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**Measuring the Impact of International Migration and Remittances:
Will Latin America Be a Big Winner?¹**

Julio Guzman and Masakazu Watanuki²

Abstract

This study evaluates the potential gains of international migration, based on stock of migration and corresponding remittance flows in complete bilateral dimensions. The model incorporates 3 types of households in both high-income and developing countries, differentiated by nativity. Labor market is decomposed into 3 categories—high, mid, and low skills—and again differentiated by country of origins. This study assumes that emigration rates from each country are held constant as a policy shock, as opposed to the constant share of migrant workers in labor force in each host country in a baseline scenario, while updating each year based on the growth of labor force. The recursive dynamic CGE model simulates from 2004 base year to the projection year 2020.

The preliminary simulation results reaffirm the win-win nature of international migration for both origin and host countries. The global GDP increases by 1.4 percent from the baseline scenario. Measured at 2004 prices, international migration also generates \$760 billion of global income in 2020, corresponding to 1.27 percent increase. The bulk of the gains accrue to the origin of developing countries, amounting to \$640 billion, or approximately 85 percent of the global gain. Thus the south-north migration is the key driver of raising the global income, generating the global endogenous income-generating growth process. Migrant households in high-income countries reap the largest gains, amounting to \$450 billion. Yet the mechanism and sources of gains are differentiated between migrant-receiving high-income host countries and migrant-sending low-income developing countries. The former benefits from the increase in capital income, offsetting the decline in wages. In contrast, the latter gains from the rise in labor income and remittances. Latin America will be a global winner, with an increase in real GDP by 1.8 percent, and the region capture a quarter of the aggregate income gain in developing countries.

Key Words: International Migration, Remittances, Dynamic CGE model

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² The views expressed in this paper are those of the authors, and do not necessarily reflect views of the Inter-American Development Bank and its member countries. The authors are responsible for remaining errors and omissions: juliogu@iadb.org; masakazuw@iadb.org. The authors gratefully acknowledge Terrie L. Walmsley for providing the GMig2 database for this study.

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 international migration just doubled, representing only 3 percent of the global population, equivalent to 190 million in 2005.³ 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 most binding factors behind the slow speed in cross-border labor movements are political, social, psychological, and cultural dimensions that the movement of goods and capital usually do not carry.

Although early literature mostly highlighted the negative sides of international migration on development prospects, recent empirical studies suggest that cross-border labor mobility would induce a virtuous circle capable of generating substantial gains for both origin and recipient countries (Lucas, 2005; Pritchett, 2006). On one side, recipient countries expand their productive capacity in labor force, which in turn increase gross income, as the pressure of labor force shortages limiting growth potential lessens (Walmsley and Winters, 2003; Poot and Cochrane, 2004). On the other hand, sending countries will also likely to benefit from increased remittances,⁴ continuous transfer of knowledge, absorption of new technology, investments made by native migrants, and the creation of business networks from the diaspora process (Dustmann and Kirchkamp, 2001; Stark, Helmenstein and Prskawetz, 1997; Yang, 2004; Adams, 2005; Ellerman, 2003). According to the recent literature, these potential effects would be more amplified when the migrant labor force is temporary in status, allowing for a more dynamic back-and-forward transfer of skills, assets and knowledge. Although there have been growing number of case studies in recent years, data and methodological limitations still poses significant challenges in evaluating the potential impact of migration-related feedback effects in a more systematic, comprehensive and integral manner.

Based on cross-country migration flows in a global scale, however, a couple of empirical studies applying computable general equilibrium (CGE) models emerged in recent years. Walmsley and Winter (2005), using the static CGE model, estimated that relaxing the migration flows from developing to developed

³ The United Nations (2006).

⁴ In fact, remittances have become, in recent years, a major source of household income particularly for low-income families in many developing countries including Latin America.

countries, equivalent to 3 percent of the latter's labor force will increase the global welfare of 150 billion at the 1997 prices, about 0.6 percent of the world income. With the update of migration and remittance data,⁵ Walmsley, Winters and Ahmed (2007) re-examined the global gains. They found that unskilled migration from developing to developed countries has greater impact on real income of permanent residents in both host and sending countries, although skill migration would be more beneficial to developed labor-importing countries, measured in terms of per migrant worker. With the same magnitude of international migration, the World Bank (2006), applying the recessive dynamic model, found that the global income increases \$674 billion in 2025 at the 2001 prices relative to baseline, corresponding to 1.19 percent of the world income. It also found that the majority of gains—amounting to \$481 billion—accrues to migrant households in high-income countries. Furthermore, it estimated that Latin America would be the largest winner, with native households earning \$47 billion of real income. Thus, these studies reached unambiguous conclusions; namely, international migration generates a win-win solution for both origin and host countries.

This paper aims to contribute to the existing literature in evaluating the global and the distributional effects of international migration-remittance effects. It introduces updates and innovations over the recent studies. First, in contrast with Walmsley and Winter (2005), Walmsley, Winters and Ahmed (2007) and World Bank (2006), our model incorporates the complete bilateral international migration flows, not only the south-north but also north-south, within south-south and north-north flows. Second, based on the stock of migration on bilateral basis, the model captures the corresponding bilateral remittance flows. These data is completely reconciled between origin and destination, based on GMig2 database updated for the base year 2004. Third, based on Docquier and Marfouk (2004, 2005), and Docquier, Lowell, and Marfouk (2008) with some updates, labor force is decomposed into 3 categories—high, mid and low skills—instead of 2 groups, as used in the recent studies. This makes us to evaluate the impact of migration differentiated by skill, particularly important in Latin American, where countries have highly differentiated human capital endowments. Fourth, as with the World Bank (2006), the study applies a recessive dynamic model to capture the changes in migration flows over time, constructed on the country-specific Social Accounting Matrix benchmarked in 2004. Fifth, to reflect labor market rigidities, inflexibilities and segmentation in grave magnitude, the model incorporates imperfect substitution not only native and migrant workers but also counties of origin and skills. Finally but not the last, this study assumes a different migration policy shock. Instead of imposing a 3-percent increase in the stock of migrant workers in developed host countries as applied in the cited studies, this study assumes constant

⁵ It is called the GMig database (Walmsley, Ahmed and Parsons, 2007), capturing bilateral migration and remittance flows in a global scale at 2001.

emigration rates in each country based on its labor force, which results in 16.7 million of the global new migrant workers in 2020.

The preliminary simulation results reaffirm the win-win nature of international migration for both origin and host countries. International migration increases the global real GDP by 1.4 percent and generates global income of \$760 billion, measured at the 2004 prices. As the World Bank (2006) found, the bulk of real income gains accrues to migrant households in high-income countries, accounting for 60 percent of the global total. Native households in high income countries benefit from higher returns to capital, which offset the decline in labor income. On the other hand, native households in developing countries enjoy the rise in wage income, which constitutes 40 percent of the aggregate income. Remittances also play an important role in raising income, accounting for roughly 30 percent in the aggregate, with high differentiations over countries. Latin America appears to be a global winner. As a result of high degree of migration and the resultant remittances, Latin America increases its real GDP by 1.8 percent, faster than the global growth. In the meantime, the region's income would rise \$47 billion relative to the baseline, capturing a quarter of the aggregate gain in developing countries.

The rest of the paper is structured as follows. Section 2 presents the recent trends of stock of international migration and labor force based on bilateral country basis, with highlights on high-income and developing countries. It also evaluates the composition of labor decomposed by skill and the corresponding wages in each region. Section 3 describes the recent trends of the aggregate global remittances and bilateral flows in line with the migration flows in Section 2. Section 4 provides the structure and framework of the recursive dynamic model, comprising within-period static module—the core of the model—and between-period recursive dynamic module, to accommodate international migration and remittances,. Section 5 reports baseline and migration scenarios as well as preliminary simulation results. Section 6 summarizes main findings and conclusions.

2. Recent Trends of International Migration and Labor Force

Global Migration Stocks

The United Nations (2006) estimates that international migrants stood at 190 million in 2006, up from 154 million in 1990, with an annual growth rate of 1.3 percent. This constitutes approximately 3 percent of the world population. The majority of international migrants live in three geographic destinations: Europe (56.1 million), Asia (49.8 million) and North America (40.8 million). In the last decade, North America notably the United States experienced the largest increase in international migration of 13.2

million (48 percent increase), or stunning 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 migrant population in Latin America declined from 7.0 million in 1990 to 5.9 million in 2000 (-15 percent).

Based on the UN International Migration Reports (2002, 2006), the aggregate stock of international migration in 2004 is estimated at 188 million.⁶ Following the GMig 2 database (2001 base year), the bilateral international migration database 2004 are constructed, capturing the complete bilateral flows of international migrant workers not only the south-north but also north-south, within south-south and north-north directions.⁷ In 2004, roughly 40.9 million workers migrate from developing countries to high-income destinations,⁸ accounting for one-third of the global migration of 123 million. On the other hand, 10 million workers migrate within high-income countries, and the half of this size moves from high-income to developing countries. Yet the largest stock of international migration of 66.7 million workers is seen in the south-south dimension. This is equivalent to 54 percent of the global total. As many empirical studies show, international migration is determined by either geographic proximity, colonial ties, degree of economic linkages, or any combination of them. In fact, intra-regional migration amounts to 52.8 million, or 80 percent of the south-south migration. Europe comprising Eastern Europe and Former Soviet Union has the largest stock of the south-south migration (22 million workers), followed by the Middle East and Africa (15 million) and Asia (13.2 million). In contrast, migration within Latin America stands at 2.2 million, or 3.3 percent of the total south-south migration flows. Table 1 presents the stock of bilateral international migrant workers in 2004, and Annex Table 1 details the complete bilateral flows.⁹

<INSERT TABLE 1>

⁶ First, the global migration stock in 2004 is estimated by interpolating migration population between 2002 and 2006. Second, applying the national labor force participation rates in each country, international migrant workers are estimated, assuming that the emigrant population has the same labor force participations rate as the national workforce. Year 2004 is the base year for the subsequent simulation exercises.

⁷ For 5 high-income destinations (Canada, United States, EU15, Japan and Australia/New Zealand), international migration stock is estimated on the basis of emigration rates estimated by Docquier and Marfouk (2005). In order to capture the sizable presence of unauthorized migrants in the United State, survey data by Passel (2006) is used, which reports 7.25 million of migrant workers in 2005, and the vast majority originates from Mexico, followed by Central America. In the meantime, the structure of labor force in the United States is updated, using Papademetriou and Terrazas (2009).

⁸ In this paper, "high-income countries" are synonymous on "developed countries" and "low-income countries" to "developing countries" unless otherwise noted.

⁹ The migration database contains 24 countries and regions—5 high-income countries and 19 developing countries—in which 10 countries belong to Latin America: Canada, United States, EU15, Japan, Australia/New Zealand, Mexico, Central America, Colombia, Ecuador, Peru, Venezuela, Argentina, Brazil, Chile, Rest of South America, Eastern Europe, Former Soviet Union, China, East Asia, Southeast Asia, South Asia, Middle East/Northern Africa, Southern Africa and Rest of World.

From the perspective of developing countries, the key is international migration destined to high income countries. Among 5 high-income host countries, the United States is by far the largest destination, serving as strong magnet absorbing 21.5 million of migrant workers. Latin America is the major source of sending 10.5 million workers. Due to the geographic proximity, neighboring Mexico far dominates any other countries, sending 7.5 million workers, nearly the half of international migration moving from developing countries destined to the United States, which alone accounts for 93 percent of the country's gross emigrants. Central America follows, with 78 percent of the region's migrants moving to the United States.¹⁰ Down to the south, the US share as destination declines substantially: 33 percent for the Andean countries and 15 percent for Mercosur. Asia altogether (China, East, Southeast and South Asia altogether) sends 5 million of migrants to the United States after Latin America. The EU15 ranks the second destination, absorbing 12 million of migrants from developing countries. Middle East and Africa are the largest regions of origin (5 million workers), followed by Europe and Asia (2.4 million each). Both Canada and Australia/New Zealand receive approximately 3 million workers each from diversified sources. In sharp contrast, Japan, due to tight immigration as well as cultural and language barriers, is the least destination of receiving only 0.9 million of international migrants. Figure 1 shows international migration stock in high-income countries migrating from developing countries in 2004.

<INSERT FIGURE 1>

Geographic proximity, colonial and economic ties as well as immigration policies significantly influence the nature of international immigration by skill for both high-income host countries and origins of sending developing countries. Among the 5 high-income destinations, due largely to selective immigration policies, Canada and Australia/New Zealand absorb largely high-skill migrants, accounting for 42 percent and 39 percent of all immigrant workers, respectively.¹¹ Yet there are huge variations among geographic countries of origin. In these destinations, approximately more than 60 percent of migrants from Latin America are high-skill workers, whereas migrants from other developing regions are more evenly distributed over skills. This structure is sharply contrasted in the United States and the EU15, 2 main destinations of the south-north migration. In both, low-skill migrants account for nearly the half of the aggregate immigrants from developing countries, followed by mid-skill and low-skill in this order. In the United States, however, approximately two-thirds of migrants from Latin America are low-skill

¹⁰ In 2004, Central America together with Dominican Republic signed an Free Trade Agreement (CAFTA-DR) with the United States. After ratifications in each designated countries, the FTA entered into force in recent years.

