A Fifty-Year Journey of China Towards the World Economy

An Empirical Study on the Determinants of China's Bilateral Trade Relations

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A Fifty-Year Journey of China Towards the World Economy

An Empirical Study on the Determinants of China's bilateral Trade Relations

Proefschrift

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Contents

Chapter 1
Introduction

This chapter gives an overview of the thesis. We first provide the motivation for this thesis, and then briefly introduce the research questions, as well as an integrative framework. Finally, we introduce the remaining six chapters in this thesis.

1.1 Motivation

The study of international trade is among the oldest specialities in economics. Changing environmental conditions and all kinds of economic or political events continuously introduce triggers that may give rise to new trade patterns. Such dynamics stimulate the theoretical and empirical study of international trade. As a result, the study of international trade still is a very active field in economics. The industrial revolution, collapse of the colonial system, regional integration, economic transition and globalization – these and other driving forces behind the development of trade have inspired this sub-discipline of economics to develop new theories and perform additional empirical studies. In the contemporary world of the late 20th and early 21th centuries, globalization has become what is probably the most talked-about theme, due to its forceful impact on the world economy and the heated debate between advocates and opponents. No country can escape from its influence, and not many countries intend to exclude themselves from the process of globalization altogether. On the contrary, many countries that adopted inward-oriented strategies for many decades, are now making an effort to connect their economy into the world network of business and trade.

China is an extraordinary example. In 1978, China ended a long period of isolation by adopting an open-door policy. Since then, China has gradually increased its

involvement in the international production network by launching successive steps in the context of an overall policy of liberalization. Owing to its huge market potential, high growth, deepening economic reform, and outward-oriented strategy, China is not only influenced by the trends of globalization, but is also among the most forceful countries that boost the current globalization process. China is particularly influential as a result of the high growth of its international trade and foreign direct investment. No wonder, then, that China receives so much attention, both in academic and policy circles. Furthermore, given its unique context as a distinctive cultural, economic, political and social system, China seems to offer an excellent setting for testing and adapting the theories that were developed with reference to the empirical evidence as to developed market economies in the West. Therefore, this thesis tries to enrich the literature by examining China's foreign trade relations through a series of five empirical studies.

The reform process that started at the end of the 1970s, has gradually brought China in line with the economic rhythms of the world system. During this transitional process, China's foreign economic relations witnessed an unprecedented history of changes, both in number and nature. In particular, after 1978, China became a prime example of a developing country that integrated into the world economy, particularly in the areas of international trade and foreign direct investment (FDI). The growth of China's trade volume since 1978 has been four and a half times that of world trade, which changed China from a closed economy into one of the largest trading nations in the world. China's share of world trade septupled from 0.67 per cent on the eve of reform in 1977 to 4.89 percent in 2002.[1] In the post-war period, no other country has increased its share in international trade so rapidly. At the same time, China has become more open to FDI than most of the other developing countries, which increased China's inward FDI from nearly zero in 1978 to a level that makes it

[1] Source: IMF's DOTS databank.

the largest FDI recipient in the developing world in the early 21th century. As we will explore below, the large FDI stock is playing an unusually influential role in the development of China's international trade structure.

The starting point of this thesis is the 'old' observation that the development of international trade is influenced by institutional and political dynamics, next to economic drivers. China's institutional setting has experienced tremendous changes in the last five decades, first changing from a semi-feudal and semi-colonial economy after the Opium War into a centralized socialist economy in the 1950s, and subsequently shifting gradually from a highly centralized socialist system to a decentralized market-oriented economy in the last two decades. China's contemporary history offers a natural experiment for a study into the impact of institutional and political changes on the evolution of trade relations. As a benchmark hypothesis, we expect that, during this accelerated evolutionary process, "traditional" economic factors (cf. the gravity model, Linder's effect and new trade theories) especially started to exercise their role in driving the pattern of trade flows in the recent two decades of liberalization. Furthermore, after China opened its market to multinational companies, we hypothesize that foreign direct investment is likely to be an important determinant of China's bilateral trade pattern.

In terms of economic growth, China has been the world's number-one country over the past two decades. Not very surprisingly, this attracted a substantial amount of attention from economists. The literature is unanimous that expanding international trade is an important engine for high growth, also in the case of China. This thesis aims to contribute to the extant literature by figuring out empirically which factors indeed fuel this engine. In so doing, we broadly take into account the impact of a wide range of cultural, economic and political factors on the development of China's foreign trade relations ever since the 1950s, with an emphasis on the late 20th and early 21th centuries. Another objective of this thesis is to test whether – in if so: to

what extent – established trade theories that were developed with reference to the evidence as to developed market economies in the West work for China, an emerging transition economy, as well. In order to achieve this pair of aims, we will explore a rich panel data set by applying advanced econometric techniques.

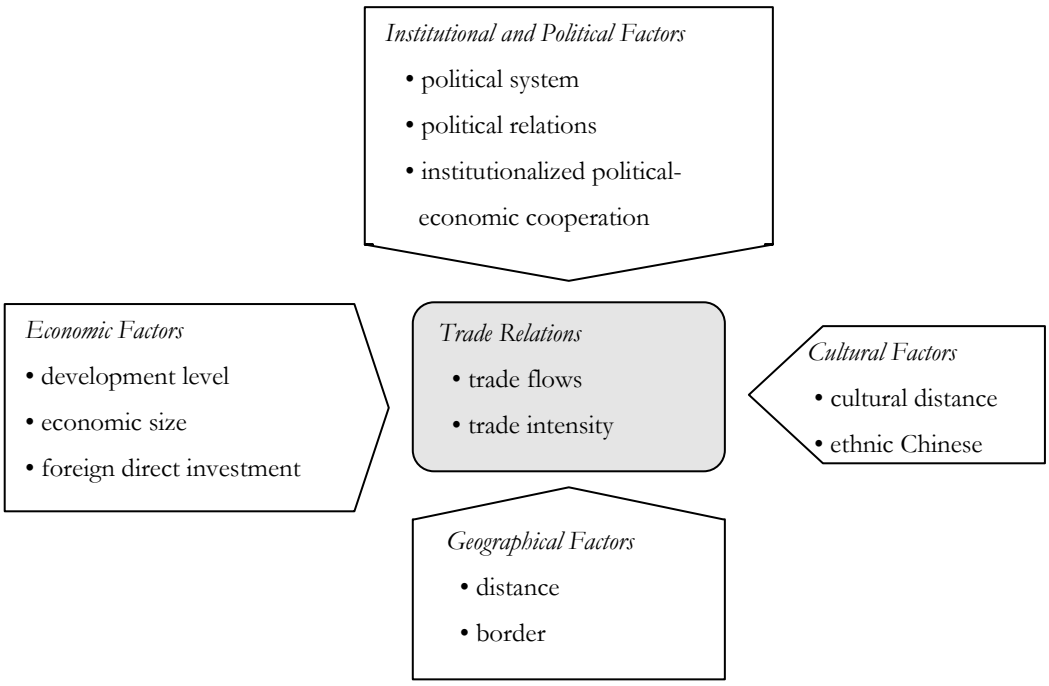
Of course, in this thesis, we stand on the shoulders of giants. Much work has already been done, both empirically and theoretically, also for the case of China. In the following chapters, we offer reviews of the relevant literatures. From such overviews, we learn that, although previous studies have revealed quite a few of the important features of China's international trade evolution, a number of issues still remain to be explored. For example, very little effort has been devoted to the estimation of the impact of changes in the institutional and political context on Chinese bilateral trade patterns with panel data that cover a long time window, the number of studies that address China's bilateral structure and its determinants is quite limited, and the detailed investigation of how FDI and trade (reciprocally) interact is just starting to emerge. This thesis tries to fill these gaps by presenting a series of five empirical studies.

1.2 Research Questions and Integrative Framework

This thesis focuses on empirical studies into China's bilateral trade relations, examining how and to what extent the bilateral trade relationships were and are influenced by cultural, economic, geographical and political factors. To fulfill this aim, the thesis deals with such questions as "How have China's trade relations developed over time?", "How can bilateral trade relations be measured?", "How and to what extent do politicians influence bilateral trade relations?", "Do the economic invisible hands and the political visible ones both play a role in China's bilateral trade relations, and what is their relative importance?", "What factors affect the structure of bilateral trade?", "Does Linder's effect determine China's trade pattern, at least in

part?", "Does FDI influence trade?", and "Is there a two-way causal relation between trade and FDI?" By answering these and other questions, we hope to contribute to the development of a better understanding of the drivers behind the changes in China's bilateral trade relations during the last half century. Based on the extant literature, we can refer to the integrative research framework in Figure 1.1 to position our series of five empirical studies. The framework includes all the potential dependent and independent variables that we will examine in this thesis.

Figure 1.1 Integrative framework



In the next section, we will briefly explain how our five studies relate to Figure 1.1.'s integrative framework. In advance, we like to emphasize that we purposefully decided not to eliminate all the overlap among our five studies (and, thus, our five empirical chapters). As a consequence of this strategy of reporting, that is, each of the five empirical studies can, in principle, be read without consulting any of the other four chapters. However, as we will explain in the next section and in Chapter 7, the five empirical studies produce different pieces of the overall puzzle of the development of China's international trade in the post-war period.

1.3 Chapters

Chapter 2 reviews the historical changes of China's foreign economic relations and related policies in the post WWII period. Here, the objective is to provide background information that sets the scene for the four empirical tests in subsequent chapters. China's foreign economic relationships experienced tremendous changes during the last 50 years. These changes reflect important shifts in the larger world's environment, such as the rise and fall of the Cold War from the 1950s to the 1980s, and intensifying processes of globalization in the late 20th century. However, shifts in China's internal regimes and policies might take more responsibility for these trade relation changes. The review indicates that, in China's pre-reform era, politicians were decisive in preventing or assisting trade with the rest of the world, whilst in the reform era open-door policies enabled – and still do so – economic factors to come to the fore. Subsequently, the purpose of the following four empirical studies is to rigorously test which determinants of bilateral trade were important when and how, taking this general observation into account.

Chapter 3 aims to find an answer to the following question: does trade follow the flag? To answer this question, we investigate the significance of the impact on bilateral trade relations of political factors by using data as to 78 of China's trade

partners over the 1950-2002 period. We use the so-called trade intensity index to measure bilateral trade relations, which explicitly reveals the relative importance of trade between two countries. We test the impact of five political factors on this trade intensity index: (1) diplomatic relationship, (2) cooperation and conflicts, (3) high-level visit, (4) political system similarity, and (5) military alliances. To estimate the relative importance of these political factors *vis-à-vis* economic determinants, we explicitly take the latter on board as well. In the empirical model, we try to deal with issues of data censoring, temporal dynamics and heterogeneity. This study provides strong empirical evidence for the hypotheses that the establishment of diplomatic relations, cooperation, visits of heads of states and similarity of political systems are associated with higher intensities of trade linkages.

Chapters 4 and 5 focus on another question: does trade follow the market? For one, in Chapter 4, we try to reveal the impact of the Chinese trade liberalization program in the 1990s on changes in bilateral trade intensities. The objective here is to investigate whether or not trade liberalization measures have made the economic explanations more significant. We estimate six models for the 1993-1999 period, as well as for the 1993 and 1999 milestone years separately, explaining the shifts in the export and import intensities of trade with different trade partners in the 1993-1999 period. The differences across our estimation results for the six models indicate, indeed, that factors influencing bilateral trade intensities have been changing significantly during the transition process. Particularly, the political determinants of trade intensities that were still very important in 1993, have been moved to the background by economic explanations in 1999.

Next, in Chapter 5, we turn to the examination of China's bilateral trade structure and its determinants. Here, we shift our focus from inter-industry trade, as explored in Chapters 3 and 4, to intra-industry trade (IIT). Growing importance of IIT is one of the major new developments in patterns of international trade in the last half

century. A high level of IIT can be expected only when a country's economic development reaches a certain stage, implying that this country integrates well into the world economy. Given its character, IIT is likely to be more beneficial than inter-industry trade, because it stimulates innovation and exploits economics of scale. During the last two decades, China's intra-industry trade index has increased substantially, which implies that China upgraded its trade structure. The main objective of this chapter is to explore the determinants of bilateral IIT by using panel data. We estimate three models for total intra-industry trade, vertical intra-industry trade (VIIT) and horizontal intra-industry trade (HIIT). Using factor analysis, we are able to extend the extant literature by including more potential determinants into the models. On the one hand, VIIT appears to be positively related to differences in consumer patterns. On the other hand, HIIT is negatively related to these differences. In addition, we find that FDI has played an important role in determining IIT, especially VIIT. Other significant intra-industry trade drivers are geographical distance, economic size, trade openness and trade composition.

Subsequently, Chapter 6 deals with the FDI-trade causality issue. That is, we investigate long-run relationships and the causality structure between FDI, export and import by using cointegration and Granger-causality approaches. In Chapters 4 and 5, FDI is set, among many other potential trade determinants, as a very important explanatory variable of bilateral trade intensities (Chapter 4) and bilateral IIT (Chapter 5). Chapter 6 goes one step further to investigate the two-way causality relationship between FDI and trade by estimating a Vector Error Correction Model (VECM). In so doing, we unravel the causality and direction of FDI – trade linkages for the Chinese economy in the 1980 – 2003 period. The key findings indicate a virtuous process of the development of China's outward-oriented economy: more imports lead to more FDI, more FDI leads to more exports, and more exports lead to more FDI.

Finally, Chapter 7 summarizes the main findings of the five empirical studies that form the core of this thesis. There, we point to a number of limitations of this thesis, suggesting a few issues that deserve attention in future work.

Chapter 2

Development of China's Foreign Economic Relations since 1949

In order to provide background information for following empirical studies, this chapter gives an historical overview of the development of foreign trade and FDI in China since the foundation of socialism in 1949. China's economic development experienced, by and large, two different periods. The first period, from 1949 to 1978, is the pre-reform epoch. In this period, China was a closed economy: foreign trade accounted for a small part of the Chinese economy only. The second period, since 1978, is the reform era in which China has moved towards greater participation in the world market. Chinese foreign trade has soared since the open-door policy was formally launched in the late 1970s. This chapter starts with an overview of the ins and outs of China's foreign trade regime and its foreign trade features in the first period. Subsequently, we present China's foreign trade reform and trade development in the second period. After that, we summarize the changes in China's foreign trade regime and trade policy instruments during the 50-year period. In view of the close relation between FDI and trade, we conclude with a description of the development of FDI in China.

2.1 Introduction

Contemporary history of China is dominated by Communism. In the late 1940s, a cival war ended with the victory of Mao's Communist forces. Under his reign, China developed an inward-looking policy of independence and self-reliance. After Mao's death and an interim power struggle in the second half of the 1970s, Deng Xioping's

leadership initiated a major policy shift, with the purpose to bring prosperity to China by combining a monopoly of the Communist Party in the political arena with market capitalism in the economic sphere. The effect of this open-door policy, which was developed step by step in the 1980s and 1990s, has been dramatic. In this thesis, which covers the 1950-2002 period, we need to develop an understanding of the nature of these changes, and their likely impact on China's economy in general and its foreign trade relations in particular. In this chapter, we provide an overview of just that.

First, in Section 2.2, we focus on the Maoist period of isolation. Subsequently, in Section 2.3, we turn to the liberalization era of the 1980s and 1990s. Next, in Section 2.4, we offer an intermediate conclusion and summary. As an addendum, in Section 2.5, we zoom in on foreign direct investment (FDI), as FDI started to play such an influential role ever since the early 1990s. Finally, in Section 2.6, we give a brief summary.

2.2 Isolated Era

When the Chinese Communist Party came to power in 1949, its leaders' fundamental long-term goal was to transform China into a modern, powerful, socialist nation. The basic policy for achieving this goal relied on independence and self-reliance. Mao emphasized the importance of self-reliance, advocating that China should rely as much as possible on its own resources for economic and social development to achieve economic and political independence. Mao feared the vulnerability that foreign trade and investment would engender (Roy 1998). Based on this idea, Maoist China was essentially a "closed economy", which sought to operate isolated from outside influences for about three decades. In addition, the establishment of the new

People's Republic of China in 1949 was considered by the West to give birth to a hostile state, dedicated to overthrowing global capitalism. This belief further intensified China's isolated position. Under these circumstances, China was not a significant player in the world market. Foreign trade was highly controlled by central government, and foreign investment was highly restricted. Since foreign direct investment in this period was negligible, we only focus on the foreign trade system in this period of China's history.

2.2.1 China's foreign trade system during the pre-reform period

After the establishment of the People's Republic in 1949, China, historically a semi-feudal and semi-colonial country after the Opium War, was changed into a centralized socialist country. Accordingly, a highly centralized and controlled trade system had been set up, particularly since 1957, when the state took over all enterprises from private (e.g., Japanese) and public (e.g., the Kuomintang government) owners. As stated by Liu Chao-chin, the director of Beijng's foreign trade department: "After the founding of the People's Republic of China in 1949… we took over the control of foreign trade; reformed the customs system; abrogated the immediate effect of all the special rights of imperialists in China; nationalized the customs service; freed ourselves from the imperialist monopoly of foreign trade; … set up state-owned foreign trade enterprises; gradually transformed the private export firms; and thus put an end to old China's dependence upon imperialism in foreign trade … [and] transferred semi-colonial foreign trade into a new socialist foreign trade."[1]

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[1] See Economic Information & Agency (1978: 2).

The most important objective of China's foreign trade policy in the immediate post-1949 period was to serve the development of China's industry, particularly heavy industry. The goal of industrialization was to achieve economic self-reliance. To guarantee the implementation of the country's industrialization program, it was necessary to export in order to obtain the funds needed to import materials and equipment for industrial development. In the word of Ye, minister of foreign trade at that time, "export is for import, and import is for the country's socialist industrialization."[2] Therefore, the trade system in this period was regarded as an extreme example of import substitution (Lardy 1992). Yet, notwithstanding the underlying strategy of import substitution, import of consumer products and raw materials were required to alleviate domestic shortages. In general, the purpose of imports was primarily to overcome bottlenecks due to limited domestic production capabilities. Exports were perceived mainly as a means of financing imports.

In the planned economy, China's foreign trade was conducted strictly according to central planning guidelines. The foreign trade plans concerned all aspects of foreign trade, such as the commodities composition, the trade direction, transportation, accounting, foreign exchange rates, labor and wages. Accordingly, China's foreign trade system was composed by the Ministry of Foreign Trade, the national foreign trade companies (FTCs) and their branches in various provinces and ports, the commercial offices abroad, and local foreign trade bureaus at the provincial level. The State Planning Commission and Ministry of Foreign Trade were the key players

[2] Ye Jizhuan "Speech at the Second Session of First National People's Congress", People Daily, July 30, 1995.

in drawing up the plan for trade with the objective to fulfill the government's overall plan. The Ministry of Foreign Trade (MFT) was the executive department responsible for implementing the state's foreign trade plans. FTCs were the state-owned enterprises to deal with export and import, seeking to achieve the foreign trade task that the MFT allocated to them. Local foreign trade bureaus at the provincial level supervised the foreign trade organizations under their jurisdiction. They were subject to the dual-leadership of the MFT and their local so-called Revolutionary Committees.

The main features of this planning foreign trade system were fivefold.[3]

1) Foreign trade was handled exclusively by 12 to 16 national FTCs with numerous branches, which were highly specialized and monopolized. For example, the China National Chemicals Import and Export Corporation handled goods produced by the Ministry of Chemical Industry, and the China National Textiles Import and Export Corporation handled goods produced under supervision of the Ministry of Textile Industry.

2) A centralized accounting system was run through the Ministry of Foreign Trade and the Ministry of Finance. Under this system, the producers and foreign trade corporations that handled imports and exports were not responsible for the profits and/or losses incurred in the production and trading activities. Financial variables such as profits played only a secondary role, backing up the central plan's physical targets. Under the pressure to fulfil their export quotas, FTCs sometimes would be

[3] See the descriptions in Lardy (1992), Huang and Wong (1996), and Song (1999).

forced to acquire higher-cost goods, which could be sold in the international market only at a loss.

3) A planned price system was employed in foreign trade.[4] Domestic prices of commodities, therefore, were shielded from the world market. In other words, domestic and world market prices were completely separated. For example, the procurement of export goods and domestic sales of imported goods were controlled by the domestic planned price system, whilst the prices of exports and imports were based on the international market prices.

4) Foreign exchange allocation and exchange rates were strictly controlled by the central government. Foreign trade corporations handed over all their foreign exchange earnings to the state. Demands for foreign currencies by domestic users for imports were met by allocating foreign currencies to these users according to the plan. The Yuan was highly overvalued during the whole period, which played an important role in balancing the foreign trade balance and subsidizing certain categories of imported goods. However, the overvalued Yuan resulted in financial losses on China's exports. For example, by the early 1960s, the average cost of earning one U.S dollar was 6.65 Yuan, and the loss per dollar exports was 4.19 Yuan, given the official rate of 2.46 (Lardy 1992).

5) The conventional trade policy instruments were less important. Price-based measures such as tariffs were obviously unimportant since the planning system was

[4] Chinese prices were fixed by the state, implying that they were not necessarily related to real economic scarcities.

based on quantity decisions rather than behavioral responses to prices. And quotas or licenses were not necessary because the import quantities were controlled through the monopoly trading corporations.

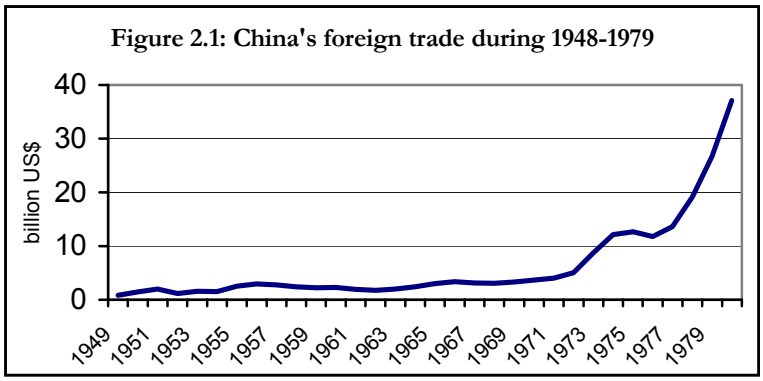
Apart from economic motives, China used foreign trade as a weapon in international political struggles, too. Overall, in the pre-reform period, China implemented an import substitute strategy of industrialization. The Chinese foreign trade system was run as a complete state monopoly. The market mechanism was switched off. Consequently, foreign trade was particularly influenced by politicians rather than by economic agents. It can therefore be expected that political reasons were important drivers of or barriers for the development of foreign trade relations. A detailed discussion of this political "visible hand" can be found in Chapter 3.

2.2.2 Foreign trade development in the isolated area

Under the influence of an excessive self-reliance principle, China's foreign trade was very limited. As stated above, imports were only made up for shortages in domestic production, such as essential raw materials and capital goods, whilst exports were only a means to provide foreign currencies necessary to finance imports. In addition, hostile foreign relationships between China and the Western countries produced a trade embargo from the West against China in the 1950s and 1960s. As a result, China's foreign trade hardly increased at all in this period. From 1950 to 1972, China's foreign trade had been languishing at about 2 to 4 billion US$, as is depicted in Figure 2.1. Beginning in 1972, China's foreign trade jumped sharply, reflecting by the historic trip of the US's President Richard Nixon to China, and the ending of the US trade embargo against China. This was China's initial turn toward the outside world. Total trade tripled from 4.06 billion in 1971 to 13.6 billion in 1977. However, in general, during the pre-reform area, China actually failed to make full use of foreign trade to accelerate economic development. One of the indicators of such a failure was China's decreasing share in the total world export and import from

0.91and 0.90 per cent in the 1950s to 0.71 and 0.66 per cent in the 1960s, and 0.80 and 0.77 per cent in the 1970s. Table 2.1 provides detailed figures.

Figure 2.1: China's foreign trade during 1948-1979



Source: IMF DOTS databank.

Table 2.1: The share of China in world export and import (%)

	1950s	1960s	1970s	1980s	1990s	2000-2002
Export	0.91	0.71	0.80	1.45	2.84	4.46
Import	0.90	0.66	0.77	1.58	2.44	3.88

Source: Author's calculations based on the data from IMF DOTS databank.

In contrast to the stagnant aggregate trade value, China's trade direction has changed considerably during this period. Probably, these changes reflect the policy shifts that occurred in the same period. In the 1950s, under the "lean-to-one-side" policy, the Soviet Union and Eastern Europe were the most important trade partners. In 1955, 69.2 per cent of Chinese foreign trade took place with the Soviet Union and Eastern Europe. In the early 1960s, China shifted from an alliance with the Soviet Union

against the United States to an anti-Soviet policy. This change led China to cultivate ties with Third World countries in Asia, Africa and Latin America in the 1960s and 1970s, and to seek rapprochement with Japan, the United States and Western Europe in the 1970s. Influenced by the policy shift, China's trade partners became increasingly diversified. The share of industrial countries, Asia and Africa in China's total trade value increased significantly, as is clear from Table 2.2.

Table 2.2: Direction of China's foreign trade, 1950-1979 (%)

	1950	1955	1960	1965	1970	1975	1979
U.S.S.R.	31.0	51.0	42.0	10.7	1.1	1.9	1.6
Eastern Europe	1.9	17.2	8.0	5.4	8.2	6.9	7.3
Industrial countries	35.5	14.3	30.6	49.0	57.4	62.2	61.0
Africa	0.9	1.0	2.4	5.0	6.3	4.7	1.8
Asia	26.9	12.7	14.9	24.4	21.2	17.1	23.2

Sources: Author's calculations based on the data from IMF DOTS databank, data from Mah (1971), and data from Eurostat (1981).

2.3 Trade in the Opening Era

At the milestone Third Plenum of the National Party Congress's Eleventh Central Committee in December 1978, after Mao's death, the party leaders decided to undertake a program of gradual but fundamental reform of the economic system. They concluded that the Maoist version of the centrally planned economy had failed to produce efficient economic growth, and had caused China to fall far behind not only the industrialized nations of the West but also the new industrial powers of Asia: Japan, the Republic of Korea, Singapore, Taiwan, and Hong Kong. The purpose of the reform program was not to abandon communism, but rather to make it work

better by substantially increasing the role of market mechanisms in the system by reducing, not eliminating, government planning and direct control. The process of reform was incremental. New measures were first introduced experimentally in a few localities, and were then popularized and disseminated nationally if they proved to be successful. By the end of the 1980s, the program had achieved remarkable results in increasing supplies of food and other consumer goods, and had created a new climate of dynamism and opportunity in the economy. In this section, we focus on this incremental process of foreign trade reform and development.

2.3.1 China's foreign trade reform during the transition period

The over-centralized and inflexible trade system was entirely unsuitable to facilitate the opening up of the Chinese economy to the outside world. The reform of the trade system started with the decentralization of the foreign trade authority. This decentralization policy consisted of the following five aspects.

1) De-monopolizing of the foreign trade regime. Since 1978, the de-monopolization of the foreign trade regime opened a window of opportunity for new entrants into foreign trade activity. The national ministries, provincial governments, three municipalities (Beijing, Tianjin, and Shanghai) and a number of large state-owned enterprises were authorized to establish their own trading companies. Almost every provincial and municipal government had its own network of FTCs conducting foreign trade. As a result, the number of foreign trade corporations increased from

12 in 1978 to 5,075 in 1988, and to 10,000 in 1995.[5] In addition, according to the Law of Foreign Investment, all foreign-invested enterprises were automatically given trading rights within a prescribed scope when they registered. These changes generated increased competition, both upstream and downstream: FTCs had not only to compete for foreign markets, but also for domestic supply as production units were progressively granted the freedom to choose their FTC. This competition led to selective retrenchment. For example, in mid-1988, about 2,000 FTCs were dissolved, or merged with rivals (Fung et al. 1998). In 1999, de-monopolization was extended to private firms, which could from then on apply for trade rights. In 2000, a notice issued by the Ministry of Foreign Trade and Economic Cooperation (MOFTEC) announced that the same rules applied for state-owned, collectively-owned and private enterprises, as well as research institutions, in granting them rights to engage in foreign trade business (XINHUA, December 18 2000). Since then, state corporations, foreign-invested firms, collectively-owned enterprises, and private organizations all have direct trading rights.

2) Decentralization of decision making. The scope of mandatory planning for foreign trade has been reduced. The foreign trade system was transformed from mandatory planning to a combination of mandatory planning, guidance planning and a market mechanism. Gradually, mandatory planning was abolished. Before 1979, the mandatory export plan covered about 3,000 items, but in 1988 this number fell to a mere 112. By the end of the 1980s, the proportion of exports under mandatory or guidance plans accounted for about 34 per cent of total exports. Compared with its export counterpart, the import system remained relatively rigid in the 1980s. In

[5] *China Economic News*, June 24 (1996: 33).

addition to import licensing and high tariffs on protected products, almost all importers were subject to a series of administrative measures and complicated approval procedures. But in the process of reforming the foreign trade system, the general scope of mandatory planning for imports was narrowed, too. By 1991, no more than 40 per cent of China's imports were subject to mandatory or guidance plans (Fung and Iizaka 1998). Later in the 1990s, pressured by the desire to join the World Trade Organization (WTO), China's trade regime has been moving further into a more deregulated and market-oriented direction. Specifically, mandatory export plans have been abolished, and import plans have been scaled down substantially. National monopoly and canalization only apply to a limited number of agricultural and industrial products, deemed essential for the Chinese society, calling for special protection, such as crude oil, rubber, automobiles, key automotive parts and accessories, coal, and tobacco and cigarettes.[6] Meanwhile, almost all FTCs are independent, being responsible for their own profits and losses.

3) Relaxation of exchange control. The foreign exchange rate system has been relaxed, step by step. In 1979, to start with, enterprises were granted the right to buy back a fraction of their hard currency earnings from the Bank of China. Later, they were allowed to retain up to 25 per cent of planned export earnings. The retention system came with the establishment of foreign exchange adjustment centers across the country in 1986. Through the foreign exchange adjustment centers, enterprises

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[6] See the recent announcement and provisions concerning trade management, such as "2003 commodities list under the import licensing control" (2002, jointly issued by MOFTEC and the Customs of People's Republic of China).

short of foreign exchange could purchase foreign currencies at a significant discount relative to the official rate. China thus had a dual exchange rate system. One the one hand, there was the administered official exchange rate, which used for transactions under the foreign trade plan and for most capital account transactions; on the other hand, there were the swap market exchange rates as determined in the foreign exchange adjustment centers, which were applicable to foreign exchange transactions outside the foreign trade plan. In 1994, the two rates were unified and the foreign exchange adjustment centers were replaced by a national foreign exchange market operating through designated banks. All enterprises must now buy and sell foreign currencies at this national market. This new exchange system has strengthened the Central Bank's ability to stabilize the exchange rate, thereby achieving more flexibility in responding to movements in the balance of payments and global market conditions. The united system provides a more efficient trading and settlement mechanism, as well as a unified regulatory framework.

4) Devaluation. For a long time, the losses on exports caused by the overvalued Yuan increasingly deterred China's trade development. Devaluation was an important measure to alleviate the disincentive effects of currency overvaluation on exports. The first round of devaluation took place in January 1981 with the introduction of an internal settlement rate of 2.8 Yuan per US dollar. From 1981 to 1993, there were six major devaluations in China, ranging from 9.6 to 44.9 per cent: the official exchange rate went from 2.8 to 5.32 Yuan per US dollar. On January 1, 1994, China unified the two-tier exchange rates by devaluing the official rate to the prevailing swap rate of 8.7 Yuan per US dollar. By the end of May 1998, the foreign exchange reserve of China had reached US$140.91 billion. Due to the increase in foreign exchange supply, the official exchange rate has continued to appreciate slightly. Since the end of May 1998, the official exchange rate has stayed at 8.28 Yuan per US dollar. Table 2.3 provides the 1980-2003 time series. Studies found evidence to support the idea that the current Chinese exchange rate is more realistic,

compared to the one in the pre-reform period. For example, Zhang (1999) indicated that the actual real exchange rate in China moved closer in line with its equilibrium value after 1981.

Table 2.3: Exchange rate of Renminbi (Yuan/$)

Year	Exchange Rate	Year	Exchange Rate	Year	Exchange Rate
1980	1.5	1988	3.72	1996	8.31
1981	1.7	1989	3.77	1997	8.29
1982	1.89	1990	4.78	1998	8.28
1983	1.98	1991	5.32	1999	8.28
1984	2.32	1992	5.51	2000	8.28
1985	2.94	1993	5.76	2001	8.28
1986	3.45	1994	8.62	2002	8.28
1987	3.72	1995	8.35	2003	8.28

Source: IMF.

5) Trade liberalization. As stated above, before the reform, all imports and exports were handled by the special national import and export companies under the jurisdiction of the former Ministry of Foreign Trade and its branch companies. Common trade policy instruments were not important. During the 1980s, the government restored the import and export license system to control foreign trade. The share of trade regulated by licenses rose sharply. By 1989, the share of imports under licenses was 46 per cent, and the share of export under licenses was 55 per cent (Lardy 1992). Since 1992, China has made substantial progress in reducing the number of non-tariff barriers in its trade regime. In 1992, the government lowered the number of export goods subject to quota license regulation from 212 to 183, and fully eliminated import-quota license requirements for 16 categories of goods. In December 1993, China canceled import license requirements for 9 categories of

goods that comprise 283 products, including steel products, pesticides, civil airplanes, and black-and-white television tubes. In May 1994, China eliminated import license requirements for another 195 goods, including 30 goods that were to be relieved of requirements by the end of 1994 in accordance with a Sino-US memorandum of understanding. In 1995, another 120 goods were relieved of import license regulation. In April 1996, 30 per cent of the remaining quotas were dropped. By the end of 1997, the import commodities subject to licensing controls were reduced to 374 products (http://www.tdctrade.com/sme/ir/chinair.htm). In fulfilling China's WTO commitment, China has removed the import license requirements for more products in recent years; by 1 January 2003, only 8 categories and 143 products were subject to licensing control.[7]

Moreover, the Chinese government has lowered trade tariff rates more broadly and more significantly. In January and again in December 1992, China reduced import tariffs for 3,596 duty codes, reflecting different product categories, by an average of 7.3 per cent. In the same year, China eliminated an adjustment tax that had been levied since 1985 on the import of 16 categories of goods. In December 1993, China further cut back on import tariff rates for 2,898 duty codes by an average of 8.8 per cent. In January 1994, import tariff rates for sedans were reduced from 220 per cent and 180 per cent (depending on the model) to 150 per cent and 110 per cent, respectively. In April 1996, import tariffs for 4,971 items were lowered by an average of 35 per cent, reducing the country's average tariff rate from 35 to 23 per cent for all goods. The average rate was further decreased to 17.8 per cent on October 1 1997 (Customs of the People's Republic of China). In 2001, China cut import tariff rates

[7] MOFTEC 2002, "2003 commodities list under the import licensing control".

on 3,462 items by an average of 6.6 per cent, bringing the country's average tariff rate down to 15.3 per cent (*China Daily* of May 1 2001). In all, the trade liberalization program during the post-1992 period is associated with a drop of the arithmetic average of tariff rates from 43.2 per cent in 1992 to 15.3 per cent in 2001. In order to fulfill the promise for the entry of WTO, in 2002, China cut back on import tariff rates for 5000 duty codes, which bring average tariff rate to 12%. In 2003 this rate was further cut down to 11.1%, with more than 3,000 tariff items involved. Table 2.4 provides details.

Table 2.4: The average tariff rates in China: 1992-2003 (%)

	All products		Primary products		Manufactures	
	Simple*	Weighted**	Simple	Weighted	Simple	Weighted
1992	42.9	40.6	36.2	22.3	44.9	46.5
1993	39.9	38.4	33.3	20.9	41.8	44.0
1994	36.3	35.5	32.1	19.6	37.6	40.6
1996	23.6	22.6	25.4	20.0	23.1	23.2
1997	17.6	18.2	17.9	20.0	17.5	17.8
1998	17.5	18.7	17.9	20.0	17.4	18.5
1999	16.7					
2000	16.3	14.7	16.5	18.8	16.2	13.7
2001	15.3	14.3	18.8	18.6	14.7	12.9
2002	12		18.1		11.4	
2003	11		16.8		10.3	

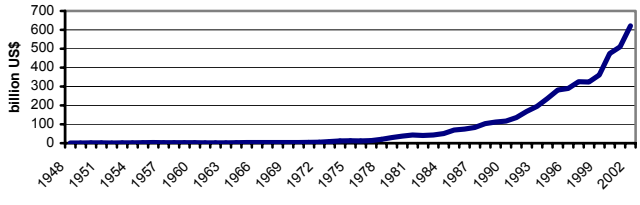
* Simple average tariff rate; ** Weighted average tariff rate.
Source: Data during 1992-1998 and for 2000 come from the World Bank (1999: 340; and 2001: 348). For the other years, the sources are Xinhua News Agency, MOFTEC, and the Hong Kong Trade Development Council.

2.3.2 China's foreign trade development since 1978

2.3.2.1 The role in the world

In the period after the launch of the trade system reform, China's foreign trade expanded dramatically, as is immediately clear from Figure 2.2. The growth of China's trade since 1978 has been four and half times that of world trade. As a result, China's share in world export increased from 0.8 per cent in the 1970s to 4.46 per cent in the 2000s (see Table 2.1). China has increased its penetration into both developed and developing markets. The role of China's products in Western countries and in Asian regional trade has become increasingly important, as the data in Table 2.5 reveal. For example, in 2002, China's exports accounted for 11 per cent of US imports and 18.3 per cent of Japan's imports. Similarly, China has become a more important export destination, especially for regional economies. In effect, China is now among the most important export destinations for other Asian countries, as is reflected in Table 2.6's evidence. For example, a 14.7 per cent of Korea's exports flowed into China in 2002, up from zero per cent in 1990. While most of the dramatic increases in exports to China have occurred from within the Asian region, the share of exports from the United States and the European Union to China has also increased, from 1.2 and 1.5 per cent, respectively, in 1990 to 3.2 and 3.4 per cent in 2002.

Figure 2.2: China's foreign trade during 1949-2002



Source: IMF DOTS databank.

Table 2.5: China's market share in selected trade partners
(the share of China's products in their total imports)

	United States	European Union	Japan	Korea	Australia	Africa
1980	0.5%	0.8%	3.1%	0.0%	1.2%	0.8%
1981	0.8%	0.8%	3.7%	0.0%	1.4%	1.3%
1982	1.0%	0.8%	4.1%	0.0%	1.3%	1.1%
1983	0.9%	0.9%	4.0%	0.0%	1.2%	1.0%
1984	1.0%	0.9%	4.4%	0.0%	1.3%	1.0%
1985	1.2%	1.0%	5.0%	0.0%	1.2%	0.9%
1986	1.4%	1.4%	4.5%	0.0%	1.4%	1.2%
1987	1.6%	1.7%	5.0%	0.0%	1.8%	0.9%
1988	2.0%	1.9%	5.3%	0.0%	2.1%	1.0%
1989	2.6%	2.1%	5.3%	0.0%	2.4%	0.9%
1990	3.2%	2.3%	5.1%	0.0%	2.7%	1.1%
1991	4.0%	3.1%	6.0%	4.2%	3.5%	1.2%
1992	5.0%	3.5%	7.3%	4.5%	4.2%	1.7%
1993	5.6%	4.2%	8.5%	4.5%	4.7%	1.8%
1994	6.0%	4.4%	10.1%	5.3%	4.9%	1.8%
1995	6.3%	4.3%	10.7%	5.5%	5.0%	1.9%
1996	6.7%	4.6%	11.6%	5.7%	5.2%	2.0%
1997	7.3%	4.9%	12.4%	6.9%	5.7%	2.4%
1998	8.0%	5.3%	13.2%	6.9%	6.0%	3.0%
1999	8.2%	5.7%	13.9%	7.4%	6.5%	3.0%
2000	8.6%	6.2%	14.5%	8.0%	7.8%	3.8%
2001	9.3%	6.7%	16.6%	9.4%	8.8%	4.3%
2002	11.1%	7.5%	18.3%	11.4%	10.1%	5.0%

Source: IMF DOTS databank.

