

The impact of return migration on the Mexican labor market

El impacto de la migración de retorno en el mercado laboral de México

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México

Recibido: 2 de agosto de 2014

Aceptado: 7 de diciembre de 2014

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Abstract

Mexican return migration has been stable until 2012, while migration flows to the USA have fallen substantially between 2005 and 2012; the changes in the Mexican migration flows have affected the supply side of the Mexican labor market. The paper analyses the potential effects of the return migration on the Mexican labor market. According to the National Survey of Occupation and Employment (ENOE), return migrants to Mexico started to significantly increase since the third quarter of 2005 to the third quarter of 2009, and after that the number of returned migrants started to slightly decline until the second quarter 2013. Considering the availability of data an empirical econometric model is established including the unemployment rate as dependent variable and the real GDP and socioeconomic characteristics of migrants as explanatory variables. The results showed that changes in return migration have a positive impact in changes in the unemployment rate. On the other hand, the real GDP and migration to the USA have had a negative impact on the unemployment rate of Mexico. Given the increase of unemployment reported in ENOE, the results suggest that the inadequate capacity of the Mexican economy to absorb the return migration workers is limited.

Keywords: Return migration, migration, labor market, unemployment rate

Resumen

Desde el 2012, la migración de retorno de México se ha estabilizado mientras que los flujos de trabajadores migrantes se ha reducido substancialmente. En este contexto, el presente trabajo analiza los efectos de la migración mexicana de retorno en el mercado laboral en México, en particular, en la tasa de desempleo. De acuerdo a la Encuesta Nacional de Ocupación y Empleo (ENOE), la cantidad de migrantes de retorno hacia México se incrementó entre el tercer trimestre de 2005 y el tercer trimestre de 2009 y, posteriormente, el número de migrantes retornados empezó a declinar ligeramente hasta el 2013. Con base en la disponibilidad de información estadística de la ENOE se realizó una regresión de mínimos cuadrados para analizar el efecto de los cambios del PIB real y los cambios en los flujos migratorios de trabajadores mexicanos a los EUA en los cambios de la tasa de desempleo en México. Los resultados corroboran que los cambios en la migración de retorno tienen un impacto positivo en la tasa de desempleo de México. Por otra parte, el PIB real y la migración de trabajadores mexicanos tienen un impacto negativo en el desempleo laboral de México. Por tanto, considerando que la ENOE ha mostrado un incremento de la tasa de desempleo de México, los resultados sugieren la poca capacidad de la economía mexicana para absorber los migrantes de retorno y la migración declinante de trabajadores mexicanos hacia los EUA.

Palabras Clave: Migración de retorno, migración, mercado laboral, tasa de desempleo

1. Introduction

Mexican migration is the expression of the differences in the demographic transition and the economic and social differences between in the U.S.A. and Mexico. These conditions have generated an increased demand of unskilled workers to fill the shortage of labor supply in the economic activities in the U.S.A. However, it is important to point out that migration flows are accompanied by counter-flows to the country of origin and that those can be classified as permanent, return and circular migration. Obviously, there are multiple socio-economic factors that affect the migratory process and, therefore, there are a variety of theoretical approaches and analytical frameworks seeking to define conceptual structures in order to draw attention to different explanations of the logic of the decision to migrate (Arango, 1985). In order to explain the migration phenomenon, a diversity of theoretical approaches have been developed (Massey et al, 1993).

From the economic perspective of the neoclassical theory at both the macroeconomic level (Lewis, 1954; and Harris and Todaro, 1970), and the microeconomic level (Sjaastad, 1962) and (Borjas, 1989), the international migration flows are determined by labor market mechanisms. The first approach underlines the wage differentials and the probability of finding employment. On the other hand, the microeconomic perspective puts emphasis on the decision to migrate based on a cost-benefit analysis of the costs of migration and the potential income that migrants can earn in the sending country.

Evidently, there are additional economic factors that affect migration. For instance, from the neoclassical perspective, the “failed” migratory experience is related to the lack of expected income, when considering the wage differentials between the receiving and sending countries. In addition, it has been pointed out that the reasons for return migration are related to the fact that undocumented migrants have an incentive for returning to their country of origin due to the lack of possibilities of receiving wages according to their labour skills (Dustmann 1999, 2003a, 2003b), (Reagan and Olsen, 2000) and (Orrenius and Zavodny, 2005).

It is important to mention that another theoretical explanation of the determinants of international migration has its foundation in the models of “rational decision” and segmented markets. According to this approach, international migration is linked to demand factors in the receiving industrialized countries (Piore, 1979). In addition, some studies have proposed that it is important to generate improved economic conditions in the sending countries in order to reduce undocumented migration (Rotte y Vogler, 1998). Therefore, in addition to the population increase and differences in per capita income (Easterlin, 1961), the wage differentials between skilled and unskilled workers have been considered important push factors for migration (Hatton and Williamson, 1994).

