Global Economic Prospects for Increasing Developing Country Migration into Developed Countries

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Abstract

Global labor markets have evolved dramatically in the last several decades and will continue to so for some time to come, driven by changing population demographics, economic globalization, dramatic changes in transportation technology, and accelerating institutional change. All these characteristics of migration make it an essential policy issue for the human development agenda. The United Nations Human Development Report for 2009 intends to provide a forward-looking assessment of global labor market dynamics, with particular reference to the effects of increased labor mobility on global patterns of employment and output. To date, the most rigorous analysis of this subject is the World Bank Global Prospect Group's forecasts with their Global Economic Prospects Linkage model. This report describes how an update of the GEP model captures more detailed information on global labor movements and heterogeneity, and reports new projections on global migration patterns.

These results suggest complex market interactions between migrants and resident workers, whether native or migrant, and between labor and other factors of production. For example reducing migration raises the premium on migrant labor in the destination countries, while lowering the relative return to capital. The first effect makes for higher real income, consumption, and remittances for migrants of both types. For native populations in high income countries, the negative capital income effect dominates the wage effect of reduced competition from migrants. It is perhaps ironic that reducing labor competition is more beneficial to migrants, who lack the capital income and thereby gain absolutely from rising relative wages. Of course one of the primary demand drivers for migrants is the desire to profit from using capital resources more fully within high income economies. In OECD economies, pension schemes guarantee that a significant part of these profits accrue indirectly to native workers. Taken together, these results strongly support the argument that migration has beneficial growth effects on global real economic activity, improving the efficiency of international resource allocation for the benefit of both sending and receiving countries. However, these reassuring aggregate results mask more complex interactions in domestic labor markets, and there will inevitably be both winners and losers from the ensuing structural adjustments. Having said this, the existence of substantial aggregate gains, particularly new fiscal resources for the public sector, suggests the prospect of adjustment assistance to offset adverse impacts.

Keywords: Migration, globalization, North-South.

1   Introduction

Global labor markets have evolved dramatically in the last several decades and will continue to so for some time to come, driven by changing population demographics, economic globalization, dramatic changes in transportation technology, and accelerating institutional change. The ever growing number of international migrants and the role they play in national, regional, and global economies has made migration a highly visible topic in recent years. Migration serves many purposes for those who make this decision, as well as for their families and other social group members, and their economies of origin and destination, as well as collateral markets, are changed by their movements. All these characteristics of migration make it an essential policy issue for the human development agenda.

The United Nations Human Development Report for 2009 intends to provide a forward-looking assessment of global labor market dynamics, with particular reference to the effects of increased labor mobility on global patterns of employment and output. To date, the most rigorous analysis of this subject is the World Bank Global Prospect Group's forecasts with their Global Economic Prospects Linkage model. The purpose of the proposed research is to update the GEP model to capture more detailed information on global labor movements and heterogeneity, and then to produce new projections for use in writing the HDR.

The distinguishing feature of a general equilibrium model like Linkage is its closed form specification of all activities in the economic system under study. This can be contrasted with more traditional partial equilibrium analysis, where linkages to other domestic markets and agents are deliberately excluded from consideration. A large and growing body of evidence suggests that indirect effects (e.g., upstream and downstream production linkages) arising from policy changes are not only substantial, but may in some cases even outweigh direct effects. In a multi country model like the one used in this study, indirect effects include the trade linkages between countries and regions which themselves can have policy implications. Because migration affects so many markets, within and between economies, this is the appropriate tool of analysis to capture the full spectrum of benefits and costs.

The next section provides background information on global migration patterns, followed the policy scenarios and results analysis in Section 3. The report concludes with references and a technical annex.

2   Overview of Migration Patterns and Processes

Labor migration in recent years has been transformed by economic globalization, transportation technology, and pervasive institutional changes. Many of these more recent trends are fundamental to understanding future patterns of migration, so in this section we provide a brief overview of issues of most relevance to the present analysis. For more detailed discussion, the reader is referred to Martin (2009). We begin by discussing population dynamics, then review the role of migration in global labor markets, using examples from three leading migration theatres. This is followed by a brief discussion of migration infrastructure and related factors that shape migration decisions. Finally, the 2008-2009 recession and its impact on migration flows is discussed.

2.1   Population

Understanding trends in global population growth is crucial for predicting future migration flows. Developed countries' populations are predicted to remain constant, and matched with an ageing population this creates an economically unproductive population pyramid. Immigrants can help bolster a depleting working-age population, and therefore future trends in migration are directly related to population trends.

The best estimates for future global population come from The Population Division of the United Nations. Their flagship study on population, "World Population Prospects" was last revised in 2006 and contains a wealth of information regarding population models. According to the "2006 Revision", the world population is expected to increase by approximately 2.5 billion people by 2050 under medium bounds. This would increase the population from the current total of 6.7 billion in 2006 to 9.2 billion. However, essentially all of this growth is expected to take place in the less developed regions of the world. Developing countries' populations are projected to rise from 5.4 billion in 2007 to 7.9 billion by 2050. In stark contrast, the population of developed countries are expected to remain flat at 1.2 billion and would actually decline in population were

it not for migration from less developed countries. Net migration from developing to developed countries is expected to average 2.3 million persons a year after 2010 (UN:2007).

What is far more relevant to predicating future migration patterns are the rapidly changing population structures of the world. Due to declining fertility levels and increasing longevity, the populations of numerous countries are ageing rapidly. While this trend is happening nearly universally across the globe, it is most pronounced in developed countries. Between 2005 and 2050, half of the increase in world population will be accounted for by a rise in the population aged 60 years or over, while the population aged 15 and under (considered children by the United Nations) will actually decline slightly. This trend is even more drastic in developed countries, where the population aged 60 or over is expected to nearly double (from 245 million in 2005 to 406 million in 2050), while the population aged under 60 is expected to decline (from 971 million in 2005 to 839 million in 2050, UN:2007). This has tremendous implications for migration and is worth examining in more detail.

When looking at population ageing there are three distinct demographic transition categories. Developed countries represent the third and final stage of the transition and many have populations that are among the oldest in the world. Overall, the European continent is the oldest in the world with a median age of 39 years old. All but three countries (Albania, Ireland, and the Republic of Moldova) currently have a median age higher than 34 years and 12 countries have median ages higher than 40. Japan has the oldest population in the world with a median age of 43 years in 2005. By 2050, all developed countries are expected to have median ages higher than 40 years (UN:2007).

The next transitional category consists of countries where the population of the working age (from 15 to 59 years) is still growing as a proportion of the whole population. Most countries in Asia and Latin America fill this category, although many are transitioning into the third category as well. Fertility reductions in both of these regions have been rapid, and as a result their populations are expected to age more rapidly than the population of developed countries. For example, in 37 of the 49 developing countries in Asia, the median age is expected to rise by at least 12 years between 2005 and 2050. In Latin America and the Caribbean, the median age is projected to increase by over 12 years in 32 of the 37 countries (UN:2007). In terms of migration, it should come as no surprise that both Asia and Latin America have large migrant

populations, which is indicative of countries with a relatively large share of a working age population. However, over the next several decades as these countries transition into the third category (and continue to develop simultaneously) these migration patterns may reverse.

Most African countries represent the first stage of the transition and their populations are still young. However, if predicted fertility models prove to be accurate, many African countries are poised to enter a period characterized by a beneficial age distribution, where the proportion of working age adults increases relative to that of dependants (children and elderly combined). Population ageing in Africa is expected to be moderate, as the median age is projected to rise by 12 years in only 11 of the 54 countries in the continent and most are located in Northern Africa (UN:2007). In terms of migration, as Africa's working age population continues to increase over the next several decades, so should their migrant populations.

