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# Highly qualified Mexican immigrants in the U.S. and transfer of resources from Mexico to the U.S. through the education costs of Mexican migrants

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# Highly qualified Mexican immigrants in the U.S. and transfer of resources to the U.S. through the education costs of Mexican migrants

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## Abstract

In this article, we calculate the number of Mexican immigrants with doctorates living in the United States. We describe some of their characteristics and point to some factors that contribute to the emigration of this group of persons. We also quantify the transfer that Mexico has made to the United States through the education costs of the Mexican migrants prior to their emigration. On average, we find that over recent years Mexico has made a transfer of resources equivalent to just over half a percentage point of GDP each year.

# Highly qualified Mexican immigrants in the U.S. and transfer of resources to the U.S. through the education costs of Mexican migrants

Generally, when there are references to Mexican immigrants in the U.S., they are associated almost automatically and in a general way to people of low educational and income levels. Poverty is deep-rooted in those perceptions as an underlying determining factor in the migration of people. Nevertheless, as we have shown in previous issues of **Migration Outlook Mexico**,<sup>1</sup> a minimum level of income and education is required to assume the initial costs of migration. There has been little study of the emigration of highly qualified individuals in the case of Mexico, perhaps due to that prevailing perception regarding the profile of migrants. However, as we show in this article, emigration by this group is very important from various points of view: first, its size compared to the total number of Mexicans with high educational levels, which is significant; second, its trend, which is growing and more dynamic than that of traditional immigration; and third, its impact on technological transfer.

Some studies have considered the cross-border movements of people with a particular profile of knowledge as a channel for international technological diffusion.<sup>2</sup> It is clear that in the host countries, when the migration of highly qualified workers is of a more permanent nature, given that their human capital is high and can continue to increase over time through experience and participation in the development of new knowledge and technologies, this process translates into a rise in the growth potential of the country receiving immigrants. Though not in a symmetrical way, this could represent a loss for their countries of origin.

In this article, we present an analysis of highly-qualified migration from Mexico to the United States. Specifically, we approach the case of individuals with doctorates and quantify the number of Mexican immigrants at this educational level. We describe their characteristics and point out some features that contribute to the emigration of this group of persons. The study is complemented by a quantification of the transfer that Mexico has made to the United States through the educational costs of Mexican migrants prior to their emigration.

The main statistical base for identifying the number of migrants with doctorates is in the Current Population Survey-CPS published in the U.S. by the Census Bureau in March 2009, while the information regarding individuals of this educational level living in Mexico was obtained from the National Survey of Occupation and Employment (ENOE by its Spanish initials), published by the National Institute of Statistics, Geography and Information Technology (INEGI by its Spanish initials) corresponding to the first quarter of 2009.

## People born in Mexico with doctorates who live in the U.S.

According to CPS figures, in 2009 there were just over 20,000 Mexican immigrants with doctorates living in the United States. Of these, 46% entered the U.S. in the last two decades. The decades between the 1970s and 1980s accounted for 34%, while the rest entered prior to 1970. This shows the growing trend over recent years.

<sup>1</sup> In the edition of June 2009, poverty and education are analyzed at the municipal level as factors in the expulsion of Mexican migrants.

<sup>2</sup> UNCTAD Report (2007)

Chart 1

**Mexican migrants with doctorates in the U.S. by date of entry**

Period	Number	% share in the total
Antes de 1970	4,002	19.8
1970-1980	6,832	34.0
1990-2009	9,383	46.0
<b>Total</b>	<b>20,218</b>	<b>100</b>

Source: BBVA Research with Census Bureau data, Current Population Survey (CPS), USA, March 2009

According to ENOE figures for the first quarter of 2009, in that year slightly more than 80,000 persons with doctorate studies were living in Mexico, of whom 73,000 were born in Mexico. Therefore, around 20% of the people born in Mexico who have doctorates live in the U.S. The proportion is considerable, practically twice the 11% total of Mexican migrants in the U.S.. Another relevant comparison corresponds to the number of researchers with doctorates who are registered in the National Researchers System (SNI for Sistema Nacional de Investigadores) in Mexico. This figure is 16,000, lower than the number of Mexican immigrants with a doctorate in the U.S. (20,000). Thus, a significant proportion of highly qualified Mexican human capital is not being taken advantage of by the country.