Table 2.6: The share of China in selected countries' exports
(exports to China divided by their total exports)

	United States	European Union	Japan	Korea	ASEAN	Australia	Africa
1980	1.7%	0.9%	3.9%	0.0%	1.0%	3.6%	0.3%
1981	1.5%	0.8%	3.4%	0.0%	0.8%	2.9%	0.3%
1982	1.4%	0.8%	2.5%	0.0%	1.2%	3.8%	0.3%
1983	1.1%	1.0%	3.3%	0.0%	0.8%	1.9%	0.3%
1984	1.4%	1.2%	4.2%	0.0%	0.9%	3.1%	0.4%
1985	1.8%	2.1%	7.1%	0.0%	1.4%	3.8%	0.4%
1986	1.4%	2.1%	4.7%	0.0%	1.9%	4.7%	0.4%
1987	1.4%	1.8%	3.6%	0.0%	2.3%	4.0%	0.2%
1988	1.6%	1.8%	3.6%	0.0%	2.6%	2.6%	0.3%
1989	1.6%	1.7%	3.1%	0.0%	2.3%	2.5%	0.4%
1990	1.2%	1.5%	2.1%	0.0%	1.9%	2.5%	0.4%
1991	1.5%	1.6%	2.7%	1.4%	2.0%	2.8%	0.3%
1992	1.7%	1.8%	3.5%	3.4%	2.1%	3.2%	0.5%
1993	1.9%	2.6%	4.8%	6.0%	2.4%	3.6%	0.7%
1994	1.8%	2.6%	4.7%	6.1%	2.5%	4.3%	0.6%
1995	2.0%	2.5%	5.0%	7.0%	2.6%	4.3%	1.0%
1996	1.9%	2.3%	5.3%	8.3%	2.9%	5.0%	0.8%
1997	1.9%	2.2%	5.2%	9.4%	3.0%	4.6%	1.5%
1998	2.1%	2.3%	5.2%	9.0%	3.2%	4.2%	0.9%
1999	1.9%	2.5%	5.6%	9.5%	3.1%	4.7%	1.6%
2000	2.1%	2.7%	6.3%	10.7%	3.6%	5.7%	3.5%
2001	2.6%	3.0%	7.7%	12.1%	4.1%	6.2%	3.1%
2002	3.2%	3.4%	9.6%	14.7%	5.2%	6.9%	3.8%

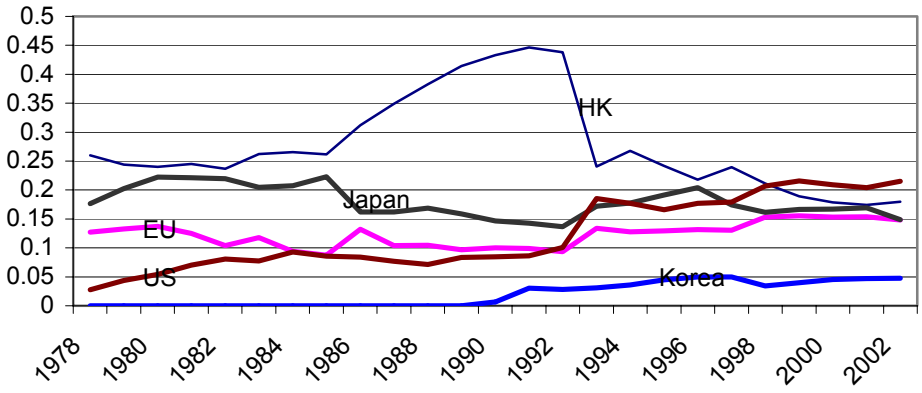
Source: IMF DOTS databank.

2.3.2.2 Changes in trade direction

Ever since the trade liberalization program is in effect, an important feature of Chinese trade patterns is the increased diversity of trade partners. The number of trade partners (with trade value more than 10,000 US$) increased from 62 in 1980 to 198 in 2002. The share of trade partners like Hong Kong and Japan decreased, but

the share of other trade partner such as the United States, the European Union and Korea increased. In Figure 2.3, a few key statistics are depicted. Hong Kong had for long been China's largest trade partner, counting for more than one third of Chinese exports during 1987-1992, but Hong Kong's share dropped to an interim low of 18 per cent in 2002 (IMF), becoming China's second largest export destination behind the United States. Trade between the European union and China has increased very fast since 1992 (Ebbers and Zhang 2003). In 2004, the European Union has surpassed the United States to become China's largest trade partner.

Figure 2.3: Share of selected countries in China's exports



Source: IMF DOTS databank.

2.3.2.3 Composition of trade

So, China's trade composition has been changed considerably during the last two decades, as is clear from the figures in Table 2.7. On the one hand, food and fuels

had been important export products for many decades, accounting for more than 40 per cent of China's export in 1985. However, these products became less important since then, with a share in China's export that decreased to 7.6 per cent in 2002. On the other hand, the manufactured goods, especially machinery and transport equipment, have increasingly gained importance. The share of manufactured goods (SITC 5-8 less 68) in China's exports increased from 36.3 per cent in 1985 to 89.9 per cent in 2002. The change in import composition is not as large as that in export. However, the share of fuels, machinery and transport equipment have been increasing, from 0.4 and 38.9 per cent, respectively, in 1985 to 6.6 and 46.4 per cent in 2002. These changes indicate that China has upgraded its trade structure: it no longer is a country that mainly exports material goods and imports manufactured goods. Of course, labor-intensive manufactured goods, largely consisting of footwear, clothing, toys, and other miscellaneous manufactured articles, have dominated China's exports. However, in recent years, China has made substantial gains in other export categories, including more sophisticated electronics (office machines and automated data processing equipment, telecommunications and sound equipment, and electrical machinery), furniture, travel goods, and industrial supplies. For example, machinery and transport equipment (SITC 7, which includes electronics) in China's exports increased from 2.8 per cent in 1985 to 46.4 per cent in 2002. In accordance with the changes in composition, China's intra-industry trade (IIT) has increased: the IIT index increased from 31.2 in 1992 to 39.4 in 2001 (Zhang and van Witteloostuijn 2005). More discussion about IIT can be found in Chapter 5.

2.3.2.4 New forms of trade

To promote export, China introduced new trade forms, such as processing trade, compensation trade, and small-scale border trade, in the post-1979 decades. Among the most important of these is export processing. Export processing is a rather broad concept, encompassing both the processing of imported raw materials for export

and the assembly of imported components to produce exportable final goods. Beginning in 1979, China sought to promote export processing by offering the relevant processing firms priority in acquiring foreign exchange currencies and appropriate supplies of domestic raw materials, fuel and electricity (Lardy 1992). After 1984, the State Council approved two schemes that allowed duty-free import of components and raw materials for use in export industries. These schemes efficiently encouraged processing export. The share of processing trade increased from 4.4 in 1980 to 53.4 per cent in 1998, becoming the dominant trade form in China. After 1999, the share of processing trade decreased, but it sustained its position as the major trade form.[8] The development of processing trade has changed China's foreign trade structure, as can be seen in Table 2.8. More details about the influence of processing trade can be found in Chapter 5.

[8] In order to promote export, the government implemented trade policy instruments such as export tax rebates, favorite policies for foreign invested enterprises, and duty-free import of components and raw materials for use in export industries. To take advantage of these policy instruments, some enterprises cheated the administration to earn extra profit. For example, some processing enterprises imported components and raw materials to subsequently sell them in domestic markets, instead of using them in export processing. In 1999, China's State Council endorsed a new system for enhancing and improving the management of processing trade activities. Cheating in processing trade has been cracked down, which statistically produced a downturn in the growth of processing trade.

Table 2.7: Commodity composition of China's foreign trade 1985-2002

(in percentages)

	All food items (SITC 0 + 1 + 22 + 4)	Fuels (SITC 3)	Ores and metals (SITC 27 + 28 + 68)	Manufactured goods (SITC 5 to 8 less 68)	Machinery and transport equipment (SITC 7)
Export					
1985	16.7	25.9	2.6	36.3	2.8
1990	12.7	8.4	2.1	71.4	17.4
1995	8.2	3.6	2.1	83.9	21.0
2000	5.4	3.2	1.8	88.2	33.1
2002	5.0	2.6	1.6	89.9	39.0
Import					
1985	4.4	0.4	5.3	78.0	38.9
1990	8.7	2.4	2.9	79.7	40.3
1995	7.0	3.9	4.4	78.5	39.7
2000	4.0	9.2	5.9	75.6	40.8
2002	3.3	6.6	5.3	80.2	46.4

Source: United Nations Statistics Division, Commodity Trade Statistics Section.

Table 2.8: Development of processing trade 1980-2002

Year	Total trade 100 million$	Processing trade		Year	Total trade 100 million$	Processing trade	
		Value	Share(%)			Value	Share(%)
1980	381.4	16.7	4.4	1992	1658.7	711.6	42.9
1981	440.2	24.8	5.6	1993	1956.7	806.2	41.2
1982	416.1	35.2	8.3	1994	2365.3	1045.5	44.2

1983	436.2	42.2	9.5	1995	2810.2	1320.8	47.0
1984	535.5	58.4	10.8	1996	2895.3	1465.0	50.6
1985	696.0	75.4	10.7	1997	3252.9	1698.0	52.2
1986	738.5	123.2	16.6	1998	3240.5	1731.5	53.4
1987	826.5	191.9	23.2	1999	3606.5	1844.6	51.2
1988	1030.4	288.5	28.0	2000	4743.1	2302.1	48.5
1989	1119.5	361.6	32.3	2001	5097.7	2414.4	45.2
1990	1156.8	441.9	38.2	2002	6207.0	3021.0	48.7
1991	1362.3	574.9	42.2				

Source: Customs General Administration of the People's Republic of China.

2.4 Evolution of China's Foreign Trade Regime and Trade Policy Instruments during 50 Post-war Years

China's foreign trade regime has experienced tremendous changes ever since the establishment of the People's Republic in 1949, as is summarized in Table 2.9. During the pre-reform period, the foreign trade principle was based on the idea of self-reliance and geopolitical motives. Accordingly, the trade regime was import substitution. After 1978, when "reform and open" was set as China's basic policy, the foreign trade regime shifted to export promotion. Since 2001, WTO accession has brought China into a trade liberalization time. In line with the changes of foreign trade regime, the policy instrument portfolio has been changed. The period from 1950 to 1958 was a transition period for China's society, which transferred from a semi-feudal and semi-colonial country into a centralized socialist nation-state. During this period, state trading monopolies were set up by establishing national FTCs and taking over the foreign trade corporations that played a significant role in China's foreign trade under the regime of the Nationalist Party.

Table 2.9: China's foreign trade regime during the 50 years.

		1950-1957 1958---1978 1979------1985-----1991 1992----- 1994---------2001---------
Ideology and politics		Self-reliance Integration into world economy Geopolitical consideration
Trade regimes		Import substitution Trade liberalization Export promotion
Trade policy instruments	Import	Import license Command plan Guidance plan Reducing import plans Quotas and license Reducing import license and quotas Exchange control Relaxation of exchange control Liberalization of current account. Import adjusted tariff Tariff reduction Import value-added tax and excise tax Import subsidy Eliminating import subsidy
	Export control	Export licenses Command plan Eliminating command plan Quotas and license
	Export promotion	Special Economic Zones Export processing . Tightening up the export processing Foreign exchange retention Eliminating retention system Export tax rebate Lowering rebate rates Export subsidy Eliminating export subsidy Export credit Foreign invested enterprises

Source: Author's compilation

Even in this transitional period, foreign trade was heavily controlled by the state. Trade licenses were important instruments to control trade flows.[9] From 1959 to 1978, China's foreign trade was conducted under a pure central planning system. All imports and exports were handled by a handful of FTCs and their branch companies in strict accordance with state plans. Thus the role of import and export licenses was reduced. Other instruments, such as licenses, quotas, foreign exchange policies, have been employed to control import. During 1979 to 1992, special economic zones, export processing, foreign exchange retention, export tax rebate, export subsidy, export credit and favorite policies for foreign invested enterprises were utilized to promote export. After 1992, administrative control was further reduced, and gradually withdrawn from trade management altogether. Other instruments, including tariff and non-tariff barriers, have been significantly reduced or eliminated. The export incentives that prevailed in the pre-reform period have also been lowered and eliminated.

2.5 Foreign Direct Investment in China

While China's trade volume increased at a high speed, China's inward FDI expanded extraordinarily. Since embarking on the open-door program at the end of the 1970s, China has emerged as one of the most attractive locations for FDI in the world. Chinese FDI inflow has risen tremendously, becoming a new factor contributing to

[9] In 1950, the central government issued the "Interim Regulations on Foreign Trade Management", in which it was stated that "[w]hile importing and exporting any goods, the importer and exporter must apply to their local foreign trade administrative department for an import and export license" (MOFTEC).

the growth of China's foreign trade. In Lardy's words, China's trade expansion might well be the fruit of its liberal investment environment (Lardy 2002). Therefore, to better understand China's foreign trade development, we need to consider the evolution of inward FDI in China and its contribution to China's economy as well.

2.5.1 Chinese success in attracting FDI

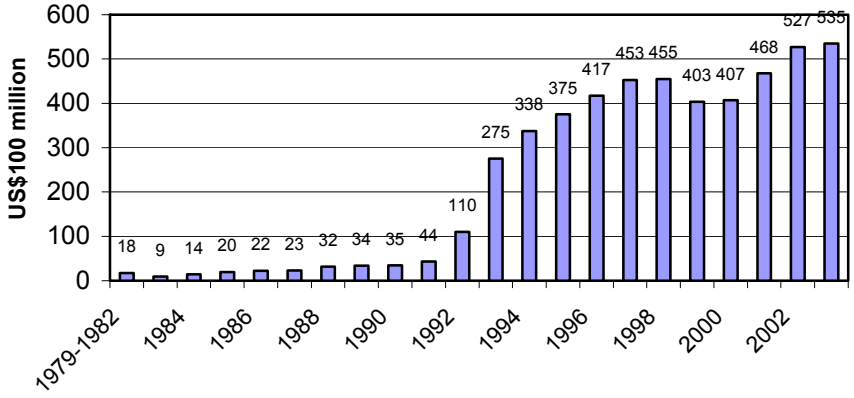
2.5.1.1 High growth.

China has been very successful in attracting FDI. By the end of 2003, China had approved a cumulative number of 465,277 foreign investment projects, which contracted and actually utilized an FDI stock amounting to US$943.13 billion and US$501.47 billion, respectively. Chinese FDI inflow has risen tremendously from nearly zero in 1978 to $53.5 billion in 2003. In Figure 2.4, we graph this evolution. Average annual growth is 30.2 per cent from 1983 to 2003.[10] In 1999, Chinese FDI inflow decreased for the first time (-11.5%) due to the Asian crisis. But since 2000, it has recovered steadily with a growth rate of 1 per cent in 2000, 14.9 per cent in 2001, 12.51 per cent in 2002, and 1.44 per cent in 2003.[11]

[10] Calculated from data of the National Bureau of Statistics of China.

[11] Source: Ministry of Commerce of the People's Republic of China.

Figure 2.4: Utilized FDI in China 1979-2003



Source: Ministry of Commerce of the People's Republic of China.

The increase of the absolute value of FDI is only part of the picture, though. The *World Investment Report 2002* introduced the UNCTAD Inward FDI Performance Index to benchmark a country's success in attracting FDI *vis-à-vis* the rest of the world. This index is the ratio of a country's share in global FDI flows to its share of global GDP. A country with an index of one receives FDI exactly in line with its relative economic size. A country with an index greater (lower) than one attracts more (less) FDI than may be expected on the basis of its relative GDP. Table 2.10 shows that China's Inward FDI Performance Index increased from below one, 0.9 during 1988-1990, to above one, 1.2 during 1998-2000. This means China attracted less FDI than expected given its size in 1988-1990, but that it attracted more than its to-be-expected share in 1998-2000. Compared with other groups of countries, China not only scores higher than the group of developing countries as a whole, but also more than the developed countries as a whole, as well as the group of Central and Eastern European countries (cf. Table 2.10). Due to the slow economic growth in most parts of the world, global FDI inflows declined by 41 per cent in 2001, and fell

by another 21 per cent in 2002 – to $651 billion, the lowest level since 1998. However, in contrast with this worldwide downturn, China's FDI inflow increased significantly in these two years, resulting in a higher inward FDI Performance Index of 1.3 during 2000-2002 (UNCTAD).

Table 2.10: Inward FDI Performance Index for 1988-1990 and 1998-2000

	1988-1990	1998-2000
Developed countries	1.01	1.00
Developing countries	0.99	0.99
Asia	1.07	0.85
Central and Eastern Europe	0.89	0.98
China	0.9	1.2

Source: UNCTAD, World Investment Report 2001 (page 27).

2.5.1.2 Important player in the world market

The high growth of FDI inflow reflects the increasingly important role that China plays in the world's capital flows. Table 2.11 indicates that the contribution of China to the world FDI inflow increased significantly. From 1980 to 2002, the ratio of China's to the world FDI inflow stock increased from 1 per cent to 6.3 per cent, to developing countries from 2.5 per cent to 19.1 per cent, and to developing Asia from 3.9 per cent to 31.9 per cent. In terms of annual FDI inflow, the share of China is even higher. In 2002, FDI inflow in China accounted for 8.1 per cent of world FDI, 2.5 per cent of FDI flowing into developing countries, and 55.5 per cent of the flow into Asia.[12]

[12] Calculated from data of UNCTAD, World Investment Report 2003, table B.1.

Indeed, China plays an increasingly important role in international production. In a global world that witnesses increased competitive pressures, multinational enterprises see China as an ideal place to expand their business. In the words of Roy Vallee, the chairman and chief executive officer of Avnet Inc., one of the world's largest business-to-business distributors of electronics: "To be successful in this industry, we have to be successful in China. We view China as an incredibly important market." (Spiegel 2001)

Table 2.11: FDI inflow stock 1980-2001 (US$ Millions)

	1980	1985	1990	1995	2000	2001	2002
World	635534	913182	1871594	2911725	6258263	6845723	7122506
Developing	245819	344463	484954	849915	2002173	2181249	2339632
Asia	160000	227764	315412	567631	1243202	1325735	1402488
China	6251	10499	24762	137435	348346	395192	447892
China/World	1.0%	1.1%	1.3%	4.7%	5.6%	5.8%	6.3%
China/Develo	2.5%	3.0%	5.1%	16.2%	17.4%	18.1%	19.1%
China/Asia	3.9%	4.6%	7.9%	24.2%	28.0%	29.8%	31.9%

Source: calculated from data of UNCTAD, *World Investment Report 2002* and *World Investment Report 2003*, Table B.3

2.5.1.3 Contribution of FDI to domestic economy

The Chinese economy expanded dramatically in the last two decades. The annual growth rate was 9.3 per cent during 1978-2001, about 6.1 percentage point above the

world average.[13] China now ranks as the world's sixth largest economy in terms of gross national income.[14] An important driving force for this development is the increasing openness of the economy, especially in the area of trade and FDI. Due to the positive interactive effect between trade and FDI (Liu, Burridge and Sinclair 2002; Liu, Wang and Wei 2001; Sun 2001; Sun 1999; Wei, Liu, Parker and Vaidya 1999; Zhang and Felmingham 2001), FDI has played a major role in China's economic growth (Zhang 2001a; Berthelemy and Demurger 2000; Henley and Kirkpatrick 1999).

First, FDI contributes to China's high growth rate by expanding China's manufacturing exports. Foreign invested enterprises (FIEs) play an increasingly important role in China's export. The share of FIEs' export and import in total national export and import increased from 1.9 and 5.6 per cent in 1986, respectively, to 54.8 and 56.2 per cent in 2003, as revealed in Figure 2.5. Proliferation of FIEs does not only augment China's export volumes, but also upgrades its export structure. FIEs have become the major force of high-tech product exports in China. In 1999, FIEs contributed 65 per cent of the high-tech product exports (MOFTEC). The relationship between FDI and trade will be discussed in much greater detail in the following chapters.

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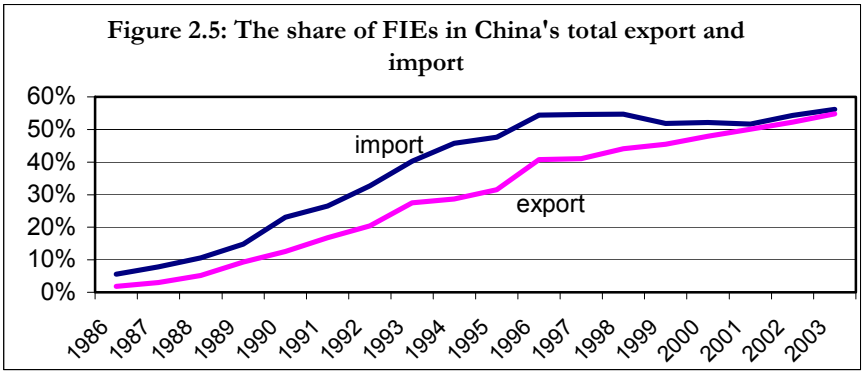
[13] Source: *Xinhua*, November 21, 2002.

[14] Source: World Bank, *2003 World Development Indicators* (page 14).

Figure 2.5: The share of FIEs in China's total export and import



Source: Ministry of Commerce of the People's Republic of China.

Second, FDI enhanced China's economic growth through raising capital formation, increasing industrial output, generating employment, and adding tax revenues. The ratio of FDI to gross fixed capital investment increased from a negligible level in 1980 to 3.5 per cent in 1991, and then to 14.7 per cent in 1995. But in 2000, the ratio declined to 10.5 per cent because of the effect of the Asian financial crisis. Since 2001, the ratio has increased steadily again (UNCTAD 2004: 396). The number of employees in FIEs increased from 0.06 million in 1985 to 1.65 million in 1991, and then to 6.42 million in 2000. The share of FIEs' output in national output grew from 5.3 per cent in 1991 to 14.3 per cent in 1995, and subsequently to 22.5 per cent in 2000. Tax contributions from FIEs rose with FDI inflows: its share in China's total tax revenues increased from 4.1 per cent in 1991 to 11.0 per cent in 1995 and 17.5 per cent in 2000. Table 2.12 offers a summary.

Table 2.12: Contribution of FDI to China's economy, 1991-2000

	1991	1995	2000
FDI inflows/gross fixed capital formation (%)*	3.5	14.7	10.3
FIEs export/ total exports (%)**	16.8	31.5	47.9
Number of employees in FIEs (million)***	1.65	5.13	6.42
FIEs' output/national output (%)**	5.3	14.3	22.5
FIEs sales/national sales (%)*	5.3	14.3	31.3
Tax contribution of FIEs/national tax revenue (%)**	4.1	11.0	17.5

* Source: UNCTD, World Investment Report 1995 and World Investment Report 2002.
** Source: MOFTEC, *Statistics on FDI in China 2001 and 1999*. The output here only refers to the output of manufacturing.
***Source: SSB (1997, 2001), *China Statistic Yearbook*.

Third, FDI facilitates the Chinese transition process. FDI has played a significant role in transforming China's ownership structure, improving China's corporate governance. The share of the assets of FIEs in total assets rose from negligible in 1978 to 13.3 per cent in 1995, and subsequently to 15.2 per cent in 2001. Correspondingly, the share of the state's and collectivities' assets dropped from nearly 100 per cent in the late 1970s to 82.2 per cent in 1995, and further to 75.1 per cent in 2001.[15] The changes in ownership structure were helpful in overcoming, at least in part, the shortcomings of corporate governance that were inherited from the times of state ownership. In a similar vein, FDI has facilitated the reform of the State-Owned Enterprise (SOE) form. Directly, foreign enterprises have joined SOE-restructuring initiatives through joint ventures (JV) or mergers and acquisitions

[15] The assets here do not include financial assets. Source: Ministry of Finance of the People's Republic of China.

(M&As). Indirectly, FDI influenced SOE-reform by the demonstration effects from the operations of FIEs.

2.5.2 Policy and FDI

National policies and legislations are important determinants of FDI inflow in China. Since 1979, China has started to liberalize its policies to establish a hospitable regulatory framework for FDI by relaxing rules regarding foreign ownership, mode of entry and operational freedom. The Chinese FDI regime has been liberalized gradually, and the legislative environment has been improved with the promulgation of a series of policies and laws regarding FDI. The evolution of the policy framework reflects the changes in the characteristics of FDI flow and FIEs in terms of entry modes (or legal form of FIEs), size of projects, contract performance, foreign sources and subnational location.

2.5.2.1 First stage 1979-1982

The initiation of the first stage was marked by the promulgation of the *Law of the People's Republic of China on Foreign Equity Joint Ventures* (EJV law) in 1979, which was followed by the creation of four special economic zones (SEZs) in 1980. The four SEZs, including Shenzhen, Zhuhai, Shantou and Xiamen, were located in two coastal provinces in the vicinity of the Hong Kong (HK), Guangdong and Fijian province. In this cautious starting period, FDI inflows were contracted directly by ministries of the central government.

Due to the uncertainty of this untested market's potential and lack of political reliability, foreign companies preferred to minimize their resource and management commitment by using flexible arrangements such as contractual joint ventures (CJVs), subcontracting and compensatory trade agreements. Although there was no legislation at the national level governing CJVs, many overseas Chinese who

originated from the Guangdong and Fujian provinces went back to their home towns to set up CJVs for the purpose of both receiving governmental incentives, as provided to joint ventures, and enjoying the flexibility of CJVs. The flexibility of CJVs refers to the option for the parties involved to pull out from all their lawful arrangements in a joint venture contract whenever they deem that necessary. For example, in a contract, parties can arrange that foreign investors can retrieve their investment from the JV's profit before the Chinese partners recover their investment (Halasz and Lan 1996).

Consequently, the most important FDI entry mode was the CJV. As can be learned from Table 2.13, in 1978-1982, the number of CVJs accounted for 87 per cent of total FDI projects, while their utilized value amounted to 45.5 per cent. Another important entry mode next to CJV was the so-called joint exploration (JE), which was adopted for the exploitation of natural resource fields, such as in the context of offshore and land co-operative oil prosecution and development projects. A JE is a cooperation project between foreign investors and central ministries and commissions. It accounted for 42.6 per cent of realized FDI in the first stage of FDI development. The other two modes, equity joint ventures (EJVs) and wholly foreign-owned enterprises (WFOEs) were responsible for 8.6 per cent and 3.4 per cent, respectively. Note that the size of the JEs was relatively large, with an average project size of 38.3 US$ million, whilst the size of other FIEs was very small (0.67 US$ million for CJV). As a result of the importance of JEs, the average size of FDI projects was not small in comparison with later stages. FDI in this initial period was characterized by slow pace, small size, and high concentration in terms of source countries and sub-national allocation. More than 80 per cent of FDI came from Hong Kong, the US and Japan. The location of FDI was largely concentrated in the four SEZs in south China. Tables 2.14 to 2.16 provide summary statistics.

2.5.2.2 Second stage 1983-1989

During the second period of FDI development, from 1983 to 1989, the law was extended to the WFOE[16] and CJV[17] form of FDI entry. The regulations for the implementation of the EJV law were promulgated in 1983.[18] At the same time, a new set of regulatory measures was introduced to further facilitate FDI. In October 1986, the government issued *The Provisions for the Encouragement of Foreign Investment,* as well as a set of central regulations to implement the provisions. Accordingly, provincial and municipal-level regulations followed. The investment environment thus improved not only by liberalizing FDI policies and introducing tax and tariff incentives, but also by a set of concrete operational measures with regard to repatriation of profits, transfer of technology, foreign exchange transactions, accounting methods, contract regulations, and guaranteeing the autonomy of joint ventures. In addition, the concept of SEZs was extended to another fourteen coastal cities (1984), Hainan Island (1988), two Delta regions (the Yangtze River Delta and the Pear River Delta), and one triangular area in Fujian province.

With the improvement of the legal environment, the CJV form was losing its attraction. The flexibility of CJVs makes them not as stable as the EJV mode. In addition, establishing a CJV was not necessary to create a limited liability company.

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[16] The Law of the People's Republic of China on Wholly Foreign-Owned Enterprises (WFOE law) was promulgated 1986.

[17]The Law of the People's Republic of China on Sino-Foreign Contractual Joint Ventures was promulgated in 1988.

[18] The whole title is The Regulations for the Implementation of the Law of the PRC on Sino-Foreign Contractual Joint Ventures. It was amended in 1986.

Gradually, more investors preferred the EJV to the CJV form. The proportion of EJVs in the total value of both contractual and realized capital went up noticeably. Since 1986, the EJV had surpassed the CJV in terms of project number, contractual value and realized value, becoming the most popular entry mode for foreign investors. The EJV form accounted for 50.4 per cent of total realized FDI in 1983-1989, whereas CJVs and WFOEs presented 29.4 per cent and 5 per cent, respectively, in same period (see Table 2.13).

Expanding the scope of SEZs allowed western companies to extend their activities to more provinces, to engage in more local market-oriented production, and to transfer their human-resource and capital-intensive technologies into their export-processing operations. Compared with the first development stage, location of FDI extended from the first four SEZs to other open cities, although most FDI was still concentrated in the eastern region (cf. Table 2.15).

2.5.2.3 Third stage 1990-2001

After 1990, relaxation of FDI policy speeded up: China entered into the third stage of FDI development. The major policy advances in this period were: (a) a set of new and revised laws and regulations were issued; and (b) openness was widened and deepened in terms of regions and industries.

First, China took a large step toward the further improvement of its legislation framework. The Chinese government issued a set of commercial laws and regulations that related to FIEs, launched detailed regulations on implementing the WFOE law (1990), and amended the three FIEs laws (2000 and 2001). Additionally, other reforms were implemented, such as the amendment of the tax system (1994), the elimination of the dual exchange rate system (1994), the relaxation of control on foreign exchanges, and the reduction of tariff and non-tarrif barriers for the import and export of a wide range of products. All this improved the investment climate dramatically.

Second, the open-area policy was extended during this third development stage. The Pudong New Area was been created (1990), and 18 inland provincial-capital cities, 28 cities and 8 areas along the Yangtze River, and 13 border cities were opened (1992). This provided foreign investors better access to the domestic interior market. Tax-free zones started in Shanghai in 1990, in Tianjin and Shenzhen in 1991, and in Dalian and Guangzhou in 1992. Within these zones, ventures are supposed to produce solely for export. Since 1999, China has speeded up in implementing its development strategy of western China. The Chinese government has taken strong measures to implement the strategy to develop the western regions, which includes increased government input, fiscal support and tax cuts to attract (foreign) investors. The implementation of the western development strategy produces more opportunities for FDI in western China. The preferential policies for certain regions have gradually disappeared.

During this period, WFOEs have seen rapid proliferation. Since 1997, WFOEs have surpassed EJVs as the most popular foreign investment vehicle in terms of number of contract approvals. Moreover, realized FDI in the form of WFOE has exceeded EJV FDI since 2000. The ratio of realized FDI in the form of WFOE to total FDI increased to 47.3 per cent in 2000 (see Table 2.13). Sectoral FDI allocation changed within a relatively short time period. The share of manufacturing increased, as did "sensitive sectors" such as transportation and communication. The geographic distribution of FDI became less concentrated. The share of the central and western area increased at the expense of the east (cf. Table 2.15), as did the size of foreign enterprises. Finally, the country source of FDI became more diversified (see Table 2.14). Hong Kang became less important compared with the previous period; the countries with a large market, high productivity and an advanced structure were capable of investing more in China, and they enjoyed a higher FDI value than other countries (Zhang 2005).

Table 2.13: FDI entry modes from 1980 to 2001

	1978-1982	1983-1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
EJV	8.6%	50.4%	54.2%	52.7%	55.5%	55.8%	53.1%	50.8%	49.7%	43.1%	40.4%	39.3%	35.2%	34.7%
CJV	45.5%	29.4%	19.3%	17.5%	19.3%	19.0%	21.1%	20.1%	19.4%	19.7%	21.4%	20.4%	16.2%	12.9%
WOFE	3.4%	5.0%	19.6%	26.0%	22.9%	23.6%	23.8%	27.5%	30.2%	35.8%	36.2%	38.6%	47.3%	50.3%
JE	42.6%	15.2%	7.0%	3.9%	2.3%	1.5%	2.0%	1.6%	0.6%	0.8%	0.4%	1.0%	0.9%	0.0%
Stock	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.6%	1.6%	0.7%	0.3%	0.0%

Source: the data for 1978 to1989 are calculated from Pomfret (1994), and the data for 1990 to 2001 are calculated from information of NBSC, *China Foreign Economic Statistic Yearbook*, 1991-2002.

Table 2.14: FDI in China by source economies

	1979-	1984-	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
HK	58.00%	61.7%	54.9%	57.0%	70.0%	64.9%	59.7%	54.6%	50.9%	46.5%	41.6%	41.3%	38.9%	36.7%
Taiwan	0	0	6.4%	10.7%	9.5%	11.4%	10.0%	8.4%	8.3%	7.3%	6.4%	6.4%	5.6%	6.9%
Japan	12.80%	13.0%	14.4%	12.2%	6.4%	4.8%	6.1%	8.3%	8.8%	9.6%	7.5%	7.4%	7.2%	9.2%
Singapore	0.70%	1.09%	1.4%	1.3%	1.1%	1.8%	3.5%	4.9%	5.4%	5.8%	7.5%	6.6%	5.3%	4.4%
Korea	0	0	0.0%	0.0%	1.1%	1.4%	2.1%	2.8%	3.3%	4.7%	4.0%	3.2%	3.7%	4.4%
EU	-	6.6%	4.2%	7.9%	2.2%	2.4%	4.6%	3.3%	6.6%	9.2%	8.8%	11.1%	11.0%	8.6%
US	11.50%	11.9%	13.1%	7.4%	4.6%	7.5%	7.4%	8.2%	8.3%	7.2%	8.6%	10.5%	10.8%	9.3%
Free	-	-	0.0%	0.0%	0.0%	0.1%	0.5%	1.0%	1.6%	4.6%	9.9%	8.0%	11.6%	12.5%
The rest	17.00%	5.7%	5.6%	3.5%	4.9%	5.7%	6.0%	8.4%	6.9%	5.3%	5.8%	5.5%	5.9%	7.9%

Source: MOFTEC, China Foreign Economic Statistic Yearbook, 1985-2002.

Table 2.15: Provincial distribution of FDI in China (in million $US)

	1979-1982	1990		1992		1994		1996		1998		2000	
Beijing	7.4%	277	7.9%	350	3.2%	1372	4.1%	1553	3.7%	2168	4.6%	1684	4.1%
Tianjin	0.1%	35	1.0%	107	1.0%	1015	3.0%	2006	4.8%	2114	4.4%	1166	2.9%
Hebei	0.0%	39	1.1%	110	1.0%	509	1.5%	826	2.0%	1429	3.0%	679	1.7%
Lia oning	0.1%	244	7.0%	490	4.4%	1437	4.3%	174	0.4%	2190	4.6%	2044	5.0%
Shandong	0.0%	151	4.3%	973	8.8%	2532	7.5%	2590	6.2%	2203	4.6%	2971	7.3%
Shanghai	3.0%	174	5.0%	481	4.4%	2473	7.3%	3941	9.4%	3602	7.6%	3160	7.8%
Jiangsu	0.0%	124	3.6%	1460	13.3%	3763	11.1%	5210	12.5%	6632	13.9%	6426	15.8%
Zhejiang	0.0%	48	1.4%	232	2.1%	1144	3.4%	1521	3.6%	1318	2.8%	1613	4.0%
Guandong	88.3%	1460	41.9%	3552	32.3%	9397	27.8%	11624	27.9%	12020	25.3%	11281	27.7%
Guangxi	0.2%	29	0.8%	178	1.6%	815	2.4%	656	1.6%	886	1.9%	525	1.3%
Hainan	0.0%	103	3.0%	453	4.1%	918	2.7%	789	1.9%	717	1.5%	431	1.1%
Fujian	0.8%	290	8.3%	1416	12.9%	3712	11.0%	4085	9.8%	4212	8.9%	3432	8.4%
East	99.9%	2974	85.3%	9802	89.1%	29087	86.1%	34974	83.8%	39490	83.0%	35411	87.0%
Anhui	0	10	0.3%	50	0.5%	370	1.1%	507	1.2%	277	0.6%	318	0.8%
Heilongjian	0	24	0.7%	71	0.6%	342	1.0%	548	1.3%	526	1.1%	301	0.7%
Jilin	0	18	0.5%	66	0.6%	242	0.7%	452	1.1%	409	0.9%	337	0.8%
Shangxi	0	3	0.1%	54	0.5%	32	0.1%	138	0.3%	245	0.5%	225	0.6%
Jiangxi	0	6	0.2%	97	0.9%	262	0.8%	301	0.7%	465	1.0%	227	0.6%

Henan	0	10	0.3%	52	0.5%	386	1.1%	524	1.3%	617	1.3%	564	1.4%
Hubei	0	29	0.8%	203	1.8%	602	1.8%	680	1.6%	973	2.0%	944	2.3%
Hunan	0	11	0.3%	129	1.2%	325	1.0%	703	1.7%	818	1.7%	678	1.7%
Shaanxi	0	42	1.2%	46	0.4%	239	0.7%	325	0.8%	300	0.6%	288	0.7%
Central	0	154	4.4%	766	7.0%	2798	8.3%	4177	10.0%	4630	9.7%	3883	9.5%
Sichuan	0	16	0.5%	102	0.9%	889	2.6%	425	1.0%	372	0.8%	437	1.1%
InnerMongolia	0	11	0.3%	5	0.0%	40	0.1%	72	0.2%	91	0.2%	106	0.3%
Guizhou	0	5	0.1%	20	0.2%	64	0.2%	31	0.1%	45	0.1%	25	0.1%
Yunnan	0	3	0.1%	23	0.2%	65	0.2%	65	0.2%	146	0.3%	128	0.3%
Gansu	0	1	0.0%	0	0.0%	88	0.3%	90	0.2%	39	0.1%	62	0.2%
Tibet	0		0.0%		0.0%		0.0%		0.0%		0.0%	0	0.0%
Qinghai	0		0.0%	1	0.0%	2	0.0%	1	0.0%		0.0%	0	0.0%
Ningxia	0	0	0.0%	4	0.0%	727	2.2%	6	0.0%	19	0.0%	17	0.0%
Xingjiang	0	5	0.2%		0.0%	48	0.1%	64	0.2%	22	0.0%	19	0.0%
West	0	40	1.2%	155	1.4%	1923	5.7%	755	1.8%	733	1.5%	795	2.0%
Central ministries & commissions		319	9.1%	284	2.6%	687	2.0%	-	-	179	0.4%	382	0.9%

Source: NBSC, China Foreign Economic Statistic Yearbook, 1991-2002

Table 2.16: FDI in China 1980-2001 (in US$ 100 million)

	1980-1982	1983	1984	1985	1986	1987	1988	1989	1983-1989	1990	1991	1992
Number of projects	904	474	1856	2962	1498	2233	5945	5579	20547	7273	12978	48764
Contractual FDI	4459	1767	2619	4611	2833	3680	5298	5600	26408	6596	11977	58124
Realized FDI	1168	636	1250	1653	1870	2305	3193	3392	14299	3487	4366	11008
Realized/contractual	26.2%	36.0%	47.7%	35.8%	66.0%	62.6%	60.3%	60.6%	54.1%	52.9%	36.5%	18.9%
Average size (realized)	1.29	1.34	0.67	0.56	1.25	1.03	0.54	0.61	0.70	0.48	0.34	0.23
Average size (contract)	4.93	3.73	1.41	1.56	1.89	1.65	0.89	1.00	1.29	0.91	0.92	1.19

	1993	1994	1995	1996	1997	1998	1999	2000	2001	1990-2001
Number of projects	83437	47549	37011	24556	21001	19799	19846	22347	26139	370700
Contractual FDI	111436	82680	91282	73278	51003	52102	41238	62380	69190	711286
Realized FDI	27515	33767	37521	41726	45257	45463	40398	40715	46850	378073
Realized/contractual	24.7%	40.8%	41.1%	56.9%	88.7%	87.3%	98.0%	65.3%	67.7%	53.2%
Average size (realized)	0.33	0.71	1.01	1.70	2.15	2.30	2.04	1.82	1.79	1.02
Average size (contract)	1.34	1.74	2.47	2.98	2.43	2.63	2.08	2.79	2.65	1.92

Source: the data for 1978 to 1989 are calculated from Pomfret (1994), and the data for 1990 to 2001 are calculated from information of NBSC, *China Foreign Economic Statistic Yearbook*, 1991-2002.

Table 2.17: Regional openness in China

Open area	Time	Location
Shenzhen SEZ	1980	Guangdong, bordering Hong Kong's Kowloon
Shantou SEZ	1980	Southeast of Guangdong
Zhuhai SEZ	1980	The south of Guangdong, west of the estuary of Pearl River, adjoining Macao to the south
Xiamen SEZ	1980	Including Xiamen Island and Gulang Islet, located in the city of Xiamen, Fujian Province
Hainan SEZ	1988	The entire island province, located to the south of China's mainland
14 coastal cities	1984	Dalin, Qinhuangdao, Tianjin, Yantai, Qingdao, Lianyungang, Nantong, Shanghai, Ningbo, Wenzhou, Fuzhou, Guangzhou, Zhanjiang and Beihai
3 golden triangles	1985	Yangtze River Delta, Pearl River Delta and Xiamen-Zhangzhou-Quanzhou Triangle
Pudong new area	1990	Shanhai
Other open cities and regions	1992-1994	A number of border cities, all capital cities of inland provinces and autonomous regions, 13 free trade zones, 32 national-level economic and technological zones and 52 high-tech industrial development zones (Qin 1994)
West region	1999	Shaanxi, Gansu, Qinghai, Ningxia, Xinjiang, Sichuan, Chongqing, Yunnan, Guizhou and Tibet

Source: compiled by the author.

2.5.2.4 Policy changes and their effect on FDI

According to UNCTAD (1998: 92), core FDI policies consist of rules and regulations governing the entry and operations of foreign investors, the standards of treatment, and the functioning of the markets within which they operate. In the case

of China, FDI policies can be broken down into two main parts: (1) the laws and regulations governing the entry and operations of foreign investors, and (2) the preferential policies for attracting foreign investment.