Table 1: Percent Distribution by broad age group for the world, development groups and major areas, 2005 and 2050 (medium variant)

	Percentage distribution in 2005				Percentage distribution in 2050			
Major area	*0–14*	*15–59*	*60+*	*80+*	*0–14*	*15–59*	*60+*	*80+*
World	28.3	61.4	10.3	1.3	19.8	58.3	21.8	4.4
More developed regions	17.0	62.9	20.1	3.7	15.2	52.2	32.6	9.4
Less developed regions	30.9	61.0	8.1	0.8	20.6	59.3	20.1	3.6
Least developed countries	41.5	53.4	5.1	0.4	28.2	61.5	10.3	1.1
Other less developed countries	29.1	62.3	8.6	0.9	18.4	58.7	22.9	4.3
Africa	41.4	53.4	5.2	0.4	28.0	61.7	10.4	1.1
Asia	28.0	62.7	9.2	1.0	18.0	58.3	23.7	4.5
Europe	15.9	63.5	20.6	3.5	14.6	50.9	34.5	9.6
Latin America and the Caribbean	29.8	61.2	9.0	1.2	18.0	57.8	24.3	5.2
Northern America	20.5	62.7	16.7	3.5	17.1	55.6	27.3	7.8
Oceania	24.9	61.0	14.1	2.6	18.4	56.9	24.8	6.8

Source: "World Population Prospects: The 2006 Revision. Population Ageing,"

These changes in the median age are the result of changes in the share of population in different age groups. When looking at the shares of population in different age groups the importance of migrants can be seen even further. In developed countries in 2050, the percentage of people aged 60 and older is expected to be double the amount of children. In other words, this means that for every one child there will be two people 60 or older. Furthermore the proportion of the working age population is expected to decrease in every major region besides Africa (Table 1). This is

useful for examining the support ratio, which is calculated as the ratio of persons aged 15-64 over the sum of the number of children and of persons 65 or over. The support ratio is expected to begin declining after 2010 in Europe, North America and Oceania, after 2015 in Asia and after 2025 in Latin America and the Caribbean. By 2050, Europe is predicted to have the lowest support ratio, at 14 persons of working age for every 10 dependents. These decreasing support ratios highlight the significant need for the working age population in future decades, and therefore migration can play a necessary role in ensuring many countries do not become over burdened (UN:2007).

Table 2: Economically Active Population / Thousands

	2008	2009	2010	2011	2012
World	3181784	3229431	3276145	3321820	3366449
MDC's	613402	615741	617614	618980	619848
LDC's	2568382	2613689	2658531	2702840	2746601
	2013	2014	2015	2016	2017
World	3409966	3452308	3493424	3533211	3571670
MDC's	620279	620362	620169	619729	619048
LDC's	2789687	2831946	2873255	2913482	2952622
	2018	2019	2020		
World	3608986	3645447	3681278		
MDC's	618156	617078	615838		
LDC's	2990830	3028369	3065440		

Source: Via Online ILO Estimates and projections of the economically active population: 1980-2020

2.2 Labor Force

The Population Division of the United Nations lumps the age group 15-59 into the working age category, but this is not technically accurate due to labor force participation rates. Therefore to get a more accurate figure of the size of the global labor force, we must take into account labor force participation rates. However, this proves to be quite difficult as many countries do not report these rates and therefore they must be estimated. The International Labor Organization (ILO) of the United Nations undertakes this responsibility and has created five reports estimating and projecting the economically active population (EAP). The most recent report, released in August 2008, contains a wealth of statistics on the EAP subset of the population. In 2008, the total EAP was estimated at 3.18 billion or roughly 47% of the total world population. In developed countries, the EAP in 2008 was 613 million accounting for approximately 19% of the total EAP. The corresponding EAP in developing countries was about 2.5 billion people. The ILO projections for the future EAP are only estimated until 2020, but are useful nonetheless. The ILO estimates that the EAP in developed countries is to remain stable at approximately 600 million, while the EAP in developing countries is expected to increase by 500 million. Again this highlights the significant potential for migration, as the developing world will be essentially adding a labor force that is equal to the size of the developed world's entire labor force over the next decade (Table 2).

2.3 Replacement Migration

The shift in population demographics is believed to be permanent, meaning the world is unlikely to return to one where there are several children for every adult. One possible theory that has been presented to reduce the economic and social burden of an ageing population has been replacement migration. Replacement migration is not a full solution; it must be used in conjunction with raising fertility levels and creating incentives for residents to work longer. However, as a partial solution replacement migration is an important policy tool, and thus a wealth of literature exists on the subject. A United Nations piece, entitled "Replacement Migration: Is it A Solution to Declining and Ageing Populations?" is the most influential and widely discussed paper on the subject. According to the UN, population size and demographics depend on three components: fertility, mortality, and net international migration. As there are no

policies feasible to increase mortality, this leaves only two possible ways to reverse the role of changing population demographics. However, the low-fertility levels of developed countries suggest there is no reason to assume fertility levels will return to above-replacement levels. Furthermore, although many countries have introduced a variety of fertility increasing measures, the long-term effectiveness of such policies is thought to be extremely limited.

The UN creates five different scenarios, but the most relevant is scenario V which is used to compute the number of migrants needed to maintain a healthy ratio of working age to elderly populations, also known as the potential support ratio (PSR). This scenario shows that replacement levels of migration would have to be significantly higher than current levels in order to maintain a PSR of 3 or more. For example, for the EU this calls for almost 2.8 million immigrants a year, which is 9.4 times, expected levels. Keep in mind this is only in order to have a PSR of 3 or more. To maintain current PSR levels the numbers of migrants become so large that the UN considers them unrealistic. The Republic of Korea demonstrates this impossibility, as it calls for 5.1 *billion* migrants needed to maintain its 1995 PSR (Table 3).

Table 3: Net Number of Migrants, 1995-2050, by Scenario and Country or Region (Thousands)

Source: "Replacement Migration: Is It a Solution to Declining and Ageing Populations?"

Not only do these numbers of migrants seem impossibly high, but they do not even solve the problem entirely. As migrants move to other countries and become permanent citizens, they too will age and become eligible for government pension systems. Thus immigration must increase over time or otherwise demographical shifts will continue with each generation. Furthermore, immigration is a highly opinionated topic and many citizens in host countries would be against significantly increased flows of migrants. Critics' complaints are numerous but most often include the charge the immigrants take much-needed jobs for local workers, or that immigrants tend to have higher levels of unemployment and can lead to social problems such as violence and drug abuse (Martin 2009).

2.4   Supply and Demand: Migrant Motivation and the Need for Migrants

There are two major labor market forces today that drive work-based migration. First, many people of working age either cannot find employment or cannot find adequate employment to support themselves and their families in their own countries. Estimates from 2003 show that 1.39 billion people work full time, but are still unable to lift themselves and their families above the $2 USD a day poverty line. Among them, 550 million do not even earn more than the $1 USD extreme poverty line. This correlates to a staggering 49.7% of the world's workers (and 58.7% of the developing world's workers) who are not earning enough to lift themselves above the standard poverty line ("World Employment Report 2004-2005: Chapter 1 Global Trends in Employment, Productivity and Poverty"). Second, some countries have a shortage of workers to fill positions in various sectors of their economies, or their working age population is steadily ageing without adequate replacement levels. These push and pull factors are perhaps the most important, but other factors influence migrations as well, such as demographic change, socio-economic and political crises, and widening wage gaps within, as well as between developed and developing countries (ILO:2007). Put much more simply however, migrants seek opportunity. When looking at rural-urban migration, if people can find opportunities within their own country, they do not cross national borders. This can be seen clearly in China, as there is a significant amount of rural-urban migration within China, but almost no migration from China to other countries. However, when rural-urban migrants cannot find employment opportunities in their own country they are much more likely to cross national boarders (Martin 2009).

2.5   International Migration

While there has been a wealth of information written on specific topics related to migration, there has been surprisingly little done to quantify the patterns of international migration between countries and regions. While both the OECD and UN produce data, these represent a global perspective and lack truly comprehensive and reliable data on bilateral flows of migration. Perhaps the most comprehensive report comes from the World Bank and was written by Parsons et al. (2007). Their report entitled, "Quantifying International Migration: A Database of Bilateral Migrant Stocks" introduces four versions of an international bilateral migration stock database for 226 by 226 countries and territories. Parsons et al. estimate a total of 175.7 million

international migrants using data from 2000-2002, which is consistent with UN estimates at 175 million in 2000. The United States is the largest recipient of migrants with 35 million, or roughly 12.5% of its total population. Australia, Canada, and Saudi Arabia all show higher percentages, while Western Europe is slightly smaller. Looking at developing countries, India, Pakistan, Iran, and Cote d'Ivoire all have high levels of immigration. In regards to emigration, Mexico, Afghanistan and Morocco all show major outflows in proportionate terms, while India and Bangladesh have large emigrate populations in absolute terms. Developed countries are also important sources as well, with the United Kingdom, Germany, Italy and the United States all in the top 15 (Table 4)[1].

Table 4: Share of Migrant Population in Total And from/to Neighboring Country

Top 15 receiving countries*	Number of immigrants	as % of host population	Immigrants from neighboring	% from neighboring
United States	16 554 798	12 5	10 287 882	62 7
Germany	4 146 244	11 2	94 7 91	1
France	6 277 129	13 5	1 274 152	21
India	6 270 005	8 6	5 562 800	42 9
Canada	5 717 001	18 5	465 551	1
Saudi Arabia	5 254 212	24 1	598 412	11 4
UK	4 865 141	8 2	517 000	11 1
Pakistan	4 242 69	3 0	724 253	17 1
Australia	4 517 211	21 5	.	.
Hong Kong	2 753 49	37 7	2 193 425	51 1
Cote d'Ivoire	2 155 005	15 4	1 212 525	51 7
Iran	2 321 453	3 4	2 256 835	95 6
Spain	2 172 217	5 5	5 61 555	24 4
Israel	1 975 102	31 1	34 882	1 5
Jordan	1 365 212	48 5	216 552	11 2
Total	83 033 991	8 9	26 126 434	36 2

[1] The information from table 4 does not include Russia, Ukraine and Kazakhstan, as they are deemed not representative of normal migration behavior. The USSR had significant internal mobility and when it split up many of the people were recorded as migrants.

