An assessment of the benefits and costs of emigration in Mexico and Uruguay[1]

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Abstract

We compare costs and benefits of migration in Mexico and Uruguay by estimating a measure of net loss based on actual remittances and forgone labor income, consumption and assets. We use the average value of these variables by age. First, we assume that the age profiles of migrants and residents are equal. Then, we perform a sensitivity analysis to test this assumption. In the case of Mexico, we assume that age profiles of the migrant population correspond to those of the resident population with a basic level of education. In the Uruguayan case, we assume that they are similar to those of the population with middle-high educational level. The main conclusiones are: i) there are non-neglible benefits and costs other than the remittances; ii) the estimations are sensitive to the assumptions about the educational level of migrans; iii) the difference between countries is due to the difference in the age structure (Uruguayan migrants are older) and to the difference of the per capita loss by age.

Resumen

El trabajo busca comparar los costos y beneficios de la emigración para México y Uruguay. La metodología consiste en estimar una medida de pérdida neta que se obtiene a partir de una función basada en los ingresos por remesas y en el ingreso laboral, consumo y activos perdidos. Para ello usamos el valor promedio de estas variables por edad.. Primero se supone que el perfil por edad de la población migrante es igual al promedio de la población residente en el país. Luego se analiza la sensibilidad de los resultados a ese supuesto. Por eso, en el caso de México se hace una segunda estimación donde la distribución por edad de los perfiles para la población migrante corresponde a un individuo residente promedio

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con nivel educativo básico. En el caso de Uruguay, la segunda estimación supone que los perfiles de la población migrante son los de la población residente de nivel educativo medio alto. Las principales conclusiones son: i) los costos y beneficios otros que las remesas no son despreciables; ii) las estimaciones son sensibles al supuesto sobre el nivel edcuativo de los emigrantes; iii) la diferencia entre países se debe tanto a la diferencia en la estructura etaria del stock de emigrantes (de mayor edad en Uruguay) como a la diferencia del valor de la pérdida promedio por edad.

Introduction

A great branch of the literature that focuses on the costs and benefits of migration in sender countries studies the effect of remittances. Most of the studies for Latin America conclude that an important share of consumption and investment of recipient households are financed by remittances (Borraz y Pozo, 2007; Albo y Ordaz, 2009; Canales, 2008). However, the macro level effect is more controversial. Some studies found that remittances have a positive effect on economic growth (Pradhan et al, 2008; Orozco, 2002; Orozco and Wilson, 2005) but there is no consensus on the matter. For instance, in a comprehensive analysis of remittances in Mexico, Canales (2008) does not find any remittances effect on growth or poverty. Also, he argues that remittances are rather scarce to have a significant effect on private investments.

In this paper we study the costs and benefits of migration using a wider approach. We follow the methodology developed by Mejía-Guevara and Vega (2012) to assess the net economic loss in Mexico due to emigration to the United States. We apply this methodology to the Mexican and Uruguayan cases, two countries that have a long tradition of emigration

This proposal is based on the estimation of a loss function which is integrated by four variables. On one hand, migration entails costs because of forgone production. These costs are proxied by estimations of forgone labor and asset income. On the other hand, there are gains due to the forgone consumption; indeed, the consumption of migrants that does not require to be funded in the sender country. Finally, the loss funcion takes into account the production of migrants allocated in the sender country, that is, the remittances.

We may expect that the net loss generated by each migrant vary between migrants. Among all the dimensions that affect this heterogeneity, the proposed loss function chooses to take into account the age. Indeed, there is a loss function for each age "a" that gives an estimation of the average net loss associated to the stock of migrants who are age "a" at the year of the estimation. The aggregate net loss is obtained by adding the net losses of all the ages weighted by the stock of migrants of each age.

As Mejía-Guevara and Vega (2012), we perform an estimation in which assume that the average forgone labor income, asset income and consumption by age of the migrant

population are properly represented by a cross-section average age-profile of residents in the sender country. These profiles were estimated following the National Transfers Accounts (NTA) methodology (see Mason et al., 2009a). We use data of 2004 and 2006 for Mexico (Mejía-Guevara, 2011) and Uruguay (Bucheli and González, 2011), respectively.

Besides, we perform an estimation using the age-profile of a sub-population group Note that migrants are not randomly selected among population. As long as the variables that affect the decision of migration are correlated with production and consumption, the used average age profiles are not an accurate measure of the average age profile of migrants. Among these variables we chose to analyze the sensitivity of the estimated loss using the average age profiles of selected educational groups. Previous work suggests that the propensity to migrate declines with education in Mexico (Pellegrino, 2001) but increases in Uruguay (Vigorito and Pellegrino, 2005). Thus, we work with the age-profile of middle-low educated population in the Mexican case and with the middle-high educated population in the Uruguayan case.

