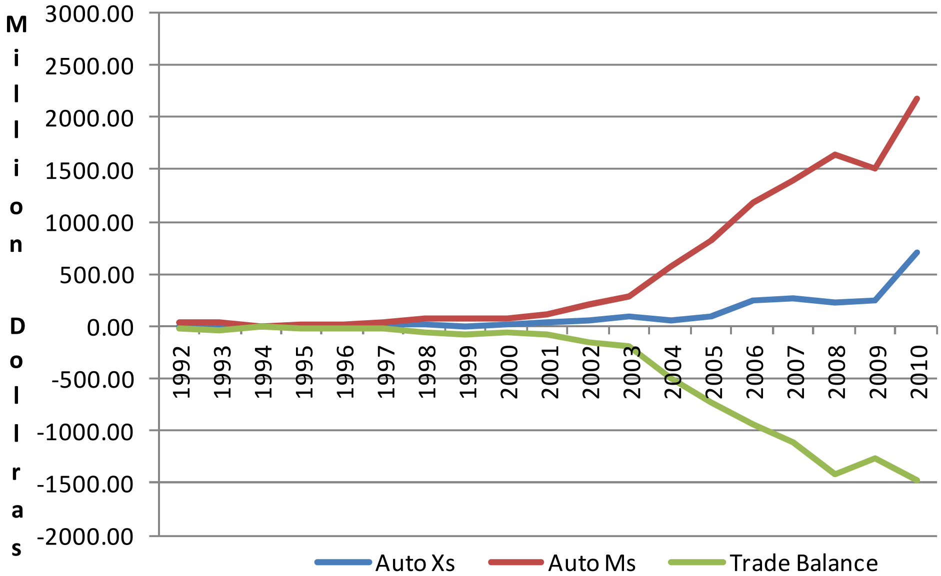
Source: Own elaboration based on UN COMTRADE Database.

Figure 6.4. China-Mexico Motor Bilateral Trade, 1992-2010 (China as Reporter Country)



Source: Own elaboration based on Table 6.10.

Figure 6.5. China-Mexico Motor Bilateral Trade, 1992-2010 (Mexico as Reporter Country)



Source: Own elaboration based on Table 6.10.

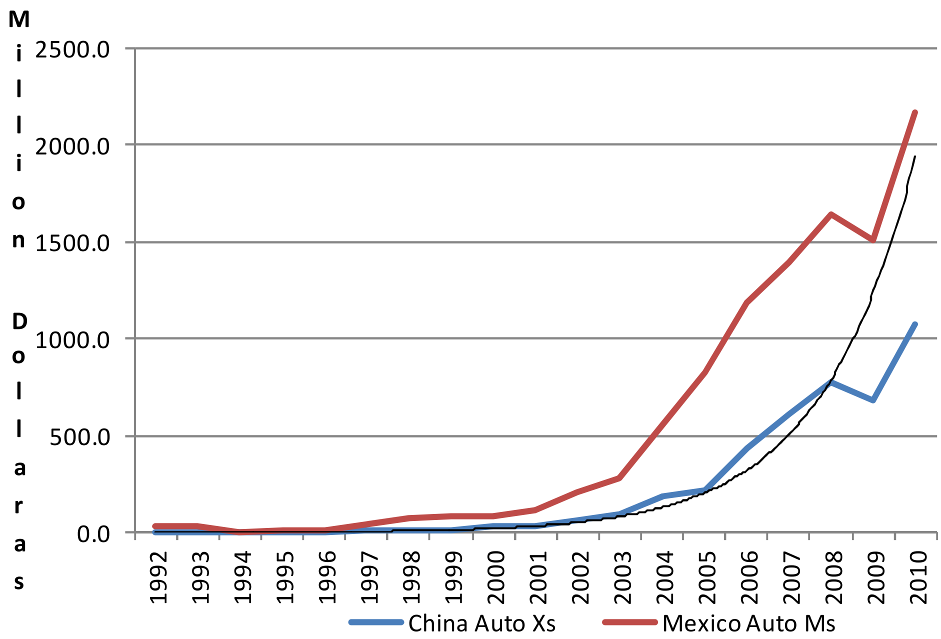
Table 6.11. Ratio of Imports to Exports in Mexico's Total Bilateral Trade and Bilateral Motor Trade with China (Mexico as Reporter Country)

Year	Ratio of Imports to Exports: Total Bilateral Trade	Ratio of Imports to Exports: Motor Trade
1992	8.5	13.8
1993	192.3	953.8
1994	5.0	27.6
1995	14.1	27.6
1996	3.7	6.2
1997	9.1	2.1
1998	8.4	2.9
1999	15.2	35.5
2000	9.3	3.6
2001	10.5	3.6
2002	9.6	4.3
2003	9.6	3.0
2004	30.3	8.8
2005	15.6	8.9
2006	14.5	4.7
2007	15.7	5.1
2008	17.0	7.0
2009	14.7	5.9
2010	10.9	3.1

Source: Own elaboration based on UN COMTRADE Database.

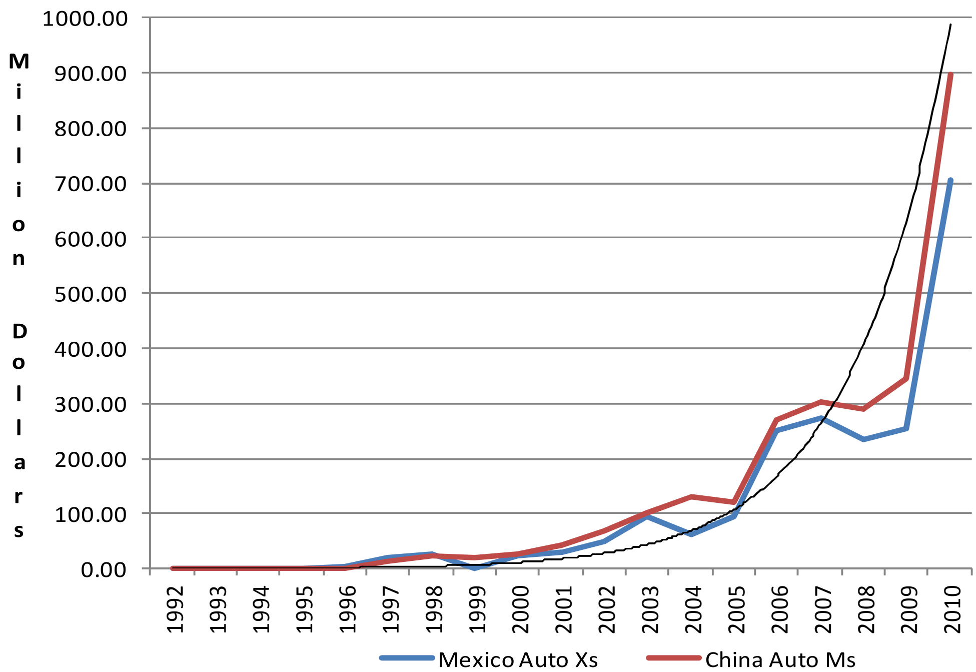
Another similarity with total bilateral trade is that the trade imbalance is smaller according to Chinese sources. Again, the main discrepancies in automotive trade figures arise in China's exports to Mexico compared to Mexico's imports from China. The difference is around 100% (US$ 1 billion). Nevertheless, it is worth noting that despite these discrepancies, both Chinese and Mexican sources report the same increasing tendencies in export and import values (Figures 6.6 and 6.7).

Figure 6.6. China's Motor Exports to Mexico vs Mexico's Motor Imports from China, 1992-2010



Source: Own elaboration based on Table 6.10.

Figure 6.7. Mexico's Motor Exports to China vs China's Motor Imports from Mexico, 1992-2010



Source: Own elaboration based on Table 6.10.

Finally, looking at the evolution of the bilateral trade between China and Mexico, it can be argued that, unlike other sectors such as garments, toys and electronics, in the automotive case the big trade boost started by the mid-2000s and not immediately after China joined the WTO. This might be explained by the sectoral differences, in particular the type of global value chains involved and their form of governance, technological conditions, required scale economies, as well as market and competition conditions, among other factors.

6.3.2. Structure and Composition of Bilateral Motor Trade

Based on the analysis of the sector’s evolution, motor trade plays an important role in the bilateral trade of both China and Mexico, and has also registered a dynamic pace of growth, especially during the last decade. This section discusses the structure and product composition of the China-Mexico bilateral motor trade, and whether there is some kind of specialisation pattern between the two countries. As seen in the previous section, there are discrepancies in both Chinese and Mexican sources, although similar increasing tendencies in export and import values can be seen, and both countries’ sources present similar product composition in their export and import structure of motor goods. Nevertheless, the following analysis will mainly consider Mexico as reporter country.

Table 6.12 shows Mexico’s major export and import motor products in 2010. In correlation with China, Mexico’s automotive exports are highly concentrated in small number of items: nine products concentrate 96.2% of total exports to China. As in China’s import structure, automobiles represent Mexico’s single largest export product, accounting for around 80% of total motor exports. Besides motor vehicles, other important items are electronic and safety systems (safety airbags with inflated system); engine components (parts for spark-ignition type engines, and parts for diesel and semi-diesel engines); parts for motor vehicle bodies; general parts and accessories. In addition, in Mexico’s major export items appear important component categories related to transmissions and drive train components such as drive axles with differentials; steering wheels, steering columns and steering boxes; and transmission shafts and cranks.

Table 6.12. Mexico's Major Motor Export and Imports Products in Trade with China, 2010
(Mexico as Reporter Country)

HS Code	Product Description	Value (Million Dollars)	% of Total	AAGR 2001-2010
	EXPORTS			
870323	Automobiles w reciprocating piston engine displacing >1500 cc to 3000 cc	555.269	78.9	182.2
840991	Parts for spark-ignition type engines nes	27.476	3.9	4.4
870899	Motor vehicle parts nes	24.208	3.4	46.3
870895	Safety airbags with inflated system	16.673	2.4	87.8
870850	Drive axles with differential for motor vehicles	13.084	1.8	32.6
870829	Parts and accessories of bodies nes for motor vehicles	12.961	1.8	15.4
840999	Parts for diesel and semi-diesel engines	12.935	1.8	79.6
870894	Steering wheels, steering columns and steering boxes for motor vehicles	9.392	1.3	124.6
848310	Transmission shafts (including camshafts and crankshafts) and cranks	6.441	0.9	28.2
TOTAL		703.573	100.0	36.8
	IMPORTS			
732690	Articles, iron or steel, nes	218.627	10.1	27.0
401120	Pneumatic tyres, new of rubber for buses or lorries	155.594	7.2	57.2
850780	Storage batteries, nesoi	139.816	6.4	42.9
401110	Pneumatic tyres, new of rubber for motor cars, including station wagons and racing cars	135.357	6.2	43.8
870829	Parts and accessories of bodies nes for motor vehicles	99.612	4.6	61.6
841490	Parts of vacuum pumps, compressors, fans, blowers, hoods	92.019	4.2	50.6
870899	Motor vehicle parts nes	90.160	4.2	40.9
841459	Fans nes	81.562	3.8	23.8
854420	Co-axial cable and other electric conductors	76.306	3.5	41.4
853641	Relays for a voltage not exceeding 60v	66.806	3.1	39.5
851190	Parts for electrical ignition or starting equipment used for internal combustion engines	54.628	2.5	55.2
870870	Wheels including parts and accessories	56.406	2.6	52.6
851290	Parts of electrical lighting, signalling and defrosting equipment	54.821	2.5	52.2
870850	Drive axles with differential for motor vehicles	53.518	2.5	165.5
850720	Lead-acid electric accumulators nes	47.526	2.2	27.4
TOTAL		2,171.6	100.0	34.6

Source: Own elaboration based on UN COMTRADE Database.

Mexico's motor imports from China are more diversified than exports. Except for a few items, there is also a high correspondence between Mexico's imports with China's exports. The most important import item in 2010 was iron and steel articles with 10.1%; this is followed by pneumatic tyres for buses and automobiles adding up to 13.4% between them. Electrical parts also take a considerable share of imports, making nearly 10% among three items: co-axial cable and other electric conductors; parts for electrical ignition or starting equipment used for internal combustion engines; and parts for electrical lighting, signalling and defrosting equipment. Other components are parts of vacuum pumps; storage batteries; lead-acid electric accumulators; and accessories and general parts. In the list also appear wheels, including parts and accessories, as well as drive axles with differential. Finally, in terms of the pace of growth, while most of Mexico's imported items registered AAGR above the average, some of the exported ones presented growth rates below the average, showing a loss of dynamism during the period analysed.

Given the above trade structure and product composition, and in order to identify the possible existence of a specialisation pattern in the China-Mexico motor bilateral trade in a more systematic way, a specific methodology was designed for this purpose. This scheme is also useful for assessing the qualitative side of a "competitive threat", as applied in Chapter 7, where the China-Mexico competition in the U.S. market is evaluated. As described in the Methodological Chapter, this particular methodology classifies the 108 products included in the automotive "cluster", at 6-digit level of the Harmonised System (HS), into five categories and twenty-five subcategories with different technological complexity within the automotive value chain. Ranging from high to low complexity level, the major categories are:

I. Finished Vehicles;
II. Major Components and Systems. Machining and Stamping;
III. Sophisticated Parts and Subsystems. Specialised Technology;
IV. Parts & Components. Moderate and Universal Technology; and,
V. Accessories and Simple Parts.

This methodology also considers the fact that, within the category of "Finished Vehicles", a differentiated technological complexity exists. This is the case, for instance, of the low end-smallest cars, such as sport & recreational, microcars/bubble, and subcompacts, compared to compact, mid-size cars, compact SUVs, luxury and full-size SUVs.

Tables 6.13 and 6.14 show the classification of Mexico's motor exports and imports in its bilateral trade with China, within the major categories of technological complexity, for selected years of the analysed period.[61] Despite the fact that the bilateral automotive trade during the 1990s was irregular, as that data discrepancies exist between the two countries, the results seem to be consistent. In general, these results suggest a current trade pattern in which China is more specialised in the lower-end categories of technology complexity of automotive goods, and Mexico in the more sophisticated ones, particularly in finished vehicles from the second half of the last decade (Figures.6.8 and 6.9).

As observed in Table 6.13, during the period analysed, the great majority of Mexico's exports to China have consisted of products classified in the high-technology complexity categories. With the exceptions of some years, the percentage of these categories in Mexico's total motor exports to China have ranged between 80 and 95%. Exports of finished vehicles to China have gained relative importance during the last five years. From a marginal value of vehicle exports by the late 1990s, in 2010 these items accounted around 80% of Mexico's total motor exports to China. That year, nearly 30,000 vehicles were exported to China, an increase of 330% in relation to 2009. As a result, China became Mexico's sixth largest export destination of cars in 2010 (El Economista, 2011). In the categories II and III, the largest share of exports corresponds to engine, transmissions components, electronic, and safety systems. Mexico's motor trade flows to China are greatly linked to the major auto TNCs operating in both countries. VW, for instance, besides exporting sedans, also sends parts and components to be used in the 'Jetta' assembly plants in its Chinese JV operations.

[61] The complete set of tables with data for China's and Mexico's export and imports of automotive products in their bilateral trade by Category and Subcategory is presented in Appendix 6.3.

Table 6.13. Mexico's Motor Exports to China by Category of Technological Complexity in the Value Chain, 1992-2010
(Mexico as Reporter Country)

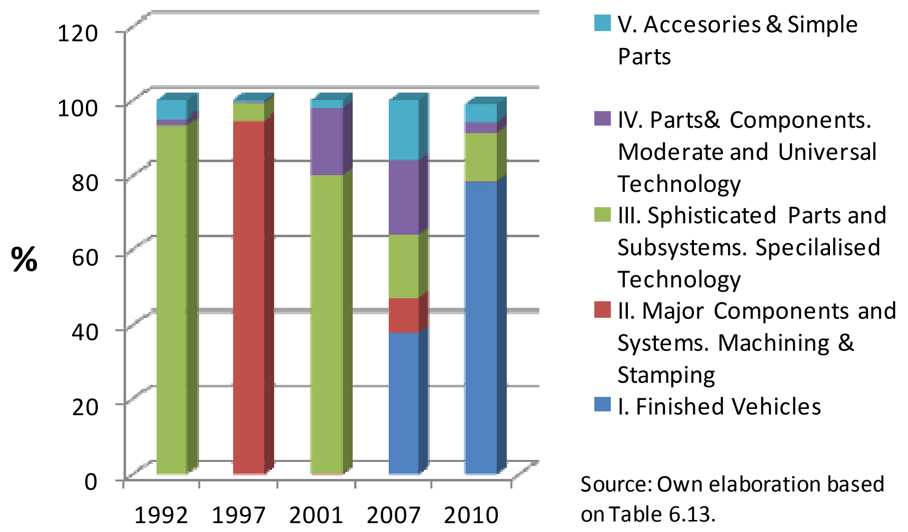
Category	1992	1997	2001	2007	2010
Value (US$ Million)[1]					
I. Finished Vehicles			0.006[2]	103.6	558.8
II. Major Components and Systems. Machining and Stamping		19.170	0.078	25.1	1.27
III. Sophisticated Parts and Subsystems. Specialised Technology	2.039	0.913	24.503	46.8	90.8
IV: Parts & Components. Moderate & Universal Technology	0.037	0.075	5.435	54.1	20.7
V. Accessories & Simple Parts	0.105	0.072	0.659	44.3	31.9
Grand Total	*2.181*	*20.232*	*30.676*	*274.011*	*703.573*
Percentage (%)[1]					
I. Finished Vehicles			0.03[2]	37.8	79.4
II. Major Components and Systems. Machining and Stamping		94.8	0.25	9.2	0.18
III. Sophisticated Parts and Subsystems. Specialised Technology	93.5	4.5	79.9	17.1	12.9
IV: Parts & Components. Moderate & Universal Technology	1.7	0.4	17.7	19.7	2.9
V. Accessories & Simple Parts	4.8	0.4	2.2	16.2	4.54
Grand Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

[1]Totals do not add up 100% due to rounding. [2]2000.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.14. Mexico's Motor Imports from China by Category of Technological Complexity in the Value Chain, 1992-2010 (Mexico as Reporter Country)					
Category	**1992**	**1997**	**2001**	**2007**	**2010**
Value (US$ Million)[1]					
I. Finished Vehicles	0.002	0.003	0.046	26.7	13.9
II. Major Components and Systems. Machining and Stamping		0.086	0.115	17.9	74.0
III. Sophisticated Parts and Subsystems. Specialised Technology	2.965	10.364	23.929	286.7	517.8
IV: Parts & Components. Moderate & Universal Technology	20.609	17.798	29.684	587.9	1,012.3
V. Accessories & Simple Parts	6.503	13.282	57.819	472.4	553.6
Grand Total	*30.079*	*41.535*	*111.596*	*1,91.5*	*2,171.6*
Percentage (%)[1]					
I. Finished Vehicles	*0.007*	*0.008*	*0.04*	*1.9*	*0.6*
II. Major Components and Systems. Machining and Stamping		*0.208*	*0.1*	*1.3*	*3.4*
III. Sophisticated Parts and Subsystems. Specialised Technology	*9.8*	*24.9*	*21.4*	*20.6*	*23.9*
IV: Parts & Components. Moderate & Universal Technology	*68.5*	*42.8*	*26.6*	*42.3*	*46.6*
V. Accessories & Simple Parts	*21.6*	*32.0*	*51.8*	*33.9*	*25.5*
Grand Total	*100.0*	*100.0*	*100.0*	*100.0*	*100.0*

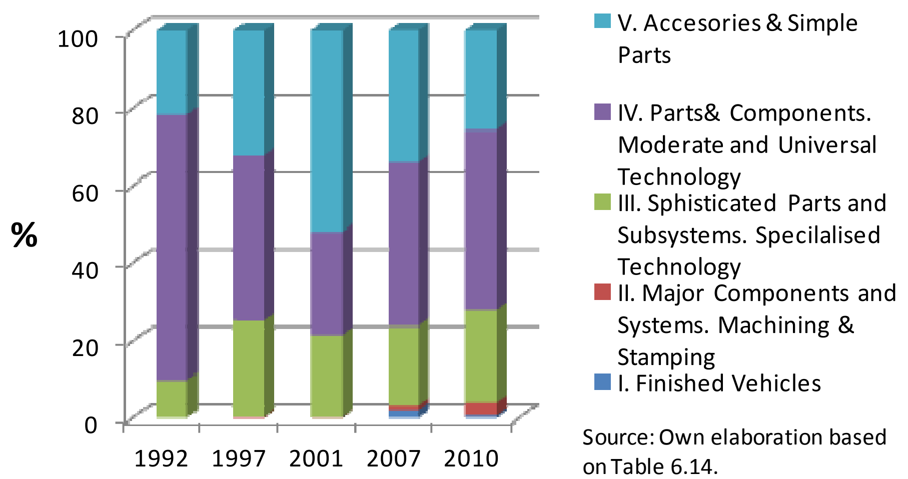
[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

Figure 6.8. Mexico's Motor Exports to China by Technological Complexity in the Value Chain, 1992-2010



Source: Own elaboration based on Table 6.13.

Figure 6.9. Mexico's Motor Imports from China by Technological Complexity in the Value Chain, 1992-2010



Source: Own elaboration based on Table 6.14.

On the other hand, the bulk of Mexico's automotive imports from China have by and large consisted in products for the aftermarket segment (replacement and accessories), corresponding to the lowest segments of technology complexity (categories IV and V). This feature of automotive imports from China was corroborated by both Mexico's governmental officials[62] and automotive industry's executives[63] during interviews. According to the interviewees, China was not present in the original equipment segments or original products, having no significant presence in Mexico's assembly industry. These imports were mostly characterised as being of very low quality and acquired by customers due to their cheap prices. When imported, the use of Chinese parts have been problematic, either because of quality or because adaptation work was needed. Both automotive agents, however, concurred on the tendency of improved quality of Chinese imported auto parts. This is the case, for instance, of the electronics segment, in which China is becoming a strong competitor. During the interview, Mexico's automotive industry official mentioned that besides semiconductors, Mexico imports electronic components and they are converted into auto parts. A VW executive also agreed with these tendencies. He considered that despite the fact that Mexico's automakers and Tier-1 suppliers are still experiencing problems with Chinese suppliers, qualitywise, logistic capacitywise, and communications, the trend of buying more from China will accelerate in the coming years (Downer, 2007).

It is important to note that, as a tendency, China's automotive exports to Mexico are slowly but increasingly escalating the technological level of its products. For instance, in 2010 the lower categories (IV and V) concentrated 70% of total exports and nearly 30% of categories II and III, the latter more sophisticated and technologically more complex, including items such as steering wheels, steering columns and steering boxes, as well as transmissions. Furthermore, China quite recently began exporting small quantities of motor vehicles to Mexico, focusing on the lower-end segments (sport & recreational, micro, and subcompact cars, as well as light and medium-size trucks in the commercial-vehicle segments).

[62] Mexicican Ministry of Economy. Personal interview. Mexico City. 13th December, 2007.
[63] Auto Parts National Industry (INA). Personal interview. Mexico City. 29th April, 2008.

However, up to now motor-vehicle import volumes are still marginal in relation to Mexico's total domestic market sales.

In this sense, it is possible to argue that during the last decade China seemed to have developed a process of import substitution from Mexico of some simple parts, accessories, as well as moderate technology components. These could be the result of the quality and technological upgrading of Chinese domestic suppliers, the increasing presence of global suppliers in China, or the import from third countries within the Asian Region. Among the automotive goods in which China's imports from Mexico/Mexico's exports to China have been losing ground are several electrical-related items, simple accessories, brake system and engine parts. The changing trend in the composition of the China-Mexico automotive bilateral trade can be observed in Table 6.15, where the AAGR for each technological complexity category is presented.

New trends have been recently changing the structure of China-Mexico motor bilateral trade. As more widely analysed in Chapter 8, the presence of Chinese automotive-related operations in Mexico has grown and acquired a variety of forms. Thus, besides the traditional imports of automotive accessories under the 'arms-length' schemes, and the import of vehicles by distribution companies (Bergé Group, Lifan, Zilent and Miles Electric Vehicles), in recent years the development of wholly-owned operations (Foton and JAC Motors), *maquiladora* plants (Minth, Dana-Wanxiang, Nexteer-PCM), technological associations (GML, Spartak), and other potential manufacturing JVs, are diversifying the China-Mexico automotive bilateral trade. This might be one of the major explanations of the changing import pattern of automotive goods into Mexico from China. For example, and although on a limited scale, during the initial stage of operations in Mexico Chinese automakers are assembling vehicles by using a large ammount of Chinese-made parts or by applying the CKD system. Likewise, in the case of the Sino-Mexican technological associations, the Chinese partner is supplying key components. An Executive Director[64] of a Mexican truck company in technological association with a Chinese partner indicated that engines, injection

[64] Giant Motors Lationamérica. Personal interview. Mexico City. 20th June, 2011.

and electronic systems are received from China. At present, the company reaches 50% of domestic integration. Other low-scale Mexican assemblers of small and medium size trucks, such as CBO Trucks and Cosmotrailer, maintain less formal technological associations with Chinese suppliers and use an important volume of imported components from China in their manufacturing operations.[65]

Another situation is the practice of importing motor vehicles from China to sell them in Mexico's domestic market under the commitment of investing in assembly operations. Under the Mexican Automotive Decree of 2003, automakers were allow import vehicles to the country, free of import duties, as long as they have an investment, or the commitment to invest, at least US$ $100 million and locally produced more than 50,000 cars a year (PEF, 2003). An example is the import of cars by the Salinas Group in its JV with FAW. Before starting the assembly operations in Mexico, they decided to sell cheap subcompacts Chinese cars using Elektra's retail chain in Mexico and Latin America. Under this scheme, FAW-Salinas Group imported around 7,000 cars from the end of 2007, before declaring the suspension of the JV by mid-2009, arguing economic difficulties derived from the global financial crisis. The FAW-Salinas Group set a negative precedent for the China-Mexico automotive bilateral relationships, since they did not comply with the commitment and were involved in legal irregularities.[66]

[65] Without specifying the type of companies or the type of auto parts, Lourdes Álvarez (2006: 110-111) reported that by seeking to lowering the cost of vehicles, some automakers in Mexico have started to include up to 30% of parts and components manufactured in China. Most probably this is the case of the low-scale truck assemblers mentioned above.

[66] This case is widely analysed in Chapter 8.

Table 6.15. AAGR of China's and Mexico's Motor Bilateral Trade by Technological Complexity in the Value Chain, 1992-2010			
Country/Category	**1992-2010**	**1992-2001**	**2001-2010**
China as Reporter Country			
China's Motor Exports to Mexico	*47.3*	*47.7*	*41.3*
I. Finished Vehicles	-	-	89.7
II. Major Components. Machining and Stamping	-	-	107.8
III. Sophisticated Parts and Subsystems. Specialised Technology	46.7	35.7	52.7
IV: Parts & Components. Moderate & Universal Technology	55.2	59.2	44.8
V. Accessories & Simple Parts	39.2	46.7	27.8
China's Motor Imports from Mexico	*72.9*	*108.4*	*35.9*
I. Finished Vehicles	**-**	**-**	***74.1***
II. Major Components. Machining and Stamping	**-**	**-**	52.6
III. Sophisticated Parts and Subsystems. Specialised Technology	63.4	135.8	20.4
IV: Parts & Components. Moderate & Universal Technology	68.3	133.9	15.0
V. Accessories & Simple Parts	47.1	65.6	25.8
Mexico as Reporter Country			
Mexico's Motor Exports to China	*35.5*	*30.3*	*36.8*
I. Finished Vehicles	112.6[1]	37.8[2]	182.1[3]
II. Major Components. Machining and Stamping	31.5[4]	26.2[5]	32.2
III. Sophisticated Parts and Subsystems. Specialised Technology	22.1	28.2	14.0
IV: Parts & Components. Moderate & Universal Technology	39.5	64.7	14.3
V. Accessories & Simple Parts	35.1	20.2	47.4
Mexico's Motor Imports from China	25.3	14.0	34.6
I. Finished Vehicles	59.3	33.2	76.8
II. Major Components. Machining and Stamping	70.5[6]	41.7[7]	90.8
III. Sophisticated Parts and Subsystems. Specialised Technology	31.2	23.2	36.0
IV: Parts & Components. Moderate & Universal Technology	22.7	3.7	42.3
V. Accessories & Simple Parts	26.4	24.4	25.3

[1]1996-2010. [2]1996-2002. [3]2002-2010. [4]1994-2010. [5]1992-2001. [6]1993-2010. [7]1993-2001.
Source: Own elaboration based on UN COMTRADE Database.

In contrast to China's exports of vehicles to Mexico, Mexico's exports to China are focused on compact and medium-size cars, as well as mid and full size SUVs, which are technologically more advanced and more expensive than the former. Most probably, Mexico's car exports to China will accelerate during the next few years, as the former country is the exclusive manufacturing and export base of specific models for global automakers. As indicated, a large part of automotive exports from Mexico to China represent an intra-firm trade and forms part of the auto TNCs' strategies operating in both countries. Although Mexico has been an important source for China's automobile imports since the second half of the 2000s, especially for the sedan types, a number of new export plans from Mexico by automakers are being developed. Besides the 'Beetle' and the 'Jetta' (VW), the Dodge 'Journey' (Chrysler) and the Cadillac SRX (GM), are already exported, Fiat projects to start exporting the Fiat 500 in 2012, and VW will also send the new generations of the 'Jetta' and the 'Beetle' to the Chinese market. In both cases, these new models are aimed at affluent Chinese buyers (Ciferri, 2011; Szczesny, 2011).

6.4. Trade Frictions: Counterfeiting, Dumping and Illegal Imports

Chinese auto parts have been at the centre of controversies in world trade for some time. Among the most common factors of conflict are counterfeiting, dumping and illegal imports. In the case of counterfeit auto parts, for example, specialists estimate that worldwide they generated US$ 45 billion in 2011, up from 12 billion in 2008. Of the total, 83% of counterfeited auto parts came from China (Haley, 2012: 29). According to this source, since 2001 the Chinese auto parts industry has received about US$ 27 billion in subsidies, which has resulted in unfair competition in world markets. Automotive-related counterfeiting is considered a serious problem for companies and national economies, since it takes jobs and money away from legitimate firms, jeopardise public safety, tarnishes brand names, and increases costs related to warranty claims, investigations, legal fees, and preventative measures (USDC, 2001). In general, Chinese counterfeiters copy high-volume aftermarket parts. Among the typical counterfeit auto parts are

spark plugs, oil filters, brake pads, and steering parts; nevertheless, in recent years more complex counterfeited parts such as air bags had also become common.
In Mexico, counterfeiting and illegal imports represent a grave problem. It has been estimated that Mexico's economy loses up to 12% of its GDP due to these factors, the textile shoe and toy industries being the most affected (Machado, 2011). In the motor industry, the auto parts aftermarket segment has also been negatively impacted by counterfeiting, "smuggling" and dumping practices. The chairman of INA declared that in the aftermarket segment, the counterfeited auto parts reached a value of around US$ 550 million in 2010 (Padilla, 2011). This represented more than 4% of Mexico's total formal replacement market, of US$ 13,000 million that year. For Mexico's formal sector organisations, this "black market" embodies an "unfair trade" that is jeopardising the national industry. By mid-2011, the president of ARIDRA (The National Association of Representatives, Importers and Distributors of Automobile Spare Parts and Accessories) indicated that counterfeiting in this auto segment amounted to between 10 to 15% of the total market, most of this being of Chinese origin (Rosagel, 2011). According to ARIDRA's president, the market prices of counterfeit Chinese auto parts are up to 40% lower than the originals, although with less quality and durability. The most common counterfeited aftermarket parts offered by auto spare stores are headlights, windshield wipers, electric systems, storage batteries, brakes, suspensions and engine parts.

Another are of conflict in Mexico's auto industry related to Chinese imports is the pneumatic tyre market. Chinese penetration in Mexico's domestic tyre market has been very dynamic in the last few years. From a value of US$ 5.3 million in 2001, Mexico's tyre imports for cars and trucks from China had an extraordinary boost, reaching US$ 291 million by 2010. In fact, together these two items (401110 and 401120 of the HS) represented the single-largest automotive product that year. In 2011, Mexico's formal market sales of tyres were 26 million units, of which 14 million were imported. Of the imported slice, 40% (5.6 million) was of Chinese origin (El Semanario, 2012b). As in the case of the aftermarket auto parts segment, industrialists and distributors argue the existence of unfair trade from Chinese imports due to dumping prices, lower than production costs, which are supported by governmental subsidies (Torres, 2011). On average, prices of Chinese-origin tyres are 40% cheaper than the domestic-produced ones, or those legally imported from other countries. The chairman of the National Chamber of the Rubber Industry (Cámara Nacional de la Industria Hulera-CNIH), Alejandro Moreno, declared that the dumping of Asian tyre imports, especially from China, are the main cause of the 50% fall in domestic production of commercial vehicle tyres in 2010 (MBW, 2011). The Chamber's executive indicated that the domestic share of imported truck tyres went up from 18 to 38% that year. The elimination of duties on Chinese truck tyres in 2009 by the Ministry of Economy, from 20 to zero percent, was seen as a catalyst of this process. It is expected that the tyre industry will be further affected since car tyre duties, which were lowered from 20 to 15% in 2009, were totally eliminated in 2010.

An additional source of trade friction is related to illegal imports of Chinese-origin used tyres. The chairman of the National Association of Tyre Distributors (Asociación Nacional de Distribuidores de Llantas y Plantas Renovadoras-ANDELLAC) denounced the fact that 5 million used tyres are illegally imported into Mexico.[67] Of these, 60% come from the United States and the rest from China (Excelsior, 2011). This tyre "black market" is considered highly negative for local producers as well as for tyre renewal plants. The used tyre trade is part of the "triangulation" problem, since it is well documented that substantial export of used and waste tyres from China to Mexico is carried out through some U.S. west-coast ports (IRSC, 2009).

6.5. Conclusions

China and Mexico have been increasingly integrated into the global economy: for Mexico, this has been since the mid-1980s,[68] by joining the GATT, and the 1990s, signing the NAFTA; China's entry into the WTO in 2001 accelerated its process

[67] As in the case of the motor industry in general, it is interesting noting that Mexico's domestic tire industry is dominated by foreign companies: Bridgestone (Japan), Continental (Germany), CooperTires and Goodyear (USA), Michelin (France), Pinelli (Italy), Hankook and Kumho (Korea), and Tornel (India).

[68] Although Mexico started a process of integration into global production networks since the mid-1960s through the development of the *maquiladora* industry.

of internationalisation of its economy. One of the major reflections of this trajectory for both countries has been the evolution and changing structure of trade flows and patterns. In the case of the motor industry, nowadays China and Mexico play significant roles in world trade: by 2010 Mexico ranked as the fourth-largest exporter of automotive products and China positioned itself in seventh place. However, up to now these worldwide roles presented a differentiated specialisation pattern: China is specialised in auto parts exports (90% of total), and Mexico in the motor-vehicle segment (55% of total). In term of tendencies, it is important to point out that although Mexico presents a much higher degree of specialization index than China in world automotive exports, the latter, though from a lower absolute base, registered higher growth pace in automotive exports than the former during the period 1992-2010.

In terms of the China-Mexico bilateral trade relationship, despite the fact that sizeable economic interaction between China and Mexico did not begin until the late 1990s and early 2000s, China became Mexico’s second largest trade partner in 2003, displacing Japan and locating itself only behind the United States. Although the pace of growth of bilateral trade was similar during the different periods analysed (1992-2001 and 2001-2010), absolute growth of trade value registered a strong boost after 2001, when China joined the WTO. A distinctive characteristic of the China-Mexico bilateral relationship is the high significance of imports from China in Mexico’s total trade. The increasing import penetration of Chinese products has produced a huge trade imbalance for Mexico, the largest deficit with a trading partner. Based on Chinese sources, in 2010 China had a surplus of nearly US$ 11 billion while, according to Mexican sources, Mexico had a trade deficit with China of US$ 41.4 billion. That year, the ratio of Mexican imports from China relative to Mexican exports to China was 11:1. The growing trade imbalance and domestic market penetration of Chinese products have caused a tense environment in the China-Mexico bilateral relationship. As pointed out in the analysis, the situation could become worse in the short term as a result of trade disputes within the WTO due to dumping, as well as other controversies such as illegal Chinese imports.

Motor trade represents a key sector in both China's and Mexico's foreign trade. Nevertheless, in terms of trade flows and value in the international context, China is more important to Mexico than the reverse. For Mexico, China ranks as its 6th automotive partner in total exports (1.04%), and its 4th in total imports (5.23%). On the other hand, for China, Mexico ranks in 14th place in total automotive exports (1.71%),[69] and 10th in total imports (1.22%). Although in relative terms bilateral automotive trade seems to still be marginal for both countries in the international context (less than 2% in China's case), the absolute figures show a substantial increase in the bilateral trade value over the last decade.

In this sense, it seems that, despite the international context automotive trade between the two countries still being "marginal", it has acquired more significance within the total China-Mexico bilateral trade. For both countries, automotive trade plays an increasing important role in total bilateral trade. For China, total automotive trade represented 8% of total bilateral trade with Mexico in 2010 (automotive exports were 6% and imports, a significant 13.1%). For Mexico, motor trade with China represented around 6% of total bilateral trade (17% of total exports and 4.8% of total imports). In terms of the pace of growth, in all the periods analysed (1992-2010, 1992-2001 and 2001-2010), China's total auto trade with Mexico, as well as auto exports and imports, registered AAGR twice as a high as the ones obtained in total bilateral trade; for automotive imports, the AARG were even higher. In Mexico's case, motor exports have been more dynamic than the rest of bilateral trade. In terms of the position of automotive trade in relation to other economic sectors in the bilateral relationship, by 2010 the more salient role is in the export segment, ranking in third place with 16.8% of total exports to China; in total imports, automotive products are located in fourth place.

Looking at the evolution of the bilateral trade between China and Mexico, it can be argued that unlike other sectors such as garments, toys and electronics, in the automotive case the big trade boost started by the mid-2000s and not immediately

[69] It is interesting noting that if China homologises its export sources with the Mexican ones, then Mexico would be ranked in 6th place in 2010.

after China joined the WTO. This might be explained by the sectoral differences, in particular the type of global value chains involved and their form of governance, technological conditions, required scale economies, as well as market conditions, among other factors. Likewise, this might reflect the fact that, compared to the other sectors, especially those with lower capital intensity, the Chinese motor industry gained international competitiveness at a later stage. Nowadays, the China-Mexico bilateral motor trade looks much more complex than the simple import of Chinese products displacing local production and market, as is the case in some other Latin American countries or other sectors in Mexico.

Another feature of the China-Mexico automotive bilateral relationship is related to trade balance. As in the case of total bilateral trade, Mexico's motor sector also presents a negative trade balance with China. In 2010 this sector's trade deficit was US$ 1.4 billion. Nevertheless, in relative terms the deficit's proportion seems to have been decreasing in recent years. In fact, whereas the ratio of imports to exports in Mexico's total bilateral trade with China was 30.3:1.0 in 2004, 17.0:1.0 in 2008 and 10.9:1.0 in 2010, the ratio for motor trade was 8.8:1.0, 7.0:1.0 and 3.1:1.0, respectively. These trends suggests that, unlike other domestic manufacturing sectors, Mexico's motor industry possesses strengths, especially in the export segment, that allow it to maintain competitive position in the bilateral trade with China, despite the enormous power of the latter in the international market. In this sense, it could be argued that Mexico's motor industry is one of the exceptions among the manufacturing sectors, taking advantage of Latin America's export boom to China.

In terms of the assessment on the specialisation pattern of China-Mexico motor bilateral trade, the results suggest a current trade pattern in which China is more specialised in the lower-end categories of technology complexity of automotive goods, and Mexico in the more sophisticated ones, particularly in finished vehicles from the second half of the last decade. In contrast to China's exports of micro and subcompact vehicles to Mexico, China's imports from Mexico is focused on compact and medium-size cars, as well as mid and full size SUVs, which are technologically more advanced and more expensive than the former. Most probably, Mexico's car exports to China will accelerate during the next few years, as the former country is the exclusive manufacturing and export base of specific models for global automakers. A number of new export plans from Mexico by automakers are being developed for the Chinese market. The great majority of motor exports from Mexico to China represent an intra-firm trade and forms part of the auto TNCs' strategies operating in both countries. Nevertheless, a key question is whether Mexico's car export trend to China will maintain its growth over the long-term or it only represents a short-term strategy of auto TNCs. For the time being, despite the huge investment in China's motor sector, transnational automakers are unable to cope with the accelerated pace of growth of the Chinese market. Under these circumstances, some auto firms have accepted the payment of duties on product with relatively modest demand that might not justify the cost of tooling up for production. As in the VW's Beetle case, the relatively low cost of manufacturing in Mexico helps compensate for the additional shipping costs and duties (Szczesny, 2011). For the other automotive segments, most of Mexico's auto parts exports to China are OEM directed to the assembly of new vehicles through the network of TNCs. VW, for example, has sent parts and components for several years to be used in the assembly of the 'Jetta' models in its JVs with Chinese partners.

On the other hand, based on the different sources analysed, the large majority of Mexico's automotive imports from China consist of products for the aftermarket segment (replacement and accessories). Most of this low-end automotive segment is supplied by domestic Chinese firms. According to different agents of Mexico's motor industry, nowadays China does not have a relevant presence in the OEM segments. Nevertheless, it is important noting that, as a tendency, China's motor exports to Mexico are slowly but increasingly escalating in terms of the technological level of its products. This is especially the case of the electronics segment, in which China is becoming a strong global competitor. Based on the above-mentioned tendencies, it could be argued that the structure and pattern of Chinese automotive imports into Mexico has changed over the past decade. This trend might be mostly explained by three interrelated factors: a) the quality and technological upgrading of domestic Chinese auto parts industry; b) the exports of auto parts from China of global auto suppliers located in China; and c) the increasing presence of Chinese automotive operations in Mexico (wholly-owned operations, *maquiladora* plants, technological associations, JVs, etc.). Domestic Chinese firms, through these diverse operation modes and linkages, are importing into Mexico more technological upgraded auto parts and some key major components. As a consequence, a diversified auto parts exports from China to Mexico are likely to rise in the coming years.

Regarding this changing bilateral trade trends, during the last few years China began exporting small quantities of motor vehicles to Mexico, focusing on the lower-end segments (sport & recreational, micro, and subcompact cars, as well as light and medium-size trucks in the commercial-vehicle segments). The bulk of these vehicles are exported by domestic Chinese firms, some of them with internationalisation strategies (FAW, Foton, Lifan, Geely, JAC Motors, Dongfeng). However, up to now, motor-vehicle import volumes are still marginal in relation to Mexico's total domestic market sales. Considering the size of the domestic market in Mexico, at present motor vehicle imports from China probably represent less than one percent of total sales. Given their market strategy, Chinese car are competing in the lower-end, low-price, segments. On the positive side, Chinese auto firms are targeting middle and lower income population, which has no access to credit from traditional financing institutions.

In this regard, another key question is whether Sino-Foreign JVs will start exporting cars assembled in China to Mexico. In recent years, some foreign automakers began exporting modest quantities of Chinese-built subcompacts overseas, but exclusively to emerging and developing country's markets. For instance, Shanghai-GM is exporting its 'New Sail' car to Egypt, Chile, Peru, Algeria and Iraq; Daimler is shipping sedans to the Middle East; Mercedes-Benz to Colombia; and VW plans to export to Russia (Yang, 2012). Although a potential FTA between China and Mexico could induce motor TNCs to export Chinese-built cars to Mexico, up to now, unlike other Latin American countries, and despite lower prices, in Mexico Chinese cars are not well positioned in the domestic market.[70] Besides the "negative image" of Chinese cars, the Mexican automotive market is considered to be more sophisticated and demanding than Chinese, Latin American, African and other emerging economies. Given these trends, the likelihood is that it will take some time for Chinese-made cars to obtain a substantial share of Mexico's domestic market.

The perspective of the Mexican Automotive Industry Association (AMIA) was not enthusiastic about the arrival of Chinese motor operations to Mexico. Although AMIA's agents did not conceive the Chinese automakers as direct competition, they showed concerns about the car's safety and environmental standards, as well as the entry modes into the Mexican market. AMIA's Deputy Director of Economic Studies and Informatics[71] stated that Chinese companies and cars are very welcome in Mexico as long as their entry is equitable in relation to requirements applied to other countries/companies (investment regulations, safety, environmental standards, etc.). His view was that Chinese companies currently operating in Mexico were fundamentally distributors, and they did not carry out manufacturing activities.

Is it in Mexico's aftermarket segment where Chinese imports have had a sizeable domestic market penetration. Associated to this, several frictions related to counterfeiting, "smuggling" and dumping practices have impacted the China-Mexico bilateral trade relationship. All these factors are considered to have negatively impacted Mexico's domestic market, harming production, sales and jobs. Representatives of diverse aftermarket associations have denounced the negative impacts of the "black market" and "unfair trade" provoked by Chinese imports. Industrialist and distributors are demanding that the Mexican government takes defensive measures against Chinese imports, and tensions and frictions derived from these trends may continue, and increase, in the next years. The recent elimination of duties to Chinese imports of tyres in 2009 and 2010, together with end of the Transition Measures on Compensatory Quotas for other sectors on December 11, 2011, by which China will only pay 15% of customs duties as other

[70] For instance, in Peru Chinese brands have captured 17% o the domestic market (Global Auto Industry, 2012c), 13.5% in Uruguay (Delgado, 2009), and 7% in Chile (Chrysler, 2011).
[71] Personal interview. Mexico City. 20th August, 2008.

151 WTO' member countries in the export of diverse products will most probably increase the bilateral frictions. In addition, Mexico has still not recognised China's status as a market economy. In this regard, more deep and specific research is needed to evaluate the impacts of Chinese domestic competition on Mexican domestic producers of the auto sector and its diverse production and distribution segments, and the solution to bilateral statistics discrepancies must be addressed.

Recently, new and challenging proposals have been put forward intending to improve the China-Mexico bilateral relationship. Some have emphasised the need for long-term vision in the bilateral relationship, as well as the promotion of greater institutional measures, such as the strengthening of existing binational institutions (Dussel Peters, 2009). Others have recommended the instrumentation of a "Strategic Economic Association" that considers the elimination of custom duties for those sectors in which the main trading products with higher weight in the respective trade balance are included (Martínez, 2010). In addition, the signing of a "Free Trade Agreement" has also been proposed by a business promoter.[72] For this executive, who estimates that this FTA would take around ten years to materialise, it is the only way to alleviate bilateral trade frictions, and a way to obtain massive flows of Chinese FDI into Mexico. Very recently, Chen Yuming, Economic Attaché to China´s Embassy in Mexico, declared that China is very much interested in entering in a FTA with Mexico. Nevertheless, in order to negotiate such an agreement, China demands equal treatment, and a prior condition is that its market economy status be recognised by Mexico (Maquila Portal, 2011). The short- and long-term solutions to the bilateral trade conflicts between China and Mexico could benefit the motor industry in an important degree. On the one hand, trade frictions (counterfeiting, smuggling and dumping) could be reduced, and potential complementarities, that already exist, could be enhanced.