¹¹ Canada's immigration is intended to attract skilled young migrants, administrated by the so-called point system, in which "education" is allocated the largest point, followed by "language". The similar system is applied in Australia and New Zealand.

workers,¹² while the half of immigrants from other developing countries concentrates on mid-skill workers. Table 2 shows international migration stocks and their composition by skill in high-income destinations.

<INSERT TABLE 2>

Structure of Labor Force and Average Wages

Based on the ILO Labor Statistics (LABSTAT)¹³ and the migration database constructed for the study, the composition of labor force by nativity is examined. In 2004, the global labor force reaches approximately 3 billion of labor. Out of this figure, 434 million of workers live in high-income countries, constituting 14.5 percent of the global total. The composition of nativity (or origin of migrants) varies country by country. The United States relies 15 percent of workforce on immigrants largely from developing countries, essentially from Mexico. The EU15 is less reliant on immigrants than the United States, with the share of 10 percent of migrant workers. The smaller countries are more open and rely considerably on immigrants. In Canada, the natives account for less than three-quarters of the national labor force, whereas immigrants constitute 18 percent. Australia/New Zealand is heavily dependent on immigrant workers; the natives share only 60 percent, and migrants from developing countries account for 25 percent and another 14 percent from high-income origin. Compared with other high-income countries, Japan is the least reliant on immigrants; the natives constitute 98.6 percent of the national workforce. In sharp contrast, across developing countries, native labor far dominates domestic labor force with the share of aggregate 97 percent. The exceptions are Europe and Middle East/Northern Africa, both of which rely around 10 percent of labor force on immigrants, largely from intra-regional origin or from neighboring countries. Table 3 reports the composition of labor force by nativity in 2004.

<INSERT TABLE 3>

The structure of labor force is considerably differs between high-income and developing countries, among host destinations, and among migrant workers. In high-income host countries, high-skill workers account for some 30 percent of the native labor force, followed by 40 percent by mid-skill workers. The United States has the highest proportion of high-skill native workers (37 percent), while mid-skill labor accounts for 43 percent and low-skills 20 percent. The EU 15 has more balanced distribution of labor: around 35 percent share of both low and mid-skill workers, followed by high skill labor of 28 percent. In Canada,

¹² This is due largely to the sizable unauthorized migrant workers originating from Mexico and Central America, as mentioned before. Within Latin America, however, there are wide variations. Nearly half of migrants from Peru, Venezuela, Argentina and Brazil are classified as high-skill workers.

¹³ Accessed in August 2009.

the half of the national workforce belongs to mid-skill category, while Japan and Australia/New Zealand has quite similar distribution to the aggregate of the high-income countries. The composition of migrant workers by skill in high-income host countries is also fairly heterogeneous. The United States has the lowest share of high-skill immigrant workers (32 percent) from the origin of developing countries, followed by the EU15 by 16 percent. In sharp contrast, low-skill workers account for half of the immigrants in these destinations.¹⁴ Annex Table 2 details the composition of labor force by nativity and skill.

Labor market structure in developing countries is sharply differentiated from those in high-income countries. Low-skill labor far dominates in many developing countries, with the aggregate share of 68 percent of the native workforce. In Latin America, workers in this category account for three-quarters or more of the labor force: 80 percent in the rest of South America, 78 percent in Brazil, 77 percent in Central America and 74 percent in Ecuador. Labor market structure in other developing countries again differs country by country. In Europe, mid-skill workers account for roughly the half of labor force. In contrast, low-income countries in Asia, Middle East/Northern Africa and Southern Africa are characterized by high proportion of low-skill workers, with the highest labor share of 82 percent in Southern Africa. China has the lowest share of high-skill labor in its native labor, followed by South Asia (to which India belongs).

Figure 2 presents average wages differentiated by home (native) and migrant workers in 2004. In high-income countries, wage variations are small between natives and migrant workers from high-income origins. In the United States, EU15 and Japan, average wages are within 5 percent differences. However, there exist wide variations in wages for migrants between high-income origins and developing countries. In Japan, migrants from developing countries earn 80 percent of wages by peers from high-income origins, the narrowest among 5 destinations, followed by the United States (72 percent). In sharp contrast, wage differentials nearly double in Canada, EU15 and Australia/New Zealand. In developing countries, there exist huge wage differentials among developing countries on one hand, and between migrants from high-income countries and the rest on the other. Wages for native workers are the highest in East Asia, followed by Mexico, Eastern Europe and Chile. Migrants from low-income countries earn more or less the similar wages as natives do. In sharp contrast, there exist sizable wage differentials between migrants from high-income countries and those from developing countries: 45 times in Southern Africa and South Asia; and 25 times in Former Soviet Union and China.

¹⁴ As explained before, high degree of low-skill workers in the United States is attributed largely to the unauthorized migrants from Mexico and Central America.

<INSERT FIGURE 2>

3. Global Remittance Flows

In this decade, the global remittances tripled from \$131 billion in 2000 to \$433 billion in 2008 in nominal terms with an average growth rate of 16 percent per annum (World Bank, 2008).¹⁵ Clearly developing countries are by far the largest recipient of global remittances, sharply expanding from 88 billion in 2000 to \$346 billion in 2008. This corresponds to astonishing 18 percent annual growth, which is twice as fast as that of high-income countries. In this period, remittances into Latin America also expanded from \$16.6 billion in 2000 to \$56.6 billion (16.6 percent annual growth).¹⁶ The region's share increased from 12.6 percent in 2000 to the peak of 17 percent in 2006, and then declined to 13 percent in 2008, although remittances in value terms continue to increase. Eastern Europe, Former Soviet Union, China and South Asia increase remittance shares, whereas Middle East/Northern Africa loses by more than 4 percentage-points, and the shares of the rest roughly remain unchanged. In high-income countries as a whole, remittances doubled from \$43 billion in 2000 to \$87 billion in 2008. Because of slower growth, their share in the global remittance flows steadily declines from 33 percent in 2000 to 20 percent in 2008. Figure 3 presents the trend of the global remittance share by region between 2000 and 2008.

<INSERT FIGURE 3>

Remittances play an important role in multiple development fronts. Primarily remittances are intended to support their families for their basic needs. Remittances sent back by migrants directly increase the income of the recipients and raise their purchasing power for consuming 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 important means in reducing the incidence and severity of poverty in many developing countries.¹⁷ At the macroeconomic level, remittances are also a major source of foreign earnings for some countries and are an important element for national income.

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 size of emigrants from countries of origin to destinations is the key determinant of bilateral

¹⁵ Remittances in 2008 are estimates.

¹⁶ Throughout the period, Mexico continues to be the largest recipient, with the share of 45 percent to 52 per in Latin America, followed by Central America with the share of around 20 percent.

¹⁷ See, for instance, Adams and Page (2003).

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 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 sent back to their 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, as already mentioned.¹⁸ 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.

For this study, global bilateral remittance flows in 2004 base year are constructed, based on GMig2 database and the World Bank (2008). This process requires several assumptions. To avoid annual fluctuations, the global remittance flows in 2004 are estimated at \$249 billion, using moving average. Bilateral remittance flows are updated over all countries in proportion to the distribution of remittances in the GMig2 database. Based on migration flows and remittances on bilateral basis, the aggregate remittance per migrant worker is calculated in each country, differentiated by high- and low-income countries. Then the bilateral remittances are adjusted using the updated per worker remittances, and aggregated into regions in the model database. The key in this process is that the bilateral remittances are assumed to be proportional to the size of migrant workers migrated to each destination country, but differentiated by countries of origin between high-income and developing countries.

Remittances sent back from high-income countries to developing countries amount to \$132 billion. This north-south flow as opposed to the south-north migration is by far the largest remittance flow, sharing 53 percent of global total in 2004. Clearly the United States is the single largest remittance-sending country, accounting for more than 60 percent of the total remittances to developing countries. Latin America is the largest recipient (\$41 billion), which nearly shares the half of the aggregate flows sent back from the United States to all developing countries. Out of the flows to Latin America, Mexico alone accounts for 72 percent. The EU ranks the second, sending 36.3 billion to developing countries. The largest recipient is Middle East/Northern Africa (\$10.2 billion), followed by Europe (\$7.1 billion), while Latin America receives an amount of \$ 2.3 billion. In the meantime, the north-north and south-south flows are \$50 billion each, in which intra-regional remittances constitute the largest flows, 55 percent in the former and

¹⁸ For some country studies, see Lang (2000) for Germany, and Izquierdo, Lacuesta and Vegas (2008) for Spain.

46 percent in the latter. Table 4 shows the global bilateral remittance flows by major region in 2004. Annex Table 3 detailed the global bilateral remittances for 24 countries and regions.

<INSERT TABLE 4>

As with the World Bank (2006), Wamsley and Winters (2005) and Walmsley, Winters and Ahmed (2007), this study assumes for simplicity that migrant households earn only from wages. In addition, it is also assumed that remittances are fixed proportion of migrants' income. The level of remittance shares in household income varies in narrow ranges from 5 percent in Canada and Australia/New Zealand to 15 percent in the United States and EU15. This is not the case in developing countries, where remittance share for migrants' households from developing countries reach as high as 50 percent in Southeast Asia and South Asia. In Latin America, the level is high in Venezuela (50 percent) and rest of South America (45 percent). In contrast, this share for households from high-income origins is relatively low irrespective of the destinations. Figure 4 shows the share of remittances in migrant household income.

<INSERT FIGURE 4>

4. Modeling International Migration and Remittances

This study applies a dynamic recessive computable general equilibrium (CGE) model, newly developed to evaluate the impact of international migration and remittances in global scale. The model is solved in two stages in sequence: within-period static equilibrium in the first stage and between-period recursive dynamic solution in the second stage. The static module, which is the core of the model, is a neoclassical in spirit and trade-focused, global, multi-region model used for a number of trade liberalization and regional integration studies.¹⁹ The model comprises 24 countries and regions,²⁰ 9 labor categories differentiated by skill (high, mid and low) and origin of labor (native, migrants from high-income and low-income countries) plus 3 household groups corresponding to the origin of labor. All countries and regions are fully endogenized and linked only through trade. 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 country and region, benchmarked at base year 2004.

Within-period Static Module

¹⁹ The recent applications include: Giordano, Parra and Watanuki (2009) for the evaluation of Doha agricultural liberalization and on trade and poverty evaluations for Andean countries (Giordano and Watanuki, forthcoming).

²⁰ The model has 5 high-income countries and 19 developing countries. See footnote 8 for countries and regions.

Each region in the model traces the circular flows of income through factor payments from producers to institutions—households, enterprises 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.

In order to capture the potential effects of different income generation and consumption patterns associated with international migration, the model incorporates 3 types of household groups in each country: (i) native households; (ii) migrant households from high-income countries; and (iii) migrant households from developing countries to host countries. Income generation process is clearly differentiated between native and migrant households. Income for native households comprises factor incomes—wages, capital and land rents—as well as transfers from government, private and firms. Only native households receive remittances sent from migrant households in host countries, thus excluding remittances among households between host countries. It is also assumed that migrant households differentiated by origin—high-income and developing countries—earn their income only from wages, but no non-wage incomes. In other words, migrant households from developing countries earn their income only from wage remunerations generated by migrant workers of the origin of developing countries. The same is true for households from high-income countries. On expenditures, all households pay taxes and large portion is spent on consumption.²¹ Consumer preferences are specified by a linear expenditure system (LES) of demand, derived from the maximization of a Stone-Geary utility function subject to the respective household budget constraints. 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. To simplify the model structure, two assumptions related to migration-remittance links are made. First, the aggregate remittances are assumed to be a fixed proportion of migrant household incomes. Second, bilateral remittances sent back to each home country are in proportion to the number of migrant workers in each host country.

For each sector, the model explicitly specifies output-supply and input-demand equations. Production is modeled in a two-stage nested structure, expressed by Constant Elasticity of Substitution (CES) function. At the top level, domestic output is specified between the aggregate intermediate input and aggregate value added (composite primary factor). 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

²¹ It is assumed that migrant households have the same consumption patterns as in their home countries. As a result, the sectoral demand for migrant households is derived as a weighted average of consumptions of the migrant population from each country.

function among 4 factors of production: labor, capital, land and natural resources. To accommodate labor large segmentation and imperfect substitution, the model uniquely introduces a 3-stage nested structure in labor market differentiated by nativity and skill, expressed in CES functions in all stages. At the top stage, the aggregate labor comprises native workers and aggregate migrant workers. At the second stage, native labor is disaggregated into high, mid and low-skill workers.²² On the other hand, the aggregate migrant labor is decomposed into workers originating from high-income origin and developing countries. At the third stage, the aggregate migrant labor is disaggregated into high, mid and low-skill workers, separately for the labor from high-income and developing countries. At all levels of production tree, the optimal levels of each factor and labor demand are determined by firms' cost-minimization decisions. Figure 5 presents the production nesting structure used in the model.

<INSERT FIGURE 5>

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. Likewise imports are modeled by the CES function. 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.