Return migration is a concept that has evolved overtime and is related to the theoretical approaches and historical circumstances of its occurrence and therefore there are different typologies explaining such phenomenon (Jáuregui and Recaño, 2014). The return migration process occurs under different legal conditions such as voluntary return, compulsive return (conclusion of temporal permits, asylum rejections, etc.) and involuntary return such as deportation. However, although there are different aspects and factors that explain migration flows, the context of the economic recession of 2009 and the restrictive migratory policies applied by the U.S. government have negatively affected the probability of Mexican migrants obtaining employment, and therefore have impacted the structure of the Mexican migration flows.

It is worth mentioning that the economic effect of return migration on the sending origin country depends on the labor skills and capital that migrants bring with them. With respect to the effect on the labor employment of return migrants, other factors that also should be considered are related to the re-integration to the home country’s labor markets, particularly for the case of low-skilled workers (Dayton-Johnson, et al, 2009). Therefore, the effect of return migration can vary among different economies according to the degree of skills and job-matching circumstances.

As shown by the statistical data, return migration increased in the period of the economic recession in the USA and Mexico (Table 1), corroborating that Mexican return migrants return to their country, among other factors, based on wrong information or expectations about the economic opportunities or due to sudden unexpected econom-

ic events in the USA (Borjas and Bratsberg, 1996). Hence, since the occurrence of the international economic recession of 2008-2009, the Mexican migration flow has experienced important changes. On one hand, since 2005 an important decrease in the number of migrants to the USA was estimated (Mendoza, 2012) and, on the other hand, after a surge of return migration at the end of 2008, due the severe impact of the economic recession, a declining trend of this type of migration was experienced, although at a slower pace than the reduction in migration (Rendall, Brownell and Kups, 2011). Therefore, according to the ENOE, there is not enough statistical evidence that return migration has increased substantially since 2009 (Passel and Cohn, 2009).

Table 1. Mexican international migration flows, 2005-2013

Period	Emigrants	Return migrants	Migratory balance
2005/1-2006/4	2,140,451	615,264	-1525,187
2005/2-2007-1	1,882,025	619,387	-1262,638
2005/3-2007/2	1,491,132	663,874	-827,258
2005/4-2007/3	1,441,082	657,040	-784,042
2006/1-2007/4	1,429,406	622,504	-806,902
2006/2-2008/1	1,355,274	626,818	-728,456
2006/3-2008/2	1,189,442	651,925	-537,517
2006/4-2008/3	1,143,632	638,451	-505,181
2007/1-2008/4	1,124,492	605,066	-519,426
2007/2-2009/1	1,078,124	586,086	-492,038
2007/3-2009/2	967,100	624,315	-342,785
2007/4-2009/3	893,571	626,458	-267,113
2008/1-2009/4	892,339	593,674	-298,665
2008/2-2010/1	869,363	568,046	-301,317
2008/3-2010/2	778,458	561,648	-216,810
2008/4-2010/3	732,462	554,765	-177,697
2009/1-2010/4	698,810	526,554	-172,256
2009/2-2011/1	673,657	474,913	-198,744
2009/3-2011/2	643,238	473,807	-169,431
2009/4-2011/3	618,986	436,878	-182,108
2010/1-2011/4	597,652	413,660	-183,992
2010/2-2012/1	585,466	389,827	-195,639
2010/3-2012/2	562,755	386,829	-175,926
2010/4-2012/3	586,989	356,294	-230,695
2011/1-2012/4	573,792	349,525	-224,267
2011/2-2013/1	557,887	326,274	-231,613
2011/3-2012/2	449,581	301,194	-148,387

Source: Own elaboration with data from the National Survey of Occupation and Employment (ENOE).

Therefore, return migration has been stable until 2012; while migration flows to the USA have fallen substantially between 2005 and 2012, those changes have affected the supply side of the Mexican labor market. The Mexican return migrants re-entering the labor market have increased the number of workers available, therefore expanding the economically active population. As a result, the supply of labor with the same educational and technical skills in the Mexican labor market has increased. The potential effect of the returned migrant workers depends on the characteristics of the labor market, particularly on the capacity of the productive system to expand production of goods and, as a consequence, to increase the demand for labor (Longhi, Nijkamp and Poot, 2010). Therefore, the impact of Mexican return migration could be relevant to understand changes in the labor market, and particularly, the potential effect on the unemployment rate, given the set of low labor skills that determine the limited possibility of being employed in the Mexican labor market.

The objective of the paper is to study the recent trend of Mexican return migration in the period 2005-2013 and to evaluate the impact of return migration on the labor market of the Mexican economy. For this purpose, the study estimates the number of migrants that returned in the period from 2005 to 2013. Additionally, the labor characteristics of the return migration flow are calculated in order to determine the difference in the education and employment levels of the workforce with and without the returned migrant workers. Finally, a regression model was established to estimate the effect of return migration workers on the unemployment rate of the Mexican economy.

The paper is structured as follows: the first section is the introduction; the second section analyzes the methodology for estimating the Mexican migration flows, the third section studies the economic crisis of 2008-2009 and its effect on Mexican migration; the fourth section studies the changes in Mexican migration flows; the fifth section presents the relationship between Mexican return migration and the unemployment rate, and the sixth section presents the concluding remarks.

