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DEVELOPING THE U.S.-MEXICO BORDER REGION
FOR A PROSPEROUS AND SECURE RELATIONSHIP

EMPLOYMENT EVOLUTION AND PROSPECTS
ON THE NORTHERN MEXICO BORDER

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Employment Evolution and Prospects on the Northern Mexico Border

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Employment Evolution and Prospects on the Northern Mexico Border

Abstract

This paper is an analysis of the economic factors that have impacted employment and the labor market in northern Mexico border states and major cities in the region. Also included is a summary of recent labor policies at the national level and in the northern border region, and an analysis of the advantages and limitations of various employment policies. It is emphasized that compared to other regions of Mexico, open unemployment rates¹ in the northern border states have decreased, even with the pressure of additional workers in the labor force. The states of Baja California and Nuevo León have made great efforts to offer training and courses that will meet the technical, industrial, and administrative needs of area employers. Employment policies have been an instrument of economic and social policy through government-funded job promotion programs. However, these programs have been only partially successful in reducing unemployment because they do not deal with the problem effectively. To increase employment levels, there must be a greater effort to create educational systems that respond to the needs of the businesses that are generating jobs, and to offer training to those who want to establish small businesses.

Introduction

Since the implementation of the North American Free Trade Agreement (NAFTA) on January 1, 1994, commerce and investment have been important factors in Mexico's economic growth, particularly in the northern border states. Despite the fact that Mexico's economy experienced rapid growth during the 1990s, employment indicators point to an inability to meet the demand for jobs; this has meant that unemployment, underemployment, and migration to the United States have become some of the main problems troubling the Mexican economy.

As a result of NAFTA and a growing number of connections between the economies of Mexico and the United States, there has been a decrease in formal unemployment rates in the northern Mexico border states. The decrease in unemployment has been accompanied by an increase in

¹ The open unemployment rate represents people 12 years or older who were not employed when the survey was taken but were actively looking for work.

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temporary, low-wage jobs. In addition, the number of jobs with health and other benefits has generally decreased.

Employment on the Northern Mexico Border

Economic policy changes due to economic openness to trade and direct foreign investment (DFI) have changed the characteristics and dynamics of employment in Mexico. Economic openness resulted in a decrease in public investment and the closure of some private and public companies affected by foreign competition (Revenga 1995). This appears to have caused a shortage of jobs overall in Mexico, especially those requiring more skills and that pay higher wages. The situation has become a constant in the economic growth model and has generated significant pressure on labor policies.

Both the federal and state governments of Mexico have implemented a range of programs to reduce unemployment and increase employee training. However, the effectiveness of these programs has been limited, and there are still high unemployment levels in some regions and, in general, at the national level.

Mexico's labor force of more than 40 million people has been growing at an annual average rate of more than 3 percent, creating enormous pressure on the labor market. This is because jobs growth is not keeping pace with the growth of the labor pool. As a result, there is a gap between employment demand and supply in Mexico. All of this has brought about the following situations in the labor market:

- a) An increase in informal employment.
- b) Growing numbers of Mexican workers migrating to the northern border to find jobs in maquiladoras or an opportunity to cross the border into the United States.
- c) An increase in formal employment in the industrial and manufacturing sector, particularly the maquiladora export industry, in the northern border states.

The following section describes the major characteristics of the country's labor market and evaluates how Mexico's growth model affects employment trends.

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The Impact of the Economy on Employment in Mexico

Mexico's economy has experienced steady economic growth since the last recession in 1994. Economic growth has been based largely on DFI and exports, particularly those bound for the U.S. market.

The northern border states of Mexico have, in particular, experienced dynamic growth. Whereas the Mexican economy overall had an average growth of 2.9 percent from 1993 to 2006, the northern border states showed a growth rate of 4.1 percent, with Baja California, Chihuahua, and Nuevo León showing the most rapid growth during the period.²

Thus, the border states have had the most dynamic economic growth resulting from economic aperture and integration with the United States. However, in Nuevo León and Coahuila, economic growth is due to an already existing industrial and manufacturing base generated by the industrialization process for import substitutions, a process established in Mexico in the 1940s and continued through the late 1970s.

It is important to note that the northern Mexico border region has become an attraction pole for DFI, particularly investments from the United States. DFI in Mexico between 1994 and 2007 grew by 5.9 percent.³ The average growth of DFI in some of the northern border states, such as Chihuahua, Baja California, Nuevo León, and Sonora, was higher than the national average. Baja California and Chihuahua showed higher average growth rates as a result of massive investments from the maquiladora export industry. The state of Nuevo León also received investments for maquiladoras, as well as for an export manufacturing industry not operating under the maquiladora mode. DFI associated with the northern border is generally related to investment in maquiladora plants of low capital intensity, to take advantage of local wages.

The Mexican government has encouraged a strategy of economic growth based on manufacturing exports. The process began in the late 1980s and intensified after the signing of

² Author's estimates based on Instituto Nacional de Estadística y Geografía (INEGI) data.

³ Banco de Información Económica (BIE) del INEGI.

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NAFTA by Canada, the United States, and Mexico. This resulted in a rapid growth of non-oil exports, particularly manufacturing exports, including those produced by maquiladoras (Table 1).

Table 1

Non-Oil Exports (1994-2007), Millions of Dollars				
	Total	Agricultural	Extraction	Manufacturing
1994	\$53,252.0	\$3,058.7	\$372.6	\$49,820.7
1995	\$70,858.7	\$4,581.4	\$488.2	\$65,789.1
1996	\$84,160.1	\$4,129.4	\$421.0	\$79,609.5
1997	\$98,953.8	\$4,448.7	\$450.1	\$94,055.1
1998	\$110,232.4	\$4,335.5	\$447.6	\$105,449.2
1999	\$126,391.7	\$4,456.0	\$421.2	\$121,514.6
2000	\$149,985.8	\$4,765.4	\$496.0	\$144,724.6
2001	\$145,580.4	\$4,446.3	\$385.4	\$140,748.5
2002	\$146,216.1	\$4,214.5	\$367.1	\$141,634.8
2003	\$146,164.2	\$5,035.5	\$496.3	\$140,632.1
2004	\$164,332.0	\$5,683.8	\$900.8	\$157,747.3
2005	\$182,342.3	\$6,008.2	\$1,167.8	\$175,166.2
2006	\$210,903.2	\$6,852.7	\$1,316.8	\$202,733.5
2007	\$228,857.1	\$7,435.2	\$1,736.9	\$219,684.5
TCPA	11.22%	6.83%	11.84%	11.41%

Source: INEGI-BANXICO-SAT (Servicio de Administración Tributaria) and Economy Department.