[72] Mexico-China Business Organisation. Personal interview. Mexico City. 21th August, 2008.

7. CHAPTER SEVEN

THE CHINA-MEXICO INTERACTION 3: COMPETITION IN THE U.S. MARKET

> "The 'sucking sound' of jobs going south that Ross Perot, an American presidential candidate, feared would be the consequence of NAFTA is now being heard from the east by Mexicans." (The Economist, 2003: 49).

> "Mexico, long the king of low-cost plants and exporter to the United States of products from Ford trucks to Tommy Hilfiger shirts to I.B.M. computers, is fast being supplanted by China and its hundreds of millions of low-wage workers." (Forero, 2003).

Unlike the issues of China's impacts on Latin American domestic market penetration and worldwide competition for FDI, the potential threat on the region's exports to third markets has received more attention by analysts. Given the geographical and economic influence for the region, the impacts of China's competition in the U.S. market have been the focus of diverse studies. This has been one of the major concerns for a large part of Latin America's policy-makers as well as its business community.

As with the issues of FDI and domestic competition presented in previous chapters, the positions and views of China's competition on Latin America's exports to third markets have changed over recent years. Early studies based on data from the late 1990s and the beginning of the 2000s presented a more 'optimistic' views. Although some negative effects for some industries in some countries were recognised in these perspectives, in general it was concluded that: the competitive effects of China's accession to the WTO on developing countries were exaggerated in the literature (Shafaeddin, 2004); the direct threat to exports to third country markets appeared small (Lall and Weiss, 2005a and 2007); there was not substitutability of Latin America's exports in third-country markets but rather growth in Chinese exports to these markets, signaling demand complementarities at the aggregate level (Lederman, Olarreaga and Perry, 2009);

there is no relevant trade competition between China and Latin America products in the U.S. market (Blázquez-Lidoy, Rodríguez and Santiso, 2007). Fundamentally, these conclusions and arguments were based on the differences in export structures between China and Latin America, leading to a dissimilar trade specialization pattern.

More recent studies, carried out under a broader development perspective, have emphasised the increasing threat that China poses to Latin American exports to third-country markets, including the United States (Mesquita-Moreira, 2004; Dussel Peters, 2005a; Jenkins and Dussel Peters, 2007; Jenkins, Dussel Peters and Mesquita-Moreira, 2008; Jenkins, 2009; Gallagher and Porzecanski, 2010; Jenkins, 2010). According to Jenkins (2010), among the factors leading Latin America to face increased competition from China over time are: a) the accession of China to the WTO in December 2001 improved its access to developed country markets; b) the ending of the Multi-fibre Arrangement quota system on 1 January 2005, which had regulated textile and clothing trade for over thirty years, also allowed China to penetrate third-export markets; and c) low wages levels, massive scale of production and increased productivity has led to falling prices and increased competition over time for many of the goods exported by China. As Gallagher and Porzecanski (2010) argue, the 'dragon in the room' that few are talking about is that China is out-competing Latin American manufacturers in world markets. These authors point out that 94% of Latin America's manufactured exports are threatened by China, representing 40% of all the region's exports (Ibid: 7-8). Finally, Jenkins' (2010) notable synthesis of the recent trends regarding Chinas' threat to the region's exports to third-country markets: a) most Latin American countries have lost significant market share to China since 2001; b) the trend has been for losses to increase over time; and c) losses have been particularly severe in markets for manufactured goods.

In the midst of this debate, regardless of the period of analysis or the type of methodology used, in practically all the studies one conclusion seemed to be unanimous: Mexico was the country most negatively affected by China's competition in exports to third-country markets, particularly in the United States.

As pointed out by these studies, unlike most of the other Latin American countries, Mexico and China have a similar export structure, and the former's comparative advantage has been moving in the same direction as the latter. As in other areas of the China-Latin America trade and investment relationship, Mexico emerged as the exception case or the paradigmatic example (Blázquez-Lidoy, Rodríguez and Santiso, 2007; Paus, 2008; Gallagher and Porzecanski (2008).

For Mexico, the United States represents a key market. For decades, the destination of over 80% of Mexico's total exports has been the U.S. market. However, since the beginning of the 2000s, Mexico's *maquiladora* industry has felt the 'sucking sound from the east'. As underlined in previous chapters, between December 2000 and December 2003, Mexico lost 900 plants and 260,000 jobs, around a quarter and a fifth, respectively, of the total number. Approximately 45% of these plants were relocated to China (Ornelas, 2007). In this restructuring process, China was challenging the *maquiladora* system's comparative advantage and, then, 'eating Mexico's lunch' (Rosen, 2003). In fact, in 2003 China displaced Mexico as the second-largest supplier of goods to the U.S. market, behind Canada. Studies of the China-Mexico competition in the U.S. market during that period reported that Mexico had lost market share in 47 out of 152 major U.S. categories, particularly in sectors such as apparel and textiles, toys, electrical household appliances, telephone equipment and electrical assemblies (USGAO, 2003). In the apparel sector, for example, some analysts argued that Mexico was losing jobs to China even if manufacturers may not have been shifting production to China, per se (Watkins, 2002). During the period 2000-2007, Mexico not only lost market share to China, but, among the top-five suppliers to the U.S. it was the only one to have experienced negative growth of imports; while other countries, such as Vietnam and Bangladesh had actually increased market share in the face of Chinese competition (Thoburn, 2010b).

More comprehensive studies on the China-Mexico competition in the U.S. market were carried out by the mid-2000s in the textile-garments and electronics sectors (Dussel Peters, 2005a, 2005b, 2009 and 2010). According to Dussel Peters (2009), during the period 2001-2006 China's exports to the United States increased with an AAGR of 23%, while Mexico registered only 8.7%, resulting in a share loss in U.S. imports. In the yarn-textile-garment chain, China displaced Mexico – and Central America – since 2001, becoming the United States' major import source; China's share in U.S. imports of this chain increased from 12.1% in 2002 to 17.4% in 2004, while Mexico's share declined (Ibid). Likewise, in the electronics chain, China increased its share of total U.S. imports from 2.25% to 31.03% in 1990 and 2006, respectively; in the particular segment of personal computers, China's penetration in the U.S. market was even more impressive, increasing its share from 0.02% in 1990 to 45.5% in 2006 (Dussel Peters, 2010). In other products, such as television sets, although Mexico has kept an important participation in the U.S. market, China increasingly threatened its market share (Carrillo and Plascencia, 2007).

Another important feature of the China-Mexico competition in the U.S. market is the time-frame: China's threat has accelerated since 2001, when it joined the WTO. Jenkins (2010) estimated that Mexico's loss of total exports in the United States to China was -1.1% in the period 1996-2001, increasing to -11.4% during 2001-2006. For Mexico's manufactured exports the figures were -1.5% and -13.6% in these periods, respectively. By applying an 'export threat' methodology based on market share changes at 3-digit SITC level, Lall and Weiss (2005a, 2005b and 2007) estimated China's potential threat (direct and indirect) of 11.15% of Mexico's exports to the U.S. by 2002. Following Lall and Weiss's methodology, Gallagher and Porzecanski (2007) added to the analysis the post-China WTO accession years, 2002-2004, and they calculated that 71% of Mexico's exports to the U.S. market were under threat (direct and indirect) by China by 2004, only two years later. In a further study, Gallagher and Porzecanski (2010) estimated that the percentage of Mexican exports to the United States under threat from China had increased to 80.3% by 2006. In terms of exports to the world, not only to the U.S. market, China's challenge was even greater. These authors found out that 99% of Mexico's manufacturing exports to the world, comprising 72% of total exports, were under threat from China by 2006 (Ibid).

Although with differences in study periods, methodologies, and trade digit-level classifications, another salient feature of the China-Mexico competitive threat in export markets is Mexico's advantageous position in the motor industry. By and large, in all the studies with some kind of sectoral-approach analysis, Mexico had competitive strengths over China in this sector's export markets (Watkins, 2002 and 2007; Lall and Weiss 2005a, 2005b and 2007; Dussel Peters, 2005a and 2009; Arellano, 2006; Blázquez-Lidoy, Rodríguez and Santiso, 2007; Devlin, Estevadeordal and Rodriguez-Clare, 2006; Gallagher and Porzecanski, 2007 and 2010; Gallagher, Moreno-Brid and Porzecanski, 2008). However, given the highly differentiated composition of the motor industry, there are some caveats to consider in the analysis and future trends. Some authors have argued that whereas China's competition in motor vehicles in the U.S. market is still low so far, Mexico does face an increasing threat in the auto parts segment (Dussel Peters, 2005a and 2009; Jenkins and Dussel, 2007; Jenkins, Dussel and Mesquita-Moreira, 2008). Even more, Dussel Peters (2005a) considers that China's share in the U.S. motor vehicle market will continue to rise, given the massive investments carried out by foreign companies in that country. A similar situation was found in the case of Mexico's auto parts *maquiladoras'* performance in the U.S. market, as depicted in Chapter 5. According to this, auto parts *maquiladoras* do not appear to be as threatened as the other major segments (Gerber and Carrillo, 2002; USGAO, 2003; Sargent and Matthews, 2008 and 2009). In the case of specific automotive products, however, some analyst have argued that given China's motor industry dynamism, Mexico-made harnesses, which until recently represented 90% of the U.S. market, could be produced in the Asian country in the near future (Carrillo and Gomis, 2005a).[73]

Specific and detailed studies on the competition in the U.S. market between China's and Mexico's motor industries are practically nonexistent. One exception is the work carried out by Lourdes Álvarez (2007 and 2011), who used data from 1990 to 2008, although most of the analysis is based at 2-digit level of HS. In both

[73] Nevertheless, in another study, one of these authors underlines that given the increasing technological content of harnesses production, as well as the required flexibility to adjust to a changing demand, the hypothesis of relocating low-added value processes such as this product to China, is not totally feasible in this case (Carrillo, 2008).

studies the conclusion was similar: China and Mexico participate with different type of products in the U.S. market, and it is only in some components that China represents a threat to Mexican producers. By using the export similarity index, the author also found that similarity in exports of chapter 87 of the HS was still low (Álvarez, 2011). On the other hand, linked to this increasingly competitive environment, a changing strategy by firms of the auto sector located in Mexico has been reported. Automotive firms have started to implement more skill labour and advanced manufacturing operations in order to move up the technology ladder, intending to pass from the stage of 'assembled' in Mexico to 'created in' and 'coordinated' from Mexico (Carrillo and Lara, 2003; Hunt, 2004; Carrillo and Gomis, 2005b). In the meantime, throughout the past and present decade, anecdotal information, press articles as well as businessman opinions still have a strong idea about China's increasing competitiveness and defiant threat to Mexican firms in the U.S. automotive market (Ornelas, 2004; Hunt, 2004; Anónimo, 2004; Revista T21, 2008; aregional, 2010; Morales, 2011).

The general objective of this chapter is to assess the competitive position of China *vis-à-vis* Mexico in the U.S. motor industry's market. The basic research questions are: Is China a direct competitor and a real threat to Mexico in the U.S. motor industry's market? What is the degree of China's competitive threat? If there is a substantial confrontation in the U.S. market, in what particular automotive segments/products of the motor value-chain does China most strongly threaten Mexico? Are China and Mexico playing a complementary role, with particular specialisations, in the U.S. market? In order to avoid generalisations, the 108 motor items at 6-digit level of the HS will be used in the analysis. Data is based on the MAGIC programme developed by ECLAC. MAGIC employs U.S. import data based on customs values provided by the USDC, which is compatible with UN COMTRADE database. In the calculation of the *RCA*/Specialisation index, U.S. imports figures instead of exports will be used. The qualitative assessment of the 'competitive threat' will be done by applying a typology of diverse categories of technological complexity within the automotive value chain, methodology especially designed for this purpose (see the Methodology in Chapter 3). The time frame of the analysis is 1990-2010.

7.1. China and Mexico in U.S. Total Imports

In 2003, two years after having joined the WTO, China not only became Mexico's second-largest trade partner but also, that year China displaced Mexico as the second-largest importer country to the United States. Following an impressive similar path to that at worldwide level, China rapidly became the number-one import source to the U.S. market, relegating Canada to second place in 2007. From a modest import value of US$ 15.2 billion in 1990, representing around 3% of total U.S. imports, by 2010 China accounted for nearly one fifth (19.1%) of total U.S. imports with a value of US$ 364.9 billion (Table 7.1 and Figure 7.1).

Mexico also increased its participation in total U.S. imports, jumping from 6.1% to 12.0% in 1990 and 2010, respectively, with a corresponding increase in imports value from US$ 30.2 to around 230.0 billion. China registered very dynamic AAGR in its imports to the U.S. market during the analysed periods, around 2.5 times higher than the total U.S. average: 16.34% during 1990-2010, 17.22% in 1990-2001 and 13.56% in 2001-2010. Being among the most dynamic exporters to the U.S. market, Mexico obtained its best performance during the period 1990-2001 with an AAGR of 13.05%, reflecting the effects of the starting of NAFTA operations in 1994. Although it grew at a slower pace during the 2001-2010 period, over the whole analysed period of 1990-2010, Mexico registered an AAGR of 10.15%, almost double the U.S. average of total imports. In 2001 Mexico overtook Japan as the second-largest importer to the Unites States, which it lost to China later on, in 2003.

During the two-decade period, China and Mexico's gains in share of the U.S. imports have been at the expense of some developed countries, in particular Japan and Canada. Throughout the period 1990-2010, Japan's import share fell from 18.1% to 6.3%. In 1990 this Asian country was ranked as the second largest U.S import source; however, despite its substantial share loss, Japan is currently the fourth most important import source to the U.S. Other countries that have lost relative participation in the U.S. market are Germany, U.K., France, Italy, France, Korea and Taiwan. On the other hand, emerging and transition countries such as

Ireland, Russia, India, Thailand and Malaysia have increased its participation in the American market. In fact, although from a low value base, Russia and Ireland presented higher or similar AAGR than China during the analysed period.

Table 7.1. China and Mexico in U.S. Total Imports, 1990-2010

País	1990	1995	2001	2003	2007	2010
			Value (US$ Billions)			
China	15.2	45.6	102.3	152.4	321.5	364.9
Canada	91.4	145.1	217.0	224.2	313.1	276.5
Mexico	30.2	61.7	131.4	138.1	210.8	229.7
Japan	89.6	123.6	126.6	118.0	145.5	120.3
Germany	28.1	36.	59.2	68.0	94.3	82.7
U.K.	20.3	26.9	41.4	42.7	56.9	49.7
Korea	18.5	24.2	35.2	37.0	47.6	48.9
France	13.1	17.2	30.3	29.2	41.6	38.5
Total Imports	495.1	743.5	1,142.0	1,259.3	1,953.5	1,912.0
			Percentage (%)			
China	3.1	6.1	9.0	12.1	16.5	19.1
Canada	18.5	19.5	19.0	17.8	16.0	14.5
Mexico	6.1	8.3	11.5	11.0	10.8	12.0
Japan	18.1	16.6	11.1	9.4	7.4	6.3
Germany	5.7	5.0	5.2	5.4	4.8	4.3
U.K.	4.1	3.6	3.6	3.4	2.9	2.6
Korea	3.7	3.3	3.1	2.9	2.4	2.6
France	2.7	2.3	2.7	2.3	2.1	2.0
Total Imports	100.0	100.0	100.0	100.0	100.0	100.0

	AAGR		
	1990-2010	1990-2001	2001-2010
China	16.34	17.22	13.56
Canada	5.41	7.47	2.45
Mexico	10.15	13.05	5.74
Japan	1.41	2.92	-0.51
Germany	5.27	6.40	3.40
U.K.	4.36	6.12	1.85
Korea	4.73	5.51	3.34
France	5.27	7.22	2.44
Total Imports	6.65	7.21	5.29

Source: Own elaboration based on the MAGIC Programme.

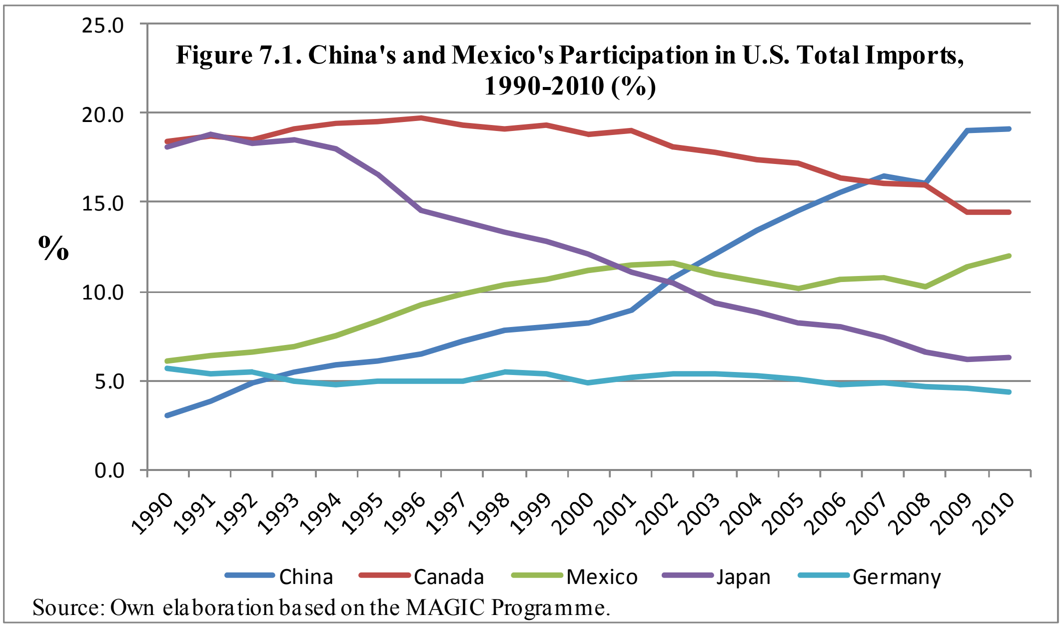


Figure 7.1. China's and Mexico's Participation in U.S. Total Imports, 1990-2010 (%)

Source: Own elaboration based on the MAGIC Programme.

Finally, an important difference between China and Mexico is the significance of the U.S. market in their respective total world exports. For Mexico, the U.S. has traditionally been its single most important export market, representing between 75 and 85% during the period 1990-2010 (U.N. COMTRADE, 2012). For China, these figures range between 23 to a maximum of 40% in 2000. In both countries a steady downward trend in their U.S. market share in relation to their total world exports can be observed, particularly during the decade 2000-2010.

7.2. Evolution and Composition of China's and Mexico's Participation in U.S. Motor Imports

Table 7.2 presents the major motor import-sourcing countries to the U.S. market for the years 1990, 1995, 2001, 2005 and 2010. China and Mexico's market participation is highlighted. It also shows the AAGR of U.S. motor imports from the selected countries as well as the world's total motor imports for the periods 1990-2010, 1990-2001 and 2001-2010. As observed, nowadays Mexico's position in the U.S. motor market is overwhelmingly superior to China's. Taking the 2010 figures, U.S. motor imports from Mexico are almost 4.5 times larger than those of

China (US$ 54,082 million *vs* $12,448). With 23.6% of total U.S. motor imports, in 2010 Mexico was the number-one supplier, followed by Canada and Japan, with 22.7% and 20.7%, respectively. Despite the gap with Mexico's import value, China accounts for 5.4% of total U.S. automotive imports, ranking in 5^{th} place. Although Japan and Canada dominated this segment in the U.S. market for several decades, together accountting for between 65 and 70% of total U.S. imports during the 1990s, in 2009 Mexico toppled Japan from the second place, and, eventually, in 2010 displaced Canada from the top of the list (Figure 7.2). As discussed in Chapter 5, this positive evolution might be associated with the effects of NAFTA in the 1990s, and the wave of new export-oriented investments made by the major auto TNCs in Mexico during the past decade, both in car assembly and components, seeking to reduce production costs in the face of the economic recession of 2000-2002 and the financial crisis of 2008-2009. These recession years are reflected in lower AAGR of U.S. motor imports during the period 2001-2010.

Beyond the absolute figures, what is interesting is the extraordinary rate of growth registered by China's imports to the United States in such a relatively short period of time. Although this may be largely explained by the very low absolute value-base registered in 1990, the growth after that year has been exceptional. In the different periods from 1990 to 2010, China registered an AAGR of 6 to 8 times higher than that of total United States' imports: 23.8% in 1990-2010, 28.5% in 1990-2001, and 15.9% in 2001-2010. Only a small number of countries registered AAGR similar to China during the analysed periods, although starting from a much lower value-base than China. Among these countries are Slovakia, Austria and South Africa. On the other hand, Mexico also observed significant levels of growth, with AAGR 2.5 times higher than that of the U.S. import average and above the other major exporters: 10.2%, 14.9% and 3.7% during the periods 1990-2010, 1990, 2001 and 2001-2010, respectively.

Table 7.2. China's and Mexico's Participation in U.S. Motor Imports, 1990-2010

País	1990	1995	2001	2005	2010
			Value (US$ Millions)		
Mexico	7,081.2	17,287.4	37,513.8	41,543.8	54,082.2
Canada	29,758.3	44,810.9	57,554.9	70,272.8	51,933.5
Japan	32,763.2	40,022.9	47,181.9	55,326.8	47,514.8
Germany	8,401.6	9,646.5	19,298.0	28,041.3	24,743.8
China	140.4	881.5	2,848.6	7,987.4	12,447.6
Korea	1,771.3	2,317.2	7,498.9	11,581.7	11,431.0
U. K.	1,948.5	2,649.7	4,501.1	8,110.4	4,945.3
Total Imports	89,979.5	127,776.2	193,016.8	246,071.9	229,106.0
			Percentage (%)		
Mexico	7.9	13.5	19.4	16.9	23.6
Canada	33.1	35.1	29.8	28.6	22.7
Japan	36.4	31.3	24.4	22.5	20.7
Germany	9.3	7.5	10.0	11.4	10.8
China	0.2	0.7	1.5	3.2	5.4
Korea	2.0	1.8	3.9	4.7	5.0
U. K.	2.2	2.1	2.3	3.3	2.2
Total Imports	100.0	100.0	100.0	100.0	100.0

AAGR

	1990-2010	1990-2001	2001-2010
Mexico	10.17	14.91	3.73
Canada	2.69	5.65	-1.02
Japan	1.79	3.09	0.07
Germany	5.28	7.18	2.52
China	23.81	28.51	15.89
Korea	9.29	12.78	4.31
U. K.	4.53	7.23	0.95
Total Imports	4.55	6.57	1.73

Source: Own elaboration based on the MAGIC Programme.

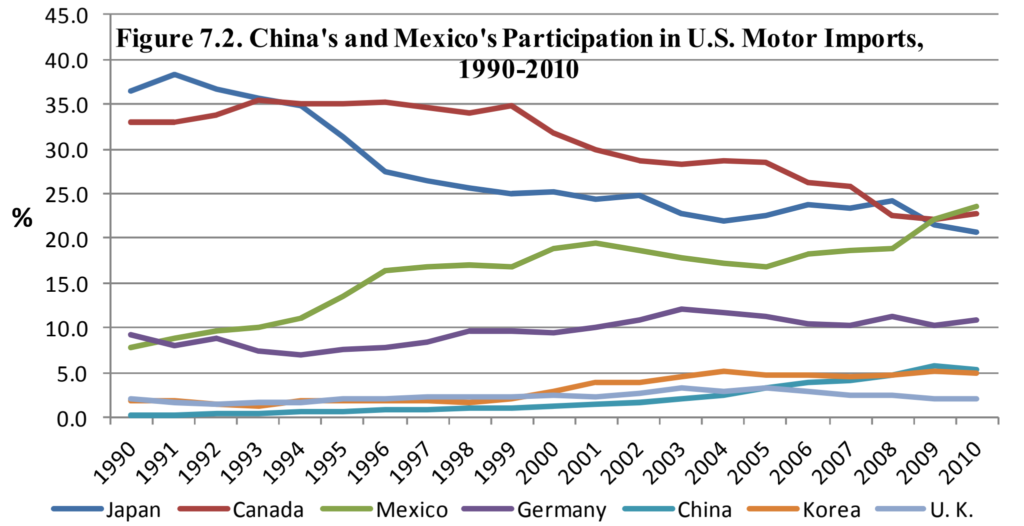


Figure 7.2. China's and Mexico's Participation in U.S. Motor Imports, 1990-2010

Source: Own elaboration based on the MAGIC Programme.

The acceleration in growth during the past two decades enabled China to jump several places as U.S. automotive sourcing-country.[74] Situated between 13th and 15th position in the early 1990s, China advanced to 7th in 2001 and 5th since 2008. By 2008 China had surpassed other key U.S. auto supplier countries such as the United Kingdom, Sweden, France, Brazil, Taiwan, Korea and Belgium. For its part, during the same period Mexico reinforced its position as U.S. sourcing country in motor trade, passing from being the third largest U.S. supplier in 1990 to the number one in 2010. The value of U.S. imports of automotive goods from Mexico grew nearly 8 times from 1990 to 2010. The share gains in the U.S. motor imports by Mexico, China and other emerging countries have been mainly at the expenses of Japan and Canada, as well as other developed countries that have lost dynamism such as Sweden, France, Belgium, Austria and Italy.

The increasing significance of China as U.S. automotive sourcing-country is even more evident when a differentiation is made between imports of complete motor vehicles (automobiles, buses, trucks and tractors), on the one hand, and auto parts,

[74] Although U.S. motor imports fron China grew faster over the period 1990-2001 (28.51%) than 2001-2010 (15.89%), the rise of China as a U.S. automotive sourcing-country could be explained by the fact that during the last period (2001-2010), the difference between China's rate of growth and the rest of competing countries widened even more (see Table 7.2).

on the other. It is clear that China's major role as U.S. automotive supplier is in the auto parts and components segment, since imports of motor vehicles are minimal (Tables 7.3 and 7.4). Thus, considering only the auto parts segment, from playing a marginal role during the 1990s, by the mid-2000s China had escalated to 4^{th} place among the largest U.S. suppliers (Figures 7.3 and 7.4). This rank was maintained by 2010, only behind Mexico, Japan and Canada, in that order. In terms of value, after 2001, the year of China's entry to the WTO, U.S. imports from China grew at an accelerated pace.

From Mexico's perspective, although below China's growth pace, auto parts imports grew at almost double the U.S. average during the period 1990-2010. Mexico improved its ranking, overtaking Japan and Canada, becoming the leading supplier of auto parts to the U.S. market in 2010. In this sense, both China and Mexico are playing an increasing role in the U.S. motor sector's supply chain. In an opposite direction to China, Mexico is also acquiring significance as a supplier of complete motor-vehicles to the United States (Table 7.3). Despite the AAGR, China plays a marginal role as motor vehicle sourcing-country, with less than 1% of total U.S. imports and a value of US$ 131.7 million. 99% of total U.S. motor imports from China belong to the auto parts segment. For its part, Mexico stands as the third-largest auto supplier, accounting for 21.3% and a value of US$ 27,743.5 million in 2010.

This differentiated role and significance of the motor-vehicle and auto parts segments between China and Mexico in the U.S. market is more clearly demonstrated through the *RCA* index, which gives an indication of the specialisation pattern of both countries in U.S. motor imports. Table 7.5 shows the *RCA* for China and Mexico for the years 1990, 1995, 2001, 2005 and 2010, in three categories/segments: a) total motor imports; b) motor-vehicle segment; and c) auto parts segment. As observed, although China's *RCA* value is increasing through the period 1990-2010, in none of the categories this country reaches the specialisation level of a minimum index of 1.0. As expected, the highest index value for China is in the segment of auto parts, with 0.653.

Table 7.3. China's and Mexico's Participation in U.S. Motor-Vehicle Segment Imports, 1990-2010

País	1990	1995	2001	2005	2010
			Value (US$ Millions)		
Canada	20,307.34	33,521.75	41,088.95	48,385.21	36,870.85
Japan	21,462.86	23,094.70	31,600.76	35,943.29	32,422.13
Mexico	2,394.36	7,623.83	21,301.35	18,444.06	27,743.45
Germany	5,884.84	6,648.85	15,052.74	20,496.53	17,508.75
Korea	1,125.62	1,655.67	6,344.92	8,770.13	6,551.24
U. K.	970.76	1,532.34	2,918.04	6,301.66	3,595.95
China	0.03	0.07	5.94	177.69	131.73
Total Imports	54,901.00	76,812.43	125,272.00	145,502.83	130,411.49
			Percentage (%)		
Canada	36.9890	43.6410	32.7998	33.2538	28.2727
Japan	39.0937	30.0664	25.2257	24.7028	24.8614
Mexico	4.3612	9.9253	17.0041	12.6761	21.2738
Germany	10.7190	8.6560	12.0160	14.0867	13.4258
Korea	2.0503	2.1555	5.0649	6.0275	5.0235
U. K.	1.7682	1.9949	2.3294	4.3310	2.7574
China	0.0001	0.0001	0.0047	0.1221	0.1010
Total Imports	100.0000	100.0000	100.0000	100.0000	100.0000

AAGR

	1990-2010	1990-2001	2001-2010
Canada	2.88	6.05	-1.08
Japan	1.98	3.28	0.26
Mexico	12.37	19.98	2.68
Germany	5.33	8.14	1.52
Korea	8.75	15.50	0.32
U. K.	6.43	9.61	2.11
China	48.62	54.53	36.32
Total Imports	4.21	7.12	0.40

Source: Own elaboration based on the MAGIC Programme.

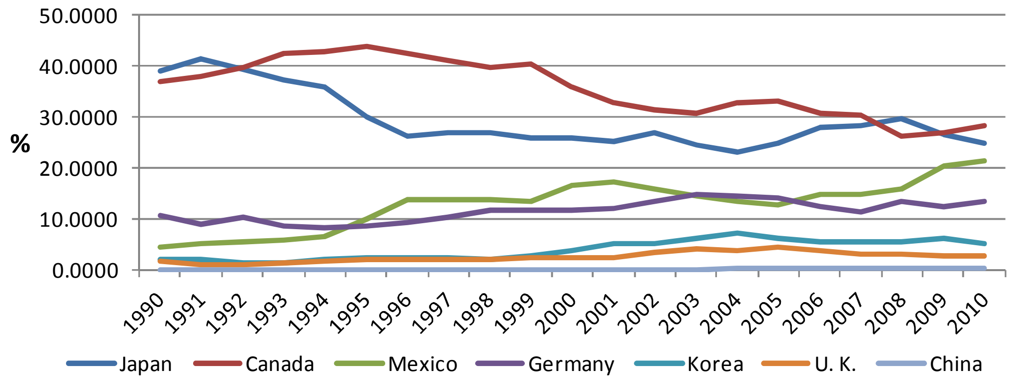
Table 7.4. China's and Mexico's Participation in U.S. Auto Parts Segment Imports, 1990-2010

País	1990	1995	2001	2005	2010
			Value (US$ Millions)		
Mexico	4,686.8	9,663.6	16,212.4	23,099.8	26,338.8
Japan	11,300.3	16,928.2	15,581.1	19,383.5	15,092.7
Canada	9,451.0	11,289.1	16,466.0	21,887.6	15,062.6
China	140.3	881.4	2,842.6	7,809.7	12,315.9
Germany	2,516.8	2,997.7	4,245.2	7,544.7	7,235.0
Korea	645.7	661.6	1,154.0	2,811.6	4,879.8
Taiwan	893.5	1,142.1	1,528.9	2,303.2	2,431.8[1]
Total Imports	35,078.5	50,963.8	67,744.8	100,569.1	98,694.5
			Percentage (%)		
Mexico	13.4	19.0	23.9	23.0	26.7
Japan	32.2	33.2	23.0	19.3	15.3
Canada	26.9	22.2	24.3	21.8	15.3
China	0.4	1.7	4.2	7.8	12.5
Germany	7.2	5.9	6.3	7.5	7.3
Korea	1.8	1.3	1.7	2.8	4.9
Taiwan	2.6	2.2	2.3	2.3	2.5[1]
Total Imports	100.0	100.0	100.0	100.0	100.0

	AAGR		
	1990-2010	1990-2001	2001-2010
Mexico	8.57	10.90	4.97
Japan	1.39	2.71	-0.32
Canada	2.24	4.74	-0.89
China	23.75	28.50	15.79
Germany	5.16	4.45	5.48
Korea	10.11	4.96	15.51
Taiwan	5.41[2]	4.58	5.97[3]
Total Imports	5.05	5.64	3.83

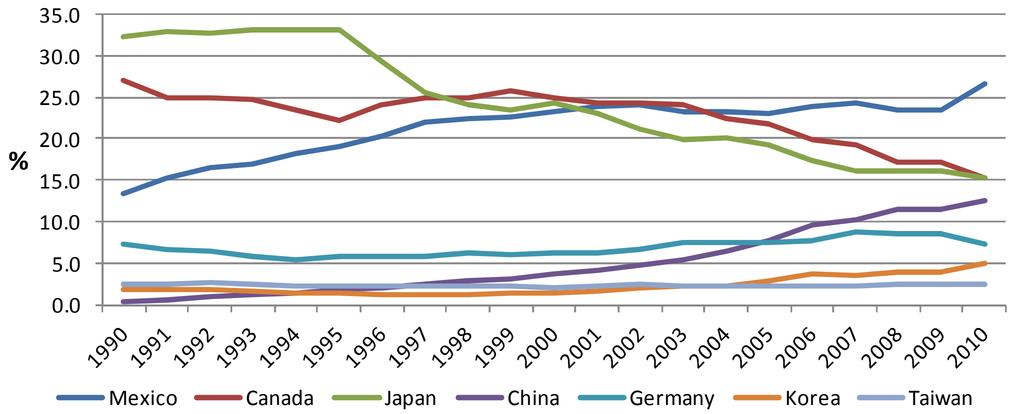
[1]2008. [2]1990-2008. [3]2001-2008.
Source: Own elaboration based on the MAGIC Programme.

Figure 7.3. China's and Mexico's Participation in U.S. Motor-Vehicle Segment Imports, 1990-2010



Source: Own elaboration based on the MAGIC Programme.

Figure 7.4. China's and Mexico's Participation in U.S. Auto Parts Segment Imports, 1990-2010



Source: Own elaboration based on the MAGIC Programme.

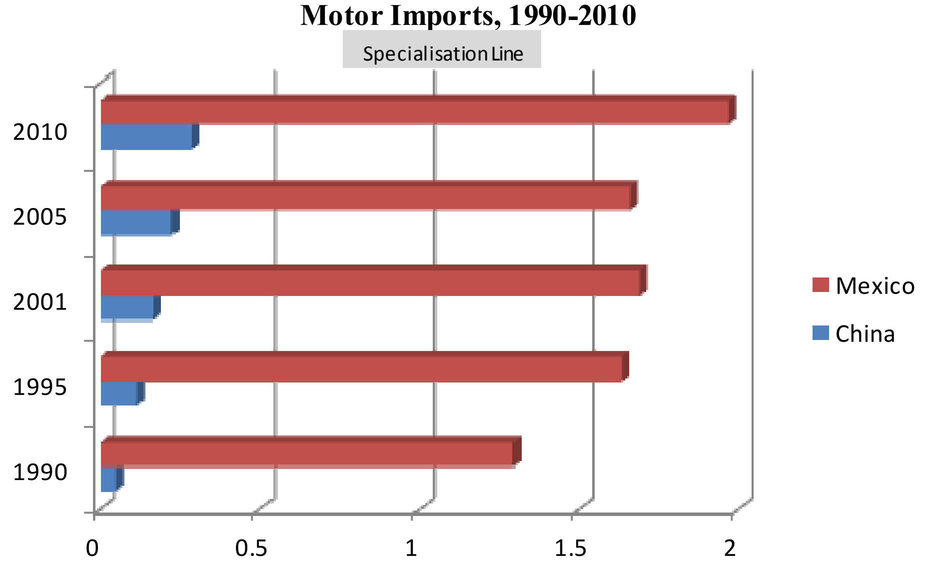
Mexico presents a more equilibrated situation between segments, with a relatively high *RCA* in both the motor-vehicle and auto parts segments, when compared with the rest of the U.S. motor supplier-countries. In 2010 Mexico's *RCA* were 1.965 for total motor imports, 1.771 for the motor-vehicle segment, and 2.221 for the auto parts segment. An interesting trend on the part of Mexico's specialisation in the U.S. motor imports is the increasing participation of the motor-vehicle segment in relation to auto parts (Figures 7.5 to 7.7).

Table 7.5. *RCA* Index[1] of China's and Mexico's Participation in the U.S. Motor Imports by Segment, 1990-2010

Country/Segment	1990	1995	2001	2005	2010
China					
Total Motor imports	0.050	0.112	0.164	0.222	0.284
Motor Vehicles	0.000	0.000	0.000	0.008	0.005
Auto Parts	0.130	0.282	0.468	0.523	0.653
Mexico					
Total Motor imports	1.291	1.630	1.688	1.657	1.965
Motor Vehicles	0.715	1.195	1.477	1.244	1.771
Auto Parts	2.192	2.284	2.079	2.254	2.221

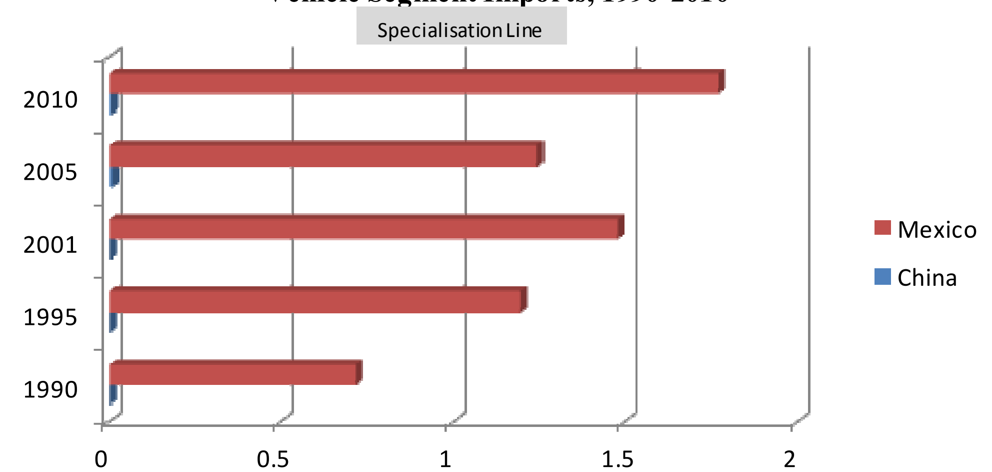
[1]A country has *RCA* in a particular product/segment when the Index is > 1.
Source: Own elaboration based on the MAGIC Programme.

Figure 7.5. China's and Mexico's *RCA* Index in U.S. Total Motor Imports, 1990-2010



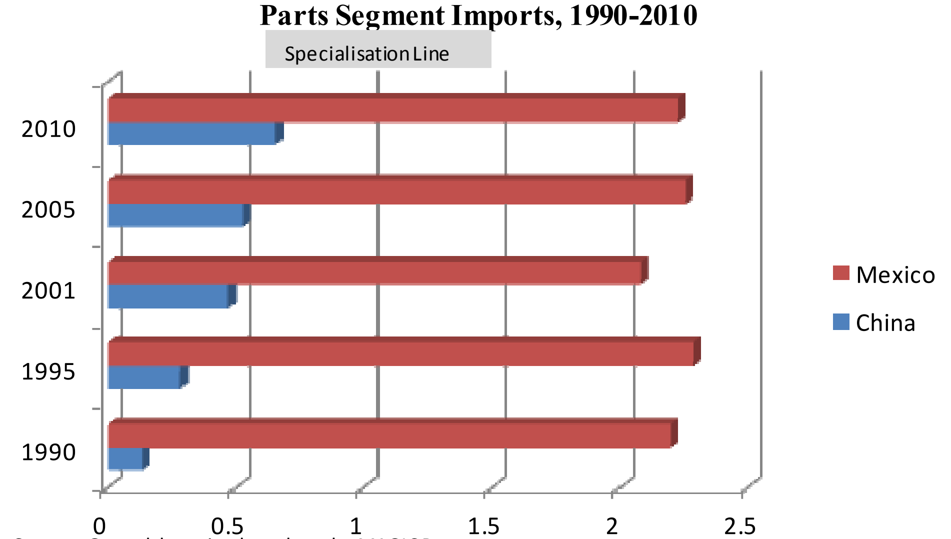
Source: Own elaboration based on the MAGIC Programme.

Figure 7.6. China's and Mexico's *RCA* Index in U.S. Motor-Vehicle Segment Imports, 1990-2010



Source: Own elaboration based on the MAGIC Programme.

Figure 7.7. China's and Mexico's *RCA* Index in U.S. Auto Parts Segment Imports, 1990-2010



Source: Own elaboration based on the MAGIC Programe.

7.3. China's Competitive Threat to Mexico in U.S. Motor Imports

As depicted in the Methodology Chapter, China's competitive threat to Mexico in the U.S. auto market will be examined by applying two indices: the *Static Index of Competitive Threat (SICT)* and the *Dynamic Index of Competitive Threat (DICT).* This methodology was developed by Rhys Jenkins (2008), presenting several advantages over other indices used in previous analysis. In addition, in order to complement the previous indices, the 'competitive threat' technique developed by Lall and Albaladejo (2004) and Lall and Weiss (2005a) will be applied. The aim of using the latter technique is to identify some more specific competitive interactions between China and Mexico in the U.S. motor import market. As the perspective is to look at competitiveness in the U.S. market, the analysis is based on U.S. import figures, rather than exports from China or Mexico. Again, a 6-digit level of the HS classification for 108 automotive products will be applied, using the MAGIC programme database. The period considered for the analysis is 1990-2010.

The Static Index of Competitive Threat (SICT) is calculated for the years 1990, 2001 and 2010, covering a period pre- and post-China's entry into the WTO. The SICT's results are presented in Table 7.6. As observed, although the number of automotive items in which China had a *RCA* > 1 increased from 7 in 1990 to 23 in 2001 and 33 in 2010, the proportion of of Mexico's exports value under threat in the U.S. market was relatively low, and even presenting a decline towards the end of the period: 0.8% in 1990, 8.5% in 2001 and 4.6% in 2010. In like manner, Mexico has also increased the number of items with *RCA* > 1 during the analysed period. In this sense, by 2010 65.8% of China's exports value was under threat from Mexico.

An interesting aspect is that there are relatively few items in which China and Mexico coincide in having an *RCA* > 1: 3 in 1990 and 16 in 2001 from a total of 104 items, and 13 in 2010, from total of 108 items. This situation may suggest that rather than competing, China and Mexico play a complementary role in supplying the U.S. automotive market. Mexico's *RCA* for the whole automotive sector in the

U.S. market is still substantially higher than China's in 2010: 1.965 vs 0.284 (Table 7.5). Given its strength in this sector's specialisation in the U.S. market, in a large number of automotive items Mexico poses higher *RCA* indices. In a preliminary way, and based on the SICT, it seems that up to now, Mexico is not threatened by China in the U.S. auto market.

Table 7.6. SICT: China's Threat to Mexico in U.S. Motor Imports, 1990, 2001 and 2010

Country/Concept	1990	2001	2010
China's Threat to Mexico			
Motor items with Chinese RCA > 1.0	7	23	33
% of Mexico's exports value under threat from China	0.8	8.5	4.6
Value of exports under threat (US$ million)	58.6	3,189.8	2,489.6
Mexico's Threat to China			
Motor items with Mexican RCA > 1.0	34	57	63
% of China's exports value under threat from Mexico	35.9	71.5	65.8
Value of exports under threat (US$ million)	50.4	2,036.1	8,196.4
Both China and Mexico with RCA > 1.0			
Number of coincident items	3	16	13

Source: Own elaboration based on the MAGIC Programme.

To calculate the Dynamic Index of Competitive Threat (DICT), the AAGR of the 108 motor product's imports for the periods 1990-2001 and 2001-2010 was considered. In correlation with the SITC analysis, these years cover the periods before and after China's entry into the WTO. The DICT includes the rates for total U.S. automotive imports from the world and U.S. auto imports from China and Mexico. Six possible situations or trade trajectories can be identified when looking at the resulting pattern of the AAGR of total (world) U.S. automotive imports, imports from China and imports from Mexico: 1. China > Mexico > World; 2. China > World > Mexico; 3. World > China > Mexico; 4. World > Mexico > China; 5. Mexico > China > World; and 6. Mexico > World > China. Given the different interactions, each of these situations represents a distinctive competitive threat.

Following Jenkins' methodology,[75] interactions 1, 2 and 5 represent a '*Competitive Threat'* (actual and potential) from China to Mexico in the U.S. market. Conversely, interactions 1, 5 and 6 represent the 'competitive threat' that China faces from Mexico. Unlike the SICT, under the DICT, which measures the pace of growth of imports into the U.S. market, the 'competitive threat' from China becomes more evident. According to this index, during the period 1990-2001, 42.4% of Mexico's motor imports into the U.S. were under threat from China. In the period 2001-2010, almost a decade after China joined the WTO, 73.8% of Mexico's imports into the U.S. were under competitive threat (Table 7.7). Accordingly, the number of items under competitive threat also increased, jumping from 75 in the period 1990-2001, to 92 during 2001-2010. The number of motor items under threat by 2010 represents 85% of the total's considered.

Under the same index's logic Mexico also poses a substantial competitive threat to China. Nevertheless, the DICT points out a decreasing tendency in the competitive threat from the pre- and post-China's entry into the WTO' periods. From a figure of 86% during the period 1990-2001, China's exports under threat from Mexico fell to 52.9% in 2001-2010. The number of automotive items under threat also fell from 73 to 53 between these periods, respectively. In summary, when looking at the pace of growth, the DITC suggests an increasing competitive

[75] The DICT identifies those products in which China is competitive as all those in which U.S. motor imports from China are growing more rapidly than U.S. total motor imports from the world. This is why in interaction 5, despite the fact that Mexico has higher RCA than China, the latter poses a potential competitive threat to Mexico, since its rate of growth is higher than U.S. imports from the world.

threat from China to Mexico's motor exports to the U.S. market. However, it is worth mentioning two caveats in this analysis. One is that the estimations of China's AAGR included all the automotive items, regardless of their value. An important number of them registered a very low-base value during the 1990s. The other is that despite this low-base value of many U.S. automotive items' imports from China, a large proportion of Mexico's items had high AAGR, standing very close to those of China's.