2. Methodology for the estimation of migration flows

Traditionally, Mexican migration has been characterized by an important component of return migration. This type of migration creates challenges for both the analy-

sis of Mexican migration and the implementation of migratory policies. The initial goal of the present paper is focused on calculating the migration and return migration flows of Mexican workers.

There are difficulties involved in estimating the Mexican migratory flows. One problem has to do with the different methods for determining the temporality of Mexican workers who return from the USA and stay in Mexico. Furthermore, generally the migration surveys sometimes do not include specific questions related to return migration. In order to estimate Mexican migration and return migration flows, two databases are used. In this way, the methodology for calculating both migration and return migration utilizes different information structures within the databases used, specifically considering the time length of return migration and the socio-economic variables included in the survey.

In this paper the source for obtaining the information on Mexican migration flows is the National Survey of Occupation and Employment (ENOE). Although there are several sources of information for determining the flows of Mexican migration such the ENAID and the Population Census, the ENOE was selected because it provides regularity in the seasonal characteristics of migration flows (Rendall, Brownell, and Kups, 2011). Also, this survey provides the information necessary for determining the residency of the Mexican workers interviewed.

The calculation of migration and return migration based on the ENOE uses socio-demographic information that indicates changes in the composition of the households. For the case of the population returning to Mexico, there is information for both the composition of the households and the individuals belonging to the family unit with plans to locate in another state or country. This information also contemplates age, gender, place of birth, schooling, and wages earned inside and outside of the state of origin, employed and unemployed population, and health conditions. For the case of the population emigrating, the information is related to variables such as gender, age, marital status and the reasons for migrating.

For the construction of the migratory flow calculation, a key variable is constructed for each of the periods of analysis, since it concentrates specific information

about cities, states, periods, and the number of households. Afterwards, the methodology links the quarterly databases in order to accumulate consecutive periods that are statistically significant. This method provides stability for the different counts of the periods; because each one has a proportional sample close to 80% of the population interviewed that change in each quarter, and therefore only 20% of the sample changes each quarter.

In order to estimate Mexican migration and return migration the ENOE was used as an information source, because it provides the information necessary for determining the residency of the Mexican workers interviewed. Following the methodology used by National Institute of Statistics, Geography and Informatics (INEGI), estimates of migration to the U.S. and return migration of Mexican workers were calculated for the period 2005-2013. The estimations of the quarterly flows for a two-year accumulated period revealed that Mexican migration exhibited different trends for the both the migration and return migration flows.

3. The economic crisis of 2008-2009 and Mexican migration flows

The international economic recession that concluded its first phase in 2009 has had an important effect in both the Mexican and American economies. The reduction of economic activity in those countries impacted not only trade and investment but also the migratory flows of Mexican workers between those countries.

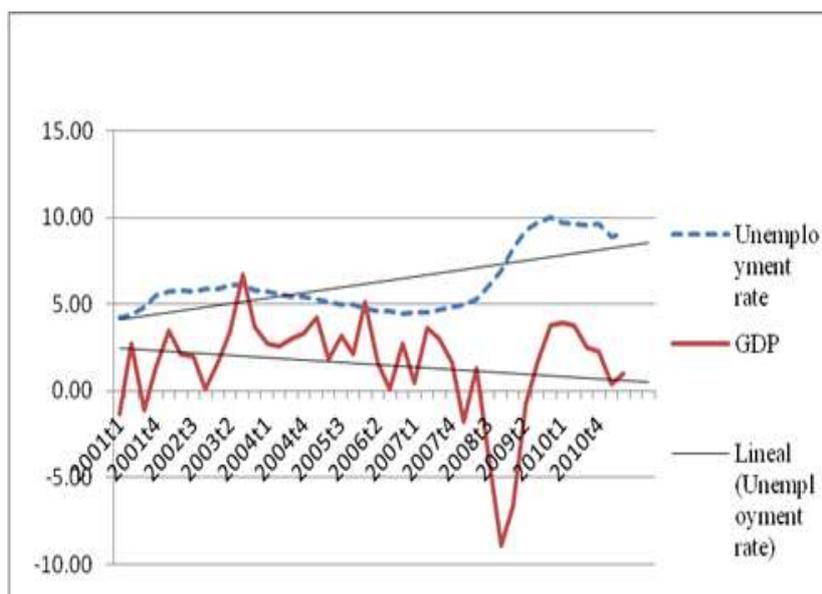
The origins of the economic recession are related to the financial crisis experienced in the financial and real estate sector of the US economy. The abundance of international savings (particularly from China and Japan) in the USA during the nineties (global savings glut) increased the availability and lower the cost of money. The economic phenomenon was originated by the accumulation of international reserves of leading exporting countries and the consequent export of capital towards the USA as well as the financial deregulation undertaken in the USA.

