Chapter 9
NAFTA, Industrial Concentration, Employment Volatility, Wages, and Internal and International Mexican Migration: 1990–2009

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Introduction

Since the late 1980s, Mexico has launched an extensive process of economic liberalization that culminated with the North American Free Trade Agreement (NAFTA) in 1994. Since then, Mexico's economy has been issuing in a constant flow of international trade. During this process, the internal structure of the economy has altered patterns in terms of the composition, size, and geographic location of economic activities. Consequently, employment and wages are among the economic factors that have been affected. These in turn have direct but different influences on regional socioeconomic development. These coinciding events of liberalization, changing wages for Mexican workers, and internal and external migration have had critical consequences for Mexico's economy and development. We are interested in the changes in wages and internal and external Mexican migration for the past two decades.

On the one hand, the evidence indicates that, in the years after NAFTA was enacted, the number of Mexican-born people living in the U.S. has increased considerably and that most of them have crossed the border illegally. In 2000 the estimated Mexican-born population residing in the United States was about 10% of

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the Mexican population living in Mexico. Approximately one-quarter of the total arrived before 1980; another one-quarter entered during the decade of the 1980s; while the remainder, nearly 50% of the Mexican-born residents in U.S., arrived during the last two decade largely while NAFTA has been in effect.

On the other hand, before 1990 migration streams originated from rural Mexican locations and moved directly to rural areas in the U.S. More recent research demonstrates that two alternative patterns of migration, which may occur in tandem, have occurred. First, there is internal migration from rural to urban places in Mexico and then, secondly and serially, there is migration from urban areas in Mexico to urban areas in the U.S. Thus the new migration streams to the U.S., which have been employed in urban service and manufacturing jobs, are more highly educated, skilled, and paid, than the previous migration streams, which moved directly from rural Mexico to rural U.S. areas.

This article discusses some of the domestic economic push factors propitiating migration flows either internally or internationally. The aim of this analysis is to tie changes in the law (NAFTA) to internal shifts in Mexico's economy. Specifically, we provide evidence related to regional changes in average wages, industrial concentration, and employment volatility that underlie the incentives for recent migration internally and from Mexico to the U.S.

We focus on a regional economic analysis for two reasons. First, certain Mexican states have historically been sharing a larger proportion of migrants to the U.S. Approximately 50% of all migrants to the U.S. come from the states located in central-western Mexico. Second, the process of economic liberalization of the economy has impacted regions in Mexico asymmetrically. We provide evidence that industrial concentrations and wage differentials among regions have deepened. We discuss implications of Mexico's internal and international migration flows that may be associated with these changing domestic economic conditions.

Review of Literature

We have organized our review of literature into two sections: (1) the impact of NAFTA on institutional arrangements in Mexico and the implication for migration, and (2) past and recent patterns of migrations as defined in the extant literature.

The Impact of NAFTA

The Mexican government started the economic liberalization process after 1983 by eliminating import license requirements, with the objective to make domestic producers more competitive by giving them access to cheaper raw materials and more advanced technology. By 1986, Mexico acceded to the General Agreement on Tariffs and Trade (GATT), currently renamed the World Trade Organization (WTO). Over the following decade from the mid-1980s to 1994, the adherence to GATT led

to a major liberalization in bilateral trade relations with the U. S., which was expanded under the North America Free Trade Agreement (NAFTA). NAFTA took effect on January 1, 1994, with the purpose of lowering trade and investment barriers in North America. It was signed with the aim of increasing growth and income levels among the three countries in North America – Mexico, Canada, and the U.S. Under NAFTA, trade and investment liberalization was predicted to lead to higher incomes, investment, growth, and employment in Mexico (Markusen and Zahniser 1997, p. 5). In particular, NAFTA was expected to improve wages in Mexico, and as a consequence, reduce the flow of migration from Mexico to the U.S.

The reality seems to suggest an increasing flow of immigrants to the U.S. after NAFTA. In the 1990s, the number of Mexicans residing in the U.S. more than doubled, growing from 4.3 million in 1990 to 9.2 million in 2000 (U.S. Census Bureau). Thus, both the intended consequences of economic liberalization enacted through NAFTA and the unintended consequences of U.S. economic behavior have impacted international migration from Mexico to the U.S. Specifically, the rate at which Mexico sent migrants to the U.S. was expected to be, as it was, much greater during the growth period of 1990s than during the economic recession period of the subsequent decade. As identified by Escobar (2008), there have been both internal and external factors that have played a major role in the increased number of migrants during the decade of the 1990s. These include: (1) the U.S. legalization of two million Mexicans in 1988, which provided the basis for further migration; (2) the economic conditions in the U.S., with unprecedented levels of U.S. employment growth (almost 2.8 million non-farm jobs from January 1995 to 2000); and (3) the Mexican economic crisis in 1995, followed by rapid levels of economic growth from 1996 to 2000. The combination of all these events generated significant pressures to emigrate (Escobar 2008, p. 9). Nonetheless, as pointed out by Alba (2008), the evidence indicates that almost 15 years after NAFTA, there is still no indication of any downward change in migration trends, other than the one probably associated with the slow-down of the U.S. economy in 2008.