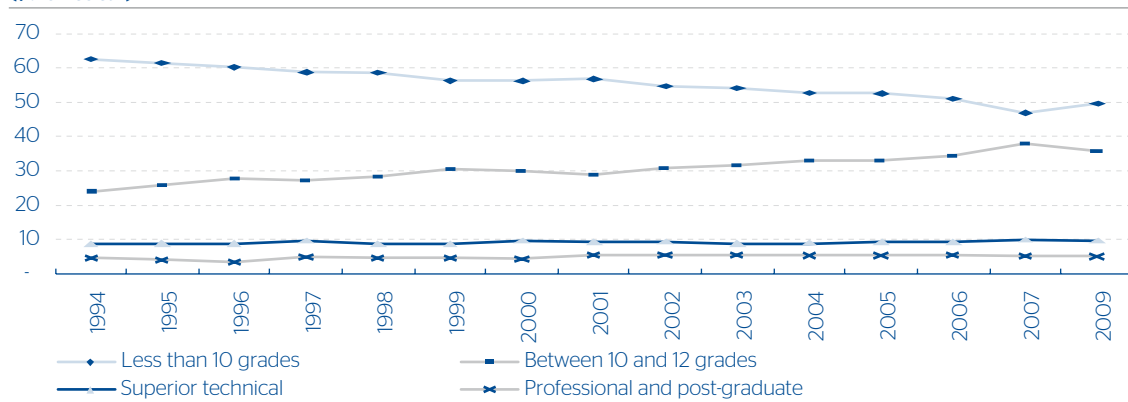
This initial result indicates that the number of highly qualified Mexican immigrants is of great importance, not so much in terms of its proportion out of the total number of immigrants, but because of its share of the total number of Individuals with high educational levels in Mexico

**By educational level, the proportion of Mexican immigrants with doctorates among the highest**

Over the last two decades, the educational level of Mexican migrants to the United States has tended to increase on average. There is a clearly decreasing trend in the population with fewer than ten years of schooling and a contrary trend among those with between 10 and 12 years of schooling. In other words, there are greater migratory flows of people with high-school studies. Although the proportion of migrants with a higher technical, professional and post-graduate level of education has not changed much, it has been increasing slightly. It can therefore be affirmed that the labor qualification of Mexican migration to the United States has increased. The number of migrants with between 10 and 12 years of schooling has multiplied by a factor of almost three between 1994 and 2009, and the number with superior technical, professional and postgraduate level schooling has doubled in each case.

Graph 1

**Population in United States born in Mexico by educational level (% of total)**



Source: Consejo Nacional de Poblacion (Conapo) (National Population Council) and BBVA Research based on the Census Bureau, Current, Population Survey (CPS), USA

Another interesting datum is that the average schooling of Mexican-born individuals aged over 15 living in the United States is of around 10 years, higher than the average schooling level in Mexico (just over 8 years for the same age range).

Chart 2

**Population in United States born in Mexico by educational level**

	<b>1994</b>	<b>1998</b>	<b>2001</b>	<b>2005</b>	<b>2009</b>
<b>Less than 10th grade</b>	<b>4,059</b>	<b>4,325</b>	<b>4,819</b>	<b>5,795</b>	<b>5,897</b>
<b>Between 10th and 12th grade</b>	<b>1,556</b>	<b>2,064</b>	<b>2,434</b>	<b>3,630</b>	<b>4,243</b>
<b>Higher technical</b>	<b>570</b>	<b>651</b>	<b>773</b>	<b>1,018</b>	<b>1,139</b>
<b>Professional and postgraduate</b>	<b>299</b>	<b>342</b>	<b>468</b>	<b>584</b>	<b>591</b>
<b>Total</b>	<b>6,485</b>	<b>7,382</b>	<b>8,494</b>	<b>11,027</b>	<b>11,869</b>

Source: Conapo, Consejo Nacional de Población and BBVA Research based on the Bureau of Census, Current Population Survey (CPS), EEUU

Another important reference for measuring the migration of qualified Mexicans or those with higher educational levels is to consider their proportion of the total population with the same educational level in the country. The educational equivalences of Mexico and the United States of the Ministry of public Education in Mexico for 2009 were used for this purpose. In general, the lowest percentages are found at the lowest educational levels, starting with those with no schooling, followed by primary or secondary school. This indicates that for every Mexican with a relatively low educational level, the number of Mexican migrants in the U.S. with that same educational level is, in general, lower than in the case of higher educational levels (high school, technical, professional, Master's Degree or doctorate).

