

DRAFT

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Measuring the impact of international migration and remittances for Latin America:

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Abstract/Summary

Computable General Equilibrium (CGE) models addressing the effects of international migration at global scale, although still few, have been very informative when measuring worldwide gains and testing for evidence about the existence of some of the benefits of the migration-induced virtuous circle in both sending and recipient countries, particularly regarding productivity, wages, and overall income. Wamsley and Winters (2007), using a static model, report global income gains by 0.3% and asserts that an increase in migrant workers conducive to a 3% increase in total labour force in high-income countries equals gains from total tariff elimination across the globe. Using the same assumption but applying a dynamic recessive model, the World Bank (2006) estimates global income gains significantly higher than previous calculations (1.2%), being sending countries the primary beneficiaries (with 1.8% in gains, versus 0.4% accrued to recipient, high-income countries). Both papers reached unambiguous results: international migration results in a win-win solution when measuring economic gains in both origin and host countries. This paper, using a dynamic recessive model with some methodological innovations suitable for the Latin American experience, arrives at analogous conclusions. Global real GDP expands at 1 percent relative to the baseline scenario, while regions, with no exceptions, benefit from international migration. Latin America is, by far, a global winner, accruing total gains equivalent to 3 percent of real GDP, versus 1.8% reported by the rest of the developing world. The significantly higher proportion of Latin American workers that emigrate to the United States, Canada, and Europe (the host countries considered in the study) relative to other developing regions is the main reason behind this particular outcome. Although all sixteen Latin American countries included in the model benefit, gains in real GDP and household income within the region are very heterogeneous, for reasons already mentioned, such as migration rates, average migrant skills and demographics, and the structure of labor and production markets in each Latin American country.

1. Introduction

Over the past three decades, barriers to cross-border trade and capital transactions have declined substantially, while barriers to cross-border labor mobility still remain high. In fact, international trade expanded by seven times and capital flows measured by Foreign Direct Investment (FDI) have exploded by more than hundred times between 1970 and 2005, but the number of international migrant workers just doubled, representing only 3 percent of the global labor force in 2005. Given the relative complementarity of factors of production and the increasing global integration of all of them with the exception of labor, the expansion of the global production frontier could be very restricted if political and policy solutions to allow a freer movement of labor are not found.

Indeed, despite its potential economic gains, international migration has long been controversial and politically sensitive. This is partly because migration, like international trade and financial transactions, has significant distributional effects in both receiving and sending countries. But the more important factor behind the slow pace in cross-border labor movements are political, social, psychological, and cultural dimensions that the movement of goods and capital usually do not carry.

Although the early literature highlighted the negative potential effects of international migration on the development prospects of emerging economies through restrictions in human capital accumulation, more recent empirical evidence suggests that cross-border labor mobility may induce a virtuous circle capable of generating substantial gains for both origin and recipient countries (Lucas, 2005; Pritchett, 2006). On one side, recipient economies may experience increases in productivity, overall income, and absorption of technology, as the pressure of labor force shortages lessens to limit economic growth potential (Walmsley and Winters, 2003; Van der Mensbrugghe, 2005; Poot and Cochrane, 2004). On the other hand, sending countries benefit from increased remittances, continuous transfer of knowledge, investments made by native migrants, and the creation of business networks from the diaspora process (Dustmann and Kirchkamp, 2002; Stark and Helmenstein, 1997; Yang, 2004; Adams, 2005; Ellerman, 2003). According to this nascent literature, those bilateral gains are amplified when the status of the migrant labor force is temporary, allowing for a more dynamic back-and-forward transfer of skills, assets, and knowledge. Although there is case-by-case growing empirical evidence about those migration-

related feedback effects, data and methodological limitations do not still allow to test for the joint existence of those phenomena in a global, cross-country integrated setting.

Computable General Equilibrium (CGE) models addressing the effects of international migration at global scale, although still few, have been very informative when measuring worldwide gains and testing for evidence about the existence of some of the benefits of the migration-induced virtuous circle in both sending and recipient countries, particularly regarding productivity, wages, and overall income. Wamsley and Winters (2007), using a static model, report global income gains by 0.3% and asserts that an increase in migrant workers conducive to a 3% increase in total labour force in high-income countries equals gains from total tariff elimination across the globe. Using the same assumption but applying a dynamic recessive model, the World Bank (2006) estimates global income gains significantly higher than previous calculations (1.2%), being sending countries the primary beneficiaries (with 1.8% in gains, versus 0.4% accrued to recipient, high-income countries). Both papers reached unambiguous results: international migration results in a win-win solution when measuring economic gains in origin and host countries.

The purpose of this paper is to contribute to existing literature in evaluating the global and the distributional effects of international migration; and most importantly, to explore in more detail the economic consequences of the South-to-North migration flows in the Latin American region. The originality of the study relative to existing literature comes from two different sources. In terms of approach, by allowing a more realistic division of the labor force (low, semi, and high-skilled), the model has the potential to capture more accurate and contextualized effects of migration, particularly in Latin American where countries expose highly differentiated human capital endowments (i.e. Central American versus Andean sub regions). In addition, this investigation proposes a different simulation scenario; instead of modeling a 3 percent increased in the stock of migrant workers in developed host countries -as the two cited previous studies proposed-, it assumes that emigration rates from developing countries remain constant, which involves 10 million new migrant workers for the period 2004-2024 in comparison to the 14.2 million workers reported by the study conducted by the World Bank (2006). In terms of methodology, the study relies on a recessive dynamic multi-region model to capture over-time changes in migration flows, and includes country-specific Social Accounting Matrix (2004) for each of the sixteen Latin American economies represented in the model.

One last but not less important caveat about the model's scope when evaluating the income effects of migration flows in sending countries, in particular, the Latin American region. According to theory, three effects should be taken into account when assessing the impact of international migration on household's income in sending countries. First, remittances sent back to migrant's families as additional household income. Second, the loss of the counterfactual wage or salary the migrant worker would have earned if he/she had decided not to migrate. And third, the effect migratory outflows has on wages of non-migrants (presumably positive) caused by a contraction of labor supply. Studies using different quantitative techniques (cross-country regression analysis, micro-simulations, and general equilibrium models) suggest that the importance of each of these three effects on household's income largely depends on the size of migrant flows, the skills and socio demographic characteristics of migrants, and the structures of labor markets and productions. The CGE model used in this paper captures the first and third effect. An extended version of this investigation plans to incorporate the counterfactual wage effect using micro-simulations.

Preliminary simulation results from this investigation reaffirm the win-win nature of international migration for both origin and host countries. Migration outflows, through the reallocation of labor force in developed countries and the transfer of remittances developing economies increases global real GDP - measured at the 2004 base year- by an additional 1 percent from the baseline scenario. Sending countries benefit the most from cross-border labor mobility, showing an increase of XX% in real GDP relative to the base scenario in comparison to the XX% in gains observed in recipient countries. Latin America is, by far, a global winner, accruing total gains equivalent to 3 percent of real GDP, versus 1.8% reported by the rest of the developing world. The significantly higher proportion of Latin American workers that emigrate to the United States, Canada, and Europe (the host countries considered in the study) relative to other developing regions is the main reason behind this particular outcome. Although all sixteen Latin American countries included in the model benefit, gains in real GDP and household income within the region are very heterogeneous, for reasons already mentioned, such as migration rates, average migrant skills and demographics, and the structure of labor and production markets in each Latin American country. Salvadorian real GDP increases by 26 percent, followed by Guatemala (19 percent) and Honduras (17 percent). In contrast, despite its relatively high emigration rate, Mexico's additional growth (2.9) is compromised by the low share of remittances in the national account. Chile, Brazil, and Venezuela are

among the Latin American countries reporting modest gains from international migration (1.1, 1.5, and 1.5 percent, respectively).

The paper is structured as follows. Chapter 2 contains descriptive analysis of international migration data from the Latin American perspective, discussing not only the magnitude of such phenomenon but also some of the reasons that could explain the high degree of heterogeneity within the region. It also shows the projections of migrant labor force by skill category for the period 2004-2024 to be included in the simulation exercise. The importance, magnitude, and potential effect of remittances on household's income in the Latin American region is analyzed in Chapter 3. The section shows the highly differentiated importance of remittances as a percentage of GDP and household share across the region and gives some insights about the determinants of such cross-border transfers. Chapter 4 focuses on modeling aspects, and Chapter 5 provides a summary of the most relevant simulation results. Chapter 6 concludes.

2. Trends of International Migration and Projection: Latin America's Perspective

Migration Stocks and Emigration from Latin America

The United Nations (2002) estimates that international migrants stood at 175 million in 2000, up from 154 million in 1990, with an annual growth rate of 1.3 percent. This constitutes approximately 3 percent of the world population. By geographic destination, the majority of international migrants live in Europe (56.1 million), Asia (49.8 million) and North America (40.8 million). The net growth of migrants is seen in developed regions. In the last decade, North America experienced the largest increase in international migrants of 13.2 million (48 percent), or 4 percent of an average annual growth rate. In contrast, the migrant population increased by 7.7 million (15.8 percent) in Europe, while the number of international migrants living in Latin America and the Caribbean¹ declined from 7.0 million in 1990 to 5.9 million in 2000 (-15 percent).

Docquier and Marfouk (2004, 2005) report that international emigrants from Latin America are 10.3 million in 2000, which account for 2 percent of the region's population. As the World Bank (2006) notes, migration continues to be determined by geographic proximity and colonial ties.

¹ In this study, Latin America and the Caribbean (LAC) covers the following 16 countries, based on geographic and sub-regional blocs—Mexico, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Bolivia, Colombia, Ecuador, Peru, Venezuela, Argentina, Brazil, Paraguay, Uruguay and Chile—unless otherwise noted.

This perfectly fits emigration flows from Latin America to its main destinations: North America and the Europe. According to Docquier and Marfouk (2004, 2005) and Docquier, Lowell and Marfouk (2008), three destinations of Canada, United States and the EU27 account for 98 percent of the total official emigration records in Latin America. Table 1 reports Latin America's emigration stocks to these destinations in 2000, compared with other sending regions.

<INSERT TABLE 1>

By destination, Latin America sends 162,000 migrants to Canada, which account for a tiny 1.6 percent of the region's total emigrants. El Salvador is the country, which records the largest number of migrants (27,700 workers), followed by Chile (21,400 workers). In sharp contrast, the United States is by far the main destination, accounting for 90 percent of Latin America's 9.1 million emigrants to that country. As Table 1 demonstrates, neighboring Mexico is, due to its proximity and presumably NAFTA, single largest source country. It sends 6.4 million of workers to the United States, which account for 70 percent of Latin America's emigrants and slightly more than a quarter of 24.5 million of the US gross immigrants. For Latin America, the EU27 is the second largest destination after the United States with the share of 8 percent. Colombia, Ecuador, Argentina and Brazil altogether account for nearly two-thirds of the region's emigrants to the European destination.