Regardless of the reasons that first initiated the out-migration from Mexico to the U.S. and the factors that have contributed to this emigration, emigrants originated from particular rural areas in Mexico. Several researchers (Chiquiar and Hanson 2005; Durand et al. 2001; Unger 2005) have identified the Mexican states that have historically, disproportionately provided the highest rates of out migration to the U.S. These states are mainly located in central-western Mexico, including Jalisco, Michoacan, Zacatecas, Guanajuato, Aguascalientes, and Colima. Figure 9.1 shows the geography of Mexican states according to migration patterns to the U.S.

Transformation from Past to Current Internal Migration Streams

Significant portions of the Mexican population employed in agriculture have departed from rural areas to become employed in service industries and manufacturing in Mexican urban areas. The passage and implementation of the Immigration
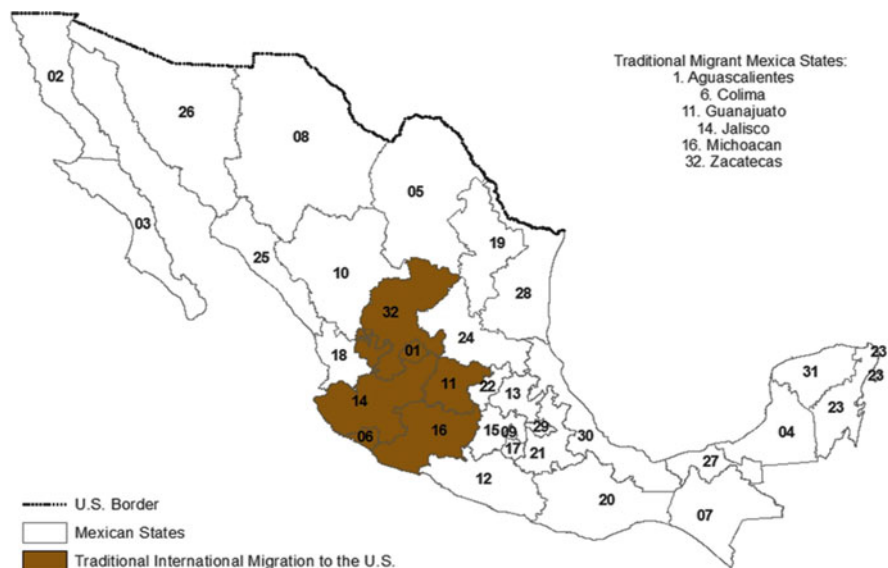
Fig. 9.1 Past established sending area of international migration to the U.S.

Reform and Control Act of 1986, which provided amnesty to 2.3 million undocumented Mexicans, allowing them to continue to occupy service and manufacturing jobs, and at the same time permitting large numbers of subsequently documented migrants to enter and occupy similar jobs under the family reunification provision of the act (Baker 1997; Durand et al. 2000; Hernandez-Leon and Zuniga 2005), had a major impact on emigration to the U.S. During this same period the successive economic crises in Mexico produced changes in the social and geographic selectivity of U.S. bound migrants (Cornelius 1992). These crises triggered the migration of middle-class Mexicans. More single and married women bound for service industry positions in the U.S. joined the migration stream. Finally new migration streams have emerged, originating in central-western Mexico, and giving rise to new migration systems linking internal and international flows (Durand and Massey 2003; Fox and Rivera-Salgado 2004: Hernandez-Leon 2005).

Prior to 1990, researchers of Mexican migration focused on migration streams from rural areas of central and western Mexico to the U.S. An understanding of this research is a solid point of departure for understanding migration after 1990. There is considerable scholarly consensus that since 1990, Mexican migration to the U.S. has been transformed (Durand et al. 1999; Roberts et al. 1999). Perhaps the most direct argument was made by Martin (1997, p. 79) who argues, "Mexico today is on the verge of its *Greatest Migration.*" Transformative change is not gradual evolutionary change; in contrast, transformation is a result of rapid, deep crisis. It is initiated from within, causing deep separations among population sectors.

The most fundamental changes in the migration stream are those of origin and destination. Before 1995, a very few scholars analyzed the role of cities in connection

with the population flows to the U.S. (Massey et al. 1987; Verduzco 1990; Cornelius 1992). In the past 15 years, several critical studies on the outcomes of urban-origin migration (Arias and Woo 2004; Lozano 2000; Fussel and Massey 2004; Hernandez-Leon 2005; Zuniga 1993) have appeared, yet little of these studies deal with migration streams. For example, Massey et al. (1994) argue that migration dynamics from big cities are sufficiently different from those from smaller towns and cities to guarantee separate study (Massey et al. 1994, pp. 1503, 1506). Further, Cornelius (1991, p. 162) argues that the severe financial crises in the Mexican economy in the 1980s resulted in a sharp increase in unemployment and saturation of the internal urban labor market and a loss of real wages. It is this type of radical crisis that initiates transformation. This was not just any type of crisis but a political and economic crisis, which resulted in transformative change – a capital crisis (Zey and Camp 1996). In response to this internal economic crisis, "Mexico's current migration streams rather than simply absorbing internal migrations from the countryside and provincial cities, . . . Mexico's large urban centers today serve increasingly as platforms for migration to the United States" (Cornelius 1991, p. 162). This transformative change has led to out-migration to the U.S. of Mexico's most critical human resources, its educated, skilled, higher waged employees. Thus, internal economic conditions in Mexico, which have resulted from changes in the legal structures of trade, have resulted in an economic crisis that initiated first internal migration to urban areas and then external migration to urban areas in the U.S.