What the above figures show is a relationship indicating that the higher the educational level, the greater the probability of emigrating. The highest proportion is at high school level: the 4.2 million Mexican migrants living in the U.S. with this educational level in the United States represent 37% of the 11.5 million living in Mexico with the same educational level.<sup>3</sup> Doctorate holders are in second place: in this case, the proportion represented by Mexican immigrants in the U.S. is 25% of the total number of doctorate holders in Mexico. In other words, for every 4 people in Mexico with doctorates, there is 1 Mexican immigrant in the United States with the same educational level.

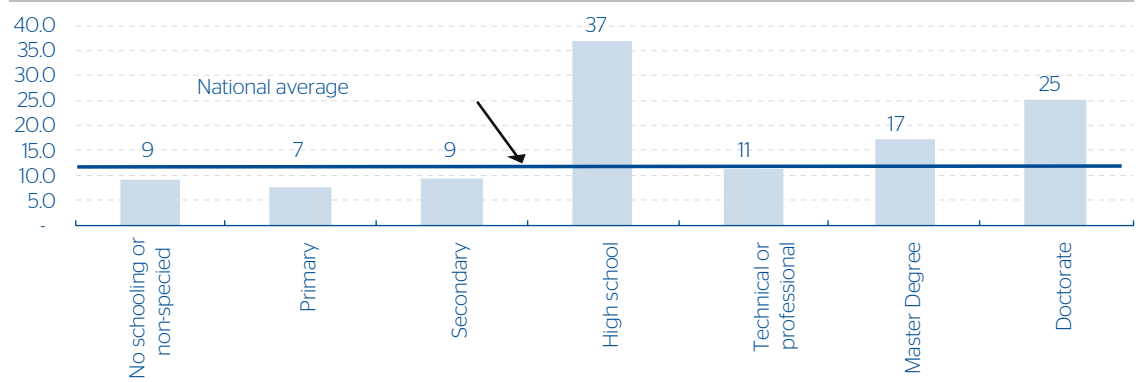
Even though the number of highly qualified immigrants represents a small share of the total number of Mexican immigrants in the U.S., the proportion is relatively high in terms of the total number of highly qualified people in Mexico. The probability that a Mexican with a doctorate will migrate to the United States is 4 times higher than in the case of a Mexican with primary school studies and 3 times higher than a Mexican with secondary school studies. In the following sections, we will attempt to discover the factors that could have a bearing on this situation.

Compared to other developing countries, Mexico has rates of qualified emigrants (including people with post-secondary studies) that are higher than countries like India, Iran, Brazil, Colombia, lower than those of Vietnam and Cuba and similar to those of the Philippines (UNCTAD, 2007).

<sup>3</sup> Lowell, Pederzini and Passel (2006) find that for the year 2000 the percentage share was highest at the doctorate level. The marked increase in migration of Mexicans with high educational levels is what has modified the relative percentage shares.

Graph 2

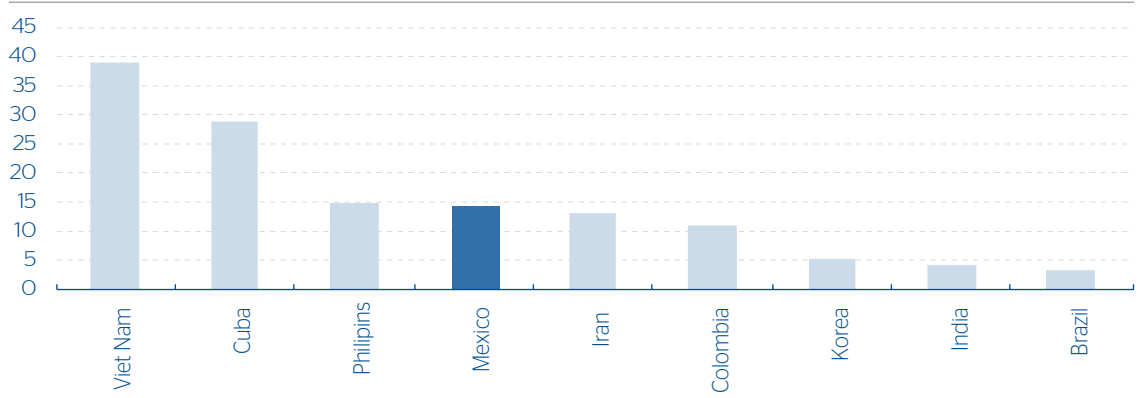
**Percentage of Mexican immigrants in the U.S. as proportion of total population in Mexico, by educational level, 2009**