Table 7.7. DICT: China's Threat to Mexico in U.S. Motor Imports, 1990-2001 and 2001-2010

Country/Concept	**1990-2001**	**2001-2010**
China's Threat to Mexico		
Motor items with Chinese AAGR > USA	75	92
% of Mexico's exports value under threat from China	42.4	73.8
Value of exports under threat (US$ million)	15,898.1[1]	39,933.4[2]
Mexico's Threat to China		
Motor items with Mexican AAGR > USA	73	53
% of China's exports value under threat from Mexico	86.0	52.9
Value of exports under threat (US$ million)	2,449.8[1]	6,582.7[2]

[1]2001. [2]2010.
Source: Own elaboration based on the MAGIC Programme.

As mentioned above, in order to have a more specific image of China's competitive threat to Mexico in the U.S. motor market, the 'competitive threat' technique developed by Lall and Albaladejo (2004) and Lall and Weiss (2005a) has been used to complement the previous analysis. In this exercise, some additional and more specific competitive interactions between China and Mexico in the U.S. market can be identified (Lall and Weiss, 2005a): a) *Direct Threat*: China gains market share and Mexico loses; b) *Partial Threat*: both China and Mexico are gaining market share but the former is gaining faster than the latter; c) *No Threat*: both China and Mexico have rising market shares and the latter is gaining more than the former; d) *Reverse Threat*: the threat is the reverse, China loses market share and Mexico gains; and e) *Mutual Withdrawal:* both China and Mexico lose shares in the U.S. market to other competitors. The number of automotive items, the percentage of Mexico's imports to the U.S. market and their value under threat from China is calculated.

Table 7.8 displays the combination of outcomes according to the U.S. motor imports' share changes for China and Mexico for the period 1990-2001 and 2001-2010. As put forward in the DICT, this exercise shows significant changes over time in China's competitive threat to Mexico. While in the period 1990-2001 China's direct threat to Mexico only accounted for a minimal share of 1.1% of Mexico's imports into the U.S. market, during the 2001-2010 this figure increased to 18.7%. The proportion of Mexico's imports under partial threat also augmented from 38.1% to more than 50% between these periods, respectively. In summary, the share of Mexico's motor imports under some type competitive threat (direct and partial) increased from 39.2% during the period 1990-2001, to 70% in the following decade. In concordance to this process, the share of items and value in which Mexico had competitive strength also decreased during the analysed periods. Thus, under the competitive interaction classified as 'reverse threat', Mexico drastically reduced its share, passing from 57.4% to 22.7% between the periods 1990-2001 and 2001-2010.

Table 7.8. China's Competitive Threat to Mexico and Trade Interactions in U.S. Motor Imports, 1990-2001 and 2001-2010

1990-2001

Competitive Interaction (AAGR)	Number of Items	Value of Mexico's Motor Imports to the USA, 2001 (US$ million)	% of Mexico's Motor Imports to USA	Competitive Threat
1. Ch > Mex > World	45	14,287.8	38.1	*PARTIAL*
2. Ch > World > Mex	16	426.2	1.1	*DIRECT*
3. World > Ch > Mex	6	0.1	0.00	*MUTUAL WITHDRAWAL*
4. World > Mex > Ch	8	85.3	0.2	
5. Mex > Ch > World	14	1,1983.8	3.2	*NO THREAT*
6. Mex > World > Ch	14	21,530.6	57.4	*REVERSE THREAT*
Total	103	37,513.8	100.0	

2001-2010

Competitive Interaction (AAGR)	Number of Items	Value of Mexico's Motor Imports to the USA, 2010 (US$ million)	% of Mexico's Motor Imports to USA	Competitive Threat
1. Ch > Mex > World	39	28,004.7	51.8	*PARTIAL*
2. Ch > World > Mex	44	10,111.5	18.7	*DIRECT*
3. World > Ch > Mex	2	0.004	0.00	*MUTUAL WITHDRAWAL*
4. World > Mex > Ch	9	2,229.9	4.1	
5. Mex > Ch > World	8	1,450.5	2.7	*NO THREAT*
6. Mex > World > Ch	6	12,285.6	22.7	*REVERSE THREAT*
Total	108	54,082.24	100.0	

Source: Own elaboration based on the MAGIC Programme.

7.4. Technological Complexity of China's and Mexico's Motor Imports to the U.S. Market

Although the distinction between trade segments of complete motor vehicles and auto parts is very helpful when analysing a potential competitive threat, the number and diversity of parts and components that go into a vehicle (Bhaskar, 1980; Maxton and Worlmald, 2004; Klier and Rubenstein, 2008) require more specification in the analysis within both the motor vehicles and auto parts segments. For instance, a more detailed classification within the auto parts segment is required for distinguishing between minor and major components, their weight and size, as well as their technological content, among other characteristics.

Based on the above clarification, the specific methodology designed for the analysis of a more detailed and qualitative composition of the 'competitive threat' and trade interactions will be exercised in this section. This methodology is also useful for identifying the existence of trade specialisation patterns in a more systematic way (see the Methodological Chapter). As applied in Chapter 6, this methodology classifies the 108 products included in the automotive "cluster", at 6-digit level of the Harmonised System (HS), into five categories and 25 subcategories of different technological complexity within the automotive value chain. Ranging from high to low complexity level, the major categories are:

I. Finished Vehicles;
II. Major Components and Systems. Machining and Stamping;
III. Sophisticated Parts and Subsystems. Specialised Technology;
IV. Parts & Components. Moderate and Universal Technology; and,
V. Accessories and Simple Parts.

This methodology also considers that within the category of "Finished Vehicles", a differentiated technological complexity exists. This is the case, for instance, of the low end-smallest cars, such as sport & recreational, microcars/bubble, and subcompacts, compared to compact, mid-size cars, compact SUVs, luxury and full-size SUVs.

Tables 7.9 and 7.10, respectively, present the composition of U.S. motor imports from China and Mexico by category of technological complexity. As observed, in general during the analysed period China has concentrated between 65 and 75% of its exports in categories IV (Parts & Components. Moderate and Universal Technology) and V (Accessories and Simple Parts), the lowest in technological content. In this sense, analysts of the U.S. automotive market have reported that the rapid increase in auto parts imports from China into the United States since the 1990s was overwhelmingly in the aftermarket segment, rather than in that of original equipment (Klier and Rubenstein, 2006 and 2008). As result, these authors argue, producers of aftermarket parts face more pressure to minimise price than to maximise quality (Ibid).

However, during the last decade, Chinese-made parts have been upgrading their value added and technological development (Klier and Rubenstein, 2006; Haley, 2012). Likewise, during the fieldwork some interviewees declared that most of the OE auto parts outsourced from China into the U.S. is carried out by global Tier-1 suppliers.[76] This emerging trend can be corroborated by looking at the rising proportion of Chinese imports to the U.S. market in category IV, and the decreasing share in category V, shown in Table 7.9. In addition, foreign automakers, in particular of U.S. origin, would increase the use of their captive centres in China to supply their home bases directly. It has been reported that GM and Ford announced that they would be purchasing more than US$ 10 billion and 7 billion worth of auto parts and accessories, respectively, from China by 2010 (Haley, 2012). In 2006, GM already decided to shift its worldwide electronics purchasing unit to Shanghai from the U.S. to place it at the hub of China's electronics industry, aiming at outsourcing more components from the Asian country (Sherefkin and LaReau, 2006).

[76] U.S. automaker's executive. Personal interview. Dearborn (Detroit), Michigan, USA. 28th August, 2008. Also, a motor analyst. Personal interview. Ann Arbor (Detroit), Michigan, USA. 27th August, 2008.

Conversely, by and large Mexico has concentrated between 60 and 75% of its motor exports to the U.S. in the categories I (Finished Vehicles), II (Major Components and Systems. Machining and Stamping) and III (Sophisticated Parts and Subsystems. Specialised Technology), the more technologically complex sectors. In fact, more than 50% of Mexico's imports into the U.S. market in 2010 were motor vehicles, with a value on nearly US$ 28 billion. A large proportion of Mexican-made parts and components are produced by foreign-owned *maquiladora* plants, including the largest global Tier-1 firms, which provide OE auto parts to assembly plants especially in the United Sates and Canada.

China's and Mexico's composition of motor imports to the U.S. are reflected in their specialisation patterns (Tables 7.11 and 7.12). The specialisation indices have been constructed by applying the RCA index. Although with lower levels of specialisation, China presents increasing indices in the accessories & simple parts category, as well as in the segments of minor electronic, minor engine & transmission, and body & chassis parts. It also registers specialisation levels in the segment of electronic & safety systems within the category of sophisticated parts and subsystems. Most of these items are relatively labour-intensive and easy to transport. During the last decade, China also reached specialisation levels in the lower-end segment of sport & recreational cars, and got close to it in the microcar/bubble segment.

Table 7.9. U.S. Motor Imports from China by Category of Technological Complexity, 1990-2010

Category	1990	1995	2001	2005	2010
			Value (US$ Million)		
I. Finished Vehicles	0.02	0.07	5.9	177.7	131.7
II. Major Component and Systems. Machining and Stamping	0.37	4.0	3.7	96.8	400.4
III. Sophisticated Parts and Subsystems. Specialised Technology	42.5	316.8	848.9	1,768.4	2,555.3
IV: Parts & Components. Moderate & Universal Technology	24.0	221.1	1,022.0	3,518.5	6,131.0
V. Accessories & Simple Parts	73.4	339.6	968.0	2,425.9	3,229.2
Total	140.4	881.5	2,848.6	7,987.3	12,447.6
			Percentage (%)		
I. Finished Vehicles	0.01	0.008	0.2	2.2	1.1
II. Major Component and Systems. Machining and Stamping	0.27	0.45	0.13	1.2	3.2
III. Sophisticated Parts and Subsystems. Specialised Technology	30.3	35.9	29.8	22.1	20.5
IV: Parts & Components. Moderate & Universal Technology	17.1	25.1	35.9	44.1	49.3
V. Accessories & Simple Parts	52.3	38.5	34.0	30.4	25.9
Total	100.0	100.0	100.0	100.0	100.0

Source: Own elaboration based on the MAGIC programme database.

Table 7.10. U.S. Motor Imports from Mexico by Category of Technological Complexity, 1990-2010

Category	1990	1995	2001	2005	2010
	Value (US$ Million)				
I. Finished Vehicles	2,394.4	7,623.8	21,130.3	18,444.3	27,743.5
II. Major Component and Systems. Machining and Stamping	646.6	1,823.4	1,585.9	2,748.1	4,107.6
III. Sophisticated Parts and Subsystems. Specialised Technology	961.9	1,821.4	4,199.1	5,886.7	8,039.1
IV: Parts & Components. Moderate & Universal Technology	2,594.4	4,961.4	8,391.3	11,069.7	11,065.5
V. Accessories & Simple Parts	483.9	1,057.4	2,036.1	3,395.3	3,127.6
Total	7,081.2	17,287.4	37,513.8	41,544.0	54,082.2
	Percentage (%)				
I. Finished Vehicles	33.8	44.1	56.8	44.4	51.3
II. Major Component and Systems. Machining and Stamping	9.1	10.5	4.2	6.6	7.6
III. Sophisticated Parts and Subsystems. Specialised Technology	13.6	10.5	11.2	14.2	14.9
IV: Parts & Components. Moderate & Universal Technology	36.6	28.7	22.4	26.6	20.5
V. Accessories & Simple Parts	6.8	6.1	5.4	8.2	5.8
Total	100.0	100.0	100.0	100.0	100.0

Source: Own elaboration based on the MAGIC programme database.

For its part, Mexico presents higher levels of specialisation in a variety of automotive segments (Table 7.12). Nevertheless, its major strength is in the category of motor vehicles, especially in the segments of compact, mid-size and compact SUV; light trucks; medium & heavy straight trucks; as well as road tractors.[77] Likewise, Mexico also shows high levels of specialisation in the more complex segments of components (II and III), and a decreasing tendency in the indices of component IV. This is the case in particular of the segments linked to electronics, such as the electronic & safety systems, and minor electronic parts. This tendency might be the consequence of increasing Chinese penetration and competition in the U.S. market in these particular auto segments.

Tables 13 and Table 14 show the list and value of China's and Mexico's major import items to the U.S. The U.S. import share of each item is also calculated. In accordance with each country's specialisation pattern, China's top export items are concentrated in the categories IV and V of technological complexity: wheels, motor vehicle and trailer parts in general, iron and steel articles, pneumatic tyres, storage batteries, parts and accessories of bodies, as well as an important number of items related to the electronic segments (radio reception apparatus, ignition wiring sets, fans, parts for spark-ignition engines, lead-acid electric accumulators, and co-axial cables). Some of these items comprise a substantial share of U.S. motor imports. For example, Chinese wheels account for 42% of total U.S. imports of this item; iron and steel articles, 34.5%; pneumatic tyres, 23%; storage batteries, 49.3%; radio reception apparatus, 27.4%; fans, 29.4%; trailer parts, 68.2%; co-axial cable, 53.4%; lead-acid electric accumulators, 43.1%; and hydraulic jacks & hoist, 82.8%.

Mexico's export items are more diversified in terms of the technological content, standing out the motor-vehicle participation in the export structure. For example, only one product, automobiles with reciprocating piston engines displacing > 1,500 cc to 3000 cc (HS 870323), account for more than a fifth of total motor imports into the U.S. market from Mexico. Gas and diesel powered trucks are also

[77] It is worth mentioning that while the average value of a car exported from China is US$ 6,500, the average value of a light vehicle exported from Mexico is around US$ 20,000.

among the major export items. Other important items are transmissions, drive axles, safety airbags, diesel engines, steering wheels, and radio reception apparatus. In 2010, the market share in the U.S. of most of these top import items was outstanding: gas powered trucks, 98.7%; road tractors, 98.2%; diesel powered trucks, 98.1%; safety airbags, 81.3%; automobiles with diesel engine displacing more than 1500 cc to 2500 cc, 76.3%; ignition wiring sets, 64%; automobiles with reciprocating piston engines displacing > 1,500 cc to 3000 cc, 23.5%; among others.

It is worth noting that of the list of China's top 15-import items and Mexico's top-21 items, only 5 coincide: ignition wiring sets; parts for spark-ignition type engines, radio reception apparatus; wheels; and motor vehicle parts. To an important degree, this is an indication of the different specialisation pattern that has prevailed up to now. The coinciding motor items face strong direct or partial competition in the U.S. market. Thus, by using the results of the competitive threat exercise carried out in the previous section, Table 15 presents a detailed classification by category of technological complexity of the 44 items being under 'direct threat' (Table 7.8). As observed, 75% of the items and nearly 60% of the value of items under 'direct threat' fall within the lower categories of technological complexity (IV and V). Within these, the Moderate & Universal Technology category is particularly significant, accounting for around 50% of both number of items and value of Mexico's exports to the U.S. market. Pneumatic tyres, locks, accumulators, ignition coils, and lighting equipment are among the major items in this category. When considering the value of exports, the category of Sophisticated Parts and Specialised Technology also acquires relevance, concentrating 18.3% of Mexico's exports under 'direct threat'. Representative items of this category are radio reception apparatus, automotive air conditioners, radiators, and steering wheels.

Table 7.11. Specialisation Index of China's Participation in U.S. Motor Imports by Category of Technological Complexity, 1990-2010

Category/Product	1990	1995	2001	2005	2010
I. Finished Vehicles	***0.000***	***0.000***	***0.001***	***0.008***	***0.005***
I.A. Sport & Recreational	0.000	0.000	0.114	1.139	1.062
I.B. Microcar/Bubble	0.000	0.000	0.035	0.735	0.850
I.C. Subcompact/City Car	0.000	0.000	0.000	0.000	0.000
I.D. Compact, Mid-size Cars and Compact SUV	0.000	0.000	0.000	0.000	0.000
I.E. Luxury, Sports, Grand Tourer, Mid & Full-size SUV	0.000	0.000	0.000	0.000	0.000
I.F. Light Trucks	0.000	0.000	0.000	0.000	0.000
I.G. Medium & Heavy Straight Trucks	0.000	0.000	0.000	0.000	0.000
I.H. Passenger Vans & Buses	0.000	0.000	0.000	0.000	0.040
I.I. Road Tractors & Dump Trucks	0.000	0.000	0.000	0.003	0.000
II. Major Component and Systems. Machining and Stamping	***0.002***	***0.006***	***0.003***	***0.035***	***0.123***
II.A. Body	0.002	0.003	0.001	0.001	0.079
II.B. Chassis with Engine	0.000	0.002	0.008	0.016	0.005
II.C. Engine	0.002	0.007	0.003	0.054	0.149
II.D. Transmission	0.000	0.003	0.003	0.003	0.087
III. Sophisticated Parts and Subsystems. Specialised Technology	***0.180***	***0.431***	***0.615***	***0.547***	***0.545***
III.A. Chassis Components	0.046	0.386	0.743	0.642	0.324
III.B. Engine Components	0.084	0.242	0.496	0.368	0.574
III.C. Transmission & Drive Train Components	0.012	0.067	0.148	0.190	0.329
III.D. Electronic & Safety Systems	0.651	1.217	1.065	1.402	0.898
IV: Parts & Components. Moderate & Universal Technology	***0.069***	***0.206***	***0.457***	***0.659***	***0.809***
IV.A&B. Minor Body & Chassis Parts	0.029	0.109	0.452	0.713	0.824
IV.C&D. Minor Engine & Transmission Parts	0.104	0.065	0.172	0.423	0.761
IV.E. Minor Electronic Parts	0.134	0.363	0.522	0.620	0.796
V. Accessories & Simple Parts	***0.278***	***0.508***	***0.759***	***0.721***	***0.969***
V.A&B. Accessories and Simple Parts	0.278	0.508	0.759	0.721	0.969
Total Motor Imports	***0.050***	***0.112***	***0.164***	***0.222***	***0.284***

Source: Own elaboration based on the MAGIC programme database.

Table 7.12. Specialisation Index of Mexico's Participation in U.S. Motor Imports by Category of Technological Complexity, 1990-2010					
Category/Product	**1990**	**1995**	**2001**	**2005**	**2010**
I. Finished Vehicles	***0.715***	***1.195***	***1.477***	***1.244***	***1.771***
I.A. Sport & Recreational	0.001	0.000	0.000	0.001	0.494
I.B. Microcar/Bubble	0.000	0.000	0.000	0.000	1.960
I.C. Subcompact/City Car	0.001	0.000	0.000	0.000	0.015
I.D. Compact, Mid-size Cars and Compact SUV	1.195	1.917	1.452	1.631	1.870
I.E. Luxury, Sports, Grand Tourer, Mid & Full-size SUV	0.000	0.312	0.926	0.437	0.207
I.F. Light Trucks	0.504	2.378	3.876	4.313	8.212
I.G. Medium & Heavy Straight Trucks	0.001	0.171	2.141	2.500	5.912
I.H. Passenger Vans & Buses	0.000	0.561	0.691	0.005	0.659
I.I. Road Tractors & Dump Trucks	0.064	0.007	0.653	1.961	7.300
II. Major Component and Systems. Machining and Stamping	***1.392***	***2.076***	***1.044***	***1.444***	***2.007***
II.A. Body	0.171	0.338	0.486	0.859	1.662
II.B. Chassis with Engine	2.421	10.865	0.279	0.000	2.298
II.C. Engine	2.004	2.630	1.481	1.986	1.912
II.D. Transmission	0.057	0.027	0.232	0.464	2.187
III. Sophisticated Parts and Subsystems. Specialised Technology	***2.058***	***1.831***	***2.369***	***2.605***	***2.728***
III.A. Chassis Components	0.471	0.617	0.989	1.867	1.639
III.B. Engine Components	1.126	1.061	1.633	2.307	2.471
III.C. Transmission & Drive Train Components	1.134	1.027	2.262	2.605	2.726
III.D. Electronic & Safety Systems	6.323	5.284	4.830	4.582	4.068
IV: Parts & Components. Moderate & Universal Technology	***3.801***	***3.417***	***2.923***	***2.967***	***2.321***
IV.A&B. Minor Body & Chassis Parts	2.326	2.005	1.920	2.091	1.654
IV.C&D. Minor Engine & Transmission Parts	2.094	0.488	0.977	1.517	1.150
IV.E. Minor Electronic Parts	6.904	5.886	4.690	4.680	3.559
V. Accessories & Simple Parts	***0.924***	***1.168***	***1.243***	***1.444***	***1.492***
V.A&B. Accessories and Simple Parts	0.924	1.168	1.243	1.444	1.492
Total Motor Imports	***1.291***	***1.630***	***1.688***	***1.657***	***1.965***
Source: Own elaboration based on the MAGIC programme database.					

Table 7.13. Main U.S. Motor Imports from China, 2010				
HS Code	Item	Total Value (US$ Million)	% of Total Motor Imports from China	% of Total U.S. Imports of Item
870870	Wheels including parts and accessories for motor vehicles	1,009.9	8.1	42.2
870899	Motor vehicle parts nes	1,001.2	8.0	9.9
732690	Articles, iron or steel, nes	821.9	6.6	34.5
401110	Pneumatic tyres, new of rubber for motor cars, including station wagons and racing cars	809.0	6.5	14.0
401120	Pneumatic tyres, new of rubber for buses or lorries	723.4	5.8	23.0
850780	Storage batteries, nesoi	672.6	5.4	49.3
852721	Radio reception apparatus for motor vehicles	629.7	5.1	27.4
870829	Parts and accessories of bodies nes for motor vehicles	553.4	4.4	7.9
854430	Ignition wiring sets & other wiring sets used in vehicles, aircraft etc	393.9	3.2	6.7
841459	Fans nes	310.4	2.5	29.4
840991	Parts for spark-ignition type engines nes	307.9	2.5	6.8
871690	Trailer and other vehicle parts nes	296.1	2.4	68.2
854420	Co-axial cable and other co-axial electric conductors	294.2	2.4	53.4
850720	Lead-acid electric accumulators nes	284.0	2.3	43.1
842542	Jacks & hoists nes hydraulic	208.3	1.7	82.8
Source: Own elaboration based on the MAGIC programme database.				

Table 7.14. Main U.S. Motor Imports from Mexico, 2010				
HS Code	**Item**	**Total Value (US$ Million)**	**% of Total Motor Imports from Mexico**	**% of Total U.S. Imports of Item**
870323	Automobiles w reciprocating piston engine displacing >1500 cc to 3000 cc	12,119.5	22.4	23.5
870431	Gas powered trucks with a GVW not exceeding five tonnes	7,306.8	13.5	98.7
854430	Ignition wiring sets & other wiring sets used in vehicles, aircraft etc	3,774.4	7.0	64.0
870120	Road tractors for semi-trailers	2,867.4	5.3	98.2
870829	Parts and accessories of bodies nes for motor vehicles	2,351.3	4.3	
870899	Motor vehicle parts nes	2,036.9	3.8	20.2
870422	Diesel powered trucks w a GVW exc five tonnes but not exc twenty tonnes	1,860.9	3.4	73.6
870840	Transmissions for motor vehicles	1,695.7	3.1	26.8
840991	Parts for spark-ignition type engines nes	1,686.9	3.1	37.5
870324	Automobiles with reciprocating piston engine displacing >3000 cc	1,364.9	2.5	2.5
870895	Safety airbags with inflated system	1,294.7	2.4	81.3
840820	Engines, diesel, for the vehicles of Chapter 87	997.7	1.8	55.0
870421	Diesel powered trucks with a GVW not exceeding five tonnes	948.8	1.8	98.1
840734	Engines, spark-ignition reciprocating displacing more than 1000 cc	926.5	1.7	17.0
870894	Steering wheels, steering columns and steering boxes for motor vehicles	911.9	1.7	40.1
870850	Drive axles with differential for motor vehicles	872.8	1.6	43.2
870332	Automobiles with diesel engine displacing more than 1500 cc to 2500 cc	863.4	1.6	76.3
852721	Radio reception apparatus for motor vehicles	655.5	1.2	28.6
841330	Fuel, lubricating or cooling medium pumps for int. comb. piston engines	602.6	1.1	35.1
840999	Parts for diesel and semi-diesel engines	513.4	0.9	20.5
870870	Wheels including parts and accessories for motor vehicles	506.0	0.9	21.2
Source: Own elaboration based on the MAGIC programme database.				

Table 7.15. Technological Complexity of Mexico's Motor Exports Under 'Direct' Competitive Threat from China in the U.S. Market, 2010

Category/ HS Code	No. of Items under Threat	% of Items under Threat	Value of Exports under Threat	% of Value under Threat	Major Items
I. Finished Vehicles Items: 870324, 870410.	2	4.5	1,365.2	13.5	Piston-engine automobiles displacing > 3000 cc; dump trucks designed for off-highway use,
II. Major Components and Systems. Machining and Stamping Items: 840731, 840732, 840734, 840790.	4	9.1	934.8	9.2	Small engines, spark-ignition type.
III. Sophisticated Parts and Subsystems. Specialised Technology Items: 870891, 870894, 841520, 852721, 852729.	5	11.4	1,847.8	18.3	Radio reception apparatus; automotive air conditioners; radiators; steering wheels.
IV. Parts & Components. Moderate & Universal Technology Items: 401120, 401310, 700711, 700721, 732090, 830120, 870821, 940120, 842199, 850720, 850730, 850780, 850790, 851120, 851130, 851190, 851220, 851290, 853910, 853921, 854430.	21	47.7	5,474.5	54.1	Pneumatic tyres; inner tubes; safety glass; springs, iron or steel; locks; lead-acid electric accumulators; storage batteries; distributors and ignition coils; ignition wiring sets; lighting equipment.
V. Accessories & Simple Parts Items: 400912, 400922, 400942, 681310, 732690, 842541, 842542, 853641, 853661, 854441, 854520, 871690.	12	27.3	489.3	4.8	Tube brake hoses; asbestos brakes lining and pads; built-in jacking systems; signalling flashers; electric lamp holders.
Total	*44*	*100.0*	*10,111.5*	*100.0*	

Source: Own elaboration based on the MAGIC programme database.

7.5 Conclusions

The United States is a key market for Mexico's motor industry since the former represents between 80 and 90% of its export destination. The evolution of China and Mexico in U.S. motor imports indicates that both countries have increased their participation in such a strategic market. Mexico has now positioned itself as the single-largest source country of motor imports to the United States, overtaking Canada and Japan. In like manner, China has rapidly climbed to situate itself among the major importers to the U.S. market, ranking in 5th place, and registering an accelerated pace of growth of its import value. Therefore, it is clear that Mexico's government officials, businessman and labour union members have reasons to fear competition from China in the U.S. motor market, but the question is whether these fears are well-founded. The answer is that they are, but the characteristics and specificities of the competitive threat and market interaction processes have to be qualified.

One of the categorical advantages of a sectoral and country-based study like the present one is its proclivity to avoid generalisations in the analysis. As seen in the literature review, most of the early studies on the China-Mexico competitive threat were carried out by using 2 to 4-digit levels of the HS. Whereas these trade classifications are useful for some purposes and economic activities, in the case of the motor industry they are not good enough given the high diversity of its structure and composition. In this study, a more disaggregated analysis was performed by using a 6-digit level classification of the HS, integrating a 'cluster' of 108 motor products. In addition, the specific methodology, based on different categories of technological complexity of the motor value chain, developed to assess the qualitative character of the competitive threat, was very helpful in obtaining a clearer view and specificities of the competitive interaction process.

Thus, although at an aggregate level Mexico's motor industry was immune to Chinese competition in the U.S. market, the application of a 6-dgit level analysis gives a different and more qualified perspective. When considering the static view in the analysis, based on each country's RCA, the results suggest a complementary structure of China's and Mexico's participation in the U.S. motor market rather than direct competition. Nevertheless, although with regard to motor vehicles there seems to be a clear specialisation pattern and division of labour in which Mexico is specialised in compact, mid-size cars, SUVs, light and medium-size trucks, as well as road tractors, and China has a marginal but incipient role in the low-end motor vehicle segments such as sport & recreational vehicles, and microcars, the competitive environment in auto parts is much more complex. Despite the fact that Mexico is well positioned in some major components and sophisticated parts, and China is more specialised in the production and export of auto parts with universal technology and simple parts & accessories, in specific auto parts products of different technological levels the competitive threat is rising considerably.

The study carried out also corroborated the importance of the time-frame considered in the analysis, as suggested by Gallagher and Porzecanski (2007) and Jenkins (2010). By aiming at assessing changes over time in China's competitive threat to Mexico, a DICT was applied. Therefore, the 1990-2010 period was divided into two phases: 1990-2001 and 2001-2010, the years before and after China joined the WTO, respectively. By taking into account this time-frame, the following conclusions arose: a) although Mexico increased its share of U.S. motor imports, this grew at a slower rate than U.S. imports from China, and the relative gap between growth rates was greater in the second period; and b) the trend in the 'competitive threat' from China is increasing at a fast pace over time.[78] Thus, whereas in the period 1990-2001 China's direct threat to Mexico only accounted for a minimal share of 1.1% of Mexico's imports into the U.S. market, during 2001-2010 this figure increased to 18.7%. The proportion of Mexico's imports under partial threat also rose from 38.1% to more than 50% between these

[78] As suggested by Lall and Albaladejo (2004) and Lall and Weiss (2005), in discussing the competitive impact of Chinese entry, it is difficult to infer *causal relationships* from relative export and market share data. In this sense, this analysis is based on the above authors' assumption that a fall in Mexico's share of exports is caused by a rise in China's share. Nevertheless, given the dissaggretation level used in the thesis, some direct casual relationships of 'compeitive threat' from China were identified in some specific motor items, through the cross-checking of every single item's tendencies for China and Mexico, as well as the qualified opinion of key actors during the interviews. This is the case, for example, of the electronics, and engine and chassis parts segments.

periods. Thus, the share of Mexico's motor imports under some type of competitive threat (direct and partial) increased from 39.2% during the period 1990-2001, to 70% in the following decade.

The qualitative analysis of technological complexity in the motor value chain shows that China's direct competitive threat is focused in the low-end (simple parts and accessories) and some medium technology-level segments of auto parts. In particular, China's competitive threat in the U.S. market is increasing rapidly in the electronic, engine and chassis parts segments. Most of these automotive items are price-sensitive generic parts, relatively labour intensive and easy to transport. However, although the rapid increase in auto parts' imports from China into the United States since the 1990s was overwhelmingly been in the aftermarket segment, rather than in original equipment, during the last decade Chinese-made parts has been upgrading their value added and technological development.

Moreover, competition in the U.S. market is likely to become fiercer since Chinese-made auto parts, including original equipment, are expected to gain a dramatically larger share of that market in the coming years (USDC, 2011; Haley, 2012). Among the factors identified for this to happen are: a) Expansion of exports to overseas automakers, where foreign automakers' captive centres in China will supply their home bases directly. While other foreign auto firms operating in China have links to auto-parts' suppliers back home, U.S. auto companies have cut their ties with suppliers in the U.S. or encouraged them to manufacture in China; b) Expansion of exports to overseas Tier-1 suppliers. A growing number of global Tier-1 suppliers have set up production facilities in China and have started to export to the U.S. market; c) With increased foreign investment and the gradual consolidation of domestic firms, auto parts manufacturers in China are becoming more competitive. As Chinese automotive firms are looking to enter new markets, top global suppliers are assisting them with engineering, technical and managerial expertise; d) Companies are buying factory equipment from leading international suppliers, as well as acquiring or investing in suppliers located overseas, including in the U.S.; e) The Chinese government is facilitating auto and auto parts manufacturers' efforts in getting loans from domestic banks to fund their exports. In addition, auto companies are being helped to build overseas R&D centres and to acquire foreign peers to improve their technology and product-development capabilities. With the recent support measures, the NDRC, China's Central Economic Planning Agency, expected to see the export value of motor vehicles and auto parts made by domestic firms grow 10% annually over the next years, and reach US$ 85 billion by 2015 (Haley, 2010).

Nowadays, competition in the motor-vehicle segment in the U.S. market is clearer and more stable. As mentioned previously, China and Mexico play a differentiated specialisation role, being complementary rather than competitive. It seems that the perspectives of change of this competitive environment in the U.S. market are not feasible in the short and medium terms. For example, a Chinese academic[79] stated that, besides quality and environmental factors, and low prices, one of the main reasons why Sino-Foreign JVs do not export much from China is because TNCs do not want to compete with their own brands in their own countries. This condition was supported by an international consultant in Shanghai,[80] who believes that foreign companies could manufacture vehicles for export from China if production is 100% for export and having 100% foreign capital. Under the current JVs in place, there is no incentive to export for reasons including the high growth of the domestic market, and the difficulties in changing the quality of vehicles with the supply chain they have at the moment. Both interviewees considered that it would take between five to eight years for Chinese-made cars to have a significant presence in the U.S. market.

The situation during the last few years has not changed radically. The great majority of vehicle exports from China are from domestic-independent firms, such as Great Wall, Chery and Geely, which account for more than 70% of China's total auto exports. Most of these cars are exported to developing countries' markets in Africa, the Middle East, South East Asia and Latin America. The exported cars, mostly small, low-end segments, have a unit price of less than

[79] Fudan University. Personal interview. Shanghai, China. 16th May, 2008.
[80] KPMG. Personal interview. Shanghai, China. 13th May, 2008.

$10,000 dollars (Tang, 2009). Plans to export more vehicles to developed-country markets, such as the U.S. and the European Union, have been repeatedly delayed due to low product quality, poor image and failure to fulfill safety and environmental requirements. Recently, some Sino-Foreign JVs have started exporting vehicles as well. During 2011, GM and Honda continued to send Chinese-built subcompacts overseas; Daimler and BMW are exporting sedans, while VW China plans to ship cars into two former Soviet republics. Nevertheless, auto analysts consider that the volume of their exports from China will remain small and their markets will be the developing countries (Yang, 2012). In the short and medium terms their main goal is to fill modest product gaps in their overseas markets. This is the case of Honda which started sending its Fit subcompact cars to Canada from China, it will stop doing so after its Mexican assembly plant comes into operation in 2014 (Ibid).

The final outcome of the China-Mexico competitive process in the U.S. motor market, particularly in the auto parts segments, is far from being clear. To a large extent, the evolution of this complex trade and production interaction will depend on the direction taken by opposing/alternative forces and tendencies currently in operation. Some of the key ones are: a) Off-shoring *vs* near-shoring/globalisation reversal; b) Relatively low labour costs in China *vs* logistics and cost of transport (high cost of maintaining a trans-Pacific supply chain); and c) Location and proximity dependence strategies *vs* increasing productivity and value added. It is worth mentioning that in both China and Mexico the weight of global foreign firms in manufacturing and export decisions will strongly define most of these trends. Of course, governmental responses to these moves would condition the particular outcomes. In addition, another important factor that could influence the China-Mexico competitive environment in the U.S. market is the future decisions of domestic Chinese motor companies about locating assembly operations in Mexico, as announced during the last few years. If these projects materialise using Mexico as an export platform, Chinese firms would be 'helping' Mexico to 'compete' with China in the U.S. market.[81]

[81] Some Chinese auto parts and *maquiladora* firms are already exporting to the U.S. market, as discussed in Chapter 8.

Despite current advantages, some factors that can negatively affect China's ability to become a low-cost source of OE-auto parts for automakers worldwide are (USDC, 2011): a) rising material, labour and energy costs in China; b) potential currency, quality and logistics-related issues; and c) the increased cost competitiveness of other global suppliers. On the other hand, Mexico has proved to be most competitive in the U.S market in relation to China in products with the following characteristics (Watkins, 2007): a) high ratio of weight to value; b) quality (rather than price) intensive; c) inputs for industries that require just-in-time delivery, customised production, or require frequent design changes; and d) protection of intellectual property is important. Motor vehicles and large segments of auto parts fit within these characteristics. Nevertheless, it is recognised that Mexico needs to embark on economic and regulatory reforms as well as improve the system of R&D to increase industrial competitiveness.[82]

An outstanding issue emerged with the implications of the China-Mexico competitive process, particularly in the U.S. market. Beyond the simple fact of losing market share to China, some analysts have argued that not only Chinese competition will probably cause Mexico's current export structure to change, but also the export and industrialisation model is at risk (Blázques-Lidoy, Rodríguez and Santiso, 2007; Mesquita Moreira, 2007; Dussel Peters, 2009; Gereffi, 2009; Gallagher and Porzecanski, 2010). As result, the export-oriented model and the role of the State in the whole Mexican development process has been put into question. This debate raises crucial questions for policy.

Finally, considering the other aspects of the China-Mexico connections previously analysed (competition for global FDI and competition in the domestic market), the issue of increasing competition in the U.S. market represents a hot topic in the China-Mexico economic and trade relationship, since a significant share of Mexico's FDI attraction and jobs creation depends on that competitive condition. Furthermore, it is worth underlining that given the deepening of the globalisation process, the issue of China-Mexico competition in the U.S. market is also a very

[82] During the fieldwork, a common proposal among the interviewees in all the sectors (academic, governmental, business) was the need to increase investment in the R&D systems in order to become more competitive.

sensitive topic for the U.S. economy. The high degree of integration of the Mexican, Chinese and U.S. economies makes it difficult to separate the implications of the dynamic's effects. For example, the increasing Chinese share supplying *maquiladora* inputs into Mexico to be included in products for export to the United States directly affects U.S. suppliers, and not necessarily Mexicans. Thus, throughout the 1990s the vast majority of imported inputs to Mexico's *maquiladora* industry came from the United States. In 2000, 90% of these inputs were from the U.S. and 9% were from Asia, with China contributing only with 1% (Cañas and Coronado, 2004). According to a Federal Reserve Bank of Dallas' economist, China's entry into the WTO changed dramatically the supply chain (MEXICONOW, 2011). By 2011, only 55% of imported *maquiladora* inputs come from the U.S. and the rest from Asia. China has taken significant advantage of the *maquiladora* programme and they now supply roughly 10 to 15% of this industry's needs (Ibid). These trends are of great concern for businessman and border development promoters in the U.S.-Mexico industrial areas, since in the next 5 years a growth of about 50% is expected in Mexico's motor exports into the U.S. market (Ibid). Thus, the Mexico-China-USA interconnection seems to have great national and local economic implications. As an Executive Director and CEO of the Laredo development Foundation expressed (Adams, 2003: 36):

> "The globalisation of products and markets is having a profound impact on all sectors of the American economy. One driving force of this trend is the relationship between Mexico and China on the U.S. economy. In every community across the country some 40 percent of all finished products (retail as well as industrial), sourced components, and assembly plants have a direct or indirect link with Mexico and/or China. Thus, an assessment of the two primary trading partners of the United States is key to an understanding of present and future economic development trends at the local, state and national level."

8. CHAPTER EIGHT

THE CHINA-MEXICO AUTO INTERACTION 4: CHINESE OPERATIONS IN MEXICO AND GLOBAL PRODUCTION NETWORKS

> "The Chinese threat to Mexico's automobile industry as a global source of small vehicles and automotive parts is real and will materialise before the end of the decade" (Ornelas, 2004: 23).

> "There is no direct competition between Mexico and China in the automotive industry because the former does not have a 'Mexican' car" (Yin, 2008).[83]

Traditionally, in particular after China's entry to the WTO in 2001, China's competitive threat to Mexico's motor industry has been mostly associated with the exponential import surge of manufactured products into the domestic market (analysed in Chapter Six), as well as the increasing trade competition in the U.S. market (Chapter Seven). Nevertheless, perhaps for being an even more recent phenomenon, the China-Mexico interaction in Mexican territory linked to the location of Chinese business operations through FDI, JVs or other forms of technical-manufacturing integration in the auto sector, have attracted much less attention from both economic and governmental agents as well as from the academic-research agenda, if not neglected altogether.

Contrary to common knowledge and expectations, besides the existing trade relationships and traditional "arms-length" market transactions between China and Mexico, the presence of Chinese capital in automotive-related operations in Mexico has materialised through a diversity of organisational forms. These entry modes range from "Greenfield" investments, JVs, technological and marketing associations to mergers and acquisitions (M&A), among others.

[83] Prof. Yin Xingmin. Deputy Director, China Centre for Economic Studies, Fudan University. Personal interview. Shanghai, China. 16th May, 2008.

Since the end of 2005, several well-positioned Chinese automakers began announcing substantial assembly plant investments in Mexico. Among the most important are China FAW Group Corporation (FAW), Hebei Zhongxing Automobile Co. Ltd. (ZX Auto), Geely Holding Group (Geely), Chongqing Changan Automobile Co., Beiqi Foton Motor (Foton), and more recently, Chongqing Lifan Automobile Co. (Lifan) and Anhui Jianghuai Automobile Co. (JAC Motors). During the first quarter of 2008, Mexican governmental officials declared that Chinese automakers would be investing approximately one thousand million dollars in the following years (Revista T21, 2008b). Nevertheless, up to now most of these relatively large investment plans have not came to fruition; some have been cancelled, others postponed and only a few have started operations or are under construction. From the companies' perspectives, the central explanation for this situation has been the severe financial and economic crisis of mid-2007 to 2009 (Yang, 2009a and 2010; Fan, 2009; Ugarte and Islas, 2009).

The above-mentioned trends have provoked new lines of discussion about Chinese FDI strategies. From a broader perspective, Jenkins and Dussel Peters (2009) pose some key questions regarding the limited scope of China's investment flows in Latin America so far, as well as the future prospects in this regard for the region. These authors try to identify the causal factors of this situation by weighting the host countries' policies – or the absence of them -, the obstacles and the lack of a suitable investment environment, on the one hand, and the home country's behaviour with a "discriminatory" FDI strategy in favour of securing a long-term supply of raw materials, on the other (ibid). These reflections represent fundamental issues for analysing the current status and prospects of Chinese FDI in Mexico's auto industry.

Besides the issues raised by Jenkins and Dussel Peters (2009) and mentioned above, both of macroeconomic character for host and home countries, in addition to the global temporary circumstances of the economic crisis, other key factors should be included in this debate. Especially, the understanding of Chinese corporate strategies for overseas expansion derived from microeconomic conditions (product/geographical diversification, scale economies, efficiency-seeking, brand image, etc.) (Bellabona and Spigarelli, 2007; Lim, 2008). In Mexico's particular case and the potential investments plans of Chinese automakers, some other questions remain open to debate linked to specific microeconomic conditions of corporations, such as their technical and managerial capabilities for establishing operations overseas and their global reach. Some of these questions are the following: a) Have Chinese firms solved the whole components' supply chain for the manufacturing process in their Mexican plants across the Pacific? b) To what extent are Chinese firms prepared in terms of the facilities and structure to fulfil warranties, services and spare parts in their Mexican operations? c) Do Chinese cars comply with the safety and environmental norms stipulated in Mexico' Auto Decree? d) If they plan to use Mexico as export platform to the United States, are they prepared to fulfil the required quality, safety and environmental norms in the short-run? e) To what extent does the so-called hyper-competition in China's domestic market obtain priority over expanding operations in Mexico? and, f) Have Chinese automakers found that Mexico's domestic market has higher levels of competition and quality standards than the markets of other developing counties in Africa, Asia and Latin America?

The objective of this Chapter is to tackle the manifestation and characteristics of the China-Mexico auto interaction in Mexico derived from the Chinese presence in the domestic market, FDI flows and linkages to global production networks. The identification of the scale and type of automotive-related operations of Chinese firms is the starting point of the analysis (How significant is China's automotive investment at present in Mexico?). In doing so, a characterisation of the modes of entry as well as of the motivation factors or investment strategies of Chinese auto companies in Mexico will be carried out (What are the main modes of entry, drivers and motives of Chinese corporate strategies in Mexico's motor industry?). In addition, an approximate assessment of the actual problems and potential implications, and the resulting interaction networks of Chinese operations on Mexico's motor sector, will be elaborated (Are Chinese auto companies operating in Mexico competing and displacing domestic automotive firms?). As underlined in the Methodology section (Chapter 3), information and official data on FDI and other forms of Chinese presence in Mexico's automotive sector is very limited. Given these shortcomings, an exhaustive daily-basis review of alternative automotive sources was carried out in order to identify the trends.

8.1 Modalities of Chinese Auto-Related Operations in Mexico

In sharp contrast with trade trends between China and Mexico analysed in the previous Chapter, China's FDI in Mexico shows both a limited and unstable character. According to the Mexican Ministry of Economy's official figures, during the period 1999-2010 China's total accumulated FDI reached US$ 144.7 million (See Appendix 8.1). This amount corresponds to less than one percent of Mexico's total world inward FDI in that period. In a similar way to other figures, some discrepancies arise when comparing Chinese OFDI sources with the Mexican ones. China registers total accumulated FDI flows of US$ 200.63 million by 2010, almost 40 per cent higher than Mexican sources.[84]

As indicated in the introductory segment of this Chapter, although still modest and despite the fact that some of the automotive "flagship" projects have not materialised, Chinese automotive-related operations in Mexico present an increasing and diversifying modalities. Among the present and potential Chinese auto operations in Mexico, it is possible to identify FDI equity and non-equity participation, direct and indirect involvement, and arm's-length and non arm's-length relationships, and so on. There are different ways of classifying the modalities of FDI and TNCs' organisational forms (UNCTAD, 1995 and 2009b; UNIDO, 2006 and 2009). For this Chapter's purpose, the analysis will be based on the more common Chinese firms' modes of entry into foreign markets, linked to their process of internationalisation or outward economic expansion: a) Manufacturing Joint Ventures; b) Wholly-Owned Operations; and c) Mergers and Acquisitions (M&A). In addition, some specific entry modes and interaction, such as Non-Equity, between Chinese companies and Mexican auto-related operations

[84] An overview of Chinese FDI in Mexico is presented in Appendix 8.1.

will be examined.[85] The analysis of the different modes of entry will help to understand the motivation of Chinese corporations' outward foreign investment in Mexico's market. Table 8.1 shows the different modes of entry and product segments of identified Chinese companies with planned or operating projects.

8.1.1 Joint Ventures

Based on the number of identified actual or planned Chinese companies' operations in automotive-related operations in Mexico so far, the "Joint Venture" seems to be the favourite modality for companies intending to establish relatively large assembly car and motorbikes projects. The most significant cases and their basic characteristics are summarised in Table 8.2.

With regard to cars, since the middle of the 1990s diverse Chinese auto companies, both large State-Owned Enterprises as well as small private ones, have carried out a number of formal agreements with Mexican or other partners to establish manufacturing operations in Mexico through manufacturing JVs. Taking the available data, these joint ventures altogether would potentially generate more than US$ 1 billion in investment, one million units in production capacity and more than ten thousand jobs.