Top 15 sending countries[1]	Number of emigrants	as % of home population	Emigrants to neighboring	% to neighboring countries
Mexico	11,462,856	11.1	9,517,744	83.0
India	6,395,478	1.0	1,046,792	16.4
Bangladesh	5,631,629	4.1	5,297,203	57.4
China	5,745,674	0.6	2,412,764	42.2
UK	4,145,174	7.1	218,527	5.5
Germany	4,362,118	4.9	976,277	22.5
Philippines	4,575,417	4.9	.	.
Pakistan	3,355,514	2.4	1,360,018	40.2
Italy	4,251,208	7.1	704,625	21.1
Turkey	3,331,152	4.5	184,843	4.2
Afghanistan	2,645,785	9.9	1,997,925	77.4
Morocco	2,614,811	9.0	346,973	13.2
USA	2,254,225	0.8	525,772	27.4
Egypt	2,345,517	3.5	2,163,888	9.4
Algeria	2,355,275	7.1	703,668	4.8
Total	64,720,456	1.5	23,849,282	35.6

2.6   *Leading Theaters of Migration*

While migration is a global demographic phenomenon, some geographic theaters exhibit more intensive and sustained migratory flux, either as sending regions, recipients, or both. These areas are doubling important to elucidating broader migration trends. They represent a large proportion of total migration, and closer examination of their dynamics provides guidance regarding emerging trends elsewhere. We review three salient examples of migration theaters.

Mexico-United States Migration

Looking at specific countries, Mexico, Morocco, and The Philippines prove to be useful case studies for understanding migration patterns because they represent large emigrating countries in three unique regions. Starting first with Mexico, bilateral flows from Mexico to the United States are the largest in the world. The actual number of Mexican migrants into the United States are hard to estimate due to large levels of illegal immigration, but most recent estimates place the total number around 12 million, meaning that approximately 10% of the total Mexican population of 120 million has migrated to the United States. The reasons for such large migration levels are many, but again understanding the population dynamics is an important first step. Back in 1970, Mexico only had a population of 50 million, with 750,000 Mexican migrants in the United States (or 1.5% of the population). However, by 2000 Mexico's population had surged to

twice the size and its migrants to the United States had increased over 13 times, to 10 million (Martin 2009). While rapid population growth in Mexico matched with declining opportunities was partly responsible for this tremendous migrant growth, the overall story is more complex.

Mexico is a rapidly urbanization country, but it still remains poor, especially compared to the United States. Furthermore, Mexico has a large rural population and the Mexican government has struggled with creating formal sector jobs. Moreover, there has been a long history of linkages to the United States labor market (most noticeably the Bracero program from 1942 – 1964). But perhaps the most telling part of the story is that the border between the United States and Mexico separates the largest gap in per capita GNI in the world (The World Bank's indicators place Mexican per capita GNI at $8,340 USD versus $46,040 USD in the United States in 2007). Therefore, for many Mexicans the gain from leaving rural Mexico is quite large and they can often earn wages that are 8 to 10 times larger than ones they would receive domestically. Again the story of migration returns to the story of opportunity. Not only are wages significantly higher just across the border, but also there is a large amount of opportunity demonstrated by the fact that from 2000 to 2006, the employment of Mexicans in the United States rose just as much as formal sector employment in Mexico (Martin 2009).

Morocco-Europe Migration

Morocco has a large emigrant population and people of Moroccan origin have emerged as one of the largest migrant communities in Western Europe. Of Morocco's 31 million people, over 2 million have migrated to Europe alone. Historically, Morocco was a migrant receiving country, but the French Colonization of Algeria (and later Morocco) marked a new era of economic restructuring and Morocco first began to send migrants. During Morocco's colonial period (and immediate post-colonial) it saw steady migration to France and Algeria, but the real story of modern Moroccan migrants began in the 1950's and 1960's during Western Europe's rapid economic growth. This strong economic growth in Europe increased its demand for low-skilled labor, which Morocco was able to supply. During this time, Morocco singed labor recruitment agreements with several European countries including Germany (1963), France (1963), Belgium (1964), and the Netherlands (1969). Between 1965 and 1972, Moroccan emigration exploded, increasing from 30,000 to 300,000 and by 1975 there was an estimated 400,000 migrants (de Haas 2005).

Although these migrants were considered "guest-workers" and their migration only temporary, most migrants did not return after 1973. This was due to failed coups in 1971 and 1972 that produced an era of economic instability and repression. In fact, after the guest worker programs ended in 1973-74, migration continued to increase due to family unification. Moreover, large amounts of migration to Spain and Italy explain why Moroccan emigration has increased despite the end of the original guest worker programs and increasingly restrictive immigration policies. By 2005, Moroccan migrants in Europe totaled approximately 2.3 million, representing a sevenfold increase since 1972. France is home to the largest legal Moroccan migrant community (1,025,000 in 2005), followed by Spain (397,000), The Netherlands (315,000), Italy (287,000), Belgium (215,000), and Germany (99,000) (de Haas 2005).

Most recently, Morocco has emerged as a regional hub for migrants headed to Europe, especially for sub-Saharan Africans. It is estimated that several tens of thousands of sub-Saharan Africans migrate to Spain from Morocco and then into Europe. Once in Morocco, illegal migrants attempt to enter the Spanish cities Cueta and Melilla by scaling the tall boarder fences separating these cities from Morocco. Unfortunately, many sub-Saharan migrants face aggressive Moroccan and Spanish border authorities, and they are often socially and economically marginalized drawing protests from human rights organizations (de Haas 2005).

Future Moroccan migration is expected to continue at high levels, due to high levels of demand for migrant labor in Western Europe matched with high youth unemployment and low wages in Morocco. However this continued drain of working age populations might result in decreased potential for emigration in the long run (de Haas 2005).

Filipino Migration

The Philippines is the largest migrant sending country in Asia, with over 1.7 million legal workers abroad in 2007 according to official sources ("2007 Survey on Overseas Filipinos"). Moreover, migration has become an important element of the Filipino economy and society as over half of Filipinos have worked abroad or have a relative who is or was abroad. The very first Filipino migrants were men, often employed as support personnel by the United States military contractors during the Viet Nam war. However, large levels of migration began as a reaction to oil shocks in 1973-74 that decreased economic growth and produced high levels of

unemployment. While most of the beginning migrants were men, by the early 1980's an increasing share had become women that were going abroad to provide health care in private homes (Martin 2009).

As is often the case, estimating true levels of migrants can be difficult. While the Philippines official, "2007 Survey on Overseas Filipinos" places the total number of migrants at 1.75 million; other sources claim this number is higher. For example, the World Bank estimates the total stock of Filipino migrants at 3.6 million in 2006, and unofficial sources indicate the number could be as high as 8 million (Dilip and Xu 2008 and Collymore 2003). There is also some debate as to which country is home to the most Filipino migrants. According to the Filipino government, Saudi Arabia has the largest migrant community with 19.8% of total overseas Filipino workers (OFWs) in 2007. Other large migrant receiving countries and regions include United Arab Emirates (12.1%), North and South America (9.3%), Europe (9.2%), Hong Kong (6.7%), Singapore (6%), Japan (5.6%) and Taiwan (5.5%) (GOP:2008). The World Bank however estimates that the United States is the top migrant receiving country and Malaysia, Australia, Guam, and The Republic of Korea are also in the top ten (Dilip and Xu 2008). The Filipino government's survey found that there were more male OFWs (50.9%) than females (49.1%) during 2007.

While there is debate among the exact numbers of Filipino migrants, the story of how the Philippines became a large migrant sending country is clear. For several decades the Philippines has seen declining economic indicators. In 1960, the Philippines was the second wealthiest country per capita in Asia, only behind Japan. However due to years of strict import-substitution policy, the Philippines did not enjoy large flows of FDI as did several other Southeast Asian countries. Furthermore, rampant corruption and complicated tax laws have severely limited investment in infrastructure and other pro-growth policies have been routinely blocked in congress leading to a low savings rate and high levels of domestic and foreign debt (Martin 2009). Despite all this, the Philippines is rapidly urbanizing, growing from an urban population of 31.8% in 1970 to 47% in 1990 (SPPR 2004). These high levels of urbanization have lead to crowded cities, and matched with years of economic failures, many rural citizens see migration as an attractive alternative to better their lives.