Table 2 lists the share of three host countries by labor category—low, semi and high—classified by educational attainment for Latin America.² It demonstrates several unique features of Latin America's migration relation with these destination countries. First, migration is highly associated with the geographic proximity as cited before as well as the degree of economic integration with a host country. This is clearly exemplified by the relation between Mexico and Central America with the United States: the latter accounts for more than 90 percent of emigrant shares from these countries. Mexico has a 2000-mile border but already enjoyed a free market access with the United States in 2000. Likewise, Central America used to have strong economic ties with the United States, under the preferential treatment of the Caribbean Basin Initiative. On the contrary, moving down to the South, the US shares among three destinations for Latin America's emigrants

² Labor categories are classified according to the educational attainment Docquier and Marfouk (2004, 2005). Low-skill workers are defined as those with primary education (0-8 years of complete schooling). Semi-skill workers are those with secondary education (9-12 years of complete schooling). High-skill workers are those with tertiary education (13 years and above).

decline. In South America, the shares of the United States for high-skill migrants are higher than those for low-skill migrants: 26 percentage-points higher in Venezuela, 22 percentage-points in Brazil and 20 percentage-points in Paraguay. The only exception is Uruguay, in which the share is almost the same between low- and high-skill migrants to the United States.

<INSERT TABLE 2>

Second, colonial ties also would be one of the significant determinants for low- and semi-skill migrants particularly from South America heading to the North. For low- and semi-skill emigrants from Venezuela, Argentina, and Chile, the Europe is the main destination rather than the United States. For these emigrants in Brazil, the Europe nearly has the similar share as with the United States. For semi-skill migrants in Uruguay, the European share is 40 percentage-points larger than that of the United States.

Third, contrary to the second, the United States is the prime destination for high-skill migrants across Latin America. In Mexico and Central America, more than 90 percent of emigrants with high skills head to the United States; El Salvador is the only exception, with a share of 88 percent. Though following the similar declining trends moving down to the South, the US share for high-skill migrants is still high. In Bolivia and Colombia, its share is over 80 percent and 77 percent in Ecuador and Peru. The United States receives more than twice as large high-skill migrants even from Mercosur countries as does the Europe.

Labor Force and Emigration Projection for Latin America

Based on Docquier and Marfouk (2004, 2005) and ILO labor force database,³ Table 3 shows the labor force composition by skill category in 2000 for 16 countries in Latin America and its main host countries—Canada, United States and the EU27. Latin America registers approximately 210 million labor force in 2000, decomposed by 144 million of low-skill workers (68 percent share), 41 million of semi-skill labor (20 percent) and 25 million of high-skill workforce (12 percent). Brazil is by far the largest country, accounting for 40 percent of labor force in Latin America, followed by Mexico with 20 percent share.

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³ ILO Estimates and Projections of the Economically Active Population: 1980-2020, fifth edition, August 2008.

In Latin America, labor force composition varies country by country. Yet across the region, low-skill labor far dominates labor market. In Mexico, it records 60 percent of the country's workforce. In Central America, low-skill labor accounts for more than 80 percent in El Salvador, Guatemala and Honduras. In Andean region, its share is high but low relative to the figures in Central America and Mercosur. Venezuela has the largest share of low-skill labor with 78 percent, followed by Bolivia (70 percent). In Brazil, the largest labor force supplier in Latin America, low-skill labor accounts for nearly four over all five workers. In contrast, low-skill workforce occupies around a half of the country's labor in Chile and Peru. Labor with Semi-skills is an important workforce in Chile (36 percent share), Uruguay (32 percent), Mexico (29 percent), and Peru (28 percent). On the other hand, high-skill workers have relatively high share in Peru (22 percent), Argentina (20 percent) and Cost Rica (18 percent).

In Latin America's host countries and region, the structure of labor force differs significantly from that in Latin America. In Canada, low-skill workers account for 10 percent of its labor. The share is only 6 percent in the United States, or 8 million workers out of 149 million total workforce in that country. In sharp contrast, high-skill labor occupies around the half of the labor market in these two host countries. The composition of workforce in EU27 is sharply contrasted with that of Canada and the United States. Out of 226 labor force in Europe, low- and semi-skill labor accounts for some 40 percent each.

Figure 1 presents labor force projection decomposed by regional bloc decomposed by three labor categories in Latin America for the period 2004-2020. This projection is based on two main sources. First is the most recent update of ILO labor force projections: 1980-2020 (August 2008). The second source is Docquier and Marfouk (2004, 2005) and supplemented by Docquier, Lowell and Marfouk (2008) in order to decompose labor force in each country in Latin America and its host countries over the projection period 2020. Based on the labor force decomposition in 2000 reported in Table 1, this study assumes that the structure of labor force remains unchanged for both Latin America and its host countries.⁴

<INSERT FIGURE 1>

⁴ This is a very strong assumption. The structure of labor market changes in each country over time. But so far there is no reliable and accurate projection with labor market decompositions, using the uniform methodologies across Latin America and its main host countries. Although being unrealistic, this assumption gives benchmark reference for the model simulations.

In Latin America, labor force will increase from 232 million in 2004 to 304 million in 2020, with an annual average growth rate of 1.7 percent. Out of an increase in labor force of 71.5 million, low-skill labor accounts for 69 percent, semi-skill workers 19 percent and 12 percent. In terms of the increase in labor force, it increases the most by 24 million in Brazil, the largest country in Latin America, followed by 11 million in Mexico. In terms of growth rates, however, small countries contribute to the most of the increased workforce in Latin America. Labor force sharply rises by 50 percent in Central America, notably in Guatemala with an increase of 65 percent, and almost 50 percent in Nicaragua and Honduras. Likewise, Paraguay increases its labor force by 50 percent.

Figure 2 shows the projections of labor force and its participation ratio in host countries for Latin America. In Canada, labor force increases by a small 3 million from 17.6 million in 2004 to 20.5 million in 2020. This corresponds to an average annual growth rate of 0.96 percent. In the United States, largest destination for Latin America's destination, labor force increases from 153 million in 2004 to 174 million in 2020, with an average growth rate of 0.8 percent per year.⁵ In the European Union, labor force is projected to be at 236 million in 2020. But in contrast with Canada and the United States, it is expected to peak at 240 million in the middle of the next decade before declining afterward. In all three destinations, labor force participation ratio, defined as the ratio of labor force over the population, will reach a peak well before 2020. It is projected to peak in early next decade in Canada and the European Union, whereas it already peaked in 2006 and now on the declining path in the United States.

<INSERT FIGURE 2>

3. Remittances for Latin America

Remittances play an important role in multiple development fronts. Primarily remittances are intended to support their families back home in order for them to meet the basic needs. Thus remittances sent back by migrants directly increase the income of the recipients and raise their purchasing power for consumption goods and services, while helping households to diversity their income source. Remittances can also augment household savings and investment particularly in education and health, all of which tend to generate a high social return. Recent studies suggest that

remittances are an important means in reducing the incidence and severity of poverty in many developing countries.⁶ At the macroeconomic level, remittances are also a major source of foreign earnings for some countries and are an important element for national income.

Since the onset of this decade, remittances to Latin America tripled from \$16.6 billion in 2000 to 52.9 billion in 2007 with an average growth rate of 18 percent per year (World Bank Development Indicator).⁷ Mexico continues to be the largest recipient of remittances throughout the period, accounting for nearly the half of total flows to Latin America. In Central America, remittances sharply increased by more than 3.5 times with an annual growth rate of 20 percent. Remittances jumped by almost 7 times in Guatemala and 6 times in Honduras. In South America, Colombia, Ecuador, Peru and Brazil are the large recipients. In 2007, these four countries account for roughly a quarter of the gross remittance inflow to Latin America. Table 4 presents remittance flows to Latin America in 2000-2007.

<INSERT TABLE 4>

Figure 3 shows the share of remittance in GDP for Latin America in 2006. Remittances account for a fraction (1.7 percent) of Latin America's GDP of \$2,860 billion. But the Figure clearly demonstrates that there exist sizable differences in the magnitude of remittances in national account. It appears that smaller the economic size and lower the income level are, the greater the reliance on remittances is. The countries in Central America except Costa Rica are case in point. Honduras with \$10.8 billion GDP and \$1,150 per capita GDP has the largest 22 percent of remittance share, followed by El Salvador of 18 percent. These figures are beyond 12 percent in Nicaragua and Guatemala. On the contrary, the magnitude of remittance is negligible for Brazil and Argentina—the largest and the third in economic size respectively. Mexico is the only exception. Despite the second largest economic size (\$840 billion) and the middle income level (\$5,930 per capita GDP), Mexico relies 3 percent of its GDP on remittances.

<INSERT FIGURE 3>

⁵ According to the World Bank (2006), it projects that labor force in the United States will peak at around year 2020.

⁶ See for instance Adams and Page (2003).

⁷ According to the Inter-American Development Bank (2009), which recently updated Mexico's remittance estimates, the revised remittance flows to the entire region of Latin America and the Caribbean increased from \$30.9 billion in 2002 to \$68.9 billion in 2007, and increased to \$69.2 billion in 2008, an increase of less than one percent over 2007. IDB also predicts that remittances to the region will decrease in 2009, due to the global financial crisis.

As mentioned beforehand, remittances are an important source of family income particularly for poor and low income households in Latin America. Since private consumption is the key component of GDP in national account, the magnitude of remittances in household income roughly reflects the share in GDP. In the aggregate, remittances account for 2.3 percent of the gross household income in Latin America, slightly larger share than in GDP. Dependency on remittances greatly varies country by country. But again households in Central America have greater reliance on remittances in household income than elsewhere in Latin America. In particular, households in Honduras, El Salvador and Nicaragua heavily rely on remittances as a source of income, which account for 15 percent, 14 percent and 11 percent of their household income, respectively. In Mexico, the share of remittances is 3 percent. Reflecting the insignificance in GDP, dependency on remittances is far less than 1 percent in Argentina and Brazil. Table 5 shows the share of remittances in household income along with other income sources in Latin America.

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Remittance flows are greatly influenced by several economic factors. First and the foremost, migrant stocks will have the greatest and most decisive element determining the flows of remittances. In other words, the number of emigrants from countries of origin to destinations is the key determinant of bilateral remittance flows sent back to home countries. Second, as some empirical studies show, compositional factors in skills and legal status also affect remittance flows. In general, low-skilled migrants tend to send a larger portion of their income than high-skilled migrants. Temporary workers are more likely to send a larger share of their income than permanent workers. Third, employment opportunities in the host countries matter. Flexible and open labor market in host countries makes immigrants to find better jobs or shift jobs easier. This allows them to generate an additional income, which in turn will be remitted to home countries. Fourth but not the last, length of stay and wage gaps between natives and immigrants in host countries also affect the flows of remittances. In many host countries, there exist persistent wage gaps between natives and immigrants.⁸ In general, higher the skills are, narrower the wage gaps between natives and immigrants are. Furthermore, the longer the work experience in host countries is, narrower the native-immigrant wage gaps are.

⁸ For instance see Lang (2000) for case study in Germany, and Izquierdo, Lacuesta and Vegas (2008) for Spain.

In addition to these economic factors, some specific factors also influence remittance flows in different ways.⁹ However, in reality it is extremely difficult to capture the complicated relation between remittances and migration, given measurement uncertainties and the absence of universal agreement on measuring remittances made by international migration. Due to these difficulties, this study simply assumes that the bilateral remittance flows sent back to Latin America are supposed to be in proportion to the number of workers migrated to the respective destination countries.

Table 6 presents the bilateral remittance flows sent to each country in Latin America from its host countries: Canada, United States and the European Union. The value of remittances for each country exactly matches the aggregate flows in Table 5. Mexico, the largest remittance recipient in Latin America, almost receives its entire remittances from the United States. The picture is nearly the same in Central America. More than 95 percent of remittances are sent back from the United States, amounting to \$6.8 billion. In South America, while the United States remains the main source of remittances, its share declines, as Latin America's emigrants head more to the Europe and Canada. Brazil, the second largest recipient in Latin America, receives \$2.0 billion of remittances from the United States (57 percent share) and \$1.4 billion from the European Union (40 percent). In value term, Canada is also an important source for Brazil, El Salvador, Guatemala, Paraguay and Colombia.