Durand et al.'s (2001) response to Cornelius (1991) was that the current migration stream was not due to urbanization, but rather to an increasing bifurcation, with towns of fewer than 15,000 people contributing 57% of the migration and cities of more than 100,000 contributing just 30% of the stream. They reasoned that the international out-migration from cities was due not to the social impact of the economic crisis as much as to the secular urbanization of Mexico. They retained the causal mechanism of the network as they repeated Massey's *Return to Aztlan* argument (Massey et al. 1987) ". . . Mexico has urbanized, families have brought their migratory experiences and network contacts from the country side to the city, so that the flow now embraces urban as well as rural workers" (Durand et al. 2001, p. 124). This explanation begs the question of that has caused the increase in these migration streams in the mid-1990s.

In response, Lozano (2000) has continued to present evidence of a macro causal mechanism related to foreign investment for urban-to-urban Mexican internal migration and urban-origin Mexican migration to the U.S. Using data from a national demographic survey on return migration collected in the late 1990s, Lozano demonstrates that even though migration from places with fewer than 2,500 people increased in the late 1970s, U.S. bound population streams from cities with more than 100,000 people reached a peak in the late 1980s, when they became more than 40% of the total outflow, but then declined in the late 1990s to 28%. By differentiating between traditional and non-traditional regions of migration in Mexico in his analysis, Lozano shows that in the nontraditional states, migration from cities remained higher (with 40% leaving) than the outflow from traditional rural localities (with 32% leaving). Lozano ties these fluctuations in the composition of the stream to the patterns of foreign investment in Mexico during the 1990s, which did not exist in the previous

period. He argues that the intersection between macroeconomic transformation and its uneven impact on various regions of Mexico has caused a higher level of sending in some regions of Mexico (the less traditional, urban regions) than others.

Recent studies such as Roberts and Hamilton (2005) determined that 29% of U.S. migrants during the period between 1995 and 2000 came from cities of more than 100,000 people. Then they analyzed the fourth quarter wave of the 2002 Encuesta National de Empleo (National Employment Survey), which collected data on U.S. migration between 1997 and 2002, finding that large- and medium-sized Mexican cities account for 40% of all U.S.-bound migration. Unger (2005) characterizes the nature and effects of migration in relation to intensity form urban and rural municipalities. He found that 96% of Mexican municipalities had migratory activities, from these, 58.6% represent urban municipalities (more than 150,000 people) engaged in migration. Additionally, approximately 67.2% of urban municipalities presented high migration to the U.S. He also found that the number of urban municipalities engaged in migration is larger than the number of rural communities, demonstrating the urban-origin is becoming more important in high migration groups (nearly 70%). He concludes that migration originating from the traditional states of migration from before 1990, those in the Central-Western regions, remains very high. Most significant for our research was the finding that, when size, wealth, wages, and productivity of municipality are analyzed, urban municipalities show a negative relation between wages and migration intensity, indicating that initial migration occurs from small communities where economic conditions are worse.

In general, these recent studies provide evidence that Mexico's urban residents are in significant numbers resorting first to internal and thereafter to international migration. Large- and medium-sized Mexican cities are an important and sizable source of population streams resulting from Mexico's recent economic crisis. This massive movement of populations from Mexico has garnered little attention by demographic analysts. In the contemporary globalized economy, analysts of migration from Mexico to the United States have placed relatively little emphasis on the effects of international policy changes, such as trade agreements, and even less emphasis on major changes in the economic structure of the sending country. Both planned changes in laws and unplanned dramatic economic changes have impacted the flow of migration from Mexico to the U.S.

The connection between structural economic transformations and out-migration from rural areas, both internal and internationally, attracted scholarly interests focused on imminent mass rural exodus due to the effects of agrarian reform, including the privatization of communal farms legitimized by the Mexican Constitution, the elimination of subsidies and guaranteed prices for foods, and the liberalization of agricultural imports. The causal mechanism logic is that these reforms created redundant farm labor and as many as 27–30 million farmers had to find nonfarm employment either by migrating to local urban cities or migrating to the U.S. (Cornelius and Martin 1993; Martin 1993, 1997) As a result of this agrarian revolution, as much as one-third of the agrarian workforce would be displaced in Mexico, followed by the expectation that as many as 3–4 million rural farming households would be displaced (Martin 1997).