However, the expansion of maquiladoras has not generated solid productive chain links for expansion to the domestic market. This is because the products from this sector have been destined, almost entirely, for the United States. Nevertheless, economic growth in the border region has raised employment levels as well as export activities. This process has helped transform the labor market in Mexico

Transformation of the Labor Market in Mexico

As a result of economic openness, 3.2 million jobs were added to Mexico's economy between 1991 and 1994, and a remarkable 5.2 million were added between 1994 and 1999 (Malacon and Expositi 2003). During the 1990s there was also significant growth in industrial and manufacturing employment in Mexico, as well as in the service sector and, more moderately, the construction sector.

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Economic growth based on export strategies and economic liberalization was distinguished by significant economic reforms that led to privatization, economic liberalization, and ultimately to NAFTA. These policy changes, along with a recessive period in 1994, have had a major impact on employment trends in Mexico.

Kaplan, Martínez, and Robertson (2007) suggest that the economic recessions of 1995 and 2001 affected employment markets for different reasons. The first recession was related to a lack of internal credit that affected small business; the second was related to the economic recession in the United States and the decrease in manufacturing production in that country, which affected most of the larger companies operating in Mexico, particularly on the border.

Thus, beginning in 2001, growth in the Mexican economy slowed to an annual rate of 0.2 percent. Between 2000 and 2001 the number of employed persons in Mexico went from 37.59 million to 37.68 million (Table 2).

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Table 2

Employment by type of economic activity, 2000-2007, (Thousands of Persons)										
	2000	2001	2002	2003	2004	2005	2006	2007	Growth 2007-2000	TCPA
National Total	37,591	37,681	38,558	38,874	40,210	40,455	41,849	42,552	4,962	1.8%
Agriculture	6,516	6,556	6,645	6,239	6,309	5,945	5,902	5,651	(866)	-2.0%
Industry	10,133	9,791	9,637	9,742	10,015	11,021	11,457	11,651	1,518	2.0%
Mining	156	129	143	136	165	194	164	186	30	2.5%
Manufacturing	7,366	7,187	6,907	6,781	7,057	7,479	7,670	7,682	316	0.6%
Electricity	188	195	195	213	233	186	186	220	33	2.3%
Construction	2,423	2,281	2,392	2,611	2,560	3,162	3,436	3,563	1,140	5.5%
Services	20,790	21,199	22,134	22,756	23,728	23,243	24,185	24,946	4,156	2.6%
Wholesale Commerce	8,242	8,578	8,971	9,108	9,623	8,743	8,979	9,235	993	1.6%
Hotels and restaurants	1,770	1,919	2,000	2,096	2,258	2,400	2,489	2,645	875	5.7%
Transportation & Communi- cations	1,719	1,762	1,777	1,823	1,825	1,802	1,950	1,895	175	1.4%
Financing Intermediation	295	282	288	283	286	319	379	424	130	5.2%
Real State	1,171	1,210	1,260	1,314	1,429.1	1,822	1,928	2,015	844	7.8%
Public Administration & Defense	1,742	1,686	1,790	1,820	1,798	1,916	2,031	2,041	300	2.3%
Education	1,886	1,979	2,027	2,033	2,171	2,179	2,252	2,318	432	2.9%
Health	1,064	1,045	1,094	1,118	1,212	1,171	1,178	1,251	187	2.3%
Other Activities	1,226	1,131	1,246	1,352	1,364	1,210	1,253	1,267	42	0.5%
Private Homes with Employees	1,674	1,606	1,681	1,810	1,758	1,678	1,744	1,847	173	1.4%

Source: Author's estimates based on OECD, OECD, StatExtracts, Annual Labour Force Statistics database. (TCPA) Annual Average Growth Rate.

Employment in Mexico has been relatively stagnant since 2000; between 2000 and 2007, the country experienced an annual average growth rate of 2.8 percent. During the same period, there was a 2 percent decline in employment in the agricultural sector, and very slow growth in employment in the manufacturing sector.

Since manufacturing has been a key element of an export-based growth model, the decreasing number of available jobs in northern Mexico states would seem to suggest the model has reached its limits. Furthermore, because the manufacturing and export boom of the 1990s was

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concentrated in the northern Mexico border states, the deceleration in the U.S. economy has led to a greater stagnation of employment in the U.S.–Mexico border region.

Border Economy and Labor Employment Patterns

Mexico's economic growth model has had a variety of impacts that favor some sectors to the detriment of others. In addition, the model has favored the development of some regions, such as the border, compared to the traditionally more dynamic zones of central Mexico.

According to Hanson (2003), regional economic restructuring has impacted regional markets, favoring wages and employment of Mexican workers located on the northern Mexico border or in jobs requiring more skills. Thus, in regions with major DFI, the wages of skilled workers have increased.

As a result of NAFTA, labor market integration increased between the northern Mexico region and the southern region of the United States. This integration resulted in a shift in employment market trends and manufacturing wages in the two countries in the short and long term. Employment growth rates in the border regions of both countries moved in tandem after 1994, in contrast to the divergent trends experienced before. In summary, wage and employment trends in Mexico are affected by the U.S. economy; therefore, Mexican employment policies alone cannot be effective without considering the activities of the companies operating on both sides of the border.

The dynamics of the manufacturing sector influence the employment characteristics of the northern Mexico border. The 1980, 1990, and 2000 Mexican population censuses show that the manufacturing sector workforce increased nationally from 11.7 percent in 1980 to 19 percent in 2000. The workforce of the manufacturing sector in the Mexican border region grew even more, expanding from 15.5 percent to 34.6 percent of total employment in the region between 1980 and 2000 (Table 3).