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4. Modeling the Impact of International Migration and Remittances

This study applies a dynamic recessive computable general equilibrium (CGE) model, newly developed with the explicit objective to evaluate the impact of international migration and remittances from the viewpoint of Latin America. The model is solved in two stages in sequence: static within-period equilibrium solution in the first stage and recursive dynamic between-period equilibrium solution in the second stage. The static module, which is the core of the entire model,

⁹ To name a few, substantial reduction of remittance costs is one of the typical examples, particularly between the United States and Mexico. Sizable currency depreciation of the US dollar particularly against the Euro in recent years contribute to raise the dollar value of remittances. In addition, heightened security and scrutiny on immigrants in host countries would have motivated particularly undocumented immigrants to rush to send money, responding to an increased uncertainty and risks in the future.

is a neoclassical in spirit and trade-focused, global, multi-region model used for a number of trade liberalization and regional integration.¹⁰ The model comprises 22 countries and regions, identifying 16 countries in Latin.¹¹ All countries and regions are fully endogenized and linked only through trade. Thus, the model only deals with the real side of the economy and does not consider financial or monetary markets. It is built on individual Social Accounting Matrices (SAMs) for each region and country, benchmarked at base year 2004, so that its base equilibrium solution exactly replicates the benchmark data.

Static Module of the CGE Model

Each region in the model traces the circular flows of income through factor payments from producers to institutions—households, firms and government—and back to final demand for goods in commodity markets. These institutions represent the respective economic agents, whose behaviors and interactions are explicitly specified in the model. Private consumption, intermediate use, government consumption and investment are the four components of domestic demand. Households in each region choose the optimal levels of commodity bundles for their consumption by maximizing their utility, which is expressed in Cobb-Douglas function, subject to the budget constraint and given market prices.

In order to capture the effects of different income generation and consumption patterns associated with international migration, the model incorporates three types of household groups: (i) native households in migrants' sending developing countries (home countries); (ii) native households in developed destination countries (host countries); and (iii) households of migrants moved from home countries to host countries, who live in host countries and send remittances to their families back home. On income side, household income comes from various factor incomes—wages, capital and land rents—as well as transfers from government, private, firms and remittance. For households of new migrants living in host countries, their incomes are assumed to be generated only by wage income. On expenditures, household pays taxes but the largest portion is spent on

¹⁰ The recent applications include: Giordano, Parra and Watanuki (2009) for the evaluation of DOHA Agricultural liberalization and on trade and poverty evaluations for the Andean countries (Giordano and Watanuki, 2007) and Central America (Giordano and Watanuki, 2008).

¹¹ In the model, countries in Latin America are from the North: Mexico, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Bolivia, Colombia, Ecuador, Peru, Venezuela, Argentina, Brazil, Paraguay, Uruguay, and Chile. In addition, it also includes: Canada, the United States, the European Union (EU27), Japan, China and the rest of world. In order to incorporate 16 countries in Latin America with huge asymmetries in economic size and structures

consumption.¹² The residuals are spent for household transfers or saved. Remittances migrants send to their home countries are assumed to be fixed proportion of migrants' household income. The government collects various taxes and receives foreign transfers, and allocates for goods and services, earmarks subsidies to domestic institutions (households and firms), and amortizes payments to domestic and foreign lenders.

For each sector, the model explicitly specifies output-supply and input-demand equations. Production is expressed in a nested structure, expressed by the Constant Elasticity of Substitution (CES) in all stages. At the top stage, domestic output is the combination of aggregate intermediate and aggregate value added. At the second stage, each intermediate input is determined by the fixed Leontief IO coefficients. On the other hand, the aggregate value added is again specified by the CES function among 4 factors of production: labor, capital, land and natural resources. The combined bundle of labor comprises 3 labor categories: low-skill, semi-skill, and high-skill. At each level of the production tree, firms' decision of profit maximization determines the optimal levels of each demand in such a way that the value product exactly equals its corresponding marginal cost: aggregate intermediate demand and aggregate value added at the top stage: 4 factors of production at the second stage, and each labor demand at the lower stages. However, each factor does not necessarily generate a uniform returns (labor wages, capital rent, land rent and prices of natural resources) across sectors. Instead, the model incorporates factor market rigidities or distortions, which exogenously fix the ratios of the relative sectoral returns to the economy-wide average return for that factor at benchmark.

The treatment of international trade follows the standard specifications in common with other trade-focused CGE models. The model specifies a set of export-supply and import-demand equations for traded sectors, allowing national product differentiation. Both exports and imports are modeled in a two-stage nested structure. Exports are modeled in a constant elasticity of transformation (CET) function. The optimal allocation of supply is determined by revenue-maximization choice between domestic sales and aggregate export supply at the upper stage, and among exports destined to different markets at lower stage. At the lower stage, however, the specification of imperfect substitutes for some products in certain regions or countries can be

as well as specific migration-related modeling in labor market, the model applies 7 sectors: agriculture, processed foods, light manufactures, heavy manufactures, utilities and construction, tech-intensive services, and other services.

partially or entirely turned off, permitting perfect substitutes. Likewise imports are modeled by a constant elasticity of substitution (CES) function, following the “Armington” assumption.¹³ The optimal allocation of demand is determined by cost-minimization choice between domestic demand and aggregate import purchases at the upper level, and imports from different markets at lower stage.

Regarding factor markets, the model applies the different treatments. Based on educational attainment¹⁴, labor is differentiated into 3 categories—low-skilled, semi-skilled and skilled categories—and is further decomposed into native and migrant workers. Native workers are mobile across the sectors within each region or country. No international labor migration is allowed for native workers. International migration is expressed in the following dynamic module. In order to capture wage differentials over sectors, the model applies wages payments and employment data based on household sample surveys for the previous sub-regional studies.¹⁵ Capital and land are assumed to be mobile only within each region, and the supply of land is fixed at benchmark. On the other hand, natural resources are sector-specific factor and exogenously fixed.

Unlike the standard static model, a set of investment-related equations is explicitly expressed in the model. This is because investment decision is important along with capital accumulation process in the dynamic model, summarized in the next section. Equation (1) specifies the composite investment ($QINV^r$) in region r in Cobb-Douglas functional form. In the equation, AI^r is the investment shift parameter and μ^r the share parameter, respectively. Equation (2) determines the price of capital (PK^r), which is derived as the price index of investment from the optimization of the equation (1). Investment demand for sector i (ID_i^r) is allocated by the share parameter μ^r over the total savings in each region. The model assumes that domestic investment is

¹² For households of migrants in host countries, their consumption patterns of sectoral demand are assumed to follow the one in home countries.

¹³ Armington (1969).

¹⁴ Labor market disaggregation by educational attainment follows Docquier and Marfouk (2004, 2005), and Docquier, Lowell, and Marfouk (2008). Low-skill labor is defined as those with primary education (0-8 years of schooling completed); semi-skill for those with secondary education (9-12 years of schooling completed); and high-skill for those with tertiary education (13 years or above).

¹⁵ Giordano and Watanuki (2007, 2008) for the evaluation of trade and poverty impact on Andean countries and Central America, respectively. Wage differentials in Central America and Andean countries are used for other countries in Latin America, based on the economic structure in the production process in each country.

fully financed by the total savings in each region, so that the value of the total savings is exactly equal to the product of the price of capital multiplied by the composite investment.

$$QINV^r = AI^r \cdot \prod_i (ID_i^r)^{\mu^r} \quad (1)$$

$$PK^r = \frac{1}{AI^r} \prod_i (PQ_i^r / \mu^r)^{\mu^r} \quad (2)$$

$$ID_i^r = \mu^r \cdot PK^r \cdot QINV^r / PQ_i^r \quad (3)$$

In the model, there are three key macroeconomic closures: public finance; saving-investment; and external balance. There are a number of different choices available. The choice does not affect the base equilibrium solution, which exactly replicates the SAMs at benchmark, but influences the simulation results significantly. The rationale is which choice will be the most appropriate to meet the objectives of the study. For government fiscal balance, the model applies endogenous public savings, which are derived as the gap between current revenues and expenditures. In the model, all transfers in both domestic and external account are fixed. This treatment allows fiscal surplus or deficit to adjust to balance public finance.¹⁶

For saving-investment balance, the current amount of nominal investment is completely financed by the aggregate savings in each country and region. The total savings comprise 3 components of domestic savings—households, firms and government—plus foreign savings, which is treated as an exogenous account. The model applies “investment-driven” Johansen closure, so that private saving rate in each country is endogenized as an equilibrating variable to balance the nominal value of investment with the aggregate savings.¹⁷ For the external market closure, the model applies fixed trade balance, while endogenizing exchange rate in each country. With fixed external capital flows and transfers, changes in the aggregate import demand must be completely financed by changes in exports.¹⁸

¹⁶ One of the alternative options is to fix government savings, under the so-called fiscal neutral assumption. This approach endogenizes one of tax components as equilibrating variable in order to maintain fiscal balance between revenues and expenditures in the public finance. See for instance, van der Mensbrugghe (2005), Harrison, Rutherford and Tarr (2003).

¹⁷ The alternative is the saving-driven neoclassical closure, in which investment is determined by the fixed saving rate. In this framework, domestic investment volume is adjusted by the endogeneous adjustment factor. See Lofgren et al (2002) for instance.

¹⁸ The alternative closure is to apply the fixed exchange rate, while endogenizing the external market balance. With fixed treatments in external market, this means that trade balance is endogenized to adjust the external market balance due to policy shocks.

Recursive Dynamic Module

In a recursive dynamic framework, the model is solved in sequence as the static equilibria in each period. The model is first solved for 2004, which exactly replicates the SAM benchmark for each country, then recursively solved over the projection period 2020. As with other recursive models, between-period equilibria are achieved by updating capital stocks and other pre-determined parameters. In each period, the aggregate capital stock (K^r) in the economy is updated with a capital accumulation equation (4) below, with the average rate of depreciation per annum (δ^r) and the composite investment ($QINV^r$) in the previous period.

$$K_t^r = (1 - \delta^r) \cdot K_{t-1}^r + QINV_{t-1}^r \quad (4)$$

In addition, the dynamic accumulation process in the model includes:

1. Population and labor force growth and the allocation of labor force by labor category in each country, which is explained in some detail in the previous section.
2. Government transfers to domestic institutions (households and firms) in any form including subsidies, food coupons and others.
3. Sectoral productivity growth either in total factor productivity or in labor productivity.

5. Baseline and Experimental Scenario Design and Simulation Results

Baseline and Experimental Scenarios

As already presented, this study follows the ILO labor force projections (2008), which are identical between baseline and simulation scenarios. In the baseline scenario, two assumptions are applied. First, immigrant shares in each labor category in the respective host countries remains unchanged over time, so that the proportion of international immigrants to the aggregate labor force in each host country is held constant. Second, immigrants from each country are in proportion to the bilateral migration flows in 2000 examined by Docquier and Marfouk (2004, 2005). This is because there is almost no single study on international migration projections on bilateral basis. Table 7 presents the projections of labor force and migration stocks in host countries on both baseline and experimental scenarios.