Source: Prepared by BBVA Research, based on Current Population Survey (CPS), March 2009, and National Survey of Occupation and Employment (ENOE) first quarter 2009

Graph 3

**Rates of qualified migrants in developing countries, 2000**



Source: UNCTAD, 2007

Note: Qualified migrants are people with tertiary education, i.e. post-secondary school studies

**Characteristics of Mexicans with doctorates in Mexico and in the U.S.**

According to ENOE figures, the proportion of Mexican men with doctorates in Mexico is much higher than women, 69% vs. 31%. In the United States, according to CPS results, the number of Mexican women with doctorates is similar to that of the men. Some studies have shown that educational selectivity is higher for women immigrants at the highest educational levels (See Lowell, Pederzini and Passel, 2006; and Kanaiupuni, 2000); in other words, men with lower educational levels have a greater probability of emigrating, while in the case of women it is those with a higher educational level who are more likely to emigrate.

Although the average age tends to be relatively similar in both groups, it has been observed that the proportion of Mexicans with doctorates living in the U.S. is higher both among the young (under 40 years of age) and the old (over 60 years of age). This seems to suggest that a few years ago, the emigration of Mexicans with higher educational levels was high, then, it decreased its dynamism, and, recently, it has accelerated. Lastly, as to the number of hours per week that Mexicans with doctorates work, it seems to be slightly higher in Mexico than in the U.S., according to figures of both surveys.

Chart 3

**Characteristics of Mexican workers with doctorates, by country of residence**

	<b>Mexico</b>	<b>United States</b>
<b>Gender (%)</b>		
Male	68.8	50
Female	31.2	50
<b>Average age (years)</b>	47.2	48.1
<b>Age Ranges (%)</b>		
Under 40	31.9	34.1
41-50	30.3	22.4
51-60	25.2	20.7
Over 60	12.6	22.9
<b>Weekly hours worked (average)</b>	38.1	35.1

Source: BBVA Research, based on the Current Population Survey (CPS), U.S. March 2009, and the National Survey of Occupation and Employment (ENOE) first quarter 2009

**Factors stimulating the emigration of highly qualified Mexicans to the United States**

**a. The wage gap between the United States and Mexico**

One of the first formal analytical frameworks for understanding the migratory phenomenon is the classic model of Harris and Todaro (1970), according to which the main motivation for migration from one area to another resides in the better economic conditions that are reflected in the expected income spreads between the two areas. According to this model, the elimination of the wage spread, for example through trade and labor integration between the two economies that would boost wage convergence, would tend to reduce incentives for migration.

Extensions of the Harris and Todaro model incorporate a focus on human capital. It is based on the assumption that individuals are, by nature, different from one another, in personal abilities, knowledge, capacity to adapt, education, etc., as well as their physical characteristics such as age, sex, etc. These differing characteristics would lead to varying income expectations. The resulting differences in the returns on investment in human capital can therefore explain the different propensity to emigrate. Migrants are selected according to their specific abilities on the basis of the structure of labor markets and population policies (De Haas, 2008).

The analytical framework indicated was the basis for obtaining the income earned on average by persons with doctorates in Mexico (using ENOE figures), as well as what is earned by Mexican immigrants with doctorates in the United States (using CPS figures). These results could be biased downward, since it is common for people in the highest segment of distribution to tend to report a lower income in surveys.

The ENOE indicates that Mexicans with doctorates living in Mexico earned on average 111 Mexican pesos per hour in the first quarter of 2009; which meant an average monthly income slightly higher than 20,000 Mexican pesos. Mexican immigrants with doctorates in the United States earned on average 378 Mexican pesos per hour in 2009, or around 66,000 Mexican pesos monthly. In other words, according to the results of these two surveys, a Mexican with a doctorate would tend to earn just over three times in the United States what he or she would earn in Mexico.