In order to compare the results obtained for Mexico and Uruguay, we estimate the net loss per migrant in PPP dollars and we propose a decomposition of the loss difference between countries that captures two sources: i) the portion due to the difference in the age structure of the stock of migrants between countriesa and ii) the portion due to the difference of the per migrant loss by age.

The rest of the paper is organized as follows. The next session describes the main features of the Mexican and Uruguayan migration that contextualize the estimations: evolution of the migrant flows and main recipient countries, educational characteristics of migrants and the role of remittances. In section 2 we describe the methodology and the data. In section 3 we present the results and, finally, we draw the main conclusions.

1. MIGRATION IN MEXICO AND URUGUAY

Until the mid-twentieth century, Latin America had been a net recipient of migrants. Emigration was basically directed to bordering countries. But in the last decades of the

twentieth century, migration movements have risen significantly and flows to the U.S. and other developed countries increased substantially.

Mexican migration to the United States has existed since the beginning of the twentieth century. It was basically a temporary migration of people who aimed to work in agriculture or industry for a short time. In the 1970s and 1980s the number of migrants increased and migration acquired a long-term connotation. The Mexican government has been actively involved in migration policy throughout the century, sometimes encouraging and others discouraging migration in response to different political and economic circumstances. However, since the 1970s the government has no longer an explicit migration policy (Lozano, 2002). During the 1980s and 1990s it was considered beneficial -albeit implicitly- because of remittances. Since then, government involvement has been expressed through actions aimed at protecting Mexican immigrants within the U.S. (consular protection, etc.).

The number of Mexican-born living in the U.S. increased from 880,000 in 1970 to 2.2 million in 1980, reaching 4.4 million in 1990, 9.3 million in 2000 and 11.9 million in 2010[2] (CONAPO, 2012). According to Lozano (2002), migrants are mostly working-age people who are looking for stable and well-paid jobs. Besides, in a study of Latin American migration, Pellegrino (2001) finds that Mexican immigrants are less educated than the population remained in the country.

Most studies carried out for Mexico and Central America conclude that remittances constitute an important income source for recipient households (Orozco, 2002; Canales, 2008). According to the Bank of Mexico (Banco de México, 2012), the amount of received remittances grew from 6.6 billion in 2000 to 21.6 billion dollars in 2005[3]. Since then, there has been a relatively stable inflow of remittances, amounting around 21 billion dollars per year. Mexico is the second largest remittances' recipient in the world following India, and the first recipient in Latin America.

[2]Considering the population of Mexican origin in the U.S. (those born in Mexico and the second and third generation) evolution is: 5.4 million in 1970, 9 million in 1980, 14 million in 1990, 22 million in 2000 and 33 million in 2010.

[3]Other sources of information (Bureau of Economic Analysis, BEA, Encuesta Nacional de Ingreso y Gasto de los Hogares del Instituto Nacional de Estadística, Geografía e Informática de México,INEGI) do not register such a hugh increase. Thus, the increase reported by the Bank of Mexico could be due to a methodological change of the estimates introduced in 2001 (for more information see Canales (2008) and Tuirán et al (2006)).

Several studies estimate that in the mid-2000s, about 6% of Mexican households were receiving remittances (Amuedo and Pozo, 2006; Tuirán, Santibañez and Corona, 2006; Albo and Ordaz, 2009). Although they decreased after the U.S. economic crisis, they still are an important source of resources. According to Albo and Ordaz (2009) in 2008 they represented 27% of remittance recipient households' total income (30% among rural households). They represented a very important income source for recipient families in vulnerable situation, in households mostly headed by a female, an elder or a low-educated person.

In the case of Uruguay, a little country in between Argentina and Brazil, continuous population outflows to those countries existed since the 19th century. The late 1960s is considered the beginning of a large-scale emigration process explained by adverse political and economic contexts (see an overview of the evolution of Uruguayan migration in Pellegrino and Vigorito, 2005). The main destinations continued to be Argentina and Brazil but new destinations attracted many emigrants: the U.S., Australia, Venezuela, Mexico and to a lesser extent, some European countries. The second half of the 1980s and most of the 1990s were a period of prosperity signed by the return to democracy and a small inflow of former emigrants; however, emigration continued. In 1999-2002, a major regional economic crisis triggered a considerable migration wave. The main poles of attraction were U.S. and Spain. In short, at present the majority of Uruguayan living abroad are in Argentina, Brazil, Spain and U.S. At present, Uruguay has become one of the South American countries with the greatest percentage of its population living abroad.

Studies of the characteristics of Uruguay migrants are scare. Vigorito and Pellegrino (2005) use the available census data of the main destination countries and conclude that the emigration process involves all the educational groups. However, on average emigrants are more educated than the population remaining in Uruguay. This feature has been intensified during the last economic crisis.