To summarize this section, we argue that the associated pattern of rural and urban migration within and from Mexico to the U.S. has changed. Internally, the major shifts in industrial concentration are expected to drive major changes in the internal Mexican labor market from rural farming to urban service and manufacturing jobs.

In addition, migration costs are important to the decision to migrate. Specifically, the cost of migrating to the U.S. has increased after migration laws in the U.S. were strengthened through increased law enforcement. Increased enforcement has reduced the stream of illegal migration while increasing the cost of undocumented migration. This may led to some changes in the profile of Mexican migrants. In this sense, we might not expect these migrant to be originating from the most deprived areas of the county in which there are no resources. Rather, those who are in the middle of the lower class, who have some resources, and who live in populated regions are expected to be more likely to migrate both internally and internationally.

Hence, the Mexican migration process is no longer from rural farm production to U.S. rural farm production. Migration may now involve a multi-staged process of movement from rural to urban places in Mexico, and for some population from urban-Mexican places to urban-U.S. places. In this analysis we are interested in the sending factors of place of origin in Mexico, essentially on the structure of wages in these places of departure.

Methods and Analysis

First we examine the question of the extent to which NAFTA and its resulting sea changes in the arrangement of institutional structures outlined above have resulted in major regional industrial concentration in Mexico. Then we examine the extent to which this industrial concentration has caused greater levels of regional employment volatility in Mexico. Finally we examine trends on regional wage differentials.

We focus on changes in labor market conditions as it has been identified in the migration literature as one of the main factors creating incentives for people to migrate. Specifically, neoclassical economic theory considers that migration results from changes in employment opportunities and wage differentials. Migration is induced by real income differences across locations. Individuals decide to migrate through cost-benefit calculations, which lead them to expect a positive return, usually monetary, from migration (Borjas 1994).

One of the key insights of the new economics of migration is that decisions to migrate are not taken solely as an individual choice, but as a household decision. Households act collectively in order not only to maximize expected income but also to minimize risks associated with the move itself as well as with family capital accumulation in the long run. However, labor market indicators such as employment and wages are measured at the individual level. The relevant economic variables in explaining migration are not exclusively wage differentials, but are also employment security in highly diversified industrial areas to reduce risks while maximizing access to future capital through available jobs. Families and individuals
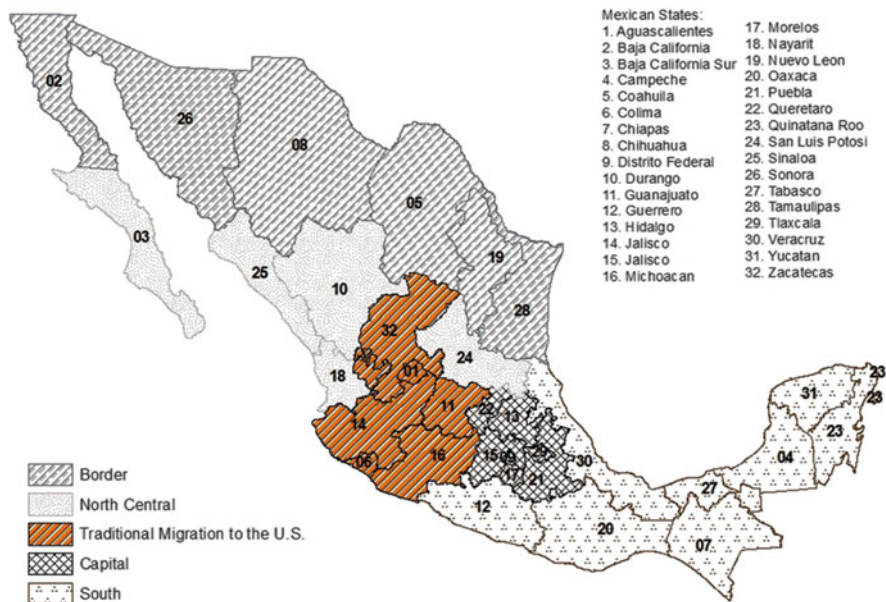
Fig. 9.2 Regional classification of Mexican states

migrate to gain access to better job markets as well as to overcome barriers attributable to access to insurance, capital, and consumer credit markets. Furthermore, this strand of theory argues that people may be motivated to migrate not only to increase their absolute income, but also to improve their household income relative to other households.

To examine the internal factors associated with migration flows, either internal or international, we have chosen a time period from 1988 to 2009, which provides an opportunity to study a 6-year period before the enactment of NAFTA in 1994 and a 15-year period after the enactment of NAFTA. This time frame enables us to measure the full effects of changes in industrial concentration, employment volatility, and wages across periods on both sides of NAFTA.

We divide the Mexican states in five regions, each one is assumed to follow particular dynamics with either internal or international migration. For example, the Border region has acted, primarily after NAFTA, as a pull region for internal migrants; the Traditional Migrant region, as above referred, is the region with long tradition of high international migration rates to the U.S.; the North Central region, characterized for being a predominantly region for high internal emigration rates; the Capital region, from which contemporary migration flows indicates high levels of internal outmigration flows; and finally the South region which has been historically associated with poor levels of socioeconomic development in the country and with high levels of internal emigration rates. This regional classification of Mexican states is showed in Fig. 9.2.