Chart 4  
**Average income of Mexicans with doctorates in 2009, by country of employment (Pesos)**

Period	Mexico	United States	B/A
	A	B	
Per month	20,056	65,908	3.3
Per hour	111.3	376.1	3.4

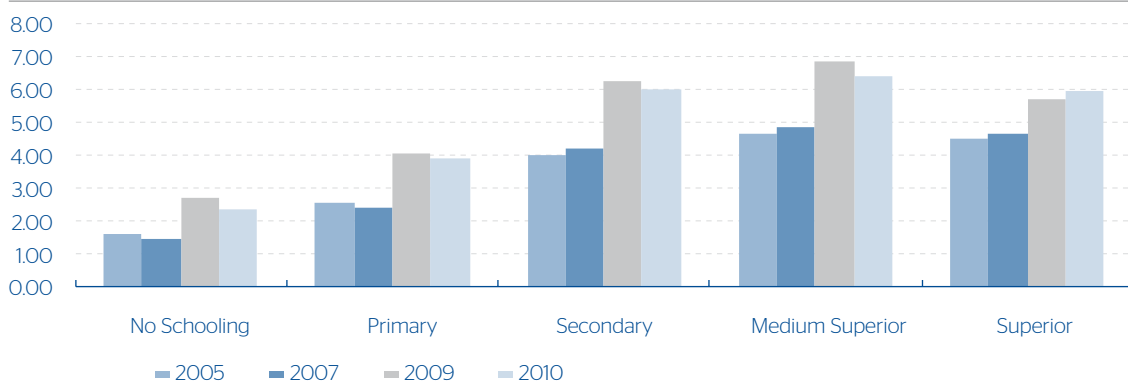
Note: The average exchange rate (pesos per dollar) considered in the estimate was that of the first quarter of 2009, 14.3  
Source: BBVA Research based on the Current Population Survey (CPS), U.S. March 2009, and National Survey of Occupation and Employment (ENOE) first quarter 2009

**b. The lack of opportunities in Mexico**

Another factor that could be crucial to the high proportion of highly qualified immigrants in the U.S. is the lack of opportunities in Mexico. According to figures of the National Survey of Occupation and Employment (ENOE), higher rates of unemployment are found among the population with higher educational levels (medium and higher education). Although within a context of a crisis such as the recent one, people with higher education did not increase their unemployment rates as much as occurred in other levels, it is clear that there are restrictions for the sectors of the population with a higher educational level that prevent that all those looking for a job from finding one. There is no correspondence between job supply and demand, and this could be a sign of segmentation between the labor markets for the highest educational levels, apart from the overall rigidity of the labor market in the country.<sup>4</sup>

When people in Mexico do not find a job for which they have been trained, they can either find a job in activities that do not correspond to their skills or emigrate to countries where they can apply their knowledge in a better way.

Graph 4  
**Unemployment rates in Mexico, by educational level**



Source: BBVA Research, based on Occupation and Employment (ENOE) first quarter 2009.  
Note: The figures for unemployment are based on the EAP at each educational level. The sample used is higher than one based on the Mexican Institute of Social Security (IMSS) figures

**c. Demand in the U.S. for qualified Mexican immigrants**

If a person to be employed in any market, he or she has to be hired. Even with the lack of opportunities in Mexico, highly qualified Mexicans do not migrate to the United States if there is no demand for them. It is less costly to be unemployed here than there.

<sup>4</sup> Some studies have shown evidence of labor segmentation in the Mexican labor market. See, for example, Esquivel and Ordaz-Díaz (2008), Gong and van Soest (2002).



In the period 2000-2009, employment of people with higher education in the United States grew by approximately 24%, and in the case of Mexican immigrants, this figure was five times higher (approximately 118%). As a result, the proportion of Mexican immigrants among the total number of workers with higher education rose from 0.5% to 0.9% during this period, despite the crisis year of 2009 when Mexican immigrants were the most affected in terms of employment.

In other words, in relative terms the demand covered by Mexican employees with higher education has increased more than in the case of the rest of the workers in the United States.

Chart 5

**Employment indicators for people with higher education in the U.S., 2000-2009**

<b>% Change</b>	
Total workers	23.5
Mexican migrants	117.8
<b>Share of Mexicans in total jobs</b>	
Year 2000	0.52
Year 2009	0.93

Source: BBVA Research with Current Population Survey (CPS) figures, U.S., March 2000 and 2009

**Transfer of resources from Mexico to the U.S. through the educational costs of Mexican immigrants**

This section deals with the specific case of migration from Mexico to the United States. The idea is to quantify the transfer of educational costs during the years 1994-2008 of people that were born in Mexico and live in the United States. It includes a description of the methodology and sources.