Also the role of remittances has scarcely been studied. The general perception and few studies indicate that their amount is quite limited. In 2002, when the country was suffering a deep economic crisis, the Uruguayan Central Bank estimated that remittances were around 0.5% of GDP. Borraz and Pozo (2007) estimate the proportion of households

receiving remittances in 2002 using a specialized migration database carried out in December 2002: they were 1.88%, according to the authors. Also, using the Household Survey, Borraz and Pozo conclude that recipient households increased between 2002 and 2005, but their proportion was still rather small in the international comparison.

2. METHOD AND DATA

2.1. The loss function

Mejía-Guevara and Vega (2012) propose a loss function to evaluate the macroeconomic effect of migrants on the sender country. For each age of the stock of migrants (*x*), they define a loss function for period *t*:

$$l_t(x) = p_t(x) \,.\, [y_t^l(x) + y_t^{pa}(x) - c_t(x) - r_t(x)] \qquad (1)$$

where $p_t(x)$ stands for the number of migrants, $y_t^l(x)$ is the average forgone labor income, $y_t^{pa}(x)$ is the average forgone asset income, $c_t(x)$ is the average forgone consumption and $r_t(x)$ is the average amount of remittances by age *x* at time *t*.

Equation (1) defines an age-specific cost function that captures the loss in production and asset accumulation ($y_t^l(x) + y_t^{pa}(x)$) derived from migration. It also captures the gains from not having to fund migrants' consumption as well as the increase on revenue stemmed from remittances ($-c_t(x) - r_t(x)$). Under this framework, migration represents a loss for the sender country when the value of forgone production and asset accumulation is not offset by the gains from not having to fund consumption plus received remittances. If we denote *X* as the maximum age, the total loss in period *t* is defined as:

$$l_t = \sum_{x=1}^{x=X} p_t(x)[y_t^l(x) + y_t^{pa}(x) - c_t(x) - r_t(x)] \qquad (2)$$

Because of the size and currency differences between countries, we express the variables in US dollars PPP (base 2005). We perform two estimations, one for each country. In the first

estimation we assume that the average value of forgone labor income, consumption and private asset income of migrants are equal to the average values for the residents in the sender country. However, we are aware that migrants are not randomly selected. Among all the possible variables that affect the probability of migration, we chose the level of education. Thus, we perform a second estimation in which we use the average values for a selected group of the sender country's population, defined according to their level of education.

In order to compare the two countries we propose a decomposition of the loss difference. To simplify notation, we denote the mean cost of migration in US$ PPP by $z_t(x) = y_t^l(x) + y_t^{pa}(x) - c_t(x) - r_t(x)$ and we replace the sub-index *t* by *M* or *U* to distinguish Mexico and Uruguay, respectively. Then, we can write the loss difference between Uruguay and Mexico as:

$$loss_U - loss_M = \sum_{x=1}^{x=X} p_U(x) \,.\, z_U(x) - \sum_{x=1}^{x=X} p_M(x) \,.\, z_M(x) \quad (3)$$

If P is the stock of migrants, the loss per migrant is:

$$loss_U - loss_M = \sum_{x=1}^{X} \frac{p_U(x)}{P_U} . z_U(x) - \sum_{x=1}^{X} \frac{p_M(x)}{P_M} . z_M(x) \quad (4)$$

We add and subtract $\sum_{x=1}^{x=X} p_U(x)/P_U \,.\, z_M(x)$ where P_M and P_U denote the total stock of Mexican and Uruguayan migrants, respectively. Rearranging terms, we can rewrite equation (5) as:

$$loss_U - loss_M = \sum_{x=1}^{X} \left[\frac{p_U(x)}{P_U} - \frac{p_M(x)}{P_M}\right] . z_M(x) + \sum_{x=1}^{X} \frac{p_U(x)}{P_U} . \left[z_U(x) - z_M(x)\right] \quad (5)$$

The loss is decomposed in two terms in right hand side of the expression (5).

We call the first term the "age structure effect". When the term in brackets is positive (negative) it indicates that Uruguayan migrants are over(under)-represented on age x compared to Mexican migrants. We multiply this number by the Mexican loss associated to age x and we obtain an estimation of the contribution of the over(under)-representation by age x caused by Uruguayan migrants to the overall loss difference between countries. The sum for all ages counterbalances the over and under representations. We interpret that this term captures the effect of the difference of the age structure of migrants between countries.

The second term measures the "loss value effect". It is the sum for all ages of the difference of the loss between countries weighted by the number of Uruguayan migrants of the corresponding age. The term depends on the loss per migrant and on the age shape of the loss by age. But it does not depend on the size of each cohort -i.e. the age structure.