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Table 3

Labor Force participation in Mexico's manufacturing sector			
	1980	1990	2000
MÉXICO	11.7%	19.2%	19.0%
BORDER REGION	15.5%	28.2%	34.6%
BAJA CALIFORNIA	13.6%	23.2%	28.3%
TIJUANA	16.7%	28.8%	32.0%
TECATE	20.3%	39.5%	38.8%
MEXICALI	11.3%	18.5%	25.4%
<i>BAJA CALIFORNIA Border</i>	14.1%	24.9%	29.8%
SONORA	9.6%	16.1%	19.5%
SAN LUIS RIO COL	8.9%	16.9%	23.4%
PUERTO PEÑASCO	8.4%	1.4%	8.4%
NOGALES	25.0%	40.4%	43.7%
CANANEA	8.6%	7.3%	17.6%
NACO	11.6%	34.2%	25.7%
AGUA PRIETA	28.1%	39.3%	31.7%
<i>SONORA Border</i>	14.9%	17.1%	27.0%
CHIHUAHUA	12.4%	26.4%	33.8%
JANOS	2.2%	9.4%	12.3%
ASCENSIÓN	5.8%	21.9%	20.4%
JUÁREZ	21.6%	41.3%	46.3%
GUADALUPE	7.3%	33.6%	43.6%
P.G. GUERRERO	3.1%	30.9%	45.0%
OJINAGA	4.8%	7.4%	17.5%
MANUEL BENAVIDES	3.2%	1.3%	1.8%
<i>CHIHUAHUA Border</i>	20.0%	39.7%	45.1%
COAHUILA	14.4%	25.6%	32.0%
OCAMPO	6.2%	39.2%	31.0%
ACUNA	18.3%	42.7%	54.5%
JIMÉNEZ	3.7%	35.7%	47.4%
PIEDRAS NEGRAS	15.4%	29.9%	35.8%
GUERRERO	6.8%	10.3%	18.8%
HIDALGO	3.8%	10.0%	3.3%
NAVA	11.5%	11.4%	26.7%
<i>COAHUILA Border</i>	14.7%	32.8%	43.0%
NUEVO LEÓN	24.5%	29.8%	28.4%
ANAHUAC	4.4%	13.9%	22.4%
<i>NUEVO LEÓN Border</i>	4.4%	13.9%	22.4%
TAMAULIPAS	11.9%	19.0%	23.3%
NUEVO LAREDO	13.2%	25.2%	23.6%
MIGUEL ALEMAN	9.6%	11.0%	11.5%
CAMARGO	9.0%	16.6%	29.7%
GUSTAVO DIAZ ORDAZ	6.4%	10.7%	26.6%
REYNOSA	15.6%	25.0%	36.4%
RIO BRAVO	8.9%	23.6%	27.5%
VALLE HERMOSO	6.6%	12.7%	26.6%
MATAMOROS	17.7%	37.9%	39.9%
<i>TAMAULIPAS Border</i>	14.1%	27.8%	32.8%

Source: Author's estimates

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The greater number of jobs in the manufacturing sector in the northern border states is related to the growth of manufacturing plants with significant exports—as in the case of the automobile industry in Monterrey and Saltillo, and with plants solely dedicated to the assembly of parts to be exported to United States. Manufacturing employment on the northern border is thus characterized in the following ways:

- 1) The states with greater participation in the manufacturing sector during 2000 were Chihuahua (33.8 percent), Coahuila (32 percent), Baja California (28.3 percent), and Nuevo León (28.4 percent). With a lower, but important, participation in the manufacturing sector were Sonora and Tamaulipas.
- 2) In 2000, the manufacturing industry employed 45.1 percent of the workers in the border areas of Chihuahua; 43 percent of the workers in the border areas of Coahuila; and 29.8 percent of the workers in the border areas of Baja California.
- 3) Manufacturers employed large numbers of workers in major border cities. In 2000, the manufacturing industry employed 46.3 percent of workers in Ciudad Juárez; in Matamoros, 39.9 percent; in Reynosa, 36.4 percent; Nogales, 43.7 percent; and in Acuña, 54.5 percent.

An important aspect of the border employment market is the urgent need to generate jobs to absorb the demand from the growing economically-active population (EAP). According to Mexico's National Population Council (CONAPO), between 2005 and 2008 the EAP of Mexico's northern border increased by an annual average of 281,400 persons. However, the population employed in the formal sector of the economy during the same period has grown at an annual average rate of only 163,854 persons. This means that the economic sector of the northern border has been unable to create a sufficient number of jobs to employ those who enter the EAP (Table 4).

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Table 4

Economically active population in Mexico's Northern Border States				
	2005	2006	2007	2008
Total Population:	18,367,797	18,641,931	18,911,895	18,978,219
Population 14 years old and more	13,363,478	13,640,101	13,894,482	13,967,495
Economically active population	7,781,167	8,091,595	8,407,888	8,373,075
Employed	7,537,114	7,778,415	8,120,922	8,028,676
Unemployed	244,053	313,180	286,966	344,399
Annual average increase of EAP 2005-2007	281,400			
Employed population annual average increase 2005-2008	163,854			

Source: Author's estimates based on Population Projections, CONAPO.

Another important point is that the open unemployment rates in northern Mexico border states are lower than the national rate, and the rates of other states in the country. The open unemployment rate for northern border states was 3.7 percent in 2005 but increased to 4.4 percent in 2008. Pressure from the growing EAP in northern border states is directly reflected in other employment indicators, such as partial unemployment rates and unemployment.⁴ These indicators also include the underemployed, or workers unable to find a full time job. This rate was higher than the open unemployment rate, reaching 8.3 percent in 2005 and 10.6 percent in the first quarter of 2008. At the same time, the critical employment conditions rate⁵ was 7.3 percent in 2005 and 6.1 percent in 2008, demonstrating the growing unemployment problems in the northern border region (Table 5).

⁴ Percentage of the economically active population (EAP) that is unemployed, plus those employed less than 15 hours per week.

⁵ Percentage of the non-agriculturally employed population working less than 35 hours per week due to market factors, plus those who work more than 35 hours per week with a monthly income lower than the minimum wage, and those who work more than 48 hours per week earning up to twice the minimum wage.

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Table 5

Unemployment Rate – Mexico's Northern Border States						
Year	Unemployment Rate	Partial Employment Rate and unemployment 1 (TOPD1)	General Pressure Rate (TPRG)	Salary Employment Rate	Underemployment Rate	Critical Employment Condition Rate (TCCO)
Baja California						
2005	1.4	2.6	2.5	66.6	1.9	3.1
2006	1.8	3.2	2.4	68	1.2	2.2
2007	3.3	5.6	4.5	65.4	2	3.6
2008	3.7	5.8	4.6	64.7	1.7	4.9
Sonora						
2005	3.5	7.9	5.9	64.9	3.6	8
2006	3.3	7.4	5	66.7	3	6.3
2007	2.8	7.3	4.3	67.3	2.8	5.4
2008	3.9	10.1	5.7	67.3	3.7	6
Chihuahua						
2005	2.5	4.4	4.6	64	3.2	4.2
2006	2.9	4.8	4.6	65.2	2.6	2.9
2007	3.3	5.6	4.5	65.4	2	3.6
2008	3.7	5.8	4.6	64.7	1.7	4.9
Coahuila						
2005	4.5	9	8.7	71.8	5.5	8.4
2006	5.4	10.5	10	71.5	7.2	7.9
2007	5.3	11.1	10.6	71.6	8.6	7.4
2008	5.6	13.8	11.9	69.7	9.5	7
Nuevo León						
2005	5.1	10.9	11.8	72.1	7.9	4.7
2006	5	10.8	11.1	72.4	6.4	4.4
2007	4.6	10.5	10.2	74.2	7	4.2
2008	4.6	11.3	10.1	73.8	7.9	4.4
Tamaulipas						
2005	4.2	11.1	9.7	65.2	12.7	12.2
2006	4.6	11.2	10	66.7	12.5	8
2007	4.5	12.4	10.4	67.2	13.3	7.1
2008	4.2	12	10.5	66	13.2	8.1
North Border Average						
2005	3.74	8.3	7.72	68.12	6.32	7.28
2006	4.02	8.62	7.7	69.06	6.06	5.76
2007	4.1	9.38	8	69.14	6.74	5.54
2008 ¹	4.4	10.6	8.56	68.3	7.2	6.08

Source: Author's estimates based on National Occupation and Employment Survey, STPS-INEGI. 1. First quarter 2008.