The model explicitly specifies a set of investment-related equations and sectoral capital allocation process. This is because investment decision is important along with capital accumulation in dynamic models. The aggregate investment is expressed in Cobb-Douglas function. This leads to the sectoral demand of investment by sector of origin and the aggregate price of capital. The capital accumulation rate, defined as the ratio of investment by sector of destination to capital stock, is an increasing function of rental rate of capital, price of capital and interest rate in the second order quadratic functional form.²³

²² In principle, labor market disaggregation into 3 categories 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). However, skill composition in some countries is adjusted, based primarily on the labor force composition by education (table 1B) in LABSTAT (ILO) and other country-specific data.

²³ With some modifications, the model follows Bourguignon, Branson and de Melo (1989), Fargeix and Sadoulet (1990) and Juan and Thorbecke (2003).

In the meantime, the aggregate capital stock is allocated by CET transformation function over productive sectors. In the model, domestic investment is fully financed by the total savings in each region.

In commodity market, equilibrium is achieved through an endogenous and simultaneous interaction of quantities and their corresponding prices. In factor market, the equilibrating mechanism of demand and supply depends on how factor supply and its price (wages, rental rate, land rent) are defined. All factors are fully employed and sectorally mobile except natural resources. The fixed aggregate supply determines the respective factor returns, including capital. For labor market, however, the model applies differentiated treatments. In developed countries, labor supply is fixed for all categories. In developing countries, labor supply is endogenized as the rising function of real wages, expressed in the elasticity form. This treatment is designed to capture the greater responsiveness to changes in real wages, given the high degree of un- and under-employment in many developing countries.

In the model, there are three key macroeconomic closures: public finance; saving-investment; and external balance. In order to achieve equilibrium in these macro accounts, it is necessary to provide a set of macroeconomic “closure rules”, which specify an equilibrating mechanism, through which adjustments take place. There are a number of different choices available. The choice does not affect the equilibrium solution, which exactly replicates the SAMs at base year, but significantly influences the simulation results in a dynamic setting. For government fiscal balance, the model applies endogenous public savings, which are derived as the gap between current revenues and expenditures. All transfers are fixed. This treatment allows fiscal surplus or deficit to adjust to balance public finance.²⁴

For saving-investment balance, the current amount of nominal investment is completely financed by the aggregate savings in each country and region. The aggregate savings comprise 3 components of domestic savings—households, enterprises and government—plus foreign savings, which are treated as an exogenous account. The relationship between saving and investment is one of the most controversial topics in macroeconomics and policy applications. One approach is the so-called “saving-driven” neoclassical closure, in which investment is determined by the level of savings. In this option, private saving rate is held fixed. The salient opposite is the “investment-driven” Johansen closure, in which the level of investment is fixed, and private saving rate is endogenized as an equilibrating variable. To apply more balance approach, private saving rate in each period is specified in the function of real rental rate on capital in an elastic form.

For the external balance, which is expressed in foreign currency, there are two market closures. One option is to apply the fixed external balance, namely balance of payment or current account. Given all accounts are held fixed in external market, trade balance also needs to be fixed so that an exchange rate adjusts to maintain a fixed level of foreign savings. The other alternative is to fix exchange rate and the external balance is free to adjust. The choice depends upon the objectives and the scopes of the study, as both have different implications for the policy outcomes. In the migration simulations, it is expected that many developing countries would experience a significant increase in inflows of remittances, as a result of migration. Then the first closure option would generate adverse effects on external account, particularly on trade performance, which in turn affects the national account. In order to maintain the external account balance, the increase in remittances must be offset by the decline in trade balance in the same magnitude. The equilibrium must be achieved by an appreciation of real exchange rate, which forces exports to decline and imports to rise at the same time. Considering these effects, the model applies the second option of fixed exchange rates as the central model closure, to measure the migration-remittance induced compound effects in a neutral external account.²⁵

Between-period Recursive Dynamic Module

The within-period static module expressed in the previous section is extended and linked with a dynamic module, in which selected parameters are updated, based on inter-temporal behaviors and outcomes of the previous periods. Thus the model is solved in sequence as the static equilibrium in each period. In other words, equilibrium solution in any given time is explicitly dependent on the past outcomes, but remains independent of forward-looking expectations (perfect foresight). As with other recursive models, between-period equilibria are achieved by updating capital stocks and other pre-determined parameters.

The process of capital accumulation is endogenized from one period to the next. In common with many other dynamic models, the aggregate capital stock in the present period is defined as the sum of investment by sector of destination plus aggregate capital stock discounted by capital depreciation in the previous period. As expressed in the previous section, the sectoral allocation of capital stock is determined by the CET transformation function over the productive sectors.

²⁴ One of the alternative options is to fix government savings, under the so-called fiscal neutral assumption. This approach instead needs to endogenize one of tax components as an equilibrating variable in order to maintain fiscal balance between revenues and expenditures.

²⁵ In a variant version, the external closures would be differentiated between high-income and developing countries. In another option, the external balance would be exogeneously imposed, based on the past and the model allows the exchange rate to adjust accordingly. The first option might be also considered as a reference.

Based on the ILOSTAT projections, population and labor force are exogenously updated each year over the projection period 2020 (explained in the following section). As the population grows, it generates a higher level of consumption demand and thereby will increase the supernumerary income of household consumption, expressed in the LES demand function. In the model, therefore, the *subsistence minima* (or committed expenditures) are updated in each period in proportion to the population growth. Yet it is assumed that marginal rate of consumption is held constant, implying that household consumption patterns or preferences remain unchanged over the periods. Labor supply for native workers in high-income countries is updated but held fixed, due to relatively low degree of un- and under-employment. On the other hand, labor supply for native workers in developing countries is adjusted in response to the changes in real wages. But labor supply of migrant workers is assumed to be exogenous for all skills, implying that migrant workers are fully employed in each host country.

In addition, productivity parameters are imposed exogenously based on observed past trends. Government aggregate consumption and all inter-agent transfers are also held fixed, while being updated in proportion to the exogenous population growth. In this study, the model is first solved for the base year 2004, which exactly replicates the SAM benchmark for each country, then recursively solved in sequence up to year 2020. By imposing the pre-determined, policy-independent updates of dynamic parameters, the model first generates a baseline growth path, called the baseline scenario. Then policy changes—exogenous changes in bilateral migration stock—are imposed, and the model re-solves for a new set of equilibrium solution. Changes between policy-imposed growth path and that of the baseline scenario are interpreted as the economy-wide impact of the policy simulation.

5. Baseline and Migration Scenarios and Simulation Results

Baseline and Migration Scenarios

In this study, changes in international migration stock are considered as the policy shock. Based on the ILOSTAT projections (ILO), demographic trends—population, labor force and labor force participation rates—in each country are projected by the year 2020. Following the past trends, changes in the composition of labor force are also considered: namely, faster changes in the composition of high-skill workers in high-income countries relative to developing countries. In high-income countries, the share of high-skill workers is assumed to increase, on average, by 3 percentage-points in 2020 compared with the levels in 2004, while declining by 2 percentage-points for low-skill and 1 percentage-point for mid-skill

workers. In developing countries, the proportion of high-skill category on average rises by 1.5 percentage-points, with decline in the share of low-skill workers by the similar magnitude.

In baseline scenario, in each host country, the share of migrant workers decomposed by skill is assumed to remain unchanged over time. However, this does not mean international migration would stay flat. The global migrant workers would increase by 21.7 million to 144.6 million in 2020. In high-income countries, the stock of migrant workers from developing countries rises to 43.9 million, an increase by 3 million from year 2004. The United States is by far the largest destination, absorbing 23.4 million of migrant workers, more than half of the south-north migration stock. Latin America accounts for nearly the half of the increase. The EU15 follows, receiving 12.3 million of migrant workers, of which 5 million migrant workers are from Middle East/Northern Africa, and another 2.5 million each from Europe and Asia. Table 5 shows the bilateral international migration stock, projected in 2020.

<INSERT TABLE 5>

However, the largest migration stock is seen in the south-south migration, which would increase by 17.8 million to 84.5 million in 2020. Approximately 80 percent of this flow (or equivalent to 67 million) would occur between neighboring countries or within regional blocs: 23.6 million in Middle East and Africa, 21.8 million in Europe and 18.4 million in Asia. Compared with large migration stock in these regions, migration within Latin America would be fairly small: an increase of 0.65 million of migrants, accounting for a marginal 3.4 percent in the south-south migration stock. In contrast, the migration originating from high-income countries would not change much from 2004 base year: an increase by 0.69 million in the north-north migration and 0.17 million in the north-south migration stock.

While the baseline scenario assumes the constant immigrant shares in labor force in each host country, migration scenario considers that emigration rates from each country of origin to the respective destinations are held constant. With this assumption, the global migrant workers would increase by 16.7 million in 2020 relative to the baseline scenario. In particular, the south-north migration would amount to 14.9 million, or 90 percent of the increase in the global migration stock.²⁶ The United States and the EU15 are by far the main destinations of new migrant workers from developing countries, receiving 7 million and 5.4 million of migrants, respectively.

²⁶ 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 2010 through 2020. This corresponds to an increase in 14.2 labor force migrated from developing countries in 2025. On the other hand, Walmsley, Winters and Ahmed (2007) assume also 3-percent increase in migrant labor force (13.2 million) in high-income countries, but applying the migrant shares at base year in host countries' labor force.

In each destination in high-income countries, the composition of migrant labor by skill is significantly heterogeneous. The United States and the EU15, two key migrant destinations, have low shares of high-skill migrant workers: 21 percent and 28 percent, respectively. In contrast, Canada and Australia/New Zealand have higher share of this skill group: 45 percent and 58 percent. Yet relative to the baseline scenario, high-skill migrant workers increase at the fastest speed among migrant labor. The EU15 would experience 70 percent increase in high-skill migrant workers, and 46 percent in the United States. On the other hand, changes are the smallest for low-skill migrant workers due primarily to large stock, ranging from 15 percent in Australia/New Zealand to 40 percent in the EU15, except in Japan, where changes over skills are least heterogeneous.

Simulation Results

Impact on Real GDP

The preliminary simulation results indicate that international migration has profound positive effects on raising global welfare. The global GDP in real term will increase by 1.4 percent relative to the baseline scenario. Yet the mechanism and source of the gains are clearly differentiated between high-income migrant-receiving countries in the north and migrant-sending developing countries in the south. An increase in labor force by migrant workers from developing countries is the main driver of raising GDP in high-income countries. Yet the effects differ due to differences in economic-related factors—size and structures on one hand—and migration-related elements: magnitude of migration, skill compositions of migrant labor, and the proportion of migrant workers in labor force in host countries.

United States, by far the largest recipient of international migration, increases its real GDP by 2.2 percent. This is essentially because the country increases 7 million of new migrant workers, which account for 18 percent of its labor force in 2020 from 14 percent in 2004. Likewise, GDP in EU15 increases by 1.2 percent. Compared with the United States, this modest growth is attributed to the smaller size of immigrants and the lower share of immigrant workers in labor force (11 percent). Real GDP increases faster at 2.5 percent in Canada and Australia/New Zealand, two highly migrant dependent countries. In these destinations, immigrant workers account for 30 percent and 42 percent, respectively. In contrast, Japan will experience the smallest growth (0.4 percent). The growth potential is limited due to modest rise in immigrants and small share of immigrant workers—a fractional 2 percent in the country's shrinking labor force. Figure 6 presents the impact on real GDP relative to the baseline scenario.

<INSERT FIGURE 6>

Developing countries would also experience favorable gains in GDP, although the magnitude differs from one country to another. Remittances induce endogenous income-generating growth process at home. Remittances increase household income in the first place. This, in turn, raises household consumption, which accounts for roughly 60 percent of GDP in developing countries. Latin America as a whole would increase real GDP by 1.8 percent, higher than the global growth. Central America, the region with high emigration rates and large reliance on remittances, will experience the highest growth (4 percent). Despite the largest migrant stocks destined to the United States far dominating any other countries in Latin America and elsewhere, Mexico's GDP grows by around 2 percent, somewhat less than expected, but faster than the growth of the world and Latin America. This is due largely to the low share of remittances in the national account. Other countries in developing world also enjoy growth but at slower speeds. Real GDP grows faster in Eastern Europe and Southeast Asia, whereas China would see, due to the least changes in migration, small share of remittances in the national account and large economic size, the smallest growth.

Applying the static model, Walmsley, Winters and Ahmed (2007) evaluate macroeconomic effects. They report that the increase in the quotas of the developed labor-importing countries, equivalent to 3 percent of their labor force, will have an overall positive impact on world income. In their evaluation, the impact is clearly dichotomized between "labor-importing" developed vs. "labor-exporting" developing countries. Developed countries belonging to the former are all winners, due to increases in labor force. Because of the static model, however, the magnitude of the impact is much smaller. For instance, real GDP will increase by 1.46 percent in the United States. On the other hand, all developing countries belonging to the latter will lose without exception, although the magnitude is relatively small. These losses in developing countries are attributed primarily to the decline in labor supply at home as a result of immigration to high-income destination. With seemingly the application of fixed labor supply for all countries, developing countries will not capture the gains from the improved labor market of their own, while only benefiting from the rise in wages. Another reason might be related to external market closure, which has significant impact on the economywide impact at national level. Under the fixed external balance (current account) closure, any increase in remittances must be offset by the decline in trade balance with the same magnitude to maintain the initial balance. This will be achieved by the loss of terms of trade and appreciation of real exchange rates, reducing exports and increasing imports simultaneously. In order to evaluate migration-remittance effects in more neutral way from the viewpoint of developing countries, it is reminded that our model applies fixed exchange rates so that the increase in remittances will allow developing countries to increase current account position.