Performing an analogous decomposition, we can estimate the effects as in equation (6):

$$loss_U - loss_M = \sum_{x=1}^{X} \left[\frac{p_U(x)}{P_U} - \frac{p_M(x)}{P_M} \right] . z_U(x) + \sum_{x=1}^{X} \frac{p_M(x)}{P_M} . \left[z_U(x) - z_M(x) \right] \qquad (6)$$

2.2. Stock of migrants

We consider the stock of Mexican-born and Uruguayan-born living in the main destination of migrants. In the case of Mexico, we restricted the sample to first generation of Mexican immigrants living in the U.S. in 2004(King et al., 2010). As previously mentioned, the U.S. is the main destination of Mexican emigrants. We also consider just the first generation of emigrants in the Uruguayan case. As presented in section 1, the destination of Uruguayan migrants is more dispersed than in the Mexican case. For the Latin American destination countries, we worked with the data of the IMILA Project for Argentina (2006) and Brazil (2000). For emigrants in the U.S. we used the American Community Survey (2006) of the US Census Bureau and for Spain, the *Padrón Muncipal* (2006) of the *Instituto Nacional de Estadística* – Spain.

We had to deal with two problems: a) in the case of Brazil, the information was prior 2006, and b) the databases inform the number of Uruguayan-born by five-age groups, except in the U.S. where the information is available by single age.

In order to estimate the Uruguayan-born living in Brazil, we assume that there were no migration flows from Uruguay to Brazil between 2000 and 2006. We took into account migrants' aging according to time and Uruguayan five-age group life tables estimated by CELADE (2004) for the period 2000-2005.We performed the estimations using the life tables for men and women separately.

Once we had the stock in 2006 by five-age groups for Argentina, Brazil and Spain, we apply the Sprague multipliers to break the five-age groups into single ages for each country separately.

Adding the information of the four countries, we obtained a stock of 265,337 individuals, that is, 8% of the Uruguayan population in 2006. Note that Cabella and Pellegrino (2005) estimated that in 2004 around 13% of the Uruguayan-born population was living abroad.

In Figure 1 we present the stock of migrant by age for Mexico (left) and Uruguay (right). In the case of Mexico, we work with single ages from 0 to 90; for Uruguay, we work with single ages from 0 to 80. The difference in the shape between countries reflects a younger stock of Mexican migrants than Uruguayan. Indeed, the 21-30 age-group represents 27% of the stock of Mexican immigrants but 14% in the Uruguayan case. On the contrary, people older than 60 account for 7% of Mexican emigrants but 18% of the Uruguayan's. This is consistent with the long-run migration of Uruguay and the recent but sharp migration of Mexico.

2.3 Age profiles of labor income, consumption, private asset income and remittances

The age profile of the required variables is available by the National Transfers Account (NTA) Project that proposes a methodology to measure the life cycle deficit and age reallocations (Mason et al, 2009b). The estimates are consistent with the values of the National Account System. The age profiles are obtained through national microdata surveys. In short, the NTA system provides the average value by age of macro variables for a calendar year.

In Figure 2 we depict the mean per capita value by age of labor income, consumption, private asset income and remittances for Mexico (left panel) and Uruguay (right panel).The reference year is 2004 for the Mexican case and 2006 for the Uruguayan case. For all ages and variables, the values are divided by the average labor income of the 30-49 age-group of the own country ("labor income units" in what follows).

Labor income includes pre-tax earnings, fringe benefits, the labor component of self-employed and labor taxes paid by employers. As depicted in Figure 2, in both countries the shape of the labor income age profile looks like an inverse-U whose peak in Uruguay is at the right of the Mexican peak.

Consumption includes private and public consumption. As illustrated in Figure 2, it increases with age among children and young and then remains quite stable, crossing through the labor income hump. It is interesting to remark that both children and the elderly have a life cycle deficit in per capita values in both countries, but the deficit is higher in Mexico than in Uruguay especially for young ages. In turn, the surplus generated at productive ages is lower in Mexico than in Uruguay.

Private asset income consists of returns to capital and property income. Capital income includes the operating surplus of corporations, the share of mixed income attributed to capital and the imputed rent from owner-occupied housing. Property income includes interests, dividends and rents. Figure 2 shows that Mexican asset income age profile looks very different from the Uruguayan profile. The difference stems from the operating surplus of corporations. This item is very high in Mexico compared to Uruguay.

Finally, remittances age profile is only depicted for Mexico. Given the low weight of remittances in Uruguay, we assume that Uruguayan emigrants do not send remittances. In the case of Mexico, we assume that the age profile of remittances is proportional to the age distribution of labor earnings of the U.S. in 2003. However, the aggregate value is the reported by the National Accounts of Mexico for 2004.

When using the profiles shown In Figure 2, we assume that the average age profile of migrants is the same than the profile of an average person remaining in the country. However, in section 2 we mentioned that there is evidence that migrants are not randomly

selected. Thus, we performed an additional estimation of the loss function with alternative age profiles.

The past evidence shwos that emigrants from Mexico are more likely less educated than the average resident in Mexico. Thus, in the additional estimation we work with the age profile of the population with 6 to 8 years of schooling except for remittances, in which case we maintain the average profile of labor earnings in the U.S.