2.7   Migration Infrastructure

Migration infrastructure plays a key role in facilitating individuals to migrate, because the more streamlined the process is, the easier it is for migrants to move. Migration infrastructure includes any number of institutions such as employers seeking migrants, public employment services that can match local workers with foreign jobs, social networks, and private recruiters. One such example of a public employment service, and arguably the most advanced is in the Philippines, as the Philippine Overseas Employment Administration established in 1982 has become a crucial part of the country's Department of Labor and Employment (Chamie 2009).   However, the overall trend recently has been the decline of direct employer recruitment and public employment, and the rise of migration agents and migration networks.

Migration Agents

Out of all the networks, perhaps the least is known about migration agents, which is unfortunate as agents also have most potential to exploit migrant workers. However Martin (2005 and 2009) has identified three policy recommendations to help ensure agents play an effective role in migration rather than exploit individuals. First, governments must set up enforcement to eliminate corrupt agents by requiring all agents to register themselves with authorities. This includes processes such as requiring agents to past tests of appropriate laws and providing financial security for clients if agents do not fulfill their promises. Second, there must be incentives for legitimate agents to get into migrant brokerage business so that competition will lead to self-regulation and provide ratings. This will grant migrants more options and allow clients to select more legitimate agents.

Third, governments must increase the role of public employment service agencies, which will create minimum standards in recruitment and deployment that must be met by private agents.

Migration Networks

Globalization has played a significant role in shaping migration networks, thanks to the sudden and sharp rise of communications, transportation, and human rights protection. As a result of increased communications, potential migrants can easily and quickly learn about opportunities abroad. Here, the role of social networks is especially important as family members and friends

are easily able to pass along information to others back home in a context that is understandable. The media also plays a part as well, as it can glorify lifestyles in the developed world, which creates strong impressions on a young migrants mind. In an increasingly globalized world, transportation costs have significantly shrunk. Whereas it once took a vast amount of money to cross oceans, today transportation costs are typically less that $2,500 to travel anywhere in the world legally, and $1,000 to $20,000 to cross borders illegally (Martin 2009). Although $20,000 still represents a large amount to poor individuals, migrants are able to pay back high smuggling fees generally within two to three years, representing a drastically shorter payback time than many years ago (Kyle and Koslowski 2001). Finally, human rights increases have allowed migrants more protection after immigrating. Many of the large migrant receiving countries have ratified different resolutions from the UN, ILO, and other conventions, which grant basic human rights to migrants. This gives further incentives to migrants as it allows them to stay in foreign countries longer and receive numerous social safety nets while awaiting decisions on their applications for asylum (Martin 2009).

2.8   *Migration and the 2008-2009 Global Recession*

The recession that began in the United States in December 2007 and has spread to the global economy has many implications for migration. Although in the long run, migration trends can be expected to continue, the recession will surely affect migration flows in the near future. Generally speaking, the migration of individuals to developed countries is expected to slow both from employers requesting fewer workers as a result of job losses, and some governments halting the direct recruitment of foreign workers.

In terms of migrant stocks, there is insignificant data to prove that the number of migrants in developed countries has declined so far. However, return migration is believed to correlate more with the economic, social, and political development in the countries of origin, than with the economic conditions in receiving countries. Therefore, it is believed that migrant stocks should not decline significantly, especially if migrant-sending countries' economies are shrinking as well. That being said, many immigrants are vulnerable during recessions as they are generally young, have lower levels of education, and have made recent entry into the labor force, which are all characteristics of the labor force that will be hit the hardest.

Moreover, immigrants are also highly overrepresented in many of industries that have experienced large job losses, such as construction, manufacturing, leisure and hospitality, and support and personal services. Conversely however, immigrants (especially recent immigrants) may be able to adjust more quickly than native-born workers because they are better suited to change industries and jobs, as well as relocate residency, as they often do not have established roots. In the United States, legal flows of migrants are expected to continue at the same rate because the process often takes years and the system is notoriously backlogged (Papademetriou and Terrazas 2009).

2.9   Conclusion

While replacement migration may not be a full solution to changing population demographics, it will certainly have a role and migration should be expected to continue. When forecasting future of flows of migrants, key aspects to consider are countries with citizens that stand the most to gain from increased opportunity, proximity to developed or emerging markets, and strong migration infrastructure making the process streamlined and easy.   Over the next several decades, countries that are in the second transitional category discussed earlier (such as numerous countries in Asia and Latin America) will transition into the final and third category. This means that many of these traditionally migrant sending countries will become migrant receiving countries as their populations' age and they become more developed. Those that will fill their role will come from surrounding countries that are in the first transitional category. Africa is the largest country in this category, and therefore its role as an important migrant sending country is surely bound to increase in future decades.

3   Forecasting Migration Patterns in a Global Framework

After an overview of recent migration trends, we examine future patterns of migration with a global economic forecasting model. The framework we use is the Linkage model, established at the World Bank's as its standard tool for economic projections.[2] A state-of-the-art dynamic computable general equilibrium (CGE) model, Linkage has been used extensively over the last decade for long-term economic analysis of structural issues such as the impacts from a potential

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[2] See van der Mensbrugghe (2006) for a detailed description of the standard model.

Doha Round agreement, regional trade agreements, and a variety of leading issues related to growth dynamics. The model was significantly enhanced for the World Bank's annual Global Economic Prospects 2006 to include international migration and remittances. A technical annex below describes the changes to the model and the derivation of the welfare analysis that underpins the key findings emerging from the analysis of changes in the patterns of international migration.

In this study, we update the 2006 GEP projections with more recent and detailed data on migration patterns. The underlying data supporting this update of Linkage was prepared by a joint effort of the Global Trade Analysis Project (GTAP) at Purdue University and researchers based at Sussex University in the UK. GTAP is providing the core data in a format compatible with its global data base. This data provides a bilateral flow of migrants—at both skilled and unskilled level—and the associated matrix of bilateral remittances. This core data is used to calibrate a new set of equations in the Linkage model that incorporates a more complex labor market and includes the new remittance flows. At the moment, the national stocks of migrants are not explained by the model, i.e. they are exogenous.

More specifically, the country specific economic data and the migration database are part of the GTAP release 6.2 posted June, 2006. The data has a 2001 base year and it is evaluated in $2001 at market exchange rates. Using this information, Linkage as used to update its baseline projections from the 2006 analysis in two ways. We revised the baseline scenario to line up with observed history (for GDP and population) through 2008 and the World Bank's forecast for 2009 and beyond. We also revised the PPP exchange rates to be consistent with the ICP estimates. The PPP exchange rates are not incorporated into the base data of the model because, for consistency reasons, Linkage does all of its calculations in $2001. We use the PPP exchange rates to re-evaluate the welfare gains (only for that part of the income migrants get in their new homes that is not remitted.)Though the migration database is part of the GTAP release, most of the underlying data comes from current UN sources, complemented with national sources and reconciled by a team based at Sussex. The result is the most up-to-date, integrated global economic and labor flow database currently available.

3.1 Scenarios for Migration and Economic Growth

Before presenting alternative scenarios for future migration trends, a few observations can usefully be made about how migration affects economic activity. For sending and receiving economies, migration obviously changes absolute and relative labor supplies, but in an international context it should be recognized that migration changes the underlying resource situation and affects international division of labor. To the extent that migration permits more efficient international matching of factors of production within economies, both national and global real output can rise. This fact is often overlooked in the political debate about immigrants displacing domestic workers and emigrants depleting stocks of domestic human capital (e.g. brain drain).

While migration itself is influenced by many complex institutional factors, it is useful to distinguish between two generic types, associated with different basic impetus to migrate. The first can be termed opportunity migration, where movement is motivated by a real or perceived difference in the real return to one's human capital. The second major impetus can be called distress migration, where movement is motivated by aversion to negative local circumstances, including crisis, persecution, or something else that drives a migrant out without direct reference to relative economic returns. Of course there are many intermediate cases between a detached rate of return decision and blind flight from adversity, but in our analysis we focus on the first category since it is thought to represent the primary determinant of modern international migration.

Opportunity migration is important to the global economy because it reflects underlying inefficiencies in global factor markets. In other words, in a world with no barriers to the flow of goods, services, and capital, long term efficiency would be attained along with factor price equalization. In the real world, substantial and persistent real wage differences exist for the same labor capabilities, and for this reason opportunity migration can bring output closer to its potential. For example, replacement migration discussed earlier represents relative labor scarcity induced by declining working age populations, and this scarcity is accompanied by a wage premium relative to that of eligible workers in sending countries. If the latter migrate, they capture the opportunity for higher real living standards, but also expand production possibilities

for the destination economy. The may be an offsetting decline in the sending country, but the migrant's higher real returns may also increase origin country income via remittances.