The economic recession of the USA impacted the unemployment rate of that economy. In the case of the Mexican economy, the economic integration with the USA has contributed to the transmission of the economic recession from the U.S.A. to the

Mexican economy, contracting the GDP and also increasing the Mexican unemployment rate. The analysis of the GDP and unemployment rate fluctuations in Mexico and the USA shows the current link between both economies. As a consequence, and given the “informal” integration of the labor markets of both economies, the recession has impacted the migratory flows of Mexicans to the USA.

3.1 The impact of the economic recession on the Mexican labor market

The analysis of the U.S. economy shows that from the third quarter of 2007, the GDP and the unemployment rate of the U.S.A. exhibited opposite trends; the GDP shrinking from 3.6% to -6.7% from the first quarter of 2007 to the first quarter of 2009 and the unemployment rate increasing from 4.5% to 8.2% in the same period . These opposite trends deepened until the first quarter of 2011 (Figure 1).

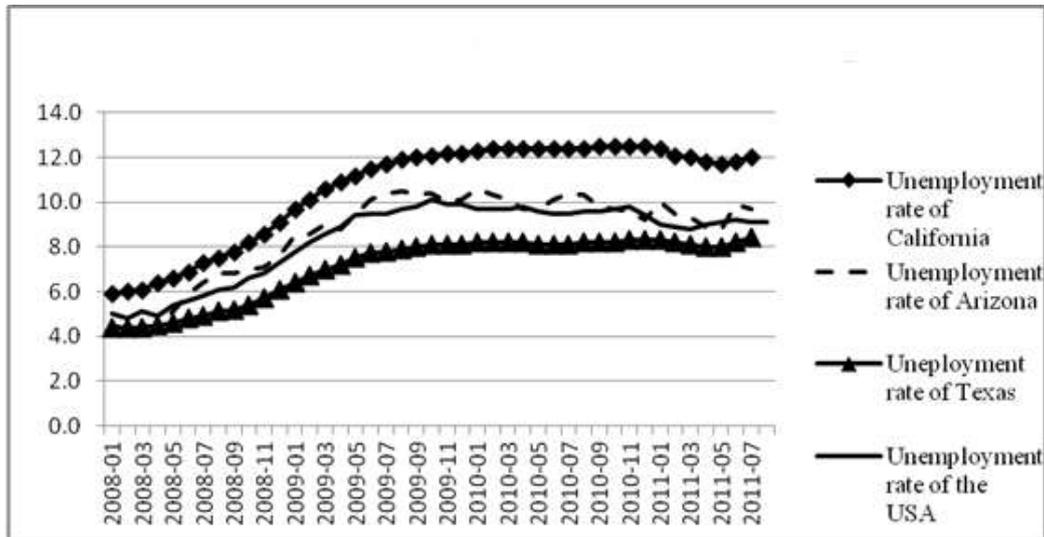


Source: Bureau of Labor Statistics, United States Department of Labor.
<http://www.bls.gov/home.htm>.

Figure 1. GDP and unemployment rate of the USA

Another characteristic of labor unemployment in the USA is related to the high unemployment rates of the states along the Mexican border, particularly the states of California and Arizona, which are states with a high number of Mexican migrants and large population of Mexican origin. In fact, the unemployment rates of those states were higher than the national average. For the case of Arizona the monthly unemployment rate in January of 2008 was smaller than the national average (4.5% and 5%); however,

since 2009 the unemployment rate has been higher than the national rate . The state of California, which already had a higher rate of unemployment than the national level at the beginning of 2008 (5.9% against 5%), increased to a level of 12.5% against the 9% national average in December of 2010 (Figure 2).



Source: Bureau of Labor Statistics, United States Department of Labor. <http://www.bls.gov/home.htm>

Figure 2. Unemployment rate of the US states with higher unemployment rate

The comparatively higher unemployment rate of California has important implications for the structure of the Mexican migratory flows towards the USA. According to a study made by the Homeland Security Department, the number of undocumented migrants in the USA was 8.46 million people in 2000; from that number 2.51 million were located in California and 1.09 million in Texas. It is worth mentioning that the number of undocumented migrants rapidly increased to 10.79 million in 2010. From the total of undocumented migrants, 4.68 million of these were Mexicans in 2000, increasing to 6.64 million in 2010.

Thus, high unemployment is a factor that affects the possibility of employment for undocumented migrants, particularly Mexicans, which would tend to lead to lower migratory flows from Mexico. Finally, it is important to point out that the unemployment rate for the Hispanic population has been higher than the national rate, which has become an additional barrier for the hiring of Mexican origin workers, because they compete in the low skill segment of the workforce.

4. The changes in Mexican migration flows

One of the first characteristics of return migrants which relates to labor skills is the years of schooling. According to information from the ENOE, the Mexican labor force returning from the USA exhibited low levels of education. From the first quarter of 2005 to the fourth quarter of 2006, the average years of schooling was 4.5 years whereas in the last of period of 2011/3-2012/2 it increased to 7.3 years (Table 2).