The changes in the first part of FDI policies in last two decades can be summarized as follows.

1 Legislation for FDI became stable and more concrete.

2 The orientation of FDI policies was refocused not only on attracting more FDI to China, but also on promoting the integration of existing FIEs since the middle of 1990s.

3 New business forms became available for FDI. In 1994, when China adopted the new Company Law, the foreign invested joint-stock company form (FIJSC)[19] was legally established as a new option for foreign investors. In 1995, MOFTEC promulgated a decree, *Interim Provisions Concerning the Establishment of Investment Companies by Foreign Investors,* granting MNCs permission to establish another new business firm, holding companies, to integrate their segmented businesses.

4 Three FIE laws either deleted or amended the restrictions and regulations imposed on FIEs in such areas as foreign exchange balance, export obligation, priority of domestic sourcing, and the reporting requirements for production and operation plans. These changes facilitated the establishment of a legal system for foreign investment in conformity with international practice.

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[19] FIJSC has been referred to with different names in English: company limited by share, stock enterprises with foreign investment, joint stock company, and stock company with foreign investment.

The second part of the FDI policies, preferential policies, can be seen as a form of regional development policy. They were first implemented in four SEZs at the beginning of the 1980s, then extended to fourteen coastal cities, three golden triangle, Hainan, and finally extended to other parts of China in the 1990s (cf. Table 2.17). Since 1999, FDI promotion policies were targeted at the development of central and western regions. Accordingly, the location of FDI has been significantly diversified. The Herfindahl-Hirschman index decreased from 0.89 in 1979-1982 to 0.36 in 2000.[20] However, when the preferential policies were widely adopted by all provinces, which resulted in policy competition for FDI among regions, the aggregated (country-level) efficiency of these policies declined. Zhou et al. (2002) have found evidence that the influence of preferential policies on location decision of foreign investors has indeed diminished over time. The experiences of some western provinces demonstrate the limitations of such policies. For example, the Yunnan province has taken strong measures to attract FDI, with measures even more favorable than those in the four pioneer SEZs. But the policies did not attract as much FDI as they were expected to do, which verifies an argument from UNCTAD that "policies are decisive in preventing FDI from entering a country. But once an enabling FDI regulatory framework is in place, the economic factors become dominant." (UNCTAD 2003: 85).

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[20] Herfindahl-Hirschman index $= \sqrt{\sum \sigma_i^2}$, where σ_i stands for the share of provinces in total FDI. The index is one if FDI concentrates in one province only, whilst an index close to zero means almost perfect diversification across all provinces.

2.6 Summary

The evidence presented in this chapter reveals that China's foreign economic relations have experienced great change during the last half century. China has grown up from a closed nation-state to an important trading country in the world market. China's foreign trade regime has shifted from a highly centralized planning system to a market-oriented regime, and from an import-substitution strategy to an export-promotion one. The composition of trade partners and trade commodities became greatly diversified in the past two decades. FDI in China has increased considerably, which largely facilitated the development of foreign trade. These changes indicate that China has integrated itself into the world economy, now being a prominent trade economy. During this integration process, political commitment is an important element in the encouragement of trade and FDI. Starting from this background, we now move on to further investigate the effect of political factors on trade in the next chapter.

Chapter 3
China's Politics and Bilateral Trade Linkages

China's position in the international world during the past half-century provides vital information for investigating the relation between politics and trade. Although there is a substantial number of studies in this area, this study extends the literature in at least three ways: (1) it tests the impact of five political arrangements simultaneously, which is, as far as we know, more comprehensive than any former study; (2) it uses trade intensity instead of trade flows as the measurement of trade relations, which better reflects the mutual relationship between politics and trade; and (3) it accounts for zero observations, temporal dynamics and heterogeneity within one framework, and therefore better fits with the characteristics of the data than other models used in previous studies. By using data as to 78 of China's trade partners over the 1950-2002 period, this study provides strong empirical evidence for the hypotheses that the establishment of diplomatic relations, cooperation, visits of heads of states and similarity of political systems are associated with higher intensities of trade linkages. Weaker empirical evidence is found in favor of Linder's effect. The hypothesis that member countries of a Preferential Trading Agreement have had lower trade intensities with non-member countries such as China, is rejected.

3.1 Introduction

Over the past half-century, China has experienced great changes in its political and economic relationship to the international world. Few countries have seen such an incredible amount of change in such a short period of history. From an economically backward country it has become an emerging great power whose global integration will have a bigger impact on the world economy than that of any previous emerging

economy. Therefore, China's experience may provide vital information for the development and test of a coherent theory of the relationship between politics and trade, applied to a non-democratic (communist) country, along the lines pioneered by such scholars as Hirschman (1945), Savage and Deutsch (1960), and Pollins (1989a, 1989b).

The key argument is that in addition to economic invisible hands, such as comparative advantages, economies of scale and economic welfare, political visible arrangements play an important role in determining and shaping international trade, both in terms of size and direction. Plenty of studies have addressed the impact of political variables, such as military conflict, democracy, alliance and institutionalized political-economic cooperation. Starting from these studies, the contribution of this chapter to the study of political and trade relations is fivefold. First, the importance of China as a major economic and political power in transition deserves in-depth attention. For one, the Chinese case offers ample opportunities to test extant theory in the context of the largest non-democratic economy. Additionally, the study of China is justified by the country's mere size and growing status in the world.

Second, this chapter uses trade intensity as the measurement of trade relations, which better exposes the intensity of bilateral trade linkages than the absolute value of trade flows. The common approach in the study of trade in the political and economic literatures is the gravity model, which was introduced by Tinbergen (1962). To determine the importance of different trade-driving forces, this model involves the identification of variables explaining the size of trade flows between countries. Usually, it emphasizes the absolute size of bilateral trade flows, producing a good estimation fit (e.g., Bergstrand 1990; Rauch and Trindade 2002). In the present chapter, we employ the trade intensity index, which reformulates the gravity model such that the relative intensity of the bilateral trade linkages across different trade

partners is explicitly measured. In most cases, after all, a large bilateral trade volume does not imply a similarly close trade relationship. For example, the export value from China to the United States is ranked first among China's trade partners in 1999 (Chinese Ministry of Foreign Trade and Economic Cooperation, or MOFTEC), but the trade linkage between these two countries is not necessarily the most intensive one, given the huge aggregate import value of the US (Zhang and van Witteloostuijn 2004), or Chapter 4 below.

Third, adopting trade intensity as the dependent variable enables us to fully focus on the estimation of political arrangements on bilateral trade. This is so because the main economic determinants in a gravity-type of model, such as economic size, international openness and the exchange rate, can be eliminated from this gravity-based trade intensity specification. By contrast, with absolute trade flows as the dependent variable, all of these variables should be included in the model.

Fourth, we investigate the impact of five political arrangements, which, as far as we know, is more than any former study, to date, has done: diplomatic ties, foreign cooperation (or conflict), high-level visits, political system similarity (or difference), and preferential trading arrangements.

Fifth, we use long-period data with great variation, and appropriate methods for that data in the estimations. The study involves trade between China and 78 trade partners over the 1950-2002 period, which covers more than 90 per cent of Chinese foreign trade over the whole period. This long period of time and wide cross-section together provide substantial and highly relevant variation on all dependent and independent variables, which offers ample opportunities to investigate the impact of political policy changes on trade relations empirically. An interesting but also difficult aspect of our data set is the large number of zero observations – i.e., 18.6 per cent with respect to export and 25.9 per cent with respect to import. These zero

observations mainly occur in the period from 1950 to 1980, when China was isolated from the world economy and foreign trade was conducted strictly to central planning guidelines. To deal with these zero observations, we employ an estimation method based on the Tobit model. Additionally, the common problems of time-series / cross-section (TSCS) data – autocorrelation, heteroskedasticity and panel correct standard errors – are accounted for in a unified approach. In so doing, we offer an estimation strategy that improves upon the methods applied in earlier work.

By way of steppingstone, the next section of this chapter starts with an introduction of Chinese foreign policies and foreign trade from a historical perspective. Subsequently, we give a theoretical overview of the relationship between politics and trade from four different perspectives, and we formulate six hypotheses that can be derived from this theoretical literature review. The purpose of this study is to test whether these hypotheses, and thus whether the described politics-trade relationships, hold for China. After that, we describe the data and the empirical model, as well as our estimation methodology. We proceed by presenting and discussing the results of our empirical analyses. Finally, we give our conclusions, and offer a brief appraisal.

3.2 Chinese Foreign Policy and Foreign Trade

China's foreign policy widely fluctuated in the post-1949 period. During Mao's era (1949-1976), China's foreign policy was characterized by militancy and self-reliance, whereas during Deng's era (1978-1997), China's foreign policy was associated with a shift towards peace with and openness to the outside world (Zhang 1998). In the literature,[1] Chinese foreign relations over the past half-century are classified in five

[1] This classification is quite coherent in different information sources: see the website http://reference.allrefer.com/country-guide-study.

different periods: (1) the Sino-Soviet alliance of the 1950s, which reflects a pattern of intra-communism relationships; (2) isolation and radicalism in the 1960s, in which China adopted an anti-imperialist (against the US) and anti-revisionist (against the Soviet Union) international united-front strategy; (3) increased international involvement in the 1970s, in which China's relation with the Western world improved; (4) the independent and peace foreign policy in the 1980s, in which China gradually opened up to the world; and (5) world multipolarization in the 1990s, in which China established strategic partnerships with the major powers of the world. During each of these periods, China's relations with the rest of the world underwent significant changes. In this study, we focus on the effects of these changes on (bilateral) trade. By time period, these effects can be characterized as follows.

In the 1950s, China took a "lean-to-one-side" foreign policy, as declared by Mao in 1949, resorting to the Soviet Union and the socialist bloc for help in rebuilding and development. In its First Five-Year Plan (1953-1957), China adopted the Soviet economic model, primarily emphasizing industrial development at the expense of agriculture, with a particular focus on heavy industry and capital-intensive technology. In order to spur industrialization, China was keen to import machinery and equipment, which was the single largest import category. During this period, over 90 per cent of all imports were producer goods, leaving less than 10 per cent for consumer goods. The producer goods, including many entire plants and pieces of equipment, were mainly imported from the Soviet Union. In addition, large numbers of Soviet engineers, technicians and scientists were sent to China to assist with the development and instalment of new heavy industrial facilities, which inevitably enhanced the trade relation between the two countries. The Soviet Union was by far the largest trade partner of China, which accounted for half of China's foreign trade in the 1950s. Consequently, China's trade intensity with the Soviet Unions was extremely high (see Figure 3.1). The three main reasons for the close relation with

Soviet Union during that period were: (1) the Soviet Union's relatively advanced industry, which could meet the need of China's construction; (2) the good political relationship, directed by mutual political sympathy; and (3) the barriers erected by the Western countries' trade bloc.

The break-up with the Soviet Union in the early 1960s triggered a precipitous decline in Sino-Soviet trade.[2] In order to continue its construction, China started a new, although smaller, program of complete plant import in 1963. These plant imports largely came from Japan, due to the fact that the Sino-Japanese tense relation had been relaxed since 1959, when the former Japanese Prime Minister Tanzan Ishibashi visited China.[3] The Sino-Japanese relation was a subtle one, though. On the one hand, China was using foreign trade as a means of establishing *de facto* diplomatic relations with Japan (Mah 1971). On the other hand, Japan assured that trade was a private matter, which should be separated from politics. This doctrine of Japan was a successful fiction that made it possible for Japan to adhere to close partnerships with the US and Taiwan, while simultaneously promoting a variety of contacts with China. As a result, China's trade intensity with Japan significantly increased during the period 1963-1976, while China's trade intensity with the Soviet Union considerably decreased (see Figures 3.1 and 3.2).

After the Sino-Soviet split, China also embarked on a more open campaign to obtain support from developing countries. At that time, Africa began achieving a degree of national self-determination, which offered fertile ground for China for seeking new

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[2] In 1960, due to political conflicts, the Soviet Union scrapped the 600 contracts signed with China, withdrew all the experts and stopped supplying important equipment urgently needed in China's construction.

[3] In general, Sino-Japanese relations were less stable due to the potential political and military threat throughout the Cold War era. However, the two countries had sought to build up a good trade relationship for economic reasons. For example, five non-governmental trade agreements have been signed during the 1952-1962 decade.

friends. The most spectacular diplomatic activity during that period was Prime Minister Zhou Enlai's goodwill visit to ten African countries between late 1963 and early 1964, which was a milestone in the history of Sino-African friendship. Since then, China has offered favorite terms for loans and aid to African countries so as to build and maintain a good political relationship with the newly rising African nations. As part of the foreign aid, China even bought up African coffee and chocolate, despite lack of demand for these products in China (Segal 1992). China's African policy was very successful from a political perspective. For instance, Africa gave invaluable support to the restoration of China's legitimate seat at the United Nations.[4] As a result of China's Africa policy, the Sino-African trade relation considerably intensified. China became a large trade partner of Africa. China's trade intensity with Africa reached its highest level during 1965-1978.

In the early 1970s, motivated by geopolitical and strategic considerations, China's relations with the Western world, especially with the United States, improved.[5] As a consequence, China's trade intensity with the Western world increased, more than that with the rest of the world (see Figure 3.4). In December 1978, at the milestone Third Plenum of the National Party Congress' Eleventh Central Committee, the party leaders decided to undertake a program of gradual but fundamental reform of the economic system. They concluded that the Maoist version of the centrally planned economy had failed to produce efficient economic growth and had caused China to fall far behind the industrialized nations in the Western world, as well as the new industrial powers of Asia. Since then, China has shifted toward a more open policy. The political relations with the Western world have been normalized as of the

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[4] Among the 76 votes for China, 26 were from African relations (Chinese Ministry of Foreign Affairs).

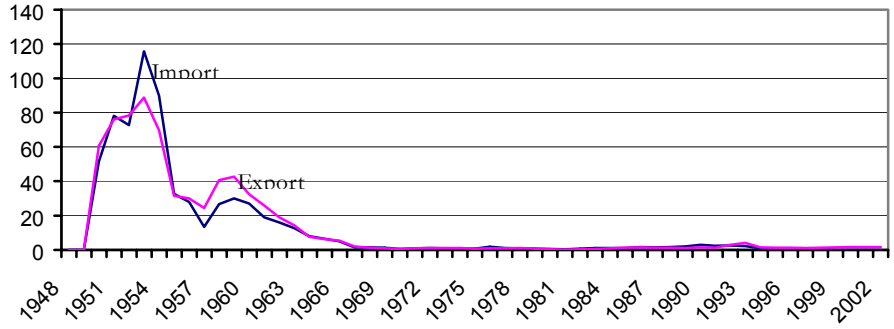
[5] The changes started when president Richard Nixon visited China in 1972. The United States' trade embargo against China was ended in the same year. The improvement of the relations with the Western world enhanced China's leverage *vis-à-vis* the Soviet Union.

1980s, and those with Asian and East-European countries have been significantly improved as of the 1990s. Since 1980, China has established diplomatic relationships with 50 countries (Ministry of Foreign Affairs of People's Republic of China). In line with the diversification of the foreign political relationship portfolio, China's foreign trade relations have diversified considerably. The number of trade partners (with trade value more than 10,000 US$) increased from 62 in 1980 to 198 in 2002.

The anecdotal evidence above suggests that political arrangements are an important factor determining China's foreign trade linkages. Political motives have been the major factor in China's trade with communist nations and underdeveloped countries in the Third World. Of course, political arrangements are not the one and only factor that can explain trade, especially China's trade with the Western world. Foreign trade with this part of the world was primarily directed towards breaking economic bottlenecks, and promoting exports to be able to finance imports. The trade system in this period is regarded as an extreme case of import substitution (Lardy 1992). For example, China imported large quantities of food grains from Australia and Canada to alleviate domestic food shortages in the early 1960s, caused by natural and man-made disasters. Simultaneously, China exported large volumes of consumer goods to Hong Kong and Singapore-Malaysia to augment its foreign exchange earnings (Mah 1971). At that time, China had no diplomatic relations with these countries.[6] This example illustrates that both political and economic visible and invisible hands had an impact on China's trade relations.

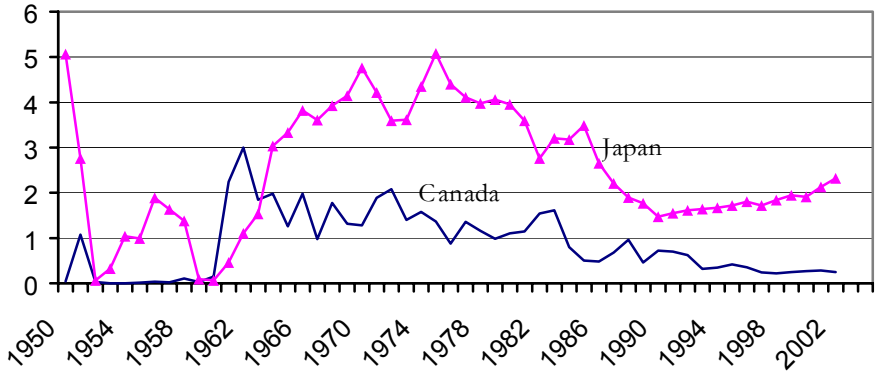
[6] China established diplomatic relations with Canada in 1970, Australia in 1972, Singapore in 1990, and Malaysia in 1974.

Figure: 3.1 China's TI with the USSR



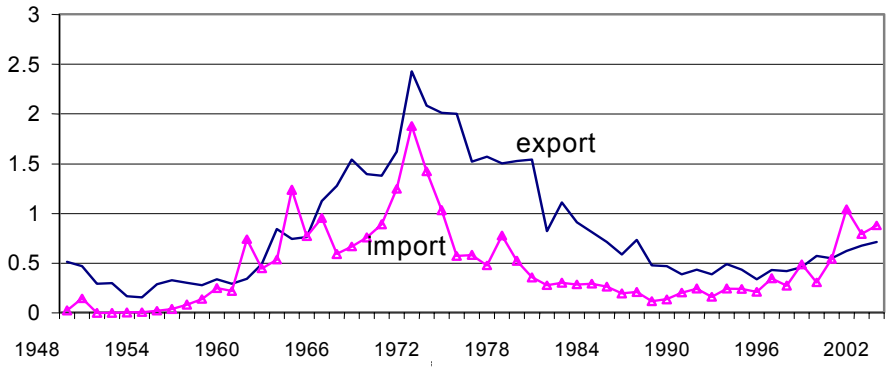
Source: author's calculation.

Figure 3.2: China's import TI with Canada and Japan



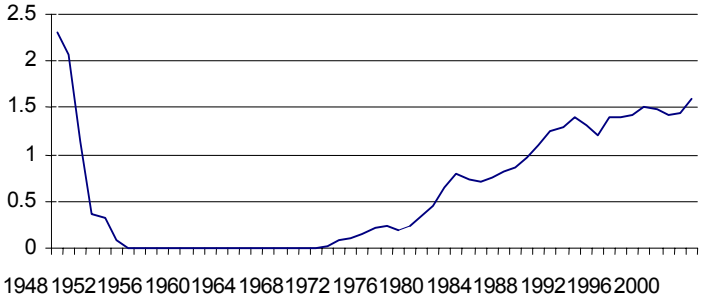
Source: authors' calculation.

Figure 3.3 China's TI with Africa



Source: authors' calculation

Figure 3.4 China's export TI with the US



Source: authors' calculation.

3.3 The Relationship between Politics and Trade

The idea that international political and economic processes are interrelated is not new. Mercantilism, for instance, prevailed in 17th and 18th centuries in the West. Mercantilists advocated a country to export more and to import less in order to enhance its political power. In later centuries, Marxists and imperialists have also been well aware of the fact that foreign trade can be an instrument of national power. Hirschman (1945) is one of the first modern economists who conceptualized the relationship between international trade and politics. He argued that Germany used the structure of its international trade to coerce Bulgaria, Hungary and Romania to support its political objectives. Since the 1970s, particularly in 1980s and 1990s, researchers have attempted to specify and measure the relationships between international trade and politics quantitatively. Many empirical studies have appeared in the literature since then. Four arguments dominate this literature. Below we explain each of these arguments, and formulate the hypotheses that can be derived from these arguments with respect to China.

Political cooperation and conflict

The first argument is that trade flows are significantly influenced by political conflict and cooperation between nations. Savage and Deutsch (1960), and Pollins (1989a, 1989b) formalized the foundations of this approach. Pollins' model is based on the choices of utility-maximizing rational agents at every level of aggregation, from individuals and interest groups to industries and nation-states. Trade flows are affected by the decisions of these agents. Since agents are risk averse, they wish to minimize the risk of disrupting trade flows. Political conditions, therefore, are important, and must be taken into account when taking decisions. Pollins expects that the trade level between two countries will decline when their political relationships are becoming more conflictive, and that the trade level will increase when their political relations become more cooperative. Estimations with data from

25 countries over the period 1960-1975 supports this hypothesis (Pollins 1989b). Recent empirical studies (e.g., Morrow, Siverson and Tabares 1998; Bliss and Russett 1998) also found evidence that supports this argument.

In the present study, it is assumed that political relations have three dimensions. The first dimension pertains to the establishment of diplomatic ties, which are a precondition for a good political relationship. The second dimension relates to cooperation and conflict, which reveal what actually happened between two countries in the political arena. The third dimension focuses on high-level visits, which show what heads of states do for bilateral relationships. Accordingly, the following three hypotheses are used to test the first argument.

HYPOTHESIS 3.1a: Diplomatic relationships have a positive effect on trade intensities.

HYPOTHESIS 3.1b: Foreign cooperation (conflict) has a positive (negative) effect on trade intensities.

HYPOTHESIS 3.1c: High-level visits have a positive effect on trade intensities.

Joint political regimes

The second argument is that shared democratic policies are associated with higher values of trade. Specifically, two countries that are both democratic will trade more than two countries of which at least one is not democratic, *ceteris paribus*. The reason behind this can be classified into two sub-arguments. First, from the perspective of state safety, it is less likely that a democratic trade partner will use its gains from trade to endanger their partners' security (Oneal and Russett 1997). A pair of democratic countries can enter into relationships of economic interdependence for absolute welfare gains, without any worry about the hazard of relative economic gains as much as they might with non-democratic partners (Powell 1991).

Accordingly, governments of democratic countries may construct policies to encourage their private economic actors to trade with people in other democratic countries (Bliss and Russett 1998).

Second, from the perspective of a private actor, trading with a democracy is less risky than trading with an autocracy. One reason is that the likelihood of conflict and the probability of war or threat of war between democratic countries tend to be lower than between non-democratic nations. Another reason is that entrepreneurs are more confident to do business in a country ruled by law than in a country ruled by people. A shared democracy, therefore, will likewise promote trade agreements. Empirical studies have found evidence supporting this argument (Bliss and Russett 1998; Dixon and Moon 1993; Morrow, Siverson and Tabares 1998; Remmer 1998; Verdier 1998).[7]

Since China was and still is not a democracy, we cannot test whether democratic dyads enjoy higher trade intensities than other dyads. Instead, we investigate whether similarity in political regimes encourages trade. This argument is in line with Oneal and Ray (1997), who have stated that governments usually take effective steps to prevent their citizens trading with enemy countries and to promote them trading with allies.

HYPOTHESIS 3.2: Similarity in political regimes has a positive effect on trade intensities.

Preferential Trading Arrangements

[7] Most of those empirical studies have been reviewed elsewhere. Bliss and Russett (1998), for example, have reviewed studies on trade flows and political systems.

The third argument is that institutionalized political-economic cooperation increases international trade. The Preferential Trading Arrangement (PTA) is the major manifestation of institutionalized political-economic cooperation, which may take the form of free trade areas, such as customs, unions or common markets (Anderson and Blackhurst 1993). According to the theory of PTA, pioneered by Viner (1953), a PTA is likely to trigger trade-creation effects for its member states (Bhagwati and Panagariya 1996). Empirical studies in both politics and economics have found evidence for this. Aitken (1973) examined the effect of the European Free Trade Area (EFTA) and the European Economic Community (EEC) on trade over the 1951-1967 period. Pelzman (1977) measured the impact of the Council for Mutual Economic Assistance (CMEA) on the trade among the seven communist members. Brada and Mendez (1983) investigated the impact of five regional integration schemes (EEC, EFTA, CACM, LAFTA and Andean Pact) on trade. Krueger (2000) reported a preliminary assessment of the effect of NAFTA on the trade of the US and Mexico. Pollins (1989a, 1989b) investigated this impact with emphasis on dyadic political relations. Mansfield and Bronson (1997) estimated the effects of PTAs on bilateral trade flows from 1960 to 1990. Martinez-Zarzoso (2003) reported the effect of six PTAs (EU, NAFTA, CARICOM, CACM, MAGREB and MASHREK) on trade.

China has not joined any formal PTA. Hence, the argument as to the direct trade impact of a PTA does not apply to China. However, if PTAs are expected to trigger trade-creation effects for its member countries, the trade intensity of non-member countries with these countries will fall. This indirect effect is the basis for our third hypothesis.

HYPOTHESIS 3.3: Countries that are member of a PTA have lower trade intensities with China.

Military alliances

The fourth argument is that military alliances influence the direction of trade (Gowa 1989, 1994; Gowa and Mansfield 1993; Mansfield 1994). The causal relation between military capability and international trade is reciprocal. According to standard trade theory, trade increases both countries' wealth. Furthermore, if one country invests its gains from trade to increase its military power, its trade partners will also gain from this increase in military power so long as the military alliance pursues similar ends. Conversely, a country might impede trade with enemy nations for fear that these countries would use the benefits of trade to build up their military capability and hence post a greater threat. Accordingly, free trade is more likely within than across military alliances. Recent studies have found empirical evidence that supports this political argument (Gowa and Mansfield 1993; Mansfield and Bronson 1997; Morrow, Siverson and Tabares 1998). In addition, it has been found that military alliances are more likely to evolve into free-trade coalitions when embedded in a bipolar rather than a multipolar system (Gowa 1994: 31).

China's involvement in military alliances has been limited in the 1950-2002 period to the Sino-Soviet alliance in the 1950s. The relationship between China and the Soviet Union during the 1950s can be characterized as a bipolar military alliance, which suggests our fourth hypothesis.

HYPOTHESIS 3.4: The military alliance between China and the Soviet Union has had a positive effect on China's trade intensity with the Soviet Union.

3.4 An Empirical Model for Trade Intensity

Dependent variables

The dependent variables in this study are China's export and import intensity indices. Although we have no *a priori* reason to expect that export and import react

differently to political arrangements, we would like to test whether the results are indeed symmetrical. The trade intensity index (TI), developed by Kojima (1968), Roemer (1976), Kunimoto (1977) and Drysdale and Garnaut (1982), measures the degree to which two countries trade more or less intensively with each other than they do with the rest of world. For export, the trade intensity of country c with country f is defined as a ratio with in the numerator c's export share in f's total import and in the denominator c's export share in total world import. For import, an equivalent ratio can be calculated. This study's dependent variables are the export trade intensity index (ETI) and the import trade intensity index (MTI) of China. Since China cannot export to (or import from) itself, the denominator must be modified by using overall world trade reduced by China's import (export). This gives the trade intensity indices

$$ETI_{cf} = \frac{E_{cf} / m_f}{E_c /(m_w - m_c)} \text{, and} \qquad (3.1)$$

$$MTI_{cf} = \frac{m_{cf} / E_f}{m_c /(E_w - E_c)},$$

where E_{cf} is Chinese export to country f, m_f is total import of country f, E_c is Chinese total export, m_w is world import, and m_c is Chinese total import. Similarly, m_{cf} is Chinese import from country f, E_f is total export of country f, m_c is Chinese total import, E_w is world export, and E_c is Chinese total export. A value of TI greater than one indicates that China exports to (or imports from) country f more intensively than it does to (or from) the rest of the world. Conversely, a value of TI less than one reflects that China exports to (or imports from) country f less intensively than it does to (or from) the rest of the world.

Following gravity-type of logic, determinants of bilateral trade (export or import) can be classified into three categories of variables: (1) total potential supply of the

exporting country c, P_c; (2) total potential demand of importing country f, P_f; and (3) "resistance" to trade from potential supplier c to potential buyer f, D_{cf}. The first two categories of variables offer proxies for the trade potential of the countries c and f, respectively, which are determined by a set of characteristics of c and f, such as economic size, international openness and the exchange rate. Prominent examples of resistance variables are (a) discriminatory trade integration, (b) geographical distance, (c) historical and political affinities, (d) cultural (dis)similarity, and (e) economic structure overlap (Linnemann 1966; Parsley and Wei 2001).

In the international trade linkages literature, the common approach to determine the impact of these three categories of variables is the gravity model, which takes the following functional form:

$$E_{cf} = P_c^{\alpha} P_f^{\beta} / D_{cf}^{\gamma} \text{ and } m_{cf} = P_c^{\alpha} P_f^{\beta} / D_{cf}^{\gamma}, \tag{3.2}$$

where α, β and γ represent unknown parameters to be estimated. Starting from this model, China's total export can be written as

$$E_c = \sum_{i=1}^{n} E_{ci} = \sum_{i=1}^{n} \left(P_c^{\alpha} P_i^{\beta} / D_{ci}^{\gamma} \right) = P_c^{\alpha} \sum_{i=1}^{n} \left(P_i^{\beta} / D_{ci}^{\gamma} \right), \tag{3.3}$$

where n represents the number of countries in the world, except China. Similarly, total import of a particular country f (except f itself) can be rewritten as

$$m_f = \sum_{i=1}^{n} m_{if} = \sum_{i=1}^{n} \left(P_i^{\alpha} P_f^{\beta} / D_{if}^{\gamma} \right) = P_f^{\beta} \sum_{i=1}^{n} \left(P_i^{\alpha} / D_{if}^{\gamma} \right), \tag{3.4}$$

On substituting (3.2), (3.3) and (3.4) into (3.1), we get

$$ETI_{cf} = \left(\frac{P_c^{\alpha} P_f^{\beta} / D_{cf}^{\gamma}}{P_c^{\alpha} \sum_{i=1}^{n} \left(P_i^{\beta} / D_{ci}^{\gamma} \right)} \right) \div \left(\frac{P_f^{\beta} \sum_{i=1}^{n} \left(P_i^{\alpha} / D_{if}^{\gamma} \right)}{m_w - m_c} \right) = \left(\frac{1 / D_{cf}^{\gamma}}{\sum_{i=1}^{n} \left(P_i^{\beta} / D_{ci}^{\gamma} \right)} \right) \div \left(\frac{\sum_{i=1}^{n} \left(P_i^{\alpha} / D_{if}^{\gamma} \right)}{m_w - m_c} \right). \quad (3.5)$$

In logarithmic form, this formula can be rewritten as

$$LogETI_{cf} = -\gamma \log D_{cf} + [\log(m_w - m_c) - \log \sum_{i=1}^{n} \left(P_i^{\beta} / D_{ci}^{\gamma} \right)] - \log \sum_{i=1}^{n} \left(P_i^{\alpha} / D_{if}^{\gamma} \right). \quad (3.6a)$$

Similarly, China's import intensity index is

$$LogMTI_{cf} = -\gamma \log D_{cf} + [\log(m_w - m_c) - \log \sum_{i=1}^{n} \left(P_i^{\beta} / D_{ci}^{\gamma} \right)] - \log \sum_{i=1}^{n} \left(P_i^{\alpha} / D_{if}^{\gamma} \right). \quad (3.6b)$$

Equations (3.6a) and (3.6b) show that both the export and import intensity index are a function of three groups of determinants, and that both functions are identical to each other. The first term at the right-hand side of Equations (3.6a) and (3.6b), D_{cf}, represents the "resistance" to trade between China and its trade partner f. The second term includes total world import (except for China) minus China's export potential. The latter is determined by demand factors in other countries, weighted by distance. Importantly, this term is independent of f. If China's trade intensity index is regressed on a variable from this group of determinants using TSCS data, this variable will be country-invariant. This implies that time dummy variables may be used to control for this group of determinants. The third term in equation 3.6 measures the export potential of other countries than China. Note that this term is independent of focal country c (here, China); it measures the linkages of China's trade partners with the rest of the world. For that reason, data on these determinants are often difficult to obtain. If China's trade intensity index were regressed on a variable from this group of determinants using TSCS data, this variable would still vary over space and time. In this context, country and time dummy variables may

used to control for these determinants at least partially.

In sum, the trade intensity index primarily depends on the first group of determinants, provided that the second and the third group of determinants are controlled for by country and time dummy variables. This is an extremely important observation, because it offers the opportunity to restrict the analysis on "resistance" to trade between China and its trade partners and, more specifically, on the estimation of political determinants of bilateral trade, which is the purpose of this study. By contrast, the main economic determinants in a gravity-type of model, such as economic size, international openness and the exchange rate, can be eliminated from the trade intensity model.

Independent variables

To test our hypotheses, the trade intensity indices are taken to depend on six political variables. In addition, we control for key economic factors, as well as time and country dummy variables. Below, we introduce all our independent variables and measures, one by one.

The first political variable, DIPLO, reflects whether China and its trade partner had a diplomatic relationship at time point t. Since the trade intensity index measures a country's import share from China (or China's import share from a particular country) to its import share from the rest of he world, this 0-1 variable must be taken relative to the total number of countries with which China had a diplomatic relationship at time point t. This set-up implies "decreasing returns to scale"; the greater the number of countries with which China has a diplomatic relationship, the smaller the impact of establishing a diplomatic relationship with another country on the trade intensity with that country. After all, if China would have diplomatic relationships with all countries in the world, this type of political arrangement can no

longer explain any cross-sectional differences among trade intensity indices. A similar set-up is used for the other political variables.

The second political variable, COOP, measures whether and to which extent China and its trade partner cooperate or are in conflict. Following Goldstein (1992), daily events as to conflict and cooperation are weighted and aggregated into annual numbers for each (potential) trade partner. Events (with their weights in parentheses, adopted from Goldstein 1992) included are: military attack or assault (-2); break-up of diplomatic relation (-1.4); non-military sanction (-1.1); expel organization or person (-1); formal complaint or protest (-0.5); apologize (0.25); suspend sanctions (0.3); agreement (1); and economic aid (1.1).

The third political variable, VISI, represents the annual number of high-level visits of heads of states and other influential politicians, the first weighted by 2 and the second by 1. The fourth political variable, SYST, pertains to the political system similarity and reflects whether (1) or not (0) China's trade partner is a socialist or a transition country. With the latter coding rule, we avoid a discontinuity in our time series, as many former communist countries turned into transition economies in the years after the collapse of the Berlin Wall in 1989.

As our fifth political variable, to investigate the political impact of institutionalized political-economic cooperation, seven PTAs are considered: Central American Common Market (CACM), European Free Trade Area (EFTA), the European Union (EU), the North-American Free Trade Agreement (NAFTA), the Association of Southeast Asian Nations (ASEAN), Council for Mutual Economic Assistance (CMEA), and the Latin-American MERCOSUR. Each PTA variable reflects whether (1) or not (0) China's trade partner was member of a PTA at time point t.

The sixth and last political variable, ALLI, is a dummy variable that takes the value of 1 during the years that the relationship between China and the Soviet Union can be

characterized as a bipolar military alliance, and 0 otherwise. This dummy variable affects only a single bilateral trade relationship directly – the Sino-Soviet trade linkage –, since China's post-1949 history witnessed only one formal military alliance (during the 1950s).

To collect the information necessary to construct these political variables for the 78 countries under study over the period 1950-2002, we developed our own database (available upon request). COPDAB and WEIS, two existing data sources that are commonly used in the political science literature, fall short for our purposes mainly because of incomplete records with respect to China. Admittedly, our database is not complete either, but much more so than COPDAB or WEIS. Information about diplomatic relations, high-level visits, cooperation and conflict are obtained from China's Ministry of Foreign Affairs, the Chinese embassies, Xinhua News Agency, and the relevant Chinese law and regulation websites.[8] Trade data are obtained from the IMF, and completed by data from Eurostat and the National Bureau of Statistics of China. Eventually, we were able to collect 3,830 observations with respect to export and 3,786 observations with respect to import. Finally, GDP data are obtained from the World Bank, and completed by either Penndata or information from the Groningen Growth and Development Center.

To control for economic "resistance" variables, we consider two economic variables. The first economic variable, DIST, measures the geographical great-circle distance between the economic center of China and that of its trade partner. In line with the gravity model, a lower trade intensity is expected, the longer this distance. The second economic variable is based on Linder's theory (Linder 1961). Linder concluded that the closer trade partners are in their demand patterns, the more similar will be their trade commodities composition and the larger will be their

[8] For example, http://www.hotlong.com/lawv2.

volume of bilateral trade. Specifically, the Linder effect refers to the impact of income level similarity on how a country distributes international trade across foreign partners. Because most finished and many intermediate goods are produced in and traded from developed countries, a long list of empirical studies have reported strong evidence for the existence of Linder's effect among developed countries, but very weak or no evidence for less developed countries (LDCs) (e.g., Thursby and Thursby 1987; Hanink, 1990). In the 1980s and 1990s, however, along with rapid economic transformation in a number of developing countries, a positive Linder effect was also found for intra-LDC trade (Weinblatt and Schrager 1985; Arnon and Weinblatt 1998). In the current study, the income difference between China and its trade partner, GDPdif, is measured by the relative difference of GDP per capita (in absolute value), $\text{GDPdif} = \left|\text{GDP}_c - \text{GDP}_f\right| / \text{GDP}_c$. A negative sign of this variable indicates Linder's effect.

3.5 Estimation Strategy

The purpose of this study is to determine the impact of political arrangements on China's trade performance. For this purpose, the dependent variables, both the export and import trade intensity index, are regressed on the independent variables using time-series / cross-section (TSCS) data on 78 countries for the 1950-2002 period, with a maximum of 53 time points for those countries having complete data. One of the central research questions in modeling TSCS data relates to selecting the right econometric model, which is anything but easy. A series of papers in the political science literature has discussed how to treat TSCS data and the problems that must be investigated (e.g., Beck and Katz 1995; Beck 2001): (1) Panel Correct Standard Errors (PCSE), (2) temporal dynamics, (3) limited dependent variables, and (4) heterogeneity. Below we discuss these problems in more detail and explain how

they have been dealt with in this study. The main methodological innovation of the empirical analysis in the present study is its novel treatment of zero observations in combination with PCSE, temporal dynamics and heterogeneity.

Panel Correct Standard Errors

The analysis starts from a simple linear model between a dependent variable Y and a set of K independent variables X:

$$Y_{it} = \beta_1 X_{1it} + \beta_2 X_{2it} + ... + \beta_K X_{Kit} + \varepsilon_{it} = \beta' X_{it} + \varepsilon_{it}, \qquad (3.7)$$

where i (= 1, ..., N) refers to a country, t (= 1, ..., T) to a given time period, $\beta_1, ..., \beta_K$ are fixed but unknown parameters, and ε_{it} are independently and identically distributed error terms for all i and t, with zero mean and variance σ^2. If the errors are "spherical", we can get optimal estimates of β using OLS. However, if the errors would be non-spherical, e.g., due to heterogeneity, spatial dependence among the observations at each point in time, and/or serial dependence among the observations on each country over time, then the OLS estimator loses its property of being efficient. To deal with this problem, one could correct for panel-heteroskedastic, contemporaneously correlated and/or temporary correlated errors. The problem with this approach is that the number of observations is generally too small relative to the number of parameters to be estimated and that the standard errors are underestimated by 50 to 200 per cent, depending on T (Beck and Katz 1995). Instead, Beck and Katz propose to use Panel Correct Standard Errors (PCSE), with the square roots of the diagonal elements of

$$\mathrm{Cov}(\hat{\beta}_{PCSE}) = (X'X)^{-1}[X'\Omega X](X'X)^{-1}, \qquad (3.8a)$$

$$\text{where } \Omega = \begin{bmatrix} \sigma_1^2 & \sigma_{12} & \cdots & \sigma_{1N} \\ \sigma_{12} & \sigma_2^2 & \cdots & \sigma_{2N} \\ . & . & \cdots & . \\ \sigma_{1N} & \sigma_{2N} & \cdots & \sigma_N^2 \end{bmatrix} \otimes I_T \,, \tag{3.8b}$$

and where σ_{ij} measures the interaction between countries. PCSE computed according to this set-up correct for panel-heteroskedastic and contemporaneously correlated errors, but not for temporary correlated errors.

Temporal dynamics

TSCS data often reveal dynamics. The old-fashioned treatment is to think of these dynamics as a nuisance – that is, to model them as serially correlated errors – so that

$$\varepsilon_{i,t} = \rho\varepsilon_{i,t-1} + v_{i,t} \,, \tag{3.9}$$

where $v_{i,t}$ replaces $\varepsilon_{i,t}$ as the white noise error term. This correction can also be used to determine PCSE (Beck and Katz 1995). However, this approach has been highly criticized. Hendry and Mizon (1978) were among the first to point out that serial autocorrelation correction cannot be considered a serious effort to find the 'correct' equation (cf. Hendry 1995, Chapter 7; Mizon 1995). Instead of improving an initial econometric model when it appears to be unsatisfactory, one better starts with a more general model containing, nested within it as special cases, a series of simpler models that ideally should represent all the alternative hypotheses requiring consideration. The general model Hendry and Mizon have recommended as a generalization of the first-order serial autocorrelation model, is the first-order serial autoregressive distributed lag model; a linear dynamic regression model in which $Y_{i,t}$ is regressed on $Y_{i,t-1}$, $X_{i,t}$ and $X_{i,t-1}$. This model is also adopted in this study.