More generally, returns to capital between countries differ in ways that suggest mobility of this factor is much more limited that it would be under assumptions of perfect competition. This may be because of national risk factors or other institutional realties that markets are discounting, but in any case labor mobility can at least partially offset these distortions and other market failures to increase productive efficiency.

Obviously, these are complex interactions, and their ultimate economic impacts must be seen as an empirical question. For this reason, we apply the Linkage model, evaluating scenarios for changing destination workforces, with corresponding induced migration flows, to determine their economic impacts on sending and receiving countries, as well as the global economy. As we have already mentioned, the stocks and flows of migrants (i.e. individual decisions to participate in the labor force and to migrate) are not modeled in Linkage but taken as exogenous.

To take account of uncertainties regarding actual flows, we assess several alternatives. The reference scenario calls for increasing in the number of migrants from low and middle income sending countries to achieve a fixed percent increase in high income country labor forces. To be precise, we model this by assuming that the stock of migrants in each destination country rises, above the baseline stock in a given year, by the amount required to increase the *total domestic work force* by a specified percent, debiting the working population in the sending countries by the same amount. Thus the stock changes in the destination countries are exogenously, while labor stock and outbound migrant flow changes from sending countries are calculated residually from baseline shares. Finally, we assume this process is phased in (linearly) over the ten period 2010-2020, with destination stocks at the fixed higher percent over 2020-2025.

We assess four alternatives to Business as Usual (BAU, meaning constant shares of migrants in the destination population) over the period 2010-2025, assuming institutional or other events change the eligibility and impetus for migration. In particular, Scenarios 1 assumes migrant flows from low and middle income to high income countries rise to achieve 5% growth of the total destination labor force between 2010 and 2020 (respectively) and remain at these levels until 2025. These results are then "bracketed" by scenarios for flows that achieve destination

total workforce growth of 3% and 8%, respectively. Finally, a fourth scenario assumes the trend runs in reverse, with global <u>migration flows</u> shrinking by -50% over the same time intervals.

3.2   Results

The following tables summarize macroeconomic impacts of the migration scenarios set forth above. Although the GTAP database details over 100 distinct economies and regions, for convenience we consider two generic classes of economies as global groups. The acronym HIC denotes the high income countries, basically represented by the OECD. The remainder of the global economy is comprised of Lower and Middle Income Countries (LMIC). For a given migration scenario, the primary macroeconomic impacts are measureable in terms of domestic real income and consumption, private and public, as well as international transfers effected by migrant remittances. These are detailed in the tables.

Consider for example Table 5, which represents the 5% trend increase in global migration. In this case, by 2025, we see that the global economy benefits substantially from expanded migration activity. In particular, global real income would be nearly one trillion USD higher by 2025. Both HIC and LMIC benefit in real income and consumption terms, although incumbent migrants in HIC experience lower incomes because of wage competition from new migrants. For natives in HIC, domestic income rises because new migrants increase real output potential.

New migrants also finance a substantial amount of new government spending in their destination economies, equal to over one third (153/539) of their own income gains. Because their real incomes fall, prior migrants reduce their remittances (35 billion), but these outflows are more than offset by new migrant remittances (-156 billion). The latter make a vital contribution to their economies of origin, equal to over 60% (156/212) of real consumption growth there. In this way, new migrants more than compensate for their absence. Meanwhile, the actual economic benefit to new migrants may be overstated by comparing their new consumption levels to prior home consumption, where one USD has greater purchasing power. The second sub-table brackets this welfare effect by discounting the new migrant consumption and income differences by PPP. In reality the welfare effect will be somewhere in between these outcomes, but qualitatively they are completely in agreement.

In comparison to the original (2006) World Bank results, there are two major differences in the present analysis:

1. The baseline is quite different with lower growth in the HICs and higher in the developing. This reduces the gap in net wage compared to the 2006 baseline and therefore lowers the overall gains. At the world level, the net gains decline from $356 billion (in 2005, PPP adjusted, see Table 2.3 page 34 in GEP 06), to $300 billion.

2. The switch to the new PPPs takes it back to $355 billion (I did not target this!). Since the new PPPs exhibit higher prices in developing countries than the old PPPs, the PPP adjustment is reduced. (If a HH gained $9000--with a PPP of 4, the gain was reduced to $2250, with a PPP of 2.5 the gain is now $3600. We can produce a table showing the changes in PPP by region and showing the 'migration' weighted change in the PPP. In the US for example, where most of the migrants are from Mexico and Central America, the PPP change was pretty minor.)

Table 5: Macroeconomic Effects of 5% Destination Workforce Growth[3]

(differences from baseline in 2025)

Billions of 2006 USD		Consumption			Income	Remittance
		Private	Public	Total		
HIC	Natives	194	-4	190	189	1
	Prior Migrants	-130	0	-130	-165	35
	New Migrants	539	153	692	848	-156
LMIC	Natives	188	24	212	92	120
Global		791	173	964	964	0

PPP 2006 USD Billions		Consumption			Income	Remittance
		Private	Public	Total		
HIC	Natives	194	-4	190	189	1
	Prior Migrants	-130	0	-130	-165	35
	New Migrants	237	62	299	456	-156
LMIC	Natives	188	24	212	92	120
Global		490	81	571	571	0

To appraise the relative magnitudes of scenario changes and outcomes, we conducted two sensitivity comparison experiments, varying the growth rate of migration to achieve total destination labor force growth of 3% and 8% respectively. The counterpart results are presented in Tables 6 and 7 below. While all effects are essentially monotonic in the magnitude of migration flows, one might expect the benefits to rise at a decreasing rate because of diminishing returns. Figure 2 compares three important impact variables across the three scenarios, HIC and LMIC aggregate incomes and total Remittances, each measured as real (2006) USD variation

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[3] *This scenario assumes that the stock of migrants in each destination country rises by the amount required to increase the total domestic work force of the destination country by 5 percent between 2010 and 2020 and remains constant between 2020 and 2025, implying a significant rise in the number of migrants as a share of the population in the destination country . The alternative baseline scenario assumes that migrants as a share of the population at destination remain constant between 2010 and 2025. The difference in outcomes (consumption and income levels in the year 2025) under both scenarios are then compared for migrants and natives to yield net gains or losses for each group.*

from baseline trends in the year 2025. Because of scale disparity between the two economic regions, two different axes are used (left for HIC and right for LMIC and remittances).

Table 6: Macroeconomic Effects of 3% Destination Workforce Growth (differences from baseline in 2025)

		Consumption				
Billions of 2006 USD		**Private**	**Public**	**Total**	**Income**	**Remittance**
HIC	Natives	121	-4	117	116	1
	Prior Migrants	-89	0	-89	-113	24
	New Migrants	345	97	443	542	-100
LMIC	Natives	119	15	134	58	75
Global		496	108	604	604	0

		Consumption				
PPP 2006 USD Billions		**Private**	**Public**	**Total**	**Income**	**Remittance**
HIC	Natives	121	-4	117	116	1
	Prior Migrants	-89	0	-89	-113	24
	New Migrants	153	40	193	293	-100
LMIC	Natives	119	15	134	58	75
Global		304	51	355	355	0

Table 7: Macroeconomic Effects of 8% Destination Workforce Growth (differences from baseline in 2025)

		Consumption				
Billions of 2006 USD		**Private**	**Public**	**Total**	**Income**	**Remittance**
HIC	Natives	299	-2	297	295	2
	Prior Migrants	-178	0	-179	-227	48
	New Migrants	798	227	1,025	1,258	-232

		281	38	319	136	183
LMIC	Natives	281	38	319	136	183
Global		1,200	262	1,462	1,462	0

		Consumption				
PPP 2006 USD Billions		**Private**	**Public**	**Total**	**Income**	**Remittance**
HIC	**Natives**	299	-2	297	295	2
	Prior Migrants	-178	0	-179	-227	48
	New Migrants	347	90	437	670	-232
LMIC	**Natives**	281	38	319	136	183
Global		748	125	874	874	0