International trade theory states that two or more countries will trade with each other depending on their comparative advantage in the production of goods. It is precisely from this comparative advantage that specialization arises in each country. Specialization in the production process leads countries to benefit from trade. Trade gains are reflected in economic development in the form of industrial concentration, and at the individual level, through higher ranked occupations and with associated higher wages. Levels of endowments are relevant in determining production costs since they can create comparative advantages for each country. The cost of manufacturing labor provides Mexico with an advantage over the U.S.

Logically then, this same paradigm should apply to regional differences. According to each region's comparative advantage, a geographic concentration of production is formed. The geographic concentration of production within a nation often entails the specialization of regions in one or a few main industries (Diamond and Simon 1990). Firms also exploit this concentration of economic activity in order to minimize production costs. The incentive to locate near one another is to reduce the cost of transporting raw material and parts and distribution to the point of sales.

Firms tend to locate in particular areas in order to reduce costs by taking advantage of the agglomeration of the economic activity. Thus, the first goal is to determine whether since trade liberalization of NAFTA, Mexico has followed a pattern of specialization in the production of goods and whether this has occurred asymmetrically across the country.

To demonstrate this asymmetry or the lack of it, we calculate employment location quotient coefficients by economic sector and region for different periods. The economic activities were classified in nine productive one-digit classification sectors.[1] The purpose of this exercise is to compare a region's employment share relative to the nation's employment share and thus identify possible patterns of employment concentration in particular sectors for different time periods. Specifically, the location quotient for each sector in each region is calculated as follows:

$$LQ = \frac{\left(\dfrac{Employment\ in\ sector\ i\ in\ region\ j}{Total\ employment\ in\ region\ j}\right)}{\left(\dfrac{National\ employment\ in\ sector\ i}{Total\ national\ employment}\right)} \qquad (9.1)$$

A simple interpretation of this index is as follows: an LQ quotient larger than one indicates a relative concentration of the activity i in region j, compared to the nation as a whole. If LQ quotient is equal to one, the region has a share of employment in accordance with its national share; and if LQ quotient is less than one, the region has less of a share of the employment in a particular sector than the national share.

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[1]The industries were classified in nine productive one-digit classification sectors. The sectors included are: Agriculture; Mining; Manufacturing; Construction; Trade; Tourism; Transport, Financial Services; and Government.

The data used for the calculation were obtained from the ENEU[2] for the period 1988–2004, and the ENOE[3] for 2005–2009.

The literature focusing on regional occupational structures offers the hypothesis that the more industrially diverse an area, the more stable its economic growth because, even in a period of crisis, employment would be higher than in less industrially diverse areas (Malizia and Ke 1993, p. 222). Examining this assumption in Mexico requires an examination of regional industrial sector. The financial literature also addresses the relationship between industrial diversity and wage volatility, or risk. In regional economies, industries play the role of assets, and the region's industrial composition represents the portfolio. This approach assumes a trade-off between industrial diversity and wage volatility. In this paradigm, volatility is viewed as an undesirable characteristic mainly because it is associated with higher rates of unemployment. In times of economic downturns, it may involve displacement of workers who have trouble obtaining new jobs. Furthermore, high rates of volatility make it difficult for governments to plan long-term investments in public infrastructure such as roads, schools, and hospitals (Baldwin and Brown 2004, p. 520). For our purposes wage volatility increases the incentive to migrate.

In order to approximate increases in employment volatility for the periods previously defined, we apply a portfolio variance model. This approach is appropriate for our purposes as it measures regional employment variability based on industrial activity and structure. The portfolio variance model has two components: variance and covariance. On the one hand, the variance component measures the risk involved in the stochastic process of the individual industries (Trendle 1999). In other words, the portfolio variance measures to some extent the level of employment fluctuations in a given industrial sector during a particular period. Hence, the higher the employment variance in the industrial sectors, the higher the variability in provincial or regional employment. On the other hand, employment volatility is also determined by the changes in employment inter-sectors. That is, the covariance indicates whether employment changes in sectors move in the same or opposite directions (Chambers 1999). The covariance between sectors is then calculated as follows:

$$\sigma_{ij} = \left[\frac{1}{n-2}\right]\left[\frac{E_{it} - E_i}{E_j}\right]\left[\frac{E_{jt} - E_j}{E_j}\right] \tag{9.2}$$

where n is the number of observations. The variables E_{it} and E_{jt} are the observed quarterly rates of employment changes in sectors i and j, respectively, during quarter t. Then, the variables E_{it} and E_{jt} are the mean rates of change during the period considered.