Limited dependent variables

A serious problem of our data set is that a large number of observations is censored at zero: 711 observations with respect to export trade intensity and 981 observations with respect to import trade intensity are zero, because export or import is smaller than the minimum value of 10,000 US$. These zero observations mainly occur in the first three decades (1950-1980), when China was isolated from the world economy and foreign trade was conducted strictly according to central planning guidelines. Under this closed planning system, Chinese foreign trade was concentrated in a limited number of countries.

If the zero observations would be excluded from the sample, this creates a sample selection bias – and hence the regression parameters are likely to be biased. This treatment of zero observations assumes that these countries have zero import demand for Chinese commodities or that China has zero import demand for commodities from these countries indeed, which is not necessarily the case; some countries may have decided not to trade on political grounds. It would be more appropriate to assume that, in choosing not to trade, countries with zero trade intensities are still displaying market behavior, and for this reason it is important to include both zero and non-zero observations whilst estimating trade models. Furthermore, to eliminate zero observations or to shorten the observation period to get rid of the zero-observations problem is really a waste of data that may well yield important information.

It is evident, then, that trade involves the 'decision' whether or not to trade and, if the decision is to do so, what the intensity of trade should be. A statistical model that has often been used to deal with this two-stage 'decision' is the Tobit model. Define Y_{it}^* to be the desired but unobservable trade intensity index and Y_{it} the observed trade intensity index with a particular country. We then have

$$\begin{aligned} Y_{it} &= C \qquad \text{if } Y_{it}^{*} < C, \text{and} \\ Y_{it} &= Y_{it}^{*} \qquad \text{if } Y_{it}^{*} \geq C, \end{aligned} \tag{3.10}$$

where C denotes the limiting value of the model at hand, which in the case of trade intensity indices seems to take the value of zero at first glance.

We deliberately used the verb 'seem', because an additional problem which has to be solved is that the typical gravity model is in a double-log form, expressing the variables as log(Z), where Z represents any of the dependent or independent variables. The problem is that log(Z) is not defined for values of Z equal to zero. To preserve the double-log form, the variables can be expressed as log(1+Z). This adjustment yields results similar to a standard double-log form, since for large values of Z, log(1+Z) ≈ log (Z), whereas for values of Z approaching zero, log(1+Z) ≈ Z, approximating a semi-log relationship (e.g., Eichengreen and Irwin 1998; Coughlin and Wall 2003). This adjustment has also been applied in the current study to the political variables.[9] Importantly, in the case of the trade intensity index, this adjustment has only been applied to its numerator, because the problem of zero observations is limited to E_{cf} (or m_{cf}). The log of the export trade intensity index defined in (3.1) can be rewritten as

$$\log \text{exTI}_{cf} = \log\left(\frac{E_{cf}/m_f}{E_c/(m_w - m_c)}\right) = \log(E_{cf}) - \log(m_f) - \log(E_c) + \log(m_w - m_c). \tag{3.11}$$

Therefore, Y, Y* and the limiting value C in the Tobit model (3.10) can best be specified as (including the +1-adjustment discussed above)

$$Y_{cf} = -\log(m_f) - \log(E_c) + \log(m_w - m_c) \text{ if } E_{cf}^{*} < 0, \text{ and} \tag{3.12a}$$

[9] It has not been applied to the economic variables, because none of these variables have zero values.

$$Y_{cf} = \log\left(\frac{(E_{cf} + 1)/m_f}{E_c/(m_w - m_c)}\right) \text{ if } E^*_{cf} \geq 0. \qquad (3.12b)$$

A similar set-up is adopted for the import trade intensity index. Note that instead of being zero and constant, the limiting value determining Y_{cf} when E_{cf} is zero is now different for different countries and different time periods. The strength of this approach is that we still utilize the information recorded by the variables m_f, E_c and m_r-m_c. The larger a country's total import or the larger China's total export, both relative to world trade, the less likely it is that China and this country do not trade. If we would adopt a zero and constant limiting value, this information is not utilized.

Heterogeneity

A TSCS model, even if it is dynamic, still treats the countries as completely homogeneous, differing only in their explanatory variables. The PCSE were designed to guard against one type of heterogeneity – i.e., unequal variances between countries. A panel data approach would presume that heterogeneity is a feature of the data, and would attempt to model that heterogeneity. The simplest way of doing so is to assume that each country and each time period has its own intercept, thus changing the error structure to $\varepsilon_{i,t} = \rho\varepsilon_{i,t-1} + \mu_i + \lambda_t + v_{i,t}$, where μ_i denotes a set of country dummy variables, one for every country, and λ_t indicates a set of time dummy variables, one for every time period. Note that if both sets are included, one dummy should be dropped to avoid the dummy variable trap.

Estimation method

Methods to estimate a dynamic Tobit model with fixed effects in both the cross-section and time-series domain are not yet available. Dynamic Tobit models without fixed effects have been studied by Lee (1999). The problem of this class of models is that the distinction between an observed and a latent variable not only has to be

made at the left-hand side of the regression equation, as we did for the trade intensity index in Equations (3.12), but also at the right hand-side for the lagged value of this trade intensity index. This complicates the analysis considerably. LIMDEP is an econometric software package that can be used to estimate Tobit models with fixed effect (Greene 2002, Chapter E21: 80-85). If the lagged value of the trade intensity index is included among the regressors, one naturally obtains a coefficient estimate of this variable. However, this coefficient is likely to be biased, because this routine ignores that the lagged value of the trade intensity index is censored.

Another problem is how to determine PCSE for a Tobit specification. Although software for heteroskedastic Tobit models is now widely available (e.g., LIMDEP; see Greene 2002, Chapter E21: 41-53), this type of heteroskedasticity is not suitable to deal with panel-heteroskedasticity and contemporaneous spatial correlation. Huang (1999) has developed an algorithm to estimate SUR Tobit models, but not for models containing lagged dependent variables.

An alternative to Tobit is scaled OLS, which is based on the striking empirical regularity that the maximum likelihood coefficient estimates of the Tobit model can be approximated by dividing the least-squares estimates by the proportion of non-zero observations. This estimation method is quite popular in the trade literature (see, e.g., Eichengreen and Irwin 1998; Coughlin and Wall 2003). Its advantage is that it can easily be extended with serial dependence among the observations over time, panel-heteroskedasticity (country and time dummy variables), and contemporaneous spatial correlation (via PCSE) within one framework, three phenomena which in the political science literature have recently received such a prominent place (Beck 2001). This extension is possible as follows. The standard estimation method for the fixed-effects model is to eliminate μ_i and λ_t from the regression equation by demeaning

the Y and X variables and then estimate the resulting demeaned equation by OLS. The demeaned variable of Y is obtained by

$$Y_{it} - \overline{Y}_{i.} - \overline{Y}_{.t} + \overline{Y}_{..}, \text{ where } \overline{Y}_{i.} = \frac{1}{T}\sum_{t=1}^{T} Y_{it}, \overline{Y}_{.t} = \frac{1}{N}\sum_{i=1}^{N} Y_{it}, \text{ and } \overline{Y}_{..} = \frac{1}{NT}\sum_{i=1}^{N}\sum_{t=1}^{T} Y_{it} \quad . \quad (3.13)$$

Similar transformations apply to the X variables. To correct the demeaned equation for zero observations, we may use scaled OLS instead of OLS, and to correct the demeaned equation for contemporaneous spatial correlation, we may compute PCSE using Equation (3.8). These extensions are relatively simple to implement.[10] A final reflection is that the OLS estimator of the response coefficients in the demeaned equation is inconsistent if T is fixed (read: small) (Baltagi 2001, Chapter 8), but in this study this problem is of minor importance, since the average number of observations for each country is greater than 48.

3.6 Empirical Results

Table 3.1 reports the means of the variables and their correlation coefficients. The mean reported for the political variables and trade intensity indices reflects the average relative non-zero value. The mean value of the DIPLO variable (0.0212), for example, indicates that the average number of countries with which China has established diplomatic relationships over the observation period amounts to 1/0.0212 = 47 countries. In other words, the lower the mean value of a political variable, the more countries are involved.

Table 3.1 makes clear that the variables DIPLO, SYST and GDPdif changed so slowly over time that their observed values at time point t-1 and time point t are

[10] Software written in Matlab is available upon request.

highly correlated (over 0.87). For this reason, their lagged values have been eliminated from the regression equation. The lagged values of the seven separate PTA variables have been eliminated, too, because when taken together into one variable, PTA, this variable also appears to have changed slowly over time. The mutual correlation coefficients of the remaining independent variables are rather limited, except for the correlation coefficient between the CMEA (Council for Mutual Economic Assistance) and the SYST variables. This is because the countries involved partly overlap. By eliminating the first variable, multicollinearity is not expected to be a problem anymore.

From Table 3.1 it can also be seen that the partial correlation coefficients of the independent variables with the current and lagged values of the export and import trade intensity indices have the expected sign: DIPLO (+), SYST (+), COOP and $COOP_{-1}$ (+), VISI and $VISI_{-1}$ (+), ALLI (+), DIST (–) and GDPdif (–). Only the signs of the partial correlation coefficients of the PTA variables tend to be inconsistent with Hypothesis 3.3.

Despite its positive correlation coefficient with the trade intensity indices, the ALLI variable has been dropped from the regression equations because it only takes the value of 1 with respect to the Soviet Union during the 1950s. This is too little to find any empirical evidence in favor of our Hypothesis 3.4. As an alternative, we could estimate a separate trade intensity model of China for the Soviet Union, but this would be no more than a reconfirmation of Figure 3.1 or of the partial correlation coefficients in Table 3.1.

A general problem of country dummy variables is that they are perfectly collinear with any independent variables that do not change over time, so they force us to drop such variables from the regression equation. This happens to the DIST variable. From Table 3.1 it can be seen that this variable is negatively correlated with the trade

intensity indices, as expected. This negative relationship also appeared to be significant when the model was estimated by (scaled) OLS without country dummy variables. Unfortunately, when country dummies are included in the regression equations, the DIST variable becomes part of them, as a result of which its separate effect can no longer be estimated. This is acceptable, however, because its coefficient is not of main interest in this study anyway.

The estimation results are recorded in Table 3.2, in panel A with respect to China's export intensity index and in panel B with respect to China's import intensity index. The first two columns of both panels contain the coefficient estimates and their t-values. Basically, the coefficient estimates reflect elasticities. That is, each coefficient of a particular variable reflects the percentage change in the associated trade export or import intensity index when this variable rises by 1 per cent.

The coefficients in the first column reflect short-term effects. Long-term effects can be obtained from the short-term estimated effects by multiplying the latter by $1/(1-\hat{\tau})$, where $\hat{\tau}$ is the coefficient estimate of the lagged trade intensity index. In case of the COOP and VISI variables, the long-term effects can be obtained by $(\beta_t + \beta_{t-1})/(1-\hat{\tau})$, where the βs are the coefficient estimates of the current and lagged values of these variables. The last two columns of both panels report these long-run effects and their corresponding t-values.

The first thing to note is that the fit of the models in view of the number of observations is quite high. The R-squared is 0.75 for the export equation and 0.60 for the import equation. Part of this result is explained by the 78 country and 53 time dummies, of course. When these are excluded so that only the explanatory power of the 14 political and economic variables is measured, the R-squared reduces to 0.59 for the export equation and 0.41 for the import equation, which is still more than

reasonable, indicating that our set of economic and political variables explains substantial variance.

The second thing to note is that the results obtained for the export intensity index and for the import intensity index are not fully symmetrical. Although there is no a priori reason to expect export and import to react differently to political arrangements, in practice they appear to do so, to some extent. Generally, export needs more time than import does to adjust itself to its new equilibrium value after a change in one of its determinants. This follows from the coefficient of the lagged dependent variable, which is 0.853 for export and 0.756 for import. By contrast, the short-run responses of export to cooperation and conflict (COOP) and high-level visits (VISI) exceed those of import. The results also show that there is hardly any difference in the long-term effects: the size and significance level of the DIPLO, COOP and SYST variables in both equations is comparable. The long-term effect of the GDPdif variable appears to be significantly different from zero in the import equation, but not so in the export equation: their mutual difference is not significantly different, though. Only some of the short-term and long-term effects of the PTA variables (MERCO, EU, CACM) differ from each other.

Strong empirical evidence is found in favor of the Hypotheses 3.1a, 3.1b, 3.1c and 3.2. The short-term as well as the long-term effects of any of the DIPLO and COOP variables are positive and significant in both the export and the import equation. The long-term effect of the VISI variable is also positive and significant in both the export and the import equation, but its short-term effect is only significant in the export regression.

Table 3.1: Means and correlation coefficients of the variables

	MERCO	ASEAN	NAFTA	EU	EFTA	CACM	CMEA	DIPLO	DIPLO$_{-1}$	SYST	SYST$_{-1}$	COOP	COOP$_{-1}$	VISI	VISI$_{-1}$	GDPdif	GDPd.$_{-1}$	DIST	ALLI	exTI	imTI
Mean	0.25	0.1892	0.3824	0.132	0.153	0.3387	0.2258	0.0212	0.0218	0.2103	0.2071	0.041	0.0417	0.0383	0.0404	2.2413	2.2109	9.0041	0.0026	1.5073	1.5634
MERCO	1	-0.03	-0.01	-0.03	-0.03	-0.02	-0.03	-0.03	-0.02	-0.03	-0.03	0.03	0.04	-0.01	0	-0.03	-0.03	0.17	-0.01	0.01	0.05
ASEAN		1	-0.02	-0.06	-0.06	-0.04	-0.05	-0.07	-0.06	0.00	0.00	0.01	0.01	0.02	0.02	-0.07	-0.07	-0.32	-0.01	0.12	0.09
NAFTA			1	-0.03	-0.03	-0.02	-0.02	0.00	0.00	-0.02	-0.02	0.01	0.01	0.01	0.02	0.05	0.05	0.06	0.00	0.05	0.05
EU				1	-0.08	-0.05	-0.06	0.03	0.03	-0.07	-0.07	0.02	0.02	-0.02	-0.02	0.3	0.3	-0.01	-0.01	0.12	0.15
EFTA					1	-0.05	-0.06	0.07	0.06	-0.07	-0.07	-0.02	-0.02	-0.03	-0.03	0.32	0.32	-0.03	-0.01	0.09	0.11
CACM						1	-0.04	-0.14	-0.13	-0.05	-0.05	-0.05	-0.05	-0.06	-0.06	-0.11	-0.11	0.18	-0.01	-0.08	-0.16
CMEA							1	0.31	0.36	0.69	0.70	0.11	0.12	0.16	0.18	0.04	0.04	-0.09	0.25	0.13	0.16
DIPLO								1	0.88	0.25	0.26	0.21	0.21	0.22	0.22	-0.04	-0.05	-0.18	0.19	0.38	0.4
DIPLO$_{-1}$									1	0.28	0.28	0.24	0.25	0.21	0.27	-0.04	-0.04	-0.17	0.24	0.36	0.38
SYST										1	0.99	0.11	0.13	0.12	0.13	-0.01	-0.01	-0.11	0.18	0.11	0.16
SYST$_{-1}$											1	0.11	0.13	0.12	0.13	-0.01	-0.01	-0.11	0.18	0.11	0.16
COOP												1	0.29	0.25	0.19	-0.05	-0.05	-0.04	0.27	0.16	0.18
COOP$_{-1}$													1	0.15	0.32	-0.05	-0.05	-0.04	0.31	0.17	0.2
VISI														1	0.15	-0.08	-0.08	-0.1	0.21	0.18	0.18
VISI$_{-1}$															1	-0.08	-0.08	-0.09	0.29	0.18	0.19
GDPdif																1	0.99	0.04	0.01	-0.10	-0.01
GDPd.$_{-1}$																	1	0.05	0.01	-0.09	0.00
DIST																		1	-0.03	-0.15	-0.18
ALLI																			1	0.06	0.07
exTI																				1	-
imTI																					1

Table 3.2: Estimation results of China's trade intensity indices over 1950-2002

Explanatory variables	A. Export				B. Import			
	Short run	t-value	Long-run	t-value	Short	t-value	Long-	t-value
Lagged TI	0.853	34.90			0.756	23.84		
DIPLO	0.782	8.07	5.337	7.02	1.367	9.22	5.594	8.76
COOP	0.238	3.42	1.154	13.84	0.191	1.99	1.502	15.36
$COOP_{-1}$	0.134	2.02			0.321	3.49		
VISI	0.127	2.08	0.434	5.67	0.037	0.50	0.538	6.33
$VISI_{-1}$	0.045	0.73			0.122	1.64		
SYST	1.266	3.28	8.633	3.63	1.235	2.98	5.051	3.72
MERCO	0.988	1.69	6.733	2.01	-0.020	-0.02	-0.082	-.04
ASEAN	2.242	4.27	15.281	4.74	1.327	2.25	5.429	2.93
NAFTA	2.277	2.75	15.519	3.19	0.224	0.31	0.916	0.42
EU	-0.343	-1.57	-2.340	-1.90	0.163	0.46	0.666	0.62
EFTA	0.214	0.91	1.461	1.10	0.779	2.05	3.188	2.71
CACM	0.509	0.66	3.471	0.81	-1.436	-1.33	-5.875	-1.77
GDPdif	-0.137	-1.17	-0.931	-1.42	-0.253	-1.77	-1.035	-2.36

Notes: (1) Both equations also include 78 country dummies and 53 time dummies.
(2) The t-values are based on panel correct standard errors.
(3) R-squared of the export equation is 0.75 if country and time dummies are included, and 0.59 if excluded.
(4) R-squared of the import equation is 0.60 if country and time dummies are included, and 0.41 if excluded.

The confirmation of Hypothesis 3.1a implies that without diplomatic relationships the economic driving forces of trade may not grow to full stature. China's government has made great efforts to establish diplomatic ties with the rest of the world. During the first upsurge in the establishment of diplomatic relations from 1949 to 1955, China established diplomatic ties with 23 countries, such as the USSR, the East-European socialist states and some neighboring Asian nationalist countries. From the latter half of the 1950s to the end of the 1960s, China launched diplomatic ties with many more countries, forming a second upsurge in the establishment of diplomatic relations. At the end of 1969, there were 50 countries that had diplomatic ties with China. All the newly added countries, except France, were developing nations from Asia, Africa and Latin America. In the 1970s, another 70 countries, from both the developing and developed world, established diplomatic ties with China. In 1979, China had diplomatic relations with 120 countries. As of 2003, this number had increased to 165.

To test Hypothesis 3.1b, the following aspects of cooperation and conflict have been investigated: (1) economic cooperation, international aid, scientific and technological exchange and cooperation, military exchange and cooperation, and culture exchange, and (2) military attacks and assaults, break-up of diplomatic relations, non-military sanctions, expulsion of organizations or persons, and formal complains or protests. The estimation results imply that if politicians in China and its trade partner put more effort in encouraging cooperation and diminishing conflict, the two countries are likely to enjoy higher trade intensities. This result is very intuitive for the situation before 1979 when China's foreign trade was conducted strictly according to central planning guidelines. Politicians completely controlled the direction of trade, which enabled China to use foreign trade as a strong weapon in international political struggles. From 1980 to 1992, the regime of exclusively mandatory trade was replaced with a system of combined mandatory and advisory planning. After 1992,

administrative control was further reduced, and gradually trade management was removed altogether. However, effects of political relations on trade, although not so direct as before, still exist. According to Pollins (1989b: 741), economic agents incorporate all kinds of risk-avoiding concerns into their trade decisions and therefore tend to decrease trade with a particular country if the political relation with their country is becoming more conflictive.

High-level visits have always been seen as important events in China's foreign relations. A few historical diplomatic visits indeed changed China's position in the international system. One example is Premier Zhou Enlai's goodwill visit to ten African countries in the 1960s, which helped China to gain more friends in the Third World. Another famous example is the visit of US President Richard Nixon to China in 1972, which dramatically improved China's relation with the Western World. The objectives of high-level visits are to promote bilateral foreign relations by enhancement of understanding and improvement of cooperation between the countries involved. The confirmation of Hypothesis 3.1c shows that China has indeed benefited from these high-level visits in terms of trade.

The confirmation of Hypothesis 3.2 implies that China's close, historical contacts with most of the communist countries during the past half-century have contributed to the intensification of its trade exchange network. Previous studies mainly focused on the effect of democracy on trade, assuming that democratic dyads have greater trade flows than non-democratic dyads (e.g., Morrow, Siverson and Tabares 1998). In addition to that, the present study reveals that similarity of the political system between non-democratic dyads also has a positive impact on bilateral trade.

The results with respect to the PTA variables are rather mixed, but generally do not favor Hypothesis 3.3. Of the seven PTA variables only the short-term effects of EU

in the export equation and of MERCO and CACM in the import equation appear to be negative, albeit neither of these effects is significant statistically. The fact that during the past half-century many countries were member of a PTA, while China was not, apparently did not have a negative effect on China's trade linkages to these countries. The reason might be that China is an attractive trade partner for all member countries from PTAs anyway, because of its mere size: the Chinese market is so huge that no country is willing to sacrifice the associated market opportunities just because China is not a member of a PTA.

With regard to our economic control variables, our findings only weakly indicate that Linder's effect applies to China and its trade partners. The short-term as well as the long-term effect of the GDPdif variable is negative in both the export and the import equation, but only one of these four effects is significant statistically. Again, as suggested above, the reason for this rather weak Linder's effect might well be the mere size of the Chinese economy, making the economic "resistance" variables much less important than they have proven to be for smaller countries in earlier work.

Finally, the estimation results in Table 3.2 offer the opportunity to compare the relative importance of different political arrangements. The results indicate that the establishment of diplomatic relationships and similarity in political systems have had a greater impact on trade intensities than cooperation (and conflict) and visits of heads of states or other influential politicians. An explanation may be that the latter are the more accidental manifestations of the former.

3.7 Conclusion

Our empirical analysis on trade intensities between China and 78 trade partners over 1950-2002 has shown that political arrangements play an important role in shaping

international trade. By covering a long time window with much variation and more appropriate methods for analyzing that data, and by using a relative rather than absolute bilateral trade measure, this study has been able to find strong empirical evidence in favor of our four Hypotheses: diplomatic relationships have a positive effect on trade intensities (Hypothesis 3.1a); foreign cooperation has a positive effect on trade intensities (Hypothesis 3.1b); high-level visits have a positive effect on trade intensities (Hypothesis 3.1c); and similarity in political regimes has a positive effect on trade intensities (Hypothesis 3.2). Of these four political arrangements, the establishment of bilateral relationships and similarity of political systems appeared to have the strongest impact.

The results are less strong for Hypotheses 3.3 and 3.4. The estimation strategy employed in this study was not able to produce empirical evidence in favor of Hypothesis 3.4 that the military alliance between China and the Soviet Union had a positive effect on China's trade intensity with the Soviet Union. Although Hypothesis 3.4 is confirmed by Figure 3.1 and the partial correlation coefficients of the ALLI variable with the export and import trade intensity indices in Table 3.1, the variation in this variable appeared to be too low to find any empirical evidence in favor of this Hypothesis 3.4 in Table 3.2. However, the pattern in Figure 3.1 does provide supportive anecdotal evidence, as the Sino-Soviet trade intensity flourished in the 1950s when China and the USSR were involved in a military alliance. Finally, although the results are mixed, Hypothesis 3.3 that member countries of a PTA (Preferential Trading Agreement) have had lower trade intensities with China must be rejected. Apparently, China is too important for the members of PTAs to have their trade intensities affected.

The findings for our two economic control variables seem to suggest that, in the case of China, politics is more important than economics. For one, only weak empirical

evidence has been found in favor of Linder's economic effect, according to which the closer China and its trade partners are in their demand patterns, the more similar will be their trade commodities composition and the larger will be their volume of bilateral trade. Although the negative sign of the GDPdif variable in both the export and the import equation is in line with the existence of Linder's effect, only the long-term effect of this variable in the import equation appeared to be significant statistically. Similarly, we could not find evidence for the argument that the greater the geographical distance between China and its trade partner, the lower will be their mutual trade intensity indices. Although the expected relationship between distance and trade is confirmed by the negative partial correlation coefficients of the DIST variable and the trade intensity indices in Table 3.1, its separate effect could not be estimated in Table 3.2 due to the inclusion of country dummy variables.

Of course, the current study is characterized by a number of limitations that point the way to future work. One methodological challenge is to develop an algorithm able to produce the maximum likelihood estimates of our dynamic Tobit model with fixed effects in both the cross-section and time-series domain. Although our approach comes a long way, this would further improve the quality of the estimation strategy. One challenge from an economic and political viewpoint, next to replicating this study in different settings, is to extend the analysis with the reversal relationship between politics and trade. Using cointegration and Granger-causality methods, as done in earlier work, might be instrumental in unraveling the politics-trade causality relationships. Here, it would be interesting to find out how causality linkages run for different aspects of politics (as well as among them), and whether or not the causality chain is different for export *vis-à-vis* import.

Chapter 4

Economic Openness and Trade Linkages of China: An empirical study of the determinants of Chinese trade intensities from 1993 to 1999

The Chinese economy is on the move. In the 1980s, the Chinese regime took a number of piecemeal steps toward economic liberalization. This process accelerated impressively in the 1990s. This chapter reports an empirical study into the determinants of the emerging pattern of Chinese trade (export and import) intensities in the liberalization decade by exploring international trade statistics for 1993 to 1999. That is, six models are estimated that seek to explain the shifts in the export and import intensities of trade with different trade partners in the 1993-1999 period. The estimation results reveal striking differences for export vis-à-vis *import trade intensities, as well as for 1993 versus 1999. For example, a key result is that the political determinants of trade intensities that were still very important in 1993, have been moved to the background by economic explanations in 1999. Clearly, China is opening up to the world at large, de-emphasizing political preferences in the economic trade arena.*

4.1 Introduction

Since the launch of a market-oriented reform program in 1978, Chinese international trade has experienced an extraordinary expansion with an 18 per cent average annual

growth rate.[1] Nowadays, Chinese export and import play a non-negligible role in worldwide international economic activities. In 1999, China became the ninth largest trader in the world.[2] In 2001, entry into the World Trade Organization (WTO) was finally established. Without any doubt, China moves rapidly to join the global economy, contributing to the growing integration of global business more substantially than ever before in the communist era. During the transition from a closed to an open economy, the market mechanism started to function in Chinese society, which inevitably involved intensifying bilateral trade linkages with many countries. Not surprisingly, given the huge potential of China's billion-plus population, a substantial body of literature has emerged that is concerned with Chinese trade issues. However, among this rapidly expanding stock of studies, there is little analysis of the dynamics of Chinese trade linkages with trade partners. For sure, there are many studies that focus on the bilateral trade linkage between China on the one hand and a specific trade partner such as East Asia, Japan or the US on the other hand (e.g., Platte 1991; Wu and Zhang 1998; Loungani 2000). However, few studies aim at understanding the distribution of Chinese export and import over all trade partners so as to unravel the factors that explain the (shifts in) Chinese trade intensities. The purpose of the current study is to fill this gap by answering three questions: How have Chinese bilateral trade linkages developed in the 1990s?; What factors may explain the distribution of Chinese trade over different countries in the 1990s?; and How has the (relative and absolute) importance of these factors changed during the transition period of the 1990s?

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[1] Source: World Bank 2000 Yearbook.

[2] The Chinese Ministry of Foreign Trade and Economic Cooperation (MOFTEC).

In the international trade linkages literature, an important approach is the gravity model, which involves the identification of variables that determine the size of trade flows between countries, in so doing analyzing the relative importance of different trade-driving forces. Introduced by Tinbergen (1962), the gravity model has been successfully applied to bilateral trade flows, usually producing a good estimation fit (Anderson 1979). This model emphasizes the explanation of the absolute size of bilateral trade flows (e.g., Bergstrand 1989 & 1990; Rauch and Trindade 2002). In this chapter, we employ the trade intensity index, which reformulates the gravity model such that the relative intensity of the bilateral trade linkages across different trade partners is explicitly measured. In most cases, after all, a large bilateral trade volume does not imply a similarly close trade relationship. For example, the export value from China to the United States is ranked first among the Chinese trade partners in 1999 (MOFTEC), but the trade linkage between these two counties is not necessarily the most intensive one, given the huge aggregate import value of the United States. The empirical study reported below reveals that the mere volume of a trade flow from country y to x alone is not enough to unravel the relative importance of this trade linkage for country y or x completely.

In contrast to the trade volume measure, the trade intensity index is an explicit measure of the relative importance of the trade linkage between two countries (e.g., Chow 1999; Foroutan 1998; Greytak and Tuchinda 1990; Peh 1999). Using this trade intensity index, for both export and import, this chapter identifies the factors that affect the intensity of the trade linkages between China and a large set of different trade partners. Using trade intensity indices to measure trade linkages has a twofold advantage. First, the trade intensity index normalizes many factors that may affect the absolute trade flows, such as the countries' international openness, exchange rate

and price level. Since these country-specific factors have equal impact on the bilateral trade flows of this country with all its trade partners, these factors affect the aggregate trade volume but not the across-partners trade structure of this country. Second, and related to the above, the trade intensity index is an indicator that reveals the relative importance of the trade relationship between two counties explicitly. A trade intensity index with country y larger than one implies that the relative importance of that trade linkage with this partner y is above average.

Another theoretical model that targets the explanation of trade flows is Linder's theory (Linder 1961). The departure point of Linder's approach is that an important source of production and trade is domestic demand. From that perspective, Linder concludes that the closer trade partners are in their demand patterns to focal country y, the more similar will be their trade commodities composition and the larger will be their volume of bilateral trade. In other words, patterns and intensities of international trade are determined by similarities in the level of development, and so by convergence of domestic consumption patterns. Specifically, the Linder effect refers to the impact of income level similarity on how a country distributes international trade across foreign partners. Because most finished and many intermediate goods are produced in and traded from developed countries, a long list of empirical studies have reported strong evidence for the existence of a Linder effect among developed countries, but very weak or no evidence for less developed countries (LDCs) (e.g., Hufbauer 1970; Greytak and McHugh 1977; Ahmad and Simos 1979; Thursby and Thursby 1987; Shelburne 1987; Linnemann and van Beers 1988; Hanink, 1990). In the 1980s and 1990s, however, along with rapid economic transformation in a number of developing countries, signs of a positive Linder effect were also found for intra-LDC trade (Weinblatt and Schrager 1985; Arnon and Weinblatt 1998). The current study employs gross domestic product per capita,

education expenditures and industry structure measures to test for a Linder effect in the context of Chinese trade.

Overall, the contribution of this chapter to the study of bilateral trade linkages is fivefold. First, the examples of the gravity model and the Linder effect illustrate the need to adopt an integrative perspective, taking on board a large set of explanatory variables from different theoretical perspectives. This chapter introduces gravity and Linderian variables in a trade intensity estimation model. On top of that, this study adds additional variables to the explanatory model, such as foreign direct investment and the size of the Chinese immigrant population in the trade partners' societies. Second, instead of the mere volume of trade flows, this study introduces the trade intensity index to measure the relative weight of a set of trade linkages, which explicitly reveals the relative importance of trade between two countries.[3] Third, the current study involves China and 71 major trade partners, which – as far as we know – is much more than any former study, to date, has done. Fourth, regressions are run for export and import trade intensities separately, allowing us to explore whether or not the across-countries distribution of Chinese export and import flows are driven by similar or dissimilar forces. Fifth, this study tries to unravel the impact of the recent Chinese trade liberalization program on bilateral trade linkages by estimating

[3] Doing it all in a single chapter would be too much, as we already have to report an interpretation of a multi-way comparison of the findings for the whole time window, two milestone years and two intensity measures. The results of similar analyses for absolute trade flows, rather than relative trade intensities, are available upon request, however.

trade intensity models for the 1993-1999 period, as well as for the 1993 and 1999 milestone years separately.

4.2 Trade Reforms and Trade Partners

4.2.1 Trade reforms

Starting in 1978, China has introduced a series of opening policies toward foreign trade and investment. Roughly speaking, Chinese trade liberalization history can be divided into two stages. The first stage ranges from 1978 to 1992. During that period, the policy as to the transition toward a market-oriented system followed a gradual step-by-step approach. In this period, the opening process started with the establishment of a few special economic zones, targeting specific industries only. In terms of the trade administration system, decentralization was introduced at three levels. First, rights and responsibilities were passed from the central government to local authorities, with the aim to encourage local state-owned trading companies to develop international trade linkages (Rauch 2001). Second, a contracting-out and management-responsibility system was launched, which gave more decision-making power to trading companies. Third, trading companies were allowed to retain part of the foreign exchange they earned, so enabling them to profit from their trading activities and to operate in the foreign exchange market. Fourth, in the 1986-1991 period China decreased the import tariff rates for a small group of commodities. That is, the tariff rates for 81 (from about 6,300 duty codes, in total) were lowered by 30 to 85 per cent (Tariff Policy Commission of the State Council of China 1991). All these reforms together put an end to the era of Chinese 'splendid isolation', hence triggering the emergence of Chinese international trade. However, the reforms in this period were not sufficient to change much because the trade system suffered from disorder and even chaos, as conflicts between regions and among different levels of

authorities raised to trade-impeding degrees. The result was that much confusion and inefficiency were produced by this mixture of centralized regulation and decentralized administration.

A new stage of Chinese economic reform began in 1992. Since then, the Chinese trade system has been adapted to better reflect international norms, and the process of trade liberalization has accelerated, through five routes. First, the Chinese government lowered trade tariff rates more broadly and more significantly. In January and again in December 1992, China reduced import tariffs for 3,596 duty codes, reflecting different product categories, by an average of 7.3 per cent. In the same year, China eliminated an adjustment tax that had been levied since 1985 on the import of 16 categories of goods. In December 1993, China further cut back on import tariff rates for 2,898 duty codes by an average of 8.8 per cent. In January 1994, import tariff rates for sedans were reduced from 220 per cent and 180 per cent (depending on the model) to 150 per cent and 110 per cent, respectively. In April 1996, import tariffs for 4,971 items were lowered by an average of 35 per cent, reducing the country's average tariff rate from 35 to 23 per cent for all goods. The average rate was further decreased to 17 per cent on October 1 1997 (Customs of the People's Republic of China). In 2001, China cut import tariff rates on 3,462 items by an average of 6.6 per cent, bringing the country's average tariff rate down to 15.3 percent (*China Daily* of May 1 2001). In all, the trade liberalization program during the post-1992 period is associated with a drop of the arithmetic average of tariff rates from 43.2 per cent in 1992 to 15.3 percent in 2001.

Second, non-tariff trade barriers were reduced substantially, or even demolished altogether. In 1992, the government lowered the number of export goods subject to quota license regulation from 212 to 183, and fully eliminated import-quota license

requirements for 16 categories of goods. In December 1993, China canceled import license requirements for 9 categories of goods that comprise 283 products, including steel products, pesticides, civil airplanes, and black-and-white television tubes. In May 1994, China eliminated import license requirements for another 195 goods, including 30 goods that were to be relieved of requirements by the end of 1994 in accordance with a Sino-US memorandum of understanding. In 1995, another 120 goods were relieved of import license regulation. In April 1996, 30 per cent of the remaining quotas were dropped. In addition, 1994 was the last year in which the government issued mandatory instructional plans for export and import trade. The mandatory plans were compulsory and restrictive, being based on strict centrally-controlled foreign exchange regulation.

Third, the government started a program of administrative reforms by (a) developing an adapted trade-related regulatory and international law system and (b) making the international trade administration system much more transparent. The "Law of Foreign Trade of the People's Republic of China" was promulgated in May 1994, and entered into effect only two months later. Several regulatory measures that are associated with this new law are currently under review, including "Regulations for Import Goods", "Regulations for Export goods", "Anti-Dumping Statute", "Anti-Subsidy Statute", "Safeguard Regulations", "Regulations for Punishing Low-Price Exports", and "Regulations for Responding to Anti-Dumping Suits against China's Exports". All these administrative reforms will further smooth the process of international trade by bringing Chinese practice more in line with international standards.

Fourth, along with the liberalization of the international trade system, the reform program has been extended to services industries and foreign direct investment (FDI). Since 1992, additional industries, including a number of sensitive industries in

the services sector, were gradually liberalized to allow for entry by foreign firms. On top of this, more geographical areas were opened for foreign direct investment, including inland cities, which provided foreign investors much better access to the domestic interior market of mainland China. In addition, FDI-related reforms were speeded up, such as a tax relaxation. This set of FDI-directed reforms greatly improved China's investment environment, so promoting China's international trade position. So, the liberalization of services industries in combination with FDI-stimulating measures has introduced a further impetus to the development of international trade.

Fifth, many exchange rate reforms have been implemented. As of January 1 1994, China took a major step toward currency convertibility by unifying the official and swap market exchange rates. This was a real breakthrough in the reform of China's foreign trade system, which helped to bring China's foreign trade operations closer to international norms, playing a positive role in gaining full membership of the WTO. The measures taken included: unification of the exchange rates and adoption of a managed, market-based, uniform floating exchange rate; abolition of the retention schemes and introduction of a foreign exchange surrendering system; abolishment of the compulsory foreign exchange plan, permitting users to buy foreign exchange from designated banks on presentation of valid import documentation; termination of the issuing of Foreign Exchange Certificates (FECs) and phasing out FECs already issued; and establishment of an inter-bank foreign exchange market. The new exchange rate system has improved the efficiency of

foreign exchange allocation and strengthened the central bank's ability to stabilize the rate (e.g., Lichtenstein 2000; Lu and Zhang 2000), with a huge impact on trade.[4]

Together, by launching a series of reforms in the above five trade-related policy domains China has speeded up the pace of liberalization impressively since 1992. By now, the reform of trade policies, exchange rate regime and administrative procedures has triggered an unprecedented convergence toward international norms. Based on this observation, we selected 1993 to 1999 as the milestone period to analyze the regulation-driven changes in Chinese bilateral trade linkages (see also below). In this period, we expect the model (see below) to work, as international trade was liberalized such that the resulting changes in trade linkages could materialize. Note that trade liberalization measures are not introduced as (independent) variables in the model below, as Chinese liberalization is a continuous process that cannot be associated with clear-cut and discrete deregulatory events. Rather, we have decided to run three sets of analyses: for the whole 1993-1999 period, as well as for both milestone years 1993 and 1999 separately, In so doing, particularly by comparing the results for both benchmark observation years 1993 and 1999, we hope to be able to observe the effect of the Chinese liberalization program over time.

4.2.2 Trade partners

Ever since the trade liberalization program is in effect, an important feature of Chinese trade patterns is the increased diversity of trade partners. The number of

[4] Export grew at 20.9% in 1994 and 18.7% in 1995, whereas import increased by 31.9% in 1994 and 23.0% in 1995 (Customs General Administration of the People's Republic of China).

trade partners (representing a trade value above the one-million US dollar threshold) increased from 148 in 1990 to 183 in 1999. Additionally, the Herfindahl-Hirschman concentration index of Chinese export dropped from 0.47 in 1990 to 0.34 in 1999.[5] Hong Kong had for long been China's largest trade partner, counting for 43.2 percent of Chinese exports in 1990, but Hong Kong's share dropped to an interim low of 18.9 per cent in 1999 (IMF 1995, 2000). Besides increasing trade partner diversity, China's regional spread of trade linkages has changed along with the process of international trade liberalization. A frequently used indicator for trade linkages is the regional distribution of export and import. Of China's major trade partners, the share of the European Union, the United States, Asia (except Hong Kong and Japan) and Africa has increased, while the linkages with Hong Kong and Japan have slackened. The data in Table 4.1 substantiate, by and large, this claim by listing the export and import trade shares for eight regions.

However, as stated above, although regional trade shares are an interesting measure of trade linkages, we opt for the trade intensity index to measure the relative importance of a country or region to China's trade *vis-à-vis* the importance of the rest

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[5] The Herfindahl-Hirschman concentration index is commonly used as a measure of market structure (Daems and Douma 1989). We use this index to measure the regional concentration of Chinese export:

Herfindahl-Hirschman concentration index = $\sqrt{\sum_{i=1}^{n} \sigma^2}$,

where n denotes the number of trade partners, and σ stands for the share of export of a specific country in total export. The index is 1 if there is only one trade partner, while an index close to 0 reflects almost perfect trade diversification.

of the world. It is here where the country or region-level trade intensity index adds value (see below for a formal definition). Table 4.2 shows that the trade intensity with Asian countries is relatively high, followed by United States, the Middle East, the European Union and the Western Hemisphere (in that order).