Figure 1: Scenario Comparison of Macroeconomic Aggregates
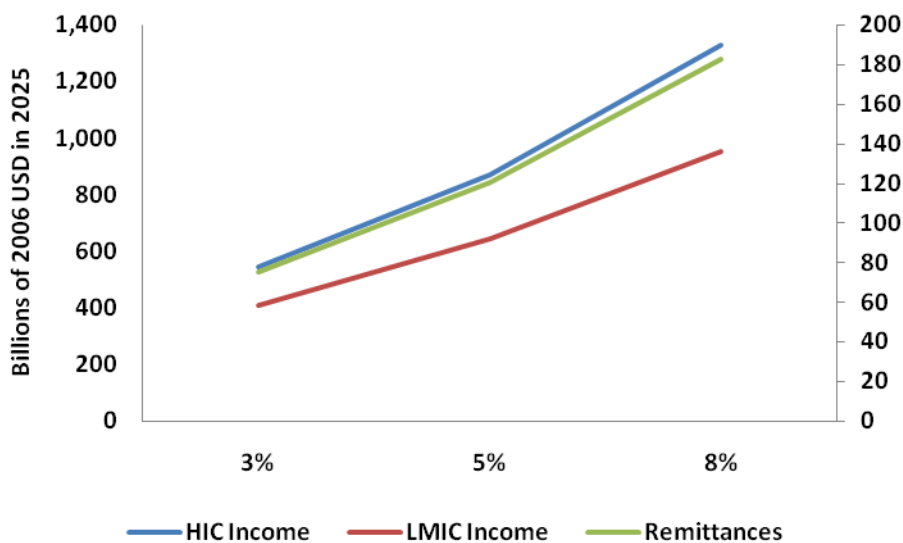
Several important insights emerge from this sensitivity exercise. Firstly, aggregate benefits to the HIC countries are much larger in all scenarios. Second, the gains to both regions increase at an increasing rate with the scale of migration. This suggests that unexploited global factor market efficiencies are far from being fully realized. Moreover, the benefits to HIC are clearly the driver of the other two outcomes, accelerating remittances with commensurate income growth in the sending countries.

Table 8: Macroeconomic Effects of 50% Migration Reduction (differences from baseline in 2025)

		Consumption				
Billions of 2006 USD		**Private**	**Public**	**Total**	**Income**	**Remitance**
HIC	**Natives**	-159	-528	-687	-687	-1
	Prior Migrants	209	-39	170	225	-55
	New Migrants	1,328	378	1,706	2,083	-377
LMIC	**Natives**	386	55	441	8	433
Global		1,764	-134	1,630	1,630	0

		Consumption				
PPP 2006 USD Billions		**Private**	**Public**	**Total**	**Income**	**Remitance**
HIC	**Natives**	-159	-528	-687	-687	-1
	Prior Migrants	209	-39	170	225	-55
	New Migrants	613	162	775	1,152	-377
LMIC	**Natives**	386	55	441	8	433
Global		1,048	-350	698	698	0

As an alternative reference case, we consider the consequences of substantially reducing migration flows. For this scenario, we assume that migration falls from baseline trends by a full 50%, declining linearly between 2010 and 2020 and remaining constant at half of baseline values for 2021-2025. As the results in Table 8 indicate, the projections strongly support the economic fundamentals behind international migration, but the impacts on different stakeholders are asymmetric. In particular, HIC native populations are actually worse off and incumbent migrants better off, the opposite of the expanding migration scenarios, while new migrants gain even more.

The reason for these variegated results is symmetry in the underlying factor market adjustments. Simply put, reducing migration raises the premium on migrant labor in the destination countries, while lowering the relative return to capital. The first effect makes for higher real income, consumption, and remittances for migrants of both types. For HIC native populations, the

negative capital income effect dominates the wage effect of reduced competition from migrants. It is perhaps ironic that reducing labor competition is more beneficial to migrants, who lack the capital income and thereby gain absolutely from rising relative wages. Of course one of the primary demand drivers for migrants is .the desire to profit from using capital resources more fully within high income economies. In OECD economies, pension schemes guarantee that a significant part of these profits accrue indirectly to native workers.

Taken together, these results strongly support the argument that migration has the expected effects on global real economic activity, improving the efficiency of international resource allocation for the benefit of both sending and receiving countries. Of course these reassuring aggregate results mask more complex interactions in domestic labor markets, and there will inevitably be both winners and losers from the ensuing structural adjustments. Having said this, the existence of substantial aggregate gains, particularly new fiscal resources for the public sector, suggests the prospect of adjustment assistance to offset adverse impacts.

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5   Annex – Adapting the Linkage Model for Migration Studies

Labor demand

The largest change to the model is on the side of labor demand. The standard version of Linkage has labor as a uniform factor of production with a single wage rate (per type of worker, i.e. skilled vs. unskilled). The new version of the model identifies workers with an additional index, i.e. region of origin, including 'natives' as a separate 'region'.[4]

Labor demand by sector is handled the same way as in the standard model, but it is now for a bundle of labor that is composed of a mix of natives and migrants. The model employs a nested CES structure to derive the demand for labor down to the origin of each worker. First, within the sectoral demand for labor, there is a breakdown of total labor demand between native workers and foreign-born workers.[5] At this level of decomposition native workers can also include foreign-born workers, i.e. close substitutes with natives. This is user-determined, By default, in developed countries the 'native' worker bundle includes all migrants from other developed countries and the 'foreign-born' bundle includes all migrants from developing countries. The opposite is true in developing countries. All developing country migrants are mapped to the 'native' bundle and all developed country migrants are mapped to the 'foreign-born' bundle. Figures 1 and 2 depict the decomposition of labor demand by region of origin.

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[4] In composite regions such as the European Union there will be both 'native' workers that includes all of those born within the European Union as well as European migrant workers, i.e. those born in the European Union but that are considered migrants since they don't work in their country of origin, for example an Italian that is working in France.
[5] Note that there is nothing in the data that allows for this decomposition at the sectoral level, i.e. the share parameters are determined at the national level and applied uniformly across sectors. The model can handle sectoral differences were data to become available.

Figure 2: Labor decomposition in high-income countries
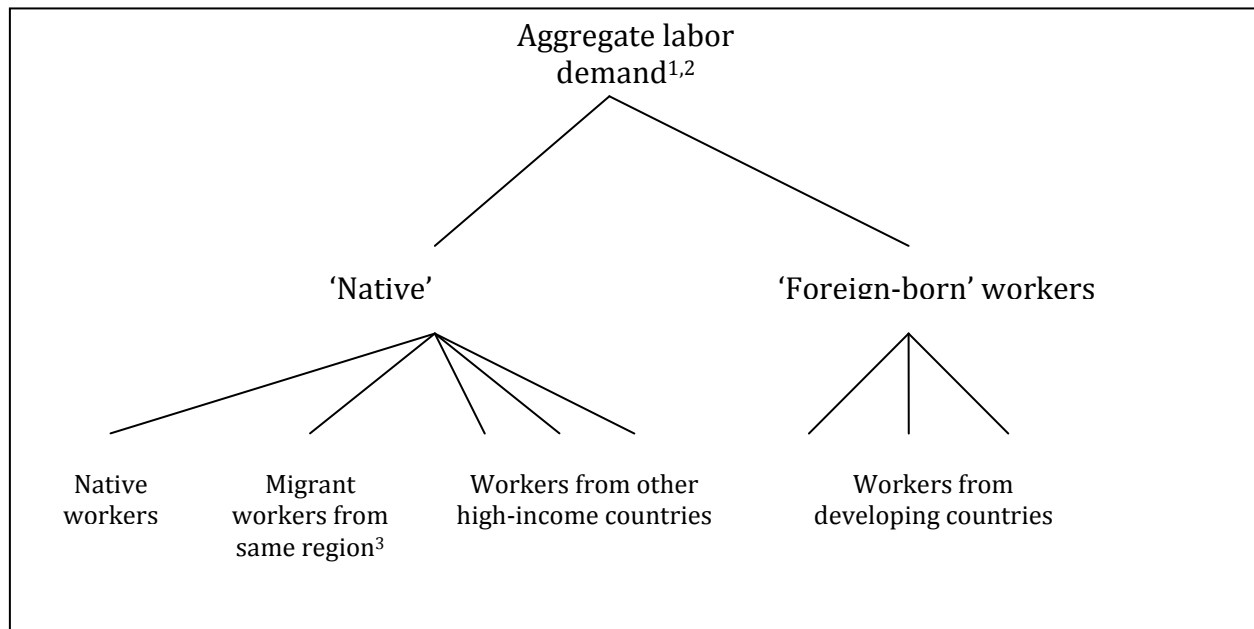
Notes: 1. Top-level CES nest is sector-specific. The second level nest is specified at the national level.

2. The model allows for perfect substitutability in which case efficiency wages are uniform.

3. Composite regions are likely to have migrant workers from the same region due to aggregation, for example Italians working in France.