Hence, the total employment portfolio variance is calculated as follows:

$$\sigma_T = \sum_j \omega_j \sigma j^2 + \sum_{i \neq j} \sum_{j \neq i} \omega_i \omega_j \sigma_{ij} \qquad (9.3)$$

where ω_i and ω_j are the average share of each sector's employment in national employment, σ_j^2 represent the total portfolio variance of sector j, and σ_{ij} is the employment covariance between sector i and sector j. Employment portfolio variance was estimated for quarterly employment data in their natural log differences standardized by the mean change in each quarter for nine sectors of economic activity. The data used in this exercise also come from the ENEU and ENOE for the periods specified above.

Findings

Industry Concentration Across Regions

For purposes of our analysis we divided industry concentration into three time periods, 1988–1994, 1995–2004, and 2005–2009. The first period is the baseline period before the enactment of NAFTA in 1994, while the remaining periods are after the enactment of NAFTA.

The industrial activities across some regions of Mexico have become less diverse over the past two decades. Prior to the enactment of NAFTA (1988–1994), the trade and tourism sectors were consolidated by Mexico's government, while after 1994, with the increased political concentration of trade, the government separated them so that trade would be reported separately. Our objective is to make comparisons of industrial concentration across time periods by region. Table 9.1 shows the regional employment location quotient index for three different periods, 1988–1994, 1995–2004, and 2005–2009.

After trade liberalization through NAFTA occurred in Mexico, industrial activity shifted to the United States-Mexico border region. In particular, the production of manufactured goods has increased considerably since the late 1980s, as can be seen from an examination of Column 3 of Table 9.1. Manufactured goods are produced in *maquiladoras*, factories exempted from taxes, where imported materials and equipment from the U.S. are assembled or manufactured in Mexico into products for final export back to the U.S. or other countries. This reallocation of firms and production of manufactured goods has led to an agglomeration of manufacturing activity in the North Border region.

As expected, the location quotient for the manufacturing sector reveals a higher concentration of employment in this sector along the North Border region for the periods after NAFTA: the concentration of the manufacturing sector increased, from $LQ = 1.07$ in the period before NAFTA, to $LQ = 1.37$ in the second period, and to $LQ = 1.45$ in period 3. An inverse pattern is shown for the Capital region: the

Table 9.1 Regional employment location quotient coefficient by sector of economic activity

Before NAFTA: 1988–1994

	Agriculture (1)	Minning (2)	Manufacturing (3)	Construction (4)	Trade-tourism (5)	Transport (6)	Financial (7)	Government (8)
Border	0.75	1.74	1.07	1.35	1.00	0.93	0.82	0.94
Capital	0.65	0.57	1.22	0.75	0.99	1.08	1.08	1.33
Traditional migrant	1.70	1.77	0.98	1.25	1.01	0.92	0.73	0.95
North Central	1.50	0.38	0.98	1.25	0.87	0.91	0.68	0.84
Southern	2.06	2.40	0.58	1.29	1.06	1.01	0.72	1.13

After NAFTA: 1995–2004

	Agriculture (1)	Minning (2)	Manufacturing (3)	Construction (4)	Trade (5)	Tourism	Transport (6)	Financial (7)	Government (8)
Border	0.69	1.48	1.37	1.09	0.99	1.01	1.02	1.09	1.06
Capital	0.22	0.86	1.04	0.95	1.13	0.99	1.54	1.65	1.28
Traditional migrant	1.36	1.04	0.90	1.04	1.02	1.09	0.79	0.75	0.98
North Central	1.16	1.05	0.94	1.11	0.96	0.97	0.83	0.79	1.00
Southern	1.61	2.27	0.61	0.96	0.86	1.24	0.88	0.72	0.98

2005–2009

	Agriculture (1)	Minning (2)	Manufacturing (3)	Construction (4)	Trade (5)	Tourism	Transport (6)	Financial (7)	Government (8)
Border	0.57	0.98	1.45	1.09	0.97	1.05	1.02	1.10	1.01
Capital	0.21	0.70	0.98	0.90	1.18	1.00	1.54	1.66	1.22
Traditional migrant	1.53	0.89	0.79	0.97	0.99	1.04	0.76	0.67	1.01
North Central	1.21	0.94	1.01	1.13	0.96	0.98	0.82	0.79	0.98
Southern	1.11	2.01	0.92	1.04	0.96	1.16	0.90	0.85	1.01

Source: Own calculation. 1987–2002: Encuesta Nacional de Empleo Urbano (ENEU). 2005–2009: Encuesta Nacional de Ocupaciony Empleo (ENOE)

Table 9.2 Employment portfolio variance by regions

	Before NAFTA	After NAFTA	% change
North	0.019	0.028	18.3
Capital	0.036	0.043	7.2
South	0.069	0.078	5.7
Center	0.019	0.018	−1.6

Source: Own calculations

concentration of the manufacturing sector decreased from an *LQ* of 1.22 in the period before NAFTA, then for the two subsequent periods, the index shows important reductions, ending in an *LQ* = 0.98 for the period 2005–2009. This pattern confirms past evidence related to the reallocation of the manufacturing sector from the Capital to the North Border region as a consequence of NAFTA (Chiquiar 2008). Nonetheless, the Capital region has experienced a pattern of industrial concentration in the financial service sector; the *LQ* quotient rose from 1.08 in the period before NAFTA to *LQ* = 1.66 for the last period.