Impact on Labor Market

In high-income countries, wages decline as a result of the increase in the aggregate labor force. Yet due to dominant proportion, the decline in wages for native labor is marginal. In Canada, Japan and Australia/New Zealand, native wages modestly rise. This is due to the effects of remittances and terms of trade. In Australia/New Zealand with the largest share (42 percent) of migrant workers, real wages increase by 1.3 percent relative to the baseline. In contrast, migrant workers face greater impact, particularly for those from developing countries. Real wages decline substantially, but the supply of migrant workforce far outpaces the decline in wages. In the United States and EU15, real wages fall by more than 3 percent, but migrant workers increase by 30 percent and 44 percent respectively. Clearly this compound effect—decline in wages, but offset by the sharp rise in labor supply—is the source of substantial income gains accrued to migrant households in high-income countries. In other high-income destinations, the impact is much smaller, but with the same patterns. The impact on migrants from high-income countries is modest except in Japan, where the sharp rise in migrant labor from developed origin is associated with 4 percent decline in wages. Table 6 shows the impact on labor market, decomposed by nativity and skill.

<INSERT TABLE 6>

The reverse is nearly the case with developing countries, and the impact is much greater and more heterogeneous. In most countries, an increase in wages is associated with the decline in labor supply. For native workers, wages for high-skill labor rise relatively fast in countries with high emigration rates, following the inelastic labor supply. They include Mexico, Central America, Southern Africa and rest of world. Across developing countries, the impact is modest for native mid-skill workers. On the other hand, low-skill native labor, accounting for the far majority of the labor force, will experience modest rise in wages in parallel to the modest increase in labor supply. This is again due to the compound effects of remittances, terms of trade and inelastic but upward-slope labor supply. Labor demand for low-skill workers increases in many developing countries, which benefit from the improved labor market, induced by endogenous migration-remittance effects. In particular, small and high-emigration countries such as Central America, Ecuador, rest of South America, expand labor demand by more than 2 percent. This is clearly one of the main ingredients generating income gains for native households in developing countries.

On the other hand, for migrant workers in developing countries, the impact is clearly dependent on where they are from and where they work. In Mexico, Central America, Argentina, Chile, and China, migrant

labor from developing countries would experience pronounced impact on all labor categories. The sharp increase in fixed labor supply is associated with substantial decline in real wages, although changes in migrant workers in size are fairly modest (see the changes of the south-south migration stock in Table 5). In sharp contrast, the impact on labor for migrants from high-income countries is almost unchanged except in Eastern Europe, where migrants from EU15 increase substantially despite shrinking native labor force.

Impact on Household Income

With changes in international migration, it is best to evaluate the potential impact on households rather than national account, as households experience direct effects arising from the migration-remittance link. They are primary beneficiaries of remittances, but at the cost of losing working-age family members at home. As explained already, households are decomposed into 3 groups in each country. First is related to native households, who receive domestic factor income including wage remunerations, domestic transfers and remittances. Second are migrant households from high-income countries. Third are migrant households from developing countries. For migrant households, their incomes comprise only wage earnings made by workers from each origin.²⁷

The simulation results find that international migration generates \$760 billion of global household income in 2020, measured at 2004 prices, or 1.27 percent increase from the baseline. Out of this gain, \$640 billion, or approximately 85 percent, accrue to the origin of developing countries: migrant households in high-income countries, native households in developing countries and households in the south-south migration. Thus, developing countries are the primary beneficiary of the global income gains generated by international migration and remittances.

By geographic demarcation, high-income countries gain \$565 billion, which almost accounts for nearly three-quarters of the global gains. On the other hand, developing countries altogether reap \$193 billion of household income gains. Due to faster growth of income, Latin America would be the largest beneficiary. The region's household income grows by \$47 billion, capturing a quarter of the aggregate gain in developing countries. Other regions also enjoy substantial income gains. Southeast Asia, South Asia and Middle East/Northern Africa increase their income by \$20 billion or more, followed by Eastern Europe, East Asia and Southern Africa, all of whose income increase by \$17 billion. On the other hand, China and

²⁷ World Bank (2006) and Walmsley, T.L., L.A. Winters and S.A. Ahmed (2007) use different household classifications: native (permanent) households; existing (previous) migrant households; and new migrant households.

the Former Soviet Union would be the least benefited.²⁸ Table 7 lists the impact of household income for all households differentiated between developed and developing countries.

<INSERT TABLE 7>

A closer evaluation on sources of income gains gives clearer picture how incomes are generated and distributed among different households. In high-income countries, native households increase their real income by \$113 billion, which only account for 20 percent of the aggregate income gains in developed countries. It is highlighted that these gains come from the substantial increase in capital income, offsetting the decline in labor income. This is due primarily to the significant rise in labor force as result of international migration, which leads to modest decline in real wages for native workers, while instead raising capital income. The United States experiences the most dramatic impact. Capital income rises by \$90 billion, but instead labor income declines \$40 billion. The EU15 sees the smaller magnitude. Native households gains \$41 billion of capital income, as opposed to the decline in \$7billion of labor income. In Canada, Japan and Australia/New Zealand, while capital income is the main source, labor income also modestly increase.

In high-income countries, the largest beneficiaries are migrant households from developing countries. Their gross income increases \$450 billion or more than 25 percent in the aggregate. This amount constitutes 60 percent of the global total. Thus the south-north migration is the key driver not only for increasing income of migrants in host countries but also the dominant source of remittances, thereby contributing to the global income gains. In the Unites States, migrant households from developing countries earn \$265 billion, accounting for nearly 60 percent of the aggregate income in high-income countries, followed by those in the EU15. In these destinations, the source of income gains over skills is relatively balanced. In Canada and Australia/New Zealand, labor income from high-skill workers dominates household income. In contrast, migrant households within high-income countries have marginal income gains, which are almost entirely generated from wages in high-skill labor in Australia/New Zealand. On the other hand, in the United States and EU15, households of high-income origin appear to be the losers, suffering income losses close to \$1 billion.

The composition of new income in developing countries is sharply differentiated from that of high-income countries. Essentially non-migrant household income in developing countries comes from two

²⁸ World Bank (2006) estimates that developing countries gain \$143 billion in real income in 2025, relative to the baseline scenario. Among developing countries, Latin America reaps \$47 billion, followed by East Asia and Pacific (\$37 billion), South Asia (\$21 billion).

sources: labor income and remittances. An improvement in labor market generates extra \$74 billion, which account for 40 percent of the aggregate increase in household income in developing countries. Labor income generated by low-skill workers is the main source, with the share of more than half of the labor income in developing countries. This is particularly the case with high emigration countries across developing countries. Income gains from mid-skill workers are also substantial in Mexico, Eastern Europe and Asia. On the other hand, changes in labor income from high-skill workers are modest; some countries gains, while others lose.²⁹ The exceptions are China and East Asia; approximately 85 percent of labor income comes from high-skill workers in China, and 22 percent in East Asia.

In developing countries, remittances are also the main source of household income, although the magnitude is highly heterogeneous, reflecting the magnitude of the south-north migration. In the aggregate, remittances constitute more than 30 percent of household income gains in developing countries. In Latin America, the share of remittances account for 40 percent of household income. In Mexico and Central America, countries with high emigration rates, the proportion is 45 percent and 50 percent respectively. Outside Latin America, the importance of remittances differs considerably. Remittances reach the highest 42 percent share in Southern Africa, while being negative in Eastern Europe. In Asia, the proportion of remittances in household income ranges from 12 percent in East Asia to 30 percent in Southeast and South Asia.

Using the static CGE model, Walmsley, Winters and Ahmed (2007), based on the update of migration and remittances, estimate 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 \$300 billion at the 1997 prices. Applying the recessive dynamic model, the World Bank (2006) estimates that the global income gains will be \$674 billion in 2025 at the 2001 prices, as a result of 3 percent increase in labor force in high-income countries. It also finds that new migrants in high-income reap \$481 billion, while non-migrant natives in developing countries gain \$143 billion, and Latin America is the largest winner. As the World Bank (2006) argues, the degree of substitution between migrant and native workers determines who gain from international migration. This is the appropriate assumption than applying perfect substitute framework, which yet would serve for the reference.³⁰ Our simulation results also suggest what matters would be the degree of substantiality between migrant and native workers on one hand, and among migrant workers themselves on the other. Applying the same dynamic modeling and imperfect substitution between migrant and native workers, our finding, still being preliminary, is fairly

²⁹ Labor income from high-skill workers in high-migrant sending countries in this labor class tends to decline, *albeit* being small. They include Mexico, Central America, Middle East/Northern Africa, and Southern Africa.

comparable to the World Bank (2006), despite there are several differences in migration-remittance data and assumptions.

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. In low-income developing 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 the aggregate, low-skill migration would potentially generate greater income than high-skill migration in both receiving (developed) countries and sending (developing) countries. Yet the opposite would be true in terms of per migrant worker (Walmsley, T.L, L.A. Winters and S.A. Ahmed (2007). Empirical studies also suggest that low-skill migration would improve labor market situations in many developing countries, reducing unemployment and underemployment without inducing significant wage increases, thereby contributing to reducing poverty. In contrast, recent findings show that high-skill migration has mixed effects.

The preliminary simulation results reaffirm the win-win nature of international migration on both origin and destination countries. International migration generates \$760 billion of global income in 2020, and the substantial portion (approximately 85 percent) accrues to households of the origins of developing countries. Latin America appears to be a global winner, expanding at the faster speed than the global growth. The region also captures a quarter of the aggregate income gain in developing countries. Yet these potential gains are highly dependent on a number of assumptions, model specifications and its key parameters. From the viewpoint of developing countries, however, it is worthwhile to note two key factors. First is related to labor substitutability between migrants and native workers in high-income countries. This determines who will gain from international migration. The higher the substitution, the greater gains accrue to migrants. For developing countries, this implies how open labor market would be in high-income countries. The second is the degree of flexibility or sensitivity of labor market in developing countries. With the outflows of migrant workers, wages at home tend to rise as a result of decline in domestic workforce. The critical issue is then how elastic and fast labor supply can respond to the (upward) changes in wages. Given relatively high un- and under-employment, labor supply for low-

³⁰ Walmsley, Winters and Ahmed (2007) apply the perfect substitute for labor aggregation from all sources.

skill labor would be most responsive, with the lesser degree for mid-skill workers, while facing supply constraints.

It is also reminded that the simulation results do not incorporate and capture social and political considerations on one hand, and migration-induced indirect effects on the other. Changes in migration laws or reforms particularly in high-income countries have tremendous impact on the flows in the south-north migration. Migrants on temporary basis tend to send larger amount of remittances in their income than on long-stay migrant households. Migrants are also the sources of transfer of knowledge to home countries. Return migrants would facilitate the catch-up process of acquiring new knowhow, knowledge, and technology. Both outgoing migrants and return migrants also increase investment, create new business and business network linking both high- and developing countries from the diaspora process. Once these effects are considered, the potential gains would be much larger than what would be quantified, and again the significantly large proportion of the global gains would accrue to developing countries.

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Table 1. Stock of Bilateral International Migration Workers (2004)

(million workers)

		Country of Destination											Total		
		Developed Countries						Developing Countries							
		Canada	United States	EU15	Japan	Australia/ New Zealand	Sub-total	Latin America	Europe	Asia	Middle East/ Africa	Rest of World		Sub-total	
Countries of Origin	Developed Countries	Canada	0.55	0.08	0.00	0.02	0.65	0.01	0.02	0.03	0.03	0.02	0.11	0.76	
		United States	0.17		0.26	0.02	0.04	0.49	0.32	0.04	0.20	0.14	0.26	0.97	1.45
		EU15	1.28	1.23	4.33	0.01	1.40	8.26	0.78	0.72	0.42	1.19	0.83	3.94	12.20
		Japan	0.01	0.13	0.06		0.02	0.22	0.06	0.01	0.07	0.02	0.01	0.16	0.39
		Australia/New Zealand	0.02	0.04	0.13	0.01	0.26	0.45	0.00	0.01	0.04	0.02	0.02	0.10	0.55
		Sub-total	1.48	1.95	4.85	0.05	1.74	10.07	1.18	0.80	0.76	1.40	1.14	5.28	15.35
	Developing Countries	Latin America	0.16	10.45	0.77	0.16	0.06	11.59	2.21	0.17	0.33	0.37	0.13	3.20	14.80
		Europe	0.39	1.05	2.37	0.00	0.27	4.09	0.05	21.99	0.62	2.43	0.35	25.45	29.54
		Asia	1.47	5.00	2.38	0.69	0.90	10.44	0.08	0.37	13.26	6.88	0.23	20.81	31.25
		Middle East/Africa	0.43	0.95	5.01	0.01	0.33	6.73	0.06	0.55	0.55	14.98	0.21	16.35	23.08
		Rest of World	0.75	4.10	1.62	0.03	1.52	8.01	0.07	0.08	0.16	0.15	0.40	0.87	8.88
Sub-total	3.19	21.54	12.16	0.89	3.08	40.86	2.47	23.16	14.92	24.81	1.33	66.69	107.55		
Total		4.67	23.50	17.01	0.94	4.82	50.93	3.64	23.96	15.69	26.21	2.46	71.97	122.90	

Notes: 1. Based on UN migration report 2002 and 2006, international migration for 2004 is estimated at 188 million in 2004.