Analysing these Chinese car-assembly JVs as a whole, several common features can be identified:

a) Manufacturing operations are focused on the small car, lower-end market segments, especially compact and subcompacts. For instance, FAW-Salinas Group intended to produce the compact cars Xiali and Weizhi, while Changan's brand small models were Benben mini, Zhixiang and Yuexiang sedans.

[85] UNCTAD (2010c and 2011) has reported the increasing relevance of non-equity modes of international production, becoming a significant feature of the emerging global division of labour. These non-equity modes include various types of international contract manufacturing, supplier and distribution relationships, services outsourcing, contract farming, franchising, licensing, management contracts and other types of contractual relationships through which TNCs coordinate activities in their global value chains and influence the management of host-country firms without owning an equity stake in those firms.

Table 8.1. Mode of Entry and Product Segment of Chinese Firms' Automotive-Related Operations in Mexico (2011-2012)

Mode of Entry	Product Segment				
	Cars	Commercial Vehicles	Motorbikes	OEM Parts	Others
Manufacturing Joint Ventures	•FAW-GSM[1] •ZX Auto-FEMA[2] •Geely-Bergé[2] •Changan-Autopark[2] •Lifan-Opeasa[3]		•Jincheng Ronda •Italika		
Wholly Owned Manufacturing Operations		•Foton[4] •JAC Motors[4] •Dayun[3]	•Long •Dayun[3]	•Minth •Prime Wheel	•Foton (Tractors) •Krystal (limousines)
Mergers & Acquisitions	•Volvo-Geely •Saab-Spyker-Youngman-PangDa			•Delphi-Beijing West •DANA-Wanxiang •Moltech-Huayi •Nexteer-PCM •Inalfa-Hainachuan	
Licensing/ Technological Associations		•GML-FAW •Spartak-Dongfeng •CBO •Cosmotrailer			
Marketing/ Distribution Agreements	•Zilent •EVI •Miles •Bergé •Lifan	•Zilent •EVI •Miles •JAC Motors	•Zilent •Toromex-Autofin •Lifan		•LiuGong (construction and heavy machinery)

Notes: [1]Cancelled/Postponed; [2]Postponed; [3]Planned; [4]Planned/Under construction.
Source: Own elaboration based on diverse automotive sources and personal interviews.

b) The ventures involve substantial amount of capital investment and production capacity.

c) At this stage, Chinese firm's competition strategy focused on low prices as the main target customer was the entry-level buyer, from the working-class population (Grupo Salinas-FAW, 2007; Grupo Elektra, 2007). Most vehicles were priced between US $5,500 and $7,000, about 10 to 20 per cent below the cheapest models on the market. In terms of supply, besides competing among themselves, Chinese cars would compete with the low-end models currently offered in the market. These include the Chevy and Corsa (Chevrolet); Pointer (Volkswagen); Atos (Dodge); and Ikon and Ka (Ford).

d) As new-entrant companies in the Mexican market, most Chinese JVs had plans to start selling cars in Mexico before beginning local production, by importing them from China. This move was possible under the commitment to build manufacturing facilities in a period of three years. The Mexican Automotive Decree of 2003 allows automakers to import vehicles to the country, free of import duties, as long as they have an investment of at least US$ $100 million and have produced more than 50,000 cars a year locally (PEF, 2003). FAW-Salinas Group, for example, had sold around 5,500 imported cars from the end of January 2008 to mid-2009 (Salinas Group, 2009; Fan, 2009).

e) In their first phase of assembly operations, Chinese companies plan to use a large proportion of parts and components imported from China. Most plants would start with welding, painting and final assembly, but the idea is to manufacture an increasing number of auto parts in Mexico, including transmissions and engines.

f) With the exception of ZA Auto, the selected location sites for establishing assembly operations of Chinese firms were around Mexico's central region, taking into consideration the geographical concentration of potential domestic market.

g) Chinese automotive JVs in Mexico are central to their ambitious global strategy and path towards internationalisation. Although the Mexican domestic market is a relevant factor for Chinese firms' decision to locate manufacturing operations, under these JVs Mexico would also act as a manufacturing base and an export springboard to the rest of Latin American and, when the U.S. auto regulations are fulfilled, to North American markets taking advantage of Mexico's FTAs. Regarding the U.S. market, despite the optimism of most Chinese firms, some executives of Mexico's automotive industry believe that only in approximately five to eight years' time would Chinese-made cars be exported to that market from Mexico, when safety and environmental standards could be met.[86]

h) A common characteristic of these automotive JVs is that they have not been able to materialise operations. While the main causes include the unworkability of ZX Auto-CHAMCO's venture had intra-partnership disagreements, as well as CHAMCO's failure to meet Mexico's federal requirements to begin operations, FAW-Salinas Group, Geely-Bergé, and Changan-Autopark all blamed the global financial crisis of 2008-2009. Although most of the JVs representatives declared that they have not cancelled the projects, but "postponed" tehm (Yang, 2009a; Chow and Yang, 2008; Gasgoo, 2009), there are serious doubts about the ventures' feasibility. References from Chen Yuming, Head of the Trade and Economic Council of China's Embassy in Mexico, pointed out that most auto Chinese investment projects were not cancelled but temporarily "suspended", due to the unfavourable economic conditions.[87]

[86] Ministry of Economy's official. Personal Interview. Mexico City. 13th December, 2007.
[87] Gdem. Mexico-China Business Development. Mexico, D.F. Personal Communication. 3 February, 2010.

Table 8.2. Major Joint Ventures of Chinese Companies in Mexico's Automotive-Related Industry

Company	Project Description	Investment Partners	Plant Location	Destination of Production	Start-up Date
First Automobile Works (FAW)	JV agreement signed in late 2007 for the production of 100,000 units a year; depending on demand, it could increase to 250,000. Assembly of compact and subcompact cars. Investment of $US 150 million and 4,000 employees. Imports of FAW cars into Mexico through "Salinas Group" since December 2007.	Joint venture with Mexican "Salinas Group"	Morelia (Zinapecuaro), Michoacan	Mexico; Central and South America; USA (in 8 years)	The plant was scheduled to start by 2010. In June 2009, FAW-SG announced the decision of postponing the project.
Hebei Zhongxing Automobile (ZX Auto)	Under ZX-Chamco agreement in 2006, the assembly of 300,000 pick-ups and SUVs, annually. Investment of 300 million and 3,000-4,000 jobs. Intention of importing ZX vehicles into the Mexican and US markets. In 2008 ZX cancelled the association with Chamco. By late 2009 and early 2010, ZX and the government of Baja California signed a deal to manufacture 200,000 vehicles. Planned investment of $100 to 400 million dollars, generating 2,000 jobs.	Originally a joint venture with Chamco, a US-based vehicle importer. Under the 2009-2010 deal, in partnership with Mexican FEMA Group.	Tijuana, Baja California	Mexico; USA, Central and South America	Originally by 2009, under ZX-Chamco association. ZX cancelled this venture in 2008. The starting date of the new deal ZX-FEMA has not been specified.
Geely Automobile Holdings	In January 2008 Geely signed a memorandum of understanding to assembly 300,000 medium-sized cars a year (sedan or hatchback), including a supplier industrial park. The project envisages $US 500 million and 2,000 employees. By then, the Mexican factory would be the firm's most expensive overseas facility and its first assembly plant outside of China with full manufacturing capabilities.	Association with Spaniard-Mexican partners (Bergé and Monterrey Groups).	Leon, Guanajuato	Mexico; USA; Central and South America	Set to start operations by 2010. In March 2009 Geely announced that the Mexican project could cut down its size.

Table 8.2. Major Joint Ventures of Chinese Companies in Mexico's Automotive-Related Industry (Continued)

Company	Project Description	Investment Partners	Plant Location	Destination of Production	Start-up Date
Chongqing Changan Automobile Co. (CHANA)	In February 2009 Changan signed a cooperation framework agreement to establish an assembly plant with an initial annual capacity of 50,000 vehicles (compact and mid-sized cars). By mid-2009 Changan intended to hire Magna International to assemble cars for its planned joint venture.	Joint venture with Spanish-Mexican partner Autopark. Changan and Magna held talks to collaborate in the operation.	Central-Southern Region	Mexico, Central and South America; and the United States	The company planned to start sales operations during late 2009 or early 2010.
Chongqing Lifan Automobile Co.	At the end of 2010 Lifan Motors expressed the intention of setting up a small car-assembly plant in Mexico. The plant would produce 50,000 units a year with an initial investment of $100 million dollars. Lifan will contribute with the *know-how* and technology.	Opeasa is Lifan's representative in Mexico, acting as leader in the project' starting phase.	Feasibility studies in the states of Guanajuato, Sonora and Chihuahua	Mexico, Latin America; and eventually to the United States and Canada	Not specified
Italika	Joint venture to produce 350,000 motorbikes a year, with an investment of $15 million dollars generating 500 direct jobs. It's Mexico's largest motorbike assembly plant. Salinas Group imported Loncin motorbikes since 2005.	Salinas Group and Loncin Group	Toluca, Estado de Mexico	Mexico and Latin America	The plant started operations in 2008
Jincheng Ronda	Joint venture constituted in 2007 with Jincheng Group to manufacture motorbikes, establishing the RONDAMEX brand. In 2008 an assembly plant starts up with an annual capacity of 60,000 units. The firm has around 50 sales points in Mexico.	Rondamex, Jincheng Group	San Francisco Papalotla, Tlaxcala	Mexico	JV constituted in 2007. Plant started operations in 2008

Source: Own elaboration based on personal interviews and different automotive sources.

A totally different story from the vicissitudes of Chinese car-assembly has been the experience of JVs regarding motorbikes. During the late 2000's, two motorbike assembly JVs between Chinese corporations and Mexican partners set up successful operations: Italika and Jincheng Ronda.

In sharp contrast to Salinas Group's other car-assembly JV with FAW, the motorbike venture with Loncin has had an extraordinary success. During the first quarter of 2011, the Elektra Group, Salinas Group's marketing unit, reported annual sales of 200,000 units, concentrating around 60% of Mexico's motorcycle national market. In six years of operation, Elektra has sold one million units of the *Italika* brand (Web Report Italika, 2011). The company also markets the Italika brand in other countries such as Guatemala, Honduras, Peru and Brazil. As in the case of cars, Italika motorbikes are distributed through Elektra's more than 2,000 retail stores in Mexico and in seven countries of Central and South America. Recently, Italika announced the expansion of its motorcycles distribution network through their marketing in Chedraui's retail stores.

For its part, Jincheng Ronda, S. de C.V. is a JV constituted in 2007 by Mexican Group Rondamex and the Chinese Jinchen Group. Jinchen Corporation is one of China's leading motorcycle manufactures, with export markets in more than 70 countries worldwide (Jinchen Corporation, 2011). Mexico's JV established an assembly plant in San Francisco Papalotla, Tlaxcala, in 2008, with an annual capacity of 60,000 units of the Rondamex brand. At present, the firm has around 50 sales points throughout the Mexican territory.

Despite the differences in assembly capacity and the market destination of production, Italika and Jinchen Ronda present some similarities in their operations, and these can be summarised as follows:

a) Both have embarked in JVs with leading Chinese companies in the motorcycle segment. The parent companies are also involved in motor vehicle production operations (especially semi-trailers, construction trucks, and mini-trucks).

b) As in the case of car assembly JVs, the main strategy of market competition in motorbikes firms is low price, intending to attract low-income population segments. Although considered of lower quality, Italika and Rondamex motorbikes are between 20 to 30% cheaper than similar Japanese brands. With this type of vehicle, the level of competition in the Mexican market is substantially lower than with automobiles.

c) Both plants are located in Mexico's central region, taking advantage of the geographical concentration of potential domestic consumers.

d) Besides private use, these motorcycles have found a market niche in micro and small enterprises, and other delivery businesses. Besides low price, consumers try to reduce maintenance costs and increase fuel efficiency.

e) Both JVs posses specialized service centres to customers, offering original spare parts.

f) In addition, Italika and Rondamex also have and provide their own credit system. Thus, low prices and accessible financing plans have produced a highly positive base for market success.

In the case of motorbike assembly JVs, all these characteristics seem to be the key factors for successful in the Mexican market. An interesting aspect of reflexion is the future potential or real possibilities for these JVs to upgrade in the production line to automobiles, such as the case of Honda during the mid-1990s, or China's Lifan. This last company has distributed its motorbikes in Mexico since 2009, and it very recently announced its intention for establishing car-assembly operations in this country through a JV.

An important effect of the starting operations of these motorbike JVs in Mexico has been the strong fall in new motorbikes imports. Based on data from AMIA (2011), from 2007 to 2010, Mexico's motorbikes imports decreased 72.4%, dropping from 432,772 to 119,456. As a counterpart, imports of motorbike components registered an accelerated increase. Motorbike frames, for instance, grew more than 600% in the same period, from 38,640 to 285,719. Nevertheless, even though it could be assumed that this reduction in motorbike imports involved

China, this country remains as the number one import source: 78.4% in 2008, 65.6% in 2009, 68.8% in 2010, and 66.7% during the first semester of 2011.

8.1.2. Wholly-Owned Manufacturing Operations

Another modality of Chinese investment in Mexico's motor industry is that of wholly-owned manufacturing activities. Unlike car-assembly JVs, all these companies have their assembly processes in operation working on a diversity of production lines. Based on information available, firms under this type of modality have made, or have committed, investments of US$ 300 million, generating more than 2,200 jobs (Table 8.3).

Up to now, the most widely publicised of this type of operations is Foton Motor Co. In Foton's globalisation strategy, Mexico is considered as a strategic site for overseas market expansion (Foton Motor Co, 2011). Foton has been a presence in Mexico since 2007, marketing tractors and light trucks through Automotive Trucks (AT), its exclusive sales agent. According to Foton sources in Mexico, the plant currently is under construction (ibid). During 2009 the Chinese firm sold 1,500 vehicles, expecting to reach the 2,000 in sales by 2010. In a similar way than car-assembly JVs, Foton market strategy in commercial vehicles is low price, being considered 20% below competitors. Likewise, after selling in the domestic market, Foton's plan is to export to South America and the U.S. in further operation stages. At present, the assembly of tractors is carried out by using the KD system, with Foton importing all spare parts from China. The plan is to implement the same KD system during the first stages of commercial vehicle production. This practice is seen as a way of avoiding Mexico's tariff of 50% on imports of new complete vehicles, offering more competitive prices and improving distribution and post-sales services (Zhou, 2009).

For its part, JAC Motors announced the establishment of a commercial truck assembly plant in Culiacán, Sinaloa, northwestern Mexico, in 2012 (Torres, 2011b). The initial production plan considers 350 trucks a year using the SKD system, in particular the drivetrain and diverse auto components. JAC Motors distributed vehicles in Mexico since 2004. At present the company has only 2 dealer offices in the country expecting to open new ones in Mexico's larger cities.

Among the modality of wholly-owned operations are the cases of two component-supplier firms: Minth and Prime Wheel. Minth is located in the state of Aguascalientes and produces exterior trims, decorative and body structural parts. Besides Nissan, which is also located in Aguascalientes, Minth also functions as a Tier-1 supplier for Fiat, Ford and Chrysler. For its part, Prime Wheel is a Chinese-American firm specialised in the production of chromeplated aluminium wheels, and is located in Mexicali, Baja California. With an initial investment of US$ 6 million it will generated around 1,000 jobs when starting operations in 2012. Its main customers are Chrysler, Ford, GM and Mitsubishi, both in Mexico and the USA.

Krystal Enterprises International (KEI) is a different kind operation as it is specialised in the assembly of limousines and luxury vans. KEI is part of Krystal Infinity, a U.S. company, and Winston Global Energy from China. KEI is the largest assembler in its field in the United States and also dominates around 30% of the world's limousine markets; Winston Global Energy makes batteries for electric vehicles, including the Lithium batteries. By mid-2011, the Chinese partner injected more capital into the venture and announced the expansion of operations by building a new plant (RVBusiness, 2011). KEI is taking advantage of Mexico's FTAs to export to the United States, Canada, Central and South America, having recently included China as an export destination.

Finally, two motorbike firms fit in this entry mode category: Long and Dayun. Interestingly, Dayun investment decision was motivated by the ending on December 11th, 2011, of the Transition Measures agreed before the WTO between Mexico and China. According to Dayun's executives, upon eliminating the transition measures, Mexico becomes highly attractive because when the production plant is set up, all the spare parts imported from China into Mexico will have a lower cost and there will be no impact on the price of the final product.

Table 8.3. Major Wholly-Owned Operations of Chinese Companies in Mexico's Automotive-Related Industry

Company	Project Description	Plant Location	Start-up Date
Beiqi Foton Motor Co.	Investment of 370,000 dollars in an assembly plant producing agricultural tractors. Plant capacity is 6,000 units a year generating 45 direct jobs. By mid- 2010 Foton announced a plan for a new investment to build light trucks. Initial investment of 15 million dollars, increasing up to 250 million in further stages of production, reaching an annual capacity of 50,000 units. At final stages, vehicles would be exported to South America and the U.S.	Coatzacoalcos, Veracruz	September 2009
Anhui Jianghuai Automobile Co. (JAC Motors)	JAC Motors announced the establishment of an assembly plant to start operations in 2012. Initial production plan of 350 commercial trucks a year using the SKD system. JAC Motors distributes vehicles in Mexico since 2004. At present the company has only 2 dealer offices in the country.	Culiacán, Sinaloa	2012
Minth México, S.A	Firm specialised in the production of exterior trims and body structural parts. Initial investment of 16 million dollars in Mach 2010, generating 110 jobs. In February 2011 Minth invested 18 million dollars in expanding operations, reaching a total staff of 500 employees. Minth is supplier to Nissan, Fiat, Ford and Chrysler.	Gigante de Arellano, Aguascalientes	March 2010
Prime Wheel de México	Chinese-American firm specialised in the production of chromeplated aluminium wheels. With an initial investment of 6 million dollars it will generated around 1,000 jobs. Its main customers are Chrysler, Ford, GM and Mitsubishi, in Mexico and the USA.	Tijuana, Baja California	2012
Krystal Enterprises International	Initial investment of $40 million dollars, generating 300 jobs, to manufacture limousines and luxury vans. Current capacity of 1,000 units a year. Krystal Infinity investment (USA) was supported by Winston Global Energy (China). Exports to North, South America and China.	Mexicali, Baja California	The plant started operations by mid-2009
Long, S.A de C.V.	A medium-size firm dedicated to the assembly of bicycles and motorbikes. Annual production is 200,000 bicycles and 40,000 motorbikes, respectively, employing 420 persons. Vehicles are exported to the U.S. and Latin America.	Mexico, City	1995
Dayun	This company is planning to invest 3 million dollars in a motorbike and truck assembly lines during the next 2 years. Dayun aims at producing 10,000 units the first year generating 500 jobs by 2012. Besides Mexico's domestic market, the firm plans to export to North and South America.	Not specified	2012

Source: Own elaboration based on personal interviews and different automotive sources.

Despite the diversity of production lines of Chinese firms under wholly-owned operations, most of them show, nonetheless, some points in common:

a) In general, wholly-owned operations involve relatively low investment amounts and production capacity.
b) Setting-up assembly operations in Mexican territory allows firms to avoid high tariff regulations.
c) Firms take advantage of Mexico's FTAs, using Mexico asan export base to USA and/or Latin America, and, recently, China.
d) As in the case of the large manufacturing JV operations, at least during the initial production stage, assembly of vehicles under the wholly-owned mode of entry is carried out through KD or SKD systems.

On the other hand, some differences can also been identified, in particular between Minth, Prime Wheel and KEI in relation to the other companies:

a) Minth, Prime Wheel and KEI are operating under the *maquiladora* regime, which gives them special fiscal treatment in trade transaction in the US market.
b) As a consequence, for these three firms, Mexico forms part of a wide North American production base.

8.1.3. Mergers & Acquisitions

An indirect way in which Chinese companies have used to gain a presence in Mexico's auto industry is through global M&A of foreign firms. At least six Chinese M&A operations of companies with manufacturing activities in Mexico have been identified: two in the automobile line (Volvo and Saab)[88] and four in the auto components (Dana, Delphi, Nexteeer and Inalfa) (Table 8.4). The total

[88] At the time this chapter was being written, Chinese companies Pang Da and Yougnman were negotiating the acquisition of Saab from General Motors, which eventually failed.

transaction value of the whole M&A operations with global companies located in Mexico during the period 2007-2011 exceeded US$ 2.5 billion.

On the automobile line, both Volvo and Saab already had presence in Mexico trough their previous parent companies, Ford and General Motors respectively. Geely, China's largest private carmaker, bought the Volvo car subsidiary operations of Ford in March 2010 in a transaction worth US$ 1,800 million. Up to now, this is the biggest overseas takeover in Chinese auto industry. The deal included Volvos' product R&D, marketing, production and distribution in 2011 (Gasgoo, 2010). At present, Volvo has 24 distribution and services centres throughout Mexican territory. According to AMIA information, Volvo car sales in Mexico reached 1,300 units in 2010 and 900 during the first semester of 2011.

The other Chinese presence in Mexico through car brands M&A is Saab. After months of negotiations, in October 2011 Swedish Automobile NB (SWAN)-Spyker signed a memorandum of understanding with Chinese firms Zhejiang Youngman Lotus Automobile Co. and PangDa Automobile Trade Co. to sell Saab for 901 million Yuan, approximately US$140 million. In Mexico, the Saab brand was introduced by General Motors in 2002. After Spyker took over Saab from General Motors in January 2010, the Swedish firm started looking for a Mexican partner to re-establish marketing, distribution and service operations. At present, two more Saab's auto links can be identified. One is an agreement with Global Armor to armour-plate cars. The other is a contract to produce about 18,000 Saab's 9-4X a year at GM's assembly plant in Ramos Arizpe, Coahuila. At the moment of the negotiations between NB (SWAN)-Spyker and their Chinese counterparts, General Motors, which still owns preferential shares in Saab, opposes the deal since it considers that could hurt GM's competitive position.

Besides materialising M&A in luxury car brands, Chinese firms have been very active in taking over world-class parts suppliers. Some of these supplier firms, such as Dana, Delphi, Nexteer and Inalfa, have production facilities in Mexico. Specific information of these transactions such as the seller company, production segment, worldwide location operations, acquirer company, and value and date of transaction is presented in Table 8.4.

Wanxiang Group acquired Dana's coupled products unit. By 2007, Dana employed about 2,130 people in the Unites States and Mexico with Dana's production facilities in Mexico located in San Luis Potosí. Beijing West Industries bought Delphi's suspension and brakes business. This unit comprises seven plants employing 3,000 people in several countries. Pacific Century Motors, a JV between Tempo International group and the municipality of Beijing, acquired GM's Nexteer steering components unit. Nexteer had around 6,200 employees and 22 plants around the world; the deal also included 6 engineering and several customer service centres. Of those facilities, three plants were located in Mexico: Ciudad Juárez, Sabinas, and Querétaro. Lastly, Beijing Hainachuan Automotive Parts bought Inalfa in May 2011. Inalfa Mexico's plant is located in Irapuato, in the state of Guanajuato in the central region.

The analysis of Chinese M&A of automotive firms, both car and auto parts, with production facilities in Mexico show one point in common: a trend in the globalization strategy of Chinese auto firms towards acquiring prestigious brand names, and the rights to world-class technological processes, in order to move up the value chain. For instance, although Volvo and Saab present financial problems, they represent reputable brands in the luxury high-end car market segments worldwide. In the same way, Dana, Delphi, Nexteer and Inalfa are highly-positioned specialised auto parts firms at worldwide level. They hold strategic locations in global markets, with advanced manufacturing and R&D facilities, and function as Tier-1 suppliers of the largest global automotive corporations. These companies form part of global production networks, using Mexico as both production and export base for international markets, especially for the North American region. This is one of the reasons why all these global suppliers operate under Mexico's *maquilador*a regime. In this sense, the role or significance of these operations for Chinese companies goes beyond the limits of Mexico's domestic market, acquiring a more global or regional dimension.

Table 8.4. Major Chinese Merger & Acquisitions of Auto Firms Operating in Mexico

Target Company	Target Nation	Seller Company	Seller Nation	Production Segment	Worldwide Operations	Acquirer Company	Value of Transaction[a]	Date
Volvo Cars Corporation	Sweden	Ford Motor Company	USA	Autos	Marketing in 67 countries	Zhejiang Geely Holding Group Co. Ltd.	1,800	March 2010
Saab Automobile AB	Sweden	Swedish Automobile NV (Spyker)	Netherlands	Autos	Marketing in 54 countries	Pang Da Automobile Trade Co. and Zhejiang Youngman L. A.	140	October 2011[b]
Dana Corporation (Coupled Products Unit)	USA	Dana Corporation	USA	Steering, heating, and brakes	USA and Mexico	Wanxiang Group	np[c]	October 2007
Delphi Corporation (Suspension and Brakes Business)	USA	DPH Holdings Corporation	USA	Suspensions and brakes	USA, France, Poland, China and Mexico	Beijing West Industries Co. Ltd.	100	March 2009
Nexteer	USA	General Motors Corporation	USA	Steering and driveline systems	USA, France, Poland, Australia, India, S. Korea, Brazil, China and Mexico	Pacific Century Motors	450	July 2010
Inalfa Roof System Group BV	Netherlands	AAC Capital Partners and Parcom Capital	Northern European countries	Roof systems	USA, Europe, Japan, S. Korea, Brazil, China and Mexico	Beijing Hainachuan Automotive Parts Co.	nd[d]	May 2011

[a] Million Dollars; [b] Signing of a memorandum of understanding; [c] Nominal price; [d] Not determined.
Source: Own elaboration based on different automotive sources.

8.1.4. Licensing and Technological Associations

Technological Associations (TAs) or Licensing Agreements (LAs) is another modality of Chinese involvement in Mexico's motor industry. Although it is not easy to clearly identify these types of operations, some automotive associations are operating with characteristics that fit in this category. This is the situation of Giant Motors Latinoamérica (GML), Spartak-Donfeng Motor Corporation (DFM), CBO Trucks, and Cosmotrailer (Table 8.5).

The best example of this modality, with a relatively good level of operational success, is GML. In 2007, this Mexican firm, headed by Bler Group, entered into a fifteen-year association with FAW, consisting in technology transfer and auto parts sourcing. GML obtained a license to manufacture light and heavy FAW branded trucks (Maquila Portal, 2010).[89] Starting with the manufacturing of mini, light and semi-heavy trucks, over the years GML has widened its supply lines with new models, such as utility mini vans, heavy trucks and buses. The recent association of Bler Group with Carso Group has contribuited to this upgrading process, giving more certitude and assurance to GML operations. The firm also has plans to start exporting vehicles to some Central and South American countries (See Appendix 8.2).

Regarding the Latin American markets, GML executives consider the firm is more competitive there since, they argue, although these countries import Chinese vehicles, GML's are of higher quality. On the other hand, in relation to the Mexican market, GML's directives believe they have advantages and strengths due to the learning and maturing process the firm has experienced. Given the domestic market characteristics, they consider it takes at least three years of learning to commercialise Chinese brands in Mexico.[90] Nevertheless, although GML receives total support from FAW in the technical and commercial areas,

[89] According to automotive industry governmental officials, GML makes use of the benefits granted from Mexico's Automotive PROSEC Programme (Sectoral Promotion Programme for the Automotive Industry) to import assembly material from China. Heavy and High Technology Industries, Mexico's Ministry of Economy. Mexico City. Personal Interview. 28th April, 2008.

[90] Giant Motors Latinoamérica (GML)-FAW Trucks. Mexico City. Personal Interview. 20 June, 2011.

GML executive pointed out that some problems have arisen in logistics, operational and assembly activities. For instance, components' shipments have been delayed, materials management has not been successful, and there have been incomplete deliveries of parts and components.

A sensitive issue came out during the interview with GML executives when tackling the topic of "domestic integration" and the "nationality" of vehicles. It is interesting that despite the fact that GML-FAW's association is based on a technological agreement and FAW is the major supplier of components, firm directives do not conceive GML's trucks as "Chinese".[91] The main arguments for this opinion were that GML trucks possess 50% of domestic integration and that engines, a major vehicle component, although assembled in China, are manufactured by Cummins, as are injection and electronic systems. Based on those aspects, they consider the GML vehicle to be a "global truck".

Spartak is another Mexican company which embarked on a formal licensing agreement with the Chinese partner DFM. Through this association, Spartak assembles and distributes light truck brands of its Chinese associate. During the first stages of operation, Spartak also had another Chinese firm, Yuejin Motor, as a partner. Spartak focuses its market strategy on selling light load trucks to the micro and small entrepreneur who seek to maximise resources by acquiring a low cost vehicle, with low maintenance and excellent performance. According to the company's general manager, Spartak's vehicles are quality units with a price between 15 to 20 per cent cheaper than other brands. At present the units come directly from China and are assembled at the Monterrey plant; they fulfil the Mexican norms since vehicles use Euro III and Euro IV engines, as well as a 30 per cent of national integration of components (Transporte Informativo, 2009).

[91] Ibid.

Table 8.5. Major Technological Associations/Licensing of Chinese Motor Companies in Mexico

Company	Project Description	Venture Partner	Plant Location	Start-up Date
Giant Motors Latinoamérica	Technical association for the assembly of 20,000 light and semi-heavy trucks a year, using parts supplied by FAW. Initial investment of 17 million dollars and plans of increasing to 60 by 2011. At present GML employs 350 people, expecting to hire 1,500 at full capacity. Capital stock is 100% Mexican.	Mexico's Bler and Carso Groups with FAW	Ciudad Sahagún, Hidalgo	2006. Association with FAW in 2007
Spartak-DFM	Association for the assembly and distributing of light trucks and mini vans' brands of its Chinese associates Dongfeng Motors Corporation (DFM) and Yuejin Motor. Currently, the plant assembles around 700 vehicles a year and employs 140 people. Capital is 100% Mexican.	Spartak and Dongfeng Motor Corporation	Monterrey, Nuevo León	2006. Association with DFM formalised in 2010
CBO Trucks	Assembly of small trucks using components imported from China. In 2009 CBO became authorised as OEM distributor of Deutz Engines. The company employs 180 people. Capital stock is 100% Mexican.	Chinese firm not identified and Deutz from Germany	Apodaca, Nuevo León	2008
Cosmotrailer	Assembly of medium-size trucks using imported parts from Chinese suppliers. Produces around 250 "Kiloton"-custom made trucks a year, generating 60 jobs. Capital stock is 100% Mexican.	Several supplying Chinese firms	Aguascalientes, Aguascalientes	2007

Own elaboration based on personal interviews and different automotive sources.

Nevertheless, in August 2010 Spartak developed a new strategy. At present, Spartak is a Dealer Master and DFM representative in Mexico, so its vehicles will have the DFM acronym. As part of the image change, vehicles are sold in DFM's exclusive dealer agencies throughout the country, under new brand identification. Therefore, Spartak-DFM Mexico will have now to fulfil the brand requirements at world level (Hernández, 2010).

Two other Mexican firms, CBO Trucks and Cosmotrailer, assemble trucks under technical associations with Chinese corporations, although these associations are less formal than GML-FAW and Spartak-DFM. These are smaller companies, and in both cases, they have Chinese firms as major components suppliers, importing from cabins, engines, front and rear axis to other minor parts (CBO Motors, 2010). Similar to GML and Spartak, CBO and Cosmotrailer are also focused on producing low cost vehicles with higher fuel efficiency levels.

This set of technological associatons presents a more homogeneous situation among the involved firms, and these are:

a) All the associations are focused on the assembly and distribution of commercial vehicles, especially trucks.
b) In all cases the capital stock was 100% Mexican.
c) Compared to the car assembly JVs, these are smaller companies, with low capital investment amounts as well as in the scale of operations.
d) Like the car-assembly JVs, the business strategy of firms under technological associations is also focussed on low price, low maintenance costs and high efficiency levels.
e) Essentially, in the short and medium term all the firms are concentrated in the domestic market; nevertheless, the relatively better-off are planning to embark on export markets, or are already exporting in low volumes, such as GML and CBO, in particular taking advantage of Mexico's FTA.
f) Although production capacity and sales volumes are still low, the operation of these TAs is increasing the level of competition in the low-end segments of commercial vehicles. Mexican-Chinese TAs compete with Japanese companies with similar production lines (Hino and Isuzu),

with one Mexican (DINA), with other Chinese brands (Foton, and JAC Motors) as well as among themselves.

g) None of the TAs are formally affiliated to Mexican major trade associations, ANPACT in this case, either because they have been rejected after an evaluation and considered not to fulfil the regulatory requirements yet, or because of their own decision, since they consider that that these organisations have prejudices towards Chinese firms or Chinese-related operations.
h) One important difference among the TAs is the licence to use the partner's brand name in the assembled vehicles, which would depend on the degree of formalisation of the assocition, as well as on the financial capacity of the Mexican partner.

8.1.5. Marketing/Distribution Agreements/Representatives

Marketing and Distribution agreements or Representative Offices are other ways by which Chinese automotive-related firms have a presence in the Mexican market. Most of the identified operations of this kind are very recent and companies carry out low-volume businesses. To most firms, this modality represents the initial phase for entering the Mexican market. Of the operations under this modality analysed, three different groups can be identified: a) an indirect way through Mexican or foreign – non-Chinese – companies with marketing or distribution activities in Mexico. This is particularly the case of companies in the line of electric vehicles (EVs) (Zilent, Miles and EVI); b) Mexican or foreign firms marketing Chinese automotive-related products (Bergé Group and Autofin); and c) Chinese companies operating through representative offices or distribution agreements (Lifan, JAC Motors and LiuGong) (Table 8.6).

Marketing operations of EVs in Mexico are very interesting cases in terms of the indirect involvement of Chinese auto companies, reflecting the complexity of global production and distribution networks. Zilent Mexico, for example, is a Mexican enterprise with a franchise to distribute EVs imported from China. Zilent cars are assembled in China with Canadian technology. According to company sources, although assembled in China, the electric systems are produced in the United States and around 40% of the vehicle parts are manufactured in Mexico, including the lithium battery (Alcántara, 2009). In addition, the Mexican firm has a participation in the Chinese plant where the vehicles are assembled (Paredes, 2011). This sort of manufacturing and distribution associations in EVs is also reflected in the cases of Miles and EVI. Miles Mexico imports the cars from China, where they are assembled by Tianjin Qingyuan Electric Vehicle Company, a FAW subsidiary; the vehicle is designed in the United States (California), Miles' headquarters location, where the drive train is also manufactured (Miles Electric Vehicles, 2011). Likewise, EVI, a U.S. company also based in California, developed the vehicle's design; in 2008 EVI signed a strategic alliance with a Chinese partner to manufacture the vehicles' bodywork; and the assembly was done in Toluca, Mexico (EVI, 2010). Given the potential market growth for alternative fuel vehicles in California, in August 2009 EVI announced the relocation of its factory and corporate headquarters back to that state. EVI developed, tested and matured its technology in Mexico for several years (EVI, 2009) and by 2010, EVI still produced light-duty electric trucks in Mexico for the Latin American markets.

In a short period of operation, EV companies have encountered a number of obstacles in positioning themselves in Mexico's automotive market. On the one hand, EV distributors had to face the 2008-2009 financial crises. On the other hand, despite their advantages in environmental terms, low operating costs, and exemptions from the regular Mexican emissions inspections, among others, it has been difficult to convince people to change to alternative energy vehicles (Paredes, 2011). Under these adverse conditions, Zilent, for instance, decided to make incursions into the electric motorbikes segment (Maquila Portal, 2010c). The firm's strategic move had two main explanatory factors: first, the motorbike market had not been as badly hit by the economic crises as the new cars market; and second, Mexico's motorbike market is less complicated and less competitive than thet for motor vehicles. It is worth noting that despite these problems and obstacles, EV distributors maintain their idea of establishing manufacturing facilities in Mexico in the short term.

Table 8.6. Chinese Presence of Automotive-Related Companies Through Marketing/Distribution Agreements in Mexico	
Company	**Project/Operation Description**
Zilent Autos Eléctricos	Zilent is a Mexican enterprise with a franchise to distribute electric vehicles imported from China. Zilent cars are assembled in China with Canadian technology. Operations started in March 2009 offering small cars, mini-trucks and motorbikes. Investment commitment of around 20 million dollars in 2009 and 2010 to set-up a 100-dealership network, expecting to create 600 jobs. At present Zilent have 10 dealerships in Mexico. Plans to build a 50 million dollar-assembly plant by 2013 with production capacity between 2,500-5000 vehicles a year, generating 1,000 jobs. During 2010 Zilent sold 200 vehicles and 1,500 motorbikes.
Miles Electric Vehicles	Miles Mexico is a subsidiary of the US firm Miles Electric Vehicles. Miles's vehicles are developed in the US and manufactured in China by FAW. Miles's small cars and trucks are distributed through Linworks Mexico, starting operations in 2009. Plans for establishing an assembly plant at the end of 2012.
Electric Vehicles International (EVI)	EVI manufactures and markets electric mini-cars as well as light and medium-duty trucks. The company was founded in 1989 in California, USA, and built its manufacturing plant in Toluca, Mexico. EVI signed a strategic alliance with Chinese automakers to develop electric vehicles in the Mexican market. It currently produces about 1,000 duty-trucks units per year. In august 2009 EVI announced the relocation of its factory and corporate headquarters back to California given the potential market growth for alternative fuel vehicles.
SK Bergé Group	SK Bergé Group is in the business of representation, trading and distribution of cars in Spain and Latin America. Bergé entered the Mexican market in 2005. Among others, Bergé Group offers Chinese brands such as SAIC, Chery and BYD. In 2008, Bergé Group and Geely announced a plan for establishing a car assembly plant in Mexico with an investment of 500 million dollars and an annual production capacity of 300,000 units.
Chongqing Lifan Auto	With a representation office, Lifan distributes cars and motorbikes in Mexico. Lifan established in Mexico in 2009 setting up a warehouse for motorcycles and spare parts at Guadalajara, Jalisco. In 2010 it announced plans for building a manufacturing plant with an investment amount of 100 million dollars to produce 50,000 cars a year.
Anhui Jianghuai Automobile Co. (JAC)	JAC has been in the Mexican market since 2006 distributing light trucks. By mid-2011 it announced the expansion of the dealership network and an increase in its product portfolio. JAC is also considering building production facilities in Mexico.
Toromex-Autofin	Chinese motorbikes are distributed by Autofin Group under the Toromex brand. Autofin is a self-financing system of houses, cars and motorbikes in Mexico. At present Autofin has more than 200 sales points along Mexico.
LiuGong Machinery Corp.	LiuGong, specialised in heavy and construction machinery, began marketing activities in Mexico in 2009 through its dealer AMMEX (Asia Maquinaria de México, S.A de C.V.). By mid-2011 opened a representative office in Querétaro in order to expand new markets. At present LiuGong has three distribution centres in Sinaloa, Sonora and Baja California.
Own elaboration based on personal interviews and different automotive sources.	

The second group represents the typical trading and marketing operations of non-Chinese companies importing automotive products from China through the establishment of distribution networks in Mexico. SKBergé, a Spanish-Chilean Group with operations in Spain and Latin America, entered the Mexican market in 2005 representing different automotive brands, including China's SAIC, Chery and BYD (SKBergé, 2011). In 2008, Bergé Group and Geely announced a plan for establishing a car assembly plant in Mexico with an investment of US$ 500 million and an annual production capacity of 300,000 units. As pointed out above, the global financial crisis has been an obstacle to this and blamed for the delay in initiliasing the plan.

The third group comprises Chinese companies operating in Mexico through representative offices or distribution agreements (JAC Motors, Lifan and LiuGong). JAC Motors has been in the Mexican market since 2006 distributing light trucks; by mid-2011 it announced the expansion of the dealership network and an increase in its product portfolio. Lifan has distributed cars and motorbikes in Mexico since 2009, setting up a warehouse for motorcycles and spare parts at Guadalajara, Jalisco. Very recently, both JAC Motors and Lifan expressed their interest in building production facilities in Mexico (Lifan, 2010). These companies' market moves can be seen as a way of avoiding import tariffs from China as well as catching with other Chinese automakers that have plans for locating assembly operations in Mexico. Finally, LiuGong considers Mexico as a key market in Latin America. The firm's strategy in Mexico is to offer products for an affordable price with state-of-the-art technology, and most of all, tailored to customer needs (Maquila Portal, 2011b).

8.2. Drivers and Motivations of Chinese Investment in Mexico

As discussed in previous chapters, the factors driving companies to embark in a process of internationalization are of diverse character. Among the major drivers, classified in the literature as "push" and "pull" factors, are market and trade conditions, costs of production, local business conditions and home government policies for the former; and potential domestic/regional markets, low cost of resources (natural resources, labour and infrastructure), as well as host government's policy framework, business facilitation activities and business conditions (liberalisation and privatisation policies, trade and investment treaties) for the latter (UNCTAD, 2006; Dunning, 2006). Likewise, some additional "pull" factors for the OFDI of emerging economies have been identified: familiarity with local business environment, geographical proximity, ethnic and cultural ties, and strategic or political considerations (Aykut and Ratha, 2004). Although in general the main drivers and motivations of Chinese automotive-related investment in Mexico seem to fit within this traditional analytical framework, some peculiarities can be highlighted, especially when contrasted within the Latin American context and other developing countries.

Based on personal interviews held with governmental agents, automotive analysts, and automotive industry associations' representatives, the main factors for Chinese auto corporations to invest in Mexico are linked to domestic market potential, liberalisation and free trade agreements, geographical location to use the country as an export platform, and a strategy to avoid import tariffs on new vehicles. In addition, aiming at attracting Chinese capital into the motor sector, Mexican authorities have promoted fiscal incentives, economic stability, low inflation and interest rates, legal certainty, intellectual property protection and access to a market of more than 1 billion consumers through Mexico's twelve FTAs covering firrt-four countries.

Chinese companies located, or with intentions to establish operations, in Mexico have mentioned both "push" and "pull" driving factors. Among the major "push" factors pointed out by both large (FAW, Changan) and small (Geely, Lifan) motor vehicle firms is the hyper-competition - as Russo et al (2009) call it -, that Chinese market is experiencing and the overcapacity associated to it. On the side of "pull" factors, companies mention Mexico's domestic market potential, import tariff system, the network of FTAs, and strategic location to use Mexico as export platform to the US and Latin American markets. In FAW's case, in addition of the pull factors of demand opportunities, push factors related to internal forces also played a role in the decision to get involved in the Mexican JV. Some of these forces are the increasing domestic competition with a surge in the number of models available in China, and excess production capacity. This is causing a decrease in demand for some Chinese automakers' models, thus squeezing domestic profit margins. For Geely executives, the firm needs to grow both its China and export businesses to generate enough scale and profit for investments in new products and capacity (Ying, 2008). On a minor scale, a group of Chinese auto parts firms (Minth, Prime Wheel) acting as T1 suppliers to the largest global automakers have explicitly alluded to becoming established in Mexico in order to obtain a low-cost production base to export to the US and other markets.

In a research report and prospect analysis on the potentials of cooperation in the automobile and auto parts sectors between China and Mexico, elaborated by China Automotive Technology & Research Centre (CATARC, 2007), some main attracting factors for investing in Mexico were identified: a) Taking advantage of Mexico's FTAs to develop U.S. and Latin American auto markets, avoiding tariff and non-tariff barriers; b) Large market demand for China's domestic independent brands; c) Mexico's excellent auto parts supply system. Based on a survey of 21 Chinese automakers regarding their interest in establishing operations in Mexico, 76.2% (16 firms) declared that they were very interested or highly interested (Table 8.7). Although this high interest level reported by Chinese automakers has not massively materialised, some of the surveyed firms are now operating in Mexico (Foton, Lifan, JAC Motors), other still have investment plans (Geely, ChangAn, ZX Auto), and one has suspended its operations indefinitely (FAW).

Literature on TNCs' investment and international production suggests that push and pull factors are not sufficient to explain the final choice of host locations; therefore, an understanding of TNCs' motives and strategies and context is necessary (UNCTAD, 2006). In order to identify the main motives of Chinese firms' investment and operations in Mexico, a traditional analytical framework from the perspective of corporate strategies is used (ECLAC, 2004b; UNCTAD, 2006; OECD, 2008; CEPAL, 2010): a) Natural-Resource-seeking strategy; b) Market-seeking strategy; c) Efficiency-seeking strategy; d) Strategic/Created-asset seeking; and e) Diversification-seeking strategies.

Table 8.7. Chinese Automotive Companies with Interest in Establishing Operations in Mexico		
Company	**Interest Index***	**Attitude about Mexico's Automotive Market**
Hafei Automobile Group	2	Hafei regards Mexican automotive market as important, and it is thinking about how to explore this market.
China FAW Group Corporation	2	Great interest.
China Brilliance Auto Co.Ltd.	1	
Baotou Beifang Benchi Heavy-Duty Truck Co., Ltd.	1	
Tianjin FAW Xiali Automobile Co.Ltd.	2	
Hebei Zhongxing Automobile Co., Ltd.	3	Zhongxing is preparing for setting up assembly line in Mexico.
Beiqi Foton Motor Co.Ltd.	2	Foton will explore Mexican automotive market in one or two years.
ChangAn Auto Co., Ltd.	3	Changan Auto Corporation gives great attention to Mexico's auto market, but they are not familiar with the policy and regulation in Mexico.
SAIC Motor Corporation Limited	3	SAIC shows great interest in Mexico.
Geely Holding Group	3	Geely will set up an agency in Mexico by 2007.
Chery Auto Co.Ltd.	3	Chery will set up auto factory with DC in near future.
Anhui Jianghuai Automobile Group Co.Ltd.	1	
Xiamen King Long United Automotive Industry Co.Ltd.	1	
Xiamen Golden Dragon Van Co. Ltd	1	
Nanjing Automobile (Group) Corporation	2	Mexican auto market is very important.
Great Wall motor Co., Ltd.	2	
China National Heavy Duty Truck Group Corp.	2	
Shanghai Maple Automobile Co.,Ltd.	2	
Lifan Group Co.,Ltd.	2	
Yutong Group Co., Ltd.	3	
BYD Auto Co., Ltd.	2	

*Interest Index: 1: Low; 2: Medium; 3: High.
Source: CATARC (2007).

By using the different mode of entry analysed above, Table 8.8 shows the main Chinese corporate motives for investing in auto-related operations in Mexico.

Given the nature of the motor sector, three main corporate strategies or motives were identified: market-seeking, efficiency-seeking and strategic/created-asset seeking. As can be observed, market-seeking is the favourite motive of the great majority of Chinese companies in Mexico in all types of entry modes, with exception of M&A. This strategy preference also seems to apply to all kind of firms, regardless of their size, ownership pattern, or the particular product segment. Some of the investments in production facilities, in particular through manufacturing JVs, wholly-owned operations, and technological agreements, are replacing previous Chinese operations under distribution centres or imports into Mexico. This is the case, for example, of Italika and Jincheng-Ronda in motorbikes and, more recently, Foton, Spartak-Dongfeng and JAC Motors in the vehicle segment. It is worth pointing out that due to Mexico' strategic geographical location and its network of FTAs, the market-seeking strategy is considered, in the medium term, to include domestic and regional markets, both to the developed countries of North America and developing counties of Latin America.