<INSERT TABLE 7>

According to the ILO projections, labor force in Canada increases by 16.5 percent from 17.6 million in 2004 to 20.5 million in 2020, or 0.9 percent of average growth rate per year. With the share of 28.7 percent of migrants over labor force, the aggregate international migrants increase from 5 million in 2004 to 5.88 million in 2020. The majority of these migrants are high-skill workers, and another 30 percents are low-skilled labor. Immigrants from Latin America account for a mere 1 percent of international migrants in Canada. Nevertheless, immigrants originating from Latin America increase from 0.18 million in 2004 to 0.21 million in 2020, out of which 60 percent of immigrants belong to high-skill workers.

In the United States, the main destination for many countries in Latin America particularly for Mexico and Central America, labor force increases by 20.5 million between 2004 and 2020, corresponding to an increase of 0.8 percent average growth rate per year. The United States is the country dominated by high-skill labor (51 percent share), followed by semi-skill workers (40 percent). Between 2004 and 2020, immigrants increase by 3.2 million, which comprise 1.1 million of low-skill (35 percent share), 0.6 million of semi-skill (20 percent) and 1.4 million of high-skill labor (45 percent). Immigrants account for 15.5 percent in labor force in the United States. But by skill category, immigrants account for 64 percent in low-skill workers in sharp contrast with 8 percent in seem-skill labor and 13.5 percent share in high-skill professionals. Immigrants from Latin America increase by 1.2 million. But in sharp contrast with migrants from other regions, 60 percent of immigrants from Latin America belong to low-skill workers.

In the European Union, labor force rises by 4.4 million to 236 million in 2020, with the peak in the middle of next decade following the reverse U-shape path. Low- and semi-skill workers account for 40 percent each in labor force. Immigrants increase from 21.1 million in 2004 to 21.7 million in 2020,¹⁹ again following the reverse U-shape trajectory, accounting for 9.2 percent of the EU workforce. By skill category, more than half of international immigrants belong to low-skill workers. Immigrants from Latin America account for only 4 percent of the aggregate immigrants of labor force in the Europe. Some 40 percent of immigrants from Latin America belong to semi-skill workers, and the rest is nearly equally divided between low- and high-skill workers.

¹⁹ In the European Union, intra-EU migration accounts for a substantial portion—40 percent of the total international migration. This includes (i) migration flows within the former European Union (EU15), and (ii) new migrant movements from the Eastern Europe to the former EU members.

In contrast with the constant immigrant shares in each labor category in the baseline scenario, the experiment²⁰ assumes that emigration rates from each countries of origin to each destination are held constant.²¹ Based on Docquier and Marfouk (2004, 2005) and the ILO labor force statistics, the bilateral migration flows to each host country are projected over 2020. It is reminded, however, that labor force by skill and its aggregate in the respective host countries is exactly the same between baseline and experimental scenarios. Admittedly the projections of labor force by skill categories and migration flows on both baseline and experiment are based on strong *ad hoc* assumptions. But it is extremely difficult to forecast the changes in labor force compositions in both countries of origin and host countries in greater detail. This is also the same with capturing the complicated process of international migration on a detailed bilateral basis. Due to these reasons, this study adopts relatively neutral assumptions.

In Canada, immigrants increase by 0.85 million to 5.89 million in 2020, or 0.01 million increase from the baseline scenario. The composition of immigrant flows by skill changes. Compared with baseline scenario, high-skill workers modestly increase in replacing low-skill labor. The share of immigrants in labor force in Canada slowly rises from 28 percent in 2004 to 28.7 percent in 2020. While the shares of immigrants are hardly changed for low- and semi-skill labor, it is modestly up for high-skill category from 32.0 percent share in 2004 to 33.2 percent in 2020. Immigrants from Latin American origin marginally increase by 0.04 million, but the largest than any other regions.²² Around 60 percent of Latin American immigrants belong to high-skill workers.

In the United States, the total immigrants increase by 4.6 million in 2020 from the baseline: 1.6 million low-skill, 1.0 million semi-skill and 2.0 million high-skill workers. The expansion of immigrants is almost proportional so that there is little differential in the skill composition of immigrants between baseline and experiment scenarios. Because the growth of the increase in immigrants is twice faster than that of labor force in the United States, the share of migrants steadily increases from 16.2 percent in 2004 to 18.1 percent in 2020. The structural changes occur in the workforce in relation to immigrant shares. While the shares of immigrants marginally

²⁰ In the evaluation of remittances and international migration, the World Bank (2006) assumes that international migration rises by 3 percent in labor force of high-income countries in 2025 relative to the baseline, phased in from 2020 through 2020. This corresponds to 14.2 million in 2025. In contrast, our study projects that 3 host countries altogether will increase by 10 million of migrants. In addition, the composition of labor significantly differs: 70 percent of unskilled vs. 30 percent of skilled labor.

²¹ In this study, emigration rate is specified as the ratio of emigrants relative to labor force in the country of origin.

increase for semi- (1 percent) and high-skill labor (2 percent), it sharply rise from 67 percent share in 2004 to 75 percent in 2020. Immigrants from Latin America increase by 3.6 million in 2020, corresponding to an increase of 2.4 million from the baseline. Out of this incremental increase, around 60 percent of Latin American immigrants are low-skill workers.

Globally the European Union is another important destination to accommodate incremental immigrants. In 2020, the region receives 5.3 million of additional immigrants from the baseline, of which 55 percent belong to low-skill labor, and the rest is roughly shared equally between semi- and high-skill workers. Migrants' share in the EU workforce modestly increases from 9.5 percent in 2004 to 11.4 percent in 2020. The shares of low- and high-skill migrant workers are up by 2 percent to 14 percent levels in 2020, whereas that of semi-skill migrants is marginally up for from 5.8 percent to 6.9 percent in 2020. The increase in immigrants from Latin America is a marginal 0.35 million from the baseline. Semi-skill labor accounts for roughly the half of new immigrants originating from Latin America.

Simulation Results

Changes in GDP and Aggregate Household Income

The preliminary simulation results indicate that the south-north international migration and remittances generate gains in both countries of origin and destination. In terms of gains in real GDP measured at the 2004 base year, the global GDP increases by additional 1 percent from the baseline scenario.²³ For Latin America, the economic gains are closely associated with the two elements: (i) degree of emigration in labor force; and (ii) reliance on remittances in both national account and household income. The region, home of large emigrants particularly in the north, will significantly benefit from international migration and remittances. The region's GDP grows 3 percent higher than the baseline scenario. Central America, the region with considerably high emigration rates and large reliance on remittances, will be the largest likely beneficiary. In particular, Salvadorian real GDP increases by 26 percent, followed by Guatemala (19 percent) and Honduras (17 percent). In contrast, despite the largest migrant stocks in Latin America and relatively and relatively high emigration rate, Mexico's growth is compromised by the low share of remittances in the national account. Nevertheless, GDP increases by 2.9 percent, at the same speed with Latin America. GDP in countries in South America also increases, but at much modest rates.

²² Immigrants from the United States and the European Union to Canada increase. But compared with the baseline scenario, their paces are much slower. This contributes to a higher increase in Latin American migrants to Canada.

Real GDP also increases in host countries, as they increase immigrant workers in their labor force. The effects differ from one country to another, and greatly depend on the composition of labor market and the share of migrants in each labor category in host countries. In the United States, by far the largest recipient of international migration, GDP rises by 1 percent. This is because, compared with the baseline scenario, the United States increases 4.6 million migrant workers, which account for 18 percent of its labor force in 2020. Likewise, GDP in the European Union increases at 0.6 percent. This modest growth is attributed to, compared with the United States, lower immigrants²⁴ and low share of immigrant workers in labor force. In Canada, immigrant workers, who account for 29 percent of the country's labor force, contribute to boost the economy with an increase of 1.3 percent. In contrast, real GDP in Japan increases a small 0.4 percent. Despite the rising share of immigrants in shrinking labor force, the marginal share of immigrants in the country's workforce limits the potential gains.

Regarding the welfare gains, Walmsley and Winter (2005), using the static CGE model, first estimated that relaxing the migration flows from developing to developed countries, equivalent to 3 percent of the latter's labor force will increase the global welfare by 150 billion at the 1997 prices. With the same assumption on migration mobility, the World Bank (2006), applying the recessive dynamic model, finds that the global gains will be \$674 billion in 2025 at the 2001 prices. With the update of migration and remittance data, Walmsley, Winters and Ahmed (2007) re-estimated the welfare gains of \$300 billion at 1997 prices. These studies give a good reference and insight of how and to what extent international migration and/or remittances will contribute to raising the global welfare.

Our simulation results show that international migration and remittances will increase the world real household income roughly by \$430 billion in 2020 measured at 2004 prices. Household income in Latin America will increase by \$62 billion, compared with the baseline scenario. This accounts for around 15 percent of the global total. In value term, households in Mexico gains additional \$22 billion of income. Households in Central America increase their income by \$15 billion, accounting for a quarter of Latin America's income gains. On the other hand, households in host countries also reap income gains. In the United States, household income rises by \$145 billion, which is the sum of both native and migrant households combined. Likewise, household income in the European Union will increase by some \$70 billion and other host countries as well. Thus, in short, international migration and remittances will generate virtuous circle on both countries of origin and destination.

²³ The World Bank (2006) finds that compared with the baseline scenario, 3 percent increase in labor force in high-income countries migrating from developing countries will increase the global real income by 1.19 percent.

²⁴ In 2020, intra-EU migrants account for 46 percent of the total migrants.

As labor force, the most important factor in production process and income generation for households particularly in developing countries, is internationally mobile beyond national border, it is best to examine the impact of international migration on real income for households rather than in the national account. To this end, this study primarily focuses the simulation results on aggregate household income and factor income for each of the countries in Latin America. In this study, households are classified into 3 groups. First are native households in migrants' sending developing countries (home countries) in Latin America and elsewhere, who do not migrate. Second are native households in developed destination countries (host countries)—essentially 3 destinations: Canada, United States and the European Union. Third are households of migrants moved from home countries to host countries, who send remittances to their families back home.

Table 8 shows the preliminary impact on the household income by category for each country in Latin America. The region's gross household income increases by \$62 billion at the 2004 prices, compared with the baseline scenario. These gains would be compared with \$ 47 billion gains by native households in Latin America and \$87 billion by new migrants from Latin America (World Bank, 2006). In value term, Mexico reaps the largest income gains by \$22 billion, followed by Brazil (\$ 7.9 billion), Colombia (\$ 7.1 billion) and Guatemala (\$6.2 billion).

<INSERT TABLE 8>

A large portion of income gains comes from labor income and remittances from new migrants. In Latin America, labor income reaches around \$40 billion, which accounts for some 60 percent of household income gains in 2020. In general, the shares of labor income are large in such countries as with low emigration rates and coincidentally with large labor force at home: Bolivia, Colombia, Argentina, Brazil and Chile. In Argentina and Chile, this income accounts for more than 80 percent of the income gains. But this is also true in countries with high emigration rates in Central America: labor income constitutes the majority of the household income: 75 percent in Costa Rica and Nicaragua on the top and the lowest of 46 percent in Guatemala. In general, as the World Bank (2006) finds, labor income gains are associated more with semi- and high-skill workers than with low-skill workers. These results suggest that the improvement in labor market conditions (higher wages) for non-migrant workers and the positive income effects generated by remittances outweigh the loss of labor force at home. Figure 4 displays the composition of household income gains in Latin America by category.