Table 4.1 Geographical composition of Chinese export and import in 1991-1999 (%)

Region		1993	1994	1995	1996	1997	1998	1999	1993-1999
EU	Export	12.81	12.72	12.79	13.12	13.50	14.85	16.02	25.06%
	Import	14.71	16.09	16.08	14.31	14.09	14.20	16.24	10.40%
USA	Export	18.49	17.74	16.61	17.67	17.90	20.65	21.54	16.50%
	Import	10.28	12.08	12.26	11.64	11.45	12.04	11.76	14.40%
Japan	Export	17.20	17.83	19.13	20.44	17.42	16.14	16.62	-3.37%
	Import	22.37	22.77	21.96	21.02	20.37	20.16	20.38	-8.90%
Hong Kong	Export	24.05	26.75	24.20	21.78	23.96	21.08	18.93	-21.29%
	Import	10.10	8.21	6.51	5.64	4.91	4.75	4.16	-58.81%
Rest of Asia*	Export	12.75	13.55	15.80	15.52	15.64	13.42	14.23	11.61%
	Import	24.60	25.39	27.19	29.46	31.95	32.85	32.18	30.81%
Africa	Export	1.30	1.10	1.30	1.40	1.40	1.84	1.69	30.00%
	Import	0.70	0.70	1.00	1.00	1.60	1.02	1.40	100.00%
Middle East	Export	2.80	2.40	2.30	2.30	2.30	NA**	2.73	-2.50%
	Import	1.60	1.20	1.70	2.20	2.70	NA**	2.19	36.88%
Western	Export	1.70	1.90	2.00	2.00	2.40	2.81	2.56	50.59%
Hemisphere	Import	1.80	1.80	2.10	2.50	2.60	2.07	1.77	-1.67%

* Rest of Asia comprises the Asian continent except for Japan and Hong Kong.

** NA denotes not available.

Sources: IMF, Direction of Trade Statistics Yearbook, 1995 and 2000.

Table 4. 2: Trade intensities of China in 1999

Region	Export intensity	Import intensity
EU	0.44	0.42
USA	1.19	0.96
Japan	3.10	2.74
Hong Kong	6.10	1.35
Rest of Asia*	1.05	2.03
Africa	0.90	0.75
Middle East	0.98	0.71
Western Hemisphere	0.42	0.33

* Rest of Asia comprises the Asian continent except for Japan and Hong Kong.

Sources: MIF, Direction of Trade Statistics Yearbook, 2000.

4.3 Hypotheses

The hypothesized determinants of the trade intensities should be variables that influence the direction of trade flows among countries, and not so much those that affect the levels of trade in the world at large. After all, we are interested in explaining the distribution of trade flows over countries rather than the absolute trade volumes. Our first group of variables is derived from the gravity model literature. In an early contribution to the literature, Linnemann (1966) classified the factors that determine bilateral trade into three categories of variables, i.e., measures of

(1) total potential supply of the exporting country A,

(2) total potential demand of importing country B, and

(3) "resistance" to trade from potential supplier A to potential buyer B.

The first two categories of measures offer proxies for the trade potential of the countries A and B, respectively, whereas the third category captures the barriers and drivers of trade intensity between the countries A and B. As far as the third category is concerned, which is of central interest in the current study, former empirical studies introduced a series of variables that offer proxies for different kinds of inter-country distance. The key argument here is that the larger the distance between country A and B, along whatever dimension relevant for international trade, the lower their trade intensity will be. Prominent examples of such distance-related measures are (a) discriminatory trade integration, (b) geographical distance, (c) historical and political affinities, (d) cultural (dis)similarity and (e) economic structure overlap (Linnemann 1966; Yamazuwa 1971; van Beers and Linnemann 1991; Parsley and Wei 2001). In the current study, apart from these five established factors, we introduce another variable that may influence the trade intensities of China: foreign direct investment. Below, we formulate six hypotheses as to the expected effect of this set of six independent variables on the Chinese trade intensities. Note that we do not develop separate hypotheses for export *vis-à-vis* import trade intensities or for 1993 versus 1999, as the (empirical and theoretical) literature offers insufficient arguments to ground diverging predictions in either direction. So, as far as these comparisons are concerned, we let the data speak.

First, trade integration is an important issue in many parts of the world. A prominent example is the discriminatory trade bloc phenomenon. After all, a discriminatory trade bloc is an important barrier-reducing vehicle for the bloc's member states, but a similarly important barrier-increasing institution for non-member nations. According to the theory of customs unions, pioneered by Viner (1953), discriminatory trade blocs are likely to trigger trade-creation effects for the member

countries, so positively affecting the intensity of trade between member states. The other side of the coin is that non-member countries are likely to lose sales inside the bloc, suffering from trade-diversion effects. This well-established type of argument induces Hypothesis 4.1 (Foroutan 1998; Soloaga and Winters 2001).

HYPOTHESIS 4.1: The Chinese trade intensities are higher (lower) with non-member (member) countries outside (inside) the world's discriminatory trade blocs.

Second, historical and political affinities cannot be ignored in a study of international trade (Loungani 2000). For one, for obvious reasons of path dependencies, a long history of inter-country exchange is likely to introduce auto-correlation in the relevant international trade time series. Moreover, friendly political relationships among similar political regimes will benefit the bilateral trade between the countries involved through policies of preferred trade arrangements. Both mechanisms together give Hypothesis 4.2.

HYPOTHESIS 4.2: The Chinese trade intensities are higher (lower) with countries that are (not) tied to China through (a) long historical bonds or (b) political system similarities.

Third, many empirical studies have shown, in accordance with modern trade theory, that transport costs negatively influence trade flows (e.g., Geraci and Prewo 1977). The geographical distance of a country from world markets and the transportation conditions inside a country, for example, determine the transport cost level (e.g., Yu and Zietlow 1995). If transportation distance from a country to potential trade partners affects the geographical distribution of international trade, then the trade intensities are affected accordingly. This is Hypothesis 4.3.

HYPOTHESIS 4.3: The Chinese trade intensities are higher (lower) with countries that are nearby (far away) in terms of geographical distance.

Fourth, in general cultural and language affiliations can facilitate transaction efficiency and effectiveness in an uncertain environment (Rauch 2001; Wei 2000). Ethnic linkages, for example, play an important role in international business. Among the ethnic group networks active in international trade, the overseas Chinese settlements have received the most attention. Earlier studies have produced two related results that are particularly interesting in the context of this chapter: (a) the overseas Chinese networks play an important role in international trade in general (e.g., Redding 1995; Rauch and Trindade 2001); and (b) ethnic ties are a crucial stimulus for doing business with China in particular (e.g., Dixon and Newman 1998; Luo 2001). Based on these findings, we assume that the size of the Chinese immigrant population in a trade partner's society influences the bilateral trade intensity positively. This is reflected in Hypothesis 4.4.

HYPOTHESIS 4.4: The Chinese trade intensities are higher (lower) with countries that host a large (small) Chinese immigrant population.

Fifth, as stated in the introduction, many studies in the Linderian tradition have found evidence in support of the argument that inter-country similarity in terms of economic structure, particularly in terms of consumption patterns, has a positive effect on bilateral trade, especially in the developed world. The findings are not unambiguous, though, as other studies fail to support this hypothesis, particularly for the developing world (Linnemann 1966; Linnemann and van Beers 1988; Peh and Wong 1999). Here, we formulate the hypothesis in line with the original contribution of Linder (1961). This is Hypothesis 4.5.

HYPOTHESIS 4.5: The Chinese trade intensities are higher (lower) with countries that reveal (dis)similar economic structures.

Sixth, it is clear that foreign direct investment (FDI) and international trade are closely interrelated as the activities of multinational enterprises (MNEs) have distinctive effects on the structure of international trade, of both home and host countries. That is, the MNE's ability and willingness to internalize cross-border transactions affect the value-added activities both within a country and between countries (Dunning 1992). In general, the literature is unanimous about the importance of this link. However, the exact nature of the relationship between FDI and trade is a controversial issue in the international economics and business literature. This is because the relationship works out differently under different circumstances. For example, market-penetration FDI may substitute for the import from host countries, whilst factor-seeking investment may increase exports from the host nation to the home country (Root 1994). Summarizing the literature on the FDI-trade relationship, we can conclude that this relationship largely depends on (a) the types of FDI and trade being considered, (b) the nature of the internationalization strategies of the MNEs and (c) the characteristics of the industries and countries involved. So, not surprisingly, the evidence in the empirical literature is mixed. A number of studies have confirmed the idea that outward FDI and export trade are complementary activities, especially in the case of the developed world (e.g., Swedenborg 1979, 1985; Lipsey and Weiss 1981; Pearce 1990; Wei *et al.* 1999). Other work has reported that FDI and international trade are substitutes, and thus negatively related (e.g., Horst 1972). As far as China is concerned, empirical studies tend to reveal a positively significant impact of FDI inflow on China's total trade volume (e.g., Chen 1996; Sun 1999, 2001; Wei *et al.* 1999). In our context, we

take this finding as the benchmark hypothesis. That is, FDI is expected to influence the trade intensities between China and the investors' home countries positively. This produces Hypothesis 4.6.

HYPOTHESIS 4.6: The Chinese trade intensities are higher (lower) with countries that represent (not) much foreign direct investment in China.

4.4 Measures, Data and Methodologies

4.4.1 Measures

In total, we collected data on two dependent and ten independent variables. The dependent variables are the Chinese export and import trade intensities. The trade intensity index (*TI*), developed by Kojima (1968), Roemer (1976), Kunimoto (1977) and Drysdale and Garnaut (1982), measures the degree to which two countries trade more (or less, for that matter) intensively with each other than they do with the rest of the world. For export, it is defined as the ratio of a focal country *c*'s export share in total imports of another country *f* on the one hand and the percentage this country *c* represents of total exports in world trade on the other hand. For import, an equivalent ratio can be calculated. This study's dependent variables are the export trade intensity index (*exTI*) and the import trade intensity index (*imTI*). Obviously, the index is influenced by the absolute volumes of either partners' trade. The trade intensity index used here, though, measures the extent to which the trade relation (in terms of either export or import) of China, *c*, with foreign partner *f* is more close (or loose) than that with the rest of the world. The uncorrected trade intensity indices are expressed as follows:

$$exuTI_{cf} = \frac{x_{cf} / m_f}{x_c / m_w}$$
$$imuTI_{cf} = \frac{m_{cf} / x_f}{m_c / x_w} \qquad (4.1)$$

Here, $exuTI_{cf}$ is defined as the uncorrected Chinese export intensity with country f, x_{cf} is Chinese export to country f, m_f is total import of country f, x_c is Chinese total export and x_w is world export. Similarly, $imuTI_{cf}$ is defined as the uncorrected Chinese import intensity with country f, m_{cf} is Chinese import from country f, x_f is total export of country f, m_c is Chinese total import and m_w is world import. Since China cannot export to (or import from) itself, the formulas above must be modified by using overall world trade reduced by China's import (export). This gives the corrected trade intensity index (dropping the *u* in the shortcut reference)

$$exTI_{cf} = \frac{x_{cf} / m_f}{x_c /(m_w - m_c)}$$
$$imTI_{cf} = \frac{m_{cf} / x_f}{m_c /(x_w - x_c)} \qquad (4.2)$$

In this study, we use expression (4.2) to calculate the export and import *TIs*. A value of the *TI* greater than one indicates that China exports to (or imports from) country *f* more intensively than it does to (or from) the rest of the world. Vice versa: a value of *TI* less than one reflects that China exports to (or imports from) country *f* less intensively than it does to (or from) the rest of the world.

In total, we use ten independent variables. The first one relates to the issue of discriminatory trade integration (Hypothesis 4.1). We use a dummy variable labeled regional integration (*INTE*) as a proxy for the relative height of such barriers, with 0

denoting non-membership and 1 membership of a trade bloc. In 1999, four close trade blocs – the European Union (EU), the North-American Free Trade Agreement (NAFTA), the Association of Southeast Asian Nations (ASEAN) and the Latin-American MERCOSUR – are taken into account. In 1993, only the EU and the ASEAN are taken on board since at that time the other blocs were not yet mature enough.

The second pair of independent variables relates to historical and political affinities (Hypotheses 4.2a and b, respectively). Our second independent variable is the duration of diplomatic ties (*DIPLO*) and the third one relates to political system similarity (*POLI*), which together offer proxies for the historical and political affinity variables. For *DIPLO* we have calculated the duration in years after the date when China and a trade partner set up a formal diplomatic relationship; and for *POLI* we use a simple 0-1 dummy with a 0-code for capitalist countries and a 1-code for communist or transitional nations.

The transport cost variable is proxied by a straightforward indication of geographical distance (Hypothesis 4.3), which is denoted as *DIST*. This is our fourth independent variable. Considering the most popular sea-road transportation route of goods from and to China, we code border countries as 0, non-border Asian countries as 1, Oceanic countries as 2, European and Africa countries as 3, and American countries as 4. We decided to use this categorical variable rather than a capital-to-capital kilometer one (as is often done in gravity model analyses) because international trade can happen everywhere outside of the capital of a huge country like China. China's border countries are more likely to trade with Chinese border provinces than with Beijing. The geographic distance between Beijing and Hanoi is about two times that between Beijing and Ulaanbaatar, but we cannot say that South Korea is two times further away from China than Mongolia is. For this reason, we suppose that the

impact of distance on bilateral trade is the same for all border countries, no matter how far the distance between the capital cities is.

The fifth independent variable is a proxy for cultural affinity, i.e., the relative size of the Chinese immigrant population in non-Chinese countries (Hypothesis 4.4). We use the share of the Chinese immigrant community in the trade partners' population (*CHIpop*) as our cultural affinity measure.

The economic structure similarity is measured through four different proxies, which are introduced to test for the (non)existence of the Linder effect in China (Hypothesis 4.5). The sixth independent variable is gross domestic product (GDP) per capita (*PGDP*). Here we use *PGDPdif* to measure the difference, which can be expressed as $PGDPdif = (PGDPc - PGDPf)/PGDPc$, where *PGDP* is measured in PPP-price (recall that *c* denotes China and *f* the foreign trading partner). The seventh independent variable is the ratio of education expenditure to GDP (denoted as *EDUC*), which is an indicator of the level of labor cost, as well as the availability of high-skill labor or high-brow technology. Again, we calculate *EDUCdif* to measure the discrepancy between China and trade partner *f*, which is expressed as $EDUCdif = (EDUCf - EDUCc)/EDUCc$. The eighth independent variable is an industry structure measure. We use the share of services in GDP, which is denoted as *SERV%*. Among the 71 trade partners (see below), all partners have a higher *SERV%* than China, except for Cameroon and Loa. Therefore, we suppose that the higher *SERV%*, the larger the economic structure difference.[6] The ninth

[6] Another reason to use SERV% instead of a SERV%-discrepancy measure is that we conjecture that SERV% per se is positively correlated with TI. The argument is

independent variable is a measure of the similarity of the commodity composition of trade, which is labeled *COS*. *COS* was developed originally by Linnemann (1966). *COS* varies between 0 (no similarity) and 1 (perfect similarity).[7]

The tenth, and final, independent variable relates to foreign direct investment. In the post-1991 period, FDI inflow in China has increased extraordinarily, which inevitably influences China's export and import performance. In 1999, the share of foreign investment companies in Chinese total export and import were 45.5 and 51.8 per cent, respectively.[8] These figures reflect the impact of China's dual trade regime (Naughton 1996, 1999) and illustrate the important role played by FDI in China's foreign trade. Earlier studies on the FDI-trade relationship used the previous year's FDI-level, thus exploiting time-series data, as the explanatory variable (e.g., Zhang and Song 2000). Our study is different in two ways, though: (a) we focus on trade intensity instead of trade flow as the dependent variable; and (b) we use cross-sectional data for two years (1993 and 1999: see below) next to and on top of time-series information. Therefore, we start from the assumption that all the active FDI inflows affect the *TI*. Based on data availability limitations, we use the previous three years' cumulative FDI inflow as our tenth independent variable, denoted as *FDIsum*.

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that a high share of services in GDP implies an advanced services industry, which facilitates foreign trade with high-quality services products, such as transportation, telecommunication, insurance, banking and financial services.

[7] $COS = \frac{\sum_k X_{ck} * M_{fk}}{\sqrt{\sum_k X^2_{ck} * \sum_k M^2_{fk}}}$, where X_{ck} is the export volume of China in commodity class k, and M_{fk} is the import volume of China's trade partner in commodity class k.

[8] General Administration of Customs of China.

4.4.2 Data

We chose 1993 and 1999 as our two milestone observation years in order to analyze what happened to Chinese export and import trade intensities, and their underlying driving or impeding forces, in the decade of accelerated liberalization. There are two reasons to select 1993. First, the new period of intensified international trade reform started in 1992, and 1993 is the first year in which the new policies functioned. So, the great changes – if any, of course – have largely materialized in the post-1993 period.[9] By comparing the results for 1993 *vis-à-vis* 1999 we can hope to reveal the changes brought about by the continuous process of international trade reform. The other reason is related to FDI. As stated above, for year *t* we use the sum of FDI in the previous three years *t-1*, *t-2* and *t-3* as a key explanation for *TI* in year *t*. Before 1990, however, FDI inflow was consistently at a very low level. In effect, in the pre-1990 period most trade partners had no FDI in China whatsoever. Even in 1990, there were only 34 countries with a Chinese FDI level above the (very low) $10,000-threshold (MOFTEC 1990). In early 1992, Chinese government reaffirmed the open-door policy and called for a massive FDI influx into China. The FDI inflow in China in 1992 doubled the figure of 1991, and in 1993 the inflow of FDI doubled the

[9] Of course, whatever benchmark year is selected, a degree of arbitrariness is unavoidable. After all, trade-affecting events happen all the time: for example, the Tiananmen crisis in 1989, China's nuclear testing in 1995, and the bombing of the Chinese embassy in Belgrade in 1999. We do believe, however, that 1993 is a good choice. For example, the sanctions imposed after the Tiananmen crisis had been relaxed during the two years after the event, as Japan lifted the sanctions after one year and the US after 18 months. Therefore, we can safely assume that the short-term effects of the event on bilateral trade had diminished by 1993. Indeed, statistics show that bilateral trade with the Western world increased at a high speed after 1991.

figure of 1992. The number of investing countries increased to 59 in 1992 (MOFTEC). Therefore, the 1990-1992 period is the turning point that demarcates the entry from a, basically, non-FDI into a new pro-FDI epoch.

The source of the international trade data is mainly the IMF, complemented by sources from inside The Custom of People's Republic of China. In total, data for 71 trade partners are available (see the Appendix). Diplomatic data are from the Chinese Ministry of Foreign Affairs. Information about the sizes of the per-country Chinese immigrant population abroad are largely copied from the *Overseas Chinese Economy Yearbook 1990* (Poston and Yu 1991), which includes the latest census data available for most countries, complemented by figures from *The Encyclopedia of the Chinese Overseas* (Pan 1999). Data for education expenditures, GDP per capita and services industry share are collected from the Worldbank 2000 database. Finally, FDI information has been provided by MOFTEC.

The descriptive statistics are reported in Tables 4.3a, 4.3b and 4.3c (though without the *COS* variable: see below for an explanation)

Table 4.3a: Mean levels, standard deviations and correlation coefficients (1993-1999)

	Mean	s.d.	1	2	3	4	5	6	7	8	9
1 INTE	0.32	0.47	1.00								
2 DIPLO	26.24	14.16	-0.05	1.00							
3 POLI	0.17	0.38	-0.27	0.03	1.00						
4 DIST	2.38	1.36	0.14	-0.15	-0.15	1.00					
5 LogCHIpop	-3.98	3.05	0.44	-0.08	-0.30	-0.14	1.00				
6 PGDPdif	2.51	3.04	0.50	-0.06	-0.15	0.21	0.38	1.00			
7 EDUCdif	1.17	0.89	0.10	-0.11	0.07	0.26	-0.18	0.42	1.00		
8 SERV%	54.35	12.08	0.32	-0.06	-0.15	0.41	0.19	0.63	0.37	1.00	
9 FDIsum	0.0043	0.01	0.15	-0.15	-0.13	-0.15	0.34	0.42	0.05	0.21	1.00

Table 4.3b: Mean levels, standard deviations and correlation coefficients (1999)

	Mean	s.d.	1	2	3	4	5	6	7	8	9
1 INTE	0.41	0.50	1.00								
2 DIPLO	28.92	14.70	-0.09	1.00							
3 POLI	0.17	0.38	-0.37	0.04	1.00						
4 DIST	2.38	1.37	0.34	-0.16	-0.15	1.00					
5 LogCHIpop	-3.98	3.07	0.53	-0.07	-0.30	-0.14	1.00				
6 PGDPdif	1.94	2.68	0.54	-0.01	-0.17	0.20	0.38	1.00			
7 EDUCdif	1.11	0.81	0.01	-0.14	0.06	0.30	-0.20	0.39	1.00		
8 SERV%	55.76	12.89	0.35	-0.21	-0.07	0.35	0.18	0.58	0.44	1.00	
9 FDIsum	0.0055	0.02	0.16	-0.17	-0.15	-0.19	0.38	0.52	-0.01	0.22	1.00

Table 4.3c: Mean levels, standard deviations and correlation coefficients (1993)

	Mean	s.d.	1	2	3	4	5	6	7	8	9
1 INTE	0.23	0.42	1.00								
2 DIPLO	23.24	14.10	-0.04	1.00							
3 POLI	0.17	0.38	-0.24	0.03	1.00						
4 DIST	2.38	1.37	-0.03	-0.15	-0.15	1.00					
5 LogCHIpop	-3.98	3.07	0.46	-0.08	-0.30	-0.14	1.00				
6 PGDPdif	3.22	3.56	0.39	-0.04	-0.14	0.22	0.39	1.00			
7 EDUCdif	1.28	1.00	-0.06	-0.10	0.10	0.20	-0.20	0.36	1.00		
8 SERV%	54.20	11.22	0.25	-0.07	-0.23	0.46	0.23	0.75	0.33	1.00	
9 FDIsum	0.0033	0.01	0.00	-0.09	-0.11	-0.11	0.23	0.43	0.04	0.18	1.00

4.4.3 Methodologies

The empirical study starts from a general log-linear specification of an estimation model using the dependent and independent variables introduced above.[10] After various tests (available upon request), we decided to specify the basic model as follows:

$$\log TI_{cf} = \beta_0 + \beta_1 INTE + \beta_2 DIPLO + \beta_3 POLI + \beta_4 DIST + \beta_5 \log CHIpop + \beta_6 PGDPdif + \beta_7 EDUCdif + \beta_8 SERV\% + \beta_9 FDIsum + \varepsilon. \quad (4.3)$$

The following aspects about the model are worthwhile discussing.

First, we ran regressions for different model specifications. Note that the superiority of specification (4.3) above obviously offers partial evidence against Hypothesis 4.5, as the *COS* variable has dropped out. That is, the *COS* coefficient is insignificant, and the plausibility of the parameter estimates improves if *COS* is removed. This implies that inter-country export-import similarity does not contribute to the intensity of trade between China and its trade partners.

Second, we calculated the Pearson correlation coefficients among all explanatory variables of model (4.3) so as to identify possible cases of problematic multi-collinearity. The results are reproduced in Tables 4.3a, 4.3b and 4.3c above. According to the rule of thumb test, multi-collinearity is not a problem since the all the values of the correlation coefficients are below 0.7 (or above –0.7, for that matter), except for the *PGDPdif* – *SERV%* 0.75 correlation for 1993, which we tolerate as both variables are proxies for the Linder effect. Therefore, the results

[10] This is different from the usual log-log specification in gravity analyses for two reasons. First, trade intensity is a ratio rather than an absolute value dependent variable. Second, many of our independent variables can take value zero.

reported below are based on the regression model (4.3) with nine independent variables.

Third, the logarithm is taken of the Chinese immigration population share variable in trade partner countries, because we expect that the relation between the *TI* and *CHIpop* is not linear. The data reveal that the marginal increase in *TI* with respect to an increase in *CHIpop* is indeed a decreasing function of *CHIpop*. For example, the *CHIpop* of Singapore and Vietnam was 68 and 0.7 per cent in 1999, respectively, but we cannot expect the influence of *CHIpop* in Singapore to be 100 times larger than that of Vietnam.

Fourth, for the remaining discrepancy variables as to the similarity of economic structures, *EDUCdif* and *PGDPdif*, we do not take the absolute value, because we may expect different effects of positive *vis-à-vis* negative economic distance on *TI*. Although there are studies that report evidence for a Linder effect in developing countries, the GDP of the countries included in those studies were not very low compared to the developing countries' average. In effect, most studies support the hypothesis that the Linder effect exists only in countries with per-capita income above a relatively high threshold (Hanink 1990; Arnon and Weinblatt, 1998; and Chow and Kellman 1999). Estimating a simple linear regression model for the 24 countries which GDP per capita lower than China, we find a weak positive relation between export *TI* and the absolute value of both *PGDPdif* and *EDUCdif* in 1999.[11]

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[11] For the PGDPdif variable, we ran all analyses for the developed and developing countries separately, which China offering the cut-off level. This produces estimation results qualitatively similar to the ones reported below in Tables 4.4 and 4.5 for the

Therefore, we conjecture that the *PGDP* and *EDUC*-discrepancy measures are negatively related to *TI* if the trade partner's GDP per capita is higher than that of China, but positively related if the trade partner's GDP per capita is lower than that of China.[12]

Fifth, we estimate log-linear rather than linear *TI* models. The reason is that the linear models are associated with a standard residual plot that indicates the existence of non-constant variance (available upon request). If we apply a natural logarithmic transformation to the *TI* variable, then the problem of non-constant variance does not emerge. The result of White's heteroskedasticity test (available upon request) indeed reveals that heteroskedasticity plagues the linear models, but not their log-linear alternatives.

Below, we report the results of OLS-estimates[13] of the log-linear model (4.3) above for the whole 1993-1999 period, two milestone observation years (1993 and 1999), two independent variables (export and import *TI*) and 71 trade partners (see the Appendix). In so doing, 93 and 94 percent of Chinese export in 1999 and 1993,

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whole country sample. This could not be checked for the case of EDUCdif, due to the small number (five) of countries with education levels below China's.

[12] The results for different model specifications, as referred to above (available upon request), support this assumption. That is, model specification with absolute values of EDUCdif and PGDPdif produces inferior results.

[13] We did not use a fixed-effect model because three out of seven explanatory variables are time-invariant. These three variables would be swept away by a fixed-effect transformation, implying a major loss of information. A random-effect model is suitable for estimation with a huge sample. However, we only have 71 (72) cross-sectional units (i.e., countries).

respectively, and 95 and 96 percent of Chinese import in 1993 and 1999, respectively, are covered.[14]

4.5 Evidence

The regression results are presented in Tables 4.4 and 4.5. As a benchmark for the discussion of the results, Table 4.6 offers an overview of how the measures and the findings relate to the six hypotheses for the 1993-1999, 1993 and 1999 regressions, respectively.

The regression results for the whole 1993-1999 period are reported in Table 4.4. For one, the explanatory power of the export trade intensity is much larger than for import trade intensity, with an R-squared of 0.565 and of 0.254, respectively. As far as the hypotheses are concerned, the export trade intensity regression produces support for Hypotheses 4.1, 4.2a, 4.3, 4.4, 4.5a, 4.5b and 4.6, whereas the import trade intensity analysis does so for Hypotheses 4.3, 4.5c and 4.6 (with the exception of *EDUCdif* estimate, all at the 1% level of significance). Significant results with unexpected signs emerge for political system similarity in the export trade intensity regression (at the 1% significance level), and education discrepancy in the import trade intensity analysis (at the 10% level of significance). Of course, the regressions

[14] Chinese import and export here refers to the trade of mainland China with other countries, but excluding trade with Hong Kong, Macao and Taiwan. By not covering all export and import flows, we avoid another econometric pitfall (because otherwise the TIs would sum up to one). Additionally, we decided not to include Hong Kong in our analyses because this 'special' part of China introduces much noise as a result of re-export and re-investment distortions (Fung 1998; Fung and Lau 2001).

for the pooled 1993-1999 data may mask underlying processes of change that emerge gradually over time. This is why we, in addition, report results for both milestone years 1993 and 1999 separately, in reverse order of chronology, before we move to the interpretation of our findings.

Table 4.4: Empirical results for Chinese bilateral trade intensity in 1993 to 1999

	Log(exTI)	Log(imTI)
Intercept	0.441 (2.758)	0.869 (2.328)
INTE	-0.403*** (-5.699)	0.201 (1.220)
DIPLO	0.010*** (5.365)	0.004 (0.970)
POLI	-0.323*** (-4.195)	-0.175 (-0.970)
DIST	-0.257*** (-10.895)	-0.455*** (-8.233)
LogCHIpop	0.042*** (3.701)	0.006 (-0.208)
PGDPdif	-0.083*** (-5.717)	0.029 (0.847)
EDUCdif	-0.073** (-1.990)	0.178* (2.085)
SERV%	-0.002 (-0.729)	-0.024*** (-3.337)
FDIsum	20.297*** (9.000)	19.231*** (3.654)
N	497	497
R-squared	0.565	0.254
F	70.327***	18.342***
P-value	0	0

Notes: * p≤0.1. ** p<0.05. *** p<0.01; and values in parentheses are t-statistics.

Table 4.5: Empirical results for Chinese bilateral trade intensity in 1993 *vis-à-vis* 1999

	1999		1993	
	Log(exTI)	Log(imTI)	Log(exTI)	Log(imTI)
Intercept	0.042 (0.086)	1.337 (1.547)	0.794 (0.902)	-0.933 (-0.775)
INTE	-0.607*** (-2.678)	0.022 (0.055)	-0.489 (-1.416)	0.058 (0.123)
DIPLO	0.009 (1.602)	0.007 (0.752)	0.022** (2.569)	0.015 (1.313)
POLI	-0.522** (-2.481)	-0.771** (-2.058)	-0.546 (-1.592)	0.800* (1.705)
DIST	-0.171*** (-2.566)	-0.420*** (-3.525)	-0.362*** (-3.453)	-0.485*** (-3.383)
LogCHIpop	0.057* (1.746)	0.081 (1.392)	0.052 (1.047)	-0.018 (-0.258)
PGDPdif	-0.110** (-2.236)	-0.090 (-1.031)	-0.069 (-1.049)	0.012 (0.129)
EDUCdif	-0.279** (-2.402)	0.443** (2.140)	-0.036 (-0.257)	0.028 (0.149)
SERV%	0.013 (1.525)	-0.025* -1.718	-0.010 (-0.525)	0.008 (0.339)
FDIsum	15.196*** (2.530)	18.155* (1.696)	19.976* (1.891)	15.655 (1.084)
N	71	71	71	71
R-squared	0.593	0.425	0.468	0.303
F	9.855***	5.00***	5.967***	2.941***
P-value	3.4E-09	4.77E-05	5.96E-06	5.78E-03

Notes: * $p \leq 0.1$. ** $p<0.05$. *** $p<0.01$; and values in parentheses are t-statistics.

Table 4.6: An overview

HYPOTHESES (variable code: expected effect)	Export TI 1993-1999	Import TI 1993-1999	Export TI 1993	Import TI 1993	Export TI 1999	Import TI 1999
4.1: Discriminatory trade blocs (*INTE*: -)	Negative	Insignificant	Insignificant	Insignificant	Negative	Insignificant
4.2a: Historical bonds (*DIPLO*: +)	Positive	Insignificant	Positive	Insignificant	Insignificant	Insignificant
4.2b: Political system similarities (*POLI*: +)	Negative	Insignificant	Insignificant	Positive	Negative	Negative
4.3: Geographical distance (*DIST*: -)	Negative	Negative	Negative	Negative	Negative	Negative
4.4: Chinese immigrant population (*logCHIpop*: +)	Positive	Insignificant	Insignificant	Insignificant	Positive	Insignificant
4.5a: GDP discrepancy (*PGDPdif*: -)	Negative	Insignificant	Insignificant	Insignificant	Negative	Insignificant
4.5b: Education discrepancy (*EDUCdif*: -)	Negative	Positive	Insignificant	Insignificant	Negative	Positive
4.5c: Services industry share (*SERV%*: -)	Insignificant	Negative	Insignificant	Insignificant	Insignificant	Negative
4.6: Foreign direct investment (*FDIsum*: +) R-squared	Positive 0.57	Positive 0.25	Positive 0.47	Insignificant 0.30	Positive 0.59	Positive 0.43

For the regression with the export trade intensity, log (*exTI*), for 1999, the F-statistic (F = 9.855) is significant at the 1% level (with a p-value of 3.4E-09), producing an R-squared of 0.593. *INTE* is significant at the 1% level, negatively influencing *TI*. This result strongly supports Hypothesis 4.1. The *DIPLO*-coefficient turns out to be insignificant, which is not in line with Hypothesis 4.2a. *POLI* is negatively significant at the 5% level, which is contrary to our expectation in Hypothesis 4.2b. An interpretation of this result may refer to the set of trading partners. Only twelve trading partners are transitional countries. Among the twelve transitional countries, nine are from Eastern Europe, two from Middle Asia and one from Southeast Asia. As a result of European economic and political dynamics, the nine East-European countries integrate rapidly into Western Europe (Drabek and Smith 1995; Festoc 1997; Liargovas and Papazoglou 1999). This biased economic orientation is likely to produce the low export *TI* with China. *DIST* is negatively significant at the 1% level, which is in line with Hypothesis 4.3. The *logCHIpop*-coefficient is positively significant at the 10% level. This finding offers support for Hypothesis 4.4, although the low coefficient value of *logCHIpop* (0.057) indicates this element is not that important in explaining the Chinese export *TI*. *EDUCdif* and *PGDPdif* are both negatively significant at the 5% level, which offers evidence in favor of Hypothesis 4.5. *SERV%*, however, does not reach significance, which implies a failure to support Hypothesis 4.5. Perhaps, this is so because the value of *SERV%* of a country x does not differ across its trade partners, implying that this variable has an effect on the scale of trade only, and not on the trade distribution. Overall, Hypothesis 4.5 is associated with mixed evidence. *FDIsum* clearly turns out to be a significant factor, positively influencing the Chinese export *TI* at the 1% level. The coefficient of *FDIsum* is as large as 15.196, which may indicate that FDI plays a

very important role in increasing the Chinese export *TI*. This result strongly supports Hypothesis 4.6.

The estimation of the model with the Chinese import trade intensities, *log(imTI)*, in 1999 is associated with a significant F-test (F = 5.00), too, again at the 1% level (the p-value is 4.77E-05). The R-squared is much lower, though (0.425). *INTE*, *DIPLO*, *logCHIpop* and *GDPdif* turn out to be insignificant, which fails to produce (partial) support for Hypotheses 4.1, 4.2a, 4.4 and 4.5. *DIST* is negatively significant at the 1% level, *POLI* is negatively significant at the 5% level, SERV% is negatively significant at the 10% level and *FDIsum* is positively significant at the 10% level, offering (partial) support for Hypotheses 4.3, 4.2b, 4.5 and 4.6, respectively. In contrast with the expectation reflected in Hypothesis 4.5, *EDUCdif* is positively significant at the 5% level. The latter result may reflect international industry specialization along the lines of the traditional theory of comparative advantage, implying that low-wage and low-skill countries (such as China) are forced to import advanced products from high-wage and high-skill trading partners.

Comparing the import *TI* with the export *TI* results for 1999 reveals a large number of interesting differences:

a) Discriminatory trade bloc membership has a (negative) effect on the export trade intensity with China, but does not influence the import trade intensity.

b) Geographical distance plays a much more prominent (negative) role in determining import trade intensity than in explaining export trade intensity.

c) Chinese immigrant population share does (positively) influence the export trade intensity with China, but leaves the import trade intensity unaffected.

d) GDP discrepancy only (negatively) influences a trade partner's export trade intensity with China, having no impact on the import trade intensity.

e) Education discrepancy has a negative impact on export trade intensity, but a positive influence on import trade intensity.

f) China imports more intensively from countries with low services industry shares than from countries with large services industry shares, whereas an export effect is absent.

g) Although FDI is important throughout, MNE behavior has a stronger impact on export than on import trade intensities.

h) Overall, the explanatory power of the model is much larger for export than for import trade intensities.

For both model estimates for 1993, the F-statistics (F = 5.967 for export trade intensity, and F= 2.941 for import trade intensity) are significant at the 1% level. The R-squares of the 1993 regressions are substantially lower than of the 1999 regressions (0.468 for import intensity and 0.303 for import intensity). At the level of the independent variables, the results for 1993 are very different from those for 1999. In the export trade intensity regression, only the *DIPLO*, *DIST* and *FDIsum* estimates reach significance, the direction of the effects being in accordance with the Hypotheses 4.2a, 4.3 and 4.6, respectively. In the import trade intensity regression, only the *POLI* and *DIST* coefficients are (positively and negatively) significant, supporting Hypotheses 4.2b and 4.3, respectively. A comparison of the results for 1993 *vis-à-vis* 1999, produces a number of additional insights:

i) Political factors (diplomatic ties and political regimes) affect trade intensities positively and significantly in 1993 (for export and import, respectively), but not at all in 1999. In contrast, political system similarity is negatively associated with export and import trade intensities in 1999.

j) From the list of economic variables, apart from geographical distance, only FDI (positively) influences the (export) trade intensities significantly in 1993.

k) The political determinants of trade intensities that were still very important in 1993, have been moved to the background by economic explanations in 1999.

l) The explanatory power of the models is much larger for 1999 than for 1993, both in terms of export and import trade intensities.

Overall, the findings suggest two main conclusions. First, from the angle of comparing the export versus the import *TI* regressions, it becomes clear that the model is much better in explaining export than import trade intensities. This is true in terms of both overall explanatory power as well as variable-level results. Second, the 1993-1999 comparison reveals that the economic effect of China's market-oriented reform needed time to materialize after the trade liberalization measures were launched in the beginning of the 1990s. In this context, the shift from political to economic drivers of trade diversity speaks a telling tale. Many of these underlying shifts in trade-determining forces were masked in the pooled 1993-1999 analyses.

4.6 Conclusion

Since 1992, the Chinese government has strengthened the program of market-oriented reform, which resulted in major changes in the pattern of bilateral trade linkages. Here, increased trade partner diversity stands out as an important shift in

China's presence in the global market place. In terms of their share of foreign trade, not taking account of Hong Kong and Japan, the importance of non-Asian regions is increasing. In 1990, the two largest non-Asian trade partners, the European Union and the United States, accounted for 18.4 per cent of total Chinese export. In 1999, their joint share has increased to 37.6 per cent (IMF 1997, 2000). This shift in China's trade distribution in the outward-oriented 1990s is much more in line with the important position of these two traders in the world market than in the 'old' days of inward-oriented Communism. In terms of trade intensity, however, there is still a long way to go. After all, even in 1990, the trade intensity with the United States is not high compared with Asian countries, whilst the trade intensity with the European Union still is very low.

The regression analyses unravel the factors that influence the trade intensities, as well as the changes brought about by the reform program in the 1990s. In this context, without any pretention of being complete, we would like to emphasize three conclusions. First, after seven years of further reform, the economic drivers of trade intensities have gained momentum. This confirms the common sense belief that China is integrating rapidly into the world market, and that the market mechanism is starting to work properly in the area of Chinese foreign trade. In 1993, the dominant factors affecting trade intensities were still geographical and political distance. But in 1999, next to the geographical distance, a number of key economic elements do indeed influence bilateral trade linkages, pushing the role of political affinities to the background. An interesting example here is the positive effect of a trade partner's Chinese immigrant population on export trade intensity (but not on import trade intensity!). Apparently, as the Chinese economy was opening up to the world market,

the slumbering potential of ethnic ties could be activated such that the overseas Chinese communities came in use as a foothold for entry into foreign markets.

Second, comparing the findings for the export and import trade intensities, economic factors appear to be, by and large, more influential in the export than in the import domain. This suggests that export activities depend more on the characteristics of trade partners than import does. An illustrative example is the impact of FDI. FDI is related more significantly to export than to import trade intensities. This is likely to reflect the effect of different Chinese FDI policies, with an overall bias toward stimulating export-oriented FDI. That is, export-oriented foreign investments were (and still are) highly encouraged by the Chinese government through special tax rebates, low land-usage fees, and offering water, electricity and other infrastructure services. For sure, FDI can also impact upon import activities, which is reflected in the regression results as well. For instance, many MNEs in low-skill host countries tend to import high-tech equipment and material from their high-skill home regions. In this context, the Chinese government introduced preferential regulations for MNEs that import advanced equipment and ditto materials, which cannot be produced in China. Examples of such measures are the "Detailed Regulations on the Management of Import by Foreign Investment Enterprises" (June 9 1995 MOFTEC) and the "Notices on Import Tariff Policy for Further Encouraging FDI" (September 1 1999, MOFTEC). But foreign enterprises still have to face not only tariff and non-tariff barriers, but also the complicated formalities that come with import activities. Probably, this is one reason why FDI does influence import trade intensity less significantly than export trade intensity. Another case in point is the diverging results for the impact of a trade partner's membership of a discriminatory trade bloc. The discriminatory trade bloc barrier strongly influences Chinese export to member nations, but not so import from those

countries. This implies that regional integration elsewhere in the world offers a big challenge to Chinese export activities.