2. Migration to 5 high-income countries is estimated on the basis of emigration rates by Docquier and Marfouk (2005).

3. For the United States, unauthorized immigrants reported by Passel (2006) are incorporated, using US labor force structure by MPI (2009).

Source: Authors' estimation based on GMig2 database (Wlamsley, Ahmed and Parsons, 2005) and notes above.

Table 2. International Migration Stock by Skill in High-income Countries (2004)

	(million workers)																			
	Destination: Canada				Destination: United States				Destination: EU15				Destination: Japan				Destination: Aust.-New Zealand			
	Skills				Skills				Skills				Skills				Skills			
	Low	Mid	high	Total	Low	Mid	high	Total	Low	Mid	high	Total	Low	Mid	high	Total	Low	Mid	high	Total
<i>Developed Countries</i>	0.41	0.13	0.94	1.48	0.45	0.58	0.93	1.95	2.26	0.96	1.62	4.85	0.01	0.00	0.03	0.05	0.40	0.48	0.85	1.74
Canada	0.00	0.00	0.00	0.00	0.22	0.08	0.24	0.55	0.02	0.02	0.04	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
United States	0.05	0.02	0.11	0.17	0.00	0.00	0.00	0.00	0.09	0.05	0.12	0.26	0.01	0.00	0.01	0.02	0.00	0.00	0.03	0.04
European Union (EU15)	0.36	0.11	0.81	1.28	0.21	0.46	0.56	1.23	2.13	0.84	1.36	4.33	0.00	0.00	0.01	0.01	0.36	0.37	0.67	1.40
Japan	0.00	0.00	0.01	0.01	0.01	0.02	0.10	0.13	0.02	0.01	0.03	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.02
Australia/New Zealand	0.00	0.00	0.01	0.02	0.00	0.01	0.03	0.04	0.02	0.04	0.07	0.13	0.00	0.00	0.00	0.01	0.04	0.10	0.12	0.26
<i>Developing Countries</i>	1.11	1.04	1.04	3.19	10.95	8.02	2.57	21.54	6.34	3.89	1.93	12.16	0.29	0.38	0.22	0.89	0.74	1.31	1.04	3.08
Mexico	0.01	0.00	0.01	0.02	5.21	1.62	0.67	7.51	0.01	0.01	0.01	0.03	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Central America	0.02	0.01	0.03	0.05	1.08	0.39	0.34	1.81	0.01	0.01	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Colombia	0.00	0.00	0.01	0.01	0.16	0.07	0.14	0.37	0.08	0.03	0.03	0.14	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Ecuador	0.00	0.00	0.00	0.01	0.12	0.04	0.06	0.21	0.08	0.02	0.03	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Peru	0.00	0.00	0.01	0.01	0.06	0.04	0.09	0.19	0.04	0.03	0.02	0.09	0.01	0.01	0.01	0.03	0.00	0.00	0.00	0.01
Venezuela	0.00	0.00	0.00	0.00	0.01	0.02	0.03	0.06	0.03	0.05	0.01	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Argentina	0.00	0.00	0.01	0.01	0.03	0.01	0.03	0.08	0.04	0.03	0.02	0.09	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Brazil	0.00	0.00	0.01	0.01	0.04	0.03	0.06	0.13	0.05	0.03	0.04	0.11	0.05	0.06	0.03	0.13	0.00	0.00	0.00	0.00
Chile	0.00	0.00	0.01	0.02	0.02	0.00	0.01	0.02	0.02	0.02	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.02
Rest of South America	0.00	0.00	0.01	0.01	0.02	0.01	0.03	0.06	0.02	0.01	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
Latin America	0.04	0.02	0.10	0.16	6.75	2.25	1.45	10.45	0.39	0.22	0.16	0.77	0.06	0.07	0.03	0.16	0.01	0.01	0.04	0.06
Eastern Europe	0.11	0.10	0.10	0.31	0.39	0.25	0.10	0.74	0.66	0.79	0.32	1.77	0.00	0.00	0.00	0.00	0.08	0.07	0.10	0.25
Former Soviet Union	0.03	0.02	0.02	0.07	0.07	0.20	0.05	0.31	0.30	0.20	0.10	0.60	0.00	0.00	0.00	0.00	0.01	0.01	0.01	0.02
China	0.13	0.09	0.11	0.33	0.45	0.32	0.11	0.89	0.08	0.08	0.03	0.18	0.06	0.08	0.06	0.20	0.03	0.05	0.08	0.17
East Asia	0.06	0.09	0.07	0.23	0.19	0.44	0.10	0.72	0.04	0.05	0.02	0.11	0.11	0.14	0.08	0.33	0.01	0.03	0.04	0.08
Southeast Asia	0.17	0.14	0.14	0.45	1.07	1.06	0.29	2.42	0.35	0.43	0.18	0.95	0.03	0.07	0.04	0.14	0.10	0.14	0.22	0.46
South Asia	0.16	0.16	0.13	0.46	0.26	0.60	0.11	0.97	0.58	0.34	0.21	1.14	0.01	0.01	0.01	0.02	0.02	0.08	0.08	0.18
Middle East/Northern Africa	0.07	0.08	0.07	0.21	0.12	0.33	0.05	0.50	2.50	0.49	0.43	3.42	0.00	0.00	0.00	0.00	0.04	0.05	0.06	0.15
Southern Africa	0.06	0.08	0.07	0.21	0.07	0.34	0.04	0.45	0.65	0.69	0.26	1.59	0.00	0.00	0.00	0.00	0.02	0.08	0.08	0.18
Rest of World	0.26	0.26	0.23	0.75	1.58	2.25	0.28	4.10	0.80	0.60	0.21	1.62	0.02	0.01	0.00	0.03	0.41	0.77	0.34	1.52
World	1.52	1.17	1.98	4.67	11.40	8.60	3.50	23.50	8.60	4.85	3.55	17.01	0.30	0.39	0.25	0.94	1.14	1.79	1.89	4.82

Sources: Authors' estimation.

Note: 1. Labor force share from Frédéric Docquier and Abdeslam Marfouk (2005).

2. The composition of labor force for some countries are adjusted, based on ILO labor force statistics and national household surveys in MECOVI (IDB).

Table 3. Labor Force and its Composition by Origin (2004)

	Number of Workers (million)				Share of Labor by Nativity (percentage)			
	Native	Immigrants		Total	Native	Immigrants		Total
		High-income origin	low-income origin			High-income origin	low-income origin	
<i>Developed Countries</i>	383.15	10.07	40.86	434.08	88.27	2.32	9.41	100.00
Canada	12.92	1.48	3.19	17.58	73.46	8.40	18.13	100.00
United States	130.08	1.95	21.54	153.58	84.70	1.27	14.03	100.00
European Union (EU15)	166.90	4.85	12.16	183.91	90.75	2.64	6.61	100.00
Japan	65.72	0.05	0.89	66.66	98.59	0.07	1.34	100.00
Australia/New Zealand	7.54	1.74	3.08	12.36	60.98	14.08	24.94	100.00
<i>Developing Countries</i>	2,480.19	5.28	66.69	2,552.16	97.18	0.21	2.61	100.00
Latin America	228.74	1.18	2.47	232.38	98.43	0.51	1.06	100.00
Europe	171.27	0.80	23.16	195.23	87.73	0.41	11.86	100.00
China	770.87	0.04	0.39	771.29	99.94	0.00	0.05	100.00
East/Southeast Asia	301.45	0.46	5.66	307.57	98.01	0.15	1.84	100.00
South Asia	574.47	0.27	8.87	583.61	98.43	0.05	1.52	100.00
Middle East/Northern Africa	119.99	0.85	14.51	135.36	88.65	0.63	10.72	100.00
Southern Africa	251.78	0.55	10.30	262.63	95.87	0.21	3.92	100.00
Rest of World	61.61	1.14	1.33	64.07	96.16	1.78	2.07	100.00
World	2,863.34	15.35	107.55	2,986.24	95.88	0.51	3.60	100.00

Source: LABSTAT, ILO.

Migration database 2004 (IDB) constructed for the study.

Table 4. Global Bilateral Remittance Flows by Major Region (2004)

(\$US million)

		Countries of Origin																Total	
		Developed Countries						Developing Countries											
		Canada	United States	EU15	Japan	Australia/ New Zealand	Sub-total	Mexico	South America	Europe	China	East/South-east Asia	South Asia	Middle East/ Northern Africa	Southern Africa	Rest of World	Sub-total		
Countries of Receipt	Developed Countries	Canada	0	3,880	466	20	46	4,412	10	36	36	7	35	50	45	50	75	345	4,757
		United States	251	0	1,575	103	77	2,006	567	225	105	38	440	83	292	144	1,123	3,017	5,023
		EU15	1,881	8,700	26,733	61	2,783	40,158	70	2,120	1,711	26	551	716	1,861	2,244	3,538	12,837	52,995
		Japan	20	939	348	0	40	1,347	5	116	16	19	180	30	34	24	38	461	1,808
		Australia/ New Zealand	27	264	789	23	509	1,612	0	3	35	12	59	48	41	40	97	335	1,947
		Sub-total	2,179	13,782	29,911	206	3,455	49,534	652	2,500	1,902	102	1,265	927	2,272	2,503	4,872	16,995	66,529
	Developing Countries	Mexico	44	29,642	84	3	1	29,773		35	14	2	74	65	150	12	62	414	30,188
		South America	255	11,584	2,213	456	49	14,556	42	2,089	22	24	85	58	136	11	292	2,759	17,315
		Europe	723	4,159	7,086	5	240	12,213	1	47	4,435	12	495	265	2,337	76	958	8,625	20,838
		China	620	3,495	543	567	151	5,376	1	28	13		9,384	54	67	8	88	9,644	15,020
		East/Southeast Asia	1,260	12,401	3,171	1,315	482	18,630	1	26	36	115	3,590	135	854	12	310	5,080	23,710
		South Asia	846	3,821	3,410	54	164	8,293	0	8	42	17	890	4,599	6,706	33	232	12,529	20,823
		Middle East/ Northern Africa	399	1,988	10,221	10	134	12,751	2	51	134	7	325	122	5,788	71	391	6,890	19,642
		Southern Africa	392	1,765	4,763	8	160	7,087	0	8	40	0	43	107	645	1,665	186	2,696	9,783
Rest of World	1,384	16,180	4,842	72	1,345	23,823	7	68	22	1	109	53	109	10	1,106	1,484	25,307		
Sub-total	5,923	85,034	36,333	2,488	2,726	132,504	55	2,360	4,759	178	14,996	5,459	16,791	1,898	3,626	50,121	182,625		
Total		8,102	98,816	66,244	2,694	6,181	182,038	707	4,861	6,661	280	16,261	6,386	19,063	4,400	8,497	67,117	249,155	

Source: Authors' estimation based on GMig2 database (Wlamsley, Ahmed and Parsons (2005).