<INSERT FIGURE 4>

In contrast, Latin America hardly benefits from income gains from capital, as the returns to capital are likely to contract relative to the baseline scenario. Yet the impact varies country by country. While capital income gains are almost unchanged in the majority of the countries, Mexico and Colombia see slight gains. On the contrary, Paraguay with the lowest emigration rate in Latin America, will suffer the most, and its magnitude greatly reduces the labor income gains. This is also the case with Ecuador again with low emigration rate.

Figure 5 presents the household income gains relative to the baseline scenario in 2020. Households in Latin America increase their aggregate income by 4 percent and none of countries in the region will lose. It also implies that income gains are well associated with two key factors: (i) emigration rates in labor force; and (ii) the share of remittances in household income. Countries in Central America are the largest beneficiaries from the best combination of high emigration rates and large remittance shares. El Salvador is the largest winner with a real income increase by 35 percent, followed by Guatemala (24 percent) and Honduras (22 percent). These high performances in Central America are contrasted with Mexico's modest outcome. Despite the huge migration stock accounting for some 60 percent of the total migrants in Latin America, the advantage of the first factor cannot well overcome the disadvantage of the second.

<INSERT FIGURE 5>

6. Summary and Conclusion

Since the bulk of economic gains from cross-border labor movements essentially accrue to migrants and their families, international migration has direct and profound distributional effects. Wages for similar occupations in high-income countries are often approximately five times larger than those of low-income countries; some estimate the gap would be the factor of ten (Rodrik, 2002). In origin countries, the most visible economic gains are by far remittances made by migrants sent back to their families. Remittances directly increase income and consumption of recipient families, as well as help to diversify the sources of income. From the national standpoints, emigration has also economic consequences in domestic economies. It is reported that low-skilled international migration can improve labor market situations, reducing unemployment

and underemployment without inducing significant wage increases, thereby contributing to poverty alleviation. In contrast, recent findings show that high-skilled migration has mixed effects. While high-skilled migration would be beneficial for origin countries, it has, in some cases, a negative impact on living standards of those left behind and on growth. (to be completed).

Preliminary simulation results from this investigation reaffirm the win-win nature of international migration for both origin and host countries. Migration outflows, through the reallocation of labor force in developed countries and the transfer of remittances developing economies increases global real GDP - measured at the 2004 base year- by an additional 1 percent from the baseline scenario. Sending countries benefit the most from cross-border labor mobility, showing an increase of XX% in real GDP relative to the base scenario in comparison to the XX% in gains observed in recipient countries. Latin America is, by far, a global winner, accruing total gains equivalent to 3 percent of real GDP, versus 1.8% reported by the rest of the developing world. The significantly higher proportion of Latin American workers that emigrate to the United States, Canada, and Europe (the host countries considered in the study) relative to other developing regions is the main reason behind this particular outcome. Although all sixteen Latin American countries included in the model benefit, gains in real GDP and household income within the region are very heterogeneous, for reasons already mentioned, such as migration rates, average migrant skills and demographics, and the structure of labor and production markets in each Latin American country. Salvadorian real GDP increases by 26 percent, followed by Guatemala (19 percent) and Honduras (17 percent). In contrast, despite its relatively high emigration rate, Mexico's additional growth (2.9) is compromised by the low share of remittances in the national account. Chile, Brazil, and Venezuela are among the Latin American countries reporting modest gains from international migration (1.1, 1.5, and 1.5 percent, respectively).

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Table 1. Emigration Stocks by Skill Category to Latin America's Main Destinations (2000)

	Destination: Canada				Destination: United States				Destination: European Union (EU27)			
	Low	Semi	High	Total	Low	Semi	High	Total	Low	Semi	High	Total
Canada					127,239	149,422	439,163	715,825	17,347	22,182	50,328	89,857
United States	31,820	22,145	145,150	199,115					61,042	63,894	170,838	295,774
Mexico	10,965	1,660	12,165	24,790	4,454,823	1,000,864	919,139	6,374,825	5,365	9,476	15,595	30,437
Costa Rica	270	110	845	1,225	17,010	13,388	24,277	54,675	701	721	1,124	2,546
El Salvador	10,260	3,730	13,795	27,785	393,157	112,449	113,578	619,185	2,883	2,537	1,280	6,700
Guatemala	2,880	1,305	4,695	8,880	218,124	58,981	64,485	341,590	763	916	1,007	2,686
Honduras	935	335	1,415	2,685	110,703	43,647	48,320	202,670	1,064	1,366	993	3,423
Nicaragua	1,360	645	4,430	6,435	64,276	38,217	61,947	164,440	544	629	1,094	2,267
Bolivia	310	135	1,015	1,460	6,920	10,619	22,966	40,505	3,708	7,181	4,415	15,304
Colombia	2,085	1,070	8,565	11,720	113,707	104,756	184,472	402,935	38,210	76,655	31,839	146,703
Ecuador	2,700	1,370	5,060	9,130	89,543	59,344	84,298	233,185	48,675	84,327	19,497	152,498
Peru	1,850	1,525	9,855	13,230	43,562	61,128	116,125	220,815	20,801	36,586	24,012	81,399
Venezuela	555	415	4,045	5,015	8,522	11,629	53,899	74,050	11,161	31,645	20,310	63,116
Argentina	2,120	1,400	6,465	9,985	22,486	22,533	60,516	105,535	25,062	50,886	34,899	110,846
Brazil	1,375	1,155	6,485	9,015	31,012	39,386	83,851	154,250	37,891	35,712	35,257	108,860
Paraguay	2,010	505	1,645	4,160	1,985	2,107	3,981	8,072	1,153	1,319	1,159	3,631
Uruguay	1,400	705	3,345	5,450	6,556	5,584	9,582	21,723	5,352	13,565	6,853	25,770
Chile	4,320	2,935	14,160	21,415	12,590	15,262	37,547	65,400	15,644	24,556	17,109	57,309
Latin	45,395	19,000	97,985	162,380	5,594,976	1,599,895	1,888,984	9,083,855	218,976	378,076	216,442	813,495
EU27	674,720	214,905	992,450	1,882,075	814,946	873,315	1,816,064	3,504,325	4,179,148	2,231,431	1,806,143	8,216,722
Japan	1,620	1,935	12,230	15,785	22,925	58,070	202,300	283,295	22,475	15,170	35,075	72,720
China	112,470	30,580	144,765	287,815	280,422	126,730	434,547	841,699	89,324	32,479	48,577	170,380
Rest of World	506,180	250,150	1,331,650	2,087,980	2,386,810	1,870,532	5,566,960	9,824,302	6,443,163	2,465,134	2,195,859	11,104,155
Total	1,372,205	538,715	2,724,230	4,635,150	9,227,318	4,677,964	10,348,018	24,253,300	11,031,477	5,208,365	4,523,262	20,763,103

Source: Docquier and Marfouk (2004, 2005).

Note: *Low: 0-8 years education, complete.

Semi: 9-12 years education, complete.

High: more than 13 years education.

Table 2. Share of Host Countries by Labor Category for Latin America (2000)

		(%)							
to from	Low-skill Migrants				Semi-skill Migrants				
	Canada	United States	EU27	Total	Canada	United States	EU27	Total	
Mexico	0.25	99.63	0.12	100.00	0.16	98.90	0.94	100.00	
Costa Rica	1.50	94.60	3.90	100.00	0.77	94.15	5.07	100.00	
El Salvador	2.53	96.77	0.71	100.00	3.14	94.72	2.14	100.00	
Guatemala	1.30	98.36	0.34	100.00	2.13	96.37	1.50	100.00	
Honduras	0.83	98.23	0.94	100.00	0.74	96.25	3.01	100.00	
Nicaragua	2.06	97.12	0.82	100.00	1.63	96.78	1.59	100.00	
Bolivia	2.83	63.26	33.90	100.00	0.75	59.21	40.04	100.00	
Colombia	1.35	73.83	24.81	100.00	0.59	57.41	42.01	100.00	
Ecuador	1.92	63.54	34.54	100.00	0.94	40.92	58.14	100.00	
Peru	2.79	65.79	31.42	100.00	1.54	61.60	36.87	100.00	
Venezuela	2.74	42.11	55.15	100.00	0.95	26.62	72.43	100.00	
Argentina	4.27	45.27	50.46	100.00	1.87	30.12	68.01	100.00	
Brazil	1.96	44.13	53.92	100.00	1.51	51.65	46.83	100.00	
Paraguay	39.05	38.55	22.40	100.00	12.85	53.60	33.55	100.00	
Uruguay	10.52	49.26	40.22	100.00	3.55	28.13	68.32	100.00	
Chile	13.27	38.68	48.05	100.00	6.86	35.70	57.44	100.00	
Latin America	0.77	95.49	3.74	100.00	0.95	80.12	18.93	100.00	

to from	High-skill Migrants				Total Migrants				
	Canada	United States	EU27	Total	Canada	United States	EU27	Total	
Mexico	1.28	97.07	1.65	100.00	0.39	99.14	0.47	100.00	
Costa Rica	3.22	92.50	4.28	100.00	2.10	93.55	4.36	100.00	
El Salvador	10.72	88.28	0.99	100.00	4.25	94.72	1.02	100.00	
Guatemala	6.69	91.88	1.43	100.00	2.51	96.73	0.76	100.00	
Honduras	2.79	95.25	1.96	100.00	1.29	97.07	1.64	100.00	
Nicaragua	6.57	91.81	1.62	100.00	3.72	94.97	1.31	100.00	
Bolivia	3.57	80.88	15.55	100.00	2.55	70.73	26.72	100.00	
Colombia	3.81	82.03	14.16	100.00	2.09	71.78	26.13	100.00	
Ecuador	4.65	77.44	17.91	100.00	2.31	59.06	38.63	100.00	
Peru	6.57	77.42	16.01	100.00	4.19	70.00	25.80	100.00	
Venezuela	5.17	68.88	25.95	100.00	3.53	52.08	44.39	100.00	
Argentina	6.35	59.40	34.25	100.00	4.41	46.62	48.97	100.00	
Brazil	5.16	66.76	28.07	100.00	3.31	56.68	40.00	100.00	
Paraguay	24.25	58.67	17.08	100.00	26.22	50.89	22.89	100.00	
Uruguay	16.91	48.44	34.64	100.00	10.29	41.03	48.67	100.00	
Chile	20.58	54.56	24.86	100.00	14.86	45.38	39.76	100.00	
Latin America	4.45	85.73	9.82	100.00	1.61	90.30	8.09	100.00	

Source: Docquier and Marfouk (2004, 2005).

Note: Refer to Table 1.