Table 2. Mexican return migration: years of schooling, 2005/1-2013/2

Period	1	%	2 to 6	%	8 to 12	%	more than 13	%	Average	SD	Total
2005/1-2006/4	251,855	41.0%	171,949	28.0%	170,254	27.7%	20,283	3.3%	4.5	4.6	614,341
2006/1-2007/4	242,926	39.1%	191,847	30.9%	162,660	26.2%	24,148	3.9%	4.7	4.6	621,581
2007/1-2008/4	252,151	41.7%	168,760	27.9%	160,939	26.6%	23,216	3.8%	4.6	4.8	605,066
2008/1-2009/4	265,449	44.8%	135,971	22.9%	169,280	28.5%	22,434	3.8%	4.7	5.0	593,134
2009/1-2010/4	239,766	45.6%	107,448	20.4%	156,219	29.7%	22,771	4.3%	4.6	4.9	526,204
2010/1-2011/4	137,554	33.7%	92,379	22.7%	153,435	37.6%	24,273	6.0%	6.1	4.7	407,641
2011/1-2012/4	51,689	14.8%	88,765	25.4%	180,293	51.6%	28,508	8.2%	7.5	4.6	349,255
2011/3-2012/2	65,540	18.9%	85,137	24.6%	164,159	47.4%	31,715	9.2%	7.3	4.7	346,551

Source: Own elaboration with data from the National Survey of Occupation and Employment (ENOE). SD= Standard deviation.

Additionally, in the last period considered, the percentage of Mexican return migrants with one year of education represented 18.9% of the return migration considered in the survey, returned migrants with two to six years of schooling participated with 24.6%, with eight to twelve years accounted for 47.4% and with more than thirteen years was 9.2%. Therefore, it can be concluded that, although schooling for the return migration workers has slightly increased, a great proportion of those workers still continues to have only six years of education (Table 2). Finally a positive aspect related to the education is the expansion of the percentage of workers of eight to twelve years of education, which increased from 27.7% in the period of 2005/1-2006/4 to 47.4% in the period 2001/3-2012/2. However, this increase in the level of education is not enough to contribute substantially to the labor skills of return migrants.

With respect to the age and gender of Mexican return migrants, the information from the survey indicates that the average age of return migrants is 30 years with a

standard deviation of around 14 years. Therefore, return migrant workers are characterized by being in the peak of their labor life cycle. In that sense, return migration can be considered as a resource for the Mexican economy. Additionally, the distribution of return migrants in terms of gender shows that in the beginning of the period measures 80.9% were males and 19.1% females. However, for the last accumulated biannually quarters the participation of females in the total return migration increased 10 percentage points to reach 29.3% (Table 3).

Table 3. Mexico: age and gender of return migration

Period	Average age	Standard deviation	Males	%	Females	%
2005/1-2006/4	30.4	14.0	497,698	80.9%	117,566	19.1%
2006/1-2007/4	30.4	13.9	495,018	79.5%	127,486	20.5%
2007/1-2008/4	30.4	14.2	474,821	78.5%	130,245	21.5%
2008/1-2009/4	28.6	14.7	447,519	75.4%	146,155	24.6%
2009/1-2010/4	29.3	14.7	392,649	74.6%	133,905	25.4%
2010/1-2011/4	30.1	15.1	303,515	74.3%	104,779	25.7%
2011/1-2012/4	29.5	15.7	251,090	71.8%	98,435	28.2%
2011/3-2012/2	29.1	16.6	244,920	70.7%	101,737	29.3%

Source: Own elaboration with data from the National Survey of Occupation and Employment (ENOE).

5. Mexican return migration and the unemployment rate

According to the information from the ENOE, the return migration employed over 16 years of age, as a share of economically active return migrant workers represented around 70% in the period from 2005-1 to 2013-2. The data also shows that there was a small reduction of that ratio from 67.7% in the period of 2005/1-2006/4 to 64.2% for the period 2011/2-2013/2 (Table 4). Another interesting aspect of the impact of return migration on the Mexican labor market has to do the share of employed return migrants to the employed Mexican population. The share is rather small and only represented an average of 0.83% of the total Mexican employed population for the period analyzed. Therefore, according to the data from the ENOE there has been a minor effect of Mexican return migration on the labor market, given the rather slight amount of employed workers to the total employed population.

Table 4. Return migration and Mexican labor market, 2005/1 to 2013/2

Period	Return migration			Mexican labor population			
	Total	Economic active population (1)	Employed population (2)	Economic active population (3)	Employed population (4)	2/1	2/4
2005/1-2006/4	554,872	375,785	314,827	304,801,386	293,952,138	67.7%	0.87
2006/1-2007/4	560,595	391,288	326,848	311,603,695	300,263,426	69.8%	0.87
2007/1-2008/4	539,881	367,317	305,782	317,830,567	305,891,576	68.0%	0.86
2008/1-2009/4	507,839	339,110	266,833	321,536,222	306,708,219	66.8%	0.82
2009/1-2010/4	454,489	298,080	218,888	327,519,495	309,795,770	65.6%	0.78
2010/1-2011/4	352,998	230,616	166,437	337,738,772	319,727,938	65.3%	0.76
2011/1-2012/4	290,097	187,188	139,031	356,885,437	338,853,027	64.5%	0.78
2011/3-2013/2	276,638	177,609	144,496	360,979,771	343,047,771	64.2%	0.86
Average	460,860	309,654	246,514	327,328,309	312,459,097	66.9%	0.83

Source: Own elaboration with data from the National Survey of Occupation and Employment (ENOE).