This market-seeking feature as the main motive for Chinese automotive-related investment in Mexico is in total contrast with non-Chinese automotive corporations' investment profile (Ford, General Motors, Volkswagen, Nissan, Chrysler, Honda, Toyota). Analyses of TNCs' strategies in Latin America have classified motor FDI in Mexico as efficiency-seeking (ECLAC, 1998 and 2004; Mortimore 2000; Mortimore and Vergara, 2004). This contrasting strategy can be explained by the current differences in the competitive advantages and organizational capabilities of each group of automakers. The well-established global auto TNCs use Mexico as an export platform as part of their regional or global production networks, mainly acting as cost centres for higher-technology activities. Besides taking advantage of Mexico's qualified and relatively low labour costs, TNCs have preferential export market access through the FTAs. For their part, in the short run Chinese auto companies are mainly focused on gaining a share of the domestic market in the lower-end segments, competing basically with low prices.

<table>
<tr><th colspan="4">Table 8.8. Main Chinese Corporate Motives (Strategies) for Investing in Mexico's Automotive-Related Operations, 2011-2012</th></tr>
<tr><th rowspan="2">Mode of Entry</th><th colspan="3">Corporate Motive (Strategy)</th></tr>
<tr><th>Market Seeking</th><th>Efficiency Seeking</th><th>Strategic/Created-Asset Seeking</th></tr>
<tr><td>Manufacturing Joint Ventures</td><td>•FAW-GSM[1]
•ZX Auto-FEMA[2]
•Geely-Bergé[2]
•Changan-Autopark[2]
•Lifan-Opeasa[3]
• Jincheng Ronda
• Italika</td><td></td><td></td></tr>
<tr><td>Wholly Owned Manufacturing Operations</td><td>• Foton (autos)[4]
• Foton (agricultural machinery)
• JAC Motors[4]
• Long
• Dayun[3]</td><td>•Minth
•Prime Wheel
• Krystal International</td><td></td></tr>
<tr><td>Mergers & Acquisitions</td><td></td><td colspan="2">• Volvo-Geely
• Saab-Youngman-PangDa
•Delphi-Beijing West
•DANA-Wanxiang
•Moltech-Huayi
•Nexteer-PCM
•Inalfa-Hainachuan</td></tr>
<tr><td>Licensing/ Technological Associations</td><td>•GML-FAW
•Spartak-Dongfeng
•CBO
•Cosmotrailer</td><td></td><td></td></tr>
<tr><td>Marketing/ Distribution Agreements</td><td>•Zilent
•EVI
•Miles
•Bergé
•Lifan
•JAC Motors
•Toromex-Autofin
•LiuGong</td><td></td><td></td></tr>
<tr><td colspan="4">Notes: [1]Cancelled/Postponed; [2]Postponed; [3]Planned; [4]Under construction.
Source: Own elaboration based on diverse automotive sources, press reports and personal interviews.</td></tr>
</table>

Despite the overwhelming market-seeking motives of Chinese auto investment in Mexico, other type of corporate strategies, not "typical" of Chinese international operations, can be identified: efficiency-seeking and strategic/created-asset seeking (Table 8.8). The explanation for this trend is the conjunction of several factors: the strategic location and Mexico's role in the motor industry's global division of labour on the one hand, and the upgrading technological and competitive capabilities of some Chinese automotive firms with internationalisation strategies, as well as M&A from Chinese firms as a fast route for gaining access to technology and internationally-recognised brands, on the other. Up to now, three Chinese firms have efficiency-seeking as their main investment motive in Mexico: two auto parts companies (Minth and Prime Wheel) and a limousine and luxury van manufacturer (KEI). The most representative firms of this strategy are Minth and Prime Wheel. Both are working under Mexico's *maquiladora* programme to take advantage of a special trade regime and tax-free operations in order to obtain cost-efficiency and a competitive supply base for global automakers. For these Chinese firms, an important motive for internationalisation was to expand relationships with other successful TNCs, often acting as suppliers to manufacturing OEMs, or as service providers (Sutherland, 2010). In the North American region, Minth has entered into the supplier system of Nissan, Fiat, Ford and Chrysler; and Prime Wheel into the system of Chrysler, Ford, GM and Mitsubishi.

Another way of entering the Mexican market by Chinese automotive corporations has been the M&A of foreign firms with operations in Mexico, both automakers and auto parts. As already pointed out, through this strategic/created-asset seeking motive, Chinese companies have gained access to technology, R&D, and internationally-recognised brands. The operations falling under this strategy in Mexico are Volvo-Geely and Saab-Youngman for cars, and Dana-Wanxiang, Delphi-Beijing West Industries, Nexteer-Pacific Century Motors and Inalfa-Hainachuan, for auto parts. Given Mexico's condition and position in the global automotive industry, with these operations Chinese firms combine a technological-asset seeking with an efficiency-seeking strategy.

8.3. Problems and Limitations

In terms of having a clear understanding of the present and future prospects of Chinese investment through JVs in Mexico's motor industry, particularly the large JV-projects and wholly-owned manufacturing operations, it is worth making a deeper analysis of the diverse causes provoking the failure or unfeasibility of recent planned projects. Based on the revision of the different cases, as well as on the opinions of the auto sector's qualified agents (governmental, entrepreneurial, consultancy) gathered through personal interviews, various types of causal factors can be identified. These range from external forces, such as the recent global financial crisis, to Mexico's automotive policies, domestic market characteristics, as well as internal factors of the firms involved, such as their technical, financial and organisational capacity. These causes are set out below in a succinct way.

Mexico's lack of a long term-strategic vision towards China

In a generalised way, analysts of the Mexico-China's economic and trade relationships coincide on the idea that Mexico, both at governmental and entrepreneurship levels, lacks a strategic vision towards its relationship with China, in particular for the medium and long terms (Dussel Peters, 2007 and 2009; Oropeza, 2007; Villalobos, 2007; Anguiano, 2010; Wu, 2010).[92] From a Mexican perspective, China is still seen as a threat and competitor rather than an opportunity and partner. In this sense, Mexican economic policies and actions towards China have been more reactive than proactive, jeopardising the binational business environment.

Inadequacy of Mexico's automotive policy and regulations

The recent experiences of new investment projects by Chinese automakers show an inadequacy in Mexico's automotive policy in a framework of multilateralism and global markets. Whereas the present automotive Decree (PEF, 2003) is appropriated in relation to the objectives of Mexico's FTAs, in particular to NAFTA, some analysts consider it poses high entry barriers to new players,

[92] Formally, Mexico and China signed a "strategic association" agreement during the official visit to Mexico of Prime Minister Wen Jiabao in December 2003 (Anguiano, 2007; Wu, 2010), but it has not been put into practice.

especially for those firms coming from countries with which Mexico has not signed a FTA, such as China and India (Dussel Peters, 2012). As stated above, the 2003 Automotive Decree states that newcomers into the Mexican market have to fulfil the following requirements: i) invest a minimum of US$ 100 million; ii) manufacture a minimum of 50,000 vehicles a year; iii) have their own brands; iv) have the capacity of supplying to consumers the parts contained in the vehicle manufactured in Mexico. This Decree also includes a clause that allows a three-year transition period, under half-yearly official inspections, to fulfil the requirements. Among the benefits of fulfilling the Decree is the fact that duty-free imports of vehicles by automakers in a quantity similar to 10% of their yearly vehicle production are allowed. In this way, automakers which are not officially registered under the Automotive Decree, they are levied between 30 and 50% tax rate for imported vehicle. Starting from January 2012, the import tariff for new vehicles from countries which do not have a FTA with Mexico will fall to 20% (Dussel Peters, 2012).

On top of that, based on the idea of avoiding an "unfair trade" from Chinese automakers, Mexico's major automotive producers and distributors associations (AMIA and AMDA) proposed to the Ministry of Economy the updating of the official norm for marketing new cars (NOM160SCFI), in order to force the new-entrant automotive firms into the Mexican market to fulfil with a minimum safety requirements (Cantera, 2009). Given the need for increasing the flows of FDI and the Chinese firms' complains about "protectionist" measures in the motor sector, by early 2011 the Ministry of Economy received Presidential instructions to facilitate the entrance of Chinese investment, as well as other Asian initiatives in Mexico's auto industry (Al Volante, 2011).

Internal structure and capability of Chinese firms to carry out international operations

In addition to the factor of car cost, there are other technical and organisational capabilities which automakers need to satisfy to enter the market. Among these are an efficient system of international auto parts sourcing, quality aftersales service, guarantees, aftermarket supply, marketing techniques, dealer networks, management and technical specialists, and financing sources. In the case of FAW-SG car JV, despite the Salinas Group-Elektra's large international retail network in Latin America, this association reflects most of these shortcomings in its internal structure and capacity to deal with different parts and levels of the whole car value chain. Owing to a variety of factors, FAW was not able to set up production facilities to fulfil with Mexican auto regulations. From different perspectives, automotive analysts[93] and company executives[94] consider the lack of these technical and organisational capabilities as some of the major causes of FAW-SG JV's failure.[95] It could be argued that other Chinese firms with intentions of locating manufacturing production through JVs in Mexico are in a similar position (ZX Auto, Geely, Changan, Lifan). Despite recent advances, it seems that Chinese carmakers still display some of the fundamental weaknesses and limitations (technical, operational and managerial) pointed out for automotive specialists during the last few years (EIU, 2006; Russo, Tse and Tao, 2009).

Financial capacity and marketing knowledge of Chinese JV's partners in the Mexican market

Besides the technical and organisational capabilities of Chinese firms entering into a JV in Mexico, equally important is the financial and marketing knowledge of their JV partners in the Mexican market. The examples of CHAMCO with ZX Auto and the Salinas Group with FAW are very illustrative in this regard. In both cases, there are some elements suggesting that these companies not only lacked knowledge of medium and long-term market conditions at both at national and international levels, but neither did they have the capacity or the commitment to fulfil with the compromises under the JV to establish manufacturing facilities according to Mexico's Auto Decree regulations. In addition, the evolution of these events shows up some legal gaps in the normative of of operations.

[93]Automotive Analyst. University of Michigan Transportation Research Institute (UMITRI). Personal Interview. 27 August, 2008. Even before FAW-SG announced the "suspension" of operations in Mexico, the interviewee was skeptical about FAW's international provisioning efficiency.

[94] GML-FAW Trucks. Mexico City. Personal Interview. 20 June, 2011.

[95] It is common to find newspaper's articles and comments of FAW-SG's customers complaining about problems with car services, parts supply and guarantees.

Undoubtedly, the most publicised Chinese investment in Mexico's motor industry of the last five years has been that of FAW and its Mexican partner, the Salinas Group. Considered as a "flagship" project of Chinese FDI in Mexico, after a period of uncertainties the venture did not materialise. This situation posed a number of questions regarding the entry of new companies into the Mexican auto market, since president Felipe Calderón had already laid the first stone at the site in the state of Michoacán, central Mexico.

As a new-entrant company in the Mexican market, the FAW-SG's JV was importing cars from China under the commitment to build manufacturing facilities in a period of three years. Nevertheless, by mid-2009 construction of the plant had not yet started, even though the business plan was to start production in 2010. As a consequence, The Mexican Ministry of Economy began looking at the legal status of the Mexican-Chinese JV, analyzing a possible ban of its duty-free imports from China.[96] In the midst of this situation, in June 2009, GSM and FAW announced the decision to postpone their plans for the Mexican joint plant. According to company' executives, the major cause for this was the deep economic crisis and lower sales, which made it impossible for them to proceed with the project in line with original schedule (Yang, 2009a; Marietta, 2009a); however, the high costs of hauling parts and components from China to Mexico also played a role (Yang, 2010). During the rest of 2009 and part of 2010, the Salinas Group continued to import vehicles from FAW, along with other Chinese brands such as Chery, for distribution through its retail chains. (See Appendix 8.3 for more details of the FAW-SG' JV).

The characteristics of Mexico's domestic market

A factor against Chinese car JVs in Mexico is the characteristics of the domestic market. As pointed out above, the main competitive allure of Chinese cars is low price, though they present disadvantages in quality, safety and other diverse aftersales services. Up to now, exports and sales of Chinese cars are concentrated in low-income countries of Africa, the Middle East, Eastern Europe, Latin

[96] Some analysts consider that Mexico's Ministry of Economy has joint-responsibility in this legal problem due to the delay in reviewing the compliance with current regulations according to the firm's original business plan (Dussel Peters, 2012).

America, and Southeast Asia. According to the automotive analysts and company executives interviewed, the Mexican automotive market is more sophisticated and demanding than Chinese, Latin American, African and other emerging economies. As a consequence, Chinese cars are not well-positioned in the domestic market. Although some analysts see cheap Chinese cars as a transport alternative for low-income people, as well as for displacing "junk-imported" cars, their demand has not taken off as expected.

An automaker Commercial Executive Director,[97] summarised the major problems and shortcomings of Chinese cars in Mexico's domestic market as being the following:

a) As in the case of Japanese cars in the 1960s, in general, the reputation and image of Chinese cars is rather negative;
b) The Mexican consumer is more demanding than the Chinese, most of Latin Americans and those from other emerging countries;
c) There are high quantity of brands offered in Mexico and strong competition by consolidated global automakers;
d) New Chinese brands are not known in Mexico;
e) The Mexican consumer does not like "tasting" the offered Chinese option of "low price, high efficiency and acceptable quality";
f) There are substantial differences in guaranties and services between Chinese firms and other car companies.

The lack of capability for fulfilling the US quality and environmental standards

A possible additional factor for Chinese companies to delay automotive investments in Mexico is the lack of technical and brand capabilities to fulfil the required quality and environmental standards of the U.S. sophisticated automotive market. Most of the Chinese auto investments in Mexico which has been announced, plan to use the country as an export platform to the United States. Because of this, some U.S. critics see Chinese automotive operations in Mexico as a "Trojan Horse". However, it seems that, despite improving the value chain and the wave of M&A from Chinese companies, up to now these have not been able to

[97] Mexico City. Personal Interview. 20 June, 2011.

catch up with the required U.S. standards. Neither Chery, nor FAW or Changan have been able to export to the US market as they envisaged during recent years.

Given these trends, the U.S. market remains a distant target for Chinese automakers (Yang, 2010). The estimated time span for Chinese cars to be exported to the U.S. market is highly variable. For instance, during the personal interviews, a Mexican governmental official estimated that it would take between five and eight years for Chinese-made cars to be exported to the U.S. market from Mexico, only when safety and environmental standards could be met. Likewise, an academic from Fudan University at Shanghai considered that only in a period of ten years China would be exporting motor vehicles to the USA and Europe. Even among Chinese companies there is no agreement regarding a specific date for entering the U.S. market. Thus, although Great Wall CEO Wang Fengying recently declared that the company will enter the U.S. market by 2015 (Automotive News, 2011c), Yin Tongyao, president of Chery Automobile, said it would take dozens of years (Dunne, 2011).

The impacts of the 2008-2009 global financial crisis

The common explanation for the postponement or suspension of most of the announced Chinese JVs for car assembly in Mexico has been the severe financial and economic crisis of 2008 and 2009. In Mexico, although the motor sector's production figures during 2008 presented a small increase of 4.6% in relation to 2007, these registered a severe drop of 28% by 2009. Motor vehicle production passed from 2.2 million units to 1.6 million, from 2008 to 2009, falling back to production levels of 2003.

By the end of 2008 the global financial crisis had severely hit the automotive industry worldwide. Geely, for instance, had to reduce 2008's export target by more than 30%. As a consequence, the plan for building an assembly plant in Mexico was to be re-evaluated (Chow and Yang, 2008). By March 2009 the company announced that the Mexican project would cut down its size due to the tough macroeconomic environment. Along the same lines, in June 2009 Salinas Group and FAW announced the decision to postpone their plans for the Mexican joint plant. According to company executives, the major cause for this was the deep economic crisis which made it impossible for them to proceed with the project in line with original schedule (Yang, 2009a and 2010; Marietta, 2009a; Ugarte and Islas, 2009). Given this situation and the suspension of the marketing operations, Grupo Elektra – the unit responsible for retailing FAW cars under the Salinas Group -, reported a loss charge for approximately US$ 25 million during the fourth quarter of 2009 (Besoain, 2010). With Mexico's depressed market and having a similar situation in Latin America and the United States, FAW-SG's other target markets, the JV saw no logic in continuing the assembly plant project with a capacity of 50,000 units a year.

At the international level, as previously pointed out, the motor industry was one of those most significantly affected by the recent global financial crisis (KPMG, 2008; UNCTAD, 2009b; Haugh, *et al*., 2010). Although China's car industry was not hit as hard as most of auto-producing countries, Chinese automakers had to adjust their overseas strategies in order to adapt to sudden changes in the external environment (DRC-SAE-VW Group China, 2010). According to a survey of Chinese companies undertaken by the Asia Pacific Foundation of Canada and the China Council for Promotion of International Trade (APFC and CCPIT, 2009), more than three-quarters of respondents said the recession had impacted their foreign investment plans; similarly, some 40% reported they have cut back their planned investment offshore because of the slump.[98] On the other hand, although China's outward FDI nearly doubled in 2008, going from US$ 24.8 billion in 2007 to 52.2 billion while global FDI fell by around 20%, more recent data showed that, in 2009, China's outward FDI registered a decline of around 8% in relation 2008, reaching US$ 48,000 million (UNCTAD, 2010c).

The slow pace of Mexico's car sales in relation to other Latin American markets

Another factor linked to the recent financial crisis that could have influenced Chinese auto firms regarding delaying their investment plans is the slow pace of

[98] Results were based on a sample of 1,104 Chinese firms which are members of the China Council for the Promotion of International Trade, have been involved in international business, and have annual revenue exceeding Rmb 1 million. The survey's period was December, 2008 – February, 2009.

Mexico's domestic car sales in relation to other Latin American markets. At present, some of the largest Latin American markets register higher rates of new car sales per capita than Mexico. For example, Argentina's new car sales per 1,000 residents is 13.0, Chile's is 11.6, and Brazil's is 10.7, while in Mexico it is 4.3 (LATINtalk, 2011a). In fact, Brazil now represents the world's fourth largest automobile market, having sold 3.5 million vehicles in 2010. This situation, combined with the low acceptance of Chinese cars from Mexican buyers and the inability, up to now, of Chinese firms to export to the U.S. market due to quality and environmental standards, are all relevant factors in the projects decision-making process. In addition, in Mexico Chinese firms have to "compete" with the so-called "chocolate" cars, the nickname for used cars imported from the United States. AMIA's chairman declared that from 2000 to 2010, five million used cars were imported from abroad (Rosales, 2010). On average, this volume is around 500,000 vehicles a year, which represents more than half the current level of new car sales in Mexico.

8.4. Conclusions

The general overview of China's total FDI in Mexico confirms the limited scope and the "pragmatism" followed by Chinese firms in Latin America. Taking into account that official FDI data from both Mexican and Chinese sources is rather incomplete and inaccurate, regarding Chinese investment in Mexico's motor industry, it could be concluded that, considering the size of the Mexican auto sector, up to now this has been modest and limited. Without considering the announced and planned operations, current Chinese investment in Mexico's automotive industry represents less than one per cent in terms of capital flows, production capacity, sales and generated employment. On the other hand, this chapter analysis reveals that despite the similarities found in general terms, Chinese FDI in Mexico's motor sector presents some interesting peculiarities when compared to China's FDI evolution in Latin America, as well as to the FDI pattern in Mexico of other foreign automotive companies.

First of all, despite the fact that at this stage Chinese DFI in the auto industry is still modest considering Mexico's total inward FDI, compared to the other forms of the China-Mexico interactions (trade flows and the U.S. market), through direct and indirect modalities up to now Chinese capital is forging a kind of "silent" market penetration. Contrary to expectations, the presence of Chinese capital in automotive-related operations in Mexico has manifested itself through a diversity of entry modes, including equity and non-equity forms: manufacturing JVs, wholly-owned manufacturing operations, M&A, licensing and technological associations, as well as marketing and distribution agreements. Although they have not yet materialised, the preferred entry mode for the large car-assembly investment projects in Mexico are JVs. Unlike Chinese FDI in other developing countries, in the Mexican case this probably reflects their unfamiliarity with the domestic market. Other reasons could be the aim of having access to deeper knowledge of local customers, support networks, distribution and advertising; to reduce perceived risks and costs associated with psychic distance; and, in general avoiding an open exposure to political and business risks. Another difference in the mode of entry between Chinese and other foreign-owned automakers is that for the latter, wholly-owned operations is their exclusive mode. Decades ago, some of the old-established auto TNCs also carried out a process of M&A of Mexican firms.

Secondly, unlike the great majority of foreign carmakers operating in Mexico which have efficiency-seeking as investment strategy, Chinese corporations seem to have market-seeking strategy as the main determinant for investing in Mexico's motor industry. This Chinese FDI pattern is similar to the one observed in other Latin American and developing markets around the world and can be mainly explained by the differences in the competitive advantages they possess. Nevertheless, the particularity of the Mexican case is that this market-seeking strategy comprises a large regional area, intending to use Mexico, in the medium term, as an export platform for two quantitative and qualitative contrasting automotive markets: the U.S. and Latin America. Because of the geographical proximity of the U.S. market, some Chinese auto operations use an efficiency-seeking strategy, mostly associated to the entry modes of wholly-owned manufacturing operations and M&A of foreign firms with export-oriented production facilities in Mexico. In this sense, in the medium and long term, thinking regionally in relation to an advanced and sophisticated automotive market such as the U.S., Mexico is considered as an efficiency-seeking country base. It could be argued that some Chinese corporations' motives for investing in Mexico are of mixed character (market-seeking and efficiency-seeking) and these could become evolutionary over time.

Thirdly, as pointed out above, some modalities and corporate strategies of Chinese motor operations in Mexico reveal their increasing internationalisation and participation in complex global production networks. This is the case of the wholly-owned manufacturing ventures operating under the *maquiladora* programme as well as the firms under M&A, which all have efficiency-seeking as their main investment motive in Mexico and are using it as a production and export base for international markets, especially for the North American region. For these firms, an important motive for internationalisation was to expand relationships with other successful TNCs, often acting as suppliers to manufacturing OEMs, or as service providers. For Chinese companies, the role and significance of these operations go beyond the limit of Mexico's domestic market, acquiring a more global or regional dimension. This characteristic of Chinese automotive firms in Mexico is another important difference with Chinese FDI in the manufacturing sector in Latin America.

Fourthly, the Chinese presence in Mexico's domestic market through FDI in the auto sector shows an interesting face of the China-Mexico interaction: competition with complementarity. Even more, given that Mexican capital-owned firms are marginal in Mexico's motor industry, practically no competition between domestic and Chinese automakers is detected. Chinese automakers running business in Mexico compete against other foreign companies and among themselves in the lower-end car market segments. Paradoxically, rather than competition, Chinese involvement through JVs, licensing and technological associations, as well as some distribution agreements, is boosting and favouring conditions that create a positive business atmosphere for Mexican firms to set up automotive operations, in particular in the small and medium-size commercial vehicle segments. Even in the OEM auto parts suppliers section, with exception of some Chinese enterprises operating under the *maquiladora* regime, whoh also compete with other foreign firms, up to now they constitute minor competition for domestic OEM auto parts firms. Mexican firms have felt hard domestic competition in the aftermarket segment, but this is mainly introduced through imports, formally and informally.

Fifth, another interesting paradox of the China-Mexico automotive interaction becomes evident when taking the analysing beyond "national" statistics by complementing them with the complexity of global production networks derived from TNCs' activities. In line with some conclusions anticipated in Chapter Seven, the exports to the U.S. markets of cars and auto parts from Chinese companies located in Mexico would be officially registered as "Mexican" exports, playing against – that is competing with - the statistics of China's automotive exports to the United States. A different issue is the fact that most of auto parts exports from China to the United States are carried out by non-Chinese - foreign companies, a large number is of U.S. capital – produced with a high proportion of imported content. In the above situation, the obsessive discussion of nations competing with each other seems to lose an important degree of objectivity.

Sixth, regarding motor vehicles, in a similar way to other developing country markets, the competitive strategy of Chinese automakers in Mexico is based on the low prices of the low-end, small-car segments. Current and planned Chinese operations are following a pattern, from importing complete vehicles in a first phase and then setting up assembly operations in Mexico, by mostly using SK or CKD parts imported from China in a second phase. Some carmakers have followed a path – as the Japanese did - of first entering and testing the Mexican market with a less complex product and with a lower competition level, such as motorbikes, before embarking in motor vehicle production. The transition from phase one to phase two, which comprises assembling in Mexico, has provoked a process of import substitution of finished products for intermediate parts and components.

Seven, despite the increasing presence of Chinese automotive operations in Mexico and their diversity of FDI modalities, the expected and announced massive investment amounts, particularly the large car-assembly projects, have not yet materialised. The causal factors and explanations for this condition are of multi-dimensional character. Some are related to macro-national aspects derived of Mexico as a host country for Chinese FDI, in particular the lack of a long term-strategic vision towards China. Other factors are linked to the specific operation of Mexico's motor industry at sectoral level, such as the inadequacy of Mexico's automotive policy and regulations, the specific characteristics of Mexico's domestic market, and the current slow pace of Mexico's car sales in relation to other Latin American markets. Another set of factors is associated with the micro-company environment and internal structure, organisation and relationship with venture partners; among these the internal structure and capability of Chinese firms to carry out international operations, the financial capacity and marketing knowledge of Chinese JV partners in the Mexican market, as well as the lack of capability for fulfilling the U.S.' quality and environmental standards, all stand out. Finally, other factors result from the international economic situation, such as the impacts of the 2008-2009 global financial crisis. As depicted in the present chapter, the materialisation of Chinese large automotive investment projects in the short term will require a combination of actions from both the Mexican government and Chinese companies' JV partners, acting at the macro and micro set of factors. The reactivation of the Mexican and U.S markets, as well as their eventual acceptance of Chinese brands, would certainly play a relevant role for present and future perspectives.

Eight, is not a question of whether Chinese companies will be major players in Mexico's motor industry, but of when. From a medium term perspective, the conjunction of several favourable factors could make this trend feasible. On the Mexican side, the country represents a strategic territory for Chinese automotive companies, both automakers and auto parts, in the search for supplying the North American and the Latin American markets at lower costs. Other pull factors are the potential domestic market, the network of FTAs and the attributes of the *maquiladora* programme, among others. In recent years, Mexico has become the cheapest place in the world to manufacture products for the U.S. market. On the Chinese side, auto companies will continue to be proactive in the global competition and in the search for internationalisation. In addition, transportation costs from China and local wages have been on the increase during recent years. Hyper-competition in China's domestic market represents a strong push factor for independent Chinese automakers. In this process, the linkage with the U.S. market again seems to be relevant. Besides producing in Mexico, if Chinese automakers decide to locate manufacturing facilities in the United States – following the path of Japanese and Korean companies - they could supply components from a low-cost base in Mexico. Thus, by producing cars and auto parts in Mexico, Chinese firms could obtain market and efficiency-seeking benefits and, simultaneously, they could shorten their supply chain from China. This move would certainly deepen and extend China's role in the global motor divisions of labour.

Lastly, a full account of the impacts and risks of Chinese operations and FDI in their diverse modalities on Mexico's motor industry and economy in general is well beyond the reach of this thesis. Further research on these crucial aspects in Mexico is needed. The deep knowledge of the impacts and risks of Chinese corporate activity on areas such as employment and incomes, capital formation, technology transfer, labour skills and work conditions, structure of markets and competition, the industrialisation model, and political and cultural issues, among others, would be useful for the decision-making process in automotive policy.

9. CHAPTER NINE

CONCLUSIONS, FINDINGS AND IMPLICATIONS

> "Wish that Mexico and China auto industry could achieve mutual benefit and win-win situation in more extensive communication and cooperation". (Wang Xiaoming, n.d.).
>
> "Mexico and China working together is good news to investors: complementing interests is the key to a successful partnership" (Eduardo J. Solís, 2005).

The present research project was aimed at analysing and understanding the interactions and impacts of China's global expansion on Mexico's motor industry. Based on this general objective, two central enquires were proposed:

- Does China represent a direct competitive threat to Mexico in the global motor industry, a capital-intensive sector with high technology segments?
- Is it possible to simultaneously find competition and complementary forces in the China-Mexico motor industry's interaction?

In answering these questions this study has: a) identified the different channels of interactions between China's and Mexico's motor industries; b) appraised the impacts on Mexico's attraction of motor FDI; c) analysed the structure and evolution of the China-Mexico bilateral trade in the motor industry, as well as an approximation to the impacts of China's import penetration into Mexico's domestic market; d) assessed China's competitive threat in the U.S. motor market; and e) identified the manifestations and characteristics of the Chinese motor industry's-related operations in Mexico, in particular those linked to China's FDI, technical-manufacturing and technological associations, as well as global production networks. In addition, some insights into broader aspects of the globalisation process and the roles played by China and Mexico in the motor industry's changing international division of labour have been addressed.

Undoubtedly, the remarkable process of China's global (re)emergence has been one of the hottest topics within the literature on development issues during the past two decades. China's pace of economic growth has been outstanding in recent history. On the worldwide political arena, due to China's emergence as a major player in the world economy the 'China Syndrome' has spurred the 'competitive obsession of nations' among both developed and developing countries. If the rising of the Chinese economy and its impacts on a global scale have led to the term 'Chinese Century' being used (Shenkar, 2005), the development of its motor industry has played a key role in such a process. This sector has been considered a 'pillar' industry for the country's economic and social development since 1994. From being a marginal producer in the early 1990s, since 2009 China has become the world's largest motor vehicle producer and market. It has also developed its own domestic firms and brands, with increasing international presence. According to some analysts, 2009 is likely to be viewed as the year in which the baton of leadership in the global auto industry passed from the United States to China (Perkowsky, 2009). China not only overcame the motor industry's shining stars of the second half of the 20th century, Japan and South Korea, in the pace of growth, but also imposed greater weight and influence on the industry worldwide due its huge domestic market and capital interconnections through JVs with global TNCs. China started to become the world's motor epicentre.

Although in the initial stage in the development of their national motor industries China and Mexico had similar goals, over the years they have followed very divergent trajectories. Within the emerging economies' motor industries, different configurations have been identified. China has been classified as 'Protected Autonomous Market', intending to develop a locally-based industry; and Mexico, the prototype of 'Integrated Peripheral Markets', tending to specialise in the production of products in which they have comparative advantage on a regional basis (Humprey, Lecler and Salerno, 2000). As it does in China, the motor industry in Mexico represents a key sector due to its contribution to economic and technological modernisation, the generation of output, jobs and exports, as well as in FDI attraction. Mexico ranks among the world's top-ten largest automotive producer and exporter countries. Among its major strengths are product quality and logistics for export markets. Unlike China, Mexico has not developed its own 'Mex-car'. The Mexican government intends to transform Mexico into the 'new motor country', the world's best investment destination in the motor industry.

Given the high priority and significance of the motor industry for both China's and Mexico's national economies, the increasing positioning of China in the global auto industry became one of Mexico's competitiveness obsessions. In almost unanimous conclusion, all the studies regarding the impacts of China's economic threat on the Latin American countries, Mexico was considered to be the most negatively affected in terms of domestic market competition, FDI attraction, and competition in third-country markets, among other aspects. Taking Latin America as a region, Mexico was seen as an 'exception' or 'paradigmatic' case. Nevertheless, the literature review revealed several gaps and limitations in the knowledge of this subject. In the Latin American context, the studies first of all presented contrasting, inconclusive and heterogeneous results in several topics. Secondly, they used different methodologies, time-frame periods, and geographical coverage. And, thirdly, the high sectoral aggregation level and the assumption of homogeneity of the 'China effect' across sectors made it difficult to compare results.

From the review of specific studies on the Mexican case, despite the salient role that the motor industry plays in the China-Mexico bilateral trade and that investment prospects in this sector are promising, similar gaps and limitations to those at the Latin American level were found in the literature. Firstly, specific and detailed studies of China's impacts on Mexico's motor industry in its diverse areas (FDI, domestic market, and third-country markets competition) were practically non-existent. Secondly, no comprehensive analyses of the modalities, interactions, and impacts of Chinese automotive-related operations in Mexico were identified. And thirdly, with scant exceptions, systematic academic studies from a bilateral perspective and interaction between China and Mexico in the motor industry were also non-existent.

Therefore, this thesis intended to contribute to filling some of the gaps and limitations found in the literature regarding the impacts and interactions of China's global emergence on Mexico's motor industry. Especially, in aiming to avoid the high aggregated level and degree of generalisation of most of the previous analyses, this study took the suggestion of carrying out detailed and specific research at product, sectoral and country level on China's impacts and interactions (IDS Asian Drivers Team, 2006; Schmitz, 2006; Kaplinsky and Messner, 2008; Paus, 2008; Jenkins, 2009; Lederman, Olarreaga and Perry, 2009). A sectoral approach (motor industry) within the framework of the China-Mexico relationships in the global economic arena was the basis of the empirical research. Specifically, a taxonomy of impacts and channels of interaction in the China-Mexico motor industry's relationship was applied (Schmitz, 2006; Kaplinsky and Messner, 2008). Furthermore, given that motor vehicles are highly complex and diversified products, this thesis proposed an alternative methodology for assessing in a more systematic and qualitative way the 'competitive threat' of China on the different product segments of Mexico's motor industry. The methodological scheme was based on the technological complexity level of products/segments within the motor industry's value chain. An additional advantage of the 'sectoral' approach is that, besides being country- and product-specific, it allows the identification of explicit functional and geographic interconnections between firms as part of production networks and value chains. These sorts of interconnections are not possible to identify and explore through a traditional trade flows analysis.

It is worth to underlining the benefits of applying mixed methods research in the project, in particular the use of qualitative analysis to supplement the quantitative data. As in other topics, statistics on the motor industry were incomplete for some of the variables (i.e. dissagregated data on FDI by different auto parts segments), they were outdated in some cases, and they also presented wide divergencies depending on the source (i.e. Chinese and Mexican data on FDI and bilateal trade flows). The virtues of using qualitative analysis, which was fundamentally developed through semi-structured and focused interviewing, were several. It was a key tool in going beyond the basic purpose of describing, identifying and analysing the phenomena, and reaching an understanding and the assessment of impacts. In this way, qualitative analysis helped to answer a variety of research questions.

In addition to filling some statistical gaps (i.e. Chinese motor investment and operations in Mexico), through qualitative analysis, it was possible to obtain a diversity of points of view, their meaning and interpretation of the process or the phenomena in question, of the different actors involved in the motor industry. A similar situation was registered for policy aims and its outcomes. Qualitative methods allowed the research analysis to go beyond the surface of 'cold statistics' and getting more deeply into the phenomena (i.e. beyond bilateral trade statistics). Thus, this type of analysis was extremely useful in identifying tendencies (i.e. complementarity alongside competition), making connections between categories, finding causal relationships (i.e. competitive threat in specific products and market share), and detecting paradoxes (i.e. Chinese exports from Mexico to the U.S. market 'helping' the former to compete, statistically, against China in that market). Likewise, in methodological terms, qualitative analysis was a central factor for designing typologies, and the construction and classification of analytical categories (coding) (i.e. the typology and mapping of technological complexity of the motor-vehicle value chain).

Regarding the use of qualitative methods, if the research were to be repeated, much more emphasis ought to be given to interviewing subjects in two aspects: a) to include a large number of Chinese automakers; and b) to include a large number of Chinese and Mexican auto parts firms. The justification for this is that, in the case of the Chinese automakers, in recent years they are displaying an intense process of internationalisation, locating assembly and distribution operations in different regions of the world, particularly in developing countries, including Mexico. Some of these Chinese automakers are emerging as truly transnational corporations (i.e. Geely, Great Wall, Foton), functioning both as a source of global investment as well as adding competitive pressure to rival firms.

In the same line of discussion, if the research were to be repeated, in terms of the theoretical/conceptual framework, the International Business (IB) literature ought to be included (Buckley and Casson, 1976; Dunning, 1993 and 2000; Ramamurti and Singh, 2009; Rugman, 2005 and 2010). Given the type of topic that the motor industry represents – high degree of globalisation, and technologically and organisationally complex - the IB literature is a suitable complement to trade theories as well as GPNs and GVCs approaches. Over the years, the IB approach has been shifting its core unit of analysis, passing from country level using national statistics on trade and FDI, to the multinational enterprise and the parent's firm specific advantages. More recently, the multinational enterprise has been analysed as a network and the subsidiary became a unit of analysis (Rugman, *et al.,* 2011). The IB school has been focusing the analysis on aspects such as locational choice, modes and motives for FDI, marketing strategies, and internationalisation processes, among others.

This concluding chapter presents, in an integrated and succinct way, the major findings and implications derived from the research project as a whole. Section 9.1 shows the major empirical findings presented in Chapters Five, Six, Seven and Eight. Section 9.2 outlines some key theoretical implications that emerged from the discussion in the empirical chapters, and how they link and contrast with the broader conceptual framework depicted in Chapter Two. The policy implications derived from the analysis are presented in Section 9.3, where some general guidelines are set down at both sectoral and macroeconomic levels. Section 9.4 suggests recommendations for further research and, finally, Section 9.5 gives the closing remarks highlighting the research's core conclusion.

9.1. Empirical Findings

This section provides a synthesis of the empirical findings from the study detailed in Chapters Five, Six, Seven and Eight, linking up the main discussion topics and arguments with key research questions.

- <u>Competition, global economic cycles and FDI attraction</u>

Competition between China and Mexico for global FDI in the motor industry exists, although not in a direct, straightforward way. Previous studies on this matter have not reached at a general agreement. Based on the limited data on total motor (vehicle assembly and auto parts) FDI, there is no clear evidence that China's increasing inflows of auto FDI are substituting those of Mexico. A deduction resulting from the available comparable information is that China's dynamic development of its motor industry and powerful magnetism in attracting FDI has not stopped, or significantly changed, the tendency of Mexico's inward FDI in the automotive industry. Obviously, the size of China's economy and domestic market is so large that it makes it difficult for Mexico to avoid negative competitive or diverting effects in the motor industry's attraction of global FDI. Up to now, the evidence suggests that China is substituting FDI from Mexico in specific auto parts segments, presenting an increasing global competition. At most, following García-Herrero and Santabárbera (2007: 148), "the results should be read in terms of a counterfactual: had Chinese inward FDI not been so strong, Mexico could have attracted more FDI than it actually did".

- <u>The motor industry: a different pattern from other economic sectors</u>

The findings referred to above in the specific case of the motor industry contrast with the generalised, and almost unanimous, conclusion in the literature that Mexico is Latin America that is most adversely affected by FDI competition and substitution from China. Although Mexico has suffered fierce FDI competition in more labour-intensive operation sectors, such as textiles & garments, toys, and electronics, the evidence in the case of the motor industry does not seem to fit with this proposition. One of the main differences between that of garments and electronics, for example, and the motor industry, is that in the former, Chinese FDI is efficiency seeking whereas in the latter it is market seeking. FDI diversion is more likely where efficiency seeking FDI is involved.

- <u>A specialised role in the motor industry's global division of labour</u>

From a broad perspective, the features and evolution of China and Mexico in the motor industry's global capital market might be associated to the different role these countries play in the automotive global division of labour. From the study of China's and Mexico's motor industry, two differentiated factors in automakers' investment decisions stand out: location for Mexico and domestic market size for China. Mexico's experience shows that geography still matters under globalisation. As for China, this brings out the issue of the role of the state. Given China's market potential, and despite some undesirable regulations, foreign automakers have decided to enter China through JVs. Market size has given the Chinese government a strong negotiation factor with TNCs. In this sense, particularly in terms of investment in new motor vehicle capacity, there is no competition between China and Mexico.

- <u>Diverse perceptions on the nature of competition</u>

Mexico is mainly a production and export base for international companies, and it does not produce its own brand-name cars. From a governmental point of view, China is not Mexico's main competitor in attracting global automotive investment flows. Rather, the southern U.S. states of Alabama, Indiana, Mississippi, and Texas represent the major threat. The issue is more complex than a simple competitive relationship between two countries, so it needs to be qualified. Based on these findings, when analysing competition, this qualification has to be done at least from two perspectives. First of all, recognising the heterogeneity of the motor sector's production segments regarding technical requirements, amount of capital, product size, etc., and the specific value-chain link where the company is located. Secondly, it is necessary to identify/understand the position held by different agents of the motor industry held (companies, governments, etc.). This qualification represents some sort of technical division of labour and a social division of labour, respectively, within the automotive sector. Governments try to attract FDI and protect its domestic market, while automotive firms compete against each other to capture a larger market share, and they conceive of countries as territorial production and export bases connected through global production networks.

- The changing character of competitive advantages

The findings presented in this chapter also show the changing character of competitive advantage of countries in a short period of time. With the economic recession of 2000-2003 and the migration of certain *maquiladora* segments, it became evident that Mexico was no longer competitive in labour intensive operations. China was the shelter for most of these production units, becoming the "world's factory". Nevertheless, during recent years, a combination of economic forces is fast eroding China's competitive advantage, moving to sectors with higher technology levels. On the other hand, recent trends towards practicing 'near-shoring' in the North American market, implying the abandonment of 'off-shoring' from Asia, is opening a new perspective for Mexico as a major player in this process, not only for the relocation of investment and production capacity from North America, but also in the economic and investment relationship with China. Under this trend, the dual process of competition and complementarity between China and Mexico arises again. By taking advantage of Mexico's manufacturing base and location respect to the North and South American markets, Chinese companies may locate their production operations in Mexico to complement each other in exporting to the United States.

Bilateral Trade and China's Competition in Mexico's Domestic Market

- Differentiated specialisation patterns in motor world trade flows

In the case of the motor industry, nowadays China and Mexico play significant roles in world trade: by 2010 Mexico ranked as the fourth-largest exporter of automotive products and China positioned itself in seventh place. However, these worldwide roles present, up to now, a differentiated specialisation pattern: China is specialised in auto parts exports (90% of total), and Mexico in the motor-vehicle segment (55% of total).

- China is becoming an important trade partner producing increasing trade imbalance

Despite the fact that sizeable economic interaction between China and Mexico did not began until the late 1990s and early 2000s, China became Mexico's second largest trade partner in 2003, displacing Japan and locating itself only behind the United States. Absolute growth of trade value registered a strong boost after 2001, when China joined the WTO. A distinctive characteristic of the China-Mexico bilateral relationship is the high significance of imports from China in Mexico's total trade. The increasing import penetration of Chinese products has produced a huge trade imbalance for Mexico, creating the largest deficit with a trading partner. Based on Mexican sources, in 2010 Mexico had a trade deficit with China of US$ 41.4 billion. That year, the ratio of Mexican imports from China relative to Mexican exports to China was 11:1. The growing trade imbalance and domestic market penetration of Chinese products have caused a tense environment in the bilateral relationship.

- Increasing significance of the motor sector in the China-Mexico bilateral trade

For both countries automotive trade plays an increasing important role in total bilateral trade. To China, total motor trade represented 8% of total bilateral trade with Mexico in 2010 (automotive exports were 6% and imports, a significant 13.1%); to Mexico, motor trade with China represented around 6% of total bilateral trade (17% of total exports and 4.8% of total imports). In Mexico's case, automotive exports have been more dynamic than the rest of bilateral trade.

- Motor industry: a different and more complex trajectory from other sectors in the bilateral trade

Looking at the evolution of the bilateral trade between China and Mexico, unlike other sectors such as garments, toys and electronics, in the motor case the big trade boost started in the mid-2000s and not immediately after China joined the WTO. This might be explained by the sectoral differences, in particular the type of global value chains involved and their form of governance, technological conditions, required scale economies, as well as market conditions, among other factors. Likewise, this might reflect the fact that compared to the other sectors, especially those with lower capital intensity, the Chinese motor industry gained international competitiveness at a later stage. Unlike some other Latin American countries or other sectors in Mexico, nowadays, the China-Mexico bilateral motor trade looks much more complex than the simple import of Chinese products displacing local production and market.

- Mexico's motor industry maintains a competitive position in the bilateral trade with China

As in the case of total bilateral trade, Mexico's automotive sector also presents a negative trade balance with China. In 2010 this sector's trade deficit was US$ 1.4 billion. Nevertheless, in relative terms the proportion of deficit has decreased over recent years. Unlike other domestic manufacturing sectors, Mexico's motor industry has strengths, especially in the export segment, that allow it to maintain a competitive position in the bilateral trade with China.

- A specialisation pattern in the China-Mexico bilateral motor trade

The China-Mexico bilateral trade in the motor sector present a clear specialisation pattern. China is more specialised in the lower-end categories of technology complexity of automotive goods, and Mexico in the more sophisticated ones, particularly in finished vehicles from the second half of the last decade. In contrast to China's limited exports of micro and subcompact vehicles to Mexico, China's imports from Mexico is focused on compact and medium-size cars, as well as mid and full-size SUVs, which are technologically more advanced and more expensive than the former. Mexico's car exports to China will most probably accelerate during the next few years, as Mexico is the exclusive manufacturing and export base of specific models for global automakers. A number of new export plans from Mexico by automakers are being developed for the Chinese market. The great majority of automotive exports from Mexico to China represent an intra-firm trade and forms part of the auto TNCs' strategies operating in both countries. Nevertheless, a key question is whether Mexico's car export trend to China will keep steady over the long-term, or if it only represents a short-term strategy of auto TNCs. Regarding the other automotive segments, most of Mexico's auto parts exports to China are OEM directed to the assembly of new vehicles through the network of TNCs. On the other hand, the large majority of Mexico's automotive imports from China consist in products for the aftermarket segment (replacement and accessories). Most of this low-end automotive segment is supplied by domestic Chinese firms. Nowadays, China has no significant presence in the OEM segments.

- Chinese auto parts exports to Mexico are increasingly upgrading its technological level

China's automotive exports to Mexico are slowly but increasingly escalating the technological level of its products. This is especially the case of the electronics segment, in which China is becoming a strong global competitor. As a consequence, the structure and pattern of Chinese automotive imports into Mexico has changed over the past decade. This trend might be mostly explained by three interrelated factors: a) the quality and technological upgrading of domestic Chinese auto parts industry; b) the exports of auto parts from China of global auto suppliers located in China; and c) the increasing presence of Chinese automotive operations in Mexico (wholly-owned operations, *maquiladora* plants, technological associations, JVs, etc.). Through these diverse operation modes and linkages, domestic Chinese firms are importing into Mexico more technological upgraded auto parts and some key major components. The tendency seems to be that more diversified auto parts exports from China to Mexico are likely to rise in the coming years.