Third, the results of the regression analyses for 1999 and the pooled 1993-1999 period suggest that the Linder effect does indeed exist in a transitional country like China, especially in the export domain, for trade partners with higher GDP per capita than China. Take the results for the education discrepancy measure. *EDUCdif* is an indicator of labor cost and technology skill differences. Our findings reveal that the higher the education discrepancy, the lower is the export trade intensity. Similarly, the higher the discrepancy in terms of GDP per capita, the lower is the export trade intensity. For China, this means that export activities to developing countries are more intensive than the export linkages with the developed world. But for import, the Linder effect is very weak. That is, importing from countries with high education expenditures is more intensive than importing from countries with low education expenditures. This evidence supports the idea that developing and transitional countries, like China, need to import technology-intensive products from developed countries. As a Linder effect is absent in 1993, this observation only holds true for countries that have entered into the international trade arena by launching a liberalization reform program that stimulates a convergence toward international standards.

Of course, the current study is characterized by a number of limitations that point the way to future work. Here, we would like to offer two suggestions. First, future research might focus on a lower level of aggregation. That is, a breakdown of international trade flows by industry offers additional research opportunities. After all, since the elasticities of supply and demand might differ widely across industries, the response to international trade barriers may vary substantially across industries,

too (Learner and Bowen 1981). Therefore, a follow-up study could investigate the impact of industry-specific characteristics on trade linkages, so figuring out the factors that influence the (export and import) trade intensities in different industries, in and over time. Second, given the key role of FDI, future research might seek to unravel the underlying impact of the FDI pattern and MNE behavior. That is, how does FDI in China affect international trade at the level of different firms and different industries, and how is this related to home and host country features?

APPENDIX: List of countries

Asia (19): Japan, Cambodia, India, Indonesia, Korea, Loa, Malaysia, Nepal, Pakistan, Philippines, Singapore, Sri Lanka, Thailand, Vietnam, Kazakhstan, Uzbekistan, Iran, Jordan and Yemen.
Americas (12): The United States, Canada, Argentina, Brazil, Chile, Colombia, Costa Rica, Ecuador, Jamaica, Mexico, Paraguay and Uruguay.
Oceania (2): Australia and New Zealand.
Europe (24): Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, the Netherlands, Norway, Portugal, Spain, Sweden, the United Kingdom, Bulgaria, Czech Republic, Hungary, Poland, Romania, Russia, Slovenia, Turkey and Ukraine.
Africa (14): Angola, Cameroon, Congo, Cote d'Ivoire, Ghana, Guinea, Madagascar, Mauritius, Morocco, South Africa, Tanzania, Tunisia, Zimbabwe and Egypt.

Chapter 5
Chinese Bilateral Intra-Industry Trade: A Panel Data Study for 50 Countries in the 1992-2001 Period

This study examines the features and determinants of Chinese intra-industry trade during the transition period from 1992 to 2001 for 50 of China's trade partners. In order to detect the determinants properly, we disentangle our total intra-industry trade (TIIT) measure into vertical intra-industry trade (VIIT) vis-à-vis horizontal intra-industry trade (HIIT). The findings indicate that Chinese bilateral intra-industry trade, particularly VIIT, increased significantly during this transition period. In an attempt to estimate a more comprehensive empirical model, we first exercise factor analyses for the purpose of data reduction, and then we employ generalized least square (GLS) for the model estimations with the factor scores as the explanatory variables. On the one hand, VIIT appears to be positively related to differences in consumer patterns. On the other hand, HIIT is negatively related to these differences. In addition, we find that FDI has played an important role in determining IIT, especially VIIT. Other significant intra-industry trade drivers are geographical distance, economic size, trade openness and trade composition. This set of results implies, again, that the market mechanism has started to work properly in this transition period in China's recent history. Finally, the impact of China's policies and the special role of Hong Kong are demonstrated.

5.1 Introduction

Chapters 3 and 4 focused on the intensity of bilateral trade linkage. However, the trade structure is also important in assessing bilateral trade relationship. In the years following the Second World War, researchers have found much evidence of rapidly increasing intra-industry trade. Balassa (1966) first coined the term intra-industry trade to signal the simultaneous import and export of goods within one and the same industry in both trade partners. Since then, a large number of theoretical and empirical studies have sought to explain this phenomenon. Studies in this tradition

mainly focus on three issues: (1) measuring the magnitude of intra-industry trade (e.g., Grubel and Lloyd 1975; Brulhart 1994); (2) developing theoretical explanations for intra-industry trade's existence (e.g., Krugman 1979; Falvey 1981); and (3) examining the empirical determinants of intra-industry trade (e.g., Helpman 1987; Greenaway, Hine and Milner 1994). The current study will add new elements to the literature in the third area for the special case of the emerging transition economy of China.

Trade in emerging economies such as China has attracted increasing academic attention due to their high growth rate and rapid integration into the world economy. Institutional reform programs have greatly changed the position of these countries in the world economy. International trade in these countries has developed quickly in terms of scale and structure, which played – and still plays – an important role in driving their economic development, as well as the restructuring of the world economy. With its huge population size, high development pace and unique reform program, China is a noticeable economic force in the current transition era. The multi-faceted liberalization of the Chinese economy has generated the success of China's trade, witnessing impressing growth rates and radical pattern shifts (e.g., Garnaut and Song 1999; Doi, Tiwari and Kawakami 2002). The Chinese experience may provide vital information for the development of a coherent explanation and theory of intra-industry trade. The present study therefore aims to detect what country-specific factors influence bilateral intra-industry trade over the transition period by exploring a rich panel data set.

China started to introduce liberal economic policies in the area of foreign trade and investment in 1978. During the period from 1978 to 1992, the overall reform and opening-up policy reflected a gradual, step-by-step movement toward a more

market-oriented system. Although the era of isolation was ended as a result, China's trade barriers, including a plethora of tariff and non-tariff measures, were still maintained at levels similar to those in highly protectionist developing countries. After 1991, though, the relaxation of the foreign trade and investment policies accelerated. For example, year after year simple mean tariffs have been cut down with large slices, which dropped average import tariffs from 43.2 per cent at beginning of the 1990s to 15.3 per cent in 2001. In line with this process of accelerated liberalization, Chinese trade has expanded impressively, simultaneously producing a significant upgrade of China's trade pattern. The ratio of exports to GDP increased from 19 per cent in 1992 to 23 per cent in 2001, and the share of manufactured goods in exports increased from 80 per cent in 1992 to 90 per cent in 2001.[1] The intra-industry trade indices increased from 31.2 in 1992 to 39.4 in 2001.[2] These figures indicate the dramatic change in China's trade structure since 1992.

By exploring the case of China, we aim to make a contribution in this intra-industry trade research area in four ways. First, this chapter adds new evidence to the intra-industry trade literature by analyzing the case of the world's largest transition economy. A great deal of intellectual effort has been invested in explaining the circumstances in which intra-industry trade will arise (Greenaway, Hine and Milner 1994). However, most of the extant intra-industry trade literature focuses on developed countries. While there are a limited number of intra-industry trade studies that relate to transition countries, empirical evidence concerning China's intra-

[1] The figures are computed using data from *China Statistical Yearbook 2002*.

[2] The intra-industry trade indices are calculated on the basis of the four-digit SITC statistics from the OECD database.

industry trade is even scarcer. Only a couple of studies deal with intra-industry trade in China (e.g., Hellvin 1996; Hu and Ma 1999). Second, the present study employs a rich panel dataset, 50 countries over a 10-year period, which will help to repair the deficiencies of the cross-section design employed in most previous studies. In addition, this study incorporates all trade in the commodities at the four-digit industry aggregation level in calculating horizontal and vertical intra-industry trade measures, which reflects another improvement over earlier cross-country studies that only include a limited set of industries in their estimations. Third, the current study incorporates more potential explanatory variables into the analysis, compared to earlier work in the intra-industry trade domain. The majority of the previous studies only focus on a sub-set of the potential determinants of intra-industry trade.[3] Failing to include a key explanatory variable can seriously bias the results of the estimation, and cause problems of interpretation. This study includes 15 explanatory variables that were identified in the literature. Fourth, the present study disentangles the measure of total intra-industry trade (TIIT) into vertical *vis-à-vis* horizontal intra-industry trade (VIIT and HIIT, respectively) in order to improve our understanding of their different determinants.

5.2 Theoretical background

In the theoretical literature, the distinction of the two types of intra-industry trade – i.e., horizontal and vertical intra-industry trade – is very important, because the theories of the driving forces of horizontal and vertical intra-industry trade lead to

[3] For example, by using the case of China, Hu and Ma (1999) include four variables into each of their regression models to detect the determinants of two types of intra-industry trade. Some key variables, such as trade barriers and geographical distance, however, were excluded in their two cross-country models.

contradictory hypotheses (e.g., Abd-Rahman 1991; Greenaway and Milner 1995). In line with the extant literature, we adopt the OECD's classification of intra-industry trade. HIIT is trade in differentiated varieties of similar products (e.g., cars of a similar class in a similar price range). VIIT is trade in vertically differentiated products that are distinguished by quality and price (e.g., China exports lower-quality clothing to France and imports higher-quality clothing from France), as well as trade that emerges from vertical specialization of production in similar goods at different stages of production (e.g., China import parts of electronic equipment, but exports electrical machinery and equipment). By comparison, HIIT enables countries with similar factor endowments to benefit from economies of scale by specializing in "niche" products. Trade in vertically differentiated products may reflect different factor endowments, particularly in terms of the skills of the workforce or high fixed research and development (R&D) costs. Vertical specialization of production across countries may be driven by comparative advantages, such as cheap unskilled labor for assembly purposes or specialized personnel for R&D-intensive products (OECD 2002: 160).

The early work on intra-industry trade concentrated on horizontal differentiation by applying the traditional monopolistic competition approach (e.g., Grubel and Lloyd 1975; Dixit and Stiglitz 1977; Krugman 1979, 1980, 1981; Lancaster 1979, 1980). These models emphasize the major role of scale economies and product differentiation in determining HIIT. These models suggest that the more similar countries are in terms of their incomes, the greater the share of HIIT will be that is driven by scale economies and product differentiation. Helpman and Krugman (1985) synthesized insights into a unifying theoretical model, which became known as the so-called Chamberlin-Heckscher-Ohlin (CHO) model. This model incorporates

factor endowments, decreasing costs and horizontal product differentiation in an international trade model, which generates both intra- and inter-industry trade. The model predicts a higher share of intra-industry trade in total trade when the relative factor endowments of both trade partners become more similar. Bergstrand (1990) expanded earlier theoretical work by using a gravity-like equation to explain HIIT. His framework reveals how the share of HIIT relates to factor endowments and income levels. In the Bergstrand approach, important determinants of the share of HIIT in total trade are: (a) differences between both countries in terms of their capital-labor endowment ratio, per-capita income, and economic size; and (b) both countries' averages in terms of development level, capital-labor endowment ratio, economic size, and tariff levels.

Linder's theory (Linder 1961) can also contribute to the explanation of HIIT. When two countries are similar in their income level and consumer preference, they can produce more products that can simultaneously serve consumers in both countries. Due to the economic scale effect, both countries produce differentiated products with similar quality, but with different characteristics or attributes. So, the closer trade partners are in terms of their demand patterns, the more similar will be their trade commodities composition and the larger will be their volume of HIIT. Indeed, the rapid rise in the living standard in many developing economies, including China, seems to provide ample opportunity for 'Linder-driven' intra-industry trade in differentiated products. Based on Linder's and the above theoretical arguments, we propose our first pair of hypotheses.

HYPOTHESIS 5.1: HIIT is more prominent among countries that are more similar in terms of consumer patterns and factor endowments.

HYPOTHESIS 5.2: HIIT is more prominent among countries that are large in terms of their economic size.

Following the CHO theory, the models of Falvey (1981), Shaked and Sutton (1984), Falvey and Kierzkowski (1987) and Flam and Helpman (1987) show how trade in vertically differentiated products takes place between countries with different per-capita incomes and factor endowments. Their logic runs as follows. At the supply side, vertical differentiation is caused by differences in the trade partners' capital-labor ratios. High-quality products are more capital and technology intensive than their low-quality counterparts. Hence, the price of high-quality products is higher than the one of low-quality products. At the demand side, each individual consumer prefers only one type of differentiated product, which is determined by her or his level of income. Given that aggregate income is not equally distributed, aggregate demand targets a variety of vertically differentiated products. The models by Falvey (1981) and Falvey and Kierzkowski (1987) indicate that the relatively high-income and capital-abundant countries specialize in (and thus export) relatively high-quality products, whereas the relatively low-income and labor-abundant countries focus on the production (and export) of low-quality manufactures. In addition, the model by Flam and Helpman (1987) emphasizes the effect of technology. They suggest that the quality differences between the varieties from developing and developed countries originate from differences in technology. Therefore, VIIT is determined by comparative advantage, as in the traditional Heckscher-Ohlin model.

Because aggregate income is not equally distributed in any country, Linder's theory can also be employed to explain VIIT. Linder's theory argues that an important determinant of production and trade is domestic demand. That is, developing countries tend to specialize in the export of lower-quality products because their

low-income consumers prefer such cheaper low-quality products, whilst developed countries tend to supply the high-quality differentiated products that fit with the high income of their consumers. As result, demand variety in both developing and developed countries provides the opportunity for intra-industry trade in quality-differentiated products. In line with Linder's and the above theoretical arguments, we introduce our third hypothesis.

HYPOTHESIS 5.3: VIIT is more prominent among countries that are different in terms of factor endowments and consumer patterns.

The product lifecycle theory of Vernon (1966) provides an argument for explaining VIIT by introducing the effect of foreign direct investment (FDI). In line with the product lifecycle model, on the one hand, a higher developed country initially develops new products distinguished by certain characteristics or attributes that are considered technologically superior to existing products. The continuous introduction of such new products enables the higher developed country to sustain a monopoly position in supplying new products. On the other hand, as the technology becomes available to a less developed country through FDI, imitation, and technology transfer, the location of production of the "old" products will move to this less developed country, which enjoys a cost advantage due to lower wages. This will lead to VIIT between both countries, with the higher developed country exporting the latest versions of technologically differentiated products to the less developed country, simultaneously importing older versions in the same product category from the less developed country. The magnitude of this type of intra-industry trade depends on how quickly new products replace old ones in the entire market in question (Fukasaku 1992).

Based on Vernon's product lifecycle theory, we expect that FDI is positively associated with VIIT. This expectation is conditional on the assumption that those foreign firms combine their superior technology with local endowments to produce goods that are subsequently shipped back to the home market.[4] In this setting, the foreign firms' investment is generally labeled as efficiency-seeking FDI. However, if FDI is of a market-oriented nature, then FDI may substitute for the import of the goods that were previously produced in the investing firms' home countries. In the case of China, we expect that efficiency-seeking FDI dominated during the transition period under investigation due to the export-oriented FDI policy of the Chinese government.[5]

Similarly, from a theoretical perspective, the relationship between FDI and HIIT can run both ways, depending upon the type of FDI involved. That is, the motivation of multinational enterprises (MNEs) and the export structure of the trade partners determine the sign of the FDI-HIIT linkage. Market-seeking FDI may substitute for trade, whilst efficiency-seeking FDI may facilitate trade. In the case of China, the chance that MNEs produce horizontally differentiated products in China and ship them back to their home countries is low. The reason is that, in theory, this form of intra-industry trade should emerge between countries that are quite similar in terms of their development level, as explained above. However, by far the largest

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[4] In most cases, this type of transaction happened through intra-firm trade between the parent firms and their foreign affiliates.

[5] Some empirical studies have found evidence to support this idea. For the case of Sino-Japan trade, Kiminami and Kiminami (1999) argue that the increase of intra-industry trade in the textile industry could be attributed to FDI by Japanese textile firms into China. With data for 45 countries, Hu and Ma (1999) found that FDI is positively and significantly related to VIIT.

proportion of Chinese FDI inflow originated from countries that are more advanced than China, being driven by efficiency-seeking motives. Given our empirical setting, we therefore focus on efficiency-seeking FDI. Then, combining both arguments produces our fourth hypothesis.

HYPOTHESIS 5.4: (a) VIIT is more prominent if efficiency-seeking FDI inflow is large, whereas (b) HIIT is not.

Additionally, the literature has maintained that trade structures and trade barriers are key determinants of intra-industry trade. First, earlier studies have argued that intra-industry trade will be stimulated if the degree or potential of product differentiation is high (e.g., Helpman 1981; Krugman 1981). In general, manufacturing goods are associated with higher degrees of product differentiation than are primary commodities. Therefore, high intra-industry trade will only emerge when the share of manufacturing products in total export is high enough.[6] Second, the trade barrier issue is closely related to the trade structure. Generally speaking, trade barriers tend to be low when the share of manufacturing goods in the trade structure is large. Moreover, studies have suggested that intra-industry trade tends to be high when trade barriers are low (Falvey 1981; Matthews 1998). One reason for this negative association is that the imposition of a tariff creates a range of non-traded qualities, and hence less chance for intra-industry trade. In accordance with this line of reasoning, we formulate our fifth hypothesis.

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[6] The share of manufacturing goods in export can indicate the trade structure better than their share in import. When the share of manufacturing goods in export is high, their share in import is also high. This is indeed the case in most developed countries. However, when the share of manufacturing goods in import is high, the share of manufacturing goods in export is not necessarily high as well. This is indeed the case in most developing countries.

HYPOTHESIS 5.5: Both HIIT and VIIT are more prominent if (a) the share of manufacturing goods in the trade structure is large and (b) trade barriers are low.

Traditionally, geographical distance has been considered to be an important determinant of intra-industry trade (Loertscher and Wolter 1980; Balassa 1986a, 1986b; Culem and Lundberg 1986; Balassa and Bauwens 1987, 1988a, 1988b; Hummels and Levinsohn 1995; Stone and Lee 1995; Blanes and Martin 2000). One of the robust empirical findings is that measures of intra-industry trade relative to inter-industry trade decline with geographical distance (Amiti and Venables 2002). The reason for this can be summarized with reference to three arguments. First, the trade process of intra-industry trade makes this type of trade attenuate more rapidly with geographical distance than inter-industry trade. As Balassa and Bauwens (1987) explain, more information is needed on the characteristics of differentiated products than on the attributes of standardized goods. Since long distance will increase information costs, the transition costs of intra-industry trade will increase quicker than that of inter-industry trade when the distance between a pair of countries increases. In addition, physical distance acts as a natural trade barrier, which deters trade of closely substitutable products more than that of standardized products.

Second, in many cases, the production and demand patterns in a pair of neighboring countries are more similar than those of a pair of distant countries. Therefore, intra-industry trade will cover a larger share of trade between proximate countries than it does between distant countries. However, some scholars are reluctant to attribute this effect to geographical distance, arguing instead that close countries engage in much intra-industry trade not because of their physical proximity, but rather because they have similar economic structures. Hence, other variables but geographical distance should be included to explain this effect (Rice, Stewart and Venables 2002).

Third, intra-industry trade could occur in weight-gaining products between bordering countries (Grimwade 1989). The weight of these products increases with the degree of manufacturing (e.g., bricks and cement). This product characteristic necessitates locating production as near as possible to the end consumer. When the bordering countries integrate well, a producer in country A may export products to those consumers in country B who are geographically closer to this producer than to the domestic rivals in country B. Similarly, a producer in country B might export products to the consumers in country A who are geographically closer to this producer than to country A's domestic competitors. However, this type of intra-industry trade is not likely to be prominent in China, since the number of products that are involved in this type of trade is quite limited. Moreover, the degree of integration between China and its neighboring countries is probably not high enough.[7] So, we expect that the first effect is the main driver of intra-industry trade. According to the definition of HIIT and VIIT, the products involved in HIIT are more easily substitutable than the products subject to VIIT. Therefore, we expect HIIT to be more sensitive to geographical distance than VIIT.

HYPOTHESIS 5.6: (a) Intra-industry trade is more prominent *vis-à-vis* inter-industry trade if geographical distance is short, (b) which is especially the case for HIIT.

[7] Although bordering trade in China could benefit from a lower trade barrier than normal trade, most of these trade flows reflect inter-industry trade.

5.3 Methodology

5.3.1 Measurement of intra-industry trade

In this study, we compute the extent of intra-industry trade by using the adjusted Grubel and Lloyd index (1975), which corrects for the bias caused by the imbalance of bilateral commodity trade. This index is defined as

$$IIT = \frac{\sum(Xi+Mi)-\sum|Xi-Mi|}{\sum(Xi+Mi)-\left|\sum Xi-\sum Mi\right|}\times 100 \qquad (5.1)$$

where *Xi* and *Mi* stand for the values of export and import of product group *i*, respectively. The intra-industry trade index varies from 0 (complete inter-industry trade) to 100 (complete intra-industry trade).

As frequently done in the literature (e.g., Abd-el-Rahman 1991; Greenaway, Hine and Milner 1995), we disentangle total intra-industry trade (TIIT) into both components – HIIT and VIIT – by using a range of relative export/import unit values (UV). Specifically, the HIIT index is given by Equation (5.1) for those products *i* that satisfy the criterion

$$1-\alpha \le \frac{exportUV_i}{importUV_i} \le 1+\alpha$$

Similarly, the VIIT index is given by Equation (5.1) for those products i where

$$\frac{exportUV_i}{importUV_i} > 1+\alpha \quad \text{or} \quad \frac{exportUV_i}{importUV_i} < 1+\alpha$$

Following Hu and Ma (1999), we use a unit value dispersion of 25 per cent ($\alpha = 0.25$) for the analysis.[8]

An inevitable Gordian knot that has to be cut relates to the level of aggregation used to compute our TIIT, HIIT and VIIT indices. We decided to calculate our intra-industry trade indices on the basis of data at the four-digit level of the Standard International Trade Classification (SITC), implying that about 1,200 product groups are included in our measures. In general, the three-digit SITC statistics separate commodities into groups that correspond most closely to the economic definition of an industry (Grubel and Lloyd 1971). However, at this digit level an aggregation bias introduces too much noise in the analyses. For example, then products might be grouped together that are not close substitutes in production. That is, they are not produced with similar factor production or input requirements. For example, yarn of synthetic filaments (SITC 6516) and yarn of wool or animal hair (SITC 6511) are very different in terms of their production features, although they are classified in the same three-digit group (SITC 651). Another, more important, reason for not using three-digit industries is that at this aggregation level HIIT and VIIT are too difficult to disentangle, as the average unit price is used to distinguish HIIT from VIIT.

However, even finer-level data than our four-digit classification is frequently used in the literature to disentangle total intra-industry trade into its HIIT and VIIT components. For example, Greenaway, Hine and Miller (1994) chose to work with

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[8] Some studies choose a range of 15 per cent (e.g., Greenaway, Hine and Miller 1994). However, in our data, using the range of 15 per cent results in very low HIIT indices, so failing to reveal the actual situation of Chinese intra-industry trade. China is a large and diversified country, so that a larger price variation should be allowed for, considering the difference of transaction costs.

the five-digit SITC level for the UK, whereas Blanes and Martin (2000) even opt for the six-digit level of CN for Spain. The reason that we decided to stick to the four-digit level is threefold. First, if the intra-industry trade index is based on the very low level of sub-industries, then the index's value will be upward biased if the trade imbalances of two product varieties have opposite signs.[9] Second, this study defines vertical differentiation as not only the same product with different qualities, but also as a similar good at different stages of production. Four-digit data are better able than finer-level ones to capture this latter form of differentiation. Third, the absolute levels of summary statistics of intra-industry trade *per se* are not very meaningful anyway, since they depend critically on the level of industry aggregation that is chosen in the analyses. The current chapter focuses on comparisons across countries. We put more weight on the detailed and comparable specification at the country level, rather than on the fine-grained investigation of trade in specific industries. Four-digit statistics are more likely to produce such a compatible cross-country dataset.

Considering China's transition program and the availability of the data, we focus on the 1992-2001 period. China's intra-industry trade indices with 50 countries are calculated throughout this period. The 50 countries are selected on the basis of the value of bilateral trade, with annual trade values being larger than US$ 10,000, and data availability for the other independent variables. In total, they account for 86 per

[9] If products 1 and 2 belong to the same industry, and if $X_1 < M_1$ and $X_2 > M_2$, then the IIT index would be upward biased when we use finer-level data in which the two products are grouped into two different industries. If we group the two products into different industries, the later part of numerator of IIT changes into $|(X_1 + X_2) - (M_1 + M_2)|$, which is larger than $|X_1 - M_1| + |X_2 - M_2|$ if they are treated as

cent of Chinese export and import during this period. In order to avoid the bias caused by special events and irregular deals, we use sub-period trade data instead of annual trade data to smooth the changes in our intra-industry trade indices.[10] We break down our time window into three sub-periods: 1992-1994, 1995-1998, and 1999-2001.

5.3.2 Explanatory variables

In order to detect the country characteristics associated with TIIT and the extent to which these characteristics differ for HIIT *vis-à-vis* VIIT, we introduce the following set of explanatory variables, as reflected in the hypotheses introduced above. The first group of explanatory variables is related to differences in demand (or consumer pattern) between China and its trade partners. Three variables are introduced to measure these differences. First, cultural distance (*CULTURE*) is measured by using the four dimensions of national cultures developed by Hofstede (1980). For a given country pair, cultural distance is calculated as the arithmetic average of the deviations in Hofstede's four dimensions, correcting for the overall variance of each of these four dimensions (Kogut and Singh 1988). Second, the difference in GDP per capita (*GDPPC*) can be expressed as

$$GDPPC=\left|(GDPPC_c - GDPPC_f)/GDPPC_c\right| ,$$

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products from the same industry. As a result, the IIT index is larger than it should be.

[10] Chinese bilateral IIT indices, especially with small trade partners, are strongly influenced by a limited number of extraordinary deals. For example, intra-industry trade with Vietnam is about twice as large in 1998 than in other years, which is caused by extraordinarily high intra-industry trade in four product groups (SITC 2924, SITC 3343, SITC 4211, and SITC 6821). Intra-industry trade in these four groups was very low, or even zero, in other years.

where $GDPPC_c$ and $GDPPC_f$ denote GDP per capita in China and of its trade partner, respectively. A high *GDPPC* indicates that the difference in income level between China and its trade partner is high. Third, the difference in the Gini coefficient (*GINI*)[11] is computed as

$$GINI = \left| (GINI_c - GINI_f) / GINI_c \right|,$$

where $GINI_c$ and $GINI_f$ denote the Gini coefficient in China and in the trade partner, respectively. A high *GINI* indicates that the income distribution in the two countries is very different.[12]

The second group of explanatory variables concerns the difference in endowments between China and its trade partners. Here, we incorporate four variables. First, the difference in electric power consumption per capita (*POWER*) follows from

$$POWER = \left| (POWER_c - POWER_f) / POWER_c \right|,$$

where $POWER_c$ and $POWER_f$ denote the power consumption per capita in China and of its trade partner, respectively. The higher *POWER* is, the more different is the

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[11] The Gini coefficient is a statistical measure that is popular in the income inequality literature – i.e., being measured as the ratio of income accruing to a particular percentage of the population to the total population examined. If everyone in the population earns an identical income, the Gini coefficient for that population would be zero. Alternatively, if all income went to one individual, the Gini coefficient would be one, denoting complete inequality. Thus, the higher the Gini coefficient is, the greater the degree of income inequality present in a population (Filer, Hamermesh and Rees 1996: 580).

[12] Some researchers have used a similar proxy in intra-industry trade studies (e.g., Tharakan and Kerstens 1995; Hu and Ma 1999). The difference is that they defined a dummy variable based on the difference in the trade partners' Gini coefficients, whilst we use the difference directly as a continuous variable.

trade partner from China in terms of physical capital endowment.[13] Second, the difference in public education expenditures (*EDU*) is measured via

$$EDU = \left| (EDU_c - EDU_f) / EDU_c \right|,$$

where EDU_c and EDU_f denote the public education expenditures in China and of its trade partner, respectively. A high *EDU* indicates a large difference between China and the trade partner in terms of human capital endowment, as well as labor cost. Third, the difference in school enrollment rate in secondary education (*SCHOOLs*) is expressed as

$$SCHOOL_s = \left| (SCHOOL_{sc} - SCHOOL_{sf}) / SCHOOL_{sc} \right|,$$

where $SCHOOL_{sc}$ and $SCHOOL_{sf}$ denote school enrolment rate in secondary education in China and the trade partner, respectively. Fourth, the difference in the enrolment rate in high or tertiary education (*SCHOOLt*) is calculated in same way as is *SCHOOLs*. A high value of *SCHOOLs* and *SCHOOLt* indicate a large discrepancy in human capital endowment between China and the trade partner in the area of normally educated and highly educated labor, respectively.

The third group of explanatory variables deals with measures of economic size. In this context, we use two variables: first, GDPppp of the trade partners (*GDP*), measured in PPP-prices; and, second, the population size of the trade partners (*POPU*). The fourth (singleton) group of explanatory variables relates to the operation of MNEs in China. We introduce FDI inflows that originate from a trade partner as our key proxy (*FDI*). The fifth group of explanatory variables has to do

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[13] Hansson and Lundberg (1987), too, have used energy consumption per capita to proxy physical capital endowment.

with the characteristics of international trade per country. The first variable is the ratio of import duties to total import value (*TARIFF*),[14] the second variable is the share of high-tech products in total export (*HIGHTECH*),[15] and the third variable is the share of manufactured products in the total export (*MANUEX*).[16] The sixth pair of explanatory variables is related to geographical distance. We employ two variables. For one, the geographical distance between the capitals (*DIST*) is calculated by the latitude and longitude of the two cities, taking the great-circle distance and assuming a spherical earth. Additionally, a border country dummy (*BORD*) is coded 1 if the trade partner and China share a border, and 0 if not. These two variables are expected to have an opposite influence on intra-industry trade (*DIST* negative, and *BORD* positive).

In line with the dependent variables, all explanatory variables are measured for three sub-periods, if appropriate: 1992-1994, 1995-1998, and 1999-2001. The data for the first three groups of variables are mainly from the World Bank database. The national culture data are downloaded from the International Business Center's website (http://geert-hofstede.international-business-center.com). The FDI data come from the Ministry of Foreign Trade and Economic Cooperation (MOFTEC,

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[14] Import duties comprise all levies collected on goods at the point of entry into the country. The levies may be imposed for protectionist or revenue purposes. The higher the *TARIFF* variable is, the higher is the country's trade barrier.

[15] High-technology exports involve products with high R&D intensity. They include products such as aerospace, computers, pharmaceuticals, scientific instruments, and electrical machinery.

[16] Manufacturing comprises commodities in the SITC sections 5 (chemicals), 6 (basic manufactures), 7 (machinery and transport equipment), and 8 (miscellaneous manufactured goods), excluding division 68 (non-ferrous metals).

Yearbook of China's Foreign Economic Relation and Trade 1993-2002). The trade data are mainly from the World Bank database, complemented by information from the OECD database. Tables 5.1 and 5.2 provide the usual key descriptives.

Table 5.1: China's intra-industry trade indices in 1992-2001

	1992-1994			1995-1998			1999-2001		
	TIIT	VIIT	HIIT	TIIT	VIIT	HIIT	TIIT	VIIT	HIIT
World	30.8	19.4	11.4	38.4	27.6	10.8	39.9	32.4	7.6
Australia	7.4	6.3	1.1	10.6	7.8	2.8	9.9	7.4	2.5
Austria	5.9	5.8	0.1	10.3	9.6	0.7	17.5	15.9	1.6
Brazil	4.1	3.2	0.9	4.4	4.1	0.3	5.9	5.5	0.4
Cameroon	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Canada	7.6	6.5	1.1	9.2	8.0	1.3	9.7	9.2	0.6
Colombia	1.4	1.0	0.4	3.6	3.2	0.3	4.0	3.9	0.1
Costa Rica	0.0	0.0	0.0	3.4	3.4	0.0	5.7	2.6	3.1
Cote d'Ivoire	0.0	0.0	0.0	0.7	0.3	0.4	0.0	0.0	0.0
Denmark	7.6	4.4	3.2	11.9	10.6	1.3	15.9	14.6	1.4
Ecuador	0.3	0.1	0.1	0.1	0.1	0.0	0.7	0.7	0.0
Egypt	1.4	1.3	0.1	3.8	3.4	0.3	1.8	0.8	1.0
Finland	10.4	10.1	0.3	17.7	17.2	0.5	39.3	36.1	3.2
France	11.1	10.2	1.0	14.6	13.2	1.4	21.6	18.4	3.2
Germany	11.9	10.9	1.0	16.9	15.4	1.5	23.9	21.4	2.5
Greece	5.9	5.3	0.6	8.7	8.2	0.5	12.1	10.7	1.4
Hong Kong	61.8	42.9	18.9	88.4	59.0	29.4	86.3	59.9	26.4
Hungary	3.9	3.6	0.4	11.0	10.8	0.2	29.5	29.0	0.5
India	10.5	5.7	4.9	20.5	7.3	13.2	22.0	10.5	11.5
Indonesia	8.0	5.8	2.2	9.4	9.3	0.1	13.1	12.6	0.6
Ireland	6.1	5.4	0.8	29.9	25.3	4.6	26.4	24.0	2.4
Italy	11.5	9.7	1.8	16.2	13.3	3.0	21.9	19.7	2.1
Jamaica	2.4	0.7	1.6	0.2	0.2	0.0	0.3	0.3	0.0
Japan	18.3	12.7	5.6	25.5	18.5	7.0	26.7	24.0	2.7
Kazakhstan	1.5	1.3	0.2	1.1	0.7	0.4	0.9	0.9	0.0

Korea, Rep.	24.5	16.3	8.1	33.5	24.5	9.0	37.4	26.8	10.6
Malaysia	12.3	10.1	2.3	25.8	16.4	9.4	43.1	37.5	5.6
Mexico	2.3	2.1	0.1	7.9	6.7	1.2	38.0	37.5	0.5
Nepal	12.3	11.0	1.3	11.9	8.4	3.5	17.3	11.5	5.8
Netherlands	14.7	12.1	2.6	23.6	21.1	2.6	28.9	26.4	2.5
New Zealand	4.6	4.0	0.6	5.6	5.2	0.4	5.7	4.4	1.3
Norway	9.3	9.0	0.3	6.3	6.0	0.3	6.1	5.7	0.4
Pakistan	3.6	2.1	1.5	2.7	2.2	0.4	2.6	2.2	0.4
Philippines	13.0	6.9	6.1	32.3	27.1	5.2	26.5	24.7	1.7
Poland	1.7	1.6	0.0	6.9	5.7	1.2	9.2	7.9	1.3
Portugal	3.2	2.7	0.6	10.7	9.3	1.3	28.5	25.4	3.2
Romania	4.0	3.7	0.3	1.9	1.7	0.3	2.8	2.3	0.5
Russian	4.6	4.0	0.5	3.6	2.6	1.1	3.0	2.7	0.4
Singapore	27.6	13.6	14.0	31.8	25.0	6.9	42.0	29.6	12.4
Slovenia	0.3	0.2	0.1	3.6	3.1	0.4	15.3	13.8	1.5
South Africa	2.8	2.5	0.2	3.6	3.0	0.6	3.6	3.2	0.4
Spain	7.5	6.6	0.9	17.1	14.8	2.3	34.3	28.8	5.5
Sweden	6.7	6.3	0.4	19.2	17.5	1.7	32.5	31.2	1.4
Thailand	16.4	13.0	3.4	24.2	19.6	4.6	44.5	36.6	7.9
Tunisia	0.1	0.1	0.0	0.3	0.3	0.0	3.4	3.4	0.1
Turkey	1.2	0.8	0.4	8.4	7.5	0.9	11.2	9.8	1.4
UK	14.0	11.8	2.2	25.1	22.0	3.1	33.9	30.6	3.3
US	15.9	14.4	1.6	22.0	19.5	2.5	35.0	31.8	3.2
Uruguay	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.00	0.00
Vietnam	0.06	0.03	0.03	0.13	0.05	0.08	0.06	0.04	0.01
Zimbabwe	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00

Source: own calculations based on figures from the OECD database. Calculations are made from figures at the four-digit SITC level (SITC Rev.3), adjusted for trade imbalances.

Table 5.2: Correlation matrix of explanatory variables

	CULTURE	GDPPC	GINI	POWER	EDU	SCHOOLs	SCHOOLt	GDPppp
CULTURE	1,000							
GDPPC	0,724***	1,000						
GINI	0,656***	0,730***	1,000					
POWER	0,684***	0,714***	0,972***	1,000				
EDU	0,590***	0,400***	0,548	0,571***	1,000			
SCHOOLs	0,733***	0,629***	0,586***	0,583***	0,477	1,000		
SCHOOLt	0,677***	0,705***	0,742***	0,691***	0,371	0,629***	1,000	
GDPppp	0,197***	0,327***	0,221***	0,238***	-0,021	0,081***	0,313***	1,000
POPU	-0,202***	-0,122*	-0,114*	-0,130*	-0,221	-0,184	-0,137**	0,431***
FDI	-0,132*	0,133*	0,020	0,043	-0,163	-0,090***	-0,037	0,006
TARIFF	-0,550***	-0,554	-0,432***	-0,480***	-0,187	-0,327**	-0,530***	-0,113*
HIGHTECH	0,107*	0,380	0,217***	0,258***	0,034	0,156**	0,246***	0,232***
MANUEX	0,148**	0,345	0,063	0,087	0,031	0,118*	0,140**	0,240***
DIST	0,117*	-0,159*	-0,076	-0,061	0,171	-0,056	-0,027	0,005
BORD	-0,339***	-0,244	-0,159**	-0,187**	-0,411	-0,184**	-0,177**	-0,019

	POPU	*FDI*	*TARIFF*	*HIGHTECH*	*MANUEX*	*DIST*	*BORD*
POPU	1.000						
FDI	-0.041	1.000					
TARIFF	0.331***	-0.141*	1.000				
HIGHTECH	-0.051	0.107*	-0.389***	1.000			
MANUEX	0.115*	0.198***	-0.398***	0.378***	1.000		
DIST	-0.161**	-0.288***	0.074	-0.328***	-0.429***	1.000	
BORD	0.348***	0.310***	0.208***	-0.149**	0.040	-0.546***	1.000

Note: * $p \leq 0.1$, ** $p<0.05$, and *** $p<0.01$.

5.3.3 Methods

In line with much previous empirical work in the intra-industry trade tradition, our approach is eclectic, rather than focused by testing a specific model of intra-industry trade. As stated above, 15 variables were identified in the literature, and were

subsequently included in the present study. Although each of these variables represents a different potential determinant of intra-industry trade, they – as a group – represent a number of overlapping theoretical perspectives. As a result, seven correlation coefficients are higher than 0.7 (see Table 5.2), which implies that the 15 variables cannot be included into a single estimation directly. Therefore, in order to facilitate interpretation and further analysis, a data reduction exercise is first undertaken by means of exploratory factor analysis.[17] Principal component analysis with oblique rotation is employed, because the factors need not to be uncorrelated. For example, when a country enjoys a high level of production and demand, its trade structure may reveal large export and import flows. The result of the factor analysis, as explained below in greater detail, indeed reveals that the level of production and demand (factor 1) is related to trade development (factor 4).

In the second step of the analysis, we introduce the factor scores as the independent variables in a regression that investigates the impact of six groups of variables on the TIIT, HIIT and VIIT indices. We estimate models of the following general form:

$$IIT_{kt}=\alpha+\beta X_{kt}+\mu_{kt} \qquad (5.2)$$

where IIT_{kt} stands for China's total, horizontal or vertical IIT index (TIIT, HIIT or VIIT) with partner country k in sub-period t, and X_{kt} is a set of country-specific variables of country k in sub-period t. Because the residuals reveal cross-sectional heteroskedasticity, we employ Generalized Least Squares (GLS) in the estimations, in which each pooled equation is weighted by an estimate of the cross-sectional

[17] Both Bartlett test of sphericity (Chi-square is 1599.6) and the measure of sampling adequacy (0.73) indicate that our factor analysis is appropriate.

residual's standard deviation.[18] In the factor and regression analyses alike, the three sub-period data across 50 (with Hong Kong) and 49 (without Hong Kong) countries are pooled.[19] Because of the special role of Hong Kong in China's international trade, we perform separate analyses for the complete sample with Hong Kong and for the sample without Hong Kong.[20]

5.4 Evidence

China's intra-industry trade indices in the three sub-periods with 50 countries are listed in Table 5.1. The table reveals that intra-industry trade not only occurred between China and developing countries (see, e.g., the TIIT with India of 22.0 in 1999-2001), but also between China and developed countries (see, e.g., a TIIT with France of 21.6 in 1999-2001). Hong Kong has enjoyed the highest bilateral TIIT,

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[18] Many intra-industry trade studies also apply the logit transition method. There is no consensus as to whether or not to use this technique. Some scholars, such as Tharakan (1986) and Caves (1981), support the use of a log transformation, given the limited range of the dependent variable. However, some other researchers, such as Greenaway and Milner (1986), insist that there is no need for such a transformation when the aim of the analysis is to investigate the determinants of intra-industry trade, and not to forecast it. In this study, several observations for intra-industry trade have a value of zero. Hence, a log transformation is not possible anyway.