Table 3. Labor Force and its Composition by Skill Category (2000)

	Labor Force* (1,000)				Composition (%)			
	Low	Semi	High	Total	Low	Semi	High	Total
Latin America	143,999	40,920	24,808	209,726	68.2	19.8	12.0	100.0
Mexico	23,959	11,659	4,506	40,125	59.7	29.1	11.2	100.0
Costa Rica	1,161	187	308	1,656	70.1	11.3	18.6	100.0
El Salvador	1,984	217	262	2,464	80.6	8.8	10.6	100.0
Guatemala	2,686	301	181	3,168	84.8	9.5	5.7	100.0
Honduras	1,940	247	152	2,339	82.9	10.6	6.5	100.0
Nicaragua	1,373	296	163	1,832	74.9	16.1	8.9	100.0
Bolivia	2,512	529	513	3,553	70.7	14.9	14.4	100.0
Colombia	13,156	4,099	1,900	19,154	68.7	21.4	9.9	100.0
Ecuador	3,114	908	924	4,947	63.0	18.4	18.7	100.0
Peru	5,737	3,254	2,594	11,585	49.5	28.1	22.4	100.0
Venezuela	7,271	982	1,811	10,064	72.2	9.8	18.0	100.0
Argentina	8,836	3,975	3,141	15,952	55.4	24.9	19.7	100.0
Brazil	64,672	11,131	6,992	82,795	78.1	13.4	8.4	100.0
Paraguay	1,795	441	202	2,438	73.6	18.1	8.3	100.0
Uruguay	872	505	197	1,574	55.4	32.1	12.5	100.0
Chile	2,932	2,189	961	6,081	48.2	36.0	15.8	100.0
Host Countries and Region								
Canada	1,573	6,297	8,343	16,213	9.7	38.8	51.5	100.0
United States	8,359	64,334	76,574	149,268	5.6	43.1	51.3	100.0
EU27	94,428	92,738	38,939	226,104	41.8	41.0	17.2	100.0
World	1,687,837	815,780	292,637	2,796,254	22.2	41.9	35.9	100.0

Sources: EAPEP Database, fifth edition, ILO, August 2008.

Docquier and Marfouk (2005, 2008).

Note: Refer to Table 1.

Table 4. Remittance Flows to Latin America: 2000-2007

	(\$million)							
	2000	2001	2002	2003	2004	2005	2006	2007*
Inflow								
Mexico	7,525	10,146	11,029	14,911	18,260	21,917	24,732	25,000
Costa Rica	136	198	250	321	320	421	513	590
El Salvador	1,765	1,926	1,953	2,122	2,564	2,842	3,330	3,600
Guatemala	596	634	1,600	2,147	2,591	3,033	3,626	4,100
Honduras	416	540	718	867	1,151	1,796	2,367	2,600
Nicaragua	320	336	377	439	519	600	656	715
Bolivia	127	135	113	159	211	347	611	758
Colombia	1,610	2,056	2,480	3,076	3,190	3,346	3,929	4,600
Ecuador	1,322	1,421	1,438	1,633	1,838	2,461	2,922	3,178
Peru	718	753	705	860	1,133	1,440	1,837	2,000
Venezuela	17	19	19	21	143	148	165	165
Argentina	86	190	189	274	312	432	542	542
Brazil	1,649	1,775	2,449	2,822	3,575	3,540	4,253	4,500
Paraguay	278	264	202	223	238	269	432	450
Uruguay	..	..	36	62	70	77	89	100
Chile	13	12	12	12	12	13	3	3
Latin America	16,578	20,405	23,570	29,949	36,125	42,682	50,007	52,902
Outflow								
Mexico	..	..	..	..	..	..	..	..
Costa Rica	142	140	148	192	192	209	246	..
El Salvador	20	26	22	25	33	24	29	..
Guatemala	56	32	82	86	35	33	34	..
Honduras	1	1	1	1	1	1	1	..
Nicaragua	..	..	..	..	..	..	..	..
Bolivia	37	36	38	46	50	66	73	..
Colombia	219	204	158	65	50	56	66	..
Ecuador	6	7	7	7	7	54	62	..
Peru	275	175	121	116	113	129	133	..
Venezuela	331	406	383	209	214	211	253	..
Argentina	268	256	99	180	235	314	367	..
Brazil	366	709	361	333	401	498	690	..
Paraguay	..	..	..	..	..	..	..	..
Uruguay	..	..	..	1	2	2	3	..
Chile	16	16	16	15	15	16	6	..
Latin America	1,737	2,008	1,436	1,276	1,348	1,613	1,963	..

Source: World Development Indicators Online, World Bank.

Note: * Estimates.

Table 5. Structure of Household income in Latin America (2004)

Countries	HH Income (\$million)	Share of Income Component (%)					Total
		Labor	Capital	Other Factors	Domestic Transfers	Remittances	
Mexico	540,919	69.9	12.1	3.1	11.9	3.0	100.0
Costa Rica	15,469	72.1	14.6	2.9	8.4	2.1	100.0
El Salvador	16,213	65.5	9.6	2.0	8.8	14.1	100.0
Guatemala	29,701	62.6	8.2	3.1	17.5	8.6	100.0
Honduras	8,105	62.6	8.4	2.3	11.2	15.6	100.0
Nicaragua	4,874	62.3	7.9	4.0	14.8	11.1	100.0
Bolivia	8,280	73.5	8.5	3.9	11.7	2.5	100.0
Colombia	79,142	73.2	6.3	3.1	13.7	3.7	100.0
Ecuador	28,781	67.4	7.7	2.4	15.4	7.2	100.0
Peru	58,542	78.7	5.9	3.8	9.7	1.9	100.0
Venezuela	75,158	73.5	11.9	2.0	12.5	0.2	100.0
Argentina	119,724	78.1	7.5	2.7	11.5	0.3	100.0
Brazil	504,351	78.2	6.7	2.9	11.4	0.7	100.0
Paraguay	7,678	70.8	8.2	5.5	12.5	3.1	100.0
Uruguay	13,536	77.0	5.5	3.7	13.3	0.5	100.0
Chile	70,235	73.2	11.7	2.8	12.2	0.0	100.0
Latin America	1,580,709	76.8	9.7	3.1	12.4	2.3	100.0

Source: SAMs database of the IDB-INT CGE model.

Table 6. Bilateral Remittance Flows to Latin America (2004)

To \ from	Remittances (\$million)				Country Share of Remittance (%)			
	Canada	United States	EU27	Total	Canada	United States	EU27	Total
Mexico	70.4	18,103.3	86.4	18,260.1	0.4	99.1	0.5	100.0
Costa Rica	6.7	298.9	13.9	319.5	2.1	93.5	4.4	100.0
El Salvador	109.0	2,428.8	26.3	2,564.1	4.3	94.7	1.0	100.0
Guatemala	65.2	2,506.4	19.7	2,591.3	2.5	96.7	0.8	100.0
Honduras	14.8	1,117.0	18.9	1,150.7	1.3	97.1	1.6	100.0
Nicaragua	19.3	492.7	6.8	518.8	3.7	95.0	1.3	100.0
Bolivia	5.4	149.0	56.3	210.6	2.5	70.7	26.7	100.0
Colombia	66.6	2,289.4	833.6	3,189.6	2.1	71.8	26.1	100.0
Ecuador	42.5	1,085.6	709.9	1,838.0	2.3	59.1	38.6	100.0
Peru	47.5	792.9	292.3	1,132.7	4.2	70.0	25.8	100.0
Venezuela	5.0	74.5	63.5	143.0	3.5	52.1	44.4	100.0
Argentina	13.8	145.4	152.7	311.8	4.4	46.6	49.0	100.0
Brazil	118.4	2,026.5	1,430.2	3,575.1	3.3	56.7	40.0	100.0
Paraguay	62.5	121.2	54.5	238.2	26.2	50.9	22.9	100.0
Uruguay	7.2	28.7	34.0	69.9	10.3	41.0	48.7	100.0
Chile	1.7	5.3	4.6	11.6	14.9	45.4	39.8	100.0
Latin America	655.9	31,665.5	3,803.5	36,125.0	1.8	87.7	10.5	100.0

Source: Remittance data from WDI Online, World Bank.

Note: Remittance flows are estimated in proportion to the total number of workers migrated to host countries.

Table 7. Labor Force and Migration in Host Countries on Baseline and Experimental Scenarios

(million workers)						
Host Countries	Labor Skill	2004	2020		Changes wrt 2004	
			Baseline	Experiment	Baseline	Experiment
Canada						
Labor Force	Low	1.71	1.99	1.99	0.28	0.28
	Semi	6.83	7.96	7.96	1.13	1.13
	High	9.05	10.54	10.54	1.50	1.50
	Total	17.58	20.49	20.49	2.91	2.91
Total Migrants	Low	1.51	1.75	1.71	0.25	0.20
	Semi	0.58	0.68	0.68	0.10	0.10
	High	2.95	3.44	3.50	0.49	0.54
	Total	5.04	5.88	5.89	0.83	0.85
Migrants from LAC	Low	0.05	0.06	0.07	0.01	0.02
	Semi	0.02	0.02	0.03	0.00	0.01
	High	0.11	0.12	0.15	0.02	0.04
	Total	0.18	0.21	0.24	0.03	0.07
United States						
Labor Force	Low	12.90	14.62	14.62	1.72	1.72
	Semi	61.89	70.15	70.15	8.26	8.26
	High	78.78	89.30	89.30	10.51	10.51
	Total	153.58	174.07	174.07	20.50	20.50
Total Migrants	Low	8.27	9.37	11.02	1.10	2.76
	Semi	4.81	5.46	6.37	0.64	1.56
	High	10.65	12.07	14.13	1.42	3.48
	Total	23.73	26.89	31.52	3.17	7.79
Migrants from LAC	Low	5.76	6.52	7.91	0.77	2.15
	Semi	1.65	1.87	2.30	0.22	0.66
	High	1.94	2.20	2.76	0.26	0.82
	Total	9.35	10.59	12.97	1.25	3.62
EU27						
Labor Force	Low	96.78	98.63	98.63	1.85	1.85
	Semi	95.05	96.86	96.86	1.82	1.82
	High	39.91	40.67	40.67	0.76	0.76
	Total	231.73	236.17	236.17	4.43	4.43
Total * Migrants	Low	11.34	11.55	14.48	0.22	3.14
	Semi	5.33	5.44	6.69	0.10	1.36
	High	4.64	4.72	5.80	0.09	1.17
	Total	21.31	21.71	26.98	0.41	5.67
Migrants from LAC	Low	0.22	0.23	0.32	0.00	0.10
	Semi	0.39	0.39	0.56	0.01	0.17
	High	0.22	0.23	0.32	0.00	0.10
	Total	0.83	0.85	1.20	0.02	0.37

Source: Authors' estimations, based on ILO labor force projections and labor market decompositions by Docquier and Marfouk (2004, 2005).

Note: * In the EU27, total migrants include intra-EU migration.