In the Uruguayan case, former research indicates that emigrants are more likely more educated than the average resident in Uruguay. Thus, the alternative estimation considers the age profile of the population with 9 to 11 years of schooling. This group represents 25% of the population in Uruguay in 2006; 51% has less than 8 years of schooling (compulsory education comprises 9 years) and 24% reports at least 12 years of schooling(high-school graduated).

Figure 3 illustrates the age profile of labor income, consumption and private asset income for the corresponding educational groups. In Mexico, the levels of the three variables are lower for the population with 6 to 8 years of schooling than for the average individual, getting closer to the graph of per capita remittances. Note that per capita private asset income maintains high values for elderly. In the Uruguayan case, labor income is lower for the population with 9 to 11 years of schooling than the average due to the high labor income levels of the highest educated group. Something similar happens to private asset income for younger than 60 years old. Instead, consumption is higher for the group than for the average individual especially in old ages.

3. RESULTS

3.1. Estimated per migrant loss

In Table 1 we report the estimated loss per migrant by component (labor income, consumption, asset income and remittances) for each country using the average profiles and the educational-specific profiles. According to both estimates, the net loss from migration is higher for Uruguay than for Mexico. When we use the average resident profile, the loss is US$ 1342 (PPP) in Mexico and US$ 3042 (PPP) in Uruguay (the per capita GDP in the years of estimation was US$ 11500 PPP and US$ 10500 PPP in each country,

respectively). Note that when we use the educational-specific profile, the loss decrease to only US$ 113 in Mexico and US$ 2383 in Uruguay.

Table 1. Loss from migration by components in US$ PPP (base 2005)

	Migrants are similar to …			
	Average resident		**Mid-low educated resident**	**Mid-high educated resident**
Component	**Mexico (A)**	**Uruguay (B)**	**Mexico (C)**	**Uruguay (D)**
Labor income	6981	7252	5653	6624
Consumption	-8737	-7617	-6430	-7629
Remittances	-2653		-2653	
Private asset income	5750	3408	3542	3388
Net loss	1341	3042	113	2383

Source: Estimates from the authors.

As we have already mentioned, labor income accounts for a loss since it represents forgone production. Consumption accounts for a gain because it does not need to be funded by the sender country. Thus, in Table 2 the sign of labor income is positive but the sign of consumption is negative. Despite the high proportion of working-age people in the stock of migrants in both countries the forgone consumption is higher than the forgone labor income.

In Figure 4 we depict the aggregate labor income minus consumption by age normalized by the stock of migrant. That is, for each country we show the contribution by each age to the difference between the labor income and consumption components presented in Table 1. In panel (a) we depict the results when we assume that the average labor income and consumption by age are similar to the residents'. The child and young gains clearly dominate in Mexico; thus, as shown in column A of Table 1, the sum of both components means a net gain of US$ 1757. In Uruguay instead, the gains in the two age-tails offset the

losses at mid-ages, so when we subtract consumption from labor income, there is a gain of only US$ 366 (column B of Table 1).

In the panel (b) of Figure 4 we show the estimates when we work with the educational-specific age profiles. Consistently with the estimates presented in section 2, the loss related to the forgone income in mid-ages decreases for both countries if compared with panel (a). In turn, in Mexico consumption of children and youngs declines whereas we do not see important changes in Uruguay. Consequently, for Mexico we obtain a lower gain than in the former estimation: as shown in column C of Table 1, the per migrant gain due to labor income minus consumption is US$ 777. But for Uruguay, the loss is higher than in the former estimation: US$ 1005 (column D of Table1).

Remittances represent a source of gains. We only register remittances in the Mexican case. The per migrant gain due to remittances are equivalent to US$ 2653 in both estimations (columns A and C). In Figure 5 we depict the sum of labor income and remittances minus consumption. The effect of remittances is easily visible when we compare the shapes of Figure 4 and 5: indeed, the line that depicts Mexican loss shows a gain for all ages.

Finally, the loss due to forgone asset income is quite important in both countries. When we work with the average resident assumption, forgone per migrant asset income is US$ 5750 in Mexico (column A) and US$ 3408 in Uruguay (column B). Though its these amounts decrease in the educational-especific estimation, they are still is not neglectible: US$ 3542 and US$ 3388 in Mexico (column C) and Uruguay (column D), respectively. The effect of asset income is clearly illustrated by the comparison of Figure 6, in which we depict the net loss by age normalized by the stock of migrants, and Figure 5 (when we do not add the loss due to forgone asset income). Indeed, forgone asset income contributes to a dramatic increase of the loss.

3.2. The difference between countries.

In order to analyze the difference between countries we focus on the educational-specific estimations. The loss per migrant is higher in Uruguay than in Mexico (a difference of US$ PPP 2270). The row B of Table 2 summarize the difference by components presented in section 3.1: a) the loss due to forgone labor income is higher in Uruguay (43% of the total difference between countries) but the loss due to forgot asset income is higher in Mexico (-

7% of the total difference); b) the gains due to forgone consumption are higher in Mexico (-53%) and only Mexico has gains because of remittances (117%).