[19] A drawback of our decision to work with three sub-periods, rather than with annual data, is that we could not check for the (non)stationarity of the time series. This is a limitation that must be tackled in future research. In the current chapter, we thought it more important to avoid the bias caused by special events and irregular deals, as explained above.

[20] Hong Kong was China's largest trade partner in most years in the 1992-2001 period, although Hong Kong is not a large economy. It has been an important *entrepot* of mainland China, though. Because of the special China – Hong Kong linkage, intra-industry trade between mainland China and Hong Kong is extremely high (cf. Table 5.1).

VIIT and HIIT with China, which illustrates the special China – Hong Kong linkage. Additionally, Table 5.1 indicates that most of the bilateral IIT indices have increased steadily during our period of analysis. This development is shared by all three intra-industry trade indices – i.e., TIIT, HIIT and VIIT. Finally, Table 5.1 makes clear that VIIT is much higher than HIIT in most cases,[21] and that VIIT has increased faster than HIIT. In many instances, HIIT even declined: at the world level, China's HIIT index decreased from 11.4 in 1992-1994 to 7.6 in 1999-2001. Conversely, the aggregated VIIT index increased from 19.4 in the first sub-period to 32.4 in the third sub-period. This dual trend indicates that vertically differentiated products have increasingly dominated China's intra-industry trade, *vis-à-vis* horizontally differentiated goods. This observation suggests that comparative advantage might well be the main reason for Chinese bilateral intra-industry trade.

We performed two factor analyses, one with and one without Hong Kong. The results of both factor analyses, reported in Tables 5.3 and 5.4, are quite similar, producing five underlying factors that cumulatively explain 77 per cent of the variance.

This factor structure appears to make good conceptual sense, with five interpretable dimensions that are potentially important in the explanation of intra-industry trade. The interpretation of each of these five factors runs as follows.

Similarity (Factor 1). The first factor has high positive and significant loadings on seven variables. These variables reflect the difference between China and its trade partners along seven dimensions: cultural distance, GDP per capita, Gini index,

[21] If transfer pricing is taken into account, the VIIT index should be higher.

energy consumption, public expenditure on education, secondary school enrolment, and tertiary education enrolment. This set of seven variables exactly matches with the first two groups of the explanatory variables. This factor is therefore interpreted as the difference in consumer patterns and factor endowments between China and its trade partners. A high score on this factor indicates low similarity in the trade partner's stage of development. We expect the Similarity Factor 1 to be negatively related to HIIT, but positively to VIIT.

Distance (Factor 2). This second factor has a high negative loading on geographical distance and a high positive loading on the dummy border variable. The opposite sign of these two loadings is in line with the expectation that the two variables have conflicting influences on trade, as the geographical distance between a pair of countries sharing a common border is lower than the geographical distance between their capitals. Therefore, this factor is a sensible measure of physical distance. Distance Factor 2 is expected to have a positive impact on TIIT, especially on HIIT.

Table 5.3: Results of factor analysis I – pattern matrix with Hong Kong

	Component				
	Factor 1 Similarity	Factor 2 Distance	Factor 3 Size	Factor 4 Stage	Factor 5 FDI
CULTURE	**0.826***	-0.138	-0.019	-0.052	-0.109
GDPPC	**0.748***	-0.029	0.097	-0.280	0.134
GINI	**0.960***	0.072	0.077	0.118	0.124
POWER	**0.935***	0.031	0.066	0.071	0.134
EDU	**0.665***	-0.082	-0.189	0.077	-0.321
$SCHOOL_s$	**0.815***	0.155	-0.115	-0.032	-0.204
$SCHOOL_t$	**0.808***	-0.063	0.136	-0.050	0.106
GDP_{ppp}	0.166	-0.236	**0.866***	-0.166	0.075
POPU	-0.082	0.296	**0.796***	0.071	-0.212
FDI	-0.023	0.181	-0.086	0.005	**0.854***
TARIFF	-0.339	0.238	0.177	**0.496***	-0.312
HIGHTECH	-0.009	-0.056	0.041	**-0.781***	0.025
MANUEX	-0.053	0.193	0.081	**-0.827***	-0.070
DIST	-0.074	**-0.834***	0.079	0.417	-0.035
BORD	-0.044	**0.800***	0.124	0.213	0.251
% of variance	37.19	15.91	9.80	8.47	5.81
Cumulative %			77.18		

Notes: * indicates that a factor loading is significant at the 0.05 level; the extraction method is Principal Component Analysis; the rotation method is Oblimin with Kaiser Normalization; the Kaiser-Meyer-Olkin Measure of Sampling Adequacy is. 731; Bartlett's test of sphericity gives a Chi-square of 1599.60; and the sample size is 150.

Table 5.4: Results of factor analysis II – pattern matrix without Hong Kong

	Component				
	Factor 1 Similarity	Factor 2 Distance	Factor 3 Size	Factor 4 Stage	Factor 5 FDI
CULTURE	**0.818***	-0.133	-0.050	0.015	0.189
GDPPC	**0.745***	-0.064	0.100	-0.266	0.109
GINI	**0.971***	0.095	0.092	0.034	-0.124
POWER	**0.942***	0.050	0.081	-0.004	-0.086
EDU	**0.693***	-0.133	-0.130	0.053	-0.305
SCHOOLs	**0.792***	0.121	-0.148	0.090	0.227
SCHOOLt	**0.806***	-0.016	0.105	-0.072	0.054
GDPppp	0.160	-0.236	**0.847***	-0.155	0.178
POPU	-0.064	0.253	**0.812***	0.070	-0.110
FDI	-0.013	0.069	0.042	0.006	**0.920***
TARIFF	-0.326	0.187	0.217	**0.509***	-0.189
HIGHTECH	-0.010	-0.024	0.017	**-0.804***	-0.003
MANUEX	-0.053	0.124	0.098	**-0.802***	-0.017
DIST	-0.077	**-0.846***	0.096	0.420	-0.011
BORD	-0.039	**0.835***	0.124	0.235	0.102
% of variance	37.93	15.26	8.12	9.46	6.26
Cumulative %			77.03		

Notes: * indicates that a factor loading is significant at the 0.05 level; the extraction method is Principal Component Analysis; the rotation method is Oblimin with Kaiser Normalization; the Kaiser-Meyer-Olkin Measure of Sampling Adequacy is 0.744; Bartlett's test of sphericity gives a Chi-square of 1571.45; and the sample size is 147.

Size (Factor 3). The third factor has a high positive loading on two variables: GDP per capita and population size. This factor can undoubtedly be interpreted as a measure of the (economic) size of a country. We therefore expect Size Factor 3 to positively relate to HIIT.

Stage (Factor 4). This fourth factor has a high positive loading on trade barriers, and has two high negative loadings on the high-technology and manufacturing export proportions. This factor is therefore interpreted as a measure of the country's stage of international trade development. A low trade barrier score and high export proportions of high-tech and manufacturing products will result in a low factor score, which indicates a high international trade development stage. Consequently, Stage Factor 3 is expected to negatively influence intra-industry trade.

FDI (Factor 5). This fifth factor has a high loading on one variable only: FDI. Hence, this factor can be straightforwardly interpreted as FDI inflows. We expect that this FDI Factor 5 will be positively related to intra-industry trade, particularly to HIIT.

The above interpretations and expected effects of these five factors, as predicted in our set of six hypotheses, are summarized in Table 5.5.

Table 5.5: An overview of the factors

Factors	Variables	Interpretations	Expected signs and hypotheses		
			TIIT	VIIT	HIIT
Factor 1 (Similarity)	*CULTURE* *GDPPC* *GINI* POWER *EDU* *SCHOOLs* *SCHOOLt*	A low factor score indicates a high similarity between the two countries with respect to consumer pattern and factor endowment	?	**Positive** (H5.3)	**Negative** (H5.1)
Factor 2 (Distance)	*DIST* *BORD*	A high factor score indicates a large functioning distance	**Positive** (H5.6a H5.6b)	**Positive** (H5.6a)	**Positive** (H5.6a)
Factor 3 (Size)	*GDPppp* *POPU*	A high factor score indicator a large economic size	**Positive** (H5.2)	?	**Positive** (H5.2)
Factor 4 (stage)	*TARIFF* *HIGHTECH* *MANUEX*	A high factor score indicator a low trade level	**Negative** (H5.5)	**Negative** (H5.5)	**Negative** (H5.5)
Factor 5 (FDI)	*FDI*	A high factor score indicates a high FDI inflow	**Positive** (H5.4)	**Positive** (H5.4)	?

The next step is to estimate models that link the five factors to the TIIT, HIIT and VIIT indices by using the two sets of rotated factor scores, with or without Hong

Kong, as the independent variables. The first set of estimations is done for the complete sample of 50 countries. The results are shown in Table 5.6.

Table 5.6: Empirical results for Chinese bilateral intra-industry trade in 1992 to 2001 with Hong Kong included

	TIIT		*VIIT*		*HIIT*	
Variable	Coefficient	t	Coefficient	t	Coefficient	t
Constant	0.1251	36.78	0.0996	35.15	0.0370	15.33
Similarity	-0.0001	-0.06	0.0051***	3.64	-0.0066***	-3.05
Distance	0.0297***	9.15	0.0134***	5.38	0.0148***	5.58
Size	0.0076	1.54	0.0057	1.59	0.0018	1.24
Stage	-0.0769***	-23.42	-0.0635***	-19.88	-0.0061**	-2.44
FDI	0.0582***	14.91	0.0384***	11.83	0.0068	1.62
Adjusted R^2	0.837		0.780		0.312	
N	150		150		150	
F	153.92		106.66		14.49	
P-value	0.00000		0.00000		0.0000	

Notes: method is GLS (cross-section weights), * $p \leq 0.1$, ** $p<0.05$, and *** $p<0.01$.

The three F-statistics are significant at the 0.01 level, producing an adjusted R-squared of 0.837, 0.780 and 0.311, respectively, in the three regressions. The first factor, Similarity, is positive and significant at the 0.01 level in the VIIT model, and negative and significant at the 0.01 level in the HIIT regression. This result strongly supports Hypotheses 5.1 and 5.3. The Distance factor is positively significant at the 0.01 level in all three models, which is in line with H6. However, there is little evidence to support that HIIT is more sensitive to geographical distance than is VIIT. The third factor, Size, is not significant in any of the three models, which

implies a failure to support Hypothesis 5.2. The fourth factor, Stage, is negatively significant at the 0.01, 0.01 and 0.05 level, respectively, which offers evidence in favor of Hypothesis 5.5. The last factor, FDI, is positively significant in the VIIT estimation at the 0.01 level, but not significant in the HIIT model. This result offers support for Hypothesis 5.4.

The results of the second set of estimations for the sub-sample without Hong Kong are reported in Table 5.7.

Most of the results are quite similar to the ones of the first set of estimations. Three factors, Distance, Size and Stage, are significant with the expected signs, which again provides support for Hypotheses 5.1, 5.3, 5.6, 5.5 and part of 5.4. However, there are two differences. First, Size is now significant at the 0.01, 0.01 and 0.05 level, which is in line with Hypothesis 5.2. Second, FDI is not only significant in the VIIT model, but also in the HIIT regression, which leaves a puzzle for further research.

Table 5.7: Empirical results for Chinese bilateral intra-industry trade in 1992 to 2001 without Hong Kong included

	TIIT		VIIT		HIIT	
Variable	Coefficient	t	Coefficient	t	Coefficient	t
Constant	0.1108	32.41	0.0929	32.59	0.0159	15.84
Similarity	0.0032	1.36	0.0064***	3.37	-0.0017***	-2.90
Distance	0.0144***	5.54	0.0070***	4.23	0.0057***	4.57
Size	0.0122***	4.11	0.0080***	3.30	0.0031**	2.55
Stage	-0.0728***	-19.57	-0.0616***	-19.94	-0.0086***	-8.07
FDI	0.0108***	2.68	0.0073**	2.45	0.0026***	3.09
Adjusted R^2	0.897		0.770		0.392	
N	147		147		147	
F	255.72		98.99		19.83	
P-value	0.00000		0.00000		0.0000	

Notes: method is GLS (cross-section weights), * $p \leq 0.1$., ** $p<0.05$, and *** $p<0.01$.

5.5 Discussion

Overall, the findings give rise to at least four observations. First, intra-industry trade has taken place not only between China and trade partners with similar consumer patterns and factor endowments, but also between China and trade partners with different consumer patterns and factor endowments. However, this observation does not imply that similarity does not affect intra-industry trade – it does. The results of our two sets of estimations suggest that China's HIIT is more likely to emerge with countries that are similar than with those that are different. Conversely, China's VIIT happens more with different rather than with similar countries.

Second, three factors affect HIIT and VIIT in the same way. One is geographical distance, which has a significant and positive impact on both HIIT and VIIT. This result offers support for the argument that geographical distance does deter intra-industry trade (including VIIT and HIIT) more than inter-industry trade. Another common factor is the influence of international openness and trade structure. Both HIIT and VIIT are positively affected by an open trade system and advanced trade structures. The last common factor is the economic size of trade partners. Both Chinese HIIT and VIIT are more likely to take place with large economies than with small ones. These observations are in line with most theoretical predictions and empirical findings in the intra-industry trade literature, although HIIT and VIIT tend not to be disentangled in the literature (e.g., Stone and Lee 1995; Matthews 1998).

Third, evidence of a positive impact of FDI on VIIT is found in two estimations. This result indicates that increasing Chinese VIIT has been driven by FDI. This finding is in line with the theoretical framework explored above. In China's practice, this observation can probably be largely attributed to the launch of export-oriented FDI and trade-processing policies. Since 1984, the State Council approved two

schemes allowing duty-free import of components and raw materials for use in export industries. Since then, China has been very successful in attracting export-oriented FDI, particularly from Hong Kong. One scheme is called "Process and Assembling" (*Lai Liao Jia Gong Zhuang Pei*), which is similar to what is conventionally known as contractual processing. The other scheme is named "Processing with Imported Materials" (*Jin Liao Jia Gong*), which is similar to ordinary processing by subsidiaries. Encouraged by both policies, processed trade has gained a prominent position in Chinese international trade, accounting for 50-66 per cent of total trade. As the figures in Table 5.8 show, the performance of different business forms is different, though.

About 30 per cent of trade by state-owned enterprises (SOEs) is processed trade, which is about 80-90 per cent for foreign invested enterprises (FIEs). Obviously, FIEs are the main contributor to Chinese processed trade. They undertake about 80-90 per cent of Chinese total processed trade. In the SITC aggregation procedure, processed imports and exports are often grouped together. Therefore, FDI is very important in facilitating VIIT.

Fourth, comparing the two sets of the estimations, we observe that Hong Kong has played an important role in determining China's trade structure. There are two differences in the two sets of estimations. The first difference indicates that economic size is not significant in the first set of estimations, but positively significant in the second set of regressions. This result can be attributed to the fact that although Hong Kong is a small economy in terms of GDP and population, it has enjoyed the highest TIIT, HIIT and VIIT with China. Therefore, when we include Hong Kong in the estimation, economic size is not a significant determinant of intra-industry trade. However, when Hong Kong is excluded from the sample,

economic size is positively significant, as is anticipated in the literature. The second difference relates to the variation of the significance level of HIIT. This can be explained by trade processing undertaken by Hong Kong's FIEs. Processed trade has been dominant in bilateral trade between China and Hong Kong. According to the trade statistics, about 70 per cent of imports from Hong Kong was used in export processing in 2001 (MOFTEC). This state of affairs is largely due to the resource-seeking motives adopted by Hong Kong firms. Many Hong Kong investors emphasize activities in the area of the labor-intensive and simple processing of light industrial and textile goods, aimed at the international market. However, FDI flows from Western MNEs into China are not mainly driven by such resource-seeking motives. Rather, although resource acquisition is a motivation, their major motives for entering into China are the growing market and the market potential (Lou 2001; Zhang 2001b). Therefore, Western investors put less emphasis on processing trade than do their Hong Kong counterparts. As a result, FDI is highly significant in VIIT model when Hong Kong is included in the analyses, but the significant level declines when Hong Kong is excluded.

Table 5.8: Chinese processing trade in different business forms

	1996				2001			
	Total	SOEs	FIEs	COEs	Total	SOEs	FIEs	COEs
Total Trade	151,066	86,058	61,506	3,073	266,155	113,234	133,235	14,223
Contractual processing	24,240	19,010	4,487	740	42,233	25,961	1,434	1,827
	16.0%	22.1%	7.3%	24.1%	15.9%	22.9%	10.8%	12.8%
Ordinary processing	60,094	10,904	48,596	591	105,221	9,941	92,252	2,601
	39.8%	12.7%	79.0%	19.2%	39.5%	8.8%	69.2%	18.3%

Notes: SOEs are State-Owned Enterprises; FIEs are Foreign-Invested Enterprises; COEs are Collectively-Owned Enterprises; and the data source is the Customs General Administration of the People's Republic of China.

5.6 Appraisal

In this chapter, we investigated the nature of three forms of intra-industry trade between China and 50 trade partners during the 1992-2001 period, when China has accelerated the implementation of policies to liberalize international trade and investment. The development of the Grubel – Lloyd index indicates that intra-industry trade has indeed increased significantly during this period. VIIT has been the dominant type in China's intra-industry trade, increasing faster than HIIT has. With these measures of intra-industry trade, we explored the determinants of TIIT, VIIT and HIIT separately. The results confirmed that disentangling TIIT into its HIIT and VIIT components provides the opportunity to improve the estimation of the underlying determinants. While there are a few common drivers of HIIT and VIIT, such as geographical distance, economic size, trade development stage and FDI, differences exist in the determinants of both two types of intra-industry trade as well. Specifically, the similarity between China and its trade partners can explain HIIT, whereas the difference between China and its trade partners can explain VIIT. The fact that VIIT has been dominant in Chinese bilateral intra-industry trade suggests that comparative advantage can explain not only inter-industry trade, but also most of China's intra-industry trade. The considerable increase of VIIT indicates that China's areas of specialization based on comparative advantage have been expanded from inter-industry to intra-industry trade domains. This conclusion is in line with the progression of China into the next trade development stage.

This study confirms that most of intra-industry trade determinants discussed in the literature have done their job in the case of China in 1992-2001. This overall finding suggests that the market mechanism has started to work properly in the area of Chinese foreign trade in the post-1992 period. However, China's recent trade history

reveals a number of specific features that can be attributed to the particulars of the process of transition and liberalization. First, trade and FDI policies have influenced the nature and cause of Chinese bilateral intra-industry trade. Specifically, the policies on processed trade and export-oriented FDI have significantly encouraged related FDI and VIIT. Second, due to historical and institutional reasons, Hong Kong has played an important role in China's trade development.

A number of important business and political implications can be drawn from the findings of this study. First, the increasing intra-industry trade index suggests that China is not only moving into the center stage of the world market as a result of its high-growth rates of trade *per se*, but also by upgrading its trade structure. China does no longer confirm with the image of a developing country that exports primary products and imports industrial goods, as it did twenty years ago. It now integrates into the world economy in depth, which offers multinational enterprises more opportunities to operate profitably in China. For multinational enterprises, this implies that the Chinese market is even more of an opportunity than it was before the epoch of liberalization, suggesting that management must carefully scan both VIIT and HIIT-related opportunities for FDI in China. With the increasing importance of HIIT, China does not only offer the "usual" efficiency-seeking (VIIT) opportunities of low-cost countries in the developing world, but also the market-seeking (VIIT) ones as "normally" located in developed nation-states. Second, China's trade and investment liberalization program has played a very important – if not crucial – role as the key driver of the improvement of the Chinese trade structure. Directly, tailor-made liberalization policies facilitate the development of VIIT, such as those related to relaxing the regulatory environment for multinational companies. Indirectly, liberalization measures have done the groundwork upon which the market

mechanism started to take over the China's economy: as a result, economic rather than political determinants become the driver of intra-industry trade (cf. Zhang and van Witteloostuijn 2004). Third, further development of China's intra-industry trade may rely more on HIIT than on VIIT. According to intra-industry theory, a major determinant of intra-industry trade is product differentiation, which is the major source of HIIT. Therefore, the future of China's intra-industry trade depends not only on progress made in the liberalization program, but also – and probably even more so – on economic development. This may require a facilitating shift in China's policy, emphasizing HIIT rather than VIIT-promoting measures.

Although this study has made an effort to deepen our understanding of intra-industry trade, it is characterized by a number of limitations that point the way to future work. First, further research might include industry characteristics into the cross-country analysis in order to investigate the impact of country-specific factors on intra-industry trade in different industries over time. By using a pair of countries' cross-industry data, previous studies have maintained that the pattern of intra-industry trade changed greatly across industries, due the different features of individual industries (e.g., Greenaway, Hine and Milner 1995). Employing a combined cross-country and cross-industry design in a longitudinal context offers ample opportunities to better detect the underlying causes of the development of intra-industry trade. Second, one result of our analyses is the significant influence of FDI on Chinese HIIT, which is not as expected. Further study is needed to explain this result.

Chapter 6
The Relationships between FDI and Trade: A Cointegration Approach

The literature is unanimous on the important link between trade and FDI. However, the exact nature of the relationship between FDI and trade is a controversial issue in international economics and business. In this chapter, by applying a cointegration approach, we unravel the causality and direction of FDI – trade linkages for the Chinese economy in the 1980 – 2003 period. The results indicate that, in the long run, FDI positively relates to exports and imports; in the short run, estimating our framework reveals bi-directional causal links between FDI and exports, and one-way causal links from imports to FDI and from imports to exports.

6.1 Introduction

In the previous chapters, we found that, in the last half-century, China's bilateral trade linkages were determined by three important factors: political relations, geographical distance and economic characteristics. In Chapter 3, the findings indicate that political relations have been an important determinant of bilateral trade intensities ever since 1949. In Chapter 4 and Chapter 5, however, we report that, after two decades of economic reform, the economic elements started to play their roles as drivers of bilateral trade linkages much more prominently in the 1990s and early 21th century, pushing the role of political affinities to the background. Among the economic elements, foreign direct investment (FDI) is a central variable that gained prominence in recent decades as a key determinant of bilateral trade intensities and trade structures. Given these findings, a natural follow-up question can be raised: what are the causal relationships between China's trade pattern and

FDI inflow? Given the extant literature, the answer to this question is not so straightforward. The current chapter aims to answer this question by applying a sophisticated cointegration and Granger-causality approach.

Indeed, the official statistics suggest that FDI by multinational enterprises (MNEs) has played an increasingly dominant role in the domain of China's trade with the outside world. An important and often-used piece of evidence as to the impact of FDI on China's trade is the share of MNEs in total Chinese export and import. As Figure 2-5 in Chapter 2 demonstrates, the shares of Foreign Invested Enterprises (FIEs) in total national export and import flows have increased considerably since China's liberalization program became effective, increasing from 1.9 and 5.6 per cent in 1986 to 54.8 and 56.2 per cent in 2003. These figures seem to imply that FDI has underpinned China's trade expansion. However, the share of FIEs in total national exports and imports is a very crude indication of the impact of FDI on trade. One reason for this is that the category of FIEs does not only include wholly-owned foreign enterprises, but also joint ventures with shared ownership by both Chinese and foreign investors in which the foreign investors' capital contribution should not be less than 25 per cent of the total registered capital.[1] Therefore, domestic investments also contribute to the FIEs' exports and imports. Furthermore, an important part of FDI's influence on their host countries' trade may follow an indirect path. For example, through spillover effects, FDI can affect the export and import performance of local firms, and hence the total export and import flows in

[1] Law of the People's Republic of China on Chinese-Foreign Equity Joint Ventures (EJV Law, Article 4), Law of the People's Republic of China on Contractual Joint Ventures (CJV Law, Article 2), and Regulations for the Implementation of the Law of the People's Republic of China on Contractual Joint Ventures (CJV Implementation, Article 18).

host countries. For these reasons, simply taking the official statistics at face value provides far from sufficient evidence – if any – as to the explanation of the FDI – trade linkages. A more sophisticated and appropriate technique is needed to uncover the effects that underlie the official figures.

In Chapter 4, by introducing lagged FDI as an explanatory variable, we found evidence for a one-way causal relationship from FDI to trade. The present chapter will go further by seeking to detect whether or not two-way causal FDI – trade linkages can be uncovered by analyzing time series data. We investigate both long-run and short-run relationships between FDI on the one hand and exports and imports on the other hand by using the Granger-causality cointegration approach. Before doing that, though, we will first briefly review the relevant literature on FDI and trade.

6.2 Literature Review

From decades of research it is clear that FDI and trade are closely interrelated. MNE activity has a distinctive effect on the trade pattern of both home and host countries because of their ability and willingness to internalize cross-border transactions, thereby affecting the value-added activities both within a country and between countries (Dunning 1992). By and large, the international business and international economics literatures are unanimous on the importance of this link. However, the exact nature of the relationships between FDI and trade is a controversial issue, because (a) causalities can run both ways, from FDI to trade and from trade to FDI and (b) the sign of any FDI – trade linkages is dependent upon the underlying MNE strategies.

The mainstream in the classic theory of international trade views the mobility of goods and factors as opposing forces. As part of international integration processes,

trade in goods leads to the convergence of product prices, and thus of factor rewards; alternatively, migration or FDI triggers a convergence of factor rewards, and hence of product prices. This is the so-called Mundell principle. The Heckscher-Ohlin-Samuelson-Mundell framework suggests that international trade of goods can substitute for international movement of factors of production, which includes FDI. Similarly, the other way around, international factor mobility, including FDI, may substitute for trade in goods. In Mundell's words, "[c]ommodity movements are at least to some extent a substitute for factor movements … an increase in trade impediments stimulates factor movements and … an increase in restrictions to factor movements stimulates trade" (Mundell 1957: 320).

Vernon (1966) developed the product lifecycle model of internationalization to explain the sequence from domestic production of a new product to its export and then foreign production by investigating the US multinational companies in the 1950s and early 1960s. According to this model, in the first stage, new products initially are developed in the US, and sales occur first in the domestic market. Subsequently, in the second stage, export will start developing to those foreign markets where the consumers have the same preferences and incomes as at home. As the foreign markets grow, in the third stage, US firms might establish a subsidiary abroad to produce their products closer to their destination markets. When the production in foreign countries rises, US export to those markets will fall, as well as that to third-country markets. Finally, in the fourth stage, as foreign firms master the production processes and as their costs fall with the increased scale of production, they might begin to export their products to the US. This developmental sequence indicates that foreign production may substitute for export from the home country, even creating import of the same product in a later stage. From the perspective of a

host country, conversely, FDI is replacing its imports first and increasing its exports later.

From a macroeconomic point of view, Kojima (1975 & 1982) points out that the comparative advantage of industries in home and host countries is crucial in determining whether FDI is trade-oriented or not. Kojima's macroeconomic approach predicts that export-oriented FDI occurs when the source country invests in those industries in which the host country has a comparative advantage. It is beneficial for an investing country if an FDI flow goes abroad from its comparatively disadvantaged marginal industry for the purpose of producing goods in the host country at costs lower than at home through the transfer of efficient technology and effective management. Subsequently, in the next stage, importing the associated goods back into the home country (or exporting them to third markets) may gain prominence. Additionally, this kind of FDI benefits the host country, since it stimulates the export of new products from the host country. Therefore, on the one hand, if an MNE invests in a host country with comparative advantages that compensate for disadvantages in the home country, then FDI will increase the host country's trade. However, on the other hand, if an FDI flow comes from an industry with a comparative advantage in the home country but a disadvantage in the host country, then this FDI tends to be a trade substitute because this investment does not fit with the host country's comparative advantage, which eventually reduces the total output and trade volume of both countries involved. In developing host countries, FDI flowing into labor-intensive industries is likely to be trade-creating, whereas FDI flowing into capital-intensive industries is likely to be trade-replacing or trade-destroying.

A related literature investigates the relation of trade and FDI in the context of development issues. Based on the conceptual framework developed by Porter (1990),

Ozawa (1992) formulated a comprehensive theory describing linkages between economic development and competitiveness that create international trade and FDI. Ozawa argues that an increase in trade flows occurs as a result of improved comparative advantage, which is, in turn, influenced by FDI leading to changes in the pattern of this advantage. He offers an explanation of the causal relationships between an outward-oriented economic policy and the impact of FDI on trade by emphasizing the effects of FDI on comparative advantage and structural upgrading in manufacturing. In this line of argument, FDI and international trade are not only increasingly complementary and mutually supportive, but also increasingly inseparable as two sides of the process of economic globalization (Ruggiero 1996). Furthermore, inward FDI may stimulate exports from domestic sectors through industrial linkage or spillover effects, especially through backward linkages, buying local-made intermediate inputs to produce exports (O hUallachain 1984). This effect creates a strong demand stimulus for domestic enterprises, and promotes exports.

The international business literature emphasizes the role of the motives of multinational enterprises. With a different motivation, FDI has a different effect on trade. Motivations can be classified into two general categories: market-seeking and factor-seeking (Root 1977 & 1994). Market-seeking FDI follows demand, penetrating foreign markets with a promising sale potential. Market-seeking FDI may have a negative impact on the host country's trade balance, since "the affiliates of foreign firms (in the US) do show an apparent tendency to export somewhat less and import significantly more than US firms – indeed over two and a quarter times as much" (Graham and Krugman 1989: 67). Factor-seeking FDI includes MNE behavior aimed at gaining access to raw materials and low-cost locations. FDI motivated by the quest for raw materials is used to produce goods with natural sources that are lacking or under-supplied in the home country. In general, this type

of FDI increases exports from the host nation to the home country, as well as to other third countries (Root 1994). FDI motivated by low-cost production objectives takes advantage of low-cost factors, such as cheap labor, as part of an overall global sourcing strategy, leading to an ability to export products from the emerging host nation to other countries in the world, including the home country. In this case, the host country is able to increase exports and improve its trade balance (Phongpaichit 1990).

So, in the business and economic approaches to FDI, trade is considered to be one of the factors that determine the MNE's choice of location for FDI initiatives. On the one hand, a high level of imports in host countries suggests a high level of penetration by foreign companies, which may start off by exporting to the host country, to subsequently switch to FDI once they have established a foothold in those countries. Following this logic, a long-run positive relationship is hypothesized between host-country import and inward FDI (Culem 1988). On the other hand, in the short run, multinational companies may regard export and FDI as alternative modes of foreign market penetration, which implies a negative relationship. Therefore, there is uncertainty as to the net effect of the level of the host-country imports on FDI (Billington 1999). Of course, an MNE's motivation may be complex, implying that FDI is undertaken for more than one reason. Furthermore, regional economic integration and growth of intra-firm trade complicates the prediction of the trade effect of FDI (Narula 1996). All this together explains why unconditional hypotheses about the causality and sign of FDI – trade linkages make no sense.

To summarize, the "quick" literature review above indicates that the relationship between the trade and FDI is complicated, implying that the sign and direction of the causal relationship depend on the range and type of trade and FDI being considered, the MNEs' dominant strategies, and the characteristics of industries and

countries involved. Figure 6.1 summarizes the possible relationships that different pieces of literature predict, depending upon the set of conditions under investigation. Obviously, the causal relations between trade and FDI are not clear-cut.

Figure 6.1 A literature review: relationships between import, export and FDI

Not surprisingly, then, the empirical evidence is mixed. The majority of the empirical studies have confirmed that outward FDI and exports are complementary, especially in the case of developed countries (e.g. Swedenborg 1979; Lipsey and Weiss 1981; Blomstrom, Lipsey and Kulckyck 1988; Pearce 1990; Pfaffermayr 1996; and Wei, Liu, Parker and Vaidya 1999). An early exception to this rule is Horst (1972), who found that trade and FDI reveal a substitutive linkage, and hence are negatively related. Yet other studies have reported that the effects of FDI on exports are different from that on imports. For example, Bayoumi and Lipworth (1997) showed that outward FDI from Japan had only a temporary impact on exports, but a permanent effect on imports.

In terms of Figure 6.1's FDI – trade relations, China is an interesting case that attracts much attention from economists and politicians. Using provincial data of China over the 1985-1995 period, Wei, Liu, Parker and Vaidya (1999) revealed that provinces with a higher level of international trade attract more FDI. Using provincial data for 1984-1997, Sun (2001) found evidence for a one-way causality from FDI to export in the coastal and central regions. Using bilateral data for China and 19 trade partners for 1984 to 1998, Liu, Parker, Vaidya and Wei (2001) applied

unit-root and Granger-causality tests, indicating that import causes FDI and FDI causes export. Using quarterly data from 1981 to 1997, Liu, Burridge and Sinclair (2002) investigated the causal links between economic growth, FDI and trade, showing that two-way causal connections exist between economic growth, FDI and export. Using case study, Zhang and Ebbers (2002) argued that the characteristics of an investing country affect the FDI-trade relationship between China and the investing country. Together, these studies reveal important features of the relationships between Chinese FDI and trade. However, these previous studies either use provincial or bilateral data, and only a few studies have investigated the causal linkages between FDI, export and import at the aggregate level. Moreover, earlier work has not incorporated the influence of policy changes into their models, and information for the period after the Asian crisis has not yet been included. The present study's aim is to extend the extant literature by filling these gaps.

6.3 Methodology and Data

6.3.1 Granger-causality test

One often applied method to investigate causal relationships between variables empirically is Granger-causality analysis. The basic principle of Granger-causality analysis (Granger 1969) is to test whether or not lagged values of one variable help to improve the explanation of another variable from its own past. Simple Granger-causality tests are operated on a single equation in which variable *A* is explained by lagged values of variables *A* and *B*. It is then tested whether the coefficients of the lagged *B* variables are equal to zero. If the hypothesis that the coefficients of the lagged values of *B* are equal to zero is rejected, it is said that variable *B* Granger-causes variable *A*.

The present study will test for two-way Granger-causality relationships between exports, imports and FDI. Since a single-equation specification cannot fulfil the aim of this study, we set up a Vector AutoRegression (VAR) system, which treats all variables symmetrically. In terms of the variables central to the present study, the VAR system has the following form:

$$EX_t = a_1 + \sum_{i=1}^{n} b_{1i} EX_{t-i} + \sum_{i=1}^{n} c_{1i} IM_{t-i} + \sum_{i=1}^{n} d_{1i} FDI_{t-i} + e_{1t}, \quad (6.1a)$$

$$IM_t = a_2 + \sum_{i=1}^{n} b_{2i} EX_{t-i} + \sum_{i=1}^{n} c_{2i} IM_{t-i} + \sum_{i=1}^{n} d_{2i} FDI_{t-i} + e_{2t}, \text{ and} \quad (6.1b)$$

$$FDI_t = a_3 + \sum_{i=1}^{n} b_{3i} EX_{t-i} + \sum_{i=1}^{n} c_{3i} IM_{t-i} + \sum_{i=1}^{n} d_{3i} FDI_{t-i} + e_{3t}, \quad (6.1c)$$

where *EX, IM* and *FDI* are exports, imports and FDI, respectively; *a*, *b*, *c*, and *d* are parameters; the *e*'s are error terms; and *n* is the order of the VAR, i.e., the maximum number of lags in the system. For the $\{FDI_t\}$ sequence to be unaffected by exports, all the b_{3i} must be equal to zero; and for the $\{FDI_t\}$ sequence to be unaffected by imports, all the c_{3i} must be equal to zero. Similar logic applies to $\{EX_t\}$ and $\{IM_t\}$.

The conventional Granger-causality test based on a standard VAR-model is defined conditional on the assumption of stationarity. If the time series are non-stationary, the stability condition for VAR is not met, implying that the Wald test statistics for Granger-causality are invalid. In this case, the cointegration approach and Vector Error Correction Model (VECM) are recommended to investigate the relationships between non-stationary variables (e.g., Toda and Philips 1993). Engle and Granger (1987) pointed out that when a linear combination of two or more non-stationary time series is stationary, then the stationary linear combination, the so-called cointegrating equation, can be interpreted as a long-run equilibrium relationship between the variables.

6.3.2 Cointegration approach

This long-run equilibrium relationship cannot determine the direction of causality, though. The direction can be obtained by estimating a VECM that explicitly includes the cointegrating relations. In a VECM, long and short-run parameters are separated, which gives an appropriate framework for assessing the validity of the long-run implications of a theory, as well as for estimating the dynamic processes involved. The short-run dynamics of the model are studied by analyzing how changes in each variable in a cointegrated system respond to the lagged residuals or errors from the cointegrating vectors and the lags of the changes of all variables. Therefore, by adopting the cointegration approach and corresponding VECMs, we can detect both long-run and short-run relationships between non-stationary variables.

In the current study, we found two cointegrating relationships between exports, imports and FDI (see below). Hence, we estimate the following three-equation VECM to analyze causality:

$$\Delta EX_t = \alpha_1 + \alpha_E ect_{t-1} + \sum_{i=1}^{n-1} \beta_{1i} \Delta EX_{t-i} + \sum_{i=1}^{n-1} \gamma_{1i} \Delta IM_{t-i} + \sum_{i=1}^{n-1} \delta_{1i} \Delta FDI_{t-i} + \theta_1 D_{92} + \varepsilon_{1t}, \quad (6.2a)$$

$$\Delta IM_t = \alpha_2 + \alpha_I ect_{t-1} + \sum_{i=1}^{n-1} \beta_{2i} \Delta EX_{t-i} + \sum_{i=1}^{n-1} \gamma_{2i} \Delta IM_{t-i} + \sum_{i=1}^{n-1} \delta_{2i} \Delta FDI_{t-i} + \theta_2 D_{92} + \varepsilon_{2t}, \quad (6.2b)$$

$$\Delta FDI_t = \alpha_3 + \alpha_F ect_{t-1} + \sum_{i=1}^{n-1} \beta_{3i} \Delta EX_{t-i} + \sum_{i=1}^{n-1} \gamma_{3i} \Delta IM_{t-i} + \sum_{i=1}^{n-1} \delta_{3i} \Delta FDI_{t-i} + \theta_3 D_{92} + \varepsilon_{3t}, \quad (6.2c)$$

where ΔEX, ΔIM and ΔFDI are first differences of *EX, IM* and *FDI*, respectively; the error-correction term *ect* is a vector of residuals from the long-run equilibrium relationships; D_{92} is a step dummy variable, with zeros before and ones in and after 1992, to be discussed below; α, β, γ, δ, and θ are parameters; and the ε's denote error terms.

Two aspects of the VECM system (6.2) deserve special attention. Firstly, the error-correction term consists of the linear combinations of our three variables, which are stationary. The number of combinations, also labeled as rank or the number of cointegration vectors (r), is two in our case. Below, we will apply the Johansen cointegration test to determine the rank. The error-correction terms reveal the deviations from the long-run relationships between the three variables. The coefficients of *ect*, α_F, α_E, and α_I reflect the speed of adjustment of exports, imports and *FDI* toward the long-run equilibrium. For example, the larger the first (second) element of α_F , the greater the response of *FDI* to the previous period's deviation from the first (second) long-run equilibrium relations. Conversely, if the two elements of α_F are equal to zero, *FDI* does not respond to lagged deviations from the long-run equilibrium relationships. In this case, *FDI* is called weakly exogenous for the system. So, Granger-noncausality in the case of cointegrated variables requires the additional condition that the speed-of-adjustment coefficients are equal to zero. For example, for the $\{FDI_t\}$ sequence to be unaffected by exports, not only all the β_{3i} must be equal to zero, but also the elements of vector α_F.

Secondly, three deterministic components – a constant, a trend and step dummy D_{92} – may enter the VECM system. The form in which the constant and the trend enter the VECM is found as part of the cointegration estimation strategy. The step dummy variable controls for the important role that the Chinese government policies have played in the process of China's integration into the world economy. China's liberalization policies followed a gradual step-by-step approach before 1992 (as was explained in Chapter 3). In that period, international trade and FDI increased steadily. Since 1992, however, China has speeded up the pace of liberalization impressively. The Chinese trade system has been adapted to better reflect international norms, and

incentive measures have been launched to attract inward FDI. Consequently, China's FDI inflow has increased tremendously due to these changes in policies.

6.3.3 Estimation procedure

Figure 6.2 (see below) indeed reveals a structural break in the FDI time series as of 1992. The Chow breakpoint test confirms that the influence of this break on the relationship between our time series is significant, with an F-statistic of 41.2 ($p < 0.001$).[2] We considered three alternatives for the structural break: the break may change (1) the constant, (2) the trend, or (3) both the constant and the trend. We started from the most complicated case (3), including a step dummy (D_{92}), the product term of D_{92} and EX, and the product term of D_{92} and IM. The result indicates that the coefficient of D_{92} is significant, while the two product terms are not, which implies that case (1) is empirically validated. Therefore, we only include the step dummy D_{92} into our VECM and cointegration test.

The estimation comes of three steps. First, we test whether the three variables involved are stationary with the Augmented Dickey-Fuller (ADF) unit root test. Additionally, due to the fact that there could be structural breaks in the time series concerned, we apply the Zivot-Andrews (1992) unit root test, which allows for one structural break in the time series. When the null hypothesis of non-stationarity is not rejected by these two tests, we move to the second step: the cointegration test in Johansen's (1991 & 1995) framework. If the first two steps indicate that the three variables are non-stationary and cointegrated, we take the third step: estimating the VECM of system (6.2), and testing for weak exogeneity and Granger-causality relationships between the three variables.