Different economic theories attribute a significant role to education in economic growth and welfare. According to some theoreticians, the costs of education or training represent investments that could be considered from an economic standpoint as capital; in fact they are described as investment in human capital, since they generate economic profitability. In other words, education creates and develops certain capabilities and skills that are reflected in greater productivity, which leads to higher wages, in addition to generating greater economic growth in the productive process.

When people emigrate, their education can be used in the host countries without these countries having paid for or invested in the migrants' education, since in many cases the costs are paid in their source countries. Thus, the countries of origin transfer the costs of the education of the immigrants to the destination countries. This does not mean that the expense is not made use of by the countries of origin: immigrants obtain payment for their work and part of this is sent to their countries of origin through remittances, which could compensate to some extent for the educational expenses incurred.

It is important to note that the results obtained herein do not represent the total transfer in human capital from Mexico to the United States, since they do not include other costs incurred by the Mexican government or civil society for future Mexican immigrants, such as health or food or the provision of other public services. Nor does it represent the total migration costs for Mexico by including the amount that immigrants did not produce in their country, or other costs that their emigration implies.

### Education level and years of entry of Mexican immigrants in the United States

The main source of information is the March 2009 edition of the Current Population Survey-CPS. This survey contains information on the characteristics of the resident population in the United States, both domestic and foreign. With regard to foreigners, it includes data such as their place of origin, year of entry or arrival in the United States and education level.

According to the CPS, in 2009 there were 11.87 million Mexicans in the United States, of whom 5% (around 600,000) had professional or postgraduate level studies; of these, 200,000 entered the United States between 2000 and 2008.

A further 9.6% (1.1 million) had a higher technical educational level studies; of these, 52% entered the United States between 1990 and 2008.

A total of 4.2 million have an educational level of between 10th and 12th grade, of whom 1.3 million entered the U.S. between 2000 and 2008. Almost half of the Mexican immigrants in the United States, at 5.9 million, have less than 10 years of schooling; 37% of these entered the United States in the present decade.

Thus, the proportion of Mexican immigrants with high labor qualifications (professional and postgraduate) has grown in the United States.

Chart 6

#### Breakdown of Mexican immigrants in the U.S. by year of entry and education level, 2009 (%)

Year of entry	Nivel de escolaridad			
	Less than 10th grade	From 10th to 12th grade	Higher technical	Professional and postgraduate
Before 1990 or NA	16.9	12.1	4.6	2.0
1990-1991	2.3	2.7	0.8	0.2
1992-1993	2.3	2.0	0.5	0.2
1994-1995	2.8	2.6	0.7	0.2
1996-1997	2.9	2.2	0.6	0.3
1998-1999	4.1	3.4	0.6	0.4
2000-2001	5.1	3.7	0.6	0.4
2002-2003	4.1	2.5	0.3	0.4
2004-2005	4.0	2.0	0.4	0.4
2006-2008	5.0	2.7	0.5	0.5
<b>Total</b>	<b>49.7</b>	<b>35.7</b>	<b>9.6</b>	<b>5.0</b>

Note: NA = Not available

Source: BBVA Research, with figures from the Bureau of Census, Current Population Survey (CPS), March 2009

### Methodology for the estimation

The first step was to estimate the number of years of study of migrants in Mexico. This was done by using the formula indicated in 1) below: in other words, the number of years that person had resided in the U.S. was subtracted from the number of years of a person's schooling, based on the year of entry into the country. In those cases where a negative value was obtained, the number of years studied in Mexico was taken as 0.

$$1) \text{ Years of study in Mexico} = \text{Max} (0, \text{years of schooling} - \text{years in the U.S.})$$

This calculation will offer a conservative result on the value that Mexico has transferred to the U.S. through the cost of educating migrants, since it does not take into account that some people who have lived for several years in the U.S. have not studied a single year there.

Once the number of years that migrants studied in Mexico has been estimated, the educational costs per person are calculated according to the annual educational cost by educational level using figures from the Organization of Economic Cooperation and Development (OECD 2009). This includes levels from pre-school through higher education. In the calculation, costs corresponding to the year 2006 were considered as reference, and for purposes of the exercise they were assumed as constants in the years analyzed.