In the column "Total loss" of Table 2 we present the size of the "age effect" and "loss value effect". According to the decomposition of equation (5), the difference of the age structure of migrants explains 46% of the difference between countries; the remaining 54% is explained by the difference of the value of the per capita loss (rows D and F). When we perform the decomposition using the equation (6), these figures are 53% and 47%, respectively (rows H and I). Thus, we may say that the two effects have the same power of explanation.

Table 2. Decomposition of the difference of the loss per migrant from migration between countries by components in US$ PPP (base 2005)

Component	**Total loss**	**Labor income**	**Consumption**	**Remittances**	**Asset income**
A. Difference	2270	971	-1200	2653	-154
B. (% in row)	*100*	*43*	*-53*	*117*	*-7*
Decomposition Equation (5)					
C. Age structure	1054	14	-430	-117	1587
D. (% in column)	*46*	*1*	*36*	*-4*	*-1030*
E. Loss value	1216	957	-769	2769	-1741
F. (% in column)	*54*	*99*	*64*	*104*	*1130*
Decomposition Equation (6)					
G. Age structure	1196	239	-498	0	1455
H. (% in column)	*53*	*25*	*42*	*0*	*-944*
I. Loss value	1074	733	-701	2653	-1610
J. (% in column)	*47*	*75*	*58*	*100*	*1044*

The rest of the columns summarize the size magnitude of the "age effect" and "value loss effect" of the four components of the loss. The Uruguayan higher loss due to forgone labor income is mainly explained by the value loss effect: it accounts for 99% (75%) the

difference according to equation 5 (6). The value loss effect also dominates when we explain the Mexican higher gains related to forgone consumption: it is 64% (58%) of the difference due to consumption according to equation 5 (6). But now the age effect is not negligible. Finally, the size of the loss due to forgone asset income, that is higher in Mexico than Uruguay, is the result of the sum of important effects of different sign. The loss value effect is negative: that is, if we fix the age structure, the loss between countries would be greater in Mexico than in Uruguay. But if we fix the average loss by age, the loss between countries would be greater in Uruguay than in Mexico (the age structure effect is positive).

3.3 The aggregated loss

In Table 3 we report the estimated loss by component as a percentage of GDP. According to both estimates, the net loss from migration is higher for Uruguay than for Mexico.

Table3. Loss from migration by components as a percentage of GDP

	Migrants are similar to …			
	Average resident		**Mid-low educated resident**	**Mid-high educated resident**
Component	**Mexico**	**Uruguay**	**Mexico**	**Uruguay**
Labor income	6.4	5.5	5.1	5.1
Consumption	-7.9	-5.8	-5.8	-5.8
Remittances	-2.4	-.-	-2.4	-.-
Private asset income	5.2	2.6	3.2	2.6
Net loss	**1.2**	**2.3**	**0.1**	**1.8**

Source: Estimates from the authors.

4. CONCLUSIONS

We use a recent approach to estimate the cost and benefits of migration on the sender countries. This methodology takes into account not only the current flows between

migrants and residents (i.e. remittances) but the costs and benefits originated in the absence of migrants in the sender country (loss due to forgone labor and asset income and gains due to forgone consumption). The methodology relies on estimations of the average costs and benefits by age. We obtain the loss from migration ussing estimations of these variables for the residents in the sender country and weighting them by the number of migrants by age.

We apply the methodology to the Mexican and Uruguayan cases and we find a net loss of 1.2% and 2.3% of GDP for each country, respectively. Both countries benefit from the excess of consumption over labor income of the stock of migrants. Besides, Mexico has a gain because of the received remittances. But in both countries, the forgone private asset income offsets the mentioned gains.

We analyze the sensitivity of these results to the estimations of the average costs and benefits by age. Specifically we take into account the fact that migrants are not randomly selected among levels of education. With selected profiles, the estimated loss decreases for both countries. We obtain a loss of 0.1% of GDP for Mexico and 1.8% of GDP for Uruguay. Once again, the forgone private asset income is high enough to reverse the gains due to the excess of consumption over labor income and remittances. This sensivity analysis highlights the fact that the effort of having accurate age profiles are important.

Finally we estimate a decomposition that attempt to disentangle the effect on the difference between Mexico and Uruguay of two dimensions: the age structure and the average loss of the value by age. We find that the net loss in Uruguay would remain higher than in Mexico even if we two countries had the same age structure or if the two countries had the same per migrant loss by age. The age structure effect and the loss value effect explain around 50-50% the difference between countries. This result is driven by the forgone asset income. Indeed, the main effect of the aging of Mexican migrants is to increase the loss due to forgone private asset income. On the contrary, the "rejuvenation" of the Uruguayan stock of migrants decreases the loss of forgone asset income. The difference due to the rest of the components are mainly explained by the loss value effect.