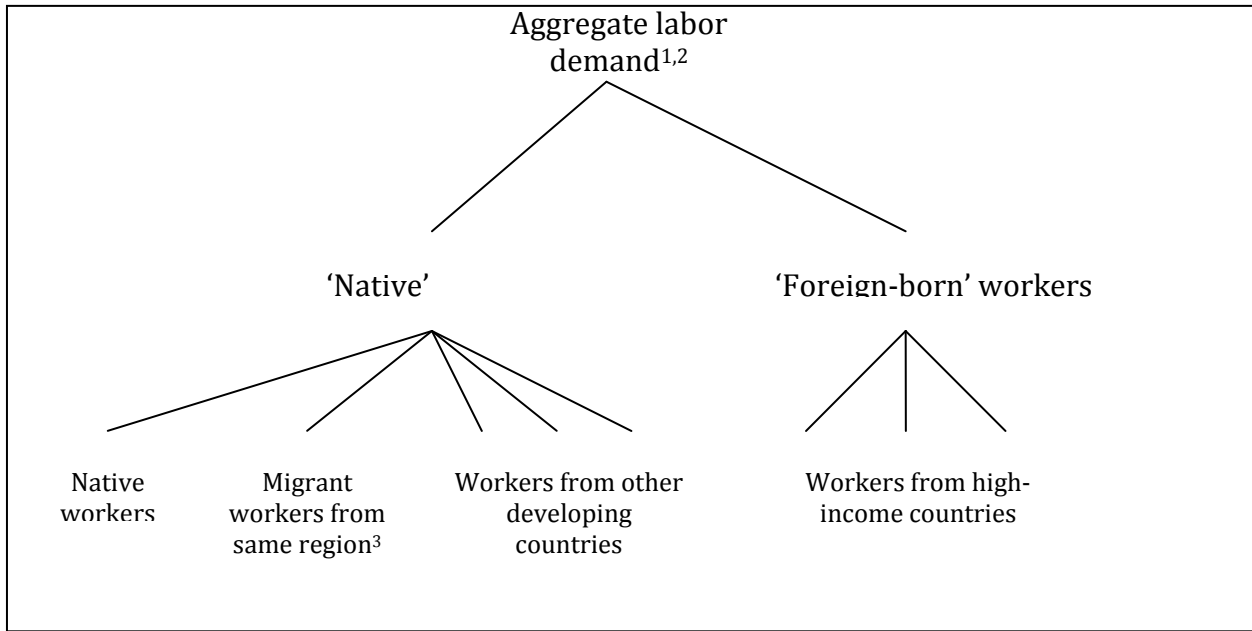**Figure 3: Labor decomposition in developing countries**

Notes: 1. Top-level CES nest is sector-specific. The second level nest is specified at the national level.

2. The model allows for perfect substitutability in which case efficiency wages are uniform.

3. Composite regions are likely to have migrant workers from the same region due to aggregation, for example Nicaraguans working in El Salvador in the Central American region.

Let SL^d represent aggregate labor demand in each sector, then the first nest, done at the sector level is to decompose this bundle into 'native' and 'foreign-born' components, indexed by s. The first part of equation (1) specifies the sectoral demand for the 'native' and 'foreign-born' bundles, SLS^d, where SL^d is aggregate labor demand by sector, with an average sectoral wage given by SW, the individual bundles receive the wage SWS and the degree of substitution between the two bundles is given by ^{l}. The index r represents the region (country) of employment, l is the skill level, i is the sector, and s is either 'ntv' for the native bundle or 'fbn' for the foreign-born bundle. The parameter ^{l} represents an efficiency parameter that corrects for differences in base year average returns. The model allows for perfect substitution between the

two bundles. In this case, the first order CES condition is replaced with the law-of-one price, adjusted by any differences in efficiency.

Equation (2) represents the aggregation condition for sectoral labor, here transformed into the CES dual price formulation in the case of a finite elasticity. For an infinite elasticity, the aggregation expression is simply the sum of the two bundles in efficiency units.[6]

$$
(1) \quad
\begin{cases}
SLS^d_{r,l,i,s} = \alpha^{slds}_{r,l,i,s} \dfrac{SL^d_{r,l,i}}{\gamma^l_{r,l,i,s}} \left(\dfrac{\gamma^l_{r,l,i,s} SW_{r,l,i}}{SWS_{r,l,i,s}} \right)^{\sigma^l_{r,l,i}} & \text{if} \quad \sigma^l_{r,l,i} \neq \infty \\[2ex]
SWS_{r,l,i,s} = \gamma^l_{r,l,i,s} SW_{r,l,i} & \text{if} \quad \sigma^l_{r,l,i} = \infty
\end{cases}
$$

$$
(2) \quad
\begin{cases}
SW_{r,l,i} = \left[\displaystyle\sum_s \alpha^{slds}_{r,l,i,s} \left(\dfrac{SWS_{r,l,i,s}}{\gamma^l_{r,l,i,s}} \right)^{1-\sigma^l_{r,l,i}} \right]^{1/(1-\sigma^l_{r,l,i})} & \text{if} \quad \sigma^l_{r,l,i} \neq \infty \\[2ex]
SL^d_{r,l,i} = \displaystyle\sum_s \gamma^l_{r,l,i,s} SLS^d_{r,l,i,s} & \text{if} \quad \sigma^l_{r,l,i} = \infty
\end{cases}
$$

The two respective bundles are now decomposed by region of origin (including natives). First, the 'ntv' and 'fbn' bundles are aggregated across sectors—since it is assumed that their decomposition by region of origin is not sector-specific.[7] Equation (3) determines the national total demand for the two bundles, TLS^d, by summing across all sectors. The decomposition by region of origin is then given by equation (5) where TLR^d represents the demand for labor (of skill l) from region rt (that encompasses natives and every country/region being modeled) in country/region of employment r. There is a mapping of rt to either of the two bundles indexed by s that is specific to each region as described above. The average wage for the 'ntv' and 'fbn' bundles is given by TWS and is uniform across sectors, with the nominal wage paid to each worker given by W. There is an efficiency parameter that adjusts for base year wage differentials

---

[6] Note that both equations can be collapsed to a single revenue equation that holds irrespective of the elasticity value, i.e.

$$
SW_{r,l,i} SL^d_{r,l,i} = \sum_s SWS_{r,l,i,s} SLS^d_{r,l,i,s}
$$

[7] Anecdotal evidence certainly suggests that workers from specific regions work in specific sectors, perhaps as a result of tradition, self-selection, social network effects, or other reasons. However, there is no data currently available in the global context to support such a sectoral decomposition of labor by region of origin.

across workers. As above, the model allows for perfect substitutability in which case the demand equation is replaced by the law-of-one price (efficiency adjusted). Equation (5) represents the aggregation expressions for both the finite and infinite substitution possibilities where in the case of the former, the CES dual price expression replaces the primal aggregation function. Equation (6) is the dual of equation (3), i.e. it sets the uniform sectoral price of the labor demand bundles.

$$(3) \qquad TLS_{r,l,s}^{d} = \sum_{i} SLS_{r,l,i,s}^{d}$$

$$(4) \qquad \begin{cases} TLR_{r,l,rt}^{d} = \alpha_{r,l,rt}^{tlr} \dfrac{TLS_{r,l,s}^{d}}{\lambda_{r,l,rt}^{eff}} \left(\dfrac{\lambda_{r,l,rt}^{eff} TWS_{r,l,s}}{W_{r,l,rt}} \right)^{\sigma_{r,l,s}^{lz}} & \text{if} \quad \sigma_{r,l,s}^{lz} \neq \infty, rt(r) \in s(r) \\[2ex] W_{r,l,rt} = \lambda_{r,l,rt}^{eff} TWS_{r,l,s} & \text{if} \quad \sigma_{r,l,s}^{lz} = \infty, rt(r) \in s(r) \end{cases}$$

$$(5) \qquad \begin{cases} TWS_{r,l,s} = \left[\displaystyle\sum_{rt(r) \in s(r)} \alpha_{r,l,rt}^{tlr} \left(\dfrac{W_{r,l,rt}}{\lambda_{r,l,rt}^{eff}} \right)^{1-\sigma_{r,l,s}^{lz}} \right]^{1/(1-\sigma_{r,l,s}^{lz})} & \text{if} \quad \sigma_{r,l,s}^{lz} \neq \infty \\[2ex] TLS_{r,l,s}^{d} = \displaystyle\sum_{rt(r) \in s(r)} \lambda_{r,l,rt}^{eff} TLR_{r,l,rt}^{d} & \text{if} \quad \sigma_{r,l,s}^{lz} = \infty \end{cases}$$

$$(6) \qquad SWS_{r,l,i,s} = TWS_{r,l,s}$$

Wages are assumed flexible and supply is fixed in any given period, hence equation (7) reflects the labor market equilibrium condition. This closes the labor side of the changes to the model (apart from changes needed to income distribution expressions).

$$(7) \qquad TLR_{r,l,rt}^{d} = TLR_{r,l,rt}^{s}$$

The only other change to the model is the incorporation of remittances. These are bilateral and are fixed (using base year levels) as a share of labor income, equation (8). Note that in equation (8) the index *r'* is used instead of *rt*. The set *r'* is a subset of *rt* that excludes natives.

$$(8) \qquad RMT_{r,l,r'} = \alpha_{r,l,r'}^{rmt} W_{r,l,r'} TLR_{r,l,r'}^{d}$$

Welfare decomposition

Income is defined for each 3-tuplet identified by the region of destination, *r*, the skill level, *l*, and the source region (or region of origin), *rt*. The set *rt* encompasses all of the model's regions plus

so-called 'native' workers. Labor income is unambiguously identified in the model as the product of the market wage times the quantity of labor for each (l,rt) pair in region r, equation (1). Net labor income is somewhat more difficult to determine since nothing in the data or in the model allows us to identify household (or worker) specific direct tax rates. In the default welfare decomposition it is assumed that all workers pay the same uniform tax and thus net labor income is simply the tax-adjusted total labor income, equation (2).