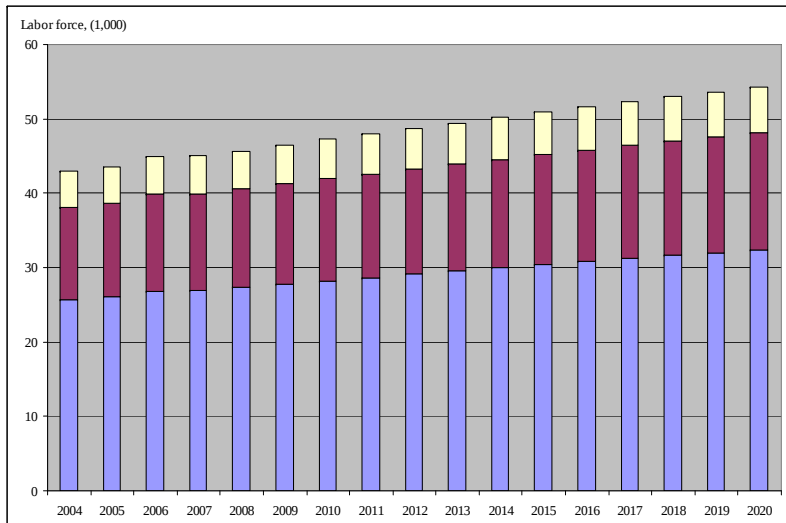
**Table 8. Changes in Household Income in 2020
(relative to baseline scenario)**

	(\$billion)				
	Labor	Capital	Land	Remittance	Total
Mexico	11.27	0.37	2.68	7.61	21.92
Costa Rica	0.99	0.01	0.15	0.16	1.30
El Salvador	3.48	0.00	0.13	1.37	4.98
Guatemala	2.88	0.00	1.55	1.76	6.19
Honduras	1.09	0.00	0.23	0.35	1.67
Nicaragua	0.58	0.00	0.04	0.18	0.79
Bolivia	0.26	-0.01	0.03	0.04	0.32
Colombia	5.98	0.17	-0.07	1.02	7.11
Ecuador	1.48	-0.52	1.22	0.52	2.70
Peru	1.06	0.00	0.08	0.34	1.48
Venezuela	0.94	0.00	0.49	0.07	1.50
Argentina	2.58	0.06	0.35	0.11	3.11
Brazil	5.75	0.06	0.01	2.10	7.92
Paraguay	0.33	-0.22	0.05	0.09	0.25
Uruguay	0.38	0.02	0.04	0.12	0.58
Chile	0.61	0.00	0.10	0.01	0.72
Latin America	39.67	-0.06	7.10	15.83	62.53

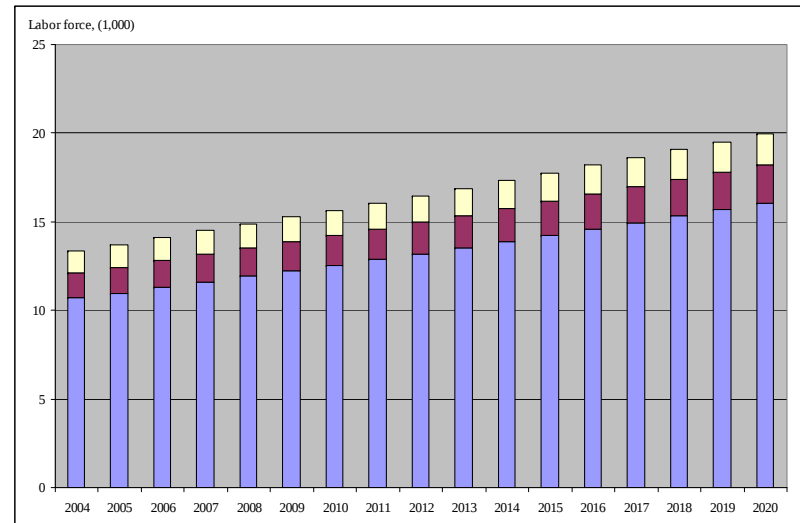
Source: Authors' model simulations.

Figure 1. Labor Force Projection for Latin America: 2004-202

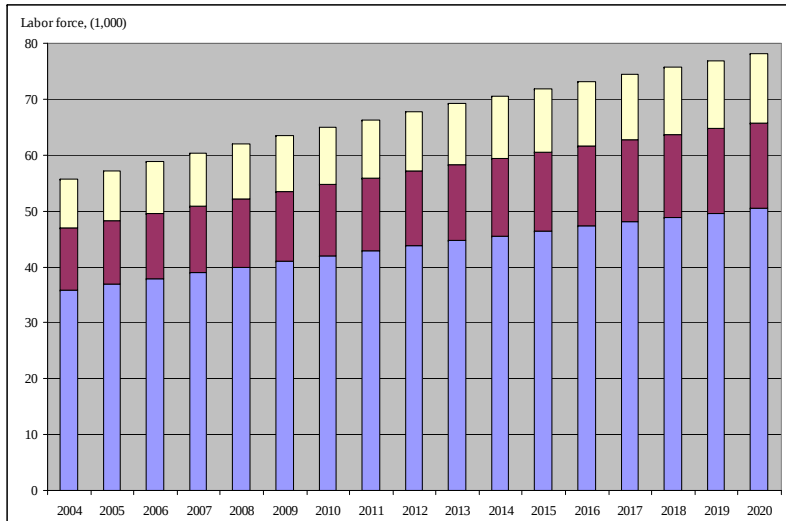
Mexico



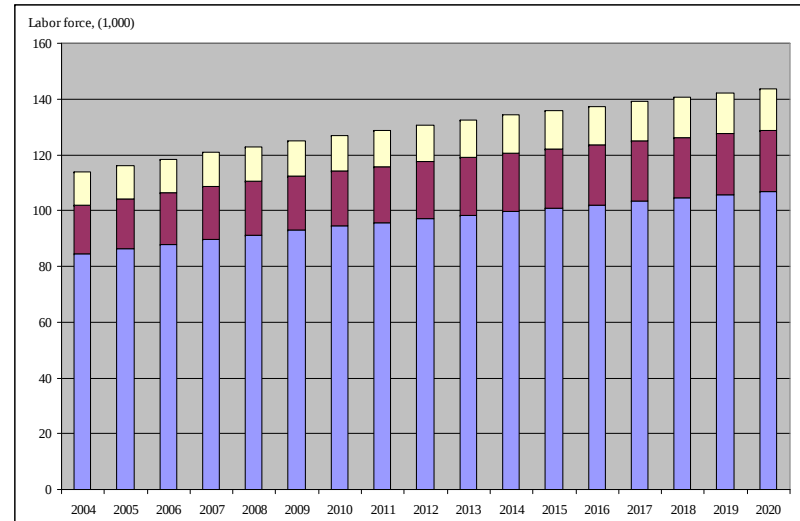
Central America



Andean Group

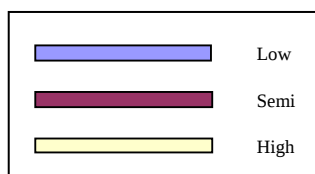
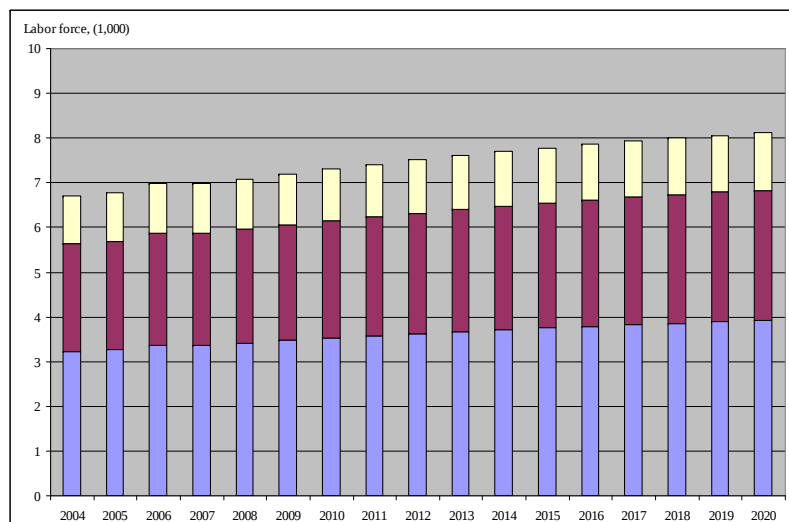


Mercosur

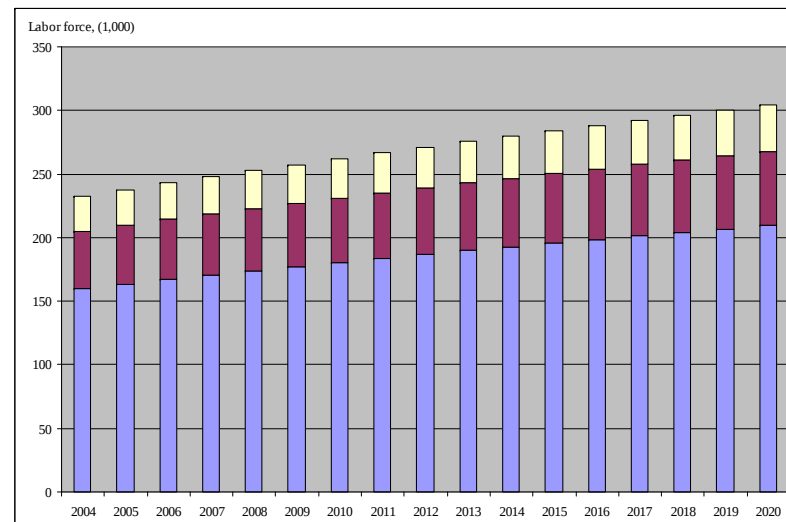


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Chile



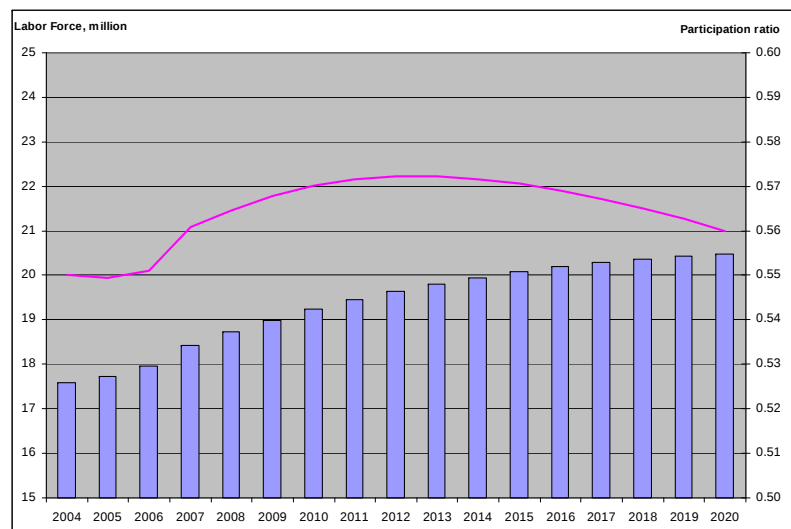
Latin America



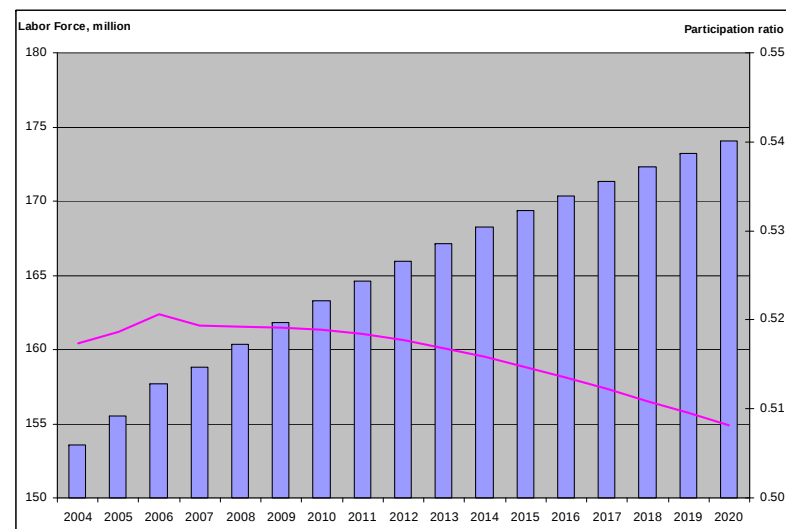
Sources: EAPPE Database, fifth edition, ILO, August 2008.
Docquier and Marfouk (2004, 2005).