The overall results highlight the potential importance of the role of assets when we are estimating costs and benefits of migration. We may note that an accurate estimation of the loss of migration requires an accurate age profile of forgone asset income. In our

estimations we have two sources of error. First, we assume that the choice of migration of an individual is independent of his asset accumulation likelihood. If migrant individuals are less prone to invest, we would overestimate the loss of migration. Second, if past remittances were allocated to investment our actual asset income age-profile does not accurately depict costs (i.e. forgone asset income).

Finally, the estimations suggest that asset income may increase over time the costs stemmed from a migration wave, at least wherever asset income increases with age as registered in Mexico and Uruguay. The Mexican and Uruguayan cases illustrate that this effect may even offset gains due to other components.

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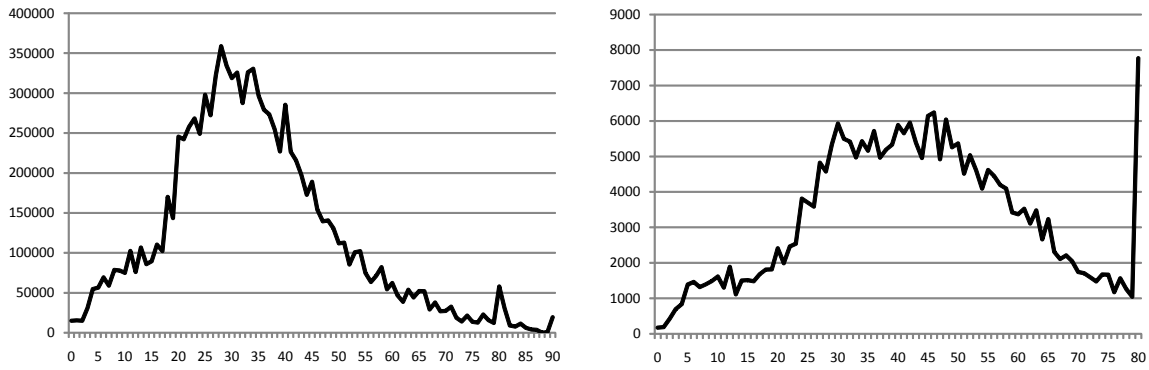
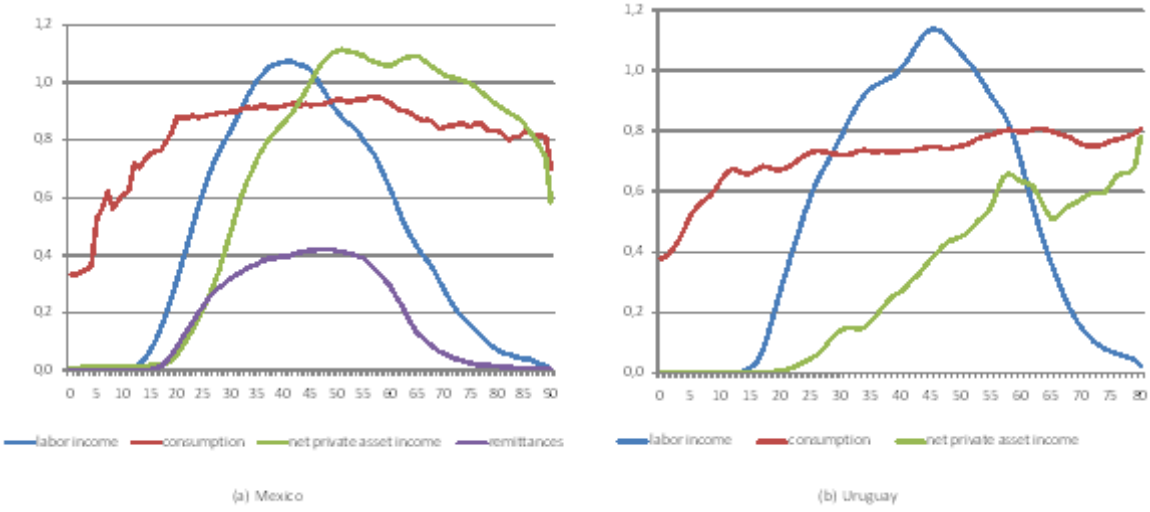
Figure 1. Age distribution of first generation Mexican immigrants living in the U.S. and Uruguayan-born living in Argentina, Brazil, US or Spain.



Source: Mexico:King et al., 2010; Uruguay: author's estimates.