- Marginal presence of Chinese cars in Mexico's domestic market

In recent years, China began to export small quantities of motor vehicles to Mexico, focusing on the lower-end segments. The bulk of these vehicles are exported by domestic Chinese firms, some of them with internationalisation strategies (FAW, Foton, Lifan, Geely, JAC Motors, Dongfeng). However, up to now, motor-vehicle import volumes are still marginal in relation to Mexico's total domestic market sales. Another key question is whether Sino-Foreign JVs will start exporting cars assembled in China to Mexico. Some foreign automakers have began exporting modest quantities of Chinese-built subcompacts overseas, but exclusively to emerging and developing country's markets. Although a potential FTA between China and Mexico could induce motor TNCs to export Chinese-built cars to Mexico, up to now, unlike other Latin American countries, and despite lower prices, in Mexico Chinese cars are not well positioned in the domestic market. Besides the "negative image" of Chinese cars, the Mexican automotive market is considered to be more sophisticated and demanding than Chinese, Latin American, African and other emerging economies. Given these trends, the likelihood is that it will take some time for Chinese-made cars to obtain a substantial share of Mexico's domestic market.

- Motor trade frictions: counterfeiting, "smuggling" and dumping practices

It is in Mexico's aftermarket segment where Chinese imports have had a sizeable domestic market penetration. Associated to this, several frictions related to counterfeiting, "smuggling" and dumping practices have impacted the China-Mexico bilateral trade relationship. All these factors are considered to have negatively impacted Mexico's domestic market, harming production, sales and jobs.

Competition in the U.S. Motor Industry's Market

- Fears in Mexico from China's competition in the U.S. motor industry's market are well-founded

The United States is a key market for Mexico's motor industry since the former represents between 80 and 90% of its export destination. The evolution of China and Mexico in U.S. motor imports indicates that both countries have increased their participation in such a strategic market, but China is growing faster. Mexico has strengthened and positioned itself as the single-largest source country of motor imports to the United States, overtaking Canada and Japan. In like manner, China has rapidly been climbing its position among the major importers to the U.S. market, ranking in 5^{th} place, and registering an accelerated pace of growth of its import value. Therefore, fears in Mexico from China's competition in the U.S. motor market are well-founded. Nevertheless, the characteristics and specificities of the competitive threat and market interaction processes have to be qualified.

- <u>Mexico's motor industry is not immune to China's competition in the U.S. market</u>

Although, according to previous studies in Latin America, at an aggregate level Mexico's motor industry was immune to Chinese competition in the U.S. market, the application of a 6-dgit level analysis gives a different and more qualified perspective. When considering the static view in the analysis, based on each country's RCA, the results suggest a complementary structure of China's and Mexico's participation in the U.S. motor import market rather than direct competition. Nevertheless, although in motor vehicles there seems to be a clear specialisation pattern and division of labour in which Mexico is specialised in the middle and higher quality segments, and China has a marginal but incipient role in the low-end motor vehicle segments, the competitive environment in auto parts is much more complex. Although Mexico is well positioned in some major components and sophisticated parts, and China is more specialised in the production and export of auto parts with universal technology and simple parts & accessories, with regard to specific auto parts products of different technological levels, the competitive threat is rising considerably.

- <u>The importance of including a time-frame perspective in the analysis</u>

The finding in this section of the study corroborated the importance of including in the analysis a time-frame, as suggested by Gallagher and Porzecanski (2007) and Jenkins (2010). By aiming at assessing changes over time in China's competitive threat to Mexico, a Dynamic Index of Competitive Threat (DICT) was applied. Therefore, the 1990-2010 period was divided into two phases: 1990-2001 and 2001-2010, the years before and after China joined the WTO, respectively. By taking into account this time-frame, the following conclusions came out: a) although Mexico increased its share of U.S. motor imports, these grew at a slower rate than U.S. imports from China, and the relative gap between growth rates was greater in the second period; and b) the trend in the competitive threat is increasing at a fast pace over time.

- China's direct competitive threat is concentrated in the low-end auto parts segments

The qualitative analysis of technological complexity in the motor value chain showed that China's direct competitive threat is focused in the low-end (simple parts and accessories) and some medium technology-level segments of auto parts. In particular, China's competitive threat in the U.S. market is increasing rapidly in the electronic, engine and chassis parts segments. Most of these automotive items are price-sensitive generic parts, relatively labour intensive and easy to transport. However, although the rapid increase in auto parts' imports from China into the United States since the 1990s was overwhelmingly in the aftermarket segment, rather than original equipment, during the last decade Chinese-made parts has been upgrading their value added and technological development.

- Competition from Chinese-made auto parts in the U.S. market is likely to become fiercer

Competition in the U.S. market is likely to become fiercer since Chinese-made auto parts exports, including original equipment, are expected to grow dramatically over the following years. Among the factors identified that may this this to happen are: a) expansion of exports to overseas automakers; b) expansion of exports to overseas Tier-1 suppliers; c) with increased foreign investment and the gradual consolidation of domestic firms, auto parts manufacturers in China are becoming more competitive; d) companies are buying factory equipment from leading international suppliers, as well as acquiring or investing in suppliers located overseas, including in the United States; e) the Chinese government is facilitating auto and auto parts manufacturers' efforts in getting loans from domestic banks to fund their exports. In addition, auto companies are being helped to build overseas R&D centres and to acquire foreign peers to improve their technology and product-development capabilities.

- Potential factors affecting China's ability to become a worldwide low-cost auto parts supplier

Despite China's current advantages, some factors that can negatively affect its ability to become a low-cost source of original equipment auto parts for automakers worldwide are: a) rising material, labour and energy costs in China; b) potential currency, quality and logistics-related issues; and c) the increased cost competitiveness of other global suppliers. On the other hand, Mexico has proved to be most competitive in the U.S market in relation to China in products with the following characteristics: a) high ratio of weight to value; b) quality (rather than price) intensive; c) inputs for industries that require just-in-time delivery, customised production, or require frequent design changes; and d) the importance of protecting intellectual property. Motor vehicles and large segments of auto parts fit within these characteristics.

- A specialised role in the U.S. motor-vehicle market: Mexico is well positioned in this segment

China and Mexico play differentiated specialisation roles, being complementary rather than competitive. Besides quality and environmental gaps as well as low prices, one of the main reasons why Sino-Foreign JVs do not export much from China is because TNCs do not want to compete with their own brands in their own countries. Under the current JVs there is no incentive to export for diverse reasons: a) the high growth of domestic market; and b) difficulties to change the quality of vehicles with the supplier chain they have at the moment. It is considered that it would take between five and eight years for Chinese-made cars to have a significant presence in the U.S. market. The great majority of vehicle exports from China are from domestic-independent firms, which account for more than 70% of China's total auto exports, but most of these cars are exported to developing countries' markets in Africa, the Middle East, South East Asia and Latin America. Plans to export more vehicles to developed-country markets, such as the U.S. and the European Union, have been repeatedly delayed due to low product quality, poor image and failure to fulfill safety and environmental requirements. Recently, some Sino-Foreign JVs have started exporting vehicles as well. Nevertheless, the volume of their exports from China will remain small and their markets will be the developing countries. In the short and medium terms, their main goal is to fill modest product gaps in their overseas markets.

- The final outcome of the China-Mexico competitive process in the U.S. motor market is far from being clear

To a large degree, the evolution of this complex trade and production interaction will depend on the direction taken by opposing/alternative forces and tendencies currently in operation. Some of the key ones are: a) Off-shoring *vs* near-shoring/globalisation reversal; b) Relatively low labour costs in China *vs* logistics and cost of transport (high cost of maintaining a trans-Pacific supply chain); and c) Location and proximity-dependency strategies *vs* increasing productivity and value added.

- The China-Mexico competition in the U.S. market: a very sensitive topic for the U.S. economy

A significant share of Mexico's FDI attraction and jobs creation depends on that competitive condition. Furthermore, given the deepening of the globalisation process, the subject of China-Mexico competition in the U.S. market is a very sensitive topic for the U.S. economy too. The high degree of integration of the Mexican, Chinese and U.S. economies makes it difficult to separate the implications of the dynamic's effects. For example, the increasing Chinese share supplying *maquiladora* inputs into Mexico to be included in products for export to the United States directly affects U.S. suppliers, and not necessarily Mexicans. China's entry into the WTO has dramatically changed the supply chain. By 2011, only 55% of imported *maquiladora* inputs come from the U.S. and the rest from Asia. China has taken significant advantage of the *maquiladora* programme and they now supply roughly 10 to 15% of this industry's needs. Thus, the Mexico-China-USA interconnection also seems to have great national and local economic implications.

- China's competition in the U.S. market has questioned Mexico's export and industrialisation model

Beyond the simple fact of losing market share before China, it seems that Chinese competititon will not only probably cause Mexico's current export structure to change, but that the export and industrialisation model was at risk. As a result, the export-oriented model and the role of the state in the whole Mexican development process were put into question. This debate raises crucial questions for policy.

Chinese Foreign Direct Investment in Mexico and Global Production Networks

- China's FDI 'pragmatic' approach in Mexico's motor sector

Considering the size of the Mexican auto sector, up to now Chinese investment in Mexico's motor industry has been modest and limited. Without considering the announced and planned operations, current Chinese investment in Mexico's automotive industry represents less than one per cent in terms of capital flows, production capacity, sales and generated employment.

- Chinese capital is forging a "silent" market penetration in Mexico

Contrary to expectations, the presence of Chinese capital in automotive-related operations in Mexico has manifested itself through a diversity of entry modes, including equity and non-equity forms: manufacturing JVs, wholly-owned manufacturing operations, M&A, licensing and technological associations, as well as marketing and distribution agreements. Although they have not yet materialised, the preferred entry mode for the large car-assembly investment projects in Mexico are JVs. Another difference in the mode of entry between Chinese and other foreign-owned automakers is that for the latter, wholly-owned operations is their exclusive mode. Decades ago, some of the old-established auto TNCs also carried out a process of M&A of Mexican firms.

- Market-seeking strategy: Chinese firms' main determinant for investing in Mexico's motor industry.

Unlike the great majority of foreign carmakers operating in Mexico which have efficiency-seeking as investment strategy, at present Chinese corporations seem to have market-seeking strategy as the main determinant for investing in Mexico's motor industry. This Chinese FDI pattern is similar to the one observed in other Latin American and developing markets around the world and can be mainly explained by the differences in the competitive advantages they possess.

- The North American market: mixed and evolutionary character of Chinese FDI motives

The particularity of the Mexican case is that this market-seeking strategy comprises a large regional area, intending to use Mexico, in the medium term, as export platform for two quantitative and qualitative contrasting automotive markets: the U.S. and Latin America. Because of this geographical proximity to the U.S. market, some Chinese operations in the auto parts segments are already using an efficiency-seeking strategy, mostly associated to the entry modes of wholly-owned manufacturing operations and M&A of foreign firms with export-oriented production facilities in Mexico. In this sense, in the medium and long term, thinking regionally in relation to an advanced and sophisticated automotive market such as the U.S., Mexico could be considered by Chinese vehicle assemblers as an efficiency-seeking country base.

- Chinese motor operations in Mexico and global production networks

Some modalities and corporate strategies of Chinese automotive operations in Mexico reveal their increasing internationalisation and participation in complex global production networks. This is the case of the wholly-owned manufacturing ventures operating under the *maquiladora* programme as well as the firms under M&A, all having efficiency-seeking as their main investment motive in Mexico and using it as a production and export base for international markets, especially for the North American region. For these firms, an important motive for internationalisation was to expand relationships with other successful TNCs, often acting as suppliers to manufacturing OEMs, or as service providers. For Chinese companies, the role and significance of these operations go beyond the limit of Mexico's domestic market, acquiring a more global or regional dimension. This characteristic of Chinese automotive firms in Mexico is another important difference with Chinese FDI in the manufacturing sector in Latin America.

- Competition and complementary in China's FDI in Mexico's motor industry

Chinese presence in Mexico's domestic market through FDI in the auto sector shows an interesting face of the China-Mexico interaction: competition with complementarity. Furthermore, given that Mexican capital-owned firms are marginal in Mexico's motor industry, practically no competition between domestic and Chinese automakers can be detected. Chinese automakers running business in Mexico compete against other foreign companies, and among themselves, in the lower-end car market segments. Paradoxically, rather than competition, Chinese involvement through JVs, licensing and technological associations, as well as some distribution agreements, is boosting and favouring conditions that create a positive business atmosphere for Mexican firms to set up automotive operations, in particular in the small- and medium-size commercial vehicle segments.

- The competitive strategy of Chinese automakers in Mexico is based on low prices of the low-end, small-car segments

In the motor vehicles segment, in a similar way to other developing country markets, the competitive strategy of Chinese automakers in Mexico is based on low prices of the low-end, small-car segments. Current and planned Chinese operations follow a pattern; from importing complete vehicles in a first phase, and then setting up assembly operations in Mexico by mostly using SK or CKD parts imported from China in a second phase. Some carmakers have followed a path – as did the Japanese - of first entering and testing the Mexican market with a less complex product and with lower competition level, such as motorbikes, before embarking in motor vehicle production.

- The expected and announced massive investment amounts have not materialised yet

Despite the increasing presence of Chinese automotive operations in Mexico and their diversity of FDI modalities, the expected and announced massive investment amounts, particularly the large car-assembly projects, have not yet materialised. The causal factors and explanations for this condition are of multi-dimensional character. Some are related to macro-national aspects derived from Mexico being a host country for Chinese FDI, in particular the lack of a long term-strategic vision towards China. Other factors are linked to the specific operation of Mexico's motor industry at sectoral level, such as the inadequacy of Mexico's automotive policy and regulations, the specific characteristics of Mexico's domestic market, and the current slow pace of Mexico's car sales in relation to other Latin American markets. Another set of factors are associated with the micro-company environment and internal structure, organisation and relationship with venture partners. Finally, other factors are the result of the international economic situation, such as the impacts of the 2008-2009 global financial crisis. The materialisation of Chinese large automotive investment projects in the short term will require a combination of actions from both the Mexican government and Chinese companies with their JV partners, acting at the macro and micro set of factors. The reactivation of the Mexican and U.S markets as well as their eventual acceptance of Chinese brands, would certainly play a relevant role for present and future perspectives.

- <u>Chinese firms as major players in Mexico's motor industry is not a question of whether, but when</u>

Having Chinese companies as major players in Mexico's motor industry is not a question of whether, but when. From a medium term perspective, the conjunction of several favourable factors could make this trend feasible. On the Mexican side, the country represents a strategic territory for Chinese motor companies, both automakers and auto parts, in the search for supplying the North American and the Latin American markets at lower costs. Other pull factors are the potential domestic market, the network of FTAs and the attributes of the *maquiladora* programme, among others. In recent years, Mexico has become the cheapest place in the world to manufacture products for the U.S. market. On the Chinese side, automotive companies will continue to be proactive in the global automotive competition and the search for internationalisation. In addition, transportation costs from China and local wages have been on the increase in recent years. Hyper-competition in China's domestic market represents a strong push factor for independent Chinese automakers. In all this process, again, the linkage with the U.S. market seems to be relevant. Besides producing in Mexico, if Chinese automakers decide to locate manufacturing facilities in the United States – following the path of Japanese and Korean companies - they could supply components from a low-cost base in Mexico. Thus, producing cars and auto parts in Mexico, Chinese firms could obtain market and efficiency-seeking benefits and, simultaneously, they could shorten their supply chain from China. This move, certainly, would deepen and extend China's role in the global motor division of labour.

Summary of Interactions Channels, Impacts and Competitive Threat Dimensions

The broader context of China and Mexico's participation in the globalisation process and the changing global division of labour in the motor industry can be sketched as follows:

- The emerging global division of labour in the motor industry is a qualitatively different one from that of the early 1990s. At present, a growing number of "New/Emerging Producing Countries" in Southeast Asia, Central Europe and Latin America are participating not only as manufacturing and export locations of low-end cars or components, but also as sites for more technology-advanced processes, including research and development activities. Within this trend, both Mexico and China are playing an increasing significant role.

- China and Mexico not only play a significant role in the motor industry's global division of labour but, in a relatively short period of time, their respective motor sectors have become increasingly integrated in trade, capital-investment and technical-manufacturing modalities.

- Mexico's obsession with China's competitiveness, seen as apparently direct competition, represents a broader structural trend of the nations' changing comparative advantage and an emerging global division of labour in the motor industry in particular. More than a cyclical or temporary condition, Mexico is losing comparative advantage in labour-intensive segments of production. China is taking that position in the international markets and, at the same time, it is rapidly upgrading its skill and technology capabilities. As Kaplinsky (2005: 223) pointed out, "In a world of rapidly changing global specialisation, and even more rapidly changing technology, no country can hope to sustain income growth without the capacity to change".

- The analysis of the "encounter" and interaction implications between Mexico and China in the motor sector's global competitive arena are much more complex than the simple idea of a straightforward "competitive threat" or "national competition". Besides competition, it involves complementary forces too. In addition, it is necessary to take the analysis beyond the phenomenon's surface – the geographical representation of competition between nations expressed in the statistics – and go to the underlying causes of change and relations derived from the action of automotive firms – both foreign and domestic - and the resulting global production networks and value chains.

Table 9.1 summarises the China-Mexico major interactions and impacts in the motor industry. Based on the framework for assessing the impact of Asian Drivers on the developing world developed by Schmitz (2006) and Kaplinsky and Messner (2008), the channels of interaction (Trade and FDI), complementary and competitive impacts, as well as direct and indirect impacts are identified.

Table 9.1. China-Mexico's Major Interactions and Impacts in the Motor Industry			
Channels	**Impact**	**Direct**	**Indirect**
Trade	Complementary	• Imports of small-cheap cars and minor parts from China. • Exports of medium-size cars and parts from Mexico to China	• Chinese firms plan to export cars to the U.S. and Latin American markets from Mexico
	Competitive	• Imports of auto parts from China displaces domestic producers • Arrival of Chinese brands in Mexico increases competition with other foreign firms in the lower-end market segments.	• Chinese and Mexican exporters of automotive products compete in the U.S. market in various segments
FDI	Complementary	• Chinese automakers investment in manufacturing plants in Mexico • Chinese investment in auto parts and *maquiladora* operations in Mexico	• Chinese firms buy U.S. companies with manufacturing facilities in Mexico (M&A) • Mexican auto parts firms buy global suppliers with manufacturing facilities in China
	Competitive	• Mexican and transnational firms relocate production facilities from Mexico to China	• U.S. and other transnational firms substitute FDI flows to China from Mexico
Source: Own elaboration.			

9.2. Theoretical Implications and Paradoxes

This section presents some theoretical implications of the major empirical findings linked to the research questions. Some of the implications look a kind of *paradoxe*s when contrasting the theory or conceptual framework with real processes. While some of the implications or findings might challenge existing theories, others are consistent with previous theoretical debates. In any case, the implications and paradoxes suggest the need for revisiting these theories and categories and deepening research in order to further understand the whole China-Mexico motor industry's interaction experience, and other broader aspects of the development process, at global level.

From Nation-State Centrism to Global Networks-Chains Approach

One of the advantages of adopting a sectoral-approach in the China-Mexico interaction was the possibility of transcending a static view of conceiving the involved countries competing against each other. This study's findings show a more complex set of relationships and 'triangulations' created by automotive firms through the operation of global production networks and value chains beyond the geopolitical boundaries of both China and Mexico. Although the use of countries as central units of research is useful for some analytical purposes, these findings endorse some authors' claims on the need to go beyond a Nation-State centrism approach to one of Networks approach to fully understand the complexities of the global economy (Dicken, et al. 2001; Henderson, 2002; Harris, 2003 and 2008; Robinson, 2004; Breslin, 2005). As Harris (2008) argued, the political mystification of the emerging world economy in terms of competing political/territorial interests rather than global non-territorial market, is an increasingly severe obstacle to understanding the processes. Some of the posed research problems are practical, since trade statistics are bilateral in nature, while global production and trade flows are not (Breslin, 2005). To others, the Nation-State centred approach poses important methodological and epistemological problems for the analysis (Robinson, 2004).

This process has given rise to an interesting paradox in the China-Mexico motor interaction, when analysed beyond "national" statistics and complemented with the complexity of global production networks derived from TNCs activities. For example, the exports to the U.S. markets of cars and auto parts from Chinese companies located in Mexico would be officially registered as "Mexican" exports, playing against – that is, competing with - the statistics of China's automotive exports to the United States. Likewise, around 65% of auto parts exports from China to the United States are carried out by wholly foreign-owned enterprises and Sino-Foreign JVs, produced with a high proportion of imported content (Haley, 2012). In the same vein, it has been recognised that as a consequence of China becoming more integrated into the global economy, it is also becoming more difficult to identify the cars rolling off the Shanghai assembly lines as being uniquely 'Made in Shanghai' or even 'Made in China' (Thun, 2004). Under the above trends, the 'nationality' of the products is becoming increasingly blurred.

When "Big" is Beautiful

In the selection of the location of investments, auto firm's decisions are based on several factors; such as foreign exchange rate, size of domestic market, logistics/distance, production costs, trade policies, among others. Based on the present research findings, in China's case the huge size and potential growth of its domestic market present an overwhelming weight in firms' decisions. Until recently, auto FDI entry motive in China was 100% market-seeking. Despite the virtues of smallness emphasised by Schumacher (1977) in "Small is Beautiful", China's market size and potential have given the Chinese government a strong bargaining power and lever in attracting TNCs' investment and more advanced technology. Thus, in spite of some undesirable regulations, foreign automakers have decided to enter the China's market through JVs. These findings share similar positions as those identified in studies on China's motor industry development and modernization (Harwit, 2004; Liu and Dicken, 2006; Thun, 2006; Bungsche, 2007; Chin, 2010).

The above points of discussion pose at least two relevant theoretical implications: a) the role and capacity of the state to carry out industrial policy and bargaining with TNCs under globalization; and b) the feasibility for replication of the motor industry's 'Chinese model' for other developing countries. Regarding the first implication, both Liu and Dicken's (2006) and Chin's (2010) studies challenge the view that, under globalisation, states are essentially powerless to influence the investment decisions of TNCs and use industrial policy to Channel FDI toward national development benefit. Nevertheless, the same authors underline that states can exert a material influence on TNCs only under the juncture of certain conditions for specific sectors: particular factor endowments of individual countries, and depending on world market conditions. To achieve this ‘obligated embeddedness’ on the part of TNCs, the state not only has to have the theoretical capacity to control access to assets within its territory, but also the power to actually determine such a process (Liu and Dicken, 2006). In addition, the state’s potential bargaining power has to ensure internal coherence in their bargaining position (Chin, 2010). In relation to the second implication, there seems to be an agreement that China’s experience in motor industry’ development is ‘unique’ and will be difficult to emulate, since hardly any other countries would fully comply with the requirements of the Chinese development model, the combination of factor endowments, as well as the specific conditions in the world economy (Bungsche, 2007; Chin, 2010).

Geography and Location Still Matter under Globalisation

In parallel to the radical proposition of the ‘End of the Nation-State’ (Ohmae, 1995), others have augured the ‘End of Geography’ (O’Brien, 1992) due to increasing capital mobility, especially in the financial sector, and the extensive use of information and communication technologies. This study’s findings contrast with the above statements. In Mexico’s case, geographical contiguity has remained a key factor in determining investment decisions by TNCs, in particular for certain automotive product segments. The entry motives of auto TNCs in Mexico have been fundamentally efficiency-seeking. In recent years, some trends towards practicing “near-shoring” in the North American market, implying the abandonment of “off-shoring” from Asia, is opening up a new perspective for Mexico as a major player in this process, not only for the relocation of investment and production capacity from North America, but also in the economic and investment relationship with China. This location pattern is consistent with that presented by other analysts who highlight the significance of geographical proximity as a salient factor in some intra and transnational regional contexts (Chen, 2005).

The discussion presented above poses some important theoretical implications, especially in relation to changing role and nature of location factors and dynamic competitive advantages of countries under the globalisation process. Certainly, the increasing globalisation and virtualisation of the economy which is being transformed from a 'space of places' into a 'space of flows' (Castells, 1996), have undermined the traditional location factors. Nevertheless, Mexico's case illustrates that, under specific circumstances and a juncture of factors, geography still matters under globalisation. As in the case of China's market size and the potential bargaining power, geographical proximity to the U.S. market *per se* is not a sufficient condition for Mexico's motor industry attractiveness. The combination with a high productivity and relatively low cost of labour, logistics, favourable trade policies, and automation improvements, on the one hand, and the loss of competitiveness of competitors due to increasing wages and shipping costs, on the other, enhance the geographic factor. In terms of geography as location factor in the competition with China, probably the old saying attributed to General Porfirio Díaz, "Poor Mexico, so far from God and so close to the United States", would change to "Fortunate Mexico, so far from China and so close to the United States".

What's Good for China is Good for GM…but not Necessarily for the U.S.

In 1953, Charles Wilson, GM's CEO at that time, told the US Congress, "What's good for GM is good for the United States" (Ayres, 1970). By then GM was the icon of the U.S. economy and, in many respects, represented a microcosms of the American State (ibid). 'What's was good for GM was good for the U.S.' and vice versa, reflected the coincidence of interests and the political and economical symbiosis between the largest U.S. corporations and the American state. But, at present, what is good for GM is not necessarily good for the United States – if it ever was. One thing is clear by now, 'What's good for China is good for GM'. GM's ties with its Chinese partner SAIC was vital to overcome the bankruptcy process. China is now GM's largest market worldwide, selling more cars than in the U.S., accounting for more thana quarter of its global sales. GM China plans to double its annual sales to 5 million units by 2015.

In June 2009, when GM filed for bankruptcy, it announced plans to close or idle fourteen plants in the U.S., eliminating more than 20,000 jobs. Simultaneously, GM was strengthening its Chinese business through its JVs and sizeable investments; it also relocated the headquarters of its international operations to Shanghai. Faced with this situation, the United Auto Workers (UAW) and others bodies such as the Steelworkers' Union reacted, claiming protection from President Obama. The unions argued that the bailing out of the U.S. motor industry, a governmental investment of US$ 50 billion, was to save American jobs and not to finance the outsourcing of jobs to other countries. In September 2009, President Obama decided to place steep duties on tyre imports from China and, as a response, the Chinese government announced an anti-dumping investigation into exports of U.S. automotive products. This situation illustrates that the actions of the U.S. and Chinese governments and those of the U.S. and Chinese motor companies were moving in opposite direction. Although the described process is more a paradox of globalisation, it does pose some theoretical implications on the role of the state and the changing loyalty of TNCs to the Nation-State, as well as emerging conflicting interests between both actors in a global economy.

The Emergence of 'New Detroits': Is the World Flat?

During the last decade, a number of new motor producing sites around the world have flourished, receiving the sobriquet of 'New Detroits'. In the 'South' is Mexico: Saltillo, Toluca, Guanajuato; and Brazil: Sao Paulo. In 'Central Europe': Poland, Hungary, Czech Republic, Romania and Slovakia. In the 'East' is China: Shanghai, Changchun and Guangzhou; India: Pune and Chennai; Thailand. Capital has also changed hands, passing from companies of the old empires to those of the ex-colonies: Tata from India owns Jaguar and Land Rover; Chinese SAIC owns Rover and MG; Proton from Malaysia owns Lotus; and the Chinese Geely owns Volvo. The geography of automotive production has drastically changed over the past several decades. By 2011, 73% of motor-vehicle production was carried out outside the 'Old Traditional Producing Countries' (USA, United Kingdom, Germany, France, Italy and Canada). To a lesser degree, auto exports are also being spatially deconcentrated. Chinese auto firms are clear example of the so-called ‘Dragon Multinationals’, considered new players in the 21st century globalisation (Mathews, 2006).

Is the world flat? The central argument of a ‘flattened world’ is that technological revolution was levelling the global economic playing field and enabling so many more people than ever to collaborate a compete in real time with more other people, on more different kinds of work from more different corner of the planet than at any previous time in the history of the world (Friedman, 2005). In contrast to this position, other analysts argue that globalisation is not flattering the world economy but accentuating its unevenness. Furthermore, it is claimed that even having equal access to a ubiquitous and flat technologies, ‘playing field’ does not imply an equal outcome among the ‘players’ in terms of wealth creation, prosperity and welfare (Christopherson, Garretsen and Martin, 2008). In the case of the global motor industry, the playfield is not totally flat, but the industry has shown itself to be increasingly mobile in a changing global division of labour.

Competition and Cooperation: Unity and Struggle of Opposites?

The findings on the motor industry’s China-Mexico interactions show a paradoxical pattern involving both competition and complementary forces. These findings are consistent with theoretical and methodological propositions of Best (1990), Nalebuff and Branderburger (1996), Schmitz (2006), and Kaplinski and Messner (2008), among others. ‘Co-opetition’, as Nalebuff and Branderburger (1996) labelled, and networking, seem to be present in the interactions of the involved nations and firms. Chinese motor products pose competitive threats to Mexico in its domestic as well as in the U.S. market. However, at the same time on an opposite pole, through wholly-owned investments, JVs and technological associations, Chinese capital and technology are generating jobs and supporting the creation of new profitably Mexican auto firms operating in the Mexican market. The case of China’s motor industry is a clear example of this process. Its development and modernisation was based on a strategy of JVs and strategic associations with TNCs. On the other hand, along with these series of cooperation arrangements, competition is found in many aspects of Chinese car industry: intra and inter-company; inter-nations; inter-local governments; between central and local governments; between domestic and foreign firms, and so on. The above reflections and trends suggest that the study of the interactions among countries and firms in a global economy from a single aspect or variable (trade, FDI, etc.) will hardly comprehend the complexity of actual processes.

Will China Change the World and the Machine?

The path of China's motor industry modernisation during the past two decades is unquestionable. Its accelerated pace of growth has been impressive and improvements in technological innovation are also evident. In a relatively short period of time China became the world's largest motor-vehicle market and producer, becoming the epicentre of the motor industry worldwide. According to industry analysts, the Chinese market has become the catalyst driving the transformation of the business model and technological underpinnings of the global auto industry (Russo et al., 2009a). Along a similar line of thought, China is considered the first pull-model in the history of the motor industry that is very likely to change the whole industry in a, so far, unprecedented way (Bungsche, 2007). As Zeng and Williamson (2007) have underlined, Chinese are disrupting global competition through a new strategy of cost innovation. Conversely, other analysts consider that Chinese firms are not changing the rules of the game or the industry's economics, but they are simply repeating the old formula for new entrants: protect, invest, subsidise, and build scale through exports (Maxton, 2006).

With the adoption and practice of the 'lean production' based on the superior productivity levels of Japanese automakers, especially after the second half of the 1970s, the industry replaced the 'Fordist' mass-production model, and the first motor revolution emerged at the beginning of the 20th century. Thus, 'the machine had changed the world' (Womack, Jones and Roos, 1990). At the beginning of the 21st century, a second motor revolution was claimed, but this time 'the world had changed the machine', essentially by the emergence of the so-called BRICs economies and the race towards alternative driving systems (Boyer and

Freyssenet, 2000; Freyssenet, 2009). Will China be capable to change the word and the machine in the foreseeable future? As for the machine, the question is still far for being answered; as for the world, up to now China's (re) emergence seems to have contributed significantly to its transformation process.

9.3. Policy Implications

With the motor industry being a central or 'pillar' sector in both China and Mexico's economic development, the research findings point some key issues with significant policy implications. The development of the whole motor industry chain in Mexico has enormous impacts on the generation of skilled jobs, exports, FDI attraction, as well as technological upgrading. Given the production structure, technological level, trade specialisation, and the role China and Mexico are playing in the global motor industry, great potential for complementarity between both countries' industries seems to exist. As a matter of fact, unlike any other manufacturing sector, nowadays the motor industry represents a crucial factor for increasing economic and trade integration, the strengthening of their bilateral relationship, and the establishment of a strategic partnership. Through a battery of strategic policies, Mexico could aspire to strengthen its competitive position *vis-à-vis* China on the one hand, and to enhance the potential benefits of complementary and cooperation opportunities, on the other. Fortunately, the study findings show that despite China's increasing competitive threat, especially in the U.S. market, in the motor industry interaction as a whole between the two countries, complementary forces and structure dominate the relationship, creating a favourable environment for cooperation.

It is worth underlining that a comprehensive policy framework for the development of Mexico's motor industry and its interaction with the Chinese counterpart does require actions that transcend the sectoral view, integrating a wider policy perspective. Likewise, the participation of all the industry actors/stakeholders (federal government, state and local governments, automakers, auto parts firms, industry associations, aftermarket distributors, labour unions, universities and research centres, transport & logistics, etc.) is also necessary. In

Mexico's case, the analysis highlights aspects such as the lack of pro-active policies towards China, the vulnerabilities/weaknesses of the current industrial model, the existence of regulatory gaps, the loss of competitiveness position in some auto segments, and 'lost opportunities' in the motor industry's interaction with China. All these sensitive issues require a profound revision of strategy and policy.

Of the different dimensions involving China's emergence as a major player in the global economy – 'successful growth story, market, partner, and competitor' – it seems that Mexico still sees China predominantly as a threat and competitor. Both at governmental and entrepreneurship levels, Mexico lacks a strategic vision towards their relationship with China, an aspect which has been emphasised by various authors (Dussel Peters, 2007b; 2009 and 2012b; Oropeza, 2007; Villalobos, 2007; Anguiano, 2010; Wu, 2010). In this sense, Mexican economic policies and actions towards China have been more reactive and protective than proactive, putting at risk the binational business environment. There is an urgent need for a proactive policy towards China, adopting a medium and long-term perspective, as well as strengthening and deepening the bilateral institutions.

As the 'Go Global' policy and the process of internationalisation of Chinese automakers continues, Mexico appears to be in a strategic location for the Chinese expansion plans abroad. In particular, among the study findings is the feasibility and intentions of Chinese automakers, not only to take advantage of Mexico's domestic market, but to use Mexico's territory as an export base for Latin American and U.S. markets. In this sense, in order to motivate Chinese auto manufacturers to locate in Mexico – and to avoid negative experiences such as the case of FAW-Salinas Group JV -, it is necessary to improve the automotive policy and regulatory framework (the 'Automotive Decree'). The aim is to establish the necessary and fair conditions to attract Chinese investment to the sector.

In the case of the auto parts segment, there is also a great ground for collaboration. Firstly, in both present operations and eventual setting-up of assembly activities by Chinese automobile manufacturers, cooperation agreements and other sorts of technological associations could be promoted between Chines automakers and Mexican auto parts firms for these to participate in their supply chain and sourcing. Secondly, given the quality and competitiveness of auto parts produced in Mexico, government agencies and firms could negotiate the export of increasing volumes of auto parts to the dynamic and enormous Chinese market. Thirdly, there is a need for regulating quality and performance of imported Chinese auto parts for the aftermarket segment, in order to take advantage of their low cost and allow theis access to some population's demand.

Another key aspect for policy implication is the debate on the prospects for Mexican manufacturing activities' competitiveness based on 'proximity-dependence', as is the case of an important proportion of export-oriented auto parts firms, instead of upgrading its technological level (Sargent and Matthews, 2004, 2008a, 2008b and 2009; Gallagher and Porzecanski, 2010). Geography and location matters, but these factors need to be accompanied by other supporting elements such as continuous technological upgrading.

An outstanding issue emerged regarding the implications of the China-Mexico competitive process, particularly in the U.S. market. Beyond the simple fact of losing market share in some auto segments to China, some analysts argued that not only did Chinese competition exposed the competitive weakness of some manufacturing sectors, but taht it also put into question the whole Mexican export and industrialisation model. (Mesquita-Moreira, 2007; Dussel Peters, 2009; Gereffi, 2009; Gallagher and Porzecanski, 2010). One of the arguments is that, while both China and Mexico have pursued export-oriented development strategies in the world economy, the results for national development and industrial technological upgrading have been rather different. In this regard, studies on the impacts of FDI in Latin America, and Mexico in particular, have underlined that national policies did not channel FDI to priority development activities and industrial upgrading (Jenkins, 1987; Mortimore, 2000 and 2004). This has traditionally been the case of FDI in the motor industry. Given the relatively complementary structures of the motor industries of China and Mexico, particularly in the latter's domestic market, through the potential collaborative options in the motor industry between the two countries, Chinese FDI could be used to serve sectoral and national development objectives, to achieve technology transfer and to increase the domestic structure of the industry. Up to now, as the research findings showed, although in an incipient way, through technological associations Chinese FDI has propelled the operation and technological upgrading of Mexican firms in the auto sector. Given the recent advances of China in the development of alternative energies, such as electric vehicles, Mexico could take advantage of it to update and establish a joint, long-term, programme on motor ‘green technologies’.

An area linked to technology transfer is R&D. In this issue of upgrading the industry’s technological capabilities, universities and research centres play a relevant role. Besides the ‘pure’ technical aspect, it is important to increase investment in training the labour force and human resources qualification. Collaboration agreements between universities and research centres of both countries to carry out specific R&D programmes and projects on the motor industry are another possibility in this line of action.

State and local governments could also take part in this collaborative strategy between China and Mexico in the motor industry. For example, based on the potential ‘green technology’ programme, local governments could design collaborative projects to implement this strategy in the transport systems of Mexico’s major urban areas. Likewise, State and local governments, along with universities, research centres and industrial promoters could develop a strategy of industrial clusters in selected motor regions, supported by the formation of territorial innovation systems.

Logistics, transport and communications is another area of great interest linked to the present and future development of Chinese automotive presence in Mexico. The increasing operations of Chinese companies in Mexico has demanded more port capacity in the country’s west coast. Most of the transport of automobiles and auto parts trade between China and Mexico is done by sea, especially using the ports of Lazaro Cárdenas and Manzanillo. This trend requires a medium and long-term logistics and transport infrastructure plan.

Another area that needs attention to increase investment and trade between China and Mexico is the obstacles posed by the different business cultures as well as the language barrier. In practice, these obstacles have provoked cross-cultural misunderstandings, which have often contributed to break potential associations an investment projects. This issue is of interest to almost all type of stakeholder in the motor industry: governments, academics, auto executives, trade associations and workers, among others. No less significant is to embark on a bilateral project to sort out the existing disparities in statistics between the two countries, not only to carry out more 'objective' research and studies, but also to avoid trade disputes.

9.4. Recommendations for Further Research

This research aimed to give a comprehensive view of the China-Mexico interactions in the global motor industry. As such, the scale and depth of the potential knowledge of this phenomenon is extensive, complex and muti-dimensional. Additional and more specific research is needed to fully understand the evolution of the process, as well as for the assessment of impacts' purposes. In order to advance on this goal, the following future research lines are proposed:

- Modes and motives of Chinese FDI. Improved knowledge on the modes and motives of Chinese automotive firms for investing in Mexico would help to understand the logic, conditions and prospects of Chinese operations in Mexico.

- Assessment of impacts, benefits and risks. A full account of the impacts and knowledge of the benefits and risks of Chinese operations and FDI in their diverse modalities on Mexico's automotive industry and economy in general is needed. Some specific crucial areas and topics are: domestic market competition, technology transfer, employment and income, capital formation, labour skills and work conditions, market structure and competition, the industrialisation model, political and cultural issues, and Chinese bargaining power, among others. In addition, the solution to bilateral statistics discrepancies must be addressed.

- Methodology for assessing the technological complexity level of the motor industry value chain. It is necessary to continue improving and fine-tuning the methodology for assessing the technological complexity level of the motor industry value chain developed in this study. This would help to better understand the implications for competitive threats as well as complementary issues.

- Special 'success' and 'failure' case studies. The study of special cases in the experiences of Chinese auto operations in Mexico would contribute to deepen the understandinf of the specific factors behind the success or failure of such ventures (policy and regulations; internal to firms' organisation; the selection and capabilities of the business partner; market conditions; etc.). The FAW-Salinas Group and the FAW-Giant Motors Lationamérica are two cases with 'failure' and 'success' characteristics, respectively, of Chinese operations in Mexico's motor industry.

- Opportunity areas for collaboration and strategic alliances. On the proactive line, a further research topic is the identification of opportunity areas for collaboration and the establishment of strategic alliances between companies of China and Mexico in both markets. The research findings highlighted positive elements for complementary potential.

- Regional Analysis of interactions. Besides the sectoral anlalysis of interactions and impacts, it would be worth to undertake a regional approach on those subjects within the Mexican territory.

Given the complexity and extensive nature of the topic, much of these research lines would require a multi- and interdisciplina-ry approach to address the research problems. The expected results would be useful for the decision-making process in automotive policy as well as for comparative analysis with international experiences of Chinese operations.

9.5. Final Remarks

The specific study of the impacts of China's global expansion on Mexico's motor industry has contributed to a more comprehensive understanding of Chinese presence and implications in the Latin and North American context. In particular, this sectoral approach within the China-Mexico automotive sector assists in avoiding the over-generalisation of findings at aggregated level of analysis of most previous studies on the subject. The resulting China-Mexico interactions in the motor industry are of complex nature, involving both competitive and complementary forces, as well as differentiated impact levels and degrees among the diverse product/segments of the industry.

China's motor industry has certainly shown an increasingly 'visible hand' in its global expansion, reshaping the industry and posing draconian competitive threats in its path. Nevertheless, as Mexico's case shows, complementary factors with China could be enhanced to seek a win-win situation. In fact, though in an incipient way, Chinese automotive operations are inducing the shaping of a new development phase of Mexico's motor industry. Mexico could take advantage of China's strengths to foster a more endogenous motor industry and diversify its export markets. Likewise, China could use Mexico as a low-cost and efficient export base for the Latin and North American markets, as well as for catching up the opportunity of Chinese cars positioning as Mexico's 'Beetles' (*'Vochos'*) of the 21st century.

APPENDICES

CHAPTER THREE

Appendix 3.1. Interviews Listing

Mexico

1. Jasso Torres, Humberto. General Director of Heavy and High Technology Industries, Mexico's Ministry of Economy. Personal Interview. Mexico City. 13 December, 2007.

2. Huerta, Ernesto. Ford South America Operations, Labour and Safety, Ford Motor Company. Personal Interview. Hermosillo, Sonora. 14 April, 2008.

3. Mosso Guadarrama, Emilio. Executive Director of the Automotive Industry, Heavy and High Technology Industries, Mexico's Ministry of Economy. Personal Interview. Mexico City. 28 April, 2008.

4. Dussel Peters, Enrique. Coordinator of CECHIMEX (China-Mexico Study Centre), UNAM (Mexico's National Autonomous University). Personal Interview. Mexico City. 29 April, 2008.

5. Morales Ochoa, Claudia. Section Manager, Industria Nacional de Autopartes, A.C. (INA) (Auto Parts National Industry). Personal Interview. Mexico City. 29 April, 2008.

6. Romero, Indira. Research Assistant, Deputy Director's Office, Economic Commission for Latin America and the Caribbean (ECLAC). Personal Interview. Mexico City. 18 August, 2008

7. Hernández, Francisco. BARDAHL' Director for Asia. Personal Interview. Mexico City. 19 August, 2008.

8. Gómez Mireles, Jorge. Deputy Director of Economic Studies and Informatics, Asociación Mexicana de la Industria Automotriz, A.C. (AMIA) (Mexican Automotive Industry Association). Personal Interview. Mexico City. 20 August, 2008.

9. Martínez, Alma. Economic Studies Department, BBVA-BANCOMER. Personal Interview. Mexico City. 20 August, 2008.

10. Ling Chong, Juan José. Gdem. Mexico-China Business Development. Personal Interview. Mexico City. 21 August, 2008.

11. Chen Yuming. Economic and Commercial Counselor, Embassy of the People's Republic of China in Mexico. Personal Interview. Mexico City. 21 August, 2008.

12. Cheng, Feng. Attaché, Embassy of the People's Republic of China in Mexico. Personal Interview. Mexico City. 21 August, 2008.

13. Romero Estrada, Juan Jesús. Executive Director of Automotive & IT Industries, PROMEXICO. Personal Interview. Mexico City. 22 August, 2008.

14. Pliego Aguilar, Víctor. Deputy Director, Automotive Sector Investors' Service, PROMEXICO. Personal Interview. Mexico City. 22 August, 2008.

15. Búrquez, Francisco. Director of COPRESON (Sonora's Council for Economic Development). Personal Interview. Hermosillo, Sonora. 17 March, 2009.

16. Santos Becerril, Mario. Director of CEDIAM-Sonora (Centre for the Development of the Motor Industry in Mexico). Personal Interview. Hermosillo, Sonora. Several meetings, January-March, 2009.

17. Sánchez Acosta, Alberto. International Business Consultancy. Personal Interview. Hermosillo, Sonora. Several meetings, January-March, 2009.

18. Acosta, Oscar. SFT Purchasing, Sonora Forming Trade. Personal Interview. Hermosillo, Sonora. Several meetings, January-March, 2009.

19. Adalid, Germán. Commercial Executive Director, Giant Motors Latinoamérica – FAW Tucks. Personal Interview. Mexico City. 20 June, 2011.

China

20. Vieyra, Luis. Trade Commissioner of Mexico in Shanghai, PROMEXICO. Personal Interview. Shanghai. 8 May, 2008.

21. Xu Bing Liang. Programme Administrator, SAE International (Society of Automotive Engineers). China Automotive Technology & Research Centre (CATARC). Personal Interview. Shanghai. 12 May, 2008.

22. Ni Shi Li. Project Engineer. China Automotive Technology & Research Centre (CATARC). Personal Interview. Shanghai. 12 May, 2008.

23. Bichara Kabalen, Roberto. METALSA's Globalisation Department. Personal Interview. Shanghai. 13 May, 2008

24. Thomson, Andrew. Deputy Chief Operating Officer, Asia Pacific, KPMG. Personal Interview. Shanghai. 13 May, 2008

25. Dorothy Chen. Marketing Department, Shanghai International Autocity Development, Co. Ltd. (SIAD). Telephone and e-mail communication. Shanghai. 13-24 May, 2008

26. Yin Xingmin. Deputy Director, China Centre for Economic Studies, Fudan University. Personal Interview. Anting, Shanghai. 16 May, 2008.

The United States

27. González, Carlos. Account Manager, DENSO, Toyota Sales Department. Personal Interview. Southfield, Michigan. 25 August, 2008

28. Ewing, Linda. Research Department, United Auto Workers (UAW). Personal Interview. Detroit, Michigan. 26 August, 2008.

29. Belzowski, Bruce M. Associate Director, Assistant Research Scientist. Automotive Analysis Division, University of Michigan Transportation Research Institute (UMITRI). Personal Interview. Ann Arbor, Michigan. 27 August, 2008.

30. Delgado, Alejandro. Senior Economist, General Motor Corporation. Renaissance Center. Personal Interview. Detroit, Michigan. 27 August, 2008.