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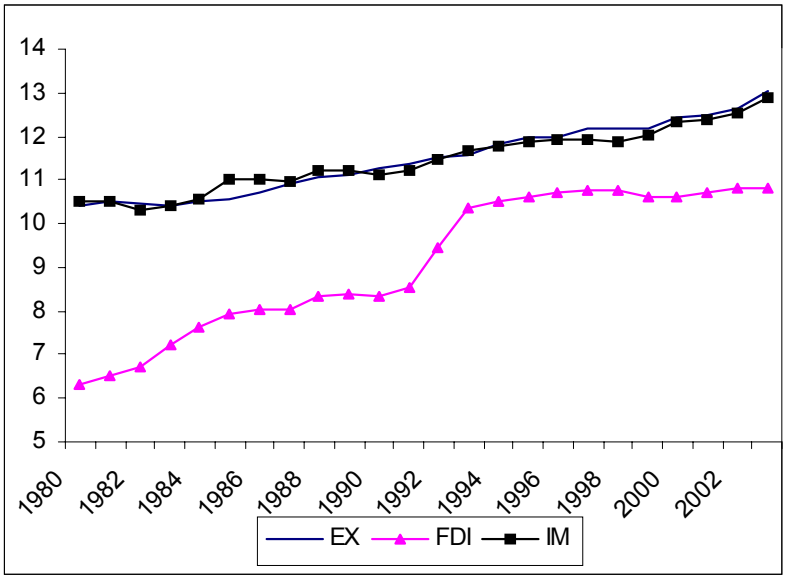
[2] We also applied the Chow breakpoint test for other years, such as 1989, 1996 and 1994, as suggested in Table 6.2 below. However, these other step dummies are not associated with significant breaks.

6.3.4 Data

The current study examines the relationships between FDI inflows, exports and imports for China using annual data from 1980 to 2003. The three time series are deflated by using a GDP deflator, and are converted to constant US dollars (2000 = 100). All variables are transformed to natural logs before estimation. GDP deflators are obtained from the OECD (SourceOECD). Annual realized FDI values are collected from the Ministry of Commerce of the People's Republic of China (MOC) and the Chinese Ministry of Foreign Trade and Economic Cooperation (MOFTEC). Exports and imports information is from the Customs of General Administration of the People's Republic of China. Figure 6.2 shows exports, imports and FDI in logarithms from 1980 to 2003.

Figure 6.2: China's FDI, exports and imports 1980-2003



Note: FDI, EX and IM stand for logarithms of FDI, exports and imports, respectively.

Clearly, our three variables reveal an upward trend during the sample period. FDI increased faster than exports and imports did, however, especially in the 1992 – 1994 period.

6.4 Evidence

6.4.1 Unit root tests

Table 6.1 reports the results of the unit root tests for exports, imports and FDI using the ADF test. Two models with different deterministic components are considered: the model with a constant only, and a model with a constant and a trend. It is clear that all the log-variables have a unit root in their levels. However, the null hypothesis of a unit root in first difference of the three variables is rejected at the 10 and 5%-level in the model with a constant and a trend. Additionally, the hypothesis is rejected at the 5%-level for all variables in the model with a constant only. Therefore, according the ADF test we can treat exports, imports and FDI as integrated of order one in our sample, denoted I(1).

The ADF test is biased toward accepting the null of non-stationarity if the time series has a structural break. Therefore, we apply the Zivot-Andrews unit root test. Table 6.2 shows the results. Again, the findings suggest that the three time series are I(1). These results permit us to proceed with the next step, cointegration tests, in order to investigate the long-run relationships between exports, imports and FDI.

Table 6.1: Augmented Dickey-Fuller unit root test

Variables	Level		First difference	
	With constant and trend	With constant only	With constant and Trend	With constant only
EX	-2.723(2)	0.912(4)	-3.937**(0)	-3.303**(0)
IM	-3.120(3)	1.081(7)	-3.462*(5)	-3.398**(5)
FDI	-1.701(3)	-1.793 (3)	-3.722**(1)	-3.442**(1)

Notes:
(1) *EX, IM* and *FDI* denote the logs of exports, imports and FDI, respectively.
(2) **, and * are significant at the 5% and 10%-level, respectively.
(3) Figures in parentheses are the number of lags that were selected by the Akaike Information Criterion (AIC).

Table 6.2: Zivot-Andrews unit root test: minimum t-statistic

	Level		First difference	
	With constant and trend	With constant only	With constant and Trend	With constant only
EX	-2.093 (1994)	-2.093 (1994)	5.126 (1996)**	5.126 (1996)**
IM	-4.019 (1990)	-4.019 (1990)	4.800 (1989)	4.800 (1989)**
FDI	-4.567 (1992)	-4.567 (1992)	5.893(1992)***	5.893 (1992)***

Notes:
(1) *EX*, *IM* and *FDI* denote the logs of exports, imports and FDI, respectively.
(2) **, and * are significant at the 5% and 10%-levels, respectively.
(3) Figures in parentheses are break points.

6.4.2 Cointegration test and long-run relationships

The purpose of the cointegration test is to determine whether our three non-stationary time series are cointegrated – that is, to detect whether there are long-run equilibrium relationships among the three variables. As mentioned above, we include the step dummy D_{92} as an exogenous variable. We test for cointegration using the

methodology developed by Johansen (1991 & 1995). We first need to find the optimal lag order for the VECM model. Lag-exclusion Wald tests indicate that three lags is the optimal lag structure in our VECM. With this optimum number of lags, we move on to choose the appropriate cointegration model for the constant and the trend. We estimated the five models considered by Johansen (1995: 80-84). The results indicate that a model with a linear trend and cointegrating equations with intercepts is supported. Therefore, we use this model to perform the cointegration test.

Table 6.3 reports the results of the cointegration test. Trace statistics and *L*-max statistics indicate that the null hypotheses of no cointegration, r=0, and one cointegration vector, $r = 1$, are rejected at the 1%-level. However, the null hypothesis of two cointegrating vectors, $r = 2$, is not rejected. Consequently, we conclude that there are two cointegrating relationships among the three selected variables in the model. Based on the normalization used in Table 6.3, the two cointegration vectors are:

$$EX - 1.97FDI + 7.01, \text{ and} \tag{6.3}$$

$$IM - 1.36FDI + 1.28, \tag{6.4}$$

which are included in the *ect* term in the VECM system of Equation (6.2). The results indicate (a) a long-run positive relation between FDI and exports, and (b) a long-run positive relation between FDI and imports. These relationships imply that China's FDI inflow is positively associated with China's exports and imports in the long run. Combining Equations (6.3) and (6.4) yields the following positive relationship between *EX* and *IM*:

$$EX - 1.45IM + 5.16. \tag{6.5}$$

Table 6.3: Johansen's cointegration tests (with three lags)

H_0=r	Eigenvalue	λ_{max}	5% critical value	λ_{trace}	5% critical value
0	0.970	70.41***	21.13	102.53***	29.80
1	0.778	30.14***	14.26	32.12***	15.49
2	0.094	1.97	3.84	1.98	3.84
Normalized cointegrating coefficients (standard error in parentheses)					
One cointegrating equation: log-likelihood = 109.31.					
β	EX	IM	FDI	c	
	1.00	-1.06	-0.571	6.08	
		(0.192)	(0.073)		
Two cointegrating equations: log likelihood = 119.37.					
β	EX	IM	FDI	c	
	1.00	0.00	-1.97	7.01	
			(0.14)		
	0.00	1.00	-1.36	1.28	
			(0.10)		

Notes:
(1) ***, **, and * are significant at the 1%, 5% and 10%-level, respectively.
(2) D_{92} is included as an exogenous variable.

We must exercise caution, however, when interpreting this result. The reason is that, although the cointegration implies positive relations between the three variables, cointegration tests cannot determine the direction in which causality flows. The causality relationships can be ascertained from performing Granger-causality tests that incorporate the cointegrating relation. This is what we do next.

6.4.3 VECM and short-run relationships

Given the existence of two cointegrating relationships between exports, imports and FDI, we test for weak exogeneity and Granger-causality by using the VECM of

Equation (6.2).[3] In line with the outcomes of the cointegration test, the order of the VECM is three, and a linear trend and cointegrating relations with constants are included in the model. Again, D_{92} is taken on board as an exogenous variable. The vector error correction estimates are shown in Table 6.4. The results indicate that D_{92} is positively significant in export and FDI equation, which confirms the effect of policy on exports and FDI.

Table 6.5 reports the results of the weak exogeneity test. Weak exogeneity is rejected for *EX* and *FDI* at the 1%-level. However, weak exogeneity is not rejected for *IM*. This result implies that two of the three variables, *EX* and *FDI*, are weakly caused by all variables in the system. This conclusion is complemented by the result of the VECM Granger-causality test, as displayed in Table 6.6. The first column defines the equations of system (6.2). The other columns display χ^2 (Wald) statistics for the joint significance of each of the other lagged endogenous variables and the error-correction term in the associated equation. In the exports Equation (6.2a), the hypothesis that imports does not Granger-cause exports is rejected at the 1%-level, and the hypothesis that FDI does not Granger-cause exports is rejected at the 5%-level. In the imports Equation (6.2b), the hypothesis that exports does not Granger-cause imports cannot be rejected, and the hypothesis that FDI does not Granger-cause imports is not rejected either. In the FDI Equation (6.2c), the hypothesis that exports does not Granger-cause exports is rejected at the 5%-level, and the hypothesis that FDI does not Granger-causes imports is rejected at the 1%-level. In summary, the Wald test statistics indicate that bi-directional causal links in the short-

[3] When variables are non-stationary at their levels but stationary at their first differences, some studies employ a vector autoregression (VAR) in first differences to detect the causality relation (e.g., Liu, Wang and Wei 2001). However, when non-stationary variables are cointegrated, then a VAR in first differences is misspecified (Engle and Granger 1987). In the current study, two cointegration vectors are found. Therefore, a VECM is used.

run dynamics exist between *ΔEX* and *ΔFDI*, and that one-way causal links run from *ΔIM* to *ΔFDI* and from *ΔIM* to *ΔEX*.

Table 6.4: Vector Error Correction Estimates

Cointegrating Eq:	CointEq1		CointEq2			
EX(-1)	1		0			
IM(-1)	0		1			
FDI(-1)	-1.968	-13.1 (t)	-1.358	-13.088 (t)		
C	7.010		1.280			
Error Correction:	D(EX)	t	D(IM)	t	D(FDI)	t
CointEq1	-0.966	-2.290	-0.643	-0.477	2.194	3.983
CointEq2	1.539	2.386	1.020	0.494	-2.959	-3.511
D(EX(-1))	-0.340	-1.820	0.177	0.297	0.411	1.685
D(EX(-2))	-0.481	-2.064	-0.754	-1.012	0.878	2.884
D(EX(-3))	0.021	0.087	-0.875	-1.108	0.984	3.050
D(IM(-1))	-0.991	-1.743	-0.996	-0.548	2.318	3.121
D(IM(-2))	-0.645	-1.797	-0.864	-0.752	1.637	3.488
D(IM(-3))	-0.147	-0.519	-0.245	-0.271	1.171	3.171
D(FDI(-1))	0.055	0.496	0.128	0.359	0.004	0.028
D(FDI(-2))	0.225	2.768	0.177	0.680	-0.192	-1.802
D(FDI(-3))	0.056	0.475	-0.044	-0.116	-0.364	-2.347
C	0.209	1.894	0.317	0.900	-0.940	-6.536
D92	0.196	2.686	0.186	0.797	0.812	8.524
R-squared	0.882		0.472		0.977	
Adj. R-squared	0.680		-0.432		0.936	
F-statistic	4.360		0.522		24.293	
Log likelihood	40.790		17.536		35.443	
Determinant resid covariance (dof adj.)			5.22E-08			
Determinant resid covariance			2.24E-09			
Log likelihood			114.038			
Akaike information criterion			-6.904			
Schwarz criterion			-4.663			

Note: t-statistics are reported in the column at the right-hand side of the parameter estimates.

Table 6.5: Weak exogeneity test

	χ^2	p-value
ΔEX weakly exogenous to the system	21.00	0.0018
ΔIM weakly exogenous to the system	3.32	0.7678
ΔFDI weakly exogenous to the system	22.08	0.0012

Table 6.6. VECM Granger-causality test

Dependent variable	Wald test statistics (χ^2)		
	ΔEX	ΔIM	ΔFDI
ΔEX		12.44***	9.95**
ΔIM	1.52		1.20
ΔFDI	15.37**	12.53***	

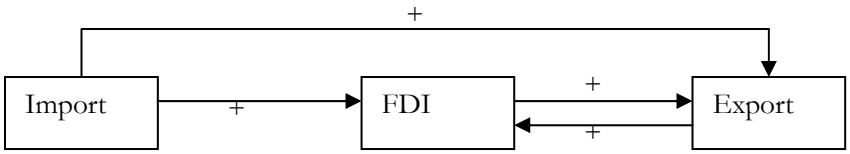
Note: *** and ** are significant at the 1% and 5%-level, respectively.

6.5 Conclusion and Discussion

In this chapter, we focused on analyzing two relationships, FDI and exports, and FDI and imports. Our empirical study confirms the interactive causality relationships between China's exports, imports and FDI, as summarized in Figure 6.3. Moving beyond previous studies, the present study finds evidence in support of more relationships between the three variables, although the findings are in line with that

in the extant literature.[4] In the long run, FDI positively relates to exports and imports, and exports is positively associated with imports. This result implies that multinational enterprises' investments in China do not substitute for China's exports and imports. In the short run, the VECM framework reveals bi-directional causal links between FDI and exports, and one-way causal links from imports to FDI and from imports to exports. In addition, this confirms the significant impact of liberalization policy on China's exports and FDI inflows.

Figure 6.3: Relations between FDI, exports and imports



First, the two-way causal link between exports and FDI suggests that growth of exports has made China more attractive to foreign investors, and foreign investment, in turn, has promoted China's exports. According to Kojima's (1975 & 1982) macroeconomic approach, export growth reveals a country's competitiveness in the world market. This competitiveness derives from the country's comparative advantages. The comparative advantages encourage multinational companies to invest in this country, so making use of these advantages to enhance their competitiveness in the world market. In the case of China, the growth of exports since 1978 has been four and a half times that of world exports, which demonstrates

[4] Most studies concern to relationships between China's exports, imports and FDI. Wei (1999), Sun (2001), and Liu, Wang and Wei (2001) found only one-way relations between the three variables. Liu, Burridge and Sinclair (2002) traced a two-way relationship between FDI and export, and one-way linkages from FDI to imports, and from imports to exports.

that China can benefit from noticeable comparative advantages. These advantages attract FDI into China that seeks low-cost production and raw-material access. Given the nature of these types of FDI inflows, they, in turn, promote China's exports. This finding is consistent with the arguments of Vernon (1966), Ozawa (1992) and Root (1977 & 1994). The causal link from FDI to export also reflects China's FDI policies, with an overall bias toward stimulating export-oriented FDI. That is, export-oriented foreign investments were (and still are) highly encouraged by the Chinese government through special tax rebates, low land-usage fees, and offering water, electricity and other infrastructure services. Furthermore, there were restrictions and regulations imposed on foreign invested enterprises (FIEs) in the area of export obligation. For example, under the *Law of the People's Republic of China on Wholly-Owned Foreign Enterprises* (1986, Article 3), FIEs have to export all or the majority of their products.[5] This is one of the reasons why FDI had a positive impact on exports in both the long run and the short run.

Second, the causal link from import to FDI found in our VECM cointegration test is in line with the internationalization argument advocated in the extant international business and international economics literatures. That is, multinational enterprises are likely to first penetrate a new market by export, to subsequently switch to FDI once they have established presence in that market.

Third, the lack of significance of causation from FDI to import can be explained by the contradictive impact of FDI on imports. On the one hand, FDI may replace import when the motivation for the investment is market-seeking. One the other hand, FDI might promote import when the motivation for foreign investment is factor-seeking. China is not only potentially the largest market in the world, but also

[5] This restriction was relaxed in 2000, but the Chinese government still encourages FIEs to market their products outside of China.

features very low labor costs. Therefore, multinational companies may be driven by both motives, which causes opposing effects on import. As a result, empirical studies do not find clear-cut evidence for either a negative or a positive relationship. In Chapter 4, we found that the impact of FDI on imports is less significant than the impact on exports, which is likely to be caused by the same reason.

In summary, the findings of this chapter indicate a virtuous process of the development of China's outward-oriented economy. As shown in Figure 6.3, more imports lead to more FDI, more FDI leads to more exports, and more exports lead to more FDI. This virtuous process reflects China's open-door policy. The trade liberalization program that started in 1978 initially facilitated China's imports, and hence, directly and indirectly, FDI and exports. In order to fulfill its promise to the WTO, China is currently further opening up its markets to the outside world. This virtuous circle is therefore likely to continue, or even accelerate, which will eventually underpin a high economic growth rate in China for many years to come. In the process, the role of MNEs through FDI is crucial.

Chapter 7
Summary, Conclusions and Discussion

The basic aim of this thesis was to explain the changes in China's bilateral trade relations. For this purpose, five empirical studies were carried out, each from a different angle. The findings of these studies are summarized below.

7.1 Conclusions from the Empirical Analyses

Evolution of China's foreign trade and related policies

Chapter 2 has thrown more light on the evolution of foreign trade and FDI in China since the foundation of socialism in 1949. China's economic development is characterized by two different periods. The first or pre-reform period from 1949 to 1978 is characterized by the following features: (1) China's implementation of an import-substitution strategy in its industrialization; (2) a foreign trade system dominated by complete state monopoly; (3) the elimination of market forces; and (4) the use of political arrangements as a weapon against enemies in international political struggles. Under this trade regime, foreign trade accounted for only a small part of the Chinese economy. China was basically a closed economy with a limited role in world trade. In line with this role, China's foreign trade was concentrated in terms of the number of trade goods and trade partners.

The second period or reform era started in 1978. In this period, China became a prime example of a developing country that integrated into the world economy,

particularly in the areas of international trade and foreign direct investment (FDI). It also shifted from import-substitution regimes to export-promotion regimes. Trade decentralization and liberalization increased the impact of the market mechanism on China's foreign trade. During the past two decades, China became one of the most dynamic trading countries in the world. China's foreign trade growth not only made China an important player in the world economy, but also exerts an important influence on its domestic economy. In terms of trade goods and trade partners, China's trade has been diversified more than at any other period in China's history. Associated with China's growth of foreign trade, FDI has expanded extraordinarily.

Impact of political factors on bilateral trade linkages

China's position in the international world during the past half-century provides vital information for investigating the relation between politics and trade. Although there is a substantial number of studies in this area, Chapter 3 extends the literature in at least three ways: (1) it tests the impact of five political arrangements simultaneously, which is, as far as we know, more comprehensive than any former study; (2) it uses trade intensity instead of trade flows as the measurement of trade relations, which better reflects the mutual relationship between politics and trade; and (3) it accounts for zero observations, temporal dynamics and heterogeneity within one framework, and therefore better fits with the characteristics of the data than other models used in previous studies.

Our empirical analysis in Chapter 3 showed that political arrangements played a crucial role in shaping China's international trade. By covering a long time window with much variation and more appropriate methods for analyzing the data, and by using a trade intensity index rather than trade value to measure bilateral trade relations, this study was able to provide strong empirical evidence in favor of the hypotheses that the establishment of diplomatic relations, cooperation, high-level

visits and similarity of political systems are associated with higher intensities of trade linkages. Weaker empirical evidence was found in favor of Linder's effect. The hypothesis that member countries of a Preferential Trading Agreements (PTA) have had lower trade intensities with China was rejected. These findings suggest that political factors were more important than economic factors over the last half century. By contrast, due to China's trade liberalization program in the 1990s, the importance of economic factors has increased over the last decade.

Impact of cultural, economic and geographical factors on bilateral inter-industry trade linkages

Chapter 4 focused on the explanation of the intensity of China's bilateral trade linkages in the 1990s. Six models were estimated in order to seek explanation for the shifts in the export and import intensities of trade with different trade partners over the 1993-1999 period. The estimation results revealed striking differences for 1993 *vis-à-vis* 1999, as well as for export *vis-à-vis* import trade intensities. By analyzing these differences, the following conclusions could be drawn. First, after seven years of further reform, the economic drivers of trade intensities have gained momentum. This confirms the common sense belief that China is integrating rapidly into the world market, and that the market mechanism is starting to work properly in the area of Chinese foreign trade. Political determinants of trade intensities that were still very important in 1993, were pushed to the background by a number of key economic factors in 1999. Second, by comparing the estimation results obtained for the export and import trade intensity indices, we found that economic factors appear to be more influential in the export than in the import domain. The reason for this difference is that, while China has largely liberalized its trade regime and has taken a number of important steps to reduce protection, import countries still face tariff and non-tariff barriers, as well as complicated formalities associated with import activities. Third, the estimation results over the 1993-1999 period suggest that Linder's effect

does exist in a transitional country like China, especially in the export domain. This finding supports the idea that a developing and transitional country, such as China, needs to import technology-intensive products from developed countries. In the import domain, Linder's effect appeared to be very weak. Fourth, in Chapter 4, we found empirical evidence in favor of the argument that the greater the geographical distance between China and its trade partner, the lower will be their mutual trade intensity indices. This is in line with standard trade theory logic. Finally, in this chapter, we found that FDI and ethnic ties positively influenced the bilateral trade.

In Chapter 3, it was found that Linder's effect did not exist in the export domain and only weakly in the import domain. This difference with respect to export and this similarity with respect to import require further explanation. In Chapter 3, we examined data from 1950 to 2002. In the first three decades of this period, China was a planned economy. The purpose of import during this period was to meet the needs of domestic industrialization. In other words, China's import plan was largely based on its planned economic situation, and economic factors were at least to some extent responsible for China's import behavior. This situation did not really change when China started to reform its economy, and market forces became responsible for China's import behavior. Consequently, the impact of Linder's effect on China's import intensity indices remained more or less the same. In the case of export, though, the situation in both periods was quite different. In the first three decades, the objective of China's export behavior was to finance its imports. Consequently, politics exerted more influence on export than on import, pushing Linder's effect to the background. Only after China thoroughly integrated into the world economy, and market forces became responsible for China's export behavior, did Linder's effect start to work. In sum, although Linder's effect became significant in the 1990s,

this period was too short to find any empirical evidence in favor of Linder's effect with respect to export over the whole sample period.

Impact of cultural, economic and geographical factors on bilateral intra-industry trade structures

In Chapter 5, we investigated the nature of intra-industry trade between China and 50 trade partners during the 1992-2001 period, when China has accelerated the implementation of policies to liberalize international trade and investment. In order to explore the determinants of total intra-industry trade (TIIT), we disentangled this measure into vertical intra-industry trade (VIIT) *vis-à-vis* horizontal intra-industry trade (HIIT). This distinction led to a significant improvement of the estimation results. The following conclusions could be drawn from this analysis. First, TIIT has increased significantly during this period, which implies that China's trade structure has been upgraded. By breaking down TIIT into VIIT and HIIT, we found that VIIT has been the dominant type in China's intra-industry trade, increasing faster than HIIT did. Second, while the variables geographical distance, economic size, trade development stage and FDI are common determinants that affect both VIIT and HIIT in the same direction, the variable reflecting similarity does not. The results of our two sets of estimations showed that China's HIIT is more likely to emerge with countries that are similar than those that are different. Conversely, China's VIIT happens more with different rather than with similar countries. The considerable increase of VIIT in Chinese bilateral trade suggests that China's areas of specialization based on comparative advantages have expanded from inter-industry to intra-industry trade domains. This conclusion is in line with the progression of China in its latest trade development stage.

Third, this study corroborates that most of intra-industry trade determinants discussed in the literature have done their job in the case of China in 1992-2001.

These determinants are cultural, economic and geographical factors. This overall finding again confirms that the market mechanism has started to work properly in the area of Chinese foreign trade in the post-1992 period. In addition to this, China's recent trade history revealed two specific features that can be attributed to the particulars of the process of transition and liberalization. One is that trade and FDI policies have influenced the nature and cause of Chinese bilateral intra-industry trade. Specifically, the policies on processing trade and export-oriented FDI have significantly encouraged related FDI and VIIT. The other is that, due to historical and institutional reasons, Hong Kong has played an important role in China's trade development.

The interaction between trade and FDI

In Chapter 6, we investigated the causality and direction of linkages between FDI, exports and imports of China's economy during the 1980 – 2003 period by applying cointegration and Granger-causality methods. In the long run, FDI appeared to be positively related to exports and imports, while exports appeared to be positively related to imports. These results imply that multinational enterprises' investments in China do not substitute for China's exports and imports. In the short run, the Granger-causality method revealed bi-directional causal links between FDI and exports, and one-way causal links from imports to FDI and from imports to exports. These results confirm the significant impact of the liberalization policy on China's exports and FDI inflows. The lack of significance of causation from FDI to import also explains our findings in Chapters 4 that the impact of FDI on imports is less significant than the one on exports.

The results of this causality analysis point to a virtuous process of the development of China's outward-oriented economy: more imports lead to more FDI, more FDI leads to more exports, and more exports lead to more FDI. This virtuous process

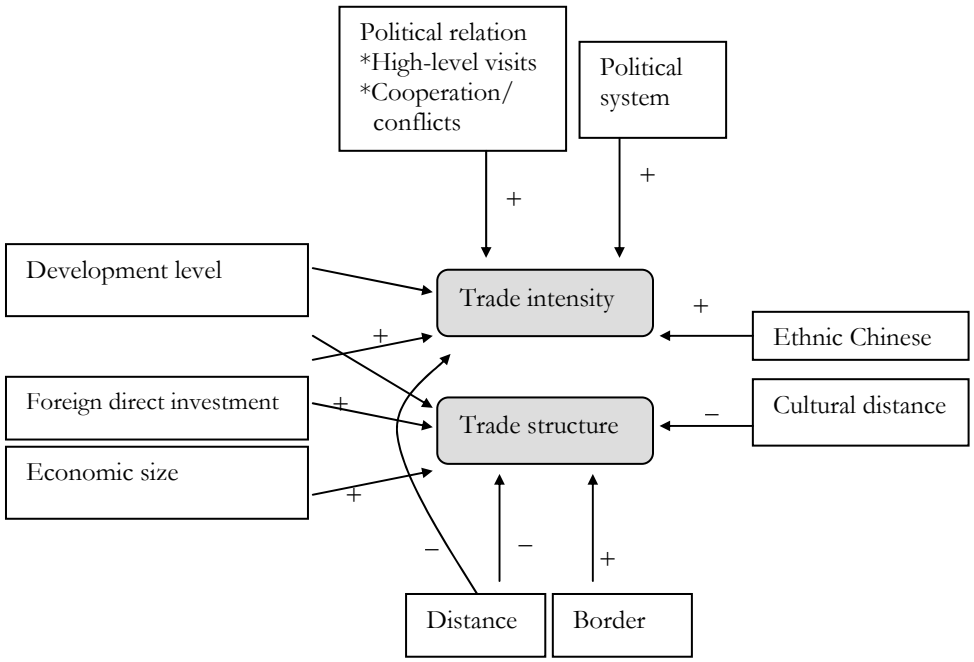
reflects China's open-door policy. The trade liberalization program that started in 1978 initially facilitated China's imports, and hence, directly and indirectly, FDI and exports. Currently, China is further opening up its markets to the outside world in order to fulfill its promise to the WTO. The implication of this policy is that the described virtuous circle is likely to continue, or even to accelerate, which will eventually underpin a high economic growth rate in China for many years to come. In the process, the role of MNEs through FDI is crucial.

7.2 General Conclusion

This thesis revealed the great changes of China's trade relations during the last half century. During the pre-reform period, institutional and political factors were the most important determinants of China's bilateral trade linkages. After China started to open the door to the world market in 1978, the market mechanism began to exert its function in China's trade linkages. Consequently, especially economic factors became more important. Particularly, MNCs play very important roles in China's foreign trade relations. Figure 7.1 gives an overview of all the results (cf. Figure 1.1).

The contribution of this thesis to the international trade literature in general and the study of China in particular is, at least, twofold. For one, it is the first study that systematically investigated the impact of four groups of factors: cultural, economic, geographical and political factors. This is, as far as we know, more comprehensive than any former study. Moreover, it has been shown that trade theories commonly applied to trade data of developed economies also apply to a large transition economy such as China.

Figure 7.1: Summary of the empirical studies



7.3 Limitations and Suggestions for Further Research

Although this thesis has deepened our understanding of China's bilateral trade relations in a period characterized by globalization and transition, it is also due to a number of limitations that point the way to future studies.

First, this thesis has studied bilateral trade linkages and trade structures at the aggregate country level. Future research might focus on lower levels of aggregation. Especially a breakdown of trade flows by industry offers additional research opportunities. The reason is that the response to both positive and negative factors

of international trade may vary substantially across industries. Furthermore, the elasticities of supply and of demand might differ widely across industries. A study at the level of single industries may offer not only additional information about China's trade relations, but also may throw more light on the kind of policies needed for industry development.

Second, given the important role of FDI found at the macro level, future studies should also pay attention to FDI at the industry level or even at the firm level. The combination of micro-level studies in international business and macro-level studies in international economics may contribute to the development of an international business and economics literature (Brakman et al., 2005). The motivation and entry mode choice of MNEs not only affect their intra-firm trade, but also the general trade pattern of a state. Since the motivation and entry mode choice of MNEs tend to vary considerably across industries, industry-level or firm-level analysis within a macro-economic framework may help to better understand international trade relations.

Third, given the important impact of political factors on China's bilateral trade relations and the limitations of our political data variables used in this thesis, further research in this area is welcome. Another potential research issue, next to replicating our study on the relationship between trade and politics in different settings, is to extend the analysis with the reversal relationship between politics and trade. Furthermore, it is interesting to explore why political arrangements are so influential in China.

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Samenvatting (Summary in Dutch)

Tot 1978 was China ondanks zijn grootte een geïsoleerd land. Daar kwam verandering in toen partijleider Mao Zedong werd opgevolgd door Deng Xiaoping en China haar economie begon te liberaliseren, de deur openzette naar het buitenland en handelsrelaties zich konden ontwikkelen. Centraal in dit proefschrift staat de vraag of China's handelsrelaties kunnen worden verklaard met behulp van handelstheorieën die in beginsel zijn ontwikkeld voor westerse economieën. Het doel van deze studie is meer zicht te krijgen op de invloed van economische, politieke, geografische en culturele factoren op bilaterale handelsrelaties, alsook in veranderingen hierin. Deze vragen zijn actueel gezien China's immense omvang en zijn huidige impact op de wereldeconomie.

Hoe hebben handelsrelaties zich ontwikkeld? Hoe kunnen handelsrelaties worden gemeten in ruimte en tijd? In hoeverre is het politieke systeem en het uitgezette beleid in China's vijfjarenplannen van invloed geweest op haar handelsrelaties? Welke factoren kunnen de ontwikkeling van China's handelsrelaties verklaren? Is er net als bij andere onderontwikkelde economieën sprake van het effect van Linder? In hoeverre hebben buitenlandse investeringen invloed gehad? Is er wellicht sprake van een wederzijdse relatie tussen handel en buitenlandse investeringen? Door een antwoord te geven op deze vragen kunnen de veranderingen die in de tweede helft van de vorige eeuw in China's handelsrelaties zijn opgetreden in perspectief worden geplaatst. Hieronder volgt een beknopte samenvatting van alle gevonden resultaten.

Het proefschrift geeft eerst een overzicht van de ontwikkeling van de buitenlandse handel en buitenlandse investeringen sinds de oprichting van een socialistische staat in 1949. China's economische ontwikkeling wordt gekenmerkt door twee perioden. In de eerste periode die loopt van 1949 tot 1978 was de economie van China gesloten. De buitenlandse handel werd gestuurd door een staatsmonopolie en het marktmechanisme had nauwelijks enige invloed. Ten opzichte van de internationale

markt was de omvang van de buitenlandse handel beperkt en betrof deze handel voornamelijk handel naar naaste buren.

De tweede periode die loopt van 1978 is China's hervormingsperiode. Ondanks dat het eenpartijstelsel bleef bestaan, voltrok zich vanaf 1978 een geleidelijk integratieproces waarin buitenlandse handel en buitenlandse investeringen een steeds grotere plaats innamen. In plaats van import werd de nadruk gelegd op export en het marktmechanisme deed zijn intrede. In de tachtiger en negentiger jaren kan China zelfs worden gekenmerkt als een van de meest dynamische economieën in de wereld met indrukwekkende groeicijfers. Door de groei van de buitenlandse handel is China ook tot een van de meest belangrijke handelsnaties verworden. Het aantal handelspartners is sterk gestegen, waaronder ook landen op grotere geografische afstand. De samenstelling van de handelsstromen is bovendien sterk gediversifieerd. Tenslotte zijn ook de buitenlandse investeringen in China sterk gestegen.

De empirische analyse uitgevoerd in hoofdstuk 3 toont aan dat politieke factoren een belangrijke rol hebben gespeeld in de ontwikkeling van de buitenlandse handel. Door de ontwikkeling van China's bilaterale handelsrelaties met 78 landen te analyseren over een periode van vijftig jaar, op basis van handelsintensiteiten in plaats van handelsstromen, en door gebruik te maken van betere econometrische schattingsmethoden dan voorheen, heeft deze studie sterk empirisch bewijsmateriaal aangedragen voor de volgende hypothesen. De handelsintensiteit tussen China en haar handelspartner zijn sterker gebleken indien bilaterale diplomatieke relaties werden aangegaan, indien werd samengewerkt, indien staatshoofden een bezoek aflegden en indien China's politieke systeem overeenkwam met dat van haar handelspartner. Zwakker empirisch bewijsmateriaal is aangedragen voor het bestaan van het effect van Linder. De hypothese tenslotte

dat de handelsintensiteit tussen China en een handelspartner minder sterk was als dit land lid was van een handelsblok is verworpen.

Bovenstaande bevindingen lijken erop te wijzen dat politieke factoren belangrijker zijn gebleken dan economische factoren. Dat is echter voorbarig, omdat het een analyse betreft over een periode van vijftig jaar. Het is mogelijk dat in China's hervormingsperiode economische factoren steeds belangrijker zijn geworden en dat dit in een analyse over vijftig jaar niet of onvoldoende tot uitdrukking komt. Daarom is dezelfde analyse in hoofdstuk 4 en 5 opnieuw uitgevoerd maar dan alleen over de jaren negentig.

Deze empirische analyse uitgevoerd in hoofdstuk 4 toont aan dat de invloed van economische, culturele en geografische factoren op China's bilaterale handelsrelaties na twee decennia van hervormingen aan significantie heeft gewonnen. Met name de hervormingen in laatste zeven jaar tot aan 1992 zijn van doorslaggevend belang gebleken. Dit bevestigt het algemene beeld dat de integratie van China in de wereldeconomie zich in snel tempo heeft voltrokken en dat de invloed van het marktmechanisme op China's buitenlandse handel vruchten heeft afgeworpen. Politieke factoren die in 1993 nog belangrijk bleken, zijn in 1999 definitief door economische factoren op de achtergrond geplaatst. Wel is duidelijk geworden dat, door de resultaten met betrekking tot export en import met elkaar te vergelijken, economische factoren van meer invloed zijn geweest op de intensiteit van de export dan van de import. Ofschoon China haar handelsbeleid heeft geliberaliseerd en stappen heeft ondernomen om protectionisme te beteugelen, is de reden hiervan dat importeurs nog steeds worden geconfronteerd met handelsbarrières zowel in de vorm van tarieven als in allerlei ingewikkelde douaneformaliteiten.

De empirische analyse in dit hoofdstuk bevestigt eveneens dat de handelsintensiteit afneemt met de geografische afstand, hetgeen in overeenstemming is met de traditionele handelstheorie. Niet onbelangrijk zijn ook de buitenlandse Chinese

gemeenschappen gebleken; chinezen die zich soms al ver in het verleden buiten China hebben gevestigd. Deze Chinese gemeenschappen blijken als een soort springplank te hebben gefungeerd bij het aanknopen of versterken van buitenlandse handelsrelaties.

De empirische analyse uitgevoerd in hoofdstuk 5 toont de invloed aan van economische, culturele en geografische factoren op China's bilaterale handelsrelaties binnen sectoren. Hiertoe is de totale intrasectorale handelsindex (TIIT) bepaald en opgedeeld in de verticale intrasectorale handelsindex (VIIT) en de horizontale intrasectorale handelsindex (HIIT). De bevindingen van deze analyse kunnen in drie punten worden samengevat.

Ten eerste is gebleken dat de totale intrasectorale handelsindex over de periode 1992-2001 aanzienlijk is gestegen, hetgeen impliceert dat de kwaliteit van de verhandelde producten is gestegen. Uit de opsplitsing is gebleken dat dit met name kan worden toegeschreven aan een toename van de verticale intrasectorale handel. Ten tweede is gebleken dat de meerderheid van de onderzochte variabelen de twee indices VIIT en HIIT in dezelfde richting beïnvloeden, zoals geografische afstand, economische omvang, het ontwikkelingsstadium van de handelsrelatie en buitenlandse investeringen. Alleen de variabele die de mate van similariteit meet vormt hierop een uitzondering. Waar similariteit tussen China en haar handelspartner bijdraagt aan de verklaring van de horizontale intrasectorale handelsindex, is het juist het ontbreken van similariteit dat bijdraagt aan de verklaring van de verticale intrasectorale handelsindex. Uit het feit dat de verticale intrasectorale handelsindex de totale index domineert, kan dan ook worden afgeleid dat comparatieve voordelen niet alleen China's intersectorale handel maar ook haar intrasectorale handel verklaren. Anders gezegd, de producten waarin China zich heeft gespecialiseerd afgeleid van haar comparatieve voordelen hebben zich

uitgebreid van intersectorale naar intrasectorale handelsdomeinen. Deze conclusie onderstreept dat China in staat is gebleken een nieuw stadium te betreden in de ontwikkeling van haar handelsrelaties. Ten derde bevestigt de empirische analyse dat de determinanten van bilaterale handel, zijnde economische, culturele en geografische factoren, ook intrasectoraal van toepassing zijn. Dit geeft wederom aan dat het marktmechanisme sinds 1992 zijn vruchten heeft afgeworpen op China's buitenlandse handel.

De analyse uitgevoerd in hoofdstuk 6 onderzoekt de relatie tussen handel en buitenlandse investeringen en vindt empirisch bewijs voor het bestaan van causale relaties tussen export, import en buitenlandse investeringen. Deze laatste blijken op lange termijn positief beïnvloed te worden door export en import, terwijl export op zijn beurt positief beïnvloed wordt door import. Deze bevinding wijzen erop dat investeringen van multinationale ondernemingen in China niet in de plaats zijn gekomen van export en import.

Tevens is er empirisch bewijs gevonden dat wijst op een wederzijdse relatie tussen export en buitenlandse investeringen op korte termijn, alsook een eenzijdige relatie van import naar buitenlandse investeringen en een eenzijdige relatie van import naar export. Het geeft aan dat China's liberalisatiepolitiek een significante bijdrage heeft geleverd aan haar export en aan de instroom van buitenlandse investeringen.

Al deze resultaten tezamen duiden op een zichzelf vesterkend ontwikkelingsproces van China's opendeur politiek: meer import leidt tot meer buitenlandse investeringen, meer buitenlandse investeringen veroorzaken meer export, hetgeen op zijn beurt weer meer buitenlandse investeringen oproept. China's liberalisatiepolitiek, dat in 1978 gestalte kreeg, leidde aanvankelijk alleen tot meer import. Niet lang daarna namen export en buitenlandse investeringen als gevolg hiervan toe, zowel direct als indirect, hetgeen uiteindelijk heeft geleid tot een positieve ontwikkelingsspiraal. Ook vandaag de dag staat het openen van haar markten nog hoog op China's politieke agenda, mede met het oog op haar belofte

aan de wereldhandelsorganisatie (WTO). Deze positieve ontwikkelingsspiraal zal daarom naar verwachting nog voortduren en zichzelf wellicht nog verder versterken, zodat ook in de komende jaren nog hoge groeicijfers verwacht mogen worden. Multinationale ondernemingen die zich in China zullen vestigen zullen hierbij een doorslaggevende rol spelen.

Dit proefschrift heeft de veranderingen die zich in de laatste halve eeuw in China's handelsrelaties hebben voorgedaan aan een diepgaande empirische analyse onderworpen. Alles overziende, blijken politieke factoren hierbij de belangrijkste rol te hebben gespeeld. Nadat China in 1978 haar deuren opende naar de internationale wereld, heeft het marktmechanisme echter vat kunnen krijgen op deze handelsrelaties. Aanvankelijk weinig, maar later steeds meer. Dit heeft ertoe geleid dat de invloed van de politieke factoren in de jaren negentig naar de achtergrond zijn gedrukt en zijn overgenomen door factoren die traditioneel thuishoren in handelsmodellen, namelijk economische, culturele en geografische factoren.