The *LQ* related to the agriculture sector shows employment concentration in the Traditional Migrant North Central, and Southern regions. Although the relevance of this sector relative to the national share has decreased in all regions, the Traditional Migrant region shows the highest LQ value for the last period. The percentage of employment in the mining sector for the Southern region has remained at almost twice the national percentage during the three periods analyzed. It is also significant to note that mining, which is often grouped with manufacturing in developing countries, changed dramatically in the Border region, but in contrast to manufacturing, it declined from *LQ* = 1.74 in the period prior to NAFTA to *LQ* = 0.98 in period from 2005 to 2009, as manufacturing replaced mining as the major industry in Border states. In contrast, many industries remained relatively stable throughout the periods of the study. Nonetheless, as was expected, as manufacturing increased, agriculture declined substantially over the three periods from *LQ* = 0.75 before the enactment of NAFTA, to *LQ* = 0.69, and then to *LQ* = 0.57 in the period from 2005 to 2009.

Employment Volatility Across Regions

Table 9.2 presents the employment portfolio variance by regions for the periods before (1987–1994) and after (1994–2002) NAFTA.[4] The North region recorded the highest level of employment variability, with an increase of 18.3% for the second period. The Capital and South regions also experienced increases in employment variance by 7.2% and 5.7%, respectively. In the Center region, variance exhibits a slight decrease of −1.6% in the second period. These results illustrate an increase in

[4]In Table 9.2 the North Central and Traditional Migration regions were grouped into a single one, referred to as Central, given that these two neighboring regions are located in central Mexico and show low variability in employment composition.

the employment volatility in almost all regions across Mexico after NAFTA. While the North Border states have shown higher levels of industrial concentration, they have also exhibited the highest levels of employment volatility.

Wage Differentials Across Regions

There are additional implications of economic activity concentration in terms of affecting the labor market. On one hand, firms require workers to live in geographic areas nearby, in these areas land rents increase due to the industrial agglomeration. To attract workers into a particular industry, firms must compensate workers for such increased costs by paying them relatively higher wages (Diamond and Simon 1990 ver version anterior?). On the other hand, the *maquiladora* industry has evolved over the last three decades from using practically unskilled labor to more skilled labor as more sophisticated production techniques have evolved (Vargas 2001). This in turn has positively affected worker's wages for the skilled labor force. Empirical evidence for the Mexican economy supports the hypothesis that the real-location of economic activity to the north has positively impacted workers' wages. Mendoza (2001) investigates the effects of agglomeration (concentration) on the manufacturing sector of the northern border cities. One of his findings indicates that globalization has created a shift of manufacturing activities from Central Mexico (Mexico City) towards the northern Mexican border region. He found a positive and strong correlation between industrial agglomeration and wages for workers in the manufacturing sector. Similarly, Cardenas (2002) finds evidence of an asymmetric geographic location of the manufacturing industry, with a high concentration in the Northern Border States, concluding that northern states pay higher wages relative to the rest of the country. Furthermore, international empirical evidence indicates that areas with high industrial concentration levels generally exhibit higher wages and in general higher levels of per-capita income (Izraeli and Murphy 2003).

Now we turn the attention to analyze the evolution of regional average wage. As shown in Fig. 9.3, average wages are in general higher in Border states while the rest of regions are fluctuating at more less the same level. Before and after NAFTA, wages in states with traditionally high out-migration rates are below those of Border, with greater regional wage differentials between these two regions in the last period.