Table 5. Bilateral International Migration Stock (2020)

(a) Baseline

(million workers)

		Country of Destination											Total		
		Developed Countries						Developing Countries							
		Canada	United States	EU15	Japan	Australia/ New Zealand	Sub-total	Latin America	Europe	Asia	Middle East/ Africa	Rest of World		Sub-total	
Countries of Origin	Developed Countries	Canada	0.00	0.63	0.08	0.00	0.03	0.74	0.02	0.02	0.04	0.04	0.02	0.13	0.87
		United States	0.20	0.00	0.27	0.02	0.05	0.54	0.35	0.04	0.24	0.17	0.31	1.11	1.65
		EU15	1.39	1.33	4.50	0.01	1.51	8.74	0.81	0.59	0.44	1.24	0.86	3.94	12.68
		Japan	0.01	0.13	0.05	0.00	0.02	0.21	0.05	0.01	0.07	0.02	0.01	0.16	0.37
		Australia/New Zealand	0.02	0.04	0.14	0.00	0.31	0.52	0.00	0.01	0.05	0.03	0.03	0.12	0.64
		Sub-total	1.63	2.13	5.05	0.04	1.91	10.76	1.24	0.67	0.83	1.49	1.22	5.45	16.21
	Developing Countries	Latin America	0.20	11.34	0.79	0.15	0.07	12.54	2.86	0.17	0.44	0.50	0.17	4.14	16.67
		Europe	0.40	1.10	2.42	0.00	0.30	4.23	0.05	21.83	0.63	2.42	0.34	25.26	29.49
		Asia	1.71	5.48	2.45	0.62	1.09	11.34	0.10	0.38	18.45	9.49	0.30	28.72	40.06
		Middle East/Africa	0.50	1.05	5.05	0.01	0.40	7.00	0.08	0.55	0.77	23.57	0.29	25.26	32.26
		Rest of World	0.87	4.46	1.65	0.02	1.79	8.79	0.10	0.08	0.22	0.20	0.55	1.15	9.94
Sub-total		3.66	23.43	12.36	0.79	3.65	43.90	3.19	23.00	20.51	36.18	1.65	84.53	128.42	
Total		5.29	25.56	17.40	0.84	5.56	54.66	4.42	23.67	21.34	37.67	2.87	89.97	144.63	

(b) Changes in Migration Stock in the Simulation

(million workers)

		Country of Destination											Total		
		Developed Countries						Developing Countries							
		Canada	United States	EU15	Japan	Australia/ New Zealand	Sub-total	Latin America	Europe	Asia	Middle East/ Africa	Rest of World		Sub-total	
Countries of Origin	Developed Countries	Canada	0.00	0.02	0.01	0.00	0.00	0.03	0.00	0.01	0.00	0.00	0.00	0.01	0.04
		United States	0.00	0.00	0.02	0.01	0.00	0.03	0.00	0.05	0.00	0.00	0.00	0.05	0.07
		EU15	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.01	0.01
		Japan	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
		Australia/New Zealand	0.00	0.00	0.02	0.00	0.05	0.08	0.00	0.00	0.00	0.00	0.00	0.00	0.08
		Sub-total	0.00	0.03	0.05	0.01	0.05	0.14	0.00	0.06	0.00	0.00	0.00	0.06	0.20
	Developing Countries	Latin America	0.04	3.43	0.37	0.07	0.02	3.94	0.25	0.06	0.02	0.01	0.01	0.34	4.28
		Europe	0.00	0.00	0.12	0.00	0.00	0.13	0.00	0.00	0.00	0.00	0.00	0.00	0.13
		Asia	0.42	1.63	1.20	0.30	0.40	3.95	0.00	0.15	0.11	0.34	0.01	0.62	4.57
		Middle East/Africa	0.21	0.52	2.99	0.00	0.23	3.95	0.01	0.24	0.06	0.16	0.03	0.50	4.45
		Rest of World	0.20	1.49	0.75	0.01	0.49	2.94	0.04	0.06	0.00	0.00	0.00	0.11	3.05
Sub-total		0.87	7.06	5.43	0.39	1.15	14.91	0.30	0.51	0.20	0.51	0.05	1.57	16.48	
Total		0.88	7.09	5.48	0.40	1.20	15.05	0.30	0.57	0.20	0.51	0.05	1.63	16.68	

Source: Authors' estimation.

**Table 6. Impact on Labor Market decomposed by Nativity and Skill
(Relative to Baseline, percentage change)**

(1) Changes in Real Wages

	Native Labor				Migrant Labor								Total	
	Low	Mid	High	Sub-total	High-income countries				Low-income countries					
					Low	Mid	High	Sub-total	Low	Mid	High	Sub-total		
<i>Developed Countries</i>														
Canada	0.91	0.87	0.92	0.91	0.20	0.19	0.18	0.20	-1.94	-2.35	-2.78	-0.12	-1.43	
United States	-0.36	-0.39	-0.38	-0.37	-1.76	-1.68	-1.74	-1.73	-4.37	-4.62	-5.58	-3.63	-1.72	
European Union (EU15)	-0.07	-0.07	-0.06	-0.07	-1.29	-1.32	-1.35	-1.27	-5.21	-5.03	-6.75	-3.18	-1.55	
Japan	0.03	0.03	0.03	0.03	-4.34	-4.32	-4.25	-4.29	-6.39	-6.13	-6.64	-6.26	-0.20	
Australia-New Zealand	1.38	1.39	1.60	1.35	0.38	0.28	0.00	0.50	-1.65	-2.31	-3.83	-1.47	-1.91	
<i>Developing Countries</i>														
Mexico	0.27	0.53	1.62	0.36	0.96	0.96	0.96	0.96	-5.20	-4.10	-2.91	-4.38	0.35	
Central America	0.64	1.30	3.26	0.67	1.36	1.36	1.36	1.36	-7.27	-7.23	-4.03	-6.74	0.42	
Colombia	0.18	0.28	1.41	0.20	0.69	0.69	0.69	0.69	-1.53	-2.24	-0.68	-1.67	0.19	
Ecuador	1.30	1.80	2.66	1.32	2.20	2.20	2.20	2.20	2.11	2.01	2.19	2.08	1.30	
Peru	-0.06	0.36	0.48	0.10	0.54	0.54	0.55	0.55	0.02	-0.94	-1.03	-0.45	0.10	
Venezuela	0.24	0.37	0.47	0.26	0.89	0.89	0.89	0.89	0.80	0.78	0.73	0.79	0.26	
Argentina	0.61	0.64	0.89	0.62	0.42	0.42	0.42	0.42	-5.16	-4.63	-4.84	-5.06	0.22	
Brazil	-0.32	-0.24	0.19	-0.32	0.09	0.09	0.09	0.09	-3.14	-2.96	-3.14	-3.08	-0.33	
Chile	-0.65	-0.31	0.03	-0.54	-0.15	-0.13	-0.17	-0.15	-4.72	-4.59	-5.40	-4.65	-0.67	
Rest of South America	-0.02	0.82	1.55	-0.01	1.09	1.09	1.08	1.08	0.17	0.21	0.21	0.19	-0.07	
Eastern Europe	0.22	0.22	0.56	0.24	-9.74	-2.44	-2.50	-8.18	-3.25	-4.27	-7.60	-3.61	0.10	
Former Soviet Union	-0.59	-0.44	-0.36	-0.49	-0.80	-1.70	-2.36	-1.26	-0.85	-0.97	-0.99	-0.89	-0.51	
China	0.04	0.05	-1.83	0.03	-0.64	-0.70	-0.40	-0.56	-8.33	-8.56	-2.96	-8.28	0.03	
East Asia	0.01	0.52	0.60	0.33	0.82	0.82	0.82	0.82	0.68	0.53	0.61	0.63	0.34	
Southeast Asia	0.13	0.08	0.66	0.12	1.01	1.01	1.00	1.01	0.26	0.35	0.36	0.30	0.10	
South Asia	0.23	0.26	0.70	0.22	0.86	0.86	0.86	0.86	0.75	0.67	0.66	0.73	0.22	
Middle East/Northern Africa	0.07	0.07	0.79	0.06	0.25	0.25	0.25	0.25	-0.45	-0.90	-1.84	-0.54	-0.04	
Southern Africa	0.08	-0.07	1.71	0.06	0.94	0.94	0.94	0.94	0.93	0.93	0.94	0.93	0.05	
Rest of World	0.82	1.29	1.74	0.91	1.20	1.20	1.20	1.20	0.40	0.21	-0.96	0.31	0.89	

(2) Changes in Labor Supply

	Native Labor				Migrant Labor								Total	
	Low	Mid	High	Sub-total	High-income countries				Low-income countries					
					Low	Mid	High	Sub-total	Low	Mid	High	Sub-total		
<i>Developed Countries</i>														
Canada	-0.39	-0.07	-0.55	-0.25	0.02	0.09	0.18	0.14	17.29	23.43	30.04	23.85	4.09	
United States	-0.20	-0.01	-0.03	-0.05	1.53	0.57	1.37	1.18	25.78	29.90	46.59	30.15	4.03	
European Union (EU15)	0.00	0.00	-0.01	-0.01	0.57	0.94	1.33	0.93	39.50	36.34	69.75	43.94	2.85	
Japan	0.00	0.00	0.00	0.00	24.82	24.55	23.42	23.77	49.64	44.74	54.60	48.92	0.66	
Australia-New Zealand	-0.19	-0.28	-2.04	-0.84	0.00	1.13	4.60	2.72	14.55	24.17	49.85	31.57	7.65	
<i>Developing Countries</i>														
Mexico	1.39	0.77	-1.77	0.79	0.00	0.00	0.00	0.00	17.93	13.41	8.79	12.87	0.81	
Central America	3.10	1.42	-3.33	2.28	0.00	0.00	0.00	0.00	24.90	24.75	10.65	19.23	2.69	
Colombia	1.64	1.40	-1.42	1.22	0.00	0.00	0.00	0.00	5.35	8.01	2.30	5.77	1.23	
Ecuador	2.16	0.88	-1.24	1.58	0.00	0.00	0.00	0.00	0.68	1.05	0.41	0.78	1.57	
Peru	1.83	0.85	0.56	1.25	0.00	0.00	0.00	0.00	0.59	4.46	4.83	3.27	1.25	
Venezuela	1.14	0.80	0.57	0.97	0.00	0.00	0.00	0.00	0.10	0.16	0.35	0.17	0.92	
Argentina	0.70	0.63	0.01	0.56	0.00	0.00	0.00	0.00	15.36	13.17	14.05	14.58	1.19	
Brazil	1.05	0.83	-0.28	0.88	0.00	0.00	0.00	0.00	8.84	8.15	8.89	8.62	0.89	
Chile	1.61	0.71	-0.15	0.98	-0.10	-0.16	-0.04	-0.09	12.01	11.47	15.00	12.51	1.16	
Rest of South America	2.36	0.25	-1.54	1.78	-0.01	-0.01	0.00	-0.01	2.16	2.03	2.06	2.08	1.78	
Eastern Europe	1.52	1.52	0.68	1.41	30.02	0.23	0.38	16.27	4.21	7.94	21.56	9.02	1.78	
Former Soviet Union	1.20	0.83	0.62	0.90	0.19	3.45	5.99	3.06	1.23	1.65	1.71	1.49	0.99	
China	-0.01	-0.01	4.58	0.20	0.95	1.15	0.00	0.37	21.41	22.48	0.58	16.05	0.21	
East Asia	1.85	0.55	0.36	0.90	0.00	0.00	0.00	0.00	0.23	0.75	0.47	0.47	0.87	
Southeast Asia	1.63	1.75	0.35	1.54	0.00	0.00	0.00	0.00	1.77	1.48	1.42	1.56	1.54	
South Asia	1.17	1.09	0.00	1.09	0.00	0.00	0.00	0.00	0.20	0.47	0.50	0.35	1.08	
Middle East/Northern Africa	0.96	0.97	-0.79	0.80	0.00	0.00	0.00	0.00	1.12	2.72	6.19	2.65	0.98	
Southern Africa	1.51	1.89	-2.41	1.46	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.40	
Rest of World	1.05	-0.15	-1.28	0.41	0.00	0.00	0.00	0.00	1.46	2.16	6.60	2.89	0.45	

Source: Authors' model simulations.

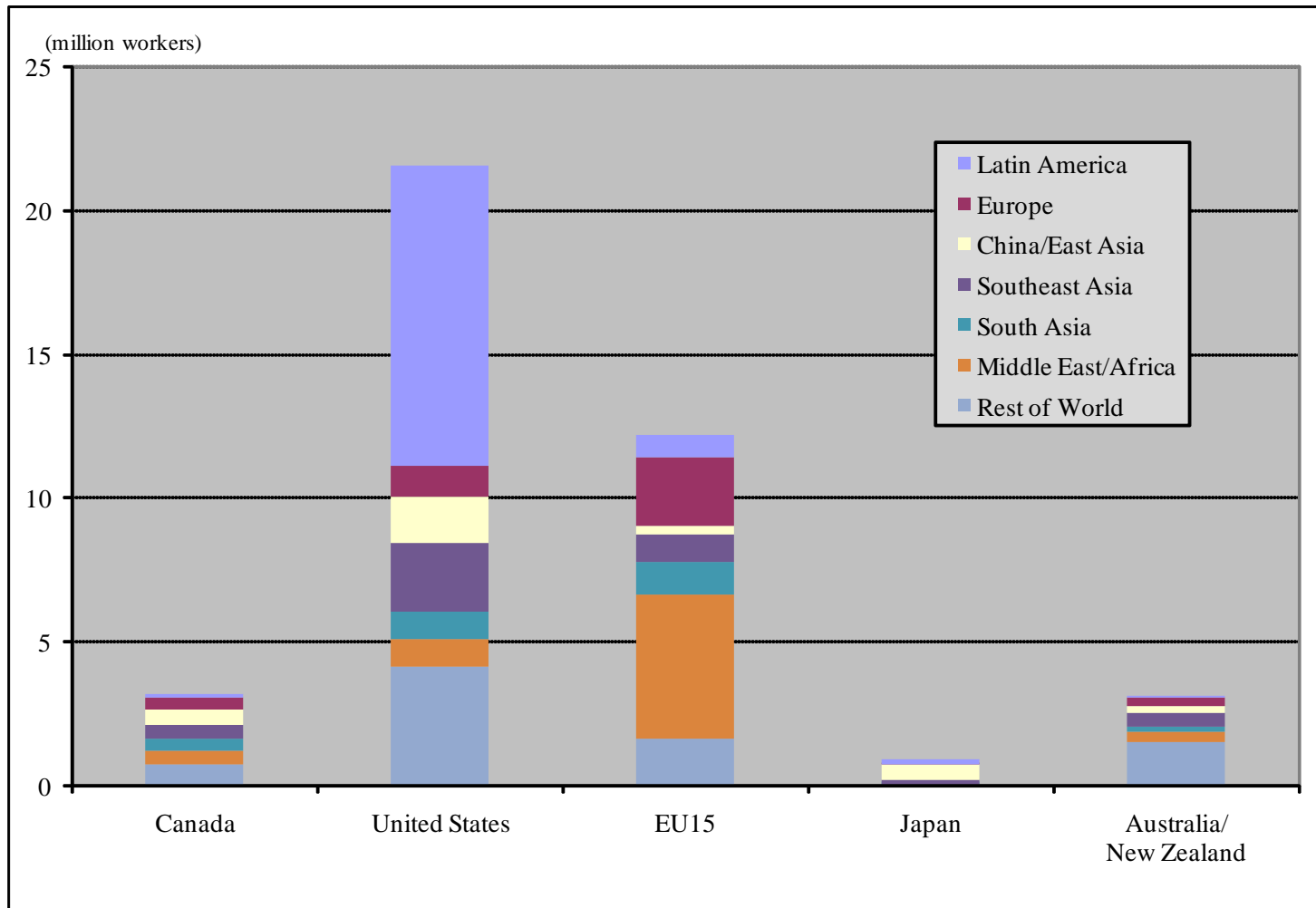
Table 7. Changes in Real Household Income relative to Baseline