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Among northern Mexico border states, Baja California showed the lowest unemployment rates, followed by Chihuahua and Tamaulipas. Nuevo León and Coahuila showed the highest percentage of hourly workers in the formal sector, demonstrating that these economies absorbed higher levels of hourly-wage employment.

Maquiladora Industries and Employment Dynamics on the Northern Mexico Border

About 30 percent of manufacturing employment is due to maquiladora jobs. A range of studies has estimated the effect of the maquiladora industry on employment levels. Mendoza and Calderon (2001), Fullerton and Schauer (2001), and Mollick (2003), for instance, conclude that maquiladora employment dynamics depend on the rate of exchange and the U. S. economic activity level.

The maquiladora export industry (MEI) has been characterized by explosive employment growth, particularly between 1990 and 2000, a period that showed an annual average growth rate of 10.9 percent. The years 1995, 1996, and 1997 were particularly dynamic, with annual growth rates of 13.4 percent, 17.3 percent and 17.2 percent, respectively (Table 6).

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Table 6

Export Maquiladora Industry (EMI) Total Employment		
Period	Total Employees EMI	EMI: Annual growth rates of total employment
1990	439,474	
1991	486,146	10.62%
1992	510,035	4.91%
1993	546,588	7.17%
1994	600,585	9.88%
1995	681,251	13.43%
1996	799,347	17.34%
1997	936,825	17.20%
1998	1,043,483	11.39%
1999	1,195,371	14.56%
2000	1,310,026	9.59%
2001	1,071,488	-18.21%
2002	1,067,948	-0.33%
2003	1,050,210	-1.66%
2004	1,131,726	7.76%
2005	1,156,477	2.19%
2006	1,170,962	1.25%
TCPA		6.1%

Source: Author's estimates based on INEGI data, EMI Statistics

Despite the fact that this sector had become the growth motor on the northern Mexico border, it experienced a drastic employment decrease in 2001 (18.2 percent), but recuperated in 2004 (7.8 percent), and has remained stable since that year.

The MEI significantly stimulated northern Mexico border manufacturing employment, at least up to 2001; however, it was not observed that this industry developed production processes that significantly improved labor force skills. Thus, between 2000 and 2006, the share of production technicians employed by MEI increased from only 12.5 percent in the first year to 13.4 percent 16 years later (Table 7).

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Table 7

Employment indicators for production technicians in the Export Maquiladora Industry					
Period	Total (1)	Production Technicians (2)	1/2	Men	Women
1990	439,474	54,715	12.45%		
1991	486,146	57,528	11.83%		
1992	510,035	61,050	11.97%		
1993	546,588	62,010	11.34%		
1994	600,585	67,491	11.24%		
1995	681,251	74,797	10.98%		
1996	799,347	88,316	11.05%		
1997	936,825	111,111	11.86%	70.28%	29.72%
1998	1,043,483	126,859	12.16%	70.94%	29.06%
1999	1,195,371	146,831	12.28%	72.15%	27.85%
2000	1,310,026	159,452	12.17%	72.51%	27.49%
2001	1,071,488	136,354	12.73%	73.44%	26.56%
2002	1,067,948	139,615	13.07%	73.50%	26.50%
2003	1,050,210	136,055	12.96%	73.58%	26.42%
2004	1,131,726	144,111	12.73%	73.36%	26.64%
2005	1,156,477	151,942	13.14%	74.04%	25.96%
2006	1,170,962	156,991	13.41%	73.80%	26.20%

Source: Author's estimates based on INEGI, EMI statistics.

The slow growth in the number of highly skilled jobs has been accompanied by mechanisms that have promoted, to an extent, job training. The progress that has been made in increasing the skill level of the work force in the maquiladora sector is related to the technical and professional training offered by public and private educational institutions, and by on-the-job training offered in the maquiladora plants.

Entry-level workers generally have an elementary school education, although a small share of workers have middle school or technical training (Carrillo 2001). The technical training of workers employed by maquiladora plants is provided by public education centers, particularly in middle schools (the electronics field) and public technology schools (the auto parts field).

With regard to training offered at maquiladora plants, according to the same author, more than 60 percent of the programs' content is focused on administration and, to a lesser degree, technical skills.

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Therefore, it can be said that while the maquiladora industry has generated a trained work force, the training has not yet resulted in a qualitative change in employee skill levels.

Low-skilled female workers once dominated the maquiladora industry, but their numbers have steadily decreased, from 29.7 percent of the work force in 2000 to 26.2 percent in 2006. This change is related to the growing participation of male workers and the development of production processes that require a higher level of skill.

The factors that have allowed employment expansion in the maquiladora industry are the relatively low wages paid in Mexico compared to wages in the United States, and the geographical proximity of Mexican border cities to the U.S. market. Additionally, the depreciation of the peso-to-dollar exchange rate has helped keep Mexican maquiladora wages lower and more competitive than manufacturing wages paid in the United States.

In addition, exchange rate depreciation has meant that worker productivity in maquiladoras, measured in U.S. dollars, increased 5.8 percent in the period of 1990–2006,⁶ but measured in constant pesos, it was only 1.7 percent.

However, the main challenge this industry faces is related to the rapid growth of exports from China to the United States. Though Mexico continues to be one of the main commercial partners of the United States, Chinese exports to the United States have surpassed Mexican exports. Between 1990 and 2006, U.S.-bound exports from China grew by 18.5 percent, compared with the 11.5 percent growth in exports from Mexico.⁷ Since 2003, China has been first and Mexico second in exports to the United States.

China has surpassed Mexico in exports of products such as computers, telecommunication equipment, glass, and kitchen furniture; however, Mexico still leads in exports of automobiles, motors, spare parts, and television sets. China's competitive advantages over Mexico include low wages that in 1990 were 23 cents per hour, which is 10 percent of the pay for similar work in

⁶ Author's estimates based on information from BIE INEGI.

⁷ Author's estimates based on the U.S. Census Bureau, Foreign Trade Division, Data Dissemination Branch, Washington, D.C. 20233.

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Mexico; in 2005, wages in China increased to \$1.00 per hour, representing 2 percent of the pay for similar work in Mexico.⁸

A conclusion could be that NAFTA's effects have included job specialization in some regions and production areas, and very significant employment for minimally skilled workers at maquiladora plants. This situation has allowed northern Mexico border states, particularly in cities along the U.S. border, to maintain a significant level of employment.