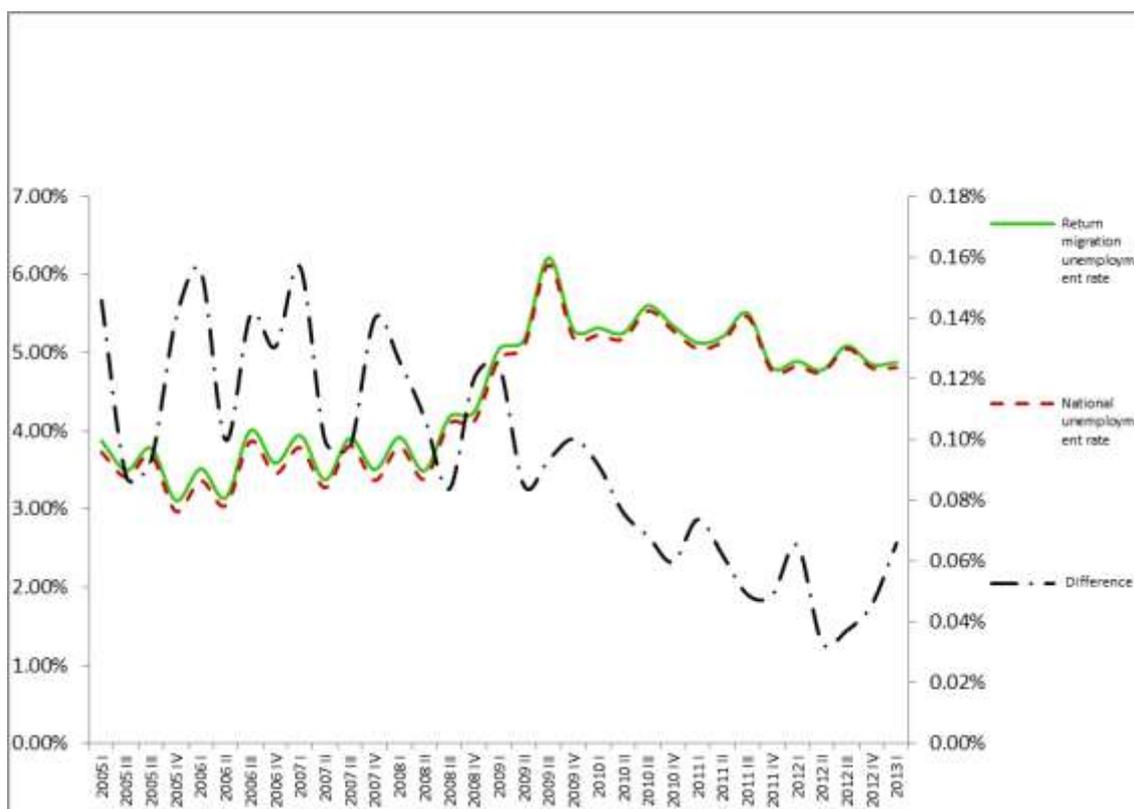
However, when calculating the unemployment rate of the Mexican labor market with and without the unemployed workers that belong to the return migration population accounted for in the ENOE, there are important characteristics that are important to point out. In the first place, the unemployment rate, taking into account the return migration in the economically active population, was systematically higher than the unemployment rate calculated for the economically active population without return migration. In the period of study, the difference between the national unemployment rate and the unemployment rate including return migrants was on average 0.10% (Table 5). Therefore, the estimations showed that, in general, return migration increases the unemployment rate, implying that there are important obstacles in the Mexican labor market to the absorption of the workers that return from their migratory trips.

Table 5. Mexico: national and return migration unemployment rate (16 years and above)

Period	Unemployment rate including return migration	Unemployment rate without return migration	Difference
2005/1-2006/4	3.56%	3.44%	0.12%
2005/2-2007-1	3.52%	3.40%	0.12%
2005/3-2007/2	3.58%	3.45%	0.13%
2005/4-2007/3	3.53%	3.39%	0.13%

2006/1-2007/4	3.64%	3.51%	0.13%
2006/2-2008/1	3.64%	3.51%	0.12%
2006/3-2008/2	3.75%	3.62%	0.13%
2006/4-2008/3	3.67%	3.55%	0.12%
2007/1-2008/4	3.76%	3.64%	0.12%
2007/2-2009/1	3.80%	3.69%	0.11%
2007/3-2009/2	4.04%	3.92%	0.11%
2007/4-2009/3	4.22%	4.10%	0.11%
2008/1-2009/4	4.61%	4.51%	0.11%
2008/2-2010/1	4.81%	4.71%	0.10%
2008/3-2010/2	5.07%	4.97%	0.10%
2008/4-2010/3	5.22%	5.12%	0.10%
2009/1-2010/4	5.41%	5.32%	0.09%
2009/2-2011/1	5.45%	5.37%	0.08%
2009/3-2011/2	5.45%	5.36%	0.08%
2009/4-2011/3	5.30%	5.22%	0.08%
2010/1-2011/4	5.33%	5.26%	0.07%
2010/2-2012/1	5.26%	5.19%	0.06%
2010/3-2012/2	5.20%	5.14%	0.06%
2010/4-2012/3	5.09%	5.03%	0.06%
2011/1-2012/4	5.05%	5.00%	0.05%
2011/2-2013/1	5.01%	4.97%	0.05%
2011/3-2012/2	4.97%	4.92%	0.05%
Average	4.52%	4.42%	0.10%
Source: Own elaboration with data from the National Survey of Occupation and Employment (ENOE).			