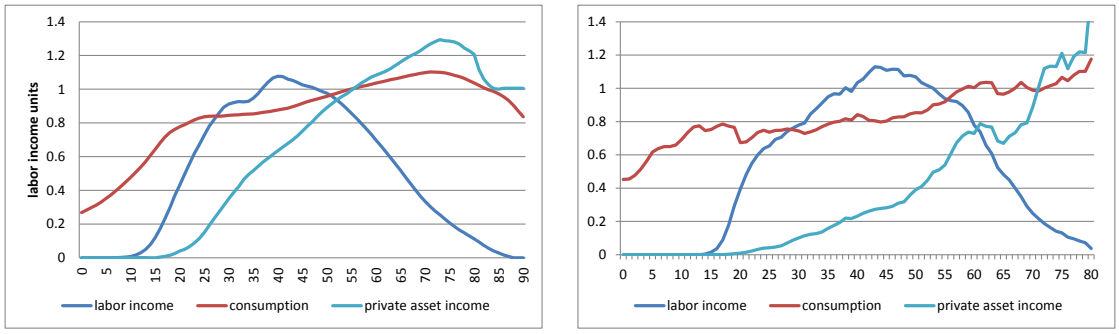
Figure 2.Age profile of labor income, consumption, private asset income and remittances in Mexico and Uruguay.



Source: Author's estimates.

Note: Values are expressed in relation to mean labor income of the 30-49 age-group.

Figure 3.Age profile of labor income, consumption, private asset income and remittances for low-educated Mexican people and middle-high educated Uruguayan people.

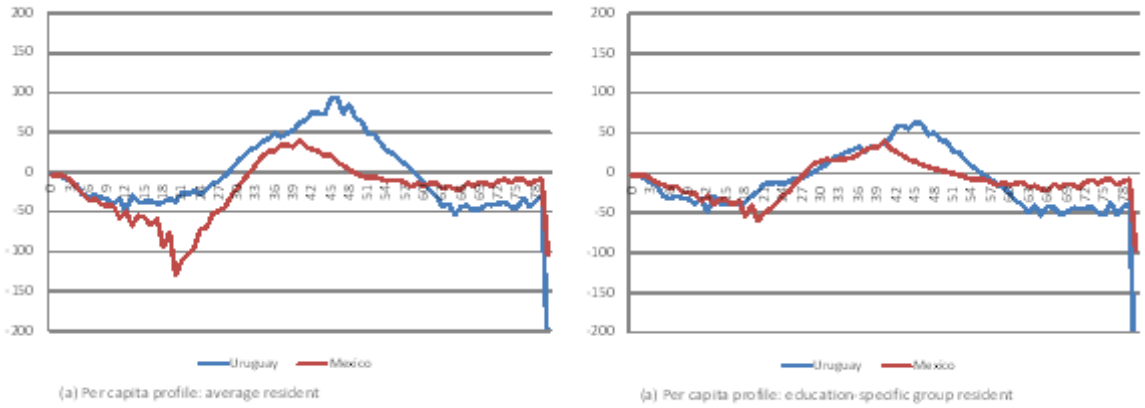


(a) Mexico (b) Uruguay

Source: Author's estimates.

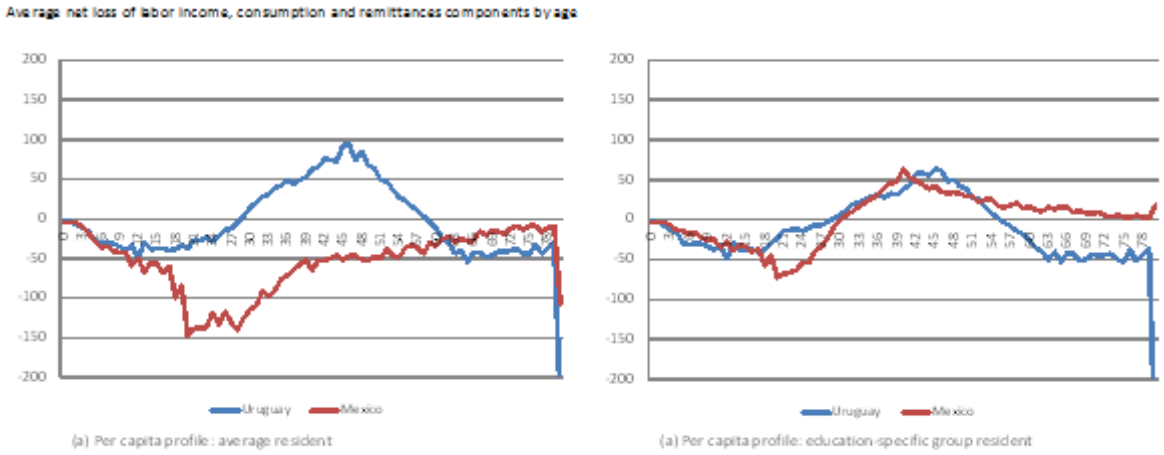
Note: Values are expressed in relation to mean labor income of the 30-49 age-group.

Figure 4. Per capita loss by age of labor income minus consumption in US$ PPP



Source: Author's estimates.

Figure 5. Per capita loss by age due to labor income, consumption and remittances in U$S PPP



Source: Author's estimates.

Figure 6. Per capita net loss by age in U$S PPP