The maquiladora industry is subject to extreme investment volatility because the capital in this sector is characterized by high international mobility. This creates a problem in the maquiladora industry. Any movement in wages, fiscal regulations, or competition in wages and efficiency—as has been the case with China's economy—can generate massive flight of productive investments and, consequently, of employment (Palma 2003).

Thus, growing exports from China and the stagnant and recessive U.S. economy are negative factors that have impacted the northern Mexico border employment panorama.

Urban Employment Analysis on the Northern Mexico Border

Demographic Growth

In addition to their geographic location, border cities are characterized by size and population growth.⁹ Highly populated northern Mexico border cities include Tijuana with 1,274,240 persons for the year 2000, followed by Ciudad Juarez with 1,187,275 persons; Torreon with 621,541 persons; and Mexicali with 549,873 persons. With the exception of Mexicali, all of these cities

⁸ Author's estimates with information from National Bureau of Statistics of China, China Statistical Yearbook, 1996, 2004, 2006 and BIE INEGI.

⁹ In this group the following cities are included: Mexicali, Ensenada, Tecate, Guadalupe Victoria, Rodolfo Sánchez & Tijuana Metropolitan Zone, in the state of Baja California; Heroica Nogales, San Luis Río Colorado, Agua Prieta, Heroica Caborca, Cananea, Puerto Peñasco and Magdalena de Kino in Sonora; in Chihuahua: Nuevo Casas Grandes, Manuel Ojinaga and Juarez Metropolitan Zone; in Coahuila: Ciudad Acuña, Sabinas, Allende and Piedras Negras Metropolitan Zone; in Nuevo León: Ciudad Sabinas Hidalgo and Anáhuac; in Tamaulipas Valle Hermoso, Ciudad Miguel Alemán, and the Metropolitan Zones of Reynosa-Río Bravo, Matamoros and Nuevo Laredo.

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are known for vigorous economic expansion, which is noteworthy, considering most are not the capitals of their respective states.¹⁰

Northern Mexico border cities showed an average annual growth rate of 2.7 percent between 1990 and 2000. Northern Mexican border municipalities with rapid population growth during this period were Tijuana, with a growth rate of 5.5 percent and Ciudad Juarez, with a growth rate of 4.9 percent. As previously mentioned, the growth is related to the economic dynamism experienced in some border cities due to the maquiladora industry. This is the case with Tijuana and Ciudad Juarez. Another important factor is the presence of temporary migrants seeking to cross the border to the United States, who have a major impact on cities such as Agua Prieta, Sonora.

Rapid population growth in the border region affects social and employment demands as well as urban infrastructure. According to National Population Council projections, the total population of border cities will almost double, going from a total of 6,342,245 in 2000 to 11,721,814 in 2030.

This rapid growth will create the need to generate mechanisms to establish social urban infrastructure in the near future.

The population increase on the northern Mexico border is particularly related to the rapid growth of three important border cities: Tijuana, Ciudad Juarez, and Mexicali. These three cities together showed a noticeable population expansion; in the case of Tijuana, the population will nearly double between 2000 and 2030, expanding from 1,238,157 to 2,422,071 persons. Ciudad Juarez is projected to grow from 1,255,884 to 2,406,411 inhabitants.

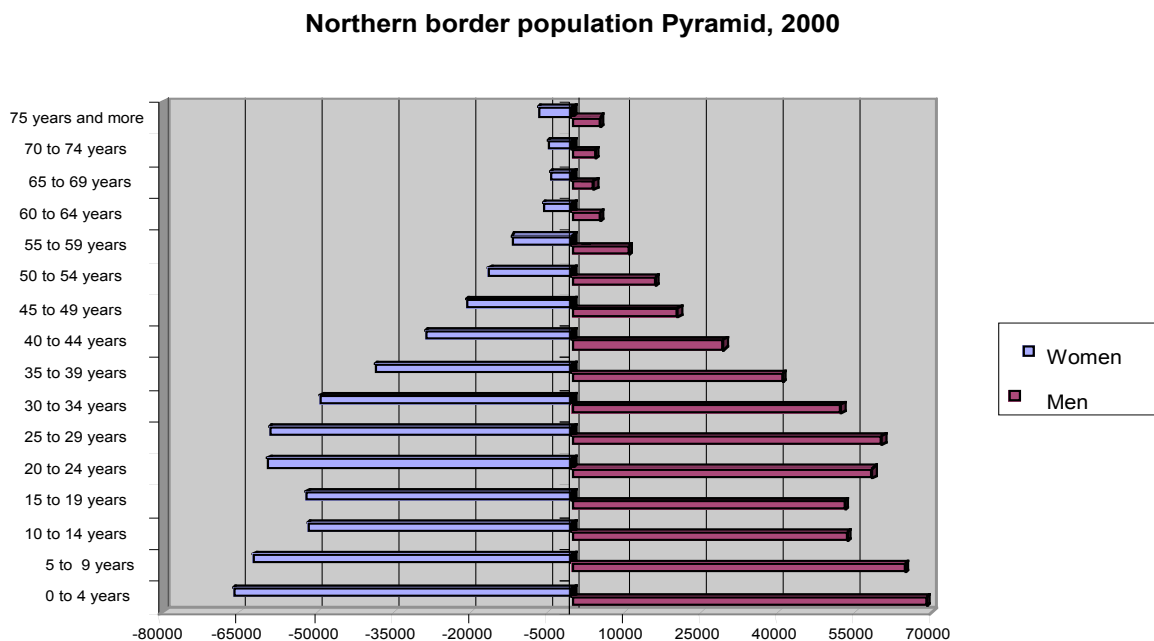
In northern Mexico border cities, children up to four years old made up 11.4 percent of the male population and 11.1 percent of the female population in 2000; of children five to nine years old, 10.9 percent were male and 10.6 percent were female. There were fewer minors aged 15 to 19

¹⁰ Estimates based on INEGI, General Population and Housing Census XI and XII, 1990 and 2000.

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(9.3 percent are male and 9.1 percent are female), but the percentages rose again with the number of young adults aged 20 to 24 (Graph 1).

Graph 1



Source: Based on General Population and Housing Census XII, 2000

However, at the national level, the population decreased with age. Of children 0 to 4 years old, 11.9 percent were male and 11.1 percent were female; minors 5 to 19 years old comprised about 10.3 percent of the population; and young adults 20 to 24 years old made up about 9 percent of the population.

This phenomenon may be caused by internal migration to northern border cities. It is worth mentioning that the first five-year cohorts concentrated 49 percent and 48.3 percent of male and female population in those cities. This puts more pressure on the labor market by the EAP that is looking for jobs in the region.