Chart 7

**Annual educational expense per student in Mexico including all services, 2006**

<b>Millions of dollars</b>	
Pre-school	1,978
Primary	2,003
Secondary	1,814
High School	2,856
Higher education	6,462

Source: OECD (2009)

**The size of the transfer**

The calculations made based on the methodology explained above result in an amount of US 81 billion. This figure represents an estimate of the transfer made by Mexico to the United States in the 1994-2008 period as the costs of the education of the Mexican immigrants in their country before they emigrated. This means that on average Mexico transferred USD 6 billion to the United States each year. Therefore, Mexico has on average made a transfer equivalent to slightly more than one half of a percentage point of its GDP.

Chart 8

**Estimate of the Transfer made by Mexico to the United States through immigrants' educational costs**

<b>Period</b>	<b>(Thousands of U.S. dollars)</b>
1994-2008	81,115,534

Source: BBVA Research

During this period, Mexico received around USD 185 billion in remittances from the U.S.; thus over the 1994-2008 period, for every dollar that Mexico spent on the education of the emigrants, it received slightly more than two dollars in return. This result can be interpreted by saying that migration has been profitable. Nevertheless, if other migration costs are considered, the profitability undoubtedly diminishes.

The United States has in turn obtained other benefits due to Mexican migration apart from the transfer of educational costs. In taxes alone (direct or indirect) paid by Mexican immigrants in the U.S., it received around 2.5 times what Mexico obtained in remittances between 1994 and 2008.<sup>5</sup>

These aggregate figures therefore suggest that the United States seems to receive a more favorable balance in economic terms than Mexico from Mexican migration.

<sup>5</sup> In the November edition of *Migration Outlook Mexico* more figures are offered on the positive economic effects in the U.S. of Mexican migration

## Conclusions: the urgent need to generate greater labor opportunities for Mexicans, a matter that is still pending

The loss of highly qualified human capital in Mexico is a reality. The highest emigration rates in Mexico are found among those with the highest educational levels. Overall, the number of Mexicans in the United States represents 11% of the total population of Mexico; in the case of people with a doctorate, this proportion is double. It is estimated that just over 20,000 Mexican immigrants with doctorates are living in the U.S., while in Mexico; there are slightly more than 70,000 Mexicans with the same educational level.

There is little doubt that human capital is a factor that contributes to economic growth. In this sense, Mexico could be losing out due to the emigration and the United States increasing its growth possibilities. In order to determine if this is happening, it is important to evaluate the net impact on Mexico this emigration; in other words, whether the possible earnings that could be obtained through remittances<sup>6</sup> or through the expertise that they gain abroad and apply in Mexico if they return offset not only the expenditure by the Mexican government on their education but also what they stop producing in Mexico. These will be some of the topics that we will be dealing with in upcoming issues of Migration Outlook Mexico in order to maintain a comprehensive focus on migratory dynamics. It is of great importance for Mexico to take advantage of the human capital that has left the country and generate the conditions for its rapid return.

Here we have indicated three factors that have a bearing on what is commonly known as the “brain drain.” The difference in wages between Mexico and the United States, the demand in the United States for this type of work and the lack of opportunities in Mexico would between them seem to be sufficient reasons from an economic standpoint to explain migration. These reasons are common for other migrant groups and sufficient to seek opportunities in another country. It would have to be noted that there could be other motivations to undertake migration, such as aspects relative to climate change, political and security considerations. These were some of the aspects described and analyzed in the first Issue of Migration Outlook Mexico.

Despite the above, at an internal level the debate in Mexico should be centered on generating greater opportunities for workers at all levels, not only for those with higher educational levels, even though this is where there is most unemployment. The Mexican economy is not absorbing a high proportion of qualified labor. Labor reform is and will be very important and could constitute a decisive step forward in this respect. There is no doubt that the productivity and competitiveness of the Mexican economy must increase, thus leading to higher wages. However, a more comprehensive reform should consider not only those elements that might increase employment opportunities, such as labor flexibility, social security or special training in certain areas, but also factors that can increase the demand for labor and generate incentives for greater public and private investment. This should gradually increase efficiency and at the same time create a more attractive environment capable of developing opportunities for all.

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<sup>6</sup> Remembering that the immigrants who send the lowest remittances are those of highest education levels see for example, Amuedo-Dorantes, Bansak and Pozo (2004)

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