31. Rubenstein, Daniel A. Purchasing Programme Manager, Emerging Market Sourcing, Ford Motor Company. Personal Interview. Dearborn, Michigan. 28 August, 2008.

United Kingdom

32. Williamson, Peter J. Visiting Professor of International Management, Judge Business School, University of Cambridge. Personal Interview. London, England. 24 March, 2009.

Appendix 3.2. Motor Industry 'Cluster' by Chapter and Item of the HS Classification

Motor Industry Cluster by Chapter and Item of the HS Classification	
Product Code	**Product Description**
Chapter 40. Rubber and Articles	
400912	Tubes, pipes and hoses of vulcanised rubber, reinforced (brake hoses)
400922	Tubes, pipes and hoses of vulcanised rubber, not reinforced (brake hoses)
400932	Tubes, pipes and hoses of vulcanised rubber, exc hard rubber, reinforced
400942	Tubes, pipes and hoses of vulcanised rubber, exc hard rubber, reinforced/otherwise
401110	Pneumatic tyre, new of rubber for motor cars, including station wagons and racing cars
401120	Pneumatic tyres, new of rubber for buses or lorries
401310	Inner tubes, of rubber for motor cars, etc., buses or lorries
401693	Gaskets, washers and other seals of vulcanised rubber other than hard rubber
Chapter 68. Articles of Stone, Plaster, Cement, Asbestos, Micra or Similar Materials	
681310	Asbestos brake linings and pads
Chapter 70. Glass and Glassware	
700711	Safety glass toughened (tempered) f vehicles, aircraft, spacecraft/vessel
700721	Safety glass laminated for vehicles, aircraft, spacecraft or vessels
700910	Rear-view mirrors for vehicles
Chapter 73. Articles of Iron and Steel	
732010	Springs, leaf and leaves therefor, iron or steel
732020	Springs, helical, iron or steel
732090	Springs, iron or steel, nes
732690	Articles, iron or steel, nes
Chapter 83. Miscellaneous Articles of Base Metal	
830120	Locks of a kind used for motor vehicles of base metal
830230	Mountings, fittings&similar articles of base metal f motor vehicles, nes
Chapter 84. Nuclear Reactors, Boilers, Machinery and Mechanical Appliances; Parts	
840731	Engines, spark-ignition reciprocating, displacing not more than 50 cc
840732	Engines, spark-ignitions reciprocating, displacing 50 cc but not more 250 cc
840733	Engines, spark-ignition reciprocating displacing 250 cc to 1000 cc
840734	Engines, spark-ignition reciprocating displacing more than 1000 cc
840790	Engines, spark-ignition type nes
840820	Engines, diesel, for the vehicles of Chapter 87

Motor Industry Cluster by Chapter and Item of the HS Classification (continued)	
Product Code	**Product Description**
840890	Engines, diesel nes
840991	Parts for spark-ignition type engines nes
840999	Parts for diesel and semi-diesel engines
841330	Fuel, lubricating or cooling medium pumps for int. comb. piston engines
841459	Fans nes
841490	Parts of vacuum pumps, compressors, fans, blowers, hoods
841520	Automotive air conditioners
842123	Oil or petrol-filters for internal combustion engines
842131	Intake air filters for internal combustion engines
842199	Parts for filtering or purifying mchy & apparatus for liquids or gases, nes
842541	Built-in jacking systems of a type used in garage
842542	Jacks & hoists nes hydraulic
842549	Jacks; nesoi
842691	Lifting or handling machinery designed for mounting on road vehicles
848310	Transmission shafts (including camshafts and crankshafts) and cranks
848350	Flywheels and pulleys, including pulley blocks
848490	Gasket sets consisting of gaskets of different materials
Chapter 85. Electrical Machinery and Equipment and Parts thereof	
850710	Lead-acid electric accumulators of kind used for starting piston engines
850720	Lead-acid electric accumulators nes
850730	Nickel-cadmium storage batteries
850740	Nickel-iron storage batteries
850780	Storage batteries, nesoi
850790	Parts of electric accumulators, including separators therefor
851110	Spark plugs
851120	Ignition magnetos, magnetos-generators and magnetic flywheels
851130	Distributors and ignition coils
851140	Starter motors
851150	Generators and alternators
851180	Electrical ignition or starting equipment used for internal combustion engines; nesoi
851190	Parts for electrical ignition or starting equipment used for internal combustion engines; parts for generators
851220	Lighting or visual signalling equipment nes
851230	Sound signalling equipment
851240	Windscreen wipes, defrosters and demisters
851290	Parts of electrical lighting, signalling and defrosting equipment
852721	Radio reception apparatus for motor vehicles
852729	Radiobroadcast receivers for motor vehicles, not capable of operating without outside power, nesoi
853641	Relays for a voltage not exceeding 60v (signaling flashers)

Motor Industry Cluster by Chapter and Item of the HS Classification (continued)	
Product Code	**Product Description**
853661	Electrical lamp-holders, for a voltage not exceeding 1,000 volts
853910	Sealed beam electric lamp units
853921	Tungsten halogen electric filament lamp
854420	Co-axial cable and other co-axial electric conductors
854430	Ignition wiring sets & other wiring sets used in vehicles, aircraft etc
854441	Electric conductors, for a voltage not exceed 80 V, fitted w connectors
854520	Carbon or graphite brushes
Chapter 87. Vehicles other than Railway or Tramway Rolling-Stock, and Parts and Access.	
870120	Road tractors for semi-trailers
870210	Diesel powered buses with a seating capacity of nine persons
870290	Buses with a seating capacity of more than nine persons nes
870310	Snowmobiles, golf cars and similar vehicles
870321	Automobiles w reciprocating piston engine displacing not more than 1000 cc
870322	Automobiles w reciprocating piston engine displacing >1000 cc to 1500 cc
870323	Automobiles w reciprocating piston engine displacing >1500 cc to 3000 cc
870324	Automobiles with reciprocating piston engine displacing >3000 cc
870331	Automobiles with diesel engine displacing not more than 1500 cc
870332	Automobiles with diesel engine displacing more than 1500 cc to 2500 cc
870333	Automobiles with diesel engine displacing more than 2500 cc
870390	Automobiles nes including gas turbine powered
870410	Dump trucks designed for off-highway use
870421	Diesel powered trucks with a GVW not exceeding five tonnes
870422	Diesel powered trucks w a GVW exc five tonnes but not exc twenty tonnes
870423	Diesel powered trucks with a GVW exceeding twenty tonnes
870431	Gas powered trucks with a GVW not exceeding five tonnes
870432	Gas powered trucks with a GVW exceeding five tonnes
870490	Trucks nes
870600	Chassis fitted w engines for the vehicles of headings Nos. 87.01 to 87.05
870710	Bodies for passenger carrying vehicles
870790	Bodies for tractors, buses, trucks and special purpose vehicles
870810	Bumpers and parts for motor vehicles
870821	Safety seat belts for motors vehicles
870829	Parts and accessories of bodies nes for motor vehicles
870831	Mounted brake linings for motor vehicles
870839	Brake system parts nes for motor vehicles
870840	Transmissions for motor vehicles
870850	Drive axles with differential for motor vehicles
870860	Non-driving axles and parts for motors vehicles
870870	Wheels including parts and accessories for motor vehicles
870880	Shock absorbers for motor vehicles
870891	Radiators for motor vehicles
870892	Mufflers and exhaust pipes for motor vehicles

Motor Industry Cluster by Chapter and Item of the HS Classification (continued)	
Product Code	**Product Description**
870893	Clutches and parts for motor vehicles
870894	Steering wheels, steering columns and steering boxes for motor vehicles
870895	Safety airbags with inflated system
870899	Motor vehicle parts nes
871690	Trailer and other vehicle parts nes
Chapter 94. Furniture, Bedding, Mattresses, Cushions and Similar Stuffed Furnishings	
940120	Seats of a kind used for motor vehicles
Source: Own elaboration based on the Harmonised Commodity Description and Coding System (HS).	

CHAPTER FIVE

Appendix 5.1. Strengths, Weaknesses and Challenges in China's and Mexico's Motor Industry

Regardless of the development state of China's and Mexico's motor industry, all the interviewed automotive actors identified strengths/advantages and weaknesses/disadvantages in the structure and competitiveness of both countries. These findings are outlined in Table 5.1.1. As observed, in a comparative perspective, China and Mexico essentially present a differentiated set of strengths/advantages and weaknesses/disadvantages in their auto industries' structure, functioning and competitive base.

China's Strengths, Weaknesses and Challenges

In accordance with the major factors driving the level of FDI in China's auto sector mentioned above, the main strengths and advantages underlined by automotive actors are associated to its huge domestic market, lower production costs and governmental support. Factors such as human resources capabilities, and an increasing investment in R&D, which in turn is leading to a process innovation, were also identified as key strengths, especially during recent years. The significance of China's domestic market size is always pointed out. A UMITRI's automotive analyst[99] expressed that domestic market is so attractive in China that, at present time, that is the priority, leaving exports in second place. He remarked that although car exports is not a simple issue, since it depends on exchange rates, distribution networks, aftermarket services, production of the right vehicle for people's tastes, etc., "car demand in China is so strong that exports from Sino-Foreign JVs are not worth it". Two Chinese automotive strengths were repeatedly highlighted: human resources capabilities and innovation upgrading. A Detroit-based auto parts' company Manager brought along the topic of Chinese 'Diaspora'. He argues that every year a large number of Chinese people graduate from engineering fields in China, plus the ones graduated in the United States and Europe. Most of them return to China to work in R&D and this is strengthening

[99] Personal interview. Ann Arbor (Detroit), Michigan, U.S.A. 27th August, 2008.

the innovation process. In the same line, the existence of well educated and inexperienced engineers is considered one of the relevant reasons for using China as export platform for components, particularly in the electronics area. This is seen as one of the main differences in both China and India, compared to Mexico.

At a more conceptual level, China's development path or strategy was described as being a kind of "disruptive innovation" and "disruptive competition". To an international consultant[100], disruptive innovation means the creation of entirely new markets and business models, appealing to customers who are unattractive to the incumbents. Although disruptive innovation typically involves simple adaptations of known technologies, entrants almost always beat incumbents at this game because established companies lack the motivation to win. In the past, this is what Japanese and Koreans implemented, he said. And the consultant added, "at present, Chinese companies are catching up very fast in achieving this trend. Obviously, technology gap exists (quality, etc.), but is a question of time". Finally, a Professor of International Management at Cambridge University[101] argued that Chinese companies have applied a cost innovation strategy, which gives them more flexibility in product change and putting down capital costs, and that competition is in capital costs, product design, and production process. He pointed out that within current business environment and competition, "it is not what you know but how fast you can learn". According to his view, the main difference between Chinese and other companies are the following: a) they learned to build a plant with less capital cost investment; b) they use more labour force they have more flexibility; c) they are willing to use more local suppliers; d) they are looking for marketing and distribution partners overseas; e) they have more similarity with developing countries' markets, especially in rural areas; and f) they are willing to embark in new technologies (i.e. electric vehicles) because they have less investment in the traditional areas.

Regarding weaknesses and disadvantages of China's car industry, actor's opinions emphasised the poor quality, safety and brand image of cars, the existing

[100] Personal interview. Shanghai, China. 13th May, 2008.
[101] Personal interview. London, England. 24th March, 2009.

technological gap with major mature producing countries and companies, as well as deficiencies in the supply chain. Various current aspects were also considered. Some of them are related to China's internal economy such as increasing labour costs and inflation, as well as currency revaluation; others are associated to external factors such as increasing oil prices affecting transport costs. Among the discussed topics, the one on technology and innovation attracted much attention. The diverse automotive actors agreed that despite Chinese domestic automakers are rapidly increasing their technological and managerial capabilities, China still presents a technological gap between foreign JVs and the domestic firms. This view was shared by China's motor industry's executives[102] who acknowledged the need for Chinese firms to upgrade their technological capabilities and product quality. That is the reason why they considered it would take around 8-10 years to Chinese firms to export substantial volume of cars to the United States and European markets. As known, Sino-Foreign JVs are seen by China's government as a way of upgrading the local companies. Nevertheless, an interviewee from the academic area considered that despite some achievements, this has not worked out for China and it would take longer to upgrade Chinese models. On the same line of arguments, China's car industry has been stereotyped as "copycat" country.[103]

[102] Personal interview. Shanghai, China. 12th May, 2008.
[103] Personal interview. Hermosillo, Sonora, Mexico. 14th April, 2008.

Table 5.1.1. Strengths and Weaknesses in China's and Mexico's Auto Industry		
	Strengths/Advantages	**Weaknesses/ Disadvantages**
China	• Very large domestic market • High car demand's rate of growth due to increasing income in important sectors of population • Governmental support and active role with policies to ensure the functioning of the market • Low cost of labour • Overheads (indirect production costs) are competitive due to governmental subsidies. • Increasing investment in technological innovation (R&D). • Human resources capability • The existence of well educated, but inexperienced engineers. • Access to I&D and technological know-how through foreign JVs • A strategy of copying and innovation	• Poor image of cars quality, safety and environmental standards • Hugh technological time-gap in relation to mature producing countries • Wide technological gap between Tier-1 and Tier-2 to Tier-4 suppliers • Substantive differences in guaranties and services between Chinese firms and the rest of the car companies • Increasing cost of labour force • Increasing oil prices • Increasing inflation levels and currency revaluation • China is considered a "copycat" • Chinese government maintains a high degree of interference in automotive industry's investment and other related issues
Mexico	• Geographical location to use Mexico as export platform to North And South America • Geographical proximity to the USA favours the practice of JIT systems and near-shoring • World class labour productivity and competitive costs • The network of Free Trade Agreements (FTAs) • More efficient and more technological upgraded car industry • More solid supply chain and a consolidated auto parts industry with high integration degree of Tier-1 and Tier-2 suppliers into the assembly industry • Specialisation in high value-added cars and components to be exported with logistics advantage • Better protection for intellectual property • Support programmes for investment promotion	• Emphasis on FDI promotion of geographical closeness and low-cost production base • Lack of a long-term vision planning • Heavy tax burden on entrepreneurs • Firms are not doing R&D (designing vehicles) for the Mexican market • Insufficient governmental support and lack of integral strategy in the industry's R&D and innovation • Relatively trade union problems in relation to China's union control • Increasing insecurity in certain places of the Mexican territory
Source: Own elaboration based on personal interviews to diverse automotive agents.		

Another interesting issue of China's auto industry came out in the interviews: the basis of Chinese firms' competition strategy and China's domestic market structure. A university Professor[104] described China's domestic competition as follows: a) ccompanies compete with each other in the domestic market; b) brands are similar than in any other country; c) there are no regulations in the market; and d) automakers compete in low-unit price. The case of the Mexican auto parts company intending to enter the Chinese market is an illustrative one. As explained by one of its executives in China[105], its firm was analysing to establish a plant in China given the high growth of the domestic market. The other option in Asia was India. The Mexican firm's first question was, to have its own investment or to go for a JV? To enter into an alliance with a Chinese company was a difficult decision (or not profitable) since production costs in China are very low. Costs are a third of those in North America. The Chinese firm would require the price set in Chinese territory/market. The required products were of low quality, but they fulfilled the requirements of China's domestic market. This is the reason why an auto parts company, besides supplying the domestic market, it would seek to export in order to obtain or to make up for the profits missed out in China's domestic market. The terminal-assembly industry does not have this requirement since the domestic market for vehicles is very dynamic. Nevertheless, the profit margins have been reduced due to the price reductions. The interviewee underlined that China's automotive industry based its development, to a greater degree, on lower prices. The preferential market of Chinese firms is the low-end one, cheap cars, competing in low prices. This explains the reason Chinese exports are fundamentally entering emerging markets such as Africa, South America, the Middle East and Eastern Europe. In this regard, the Shanghai-based international consultancy's Manager[106], stated that focusing only in low-value cars is not sustainable in the longer term. Becoming competitive and scaling the value ladder takes time. And he expressed, "Yes, Chinese automakers are going to get it. But the real question is how long does it going to take".

[104] Personal interview. Shanghai, China. 16th May, 2008.
[105] Personal interview. Shanghai, China. 12th May, 2008.
[106] Personal interview. Shanghai, China. 13th May, 2008.

Mexico's Strengths, Weaknesses and Challenges

Major strengths and advantages of Mexico's auto industry in relation to China's were location factors, especially proximity to the U.S. market, existence of a world class production base, a more consolidated supply chain and the network of FTAs. Geographical proximity to the U.S. market was seen a key factor since it favours the practice of 'Just-in-Time' (JIT) systems and near-shoring Also, Mexico's location was considered an ideal export platform, both to North and South American markets. These factors were complemented by the existence of a wide range of Mexico's FTAs in the attraction of FDI in the auto sector. The mentioned factors, it was argued, favours the location in Mexico of highly customised products sensitive to transport costs and delivery times, bulky and heavy products, as well as those requiring strong managerial management. In addition, a world class labour productivity, competitive costs and a more solid supply chain was highlighted by the interviewees. Another strength was Mexico's specialisation in high value-added cars and components to be exported with logistics advantage. Mexico's quality superiority in relation to China was tackled in specific by an TNC's executive[107], mentioning that, at that time, Ford's plant in Chihuahua, Mexico, was Ford's No. 1 worldwide in engine production quality. Finally, and in particular when compared to China, the factor of better protection for intellectual property was marked out.

On the side of weaknesses and disadvantages of Mexico's car industry, most of them were related to sectoral or macroeconomic policies affecting the industry. A critique to automotive policy and FDI attraction was made for emphasising geographical closeness and low-cost production base for FDI promotion, paradoxically, two of the main strength factors. Others on the same line were the lack of a long-term vision planning, heavy tax burden on entrepreneurs, increasing insecurity in certain places of the Mexican territory, and insufficient governmental support and lack of integral strategy in the industry's R&D and innovation. Weaknesses in relation to R&D was not only identified at government policy level but was also mentioned for corporate strategies operating in Mexico: firms are not doing R&D (designing vehicles) for the Mexican market. An automotive

[107] Personal interview. Hermosillo, Sonora, Mexico. 14th April, 2008.

analyst[108] elaborated more on this topic. He argued that the availability of engineering and manufacturing talent in Mexico has been focused on the Tier-1 supply base and not to vehicle design and manufacturing because of: a) the lack of domestic manufacturers; and b) foreign manufacturers design their vehicles outside Mexico.

Regarding R&D strategies/policies, it depends on what specific chain the country/company is located: design vehicles for local market, new engine generation, or hybrid cars, etc. The academician holds the idea that from the Mexican government and firms' perspectives, if there are no "Mexican Companies" or a "Mexican Car", there is no need for deepening R&D activities. This totally changes the perspective on the industry and R&D. So, he argues, Mexico is specialized in the production and exports of quality cars for the world markets, especially for the USA.

To face the challenges and disadvantages of Mexico's motor industry, a diversity of proposals was made by the interviewees. Some specific actions to potentiate Mexico's geographical location and the JIT system in the North American region were: a) infrastructure; b) energy supply; c) logistics; d) lower direct and indirect production costs; e) flexibility of labour regulations; and f) foster R&D. An unanimous opinion among automotive actors of the different sector was that one of the major challenges for Mexico's car industry is to increase investment in R&D. Mexican governmental officials coincide that Mexico must move towards design, development and research in the automotive industry. On the same line of thoughts, analysts and international consultants have posed the suggestive proposal for the Mexican government to take advantage of the new auto players, the Chinese automakers, to update and go for new technologies in the hybrid and electric vehicle segments, for example, where China is increasing its capabilities.

108 Personal interview. Ann Arbor (Detroit), Michigan, U.S.A. 27th August, 2008.

A more "aggressive" proposal was made by the Executive Director of a Mexico-China business organisation,[109] recommending a FTA between Mexico and China. To the executive, who estimates that this FTA would take around ten years to materialise, is the only way to obtain a massive flows of Chinese FDI into Mexico.[110] Finally, the future of Mexico's automotive industry is still under discussion. While some actors from the private sector considers that a major difference between China and Mexico is that "in both China and Mexico know where we came from, but in Mexico we do not know where we are heading to",[111] a governmental official expressed that facing the dilemma, in terms of Mexico's position in the global automotive industry, of being a lion's tail or a mouse's head, "definitively, a lion's tail". [112]

[109] Personal interview. Mexico City. 21th August, 2008.

[110] Very recently, Chen Yuming, Economic Attaché to China´s Embassy in Mexico, declared that China is very much interested in entering in a FTA with Mexico but there is reluctance in this country (Maquila Portal, 2011).

[111] Personal interview. Southfield (Detroit), Michigan, U.S.A. 25th August, 2008.

[112] Personal interview. Mexico City. 28th April, 2008

CHAPTER SIX

Appendix 6.1. China and Mexico in Worldwide Trade

As one of the signs of economic globalization, world trade has presented a dynamic trend during the last decades. According to IMF sources[113], during the periods of 1990-2000 and 2000-2010, world trade growth was practically twice as much as world output. World total exports in goods grew from US$ 3.4 trillion in 1990 to 6.4 trillion in 2000, and 15.1 trillion in 2010 (Table 6.1.1). Annual average growth rate (AAGR) for world exports in goods was 7.4, 5.9 and 8.2% for the periods 1990-2010, 1990-2000, and 2000-2010, respectively (Table 6.1.2). Negative growth in world trade was observed in 2001 and, particularly, 2009, reflecting the recent global financial crisis. World total imports in goods presented a similar trend than world exports during the analysed period (Tables 6.1.3 and 6.1.4).

A relevant feature during the last two decades has been the changing geography of world trade, reflecting the changing geography of world production. In 1990, the seven largest developed economies (USA, Germany, Japan, France, Italy, UK, and Canada) concentrated 53% of world exports and imports in goods; by 2010, this share had fallen to 33.7 and 38.3%, respectively. Simultaneously, a number of the so-called "Newly Industrialising Countries or "Emerging Economies" began to scale up positions in trade flows: Korea, China, Spain, Singapore, Mexico, India, Brazil and Russia, among others. This group of emerging economies accounted only for 9.5% of world exports and 10.2% of world imports in 1990, climbing up to around a quarter of world trade in both categories by 2010. As observed in Tables 6.1.2 and 6.1.4, although from a low absolute base, the AAGR in world exports and imports of this group of emerging countries was well above the world´s total average.

Among these emerging economies, China played an outstanding role. As it is well known, foreign trade is one of China's major engines of economic growth.

[113] IMF World Economic Outlook Database.

Nowadays, China is the world's largest exporter and the second largest importer of goods. In 1990 the Middle Kingdom exported US$ 62.1 billion accounting for only 1.8% of world's total exports; in 2000 its share increased to 3.9% with nearly US$ 250.0 billion, reaching an impressive 1,578.3 billion by 2010, accounting for 10.5% of total exports. In 2007 China overtook the United States in second place, and in 2009 it displaced Germany as the world's number one exporter (Tables 6.1 to 6.4 and Figure 6.1). In Mexico's case, it ranked in 13th place by 2010 with an export value of nearly 300.0 billion dollars, accounting for 2.0% of the world's total. Although in absolute terms Mexico has been steadily increasing its exports, the rate of growth has been at a slower pace than other emerging countries. This trend was particularly evident during the decade of 2000-2010, feeling the effects of the U.S. economic recessions of 2000-2002 and 2008-2009. China registered the highest AAGR of exports in the two-decade period of 1990-2010 as well as in 2000-2010. On its part, Mexico presented the highest AAGR during the period 1990-2000, even above China. This export "boom" evolution of both China and Mexico can be associated to processes of deepening international integration and widening their global economy participation: in Mexico's case, the starting of operations of NAFTA in 1994; and in China's case, its entry into the WTO in 2001.

Table 6.1.1. World Exports in Goods by Major Exporting Countries, 1990-2010 (Million Dollars)

Country	1990	%	1995	%	2000	%	2005	%	2010	%
China	*62,091*	*1.8*	*148,797*	*3.0*	*249,203*	*3.9*	*761,953*	*7.4*	*1,578,270*	*10.5*
USA	393,592	11.7	584,743	11.9	781,918	12.3	907,158	8.8	1,277,580	8.5
Germany	410,135	12.1	523,909	10.7	550,222	8.7	977,970	9.5	1,271,352	8.4
Japan	287,648	8.5	443,259	9.0	479,227	7.5	594,986	5.8	769,839	5.1
France	216,606	6.4	284,914	5.8	298,765	4.7	443,619	4.3	514,124	3.4
Korea	65,016	1.9	125,058	2.5	172,267	2.7	284,419	2.8	466,384	3.1
Italy	170,499	5.0	234,020	4.8	239,934	3.8	372,962	3.6	447,465	3.0
Belgium	118,328	3.5	175,884	3.6	187,876	3.0	335,738	3.2	410,387	2.7
U.K.	185,326	5.5	242,036	4.9	281,754	4.4	371,381	3.6	410,176	2.7
Russia	n.a.	n.a.	78,217	1.6	103,093	1.6	241,473	2.3	397,668	2.6
Canada	127,634	3.8	192,204	3.9	276,641	4.4	359,411	3.5	386,011	2.6
Singapore	52,730	1.6	118,263	2.4	137,806	2.2	229,652	2.2	351,867	2.3
Mexico	*40,711*	*1.2*	*79,542*	*1.6*	*166,367*	*2.6*	*213,891*	*2.1*	*298,138*	*2.0*
Spain	55,524	1.6	91,041	1.9	113,348	1.8	191,021	1.8	246,274	1.6
India	17,970	0.5	30,628	0.6	42,378	0.7	99,618	1.0	222,794	1.5
Australia	39,760	1.2	53,115	1.1	63,878	1.0	105,833	1.0	212,364	1.4
Brazil	31,414	0.9	46,506	0.9	55,119	0.9	118,529	1.1	201,915	1.3
TOTAL	*3,376,558*	*100.0*	*4,908,486*	*100.0*	*6,359,071*	*100.0*	*10,337,942*	*100.0*	*15,060,481*	*100.0*

n.a.: Not available.
Source: Own elaboration based on United Nations Statistics Division (2011-2012).

Table 6.1.2. Growth of World Exports in Goods by Major Exporting Country, 1990-2010 (AAGR)

Country	1990-2010	1990-2000	2000-2010
China	*16.66*	*13.47*	*18.27*
USA	5.77	6.44	4.56
Germany	5.54	2.71	7.91
Japan	4.80	4.75	4.40
France	4.20	2.97	5.06
Korea, Rep.	9.84	9.26	9.48
Italy	4.70	3.15	5.83
Belgium	6.10	4.29	7.36
U.K.	3.86	3.88	3.47
Russia	12.55[1]	10.48	13.06
Canada	5.41	7.29	3.07
Singapore	9.46	9.13	8.90
Mexico	*9.95*	*13.65*	*5.45*
Spain	7.35	6.70	7.31
India	12.74	8.11	16.29
Australia	8.31	4.40	11.54
Brazil	9.26	5.24	12.53
TOTAL	*7.38*	*5.92*	*8.15*

[1]1992-2010.
Source: Own elaboration based on United Nations Statistics Division (2011-2012).

Table 6.1.3. World Imports in Goods by Major Importing Countries, 1990-2010
(Million Dollars)

Country	1990	%	1995	%	2000	%	2005	%	2010	%
USA	516,987	14.8	770,852	15.6	1,259,300	19.3	1,735,060	16.4	1,968,760	13.1
China	*53,345*	*1.5*	*129,113*	*2.6*	*225,024*	*3.4*	*660,206*	*6.2*	*1,396,200*	*9.3*
Germany	346,179	9.9	464,366	9.4	495,450	7.6	780,514	7.4	1,068,054	7.1
Japan	235,424	6.7	335,990	6.8	379,491	5.8	514,988	4.9	692,434	4.6
France	234,465	6.7	281,497	5.7	310,831	4.8	490,611	4.6	603,700	4.0
U. K.	224,551	6.4	265,322	5.4	334,550	5.1	483,066	4.6	561,511	3.7
Italy	181,983	5.2	206,059	4.2	238,071	3.6	384,837	3.6	486,596	3.2
Korea	69,844	2.0	135,119	2.7	160,481	2.5	261,238	2.5	425,212	2.8
Belgium	120,325	3.4	159,716	3.2	176,992	2.7	319,798	3.0	390,578	2.6
Canada	120,242	3.4	163,954	3.3	238,811	3.7	323,365	3.1	390,527	2.6
India	23,583	0.7	34,710	0.7	51,563	0.8	142,865	1.4	329,065	2.2
Russia	n. a.		46,709	1.0	33,880	0.5	98,708	0.9	229,655	1.5
Spain	87,559	2.5	113,316	2.3	152,901	2.3	287,610	2.7	315,548	2.1
Singapore	60,774	1.7	124,502	2.5	134,546	2.1	200,050	1.9	310,791	2.1
Mexico	*41,594*	*1.2*	*72,453*	*1.5*	*174,500*	*2.7*	*221,414*	*2.1*	*301,482*	*2.0*
Australia	42,024	1.2	61,283	1.2	71,537	1.1	125,283	1.2	201,640	1.3
Brazil	22,524	0.6	53,783	1.1	58,643	0.9	77,628	0.7	191,464	1.3
TOTAL	3,490,027	100.0	4,938,609	100.0	6,530,032	100.0	10,578,130	100.0	15,085,075	100.0

n. a.: Not available.
Source: Own elaboration based on United Nations Statistics Division (2011-2012).

Table 6.1.4. Growth of World Imports in Goods by Major Importing Countries, 1990-2010
(AAGR)

Country	1990-2010	1990-2000	2000-2010
USA	6.57	8.43	4.15
China	*16.82*	*13.98*	*18.05*
Germany	5.41	3.31	7.23
Japan	5.27	4.44	5.62
France	4.61	2.60	6.22
U. K.	4.46	3.69	4.82
Italy	4.79	2.47	6.71
Korea, Rep.	8.98	7.86	9.26
Belgium	5.77	3.57	7.46
Canada	5.77	6.44	4.57
India	13.37	7.37	18.35
Russia	10.09[1]	- 0.97	19.00
Spain	6.29	5.20	6.81
Singapore	8.08	5.86	7.91
Mexico	*9.89*	*13.92*	*5.10*
Australia	7.75	4.95	9.88
Brazil	10.73	9.09	11.36
TOTAL	*7.22*	*5.86*	*7.91*

[1]1992-2010.
Source: Own elaboration based on United Nations Statistics Division (2011-2012).

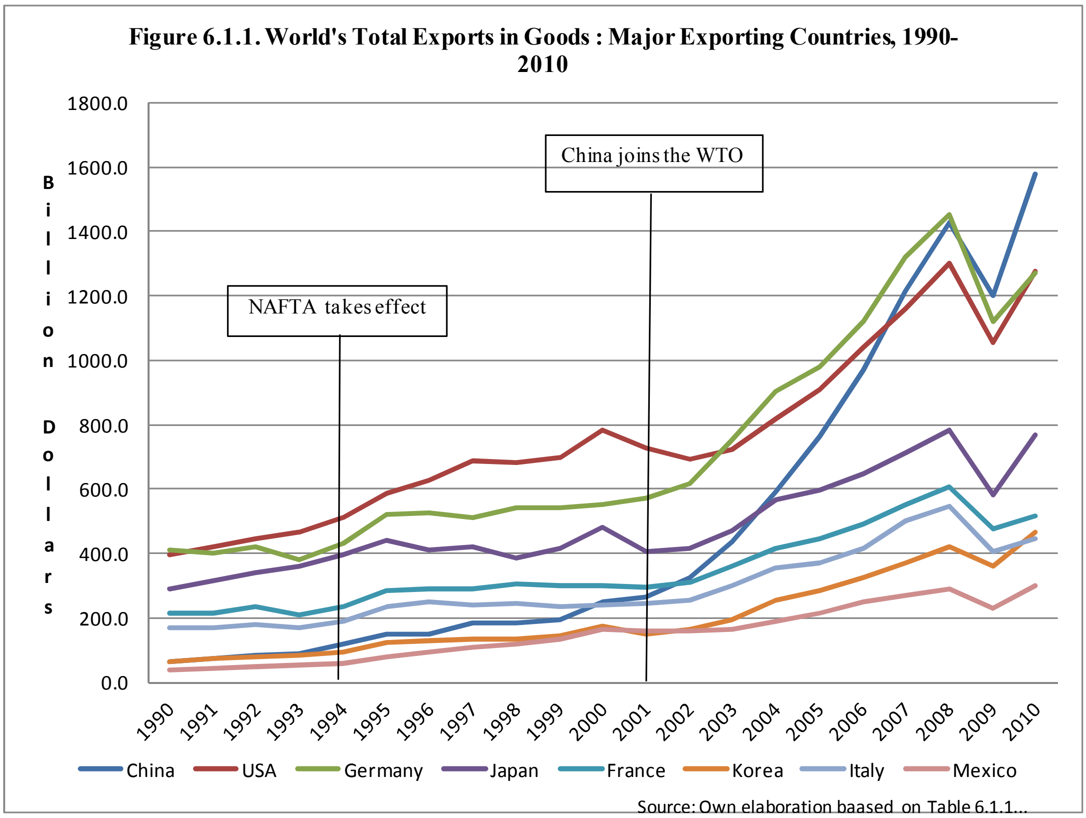


Figure 6.1.1. World's Total Exports in Goods : Major Exporting Countries, 1990-2010
Billion Dollars
1800.0
1600.0
1400.0
1200.0
1000.0
800.0
600.0
400.0
200.0
0.0
China joins the WTO
NAFTA takes effect
1990 1991 1992 1993 1994 1995 1996 1997 1998 1999 2000 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010
China
USA
Germany
Japan
France
Korea
Italy
Mexico
Source: Own elaboration baased on Table 6.1.1...

Appendix 6.2. Motor Trade in Total World Merchandise Trade

For decades, particularly since the second half of the twentieth century, the motor industry has been a lever for world trade. As one of the industries with higher levels of globalisation, its trade performance has accelerated during the last three decades. As shown in Table 6.2.1, during the period 1992-2010 world total automotive value of exports and imports represented between 8 and 13% of their respective world merchandise trade. Motor trade value[114] registered higher AAGR than total world trade for the whole period of 1992-2010, which mainly reflected its more dynamic evolution during the first period of 1992-2000. Given the recent financial crisis' severe negative effects on the motor industry (KPMG, 2008; UNCTAD, 2009; Haugh, *et al*., 2010), combined with the recession of the early 2000s, its pace of growth slow down during the years from 2000 to 2010. From a value of US$ 322.1 billion in 1992, automotive exports reached 710.4 billion in 2000 and a peak of 1,522.3 billion by 2008, just before the worsening of the global financial crisis. World automotive imports followed a similar trend.

[114] As specified in the Methodology Chapter, total world automotive trade value has been estimated by constructing a "cluster" of 108 automotive products, at 6-digit level of the Harmonised System.

Table 6.2.1. Motor Trade in Total World Merchandise Trade, 1990-2010
(Million Dollars)

Year	World Total Goods Exports (WTGE)	World Total Motor Exports (WTME)	% WTME/ WTGE	World Total Goods Imports (WTGI)	World Total Motor Imports (WTMI)	% WTMI/ WTGI
1992	3,688,163	322,095	8.7	3,797,788	285,435	7.5
1993	3,707,791	347,519	9.4	3,741,498	323,186	8.6
1994	4,110,245	458,685	11.2	4,141,912	439,184	10.6
1995	4,938,609	553,519	11.2	4,908,486	534,606	10.9
1996	5,101,371	588,176	11.5	5,170,132	572,923	11.1
1997	5,231,028	611,707	11.7	5,286,865	594,166	11.2
1998	5,165,329	650,159	12.6	5,242,845	643,422	12.3
1999	5,353,458	680,102	12.7	5,458,744	688,025	12.6
2000	6,359,071	710,486	11.2	6,530,032	717,114	11.0
2001	6,117,530	700,050	11.4	6,295,954	712,089	11.3
2002	6,403,212	771,147	12.0	6,526,644	777,647	11.9
2003	7,451,626	892,228	12.0	7,610,819	892,199	11.7
2004	9,062,403	1,052,639	11.6	9,292,103	1,049,379	11.3
2005	10,337,942	1,148,188	11.1	10,578,130	1,139,780	10.8
2006	11,952,279	1,268,616	10.6	12,153,464	1,259,220	10.4
2007	13,775,893	1,456,714	10.6	14,011,710	1,458,399	10.4
2008	15,945,609	1,522,347	9.5	16,184,733	1,512,195	9.3
2009	12,349,086	1,060,993	8.6	12,453,656	1,046,521	8.4
2010	15,060,481	1,369,017	9.1	15,085,075	1,330,776	8.8
AAGR						
1992-2010	7.7	7.9		7.5	8.4	
1992-2000	6.2	9.2		6.2	10.8	
2000-2010	8.2	6.1		7.9	5.8	

Source: Own elaboration based on United Nations Statistics Division (2011-2012) for world total merchandise trade; and UN COMTRADE Database for world total automotive trade.

Appendix 6.3. The Geography of China's and Mexico's Motor Trade Flows

In terms of the geography of motor trade flows, China and Mexico also present a differentiated pattern. The resulting geographical trade patterns mostly derive from the role and involvement in trade and production networks in their respective regions of influence: East Asia for China and North America for Mexico. In China's case, the larger share of exports is destined to East and South East Asia as well as the Middle East (Table 6.3.1 and Figure 6.3.1). Japan and Korea play a key role, but also India, Iran, Russia, United Arab Emirates, Vietnam and Malaysia.[115] As most of these flows are linked to the global operations of automakers and auto parts TNCs, some non-Asian countries appear as relevant trading partners. This is especially the case of The United States and Germany. In exports, for instance, the United States represents the number-one destination of motor products. On the other hand, China's motor imports are geographically more concentrated. By 2010 nearly 80% of imports came from only four countries, Japan, Germany, Korea and the USA, in that order (Table 6.3.2 and Figure 6.3.2). These countries are the national origin of most of the auto TNCs operating under JVs in China.

Compared to China, Mexico's motor trade is highly concentrated in North America, especially with the USA. Despite the relative tendency towards diversification during the last decade, in 2010 the U.S. market concentrated more than 80% of Mexico's total exports (Table 6.3.3 and Figure 6.3.3). Although only represented around 1% of Mexico's auto trade by 2010, China has ranked in the 6th position as destination of exports. As in the case of China, to an important degree motor trade flows in Mexico are defined by the major auto TNC's global strategies. This is reflected in the motor import figures, in which the USA, Japan and Germany account for 75% of the total value (Table 6.3.4 and Figure 6.3.4). It is worth noting, however, that in 2010 China appears as the fourth-largest import motor source for Mexico, accounting for 5.2% of total.

[115] In the statistics appears Hong Kong, both in exports and imports, which may indicate "triangulation" of trade to third countries.

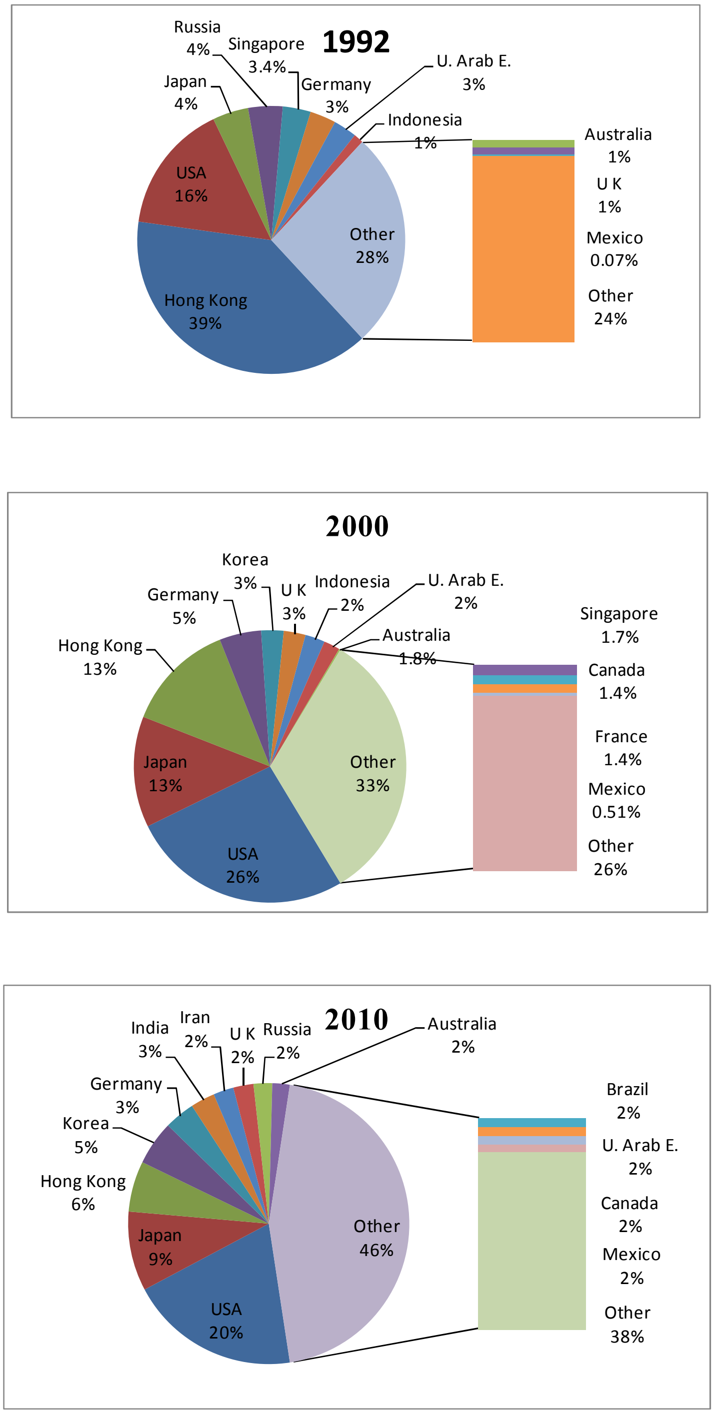
Table 6.3.1. China: Geographical Destination of Motor Exports, 1992-2010 (Million Dollars)						
Country	**1992**	%	**2000**	%	**2010**	**%**
USA	164.81	15.69	1,646.54	26.36	12,339.62	19.66
Japan	45.46	4.33	823.79	13.19	5,746.67	9.15
Hong Kong	410.72	39.11	815.16	13.05	3,646.97	5.81
Korea	8.42	0.80	16.54	2.65	3,207.38	5.11
Germany	32.97	3.14	311.04	4.98	2,203.22	3.51
India	0.00	0.00	17.84	0.29	1,750.74	2.79
Iran	0.89	0.09	42.75	0.68	1,478.55	2.36
U K	10.52	1.00	160.01	2.56	1,457.80	2.32
Russia	43.88	4.18	9.24	0.15	1,333.41	2.12
Australia	10.52	1.00	109.55	1.75	1,272.41	2.03
Brazil	2.36	0.23	38.91	0.62	1,258.76	2.01
U. Arab E.	29.43	2.80	118.90	1.90	1,180.78	1.88
Canada	5.91	0.56	85.42	1.37	1,116.15	1.78
Mexico	*0.68*	*0.07*	*32.01*	*0.51*	*1,073.91*	*1.71*
Vietnam	3.95	0.38	33.98	0.54	968.13	1.54
Malaysia	6.16	0.59	49.85	0.80	900.64	1.43
Other	273.52	26.04	1,940.00	28.58	21,844.88	34.80
TOTAL	*1,050.20*	*100.00*	*6,245.51*	*100.00*	*62,780.01*	*100.00*

Source: Own elaboration based on UN COMTRADE Database.

Table 6.3.2. China: Geographical Origin of Motor Imports, 1992-2010 (Million Dollars)						
Country	**1992**	**%**	**2000**	**%**	**2010**	**%**
Japan	1,649.27	37.54	2,649.09	40.70	23,851.44	32.35
Germany	879.73	20.03	1,269.60	19.50	19,805.26	26.86
Korea	23.07	0.53	276.79	4.25	7,467.68	10.13
USA	447.88	10.20	419.91	6.45	6,081.04	8.25
Other Asia[1]	56.64	1.29	482.27	7.41	2,786.59	3.78
U K	51.47	1.17	149.25	2.29	2,760.98	3.74
Slovakia	n. a	0.00	n. a	0.00	1,473.82	2.00
France	263.16	5.99	122.38	1.88	1,095.47	1.49
Hungary	1.14	0.03	19.56	0.30	1,093.16	1.48
Mexico	*0.03*	*0.00*	*26.92*	*0.41*	*897.16*	*1.22*
Sweden	10.47	0.24	116.66	1.79	516.50	0.70
Belgium	0.00	0.00	19.43	0.30	667.62	0.91
Austria	33.83	0.87	8.07	0.12	621.14	0.84
Canada	12.12	0.28	399.53	6.14	372.99	0.51
Brazil	2.46	0.06	16.64	0.26	123.79	0.17
Russia	454.17	10.34	6.23	0.10	60.45	0.01
Other	507.65	11.45	526.74	8.09	4,060.50	5.58
TOTAL	4,393.10	100.00	6,509.13	100.00	73,735.60	100.00

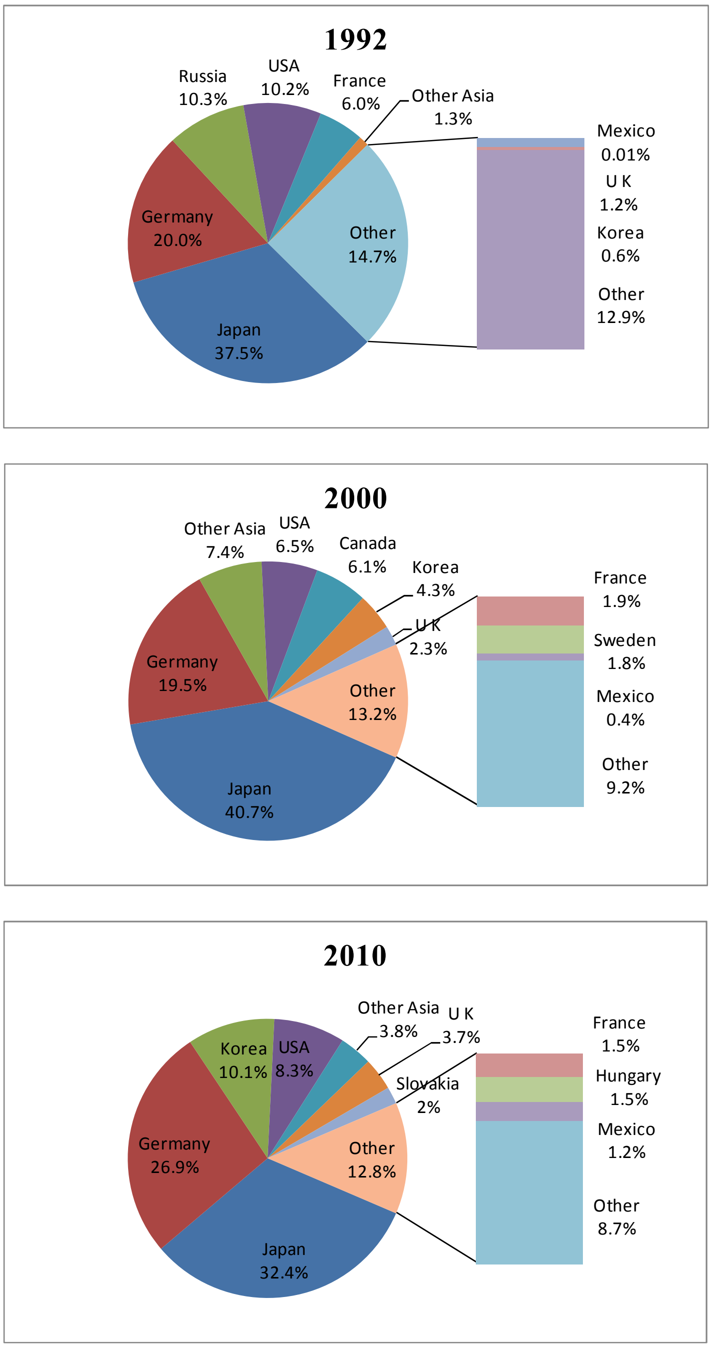
[1]It includes Hong Kong; n.a.: Not available.
Source: Own elaboration based on UN COMTRADE Database.