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Border cities may also be grouped by the migratory characteristics of the residents. Many northern border cities are characterized by a large segment of the population born outside of the region. Graph 2 shows three cities in Baja California where less than 50 percent of the population was born in the state: Playas de Rosarito, with 37 percent; Tijuana, with 43.3 percent; and Ensenada, with 50.9 percent.¹¹

Thus, the northern border cities are characterized by a large population of migrants. Some of the northern border cities have a higher emigration flow, creating pressure to generate more jobs.

Economic Aspects

During the 1990s, northern border cities experienced rapid economic and population growth. This process has had implications for the Mexican economy with regard to manufacturing dynamics, the economic growth of the northern border, job markets, and the welfare of the population.

Among border cities, the highest per capita incomes are found in Tijuana, Ciudad Juarez, and Ojinaga, with estimated income levels of \$14,493, \$13,469, and \$13,079, respectively. The average annual income for a border city resident was \$8,609 (with a standard deviation of \$2,167) compared to the national average of \$7,495 (Table 8).

¹¹ Estimates based on General Population and Housing Census XII, 2000.

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Table 8

Per capita income in border cities	
Municipality	Annual per capita income (Dollars ppc)
Tijuana	14,493.80
Juarez	13,469.42
Ojinaga	13,079.01
Mexicali	13,063.02
Ensenada	11,886.64
Nogales	11,856.95
Sabinas Hidalgo	11,577.27
Hidalgo	11,333.04
Nuevo Laredo	10,888.23
Allende	10,745.44
Acuña	10,411.24
Sabinas	10,226.12
Matamoros	10,128.65
Reynosa	9,980.03
Nuevo Casas Grandes	9,422.81
Agua Prieta	9,155.57
San Luis Río Colorado	9,127.94
Cananea	9,019.72
Magdalena	8,594.62
Anahuac	8,560.83
Caborca	8,048.63
Puerto Peñasco	7,980.09
Casas Grandes	7,260.95
Miguel Aleman	6,720.06
Navojoa	5,970.36
Deviation Standard	2,167.83

Source: CONAPO, Indices de DeBartolo Urbana Municipal (Municipal Urban Development Index)

Total employment in major northern border cities was 6.6 percent of total employment in Mexico; employment in northern border cities grew at an average annual rate of 4.9 percent between 1990 and 2000. Manufacturing activities are important in border cities, and represent 11.7 percent of total national employment in 2000. Employment related to manufacturing has

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grown at an annual average rate of 6.5 percent in border cities. Other important economic activities are restaurant and hotel services, power and water services, construction, oil extraction, personal services, and commerce (Table 9).

Table 9

Employed Population per economic activity: Northern Mexico Border, 2000			
Activity	Percentage Structure, 2000	National Percentage Participation 2000	Growth Rate, 1990-2000
TOTAL	100.00%	6.60%	4.85%
Agriculture, cattle, forestry and fishing	8.50%	2.01%	-0.83%
Mining	0.45%	6.17%	-0.09%
Oil and gas extraction	0.53%	6.96%	-7.32%
Manufacturing industry	28.62%	11.72%	6.51%
Electricity and water	0.82%	7.63%	0.19%
Construction	7.57%	6.45%	5.04%
Commerce	15.12%	6.05%	4.99%
Transportation & Communication	4.36%	6.00%	4.63%
Financing Services	1.55%	6.16%	2.03%
Public Administration & Defense	3.40%	4.73%	3.53%
Community & Social Services	7.48%	5.07%	3.76%
Professional and Technical Services	2.33%	5.86%	5.41%
Hotel & Restaurant Services	4.96%	7.50%	5.13%
Personal & Maintenance Services	10.60%	6.49%	4.62%
Non-specified	3.70%	9.48%	6.39%

Source: Author's estimates based on data from Population and Housing General Census, 1990 and 2000, INEGI.

According to the location index for border cities,¹² on average border cities showed a specialization index of 1.78 in the manufacturing sector, followed by the electricity and water sectors (1.16), and restaurant and hotel services (1.14). (Table 10).

¹² The formula to calculate location index is: $LI=(e_i/e)/(E_i/E)$

Where:

e_i = Local employment in economic activities

e = Local employed population

E_i = National employment in activities

E = Country employed population

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Table 10

Specialization Index - Northern Mexico Border Cities		
	Specialization Index	National Percentage Participation
Total Border Cities		6.60
10 Agriculture, cattle, forestry and fishing	0.305	2.01
20 Mining	0.935	6.17
20b Gas and Oil Extraction	1.055	6.96
31-32 Manufacturing industry	1.776	11.72
41 Electricity and Gas	1.156	7.63
42 Construction	0.978	6.45
50 Commerce	0.917	6.05
60 Transportation & Communications	0.909	6.00
70 Financing Systems	0.933	6.16
81 Public Administration & Defense	0.718	4.73
82 Community & Social Services	0.769	5.07
83 Professional and Technical Services	0.889	5.86
84 Hotels & Restaurant Services	1.137	7.50
85 Personal and maintenance services	0.983	6.49
99 Non specific	1.437	9.48

Source: Author's estimates based on data from the Population Census, 2000

This confirms that on the border, manufacturing activities—in particular the maquiladora export industry—are predominant with respect to the national average.

Growth Rates of the Economically Active Population

In 2000, economic activity in northern border cities grew at a rate of 4.9 percent annually, with a notable 6.5 percent increase in manufacturing, 5 percent in construction, 4.9 percent in commerce, and 4.6 percent in communication and transportation. Among the cities with fastest growth were Tijuana (6.4 percent), Agua Prieta (5.7 percent), and Nogales (5.0 percent).

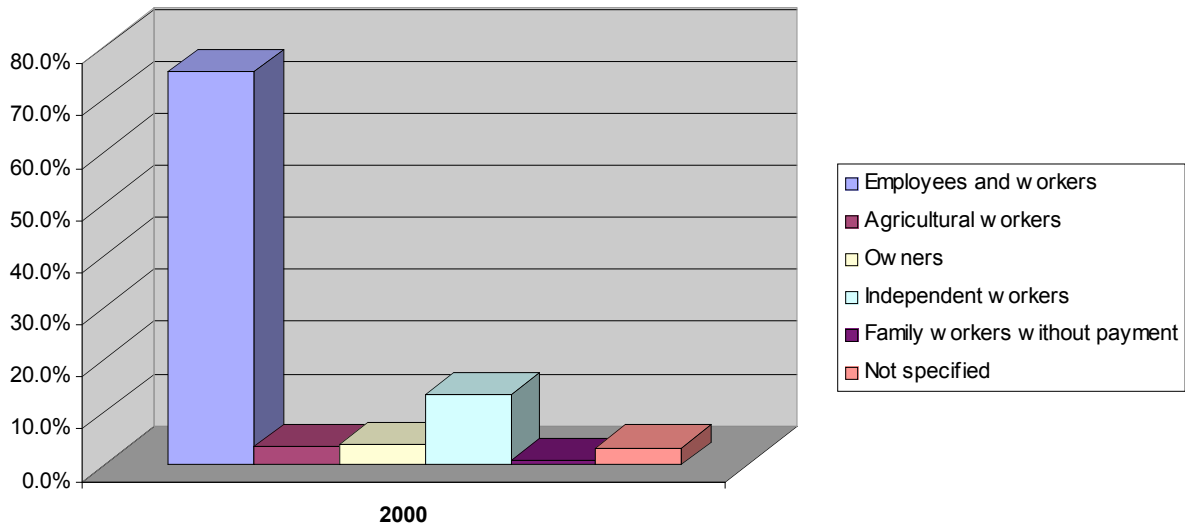
Employment Structure: Economically Active Population by Employment Status

In 2000, 75.2 percent of those employed in northern border cities were salaried and hourly workers, as opposed to agricultural workers, business owners, or other independent workers (Graph 2). This implies an important need to create jobs along the northern Mexico border.