A cursory examination of Fig. 9.3 reveals that the Mexican economy's crisis significantly impacted wages in all regions, as they experienced deep declines. The South region showed the largest declines in wages while the opposite was found for the Border states. In contrast, Traditional Migrant states have showed declines in average wages after the enactment of NAFTA, with a slightly recovery from 1999 onwards. The lowest average wage was reached in 1996 by North Central states; however this group ended with the second-highest average wages in 2008. In general, the persistence of wage differentials across regions, particularly comparing
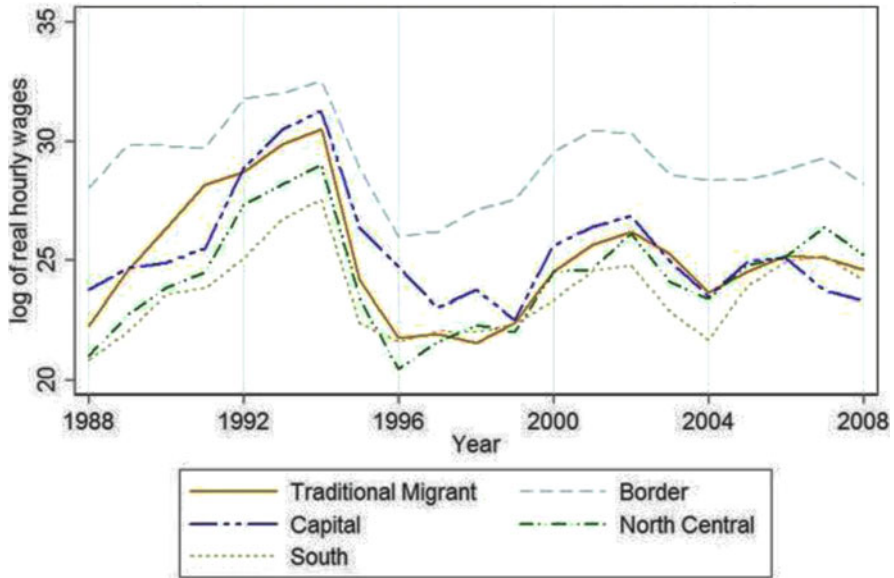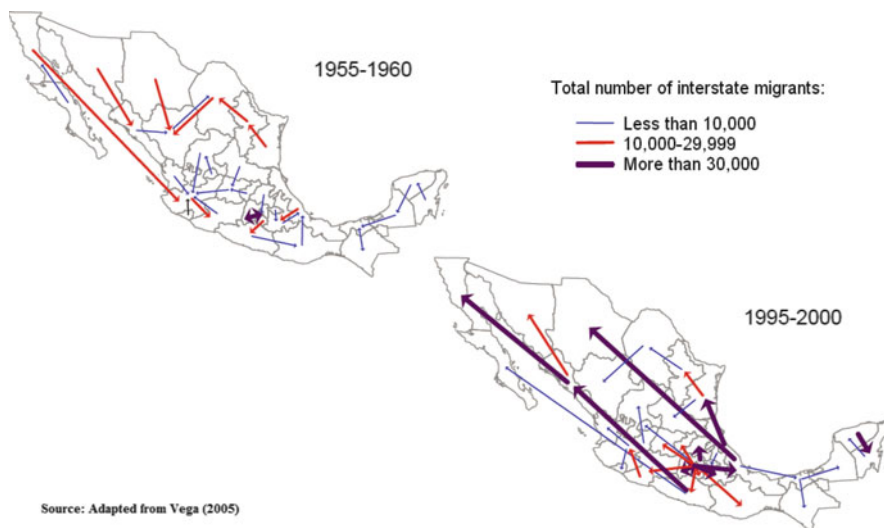
Fig. 9.3 Evolution of average wages by region

the Border with other regions, is notable. Moreover, the crisis at the end of 1994 had two main implications: all regions showed a severe drop in real average wages; nonetheless, some regions could recuperate faster than others. Therefore, not only the currency crisis but also the changes in the internal economy after implementation of NAFTA could be associated with the increasing out-migration from regions traditionally sending migrants to other areas of Mexico and the U. S. after 1994.

Conclusions and Discussion

Several major conclusions can be addressed from the above analysis: First, our analysis of the industrial sector concentration before and after NAFTA revealed that manufacturing became concentrated along the border between the U.S. and Mexico after NAFTA, while the financial services sector became concentrated in Central Mexico around Mexico City after NAFTA. In regards the region identified with long migratory tradition to the U.S., before and after it has kept relative concentration in the agriculture sector.

Second, the analysis also indicates that the employment concentration across geographic areas exhibited a major shift away from the central region of Mexico to the regions along the border between the U.S. and Mexico, a finding which corresponds to the sector concentration in the first conclusion above. However, the Border region experienced an 18.5% increase in employment volatility from the

1955-1960

Total number of interstate migrants:

—— Less than 10,000
—— 10,000-29,999
━━ More than 30,000

1995-2000

Source: Adapted from Vega (2005)

Fig. 9.4 Main interstate migration flows streams, 1995–2000 (Source: Adapted from Vega 2005)

period before to the period after NAFTA, while the central region (traditional U.S. migration region) experienced a reduction of 1.6% over the same period. Both the Capital Region, at a 7.2% increase, and the Southern region at a 5.7% increase, demonstrated significant increases in employment volatility after NAFTA.

Third, wages by region were also differentially higher in the Border region than in other regions after the enactment of NAFTA.

As explained before, higher levels of regional industrial concentration are expected to be associated with increasing economic liberalization. This in turn can be related to higher levels of wages and increasing levels of employment volatility. Nonetheless, the shifts in industry concentration patterns have not occurred evenly across regions in Mexico.

The reason of considering regions in the analysis has to do with the fact that the migratory phenomenon is not a random process unevenly distributed across the Mexican territory. There are some regions with a long migration tradition to the U.S. that theoretically should experience strong social capital formation and institutionalized migration networks. In this sense, wages in traditional migrant states to the U.S. are below other regions within the country. And a comparison of wage differentials between Mexico-U.S. would lead to a much higher wage gap.

There are also regions with particular dynamics in terms of internal migration. As shown in Fig. 9.4, contemporary internal migration flows have marked a well-established pattern towards northern states, contrasting with the patterns in late 1960s in which internal movements were in the direction to central Mexico. Hence, the Border region seems to be a good alternative for potential internal migrants. The extent to which this region retains them or serves as a platform for international migration is an open question that is left for further research.

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