Figure 6.3.1. China: Geographical Destination of Motor Exports (%), 1990, 2000 and 2010



Source: Own elaboration based on UNCOMTRADE.

Figure 6.3.2. China: Geographical Origin of Motor Imports (%), 1990, 2000 and 2010



Source: Own elaboration based on UNCOMTRADE.

Table 6.3.3. Mexico: Geographical Destination of Automotive Exports, 1992-2010 (Million Dollars)

Country	1992	%	2000	%	2010	%
USA	8,233.9	84.37	38,734.4	90.56	55,222.8	81.32
Canada	607.7	6.23	1,981.7	4.63	3,131.1	4.61
Germany	256.5	2.63	987.3	2.31	2,530.3	3.73
Brazil	26.5	0.27	147.2	0.34	1,688.3	2.49
Argentina	8.7	0.09	12.9	0.03	985.1	1.45
China	*2.2*	*0.02*	*23.0*	*0.05*	*703.6*	*1.04*
Colombia	20.6	0.21	9.8	0.02	678.4	1.00
Chile	67.0	0.69	117.5	0.27	380.6	0.56
Japan	28.9	0.30	181.9	0.43	294.0	0.43
Peru	21.2	0.22	9.9	0.02	175.7	0.26
UK	3.2	0.03	59.8	0.14	161.9	0.24
Spain	22.0	0.23	34.9	0.08	68.1	0.10
Venezuela	49.9	0.51	37.1	0.09	58.4	0.09
India	0.1	0.00	8.1	0.02	61.3	0.09
Costa Rica	4.9	0.05	29.6	0.07	58.8	0.09
Guatemala	12.0	0.12	23.6	0.06	53.2	0.08
Other	394.5	4.04	375.1	0.88	1,653.2	2.43
TOTAL	*9,759.8*	*100.00*	*42,773.7*	*100.00*	*67,904.7*	*100.00*

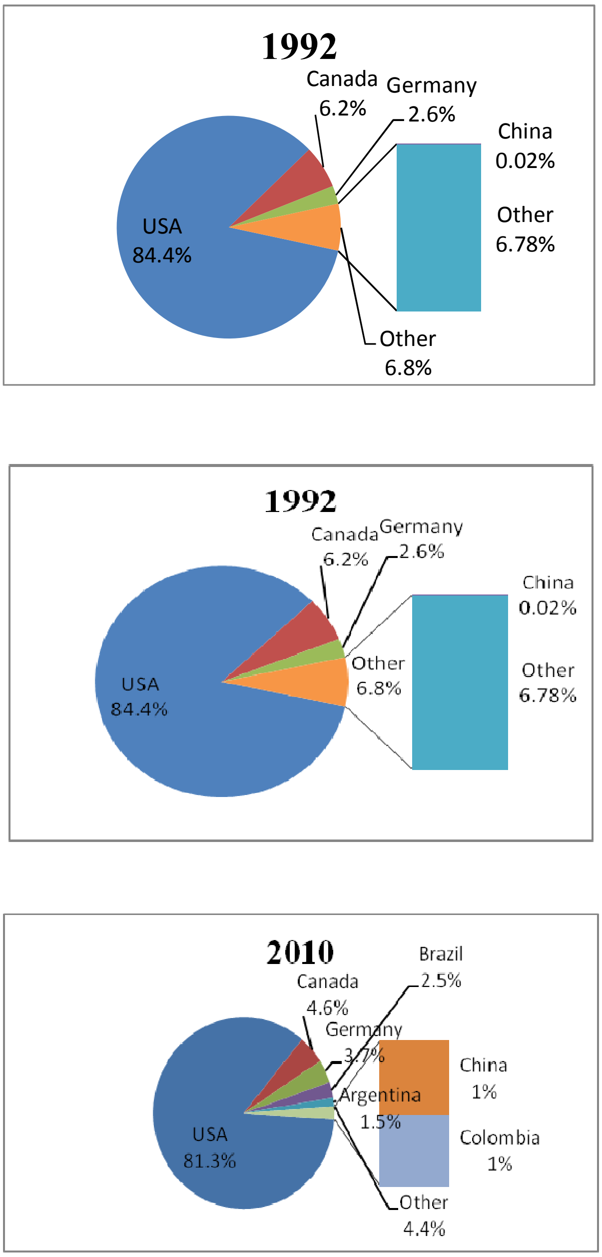
Source: Own elaboration based on UN COMTRADE Database.

Table 6.3.4. Mexico: Geographical Origin of Automotive Imports, 1992-2010 (Million Dollars)

Country	1992	%	2000	%	2010	%
USA	3,864.08	77.88	22,753.60	76.50	23,756.53	57.16
Japan	233.05	4.70	1,440.40	4.84	4,183.69	10.07
Germany	162.50	3.28	2,129.64	7.16	3,250.39	7.82
China	*30.08*	*0.61*	*83.78*	*0.28*	*2,171.60*	*5.23*
Canada	24.41	0.49	1,182.00	3.97	1,940.81	4.67
Brazil	276.24	5.57	881.74	2.96	1,646.58	3.96
Korea	24.14	0.49	167.52	0.56	1,189.84	2.86
Spain	21.67	0.44	145.14	0.49	481.19	1.16
Argentina	5.50	0.11	50.83	0.17	370.91	0.89
UK	64.80	1.31	189.21	0.64	290.69	0.70
France	123.81	2.50	104.61	0.35	220.84	0.53
Thailand	0.03	0.00	9.52	0.03	180.36	0.43
Italy	78.59	1.58	50.91	0.17	170.93	0.41
Other	52.68	1.06	555.64	1.87	1,974.63	4.10
TOTAL	*4,961.55*	*100.00*	*29,744.54*	*100.00*	*41,558.99*	*100.00*

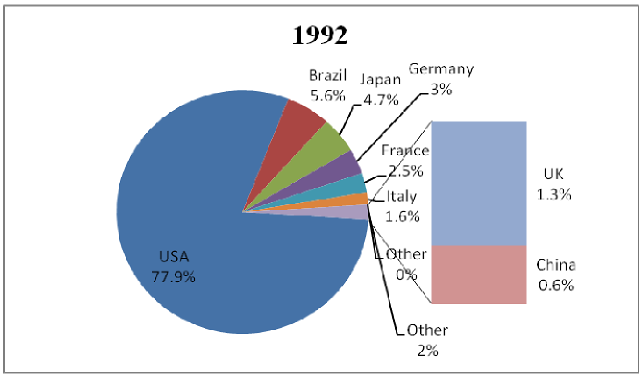
Source: Own elaboration based on UN COMTRADE Database.

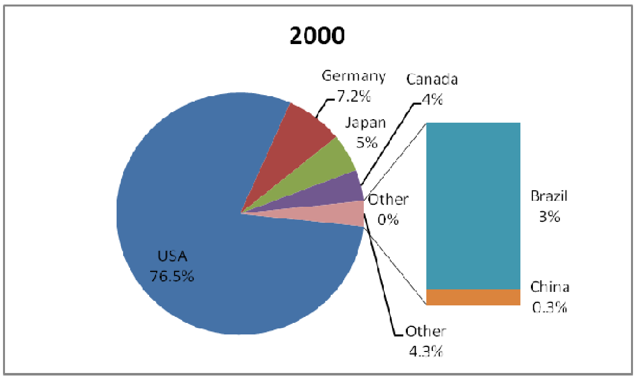
Figure 6.3.3. Mexico: Geographical Destination of Motor Exports (%), 1990, 2000 and 2010

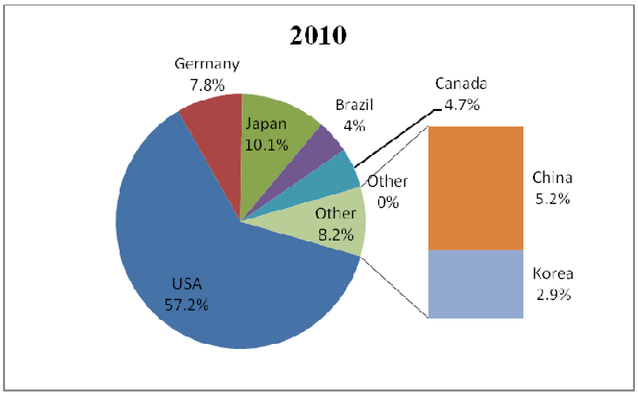


Source: Own elaboration based on UNCOMTRADE.

Figure 6.3.4. Mexico: Geographical Destination of Motor Imports (%), 1990, 2000 and 2010







Source: Own elaboration based on UNCOMTRADE.

Appendix 6.4. Data Sets – Chapter Six

Table 6.4.1. China's Major Motor Export and Imports Products in Trade with Mexico, 2010 (China as Reporter Country)

HS Code	Product Description	Value (Million Dollars)	% of Total	AAGR 2001-2010
	EXPORTS			
401120	Pneumatic tyres, new of rubber for buses or lorries	128.455	12.0	49.9
401110	Pneumatic tire, new of rubber for motor cars, including station wagons and racing cars	111.098	10.3	51.5
870899	Motor vehicle parts nes	93.291	8.7	38.8
870894	Steering wheels, steering columns and steering boxes for motor vehicles	63.799	5.9	81.3
870840	Transmissions for motor vehicles	47.639	4.4	166.8
870870	Wheels including parts and accessories for motor vehicles	43.813	4.1	61.3
870829	Parts and accessories of bodies nes for motor vehicles	41.913	3.9	34.5
850780	Storage batteries, nesoi	35.993	3.4	127.0
851220	Lighting or visual signalling equipment nes	27.25	2.5	42.7
850720	Lead-acid electric accumulators nes	26.840	2.5	39.3
840991	Parts for spark-ignition type engines nes	21.987	2.0	49.7
840999	Parts for diesel and semi-diesel engines	21.876	2.0	69.7
841330	Fuel, lubricating or cooling medium pumps for int. comb. piston engines	21.617	2.0	98.3
870880	Shock absorbers for motor vehicles	20.450	1.9	121.3
851190	Parts for electrical ignition or starting equipment used for internal combustion engines, generator	20.439	1.9	52.8
TOTAL		1,073.9	100.0	41.3
	IMPORTS			
870323	Automobiles w reciprocating piston engine displacing >1500 cc to 3000 cc	660.0	73.6	74.1
840991	Parts for spark-ignition type engines nes	44.069	4.9	9.1
870895	Safety airbags with inflated system	43.843	4.9	12.7[1]
870829	Parts and accessories of bodies nes for motor vehicles	18.644	2.1	51.7
870899	Motor vehicle parts nes	18.183	2.0	19.9
842199	Parts for filtering or purifying mchy & apparatus for liquids or gases, nes	16.640	1.9	54.4
870894	Steering wheels, steering columns and steering boxes for motor vehicles	11.829	1.3	36.7
870840	Transmissions for motor vehicles	8.118	0.9	60.9
TOTAL		897.2	100.0	35.9

[1] 2007-2010.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.2. China's Automotive Exports to Mexico by Category of Technological Complexity in the Value Chain, 1992-2010 (Million Dollars)[1]
(China as Reporter Country)

Category/Product	1992	1997	2001	2007	2010
I. Finished Vehicles			***0.030***	***28.763***	***18.550***
I.A. Sport & Recreational			0.001	8.137	6.502
I.B. Microcar/Bubble			0.008	7.484	0.222
I.C. Subcompact/City Car				5.773	0.156
I.D. Compact, Mid-size Car and Compact SUV				0.175	0.006
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV				0.075	0.301
I.F. Light Trucks				5.801	9.475
I.G. Medium & Heavy Straight Trucks				0.974	0.911
I.H. Passenger Vans & Buses			0.021	0.032	0.837
I.I. Road Tractors & Dump Trucks				0.310	0.137
II. Major Components and Systems. Machining and Stamping	***0.023***		***0.037***	***10.685***	***56.058***
II.A. Body					0.002
II.B. Chassis with Engine				0.606	0.185
II.C. Engine	0.023		0.034	9.071	8.231
II.D. Transmission			0.002	1.613	47.638
III. Sophisticated Parts and Subsystems. Specialised Technology	***0.175***	***1.112***	***3.724***	***80.1***	***256.3***
III.A. Chassis Components	0.016	0.100	0.610	4.7	20.4
III.B. Engine Components	0.159	0.157	1.122	45.3	118.5
III.C. Transmission & Drive Train Components		0.078	0.253	15.4	102.9
III.D. Electronic & Safety Systems		0.777	1.7	14.6	14.4
IV: Parts & Components. Moderate & Universal Technology	***0.130***	***2.020***	***13.6***	***330.7***	***553.3***
IV.A&B. Minor Body & Chassis Parts	0.120	1.414	7.4	156.7	345.9
IV.C&D. Minor Engine & Transmission Parts	0.002	0.015	0.108	12.1	28.5
IV.E. Minor Electronic Parts	0.007	0.590	6.1	161.9	178.9
V. Accessories & Simple Parts	***0.354***	***4.332***	***16.364***	***159.8***	***189.6***
V.A&B. Accessories and Simple Parts	0.354	4.332	16.364	159.8	189.6
Grand Total	***0.684***	***7.465***	**33.787**	***610.0***	***1,073.9***

[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.3. China's Automotive Exports to Mexico by Category of Technological Complexity in the Value Chain, 1992-2010 (%)[1]
(China as Reporter Country)

Category/Product	1992	1997	2001	2007	2010
I. Finished Vehicles			***0.1***	***4.7***	***1.7***
I.A. Sport & Recreational			0.003	1.333	0.605
I.B. Microcar/Bubble			0.03	1.220	0.021
I.C. Subcompact/City Car				0.940	0.015
I.D. Compact, Mid-size Car and Compact SUV				0.029	0.001
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV				0.012	0.030
I.F. Light Trucks				0.951	0.882
I.G. Medium & Heavy Straight Trucks				0.160	0.085
I.H. Passenger Vans & Buses			0.06	0.005	0.078
I.I. Road Tractors & Dump Trucks				0.051	0.013
II. Major Components and Systems. Machining and Stamping	***3.5***		***0.1***	***1.8***	***5.2***
II.A. Body					
II.B. Chassis with Engine					0.017
II.C. Engine	3.5		0.103	1.5	0.767
II.D. Transmission			0.008	0.3	4.436
III. Sophisticated Parts and Subsystems. Specialised Technology	***25.7***	***14.9***	***11.0***	***13.1***	***23.9***
III.A. Chassis Components	2.4	1.3	1.8	0.8	1.9
III.B. Engine Components	23.3	2.1	3.3	7.4	11.0
III.C. Transmission & Drive Train Components		1.0	0.8	2.5	9.6
III.D. Electronic & Safety Systems		10.5	5.1	2.4	1.3
IV: Parts & Components. Moderate & Universal Technology	***19.0***	***27.1***	***40.3***	***54.2***	***51.5***
IV.A&B. Minor Body & Chassis Parts	17.6	19.0	21.9	25.7	32.2
IV.C&D. Minor Engine & Transmission Parts	0.4	0.2	0.3	2.0	2.7
IV.E. Minor Electronic Parts	1.0	7.9	18.1	26.5	16.7
V. Accessories & Simple Parts	***51.8***	***58.0***	***48.4***	***26.2***	***17.7***
V.A&B. Accessories and Simple Parts	51.8	58.0	48.4	26.2	17.7
Grand Total	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***

[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.4. China's Automotive Imports from Mexico by Category of Technological Complexity in the Value Chain, 1992-2010 (Million Dollars)[1]
(China as Reporter Country)

Category/Product	1992	1997	2001	2007	2010
I. Finished Vehicles		***0.004***	***2.6***	***78.9***	***662.3***
I.A. Sport & Recreational					0.334
I.B. Microcar/Bubble					
I.C. Subcompact/City Car			0.008		
I.D. Compact, Mid-size Car and Compact SUV		0.004	2.6	78.9	660.040
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV				0.013	0.302
I.F. Light Trucks					1.544
I.G. Medium & Heavy Straight Trucks					0.052
I.H. Passenger Vans & Buses					
I.I. Road Tractors & Dump Trucks					
II. Major Components and Systems. Machining and Stamping		***14.0***	***0.132***	***28.7***	***9.1***
II.A. Body					0.9
II.B. Chassis with Engine					
II.C. Engine		14.0	0.063	14.8	0.1
II.D. Transmission			0.069	13.9	8.1
III. Sophisticated Parts and Subsystems. Specialised Technology		***0.532***	***19.7***	***88.9***	***125.7***
III.A. Chassis Components			0.5	2.2	2.0
III.B. Engine Components		0.435	18.6	46.9	52.6
III.C. Transmission & Drive Train Components		0.071	0.5	11.8	27.2
III.D. Electronic & Safety Systems		0.026		28.0	43.9
IV: Parts & Components. Moderate & Universal Technology	***0.003***	***0.690***	***15.7***	***29.7***	***63.7***
IV.A&B. Minor Body & Chassis Parts		0.010	0.3	15.8	23.1
IV.C&D. Minor Engine & Transmission Parts			0.3	3.9	21.5
IV.E. Minor Electronic Parts	0.003	0.680	15.1	9.9	19.0
V. Accessories & Simple Parts	***0.024***	***0.030***	***3.7***	***76.1***	***36.5***
V.A&B. Accessories and Simple Parts	0.024	0.030	3.7	76.1	36.5
Grand Total	***0.027***	***15.245***	***41.774***	***302.351***	***897.163***

[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.5. China's Automotive Imports from Mexico by Category of Technological Complexity in the Value Chain, 1992-2010 (%)[1]
(China as Reporter Country)

Category/Product	1992	1997	2001	2007	2010
I. Finished Vehicles		***0.03***	***6.2***	***26.1***	***73.8***
I.A. Sport & Recreational					
I.B. Microcar/Bubble					0.037
I.C. Subcompact/City Car			0.02		
I.D. Compact, Mid-size Car and Compact SUV		0.03	6.18	26.1	73.570
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV				0.004	0.034
I.F. Light Trucks					0.172
I.G. Medium & Heavy Straight Trucks					0.006
I.H. Passenger Vans & Buses					
I.I. Road Tractors & Dump Trucks					
II. Major Components and Systems. Machining and Stamping		***91.8***	***0.3***	***9.5***	***1.0***
II.A. Body					0.1
II.B. Chassis with Engine					
II.C. Engine		91.8	0.1	4.9	0.001
II.D. Transmission			0.2	4.6	0.9
III. Sophisticated Parts and Subsystems. Specialised Technology		***3.5***	***47.1***	***29.4***	***14.0***
III.A. Chassis Components			1.3	0.7	0.2
III.B. Engine Components		2.9	44.5	15.5	5.9
III.C. Transmission & Drive Train Components		0.5	1.2	3.9	3.0
III.D. Electronic & Safety Systems		0.2		9.3	4.9
IV: Parts & Components. Moderate & Universal Technology	***11.9***	***4.5***	***37.6***	***9.8***	***7.1***
IV.A&B. Minor Body & Chassis Parts		0.1	0.7	5.2	2.6
IV.C&D. Minor Engine & Transmission Parts			0.6	1.3	2.4
IV.E. Minor Electronic Parts	11.9	4.5	36.3	3.3	2.1
V. Accessories & Simple Parts	***88.1***	***0.2***	***8.8***	***25.2***	***4.1***
V.A&B. Accessories and Simple Parts	88.1		8.8	25.2	4.1
Grand Total	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***

[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.6. Mexico's Automotive Exports to China by Category of Technological Complexity in the Value Chain, 1992-2010 (Million Dollars)[1]
(Mexico as Reporter Country)

Category/Product	1992	1997	2001	2007	2010
I. Finished Vehicles			***0.006[2]***	***103.6***	***558.8***
I.A. Sport & Recreational					
I.B. Microcar/Bubble					0.212
I.C. Subcompact/City Car					
I.D. Compact, Mid-size Car and Compact SUV			0.006[2]	103.6	555.3
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV					3.3
I.F. Light Trucks					
I.G. Medium & Heavy Straight Trucks					
I.H. Passenger Vans & Buses					
I.I. Road Tractors & Dump Trucks					
II. Major Components and Systems. Machining and Stamping		***19.170***	***0.078***	***25.1***	***1.27***
II.A. Body					0.770
II.B. Chassis with Engine					
II.C. Engine		19.170	0.054	9.8	0.247
II.D. Transmission			0.024	15.3	0.241
III. Sophisticated Parts and Subsystems. Specialised Technology	***2.039***	***0.913***	***24.503***	***46.8***	***90.8***
III.A. Chassis Components		0.092	4.260	4.201	2.461
III.B. Engine Components	2.019	0.525	19.706	35.4	40.919
III.C. Transmission & Drive Train Components	0.020	0.028	0.535	7.0	30.292
III.D. Electronic & Safety Systems		0.266		0.206	17.1
IV: Parts & Components. Moderate & Universal Technology	***0.037***	***0.075***	***5.435***	***54.1***	***20.7***
IV.A&B. Minor Body & Chassis Parts	0.033	0.001	3.467	42.075	13.8
IV.C&D. Minor Engine & Transmission Parts	0.003			1.406	0.3
IV.E. Minor Electronic Parts	0.001	0.074	1.968	10.572	6.6
V. Accessories & Simple Parts	***0.105***	***0.072***	***0.659***	***44.3***	***31.9***
V.A&B. Accessories and Simple Parts	0.105		0.659	44.374	31.9
Grand Total	***2.181***	***20.232***	***30.676***	***274.011***	***703.573***

[1]Totals do not add up 100% due to rounding. [2]2000.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.7. Mexico's Automotive Exports to China by Category of Technological Complexity in the Value Chain, 1992-2010 (%)[1] (Mexico as Reporter Country)					
Category/Product	**1992**	**1997**	**2001**	**2007**	**2010**
I. Finished Vehicles			***0.03[2]***	***37.8***	***79.4***
I.A. Sport & Recreational					
I.B. Microcar/Bubble					0.03
I.C. Subcompact/City Car					
I.D. Compact, Mid-size Car and Compact SUV			0.03[2]	37.8	78.9
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV					0.47
I.F. Light Trucks					
I.G. Medium & Heavy Straight Trucks					
I.H. Passenger Vans & Buses					
I.I. Road Tractors & Dump Trucks					
II. Major Components and Systems. Machining and Stamping		***94.8***	***0.25***	***9.2***	***0.18***
II.A. Body					0.11
II.B. Chassis with Engine					
II.C. Engine		94.8	0.17	3.6	0.04
II.D. Transmission			0.08	5.6	0.03
III. Sophisticated Parts and Subsystems. Specialised Technology	***93.5***	***4.5***	***79.9***	***17.1***	***12.9***
III.A. Chassis Components		0.5	13.9	1.5	0.4
III.B. Engine Components	92.6	2.6	64.2	12.9	5.8
III.C. Transmission & Drive Train Components	0.9	0.1	1.7	2.6	4.3
III.D. Electronic & Safety Systems		1.3		0.1	2.4
IV: Parts & Components. Moderate & Universal Technology	***1.7***	***0.4***	***17.7***	***19.7***	***2.9***
IV.A&B. Minor Body & Chassis Parts	1.5	0.1	11.3	15.4	2.0
IV.C&D. Minor Engine & Transmission Parts	0.1		0.1	0.5	0.1
IV.E. Minor Electronic Parts	0.1	0.4	6.4	3.9	0.9
V. Accessories & Simple Parts	***4.8***	***0.4***	***2.2***	***16.2***	***4.54***
V.A&B. Accessories and Simple Parts	4.8	0.4	2.2	16.2	4.54
Grand Total	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***

[1]Totals do not add up 100% due to rounding. [2]2000.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.8. Mexico's Automotive Imports from China by Category of Technological Complexity in the Value Chain, 1992-2010 (Million Dollars)[1]
(Mexico as Reporter Country)

Category/Product	1992	1997	2001	2007	2010
I. Finished Vehicles	***0.002***	***0.003***	***0.046***	***26.7***	***13.9***
I.A. Sport & Recreational			0.026	0.629	0.032
I.B. Microcar/Bubble			0.023	6.945	6.280
I.C. Subcompact/City Car	0.002	0.003		14.70	0.059
I.D. Compact, Mid-size Car and Compact SUV				0.246	0.009
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV				0.075	0.500
I.F. Light Trucks			0.006	2.603	4.830
I.G. Medium & Heavy Straight Trucks				1.243	1.593
I.H. Passenger Vans & Buses				0.064	0.439
I.I. Road Tractors & Dump Trucks				0.145	0.185
II. Major Components and Systems. Machining and Stamping		***0.086***	***0.115***	***17.9***	***74.0***
II.A. Body				0.1	0.4
II.B. Chassis with Engine					0.6
II.C. Engine		0.084	0.108	13.8	44.0
II.D. Transmission		0.002	0.007	4.0	29.0
III. Sophisticated Parts and Subsystems. Specialised Technology	***2.965***	***10.364***	***23.929***	***286.7***	***517.8***
III.A. Chassis Components	0.604	0.266	1.973	44.0	41.7
III.B. Engine Components	1.604	5.064	12.641	156.2	290.9
III.C. Transmission & Drive Train Components	0.572	0.084	0.409	47.8	145.1
III.D. Electronic & Safety Systems	0.135	4.950	8.966	38.7	40.1
IV: Parts & Components. Moderate & Universal Technology	***20.609***	***17.798***	***29.684***	***587.9***	***1,012.3***
IV.A&B. Minor Body & Chassis Parts	13.056	1.609	10.612	218.0	490.3
IV.C&D. Minor Engine & Transmission Parts	0.214	0.148	0.652	24.4	66.6
IV.E. Minor Electronic Parts	7.339	16.040	18.420	345.5	455.4
V. Accessories & Simple Parts	***6.503***	***13.282***	***57.819***	***472.4***	***553.6***
V.A&B. Accessories and Simple Parts	6.503	13.282	57.819	472.4	553.6
Grand Total	***30.079***	***41.535***	***111.596***	***1,91.5***	***2,171.6***

[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

Table 6.4.9. Mexico's Automotive Imports from China by Category of Technological Complexity in the Value Chain, 1992-2010 (%)[1] (Mexico as Reporter Country)					
Category/Product	**1992**	**1997**	**2001**	**2007**	**2010**
I. Finished Vehicles	***0.007***	***0.008***	***0.04***	***1.9***	***0.6***
I.A. Sport & Recreational			0.02	0.04	0.001
I.B. Microcar/Bubble			0.01	0.50	0.289
I.C. Subcompact/City Car	0.007	0.008		1.05	0.003
I.D. Compact, Mid-size Car and Compact SUV				0.01	0.001
I.E. Luxry, Sports, Grand Tourer, Mid & Full-size SUV				0.005	0.023
I.F. Light Trucks			0.006	0.187	0.222
I.G. Medium & Heavy Straight Trucks				0.089	0.073
I.H. Passenger Vans & Buses				0.005	0.020
I.I. Road Tractors & Dump Trucks				0.01	0.009
II. Major Components and Systems. Machining and Stamping		***0.208***	***0.1***	***1.3***	***3.4***
II.A. Body				0.01	0.02
II.B. Chassis with Engine					0.03
II.C. Engine		0.203	0.1	1.0	2.02
II.D. Transmission		0.005	0.007	0.29	1.34
III. Sophisticated Parts and Subsystems. Specialised Technology	***9.8***	***24.9***	***21.4***	***20.6***	***23.9***
III.A. Chassis Components	2.0	0.6	1.8	3.2	1.9
III.B. Engine Components	5.3	12.2	11.3	11.2	13.4
III.C. Transmission & Drive Train Components	1.9	0.2	0.3	3.4	6.7
III.D. Electronic & Safety Systems	0.6	11.9	8.0	2.8	1.8
IV: Parts & Components. Moderate & Universal Technology	***68.5***	***42.8***	***26.6***	***42.3***	***46.6***
IV.A&B. Minor Body & Chassis Parts	43.4	3.9	9.5	15.7	22.5
IV.C&D. Minor Engine & Transmission Parts	0.7	0.3	0.6	1.8	3.1
IV.E. Minor Electronic Parts	24.4	38.6	16.5	24.8	21.0
V. Accessories & Simple Parts	***21.6***	***32.0***	***51.8***	***33.9***	***25.5***
V.A&B. Accessories and Simple Parts	21.6	32.0	51.8	33.9	25.5
Grand Total	***100.0***	***100.0***	***100.0***	***100.0***	***100.0***

[1]Totals do not add up 100% due to rounding.
Source: Own elaboration based on UN COMTRADE Database.

CHAPTER EIGHT

Appendix 8.1. An Overview of China's OFDI Flows into Mexico

In sharp contrast with trade trends between China and Mexico analysed in the previous Chapter, China's OFDI into Mexico shows both a limited and unstable character. According to the Mexico's Ministry of Economy official figures, during the period 1999-2010 China's total FDI reached 144.7 million dollars. This amount corresponds to less than 1 percent of Mexico's total world inward FDI in that period (Table 8.1.1). In a similar way than other figures, some discrepancies arise when comparing Chinese OFDI sources with the Mexican ones. China registers a total amount of 200.63 million dollars by 2010, almost 40 per cent higher than Mexican sources. Nevertheless, this figure looks insignificant when compared to an estimated 317,210 million dollars of worldwide China's OFDI stock in 2010, representing, as well, less than 1 per cent. The number of registered firms with Chinese participation in their share capital in Mexico was 611. The overwhelming majority of Chinese investment has been directed to two sectors: wholesale trade (43%) and manufacturing (32%).

Other sources of Chinese FDI in different Latin American countries present a huge contrast with the above figures. For example, ECLAC's Division of Production, Productivity and Management (ECLAC, 2010), has estimated flows of Chinese FDI into Mexico for 1,127 million dollars generating more than 6,000 jobs during the period 2003-2009.[116] Most of this investment has been directed to manufacturing sectors: automotive, OEM; office machinery and equipment manufacturing; electro-domestic product manufacturing; communications, training and research & development; industrial machinery, equipment, tools, sales and distribution; metals, extraction and manufacturing; paper, printing and packaging, manufacturing. On the same line, by the end of 2009 a market news network reported that Mexico had been chosen by China as its main foreign investment destination due to the advantage of the former as a manufacturing site

[116] Another source reported a total of 400 million dollars of Chinese investment in Mexico by September 2008 (Wu, 2010: 33).

for exporting to the U.S. market (FINETIK, 2009). According to this source, by then Mexico was the place with the highest number of investment projects of Chinese companies outside China with about 109 development plans throughout the Mexican territory. These recent trends indicate that official figures on Chinese FDI in Mexico are underestimated or outdated.

Table 8.1.1. China's Total Outward FDI into Mexico, 1999-2010 (million dollars)

Year	Mexican Sources		Chinese Sources	
	FDI Flows from China	**Total World FDI into Mexico**	**China's FDI Flows into Mexico**	**China's Total World OFDI Flows**
1999	5.0	13, 873.5	97.0*	1,775
2000	10.7	18,160.5	19.8*	916
2001	2.4	29,807.9	0.2*	6,884
2002	-1.7	23,727.5	2.0*	2,518
2003	25.6	15,756.5	0.03	2,850
2004	12.0	24,501.0	27.10	5,500
2005	14.0	22,424.8	3.55	12,260
2006	20.2	20,103.1	-3.69	21,160
2007	8.6	29,083.7	17.16	26,510
2008	13.1	24,912.7	5.63	55,910
2009	28.5	14,462.5	0.82	56,530
2010	6.3	14,362.0	26.73	68,810
OFDI	144.7**	251,121.7**	200.63	317,210

*It refers to approved FDI outflows. **1999-2010.
Source: Mexico: Secretaría de Economía (2011). China: MOFCOM (2009 and 2010), *Statistical Bulletin of China's Outward Foreign Direct Investment* (China's OFDI into Mexico, 2003-2010 period); UNCTAD (2003), for China's OFDI into Mexico, 1999-2002 period; and UNCTAD (2001, 2003 and 2004) for China's world total FDI flows, 1999-2002 period.

Table 8.1.2 shows a list and a brief description of major investment projects carried out by Chinese companies in Mexico in recent years. In consistency with ECLAC's figures – and considering only the available information -, Chinese FDI has surpassed the amount of 1,200 million dollars and created more than 8,000 jobs. Amongst the most important firms operating in Mexican territory are some well-known transnational corporations such as Huawei Technologies and ZTE Corporation (telecommunications sector); Lenovo (computer manufacturing segment); Huaxi Group and Jinchuan Group (mining industry); Hutchison Port Holding (port operation and storage); Golden Dragon Precise Cooper Pipe Co. (cooper pipes manufacturing); Sinatex-China World Best Group (textile industry); and Foton Motor (automotive industry). Besides serving Mexico's domestic market, most of the manufacturing-oriented firms intend to export their products to the North American and South American countries.

The Mexican counterpart in FDI flows into China is much more modest. In a similar way than Chinese FDI data in Mexico, there are no single or officially accepted figures on FDI by Mexican firms in China. PROMEXICO (2010) has reported an amount of 21.9 million dollars for the period 2006-2008. Nevertheless, as in the case of Chinese investment in Mexico, this governmental agency points out that most probably this amount is underestimated since several Mexican companies, such as Seminis, MASECA and VITRO, are operating in China thorough affiliates registered in third countries. For example, Seminis' investment in China until 2004 was close to 400 million dollars, but for Chinese statistics it is considered Korean capital, since the branch of the company in that country was the one that performed the transaction (Ibid). Using data from the years 2003 to 2007, ECLAC (2008) estimated a FDI of Mexican firms in China of 58.0 million dollars. A more complete portray of Mexican DFI in China was presented by China's Economic and Commercial Council in Mexico. According to this source, up to the end of 2008 China had received 319.0 million dollars of inward FDI from 116 Mexican companies (Chen, 2009). Given the enormous total amount of FDI received by China during the last decade, by 2008 Mexican FDI only represented a 0.01 per cent.

Table 8.1.2. Major Chinese Companies with FDI in Mexico			
Company	**Project Characteristics**	**Investment Amount (million dollars)**	**Jobs Generated**
Huawei Technologies	It was established in Mexico in the year 2000. At present it collaborates with the main operators in the telecommunications industry in Mexico, among them Alestra, América Móvil, Axtel-Avantel, Bestel, Iusacell, Maxcom, Telefónica and Telmex. The amount of the investment was 20 million dollars, and 220 jobs were generated.	20.0	300
Sinatex (China Worldbest Group)	It established a textile products plant (mainly cotton thread) in Sonora in 2002. The amount of the investment was 96 million dollars. The firm entered in a restructuring process, transferring Mexico's production plant to the Chinese company China Hengtian Group, Ltd., in May 2009.	96.0	2,800
ZTE Corporation	It was established in Mexico in 2002, embarking on projects with the most important telecommunications operators at national level and in Central America. It has regional offices that function as sales offices, in Mexico City. The amount of the investment and the number of jobs generated are unknown.	n.a.	n.a.
Huaxi Group	It bought rights to operate copper mines in 2006. Said mines are located in the state of Sinaloa. Total investment was 25 million dollars. The number of jobs generated is not known.	25.0	n.a.
Lenovo	In 2008 it announced the establishment of a new plant to assemble computers and related equipment in Nuevo León. The plant started production early 2009 and it represented Lenovos's largest manufacturing investment outside China. The new plant is able to produce 5 million units a year. Besides Monterrey, the firm also has facilities in Mexico City and Guadalajara.	40.0	1,000
Jinchuan Group	In 2008, this company acquired a copper deposit in Chihuahua from the Canadian company Tyler Resources. The amount of the investment was 214 million dollars.	214.0	n.a.

Table 8.1.2. Major Chinese Companies with FDI in Mexico (Continued)			
Company	**Project Characteristics**	**Investment Amount (million dollars)**	**Jobs Generated**
Hutchison Ports Holding	In June 2009 Hutchison Ports Holding inaugurated its new facilities specialised in grain operation and storage at Ensenada, Baja California. Hutchison has several port investments all over the country.	220.0	n.a.
Golden Dragon Precise Cooper Pipe Co.	The project considers an industrial complex to manufacture high technology copper pipes, especially for air conditioned equipment with an annual capacity of 60,000 tons. The main destination of production is North America. A plant was inaugurated in Monclova, Coahuila in October 2009. The amount of the investment is 120 million dollars. It is expected that 960 jobs will be generated.	120.0	960
Sinopec and PetroChina	The companies Sinopec and PetroChina are currently engaged in drilling and exploration in the Gulf of Mexico for its counterpart, Petróleos Mexicanos (PEMEX).	n.a.	n.a.
Diverse Companies	In August 2010 the state government of Baja California announced an investment of 100 million dollars by several Chinese companies. At present, in Baja California operate around 15 *maquiladora* plants in the areas of apparel, garments, electronics, and wood products.	100.0	2,000
Mining Companies	In October 2010 the Ministry of Economy announced the arrival of 7 Chinese companies to invest 150 million dollars in mining exploration. Their main interest is the extraction of iron.	150.0	n.a.
Foton Mexico	In November 2010 a new manufacturing facility was inaugurated at Coatzacoalcos, state of Veracruz. Initially, Foton will invest as much as $15 million to prepare a plant for light truck production. In the second stage, Foton Motor will build a variety of trucks in its Mexico plant, including pickups and SUVs, and will export them to the U.S. and South American markets. Total investment amount is estimated in 250 million dollars with an expected annual production of 50,000 units.	250.0	1,000

Source: Own elaboration based on PROMEXICO (2010); Maquila Portal (2010a); FINETIK (2009); Gobierno del Estado de Baja California (2009); Castañeda (2010); Foton Mexico (2010); Gao (2010).
n.a.: Not available information.

Especially since 2006, most of Mexico's most prominent transnational firms have opened operations in China. The major companies and investment sectors are the following (PROMEXICO, 2010):

- Food industry, beverages and agribusiness: GRUMA, BIMBO, MASECA, FEMSA, Seminis, Grupo Herdez, JUMEX, El Fogoncito;
- Construction materials industry: CEMEX, Interceramic;
- Auto Parts industry: Alfa Group-NEMAK, San Luis Rassini Corporación, Katcon, Xignux;
- Metalic machinery and equipment for oil and energy industries: TAMSA, Grupo Villacero;
- Other activities and services: Cydsa (chemicals, plastics and rubber industry); Carso Group (diverse industrial and service activities); IDEAL (project and infrastructure analysis); Televisa Group (broadcasting of radio and television programmes).

Appendix 8.2. Giant Motors Lationamérica-FAW Technological Association

Another FAW connection in Mexico is a technological association with Giant Motors Latinoamérica (GML), a Mexican company manufacturing commercial vehicles. At the end of 2006 GML, owned by Bler Group, was formally established and acquired an automobile assembly plant from DINA in Ciudad Sahagún, state of Hidalgo. In 2007 GML entered into a 15-year association with FAW, consisting in technology transfer and auto parts sourcing. GML got a license to manufacture light and heavy FAW branded trucks.

With an initial investment of 17 million dollars to fit out the Ciudad Sahagún plant, GML plans to develop a total investment of around 60 million dollars by 2011 in order to achieve full production capacity of 20,000 units a year. At full capacity the firm expects to generate 1,500 direct jobs. GML started operations at the end of 2007 manufacturing mini, light and semi-heavy trucks; in 2008 it launched to the market its first heavy truck and by 2010 widens the supply lines with the new utility mini vans and trucks. Major vehicle components come from China but GML is trying to increase the percentage of Mexican-made parts; the chassis is manufactured in Mexico and simple parts such as tires and wheels. At present GML has 35 suppliers around Ciudad Sahagún and 75 at national.

In terms of marketing, GML's executives have informed the sale of 2,350 units by the end of 2010; the firm expects to increase production and sales by 40 per cent during 2011. At present, GML-FAW holds 15 distribution agencies and service centres throughout Mexico's territory. Although in its original business programme GML planned to export between 15 and 40 per cent of total production by 2009, it rather focused on the domestic market. Nevertheless, the Mexican firm expects to start exports shortly to countries of Central and South America (Costa, Rica, Guatemala, Colombia, Uruguay and Brazil), in particular to those whose Mexico has signed a FTA. Recently, GML announced a 50-50 per cent association with Carso Group to manufacture new FAW passenger buses at the Ciudad Sahagún plant. This will be their first incursion in the public transport segment, especially school and tourist transportation.

According to GML management, the firm's strategy of market positioning is based on offering the best cost-benefit relation to customers, such as high fuel and cost efficient vehicles. Depending on the size, and given the low product costs derived from the component sourcing from its Chinese partner, GML vehicles are between 20 and 25 per cent less expensive than their closest competitors. At national level the firm has established strategic alliances with organisations such as Grupo Financiero Inbursa, Intelisis, AMA (Mexican Automobile Association), Condumex, Meusnier, Federal Mogul, and Gabriel de México.

Appendix 8.3. The FAW-Salinas Grouop Joint venture

China FAW Group Corporation, founded as the "First Automobile Works", is the birthplace of China's automotive industry. This State-owned company is the oldest and one of the largest motor vehicle manufacturers in the country. Over a span of five decades, the FAW Group has evolved into one of the world's largest motor vehicle producers, reaching a total of 1.533 million units of sales in 2008. According to Fortune, in 2010 FAW ranked 258rd among the Global 500 and 25rd among the motor vehicle and parts sector. Along with Dongfeng Motor Co. (formerly Second Automobile Works) and Shanghai Automotive Industry Corp., FAW is one of China's original "Big Three".

FAW entered the international market in 1984, exporting automobiles and vehicle kits to over 70 countries. Supporting the company's rapidly expanding international sales network, FAW Group has established modern overseas production facilities in Pakistan, South Africa, Tanzania, Ukraine, and Vietnam. Likewise, FAW Group has embarked on Sino-foreign joint ventures and technical licensing agreements with leading global automotive corporations both automakers (Volkswagen, Toyota and Mazda) and auto parts suppliers (Arvin Monitor, Eaton, Koyo, TRW and Valeo, among others). This Group has established itself as a global OEM parts supplier of modules and components to some of the world's leading firms, including Ford, Hyundai, Toyota and Volkswagen. At present, FAW Group has 28 wholly owned subsidiaries and controlling interest in 18 partially owned subsidiaries. In addition, FAW Group has established a state-of-the-art certified engineering development and test centre, becoming China's largest and most extensive automotive R&D facility.

As part of its transnational operations, at the end of 2007 FAW decided to enter the Mexican market through a joint venture with the Mexican conglomerate, the Salinas Group. FAW and the Salinas Group planned to build a $150 million factory due to open in 2010 with a capacity of 100,000 units a year; it was expected to employ 4,000 workers. The plant would be located in Zinapécuaro, near the city of Morelia, the capital of the state of Michoacán. According to the business plan, FAW would build the vehicles through its subsidiary Tianjin FAW Xiali's Automobile Division, assembling compact cars named Xiali and Weizhi. On its part, the Salinas Group Motor (GSM) was constituted by two entities: a 100 per cent owned distribution company and a 70%/30% manufacturing joint venture with FAW.

Before deciding to embark on a joint venture with FAW, the Salinas Group spent around two years in discussions with several of the most successful Chinese (Geely, Great Wall and Chery among others) and Indian automakers. In its first phase, the project considered the supply of cars from China. In addition to the assembly phase, further investments by Chinese and Mexican auto parts and components suppliers were expected. The plant would start with welding, painting and final assembly, but the idea was to manufacture transmissions and engines in Mexico. It was expected that by 2010 vehicles would be produced in their new platforms. On the other hand, company sources have informed that a further phase in the joint venture would include the setting up of a technological R&D centre in Mexico, aimed at designing vehicles focused on the target markets.

Under the agreement signed at the end of 2007, FAW cars would be sold in the Mexican market and would also be exported to Central and South America. Although FAW and the Salinas Group had declared that participation in the United States was ruled out for the moment, it was believed that only in about 5-8 years time Chinese-made cars would be exported to that market from Mexico when safety and environmental standards could be met. Sales started in Mexico at the end of January 2008. Up to mid-2009, GSM and FAW had sold around 5,500 cars. FAW took advantage of the Salinas Group's 1,700 Elektra-store network covering most of the Latin American countries and its financing programmes through Banco Azteca to market cars. Vehicles were priced between US $5,500 and $7,000, about 5 to 10 per cent below the cheapest models on the market. The main target customer was the entry-level buyer, working-class population. In terms of supply, although prices of Chinese cars are slightly cheaper, they will compete with the low-end models currently offered in the market. These include the Chevy and Corsa (Chevrolet); Pointer (Volkswagen); Atos (Dodge); and Ikon and Ka (Ford).

As a new-entrant company in the Mexican market, GSM-FAW was importing cars from China under the commitment to build manufacturing facilities in a period of three years. The Mexican Automotive Decree of 2003 allows automakers to import vehicles to the country, free of import duties, as long as they have an investment of at least U.S. $100 million and locally produce more than 50,000 cars a year. Nevertheless, by mid-2009 construction of the plant had not started yet, even if the business plan goal was to start production in 2010. As a consequence, The Mexican Ministry of Economy began looking at the legal status of the Mexican-Chinese joint venture analyzing a possible ban of its duty-free imports from China. In the midst of this situation, in June 2009 GSM and FAW announced the decision to postpone their plans for the Mexican joint plant. According to companies' executives, the major cause for this was the deep economic crisis which made impossible to proceed with the project in line with original schedule. During the rest of 2009 GSM continued to import vehicles from FAW, along with other Chinese brands such as Chery, for distribution through its retail chains.

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