Additionally, both the national unemployment rate and the unemployment rate including of the return migration workers exhibited an escalation from the third quarter of 2008 to the fourth quarter of 2010, decreasing afterwards. This was caused by the international economic crisis of 2008-2009 that affected the economic activity of the USA and Mexico, reducing the opportunities of employment. However, it is important to mention that the difference between the unemployment rate with and without including the return migrant workers, presented a decreasing trend during the period of analysis (Figure 3). This diminishing trend is a consequence of the declining flows of Mexican migration and return migration exhibited since the third quarter of 2009.



Source: Own elaboration with information from ENOE.

Figure 3. Mexico: national unemployment rate and unemployment rate including return migrants

5.1 The impact of return migration on Mexican unemployment rate: a regression analysis

Similarly to the analysis of migration flows impact on the host country, the effect of return migration can be understood as a problem of absorption of labor force in the economy. Therefore, return migration could have macroeconomic consequences because it could increase the unemployment rate in the country of origin (Jean and Jimenez, 2007).

An empirical model to calculate the impact of return migration on Mexican unemployment in the short run was developed. Particularly, the short term dynamics are important because the different factors that determine return migration could be affecting the demand for employment of Mexican workers in Mexico. Among these factors the weaker social networks, seasonal migration and the cost of searching for a job stand out (Gitter, Gitter and Southgate, 2008).

The approach to estimating the macroeconomic determinants of the unemployment rate, considering return migration was established at the macroeconomic level, given the limitations of the information obtained from the ENOE, which does not yield statistically significant data at the regional level. However, it was considered that macroeconomic variables, such as the Mexican real GDP, would allow a general context to examine the relation between the economic activity and the level of unemployment. Additionally, socioeconomic determinants, such as the average level of education, age and gender of return migration were included as instrumental variables. Therefore, it is assumed that probability of not finding a job is related to age, gender discrimination and the level of education of return migrants.

5.2 Empirical strategy and specification

Following empirical studies by Felbermayr, Prat, and Schmerer (2011) and Nickell, Nunziata and Ochel (2005), an empirical econometric model was developed. This model considers that the unemployment rate depends on the economic activity and labor income but also adding the effect on the labor supply derived from return migration. The empirical econometric specification was established as follows:

$$u_t = \alpha_t + \beta_1 \ln(GDPR_t) + \beta_2 \ln(mry_t) + \beta_3 \ln(MR_t) + \beta_4 \ln(S_t) + \beta_5 \ln(MRm_t) + \beta_6 \ln(MRh_t) + \varepsilon_t$$

where

u_t = unemployment rate of Mexico at time t,

$GDPR$ = real gross domestic product of Mexico,

mry = average hourly wage of the Mexican return migration,

MR = biannually accumulated return migration by quarters,

S = average years of education of return migration,

MRm = return migration females

MRh = return migration males

\mathcal{E} = error term.

In order to give statistical significance to the data base, the period considered in the analysis is constructed by accumulating biannually the quarterly information that is provided by the National Survey of Occupation and Employment (ENOE) and it en-

compasses from the first quarter of 2005 to the second quarter of 2013 (27 observations). Additional information for calculating the real GDP was obtained from the Economic Information Bank from the Institute of Statistics, Information and Informatics and the Bank of Mexico.

5.3 Estimation results

Table 6 presents three different specifications, all of them using the log of the unemployment rate as the dependent variable and the log of all the explanatory variables. Column 1 presents the results of a linear ordinary least squares regression. The coefficients of the explanatory variables considered are in line with the basic hypothesis of the empirical model showing that return migration has a positive and statistically significant impact on the unemployment rate in the Mexican economy. This corroborates the initial analysis of the trends of the unemployment rate of return migration and its effect on the total unemployment rate.

Additionally, the real GDP has a negative effect on the unemployment rate, which is a result that corresponds to the generally accepted Okun's Law, which states a negative relationship exists between economic activity and the unemployment rate. Finally, the coefficient of the average years of education of return migration also had a negative but statistically insignificant effect on the unemployment rate. Also, the coefficient of return migration separated by gender did not exhibit statistically significant results for females but the coefficient for males was statistically significant. Finally, as expected the coefficient of migration, included as an instrumental variable, was negative indicating that the flow of migrants to the USA reduces the level of unemployment in Mexico.