(\$billion)

	Native Households								Migrant Households								National Household Income
	Labor			Labor Income	Capital	Land	Remittances	Total Income	High-income origin			Total Income	Low-income origin				
	Low	Mid	High						Low	Mid	High		Low	Mid	High	Total Income	
				Low	Mid	High	Low	Mid				High					
Developed Countries	-6.97	-11.90	-20.74	-39.62	149.29	3.37	0.30	113.34	-0.62	-0.26	2.96	2.09	120.58	155.97	173.47	450.02	565.45
Canada	0.66	3.52	0.60	4.78	3.29	0.12	0.20	8.39	0.03	0.02	0.19	0.23	1.49	2.65	12.32	16.46	25.08
United States	-7.10	-15.51	-18.17	-40.78	90.89	2.06	0.42	52.59	-0.05	-0.43	-0.32	-0.81	79.63	105.62	79.67	264.92	316.71
EU15	-1.69	-2.41	-2.81	-6.91	41.39	0.68	-0.60	34.55	-0.71	-0.23	-0.05	-0.98	34.41	34.38	58.90	127.69	161.26
Japan	0.20	0.46	0.44	1.10	3.36	0.01	-0.02	4.46	0.06	0.05	0.33	0.44	3.06	5.12	4.66	12.84	17.74
Australia/ New Zealand	0.96	2.05	-0.81	2.19	10.38	0.49	0.29	13.35	0.05	0.33	2.82	3.21	2.00	8.20	17.91	28.11	44.67
Developing Countries	40.63	24.55	9.07	74.24	49.42	3.43	57.74	184.84	1.75	0.38	1.35	3.49	1.08	1.61	2.44	5.13	193.46
Mexico	3.96	2.16	-0.19	5.92	4.87	0.02	9.54	20.34	0.10	0.02	0.06	0.18	0.02	0.01	0.02	0.05	20.57
Central America	1.59	0.52	-0.02	2.09	1.38	0.14	4.35	7.97	0.01	0.01	0.02	0.03	0.11	0.05	0.06	0.21	8.22
Colombia	0.83	0.38	0.00	1.21	0.92	0.06	1.15	3.34	0.00	0.00	0.01	0.01	0.00	0.01	0.00	0.02	3.37
Ecuador	0.44	0.13	0.05	0.63	0.35	0.03	0.78	1.79	0.00	0.00	0.01	0.02	0.00	0.01	0.00	0.01	1.82
Peru	0.40	0.22	0.23	0.85	0.54	0.04	0.70	2.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	2.14
Venezuela	0.46	0.23	0.20	0.89	0.44	0.02	0.35	1.71	0.02	0.01	0.03	0.06	0.01	0.02	0.01	0.03	1.80
Argentina	0.51	0.40	0.25	1.16	1.08	0.08	0.24	2.55	0.02	0.02	0.03	0.07	0.26	0.13	0.09	0.48	3.10
Brazil	1.99	0.45	-0.07	2.37	1.40	0.08	0.65	4.49	0.00	0.00	0.01	0.01	0.02	0.03	0.03	0.08	4.58
Chile	0.21	0.11	-0.02	0.30	0.19	0.02	0.08	0.58	0.00	0.00	-0.01	-0.01	0.02	0.02	0.03	0.07	0.64
Rest of South America	0.37	0.05	0.00	0.41	0.24	0.04	0.45	1.14	0.01	0.01	0.02	0.03	0.01	0.01	0.01	0.03	1.20
Latin America	10.75	4.64	0.44	15.83	11.41	0.51	18.28	46.04	0.16	0.07	0.19	0.42	0.45	0.30	0.25	0.99	47.45
Eastern Europe	2.42	3.85	0.90	7.17	8.83	0.54	-0.18	16.36	1.19	-0.11	-0.07	1.02	0.03	0.14	0.36	0.52	17.90
Former Soviet Union	0.59	0.81	0.26	1.65	0.98	0.06	0.04	2.73	-0.04	0.08	0.32	0.35	0.05	0.10	0.10	0.25	3.33
China	0.29	0.28	3.25	3.82	0.84	0.21	1.18	6.05	0.00	0.00	-0.01	-0.01	0.03	0.06	-0.01	0.08	6.12
East Asia	4.29	5.05	2.67	12.01	2.31	0.14	1.99	16.44	0.01	0.01	0.02	0.04	0.12	0.21	0.40	0.73	17.21
Southeast Asia	5.17	2.63	0.83	8.64	4.18	0.70	5.57	19.09	0.06	0.05	0.16	0.26	0.06	0.09	0.09	0.23	19.58
South Asia	5.13	1.94	0.42	7.49	5.20	1.08	5.95	19.71	0.04	0.03	0.07	0.15	0.05	0.06	0.05	0.16	20.02
Middle East/Northern Africa	3.90	1.87	-0.01	5.76	6.79	0.05	7.27	19.88	0.03	0.03	0.06	0.12	0.19	0.49	0.95	1.63	21.63
Southern Africa	3.91	1.37	-0.14	5.14	4.71	0.13	7.31	17.29	0.10	0.08	0.17	0.35	0.03	0.07	0.06	0.17	17.81
Rest of World	4.18	2.10	0.44	6.72	4.18	0.00	10.35	21.25	0.20	0.15	0.44	0.80	0.06	0.10	0.19	0.34	22.39
Total	33.65	12.65	-11.67	34.63	198.72	6.80	58.04	298.18	1.13	0.13	4.32	5.57	121.66	157.58	175.91	455.15	758.91

Source: Authors' model simulations.

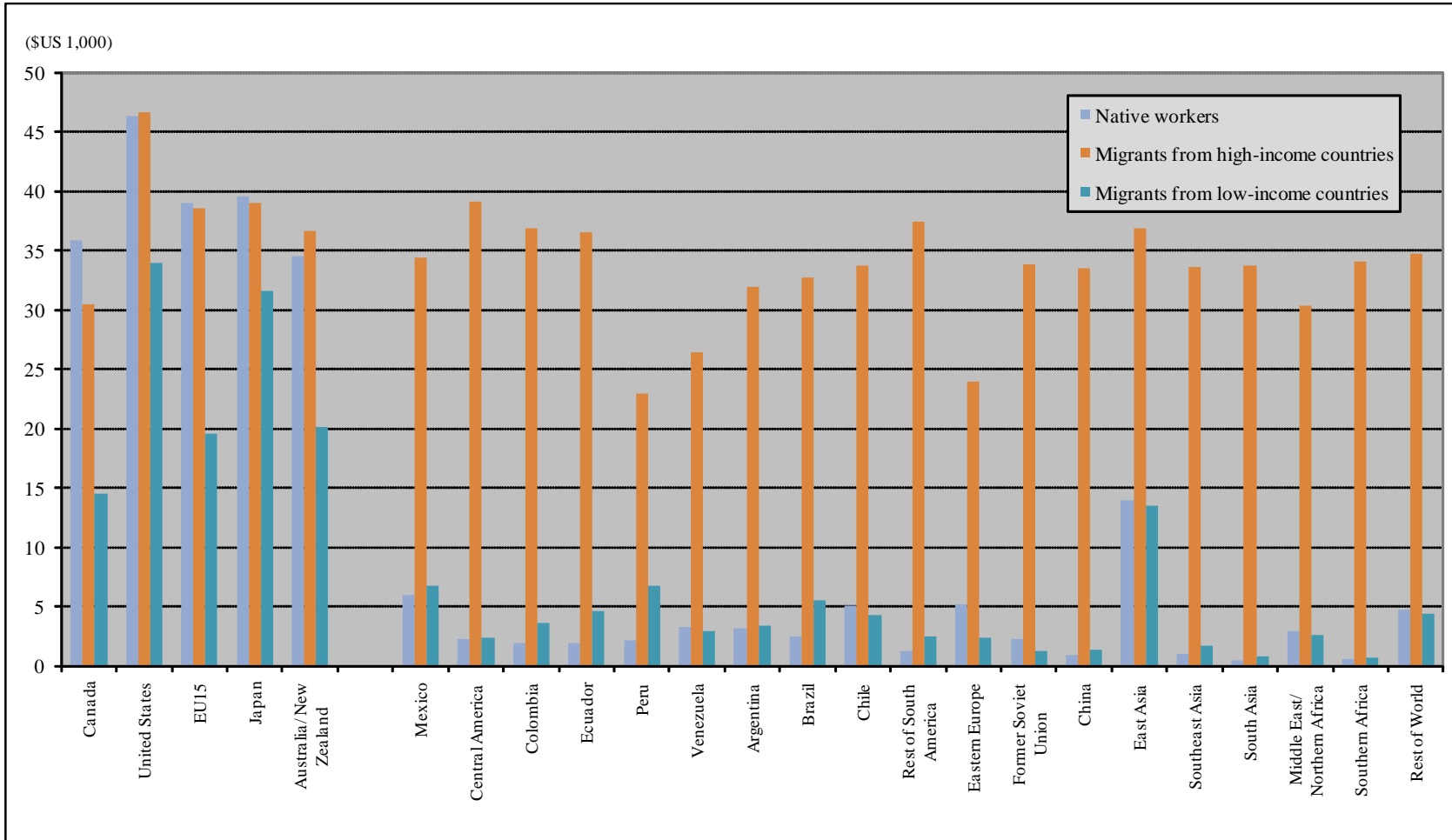
Figure 1. International Migration Stock in High-income Countries migrating from Developing Countries (2004)



Note: Refer to Table 1.

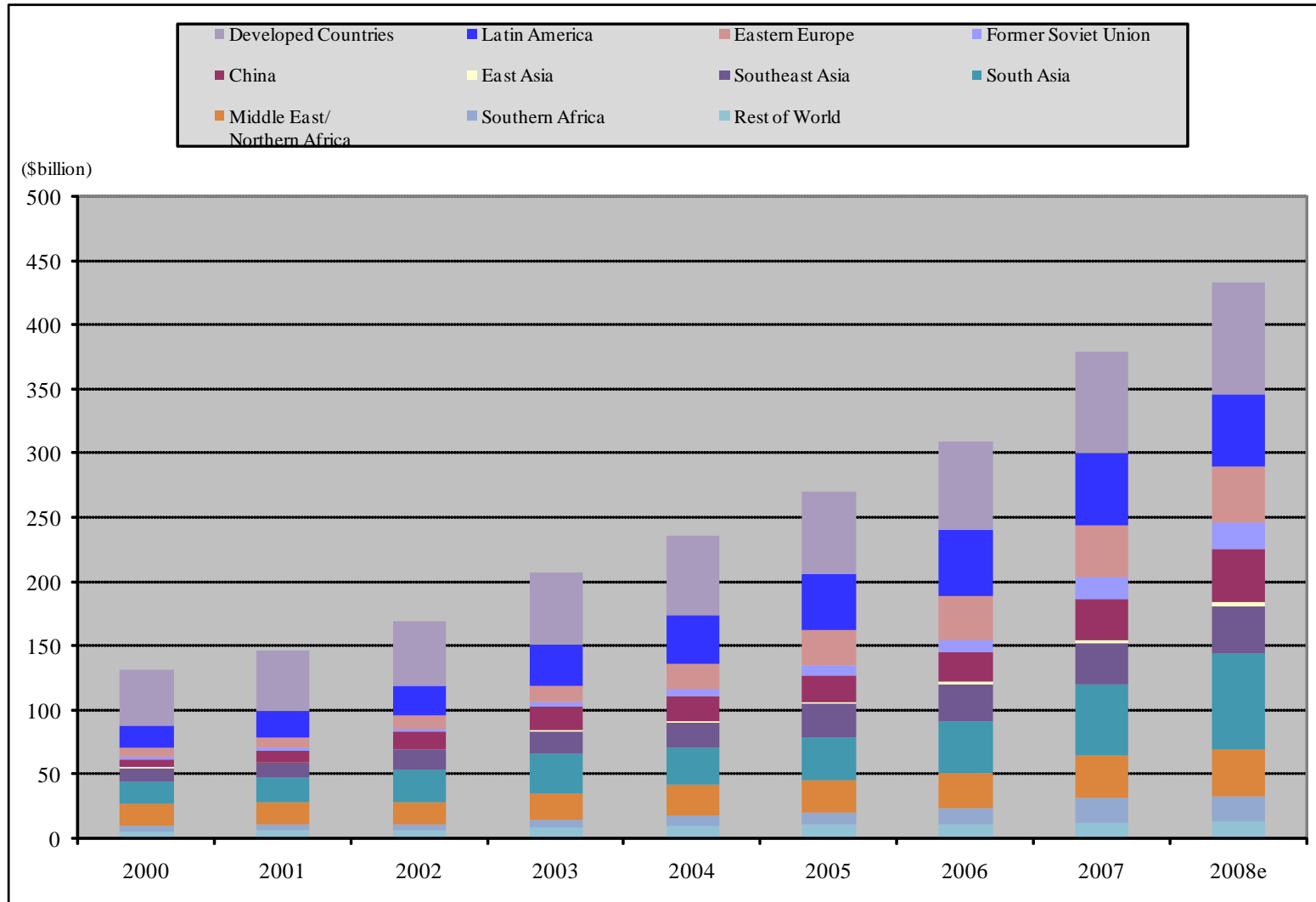
Sources: Authors' estimation.