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Graph 2

Northern Border Cities: Types of employment



Source: Author's estimates based on the General Population and Housing Census XII, 2000

In northern border cities the greatest proportion of workers are machine operators (17 percent of the total); of employed women in the region, 24.9 are machine operators. Other job categories include small business owners and clerks (11 percent), office workers (7.3 percent), and service workers (6 percent).¹³ The statistics show that workers must improve their skills to add value to their performance and receive better wages.

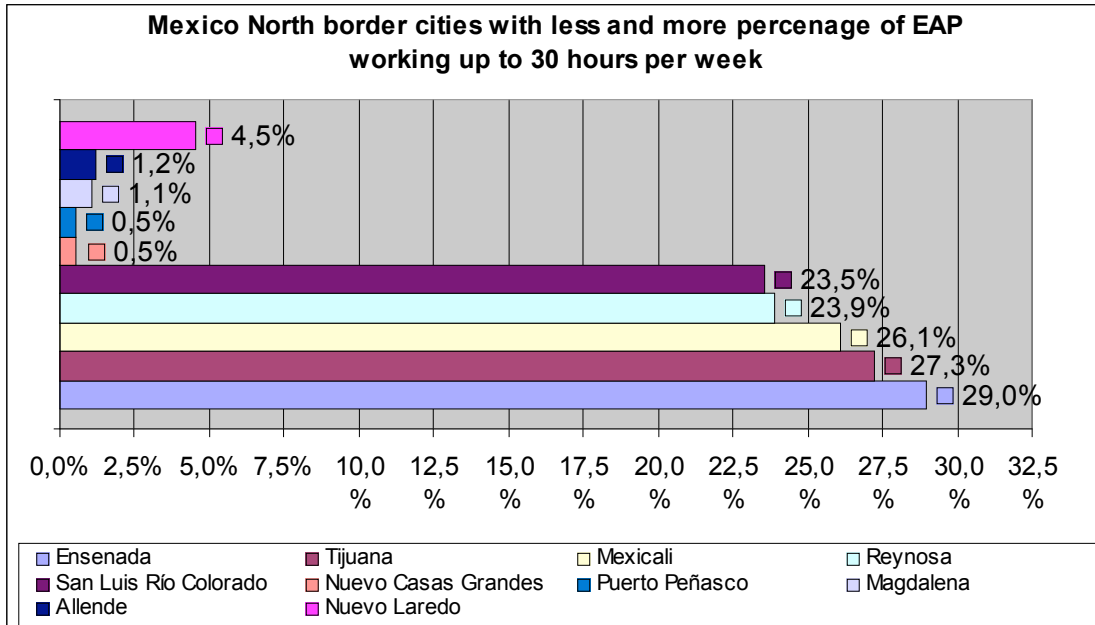
Employment Structure: EAP Employed by Number of Working Hours

The percentage of the population employed less than 40 hours per week provides an estimate of the informal employment market. On average, 13.5 percent of the EAP employed in the different municipalities work up to 32 hours a week. The cities with the greatest number of people working up to 32 hours a week were Ensenada (29 percent), Tijuana (27.3 percent), and Mexicali (26.1 percent).

¹³ Author's estimates based on the General Population and Housing Census XII, 2000.

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Graph 3



Source: Author's estimates based on the General Population and Housing Census XII, 2000.

Labor Policies and Employment on the Mexico–U. S. Border

As indicated previously, the Mexican labor market in northern border states is characterized by the rapid growth of the labor force, which creates pressure to generate jobs and encourages migratory flows to the United States; the low open unemployment rate, which reflects significant levels of formal employment; and the concentration of manufacturing plants on the northern Mexico border.

Considering this situation, labor policies have been an important instrument of social and economic policy, and help connect job supply and demand. Labor policies have created opportunities for the unemployed in a context of openness and structural change in the Mexican economy. It is important to point out that significant resources have been invested to create direct and indirect employment and for labor force training, but there are no unemployment insurance benefits (Samaniego 2002).

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Federal and state government job creation efforts have been oriented in two ways: employment or wage subsidies and direct job creation. Since 1995, due to the economic recession, tax incentives for formal businesses (fiscal credits against income taxes) have been offered to encourage hiring. State-level measures to reduce unemployment have also been implemented because of the economic recession and other economic problems that significantly reduced public and private investment in public infrastructure projects. Mechanisms to promote employment include a payroll tax exemption for additional jobs and a subsidy on real estate taxes for new companies employing more than 100 persons. In addition, programs such as the Temporary Employment Program were established; these programs primarily promoted labor-intensive activities in low-income rural zones.

The most important mechanism to promote employment is the National Employment Service, created in 1978. This program serves as a mechanism to facilitate the placement of workers in existing openings, provide training for the unemployed, and study labor markets. The system is comprised of a network of employment offices that can help match applicants with possible jobs in the formal sector. The programs are carried out across the country with funding from the Department of Labor and Social Welfare and state governments. The main placement activities are employment fairs, workshops for the unemployed, and the employment referral system.¹⁴

The Mexican government has also tried several temporary labor force training programs to promote indirect employment. These programs were established to cope with unemployment caused by adjustment policies implemented to control fiscal and trade deficits and an economic crisis that began in the 1980s. The first such program was the Scholarship Program for Worker Training (PROBECAT); another program is the Employment Training System, which is operated by state governments with resources from the Department of Labor and Social Welfare.

At the national level, employment policies have not been able to compensate for a shortage of jobs that is the result of a growing labor pool; nor have they been able to make up for the public

¹⁴ Mechanisms that give unemployed workers access to job databases of available by telephone or Internet.

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and private closures of business that have brought employment opportunities to a relative halt (Jiménez 2005).

In analyzing the employment assistance policies in the northern Mexico border states, one finds that training programs in Baja California are geared toward industry needs. As a result, the university and technical school graduates have more opportunities to obtain better jobs. The programs cover a range of professions, from electrical technicians to speakers of business English.