Figure 2. Projection of Labor Force and Participation Ratio in Host Countries for Latin America: 2004-2020

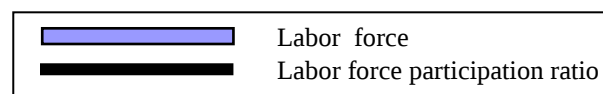
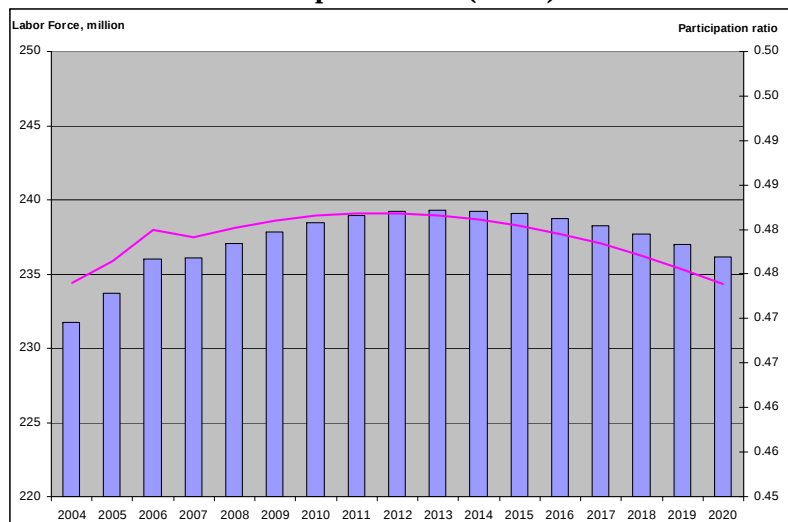
Canada



United States

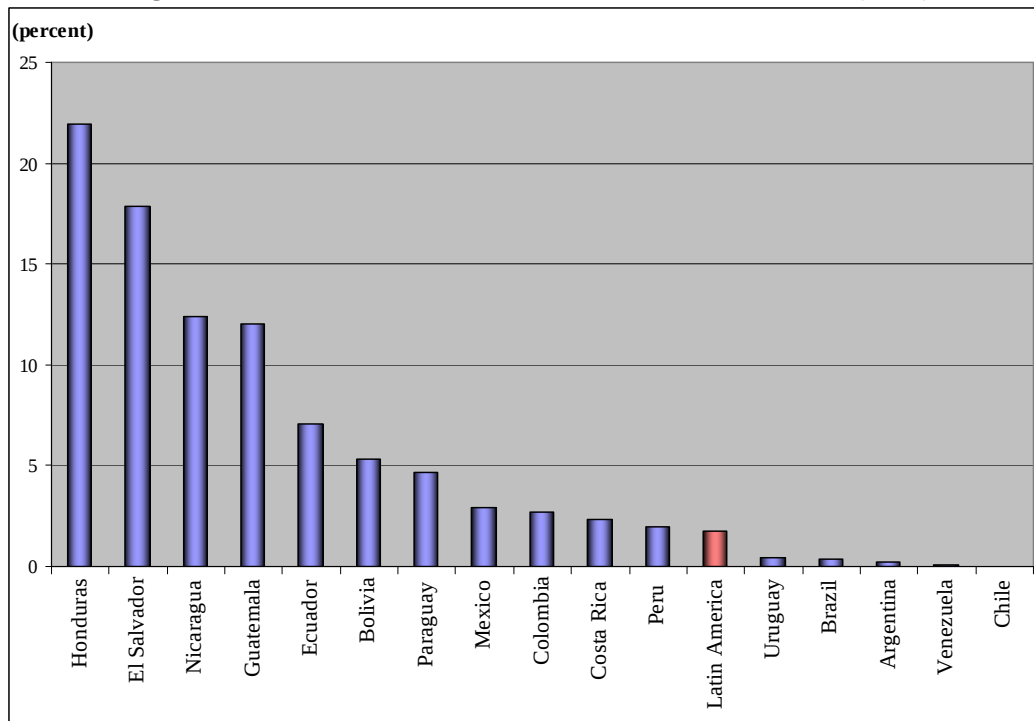


European Union (EU27)



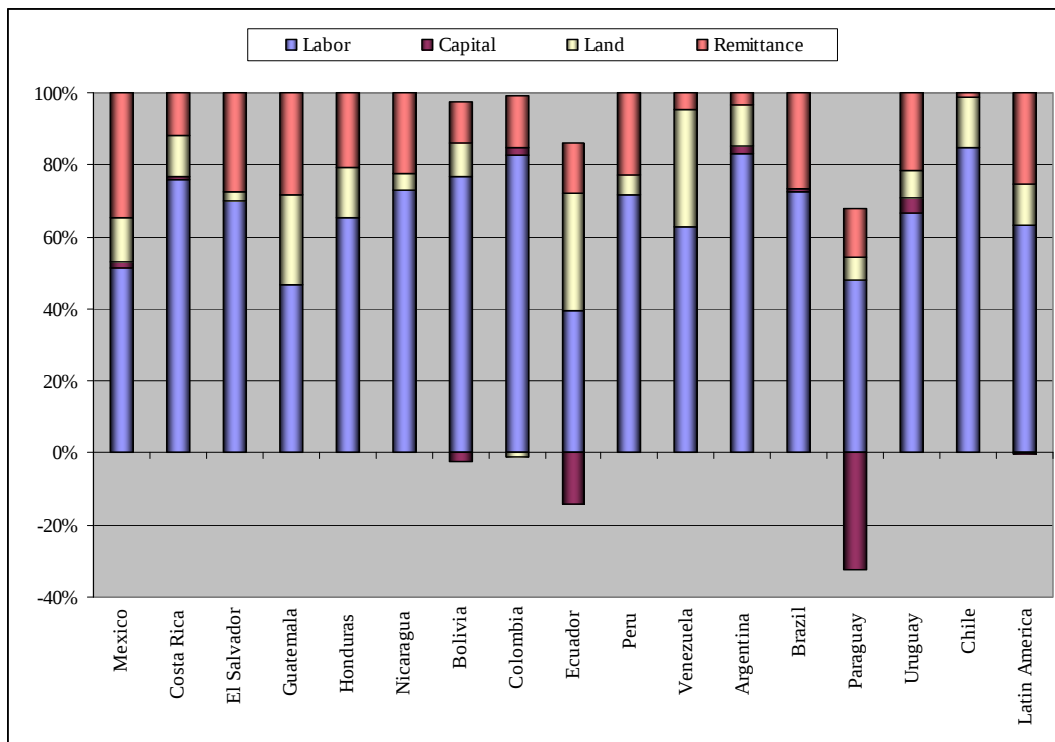
Source: EAPPE Database, fifth edition, ILO, August 2008.

Figure 3. Share of Remittances in GDP for Latin America (2006)



Source: Authors' model simulations.

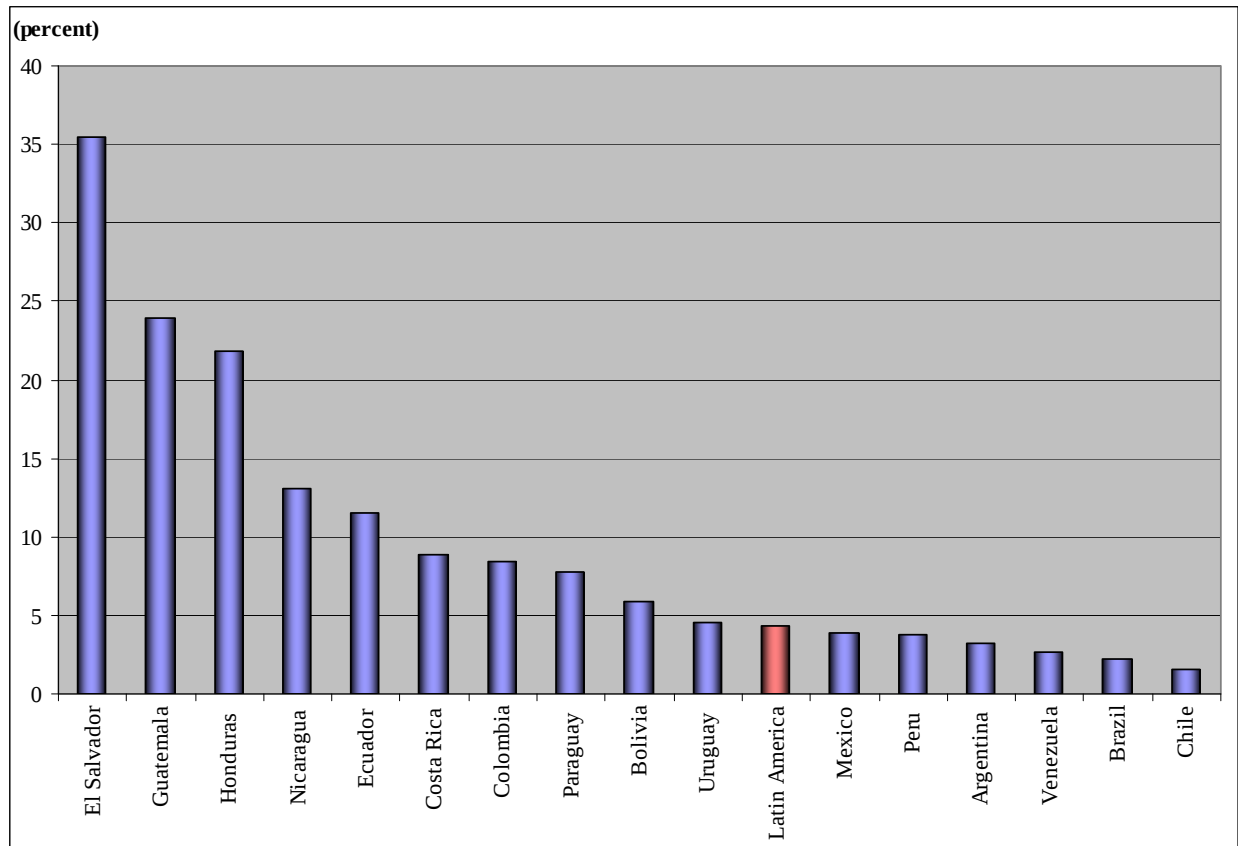
Figure 4. Composition of Household Income Gains In Latin America in 2020



Source: Authors' model simulations.

Note: Share of the gross household income gains relative to baseline scenario.

**Figure 5. Gains in Household Income in 2020
(% change, relative to baseline scenario)**



Source: Authors' model simulations.

Table **Changes in GDP and Aggregate Household Income
(relative to baseline scenario)

	GDP (%)	HH income * (\$billion)
Mexico	2.9	21.9
Costa Rica	5.6	1.3
El Salvador	26.2	5.0
Guatemala	18.8	6.2
Honduras	17.2	1.7
Nicaragua	11.1	0.8
Bolivia	4.5	0.3
Colombia	5.7	7.1
Ecuador	8.0	2.7
Peru	2.5	1.5
Venezuela	1.5	1.5
Argentina	2.0	3.1
Brazil	1.5	7.9
Paraguay	5.8	0.2
Uruguay	3.6	0.6
Chile	1.1	0.7
Latin America	3.0	62.5
Canada	1.3	14.4
United States	1.1	145.5
EU27	0.6	72.4
Japan	0.4	29.4
China	0.4	9.6
Rest of World	1.8	95.4
World	1.0	429.2

Source: Authors' model simulations.

Note: * Household income in host countries
combines both native and migrants' income.