Figure 2. Average Wages by Nativity and Country (2004)



Sources: IDB-INT CGE model database based on migration flows and other relevant data.

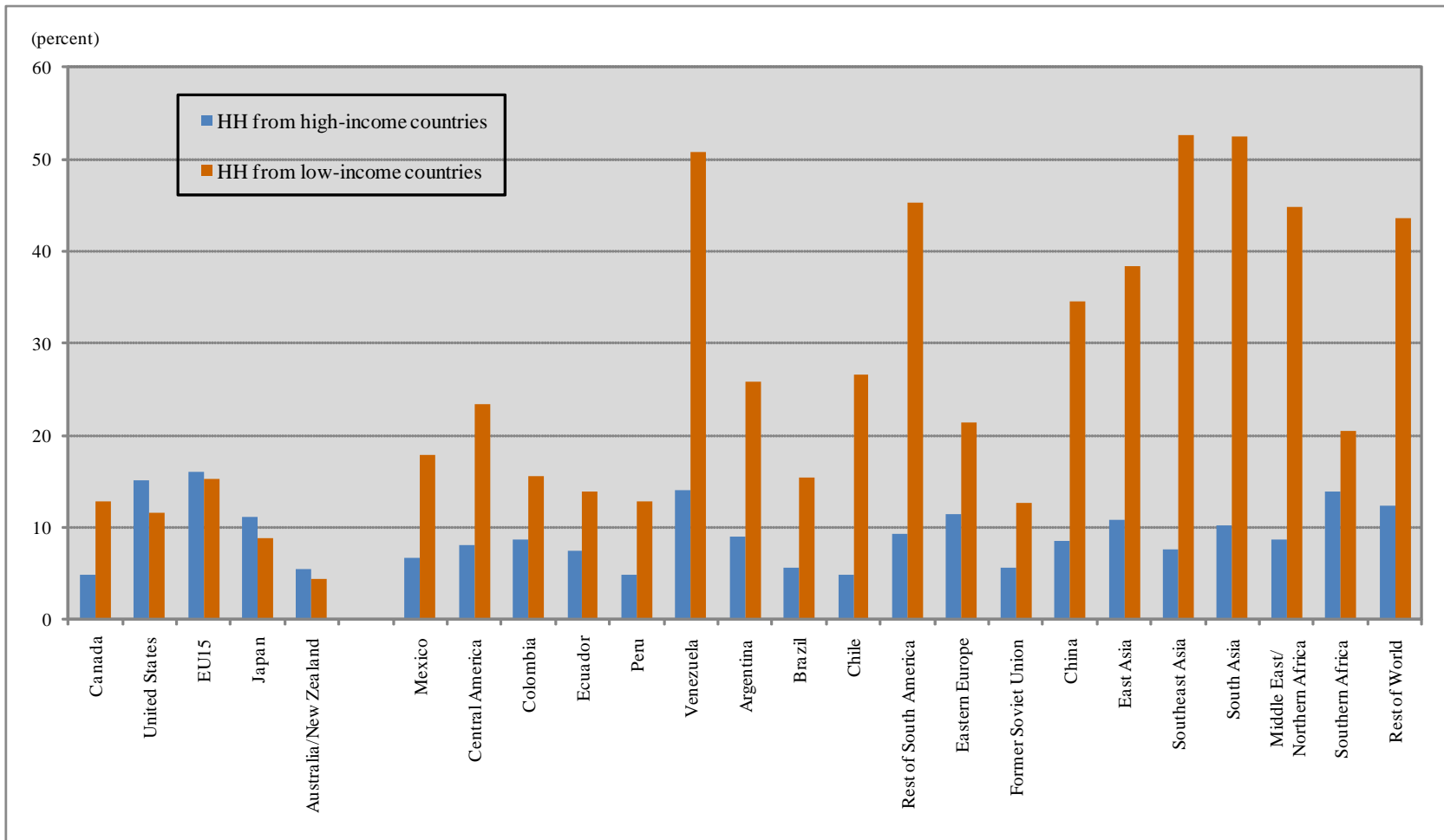
Figure 3. Share of Global Remittance Inflows between 2000 and 2008



Source: World Bank (2008).

Note: 2008 is estimates.

Figure 4. Share of Remittances in Migrant Household Income (2004)



Sources: IDB-INT CGE model database based on migration flows and other relevant data.

Figure 5. Structure of Production Nesting in the Model

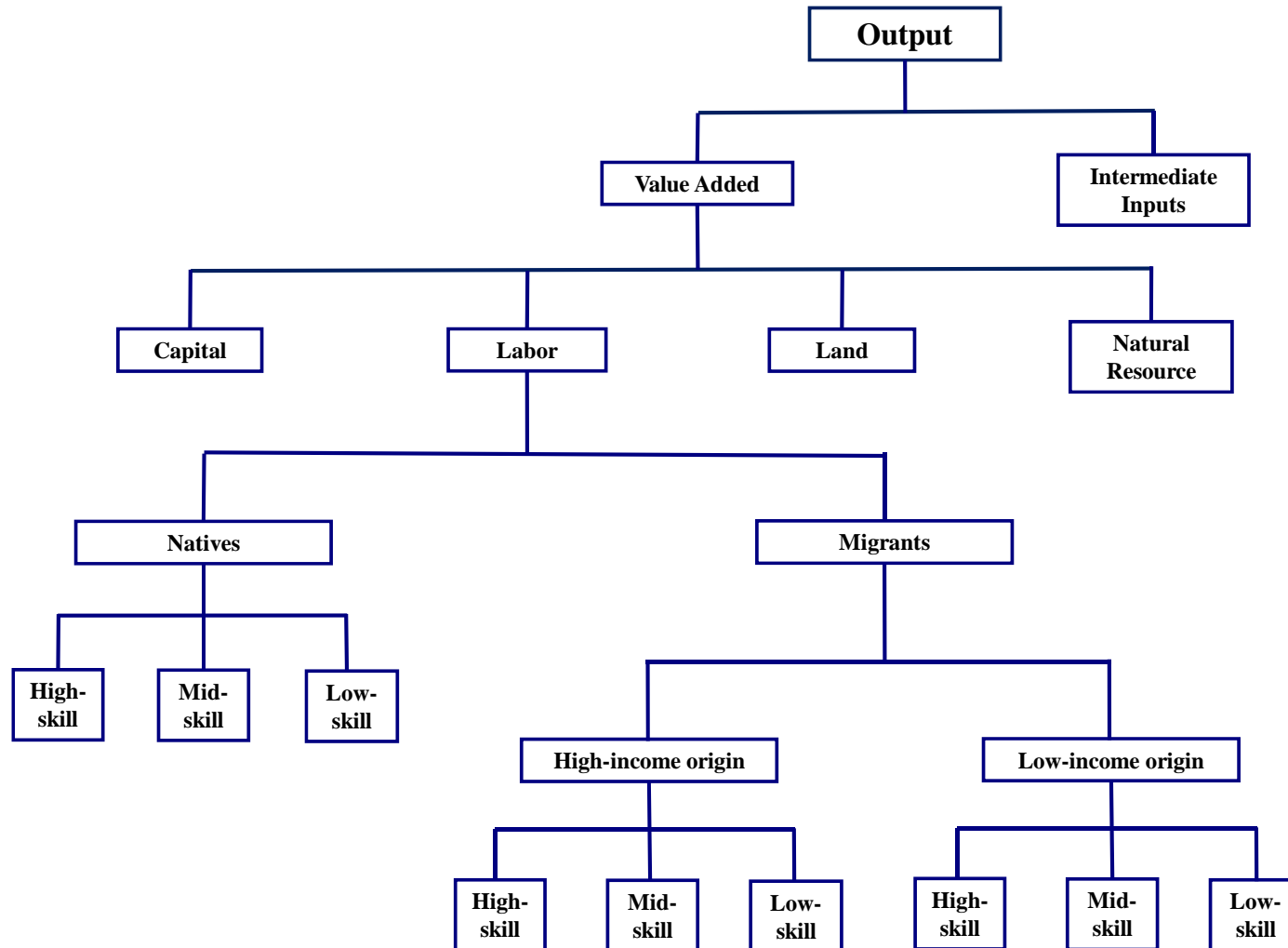
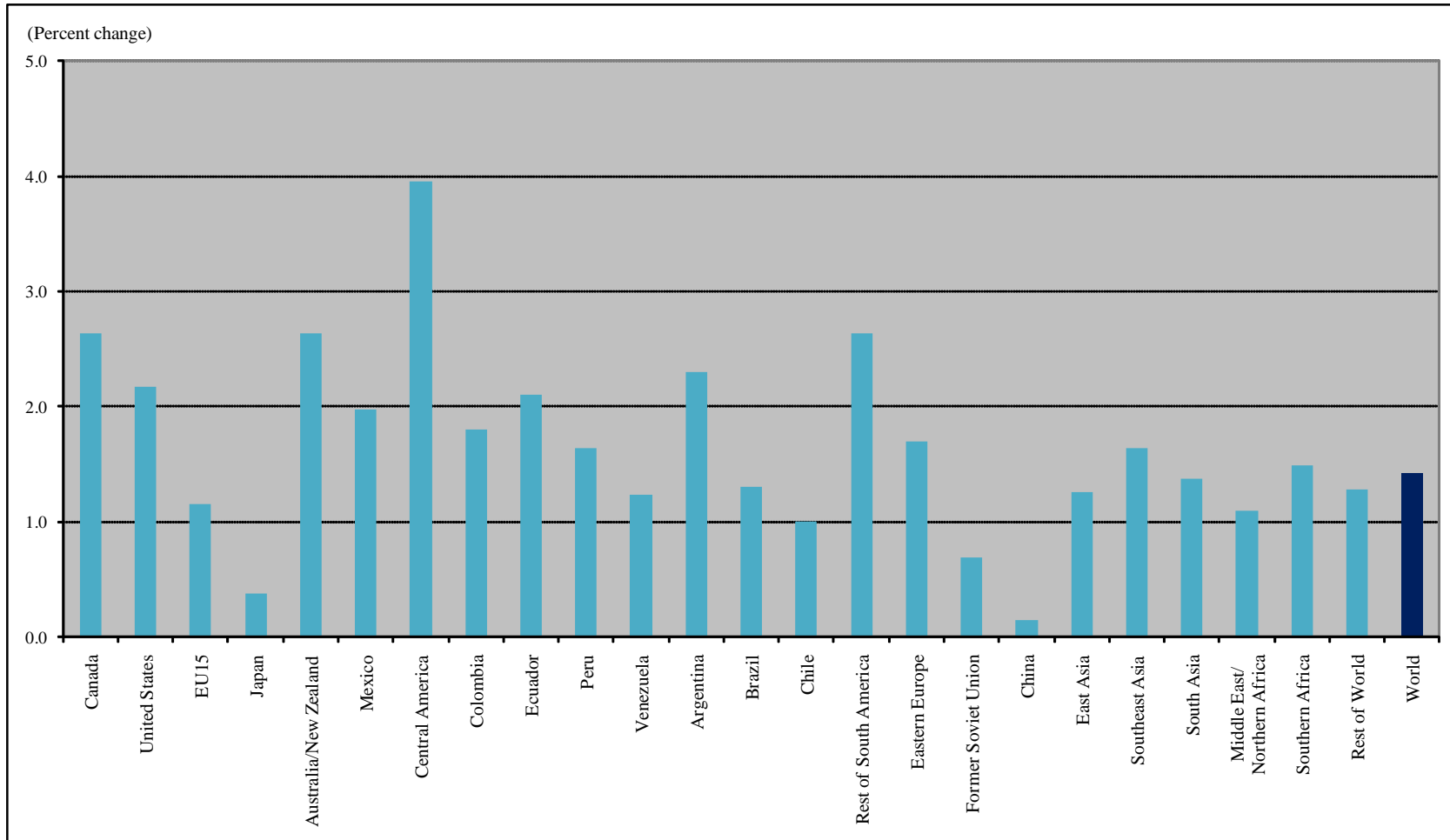


Figure 6. Changes in Real GDP relative to Baseline



Sources: Authors' model simulations.