Nuevo León has three Labor Mediation Centers equipped with computers, telephones and other devices that allow applicants to contact companies with job openings. Also in Nuevo León is the Council for Labor Relations and Productivity, which, in conjunction with the National Employment Service, provides scholarships for one- to three-month training courses for technical or administrative work. The scholarship covers training materials, instruction counseling, transportation assistance, accident insurance, and other benefits.

In addition, states work with different schools to offer courses in machine tool operations, industrial maintenance, boiler operation, and many other areas. These programs are run by the state government Training and Competitiveness Department.

In Tamaulipas, the Urban Development & Employment Department offers employment referral services, employment fairs, and employment search workshops. In addition, Regional Training and Employment Committees serve as a link to the production sector to gain an understanding of training needs. Training courses are provided throughout the state. Specialized courses include baking, plumbing, handcrafts, hairdressing, sewing and dressmaking, electrical installations, and carpentry.

In Sonora, SICAT offers assistance to job seekers by providing training geared to the specific requirements and needs of area employers. It also offers assistance to employees of small companies who seek additional training. The assistance consists of scholarships of one to three

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times the minimum wage for the duration of the training course, transportation benefits, and instructors' fees.

Employment assistance policies have become an important instrument of economic and social policy, and have made it possible to partially deal with the employment problems caused by structural changes in the Mexican economy since the 1980s. Significant state resources have been spent on employment assistance systems to reduce unemployment. However, it has not been possible to create a system that provides unemployment insurance. In addition, these programs are temporary, and serve only to compensate for the unemployment caused by economic changes and the impact of the international economy on Mexico.

Conclusion

Mexico's economic growth strategy—which is based on manufacturing U.S.-bound exports and securing DFIs, primarily from the United States—has had an important impact on the country's labor market.

At the national level, the annual growth of the economically active population has put pressure on the labor market. This has resulted in the growth of informal employment, the acceleration of Mexican worker flows into the United States, and the northern migration of workers who seek formal employment in the manufacturing industry.

The maquiladora industry has been characterized by the explosive growth of employment on the northern border, particularly between 1990 and 2000. Since 2001, however, growth has stagnated due to the reduction in U.S. economic activity and the growing competition for the U. S. market for manufactured exports (Kaplan, Martínez and Robertson 2007).

Still, as a result of the economic dynamics of the northern border, open unemployment rates in the northern Mexico border states have been lower than the rates in other regions of the country. There is, however, pressure from the growing EAP, partial employment unemployment, and the underemployment of experienced workers who cannot obtain full-time jobs.

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Against a backdrop of economic activity at the company, sector, and regional levels, state labor policies have been developed to reduce unemployment caused by the recession and a significant reduction in government expenditures on infrastructure and education projects. These factors have limited the establishment of broader strategies to reduce unemployment. Generally, mechanisms to promote employment are aimed at creating jobs in rural, low-income areas. They are primarily sponsored by the government National Employment Service.

National employment policies have been replicated at the state level with small differences. But all have been basically designed to promote training programs that meet industry needs. As a result, university and technical school graduates of these programs have better opportunities to obtain better jobs. At the same time, the private sector holds job fairs and creates employment referral systems to place workers in jobs.

Baja California and Nuevo León are notable for major efforts to develop training linked to specific company needs. Machine tool operators, industrial electricians, industrial maintenance workers, and administrators are particularly in demand.

Labor policies have been an important instrument of economic and social policy through employment assistance programs that receive significant government funding. However, these programs have only managed to combat unemployment temporarily.

Export manufacturing companies have achieved the greatest success at creating employment. Therefore, the most important mechanisms for increasing employment with higher levels of added value are related to the needs of the export or maquiladora industry. Employment expansion efforts should include educational programs focused on the employment needs of business and industry, and training for entrepreneurs who want to open small businesses.

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References

- Carrillo, Jorge. 2001. *Mercados de trabajo en la industria maquiladora* (Maquiladora industry labor markets). Spain: Plaza y Valdes.
- Cortez, W. and A. Islas. 2007. Ha inducido cambios el TLCAN en la conducta de los salarios mexicanos? (*Has NAFTA led to changes in Mexican salaries?*). In *El TLCAN y la frontera México-Estados Unidos: aspectos económicos (NAFTA and the Mexico-United States Border: Economic aspects)*, ed. J.E. Mendoza, El Colegio de la Frontera Norte.
- Fullerton, Thomas and Schauer David. 2001. Short-run maquiladora employment dynamics. *Int Adv Econ Res* 7:471–478.
- Gruben, William . 2001. Was NAFTA behind Mexico's high maquiladora growth? *Econ Financial Review*, Federal Reserve Board of Dallas, Third Quarter:11–21.
- Hanson, G. 2003. What has happened to wages in Mexico since NAFTA? Implications for hemispheric free trade. Working Paper 9563, National Bureau of Economic Research, March.
- Kaplan, David, Gabriel Martínez and Raymond Robertson. 2007. Mexican employment dynamics: evidence from matched firm-worker data. World Bank Financial Private Sector Development Department Enterprise Analysis Unit, Policy Research Working Paper 4433.
- Jiménez, Alejandro. 2005. Las políticas de empleo en México y el desarrollo regional (Labor Policies in Mexico and the Regional Development). *Aportes* 10:29 (25-43).
- López, Julio. 2002. Modernization, heterogeneity and employment in Mexico. *International Review of Applied Economics* 16:2.
- Malacon, C. and P. Expositi. 2003. Effects of the integration of Mexico into NAFTA on trade, industry, employment and economic growth. Working paper series Economic Development 68, Department of Economics, Econometrics, University of Santiago de Compostela.
- Mendoza Eduardo and Cuauhtemoc Calderon. 2001. Determinantes regionales de la maquila de exportación en la frontera norte (Regional determinants of the Export Maquila in Mexico Northern Border). *Comercio Exterior*, March, pp. 196-202.
- Mollick, Andre. 2003. Employment determination at Mexican maquiladoras: does location matter? *Journal Borderland Studies* 18(2):45–67.

Employment Evolution and Prospects on the Northern Mexico Border

Palma, Gabriel. 2003. Trade liberalization in Mexico: Its impact on growth, employment and wages. Employment Sector, International Labour Office, Geneva.

Revenge, Ana. 1995. Employment and wage effects of trade liberalization, the case of the Mexican manufacturing. Policy Research Working Paper 1524, The World Bank, Latin American and Caribbean Country Department.

Robertson, Raymond. 2000. Wage Shocks and North American Labor Market Integration. *The American Economic Review* 90:4 (742-764).

Samaniego, Norma. 2002. Las políticas de mercado de trabajo en México y su evaluación (Labor market policies in Mexico and their evaluation). Serie macroeconomía del desarrollo, Naciones Unidas (Series: Development Macroeconomic–United Nations).