The Durbin Watson statistic (DW) of the model was relatively low indicating the possibility of autocorrelation. A Breusch-Godfrey serial correlation test was estimated in order to corroborate the existence of autocorrelation. The results of the F statistics rejected the null hypothesis of the absence of autocorrelation with a probability of 0.202 and corroborated the serial correlation of the model. In order to solve that problem an AR(1) error model was estimated. This model adjusts the estimated initial regression coefficients and standard errors based on an autoregressive model allowing by

an iterative procedure to find the parameters that minimized the sum of the squared residuals (Table 6).

Table 6. Mexican unemployment rate and return migration regression analysis (OLS)]

Dependent variable: Mexican unemployment rate			
Least Squares			
Model	Least squares	Least squares AR (1)	White heteroskedasticity-consistent standard errors & covariance
C	85.1258 (10.969)*	81.2026 (8.295)*	81.2026 (8.337)*
LNS	-0.0390 (-0.292)	0.0026 (0.139)	0.0026 (0.014)
LNGDPR	-4.1591 (-9.407)*	-3.9933 (-7.501)*	-3.9933 (-7.164)*
LNf	-0.1138 (-1.301)	-0.0861 (-1.002)	-0.0861 (-1.172)
LNH	0.8192 (4.945)*	0.8047 (5.104)*	0.8047 (6.584)*
LNm	-0.4672 (-14.991)*	-0.4884 (-12.815)*	-0.488 (-11.505)*
LNMR	0.50322 (3.089)*	0.54731 (3.290)*	-0.547 (6.035)*
AR(1)		0.238285 (1.04)	0.238 (0.819)
Adjusted R-squared	0.986	0.986	0.986
F-statistic	306.884	264.7541	264.754
Prob(F-statistic)	0	0	0
Durbin-Watson stat	1.444	1.7202	1.7202

“*” statistically significant at 1% level of confidence, “**” statistically significant at 5% level of confidence.
 GDPR = real gross domestic product of Mexico, MR = biannually accumulated return migration by quarters, S = average years of education of return migration, F = return migration females, H = return migration males, M = Total emigration.
 ϵ = error term.
 Source: Own estimations.

The results of the second model corroborated the results of the first OLS regression model and improved the DW, which indicates that the serial correlation problem was solved. Finally, a White test to find the existence of heteroskedasticity was estimat-

ed (Table 7). The result of the F-statistic was 8.56 with a probability of 0.001 rejecting the null hypothesis of homoscedasticity. Therefore a White heteroskedasticity-consistent standard errors and covariance model was estimated in order to calculate asymptotic estimates of the standard errors consistent with the OLS model. In this model the coefficients showed the same sign as the ones in the two previous models, and were also statistically significant, providing more accurate estimates. Therefore, it can be concluded that the regression analysis corroborates the initial inspection of the data provided by the ENOE, providing support to the perspective that considers that return migration in developing countries such as Mexico cannot be absorbed by the labor market in the short run, thus increasing the labor supply and the unemployment rate.

Table 7. Mexico: Unemployment rate and return migration

Tests of Heteroskedasticity and Autocorrelation	
Breusch-Godfrey Serial Correlation LM Test:	
	Statistic
F-statistic	1.745
Prob. F(1,19)	0.202
Obs*R-squared	2.271
Prob. Chi-Square(1)	1.132
Heteroskedasticity Test: White	
F-statistic	2.674
Prob. F(6,20)	0.045
Obs*R-squared	12.017
Prob. Chi-Square(6)	0.062
Scaled explained SS	3.642
Prob. Chi-Square(6)	0.725
White test null hypothesis: $\sigma_i^2 = \sigma^2$	
Breusch-Godfrey test null hypothesis: $\rho_1 = \rho_2 = \dots = \rho_r = 0$. Source: Own estimations.	

6. Concluding remarks

Mexican return migration increased during the economic recession in the USA of 2008 and later it stabilized since the last quarter of 2009. However, migration flows to the USA have fallen substantially between 2005 and 2012; this phenomenon has affected the supply of labor in the Mexican labor market.

Return migrants are characterized for having low levels of education with an average of only 7.3 years. Therefore, the level of education is not enough to consider it a contribution for substantially increasing the labor skills of return migrants, although the average age of migrants indicates that this flow of workers is located at the basis of the population pyramid.

From the estimation of the unemployment rate of the Mexican labor market for return migration population based on data from the ENOE, there are important characteristics that stand out. In the first place, the return migration unemployment rate was systematically higher than the national rate of unemployment. Additionally, both the national unemployment rate and the unemployment rate of return migration workers exhibited an upward trend from the third quarter of 2008 to the fourth quarter of 2010, decreasing afterwards.

The econometric analysis corroborates the initial analysis of the trends of the return migration and its effect on the total unemployment rate and the negative effect of the real GDP on the unemployment rate. Finally, return migration exhibited a negative impact on the unemployment rate. Hence, the regression analysis suggests the insufficient capacity of the Mexican economic activity to absorb the additional workers that derive from return migration flows in the short run, and also the increasing pressure generated by the slowing pace of the migration flows to the USA.

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