The allocation of capital income across households requires additional assumptions. Aggregate capital income equals income from capital, land and other factors of production, equation (3). It is allocated to workers, (l,rt) pair according to the distribution matrix given by ^{y}. In the default welfare decomposition, it is assumed that all capital income accrues to native households in proportion to their labor income. Net capital income is equal to the total adjusted for direct taxes.

The final source of income is remittances. It is assumed that all incoming remittances accrue to native households only and within the same skill group, i.e. skilled workers send back remittances to skilled native households, etc. Equation (5) represents the incoming remittance income for natives, where the remittance share matrix (as a share of labor income earned abroad) is calibrated to base year flows. Notice the inversion of the region indices. Equation (5) represents the flow of remittances into region r from all of the other regions. The variable L^s represents the baseline (or BaU) level of migrants, whereas $Migr^{New}$ represents the new migrants from the shock scenario. In the baseline $Migr^{New}$ is 0 and therefore equation (5) holds for all scenarios. Equation (6) represents out remittances, the flip side of in remittances—for only the migrants in the baseline, not the new migrants.

$$(1) \qquad LabY^t_{r,l,rt} = W_{r,l,rt} L^s_{r,l,rt}$$

$$(2) \qquad LabY^n_{r,l,rt} = (1 - \chi^k \kappa^h) LabY^t_{r,l,rt}$$

$$(3) \qquad KapY^t_{r,l,rt} = \alpha^y_{r,l,rt} \left[KY + TY + FY - DeprY \right]$$

$$(4) \qquad KapY^n_{r,l,rt} = (1 - \chi^k \kappa^h) KapY^t_{r,l,rt}$$

$$(5) \qquad RMT_{r,l,ntv}^{in} = \sum_{r'} \alpha_{r',l,r}^{rmt} W_{r',l,r} \left(L_{r',l,r,BaU}^{s} + Migr_{r',l,r}^{New} \right)$$

$$(6) \qquad RMT_{r,l,r'}^{out} = \alpha_{r,l,r'}^{rmt} W_{r,l,r'} L_{r,l,r',BaU}^{s}$$

Total nominal after-tax income is therefore:

$$(7) \qquad Y_{r,l,rt} = LabY_{r,l,rt}^{n} + KapY_{r,l,rt}^{n} + RMT_{r,l,rt}^{in} - RMT_{r,l,rt}^{out}$$

It is this amount that is spent on private expenditures on goods and services. These expenditures are deflated and adjusted for PPP differences in subsequent steps. However, before getting to the price adjustments, we add to the welfare calculations the welfare that is derived from public expenditures on goods and services—under various assumptions.

Aggregate government expenditure is given by equation (8).

$$(8) \qquad G_{r} = \sum_{i} PAf_{r,i,Gov} XAf_{r,i,Gov}$$

Two adjustments are made for the welfare calculation. The first adjustment is to calculate government expenditures for the remaining population in the sending countries. Thus for remaining workers in developing countries, government expenditures are determined in equation (9) for the baseline, i.e. the total government expenditure accruing to remaining workers where the first term is the average per capita expenditure in the baseline and the term in brackets represents the population that stays. Equation (10) represents the government expenditures in the baseline on the new migrations (total population, not just the workers).

$$(9) \qquad G_{lmy,BaU} = \frac{\sum_{i} PAf_{lmy,i,Gov} XAf_{lmy,i,Gov}}{\sum_{l}\sum_{rt} Pop_{lmy,l,rt}} \left[\sum_{l}\sum_{rt} Pop_{lmy,l,rt} - \sum_{hic}\sum_{l} MigrPop_{hic,l,lmy}^{New} \right]$$

$$(10) \qquad G_{hic,l,lmy,BaU}^{New} = \frac{\sum_{i} PAf_{lmy,i,Gov} XAf_{lmy,i,Gov}}{\sum_{l}\sum_{rt} Pop_{lmy,l,rt}} MigrPop_{hic,l,lmy}^{New}$$

The next step is to calculate what government expenditures accrue to the new migrants in their new home. There are three options that bracket the possibilities. The default option is fiscal

neutrality, i.e. the new migrants receive public benefits in the same amount as they pay in taxes. On the low end, the alternative assumption is that new migrants receive no public benefits. On the upper end it is assumed that new migrants receive the average across the entire population.

The calculation of taxes paid by the new migrants takes into account indirect as well as direct taxes. Equation (11) provides total taxes paid by the new migrants in developed countries. The first term in brackets per capita taxes including both indirect and direct taxes, and this is applied to each migrant household. Finally, in shock simulations, total government expenditures on natives and 'old' migrants is given by total government expenditures less expenditures on new migrants.

$$(11) \quad G_{hic,l,lmy,Shk}^{New} = \left[\frac{\chi_{hic,l,lmy}^{ind} IndTax_{hic} + \chi_{hic}^{k} \kappa_{hic}^{h} \sum_{l} \sum_{lmy} W_{hic,l,lmy} Migr_{hic,l,lmy}^{New}}{\sum_{l} \sum_{lmy} MigrPop_{hic,l,lmy}^{New}} \right] MigrPop_{hic,l,lmy}^{New}$$

$$(12) \quad G_{hic,Shk} = G_{hic} - \sum_{l} \sum_{lmy} G_{hic,l,lmy,Shk}^{New}$$

Indirect taxes are calculated via residual, i.e. total expenditures less direct taxes (since in this model government savings are zero). The share parameter, cind, represents the share of the new migrants labor income in total labor income.

To summarize—there are two broad regions developed and developing. In the developed regions there are four prototypical households—natives, 'old' high-income migrants, 'old' developing country migrants and 'new' developing country migrants. Welfare of natives and old migrants involves calculating net after tax income plus their share of government expenditures. In developing regions there are three prototypical households—remaining natives and remaining developed and developing country migrants.

The price adjustment for natives—all in the case of developed, and remaining in the case of developing countries, and for the 'old' migrants simply implies taking their nominal expenditures (on private goods and services, savings and public goods and services) and deflating by the consumer price index. Government expenditures are deflated by a separate government expenditure price deflator.

The final adjustment regards price adjustments for new migrants. This is the so-called PPP adjustment. Even if the migrant sees a sharp rise in net take-home pay, prices in the new country for goods and services are also typically much higher as well and it is this price difference that is caught in the PPP exchange rate. This has important implications for welfare analysis and remittances. In some sense, the worst outcome from a (macro) welfare point of view is if the new migrants spend all of their new earnings in their new (and more expensive) countries of employment and residence—because the new earnings, from a welfare point of view, will be discounted by the PPP exchange rate. For example, say income goes from $1000 to $10000, or an increase of $9000 and there is a unique good priced at $1 in the home country but at $3 in the new country. Welfare, instead of increasing by $9000, will increase by $2,333, or only 26% as much without the PPP adjustment.[8] The best outcome from a welfare point of view is to maximize remittances, because these funds are used to purchase 'cheaper' goods and services.[9] To some extent, this is what border migrants benefit from—higher wages in the developed country but living and buying goods in the cheaper home country.

The following set of tables captures these different steps in the decomposition of the welfare gains. Table 1 shows the change in nominal income for sets of households—natives and 'old' migrants from other high-income countries in high-income countries, developing country 'old' migrants in high-income countries, natives and migrants in developing countries that do not migrate and the new migrants. Several findings emerge from this table. First, labor income for natives and 'old' migrants in developed countries decline—though for the natives, this is more than offset by an increase in the returns to relatively scarcer capital. Government expenditures, that are held constant as a share of GDP, decline for these same households because they are spread over a wider population including the new migrants. Total net income drops by around $100 billion for 'old' developing country migrants, somewhat offset by a rise of $88 billion of natives and other high-income migrants.

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[8] The former consumption of $1000 must also be PPP-adjusted, so the original $1000 can only purchase $333 units.
[9] The model and welfare calculations do adjust for real appreciation effects, which in some countries have been observed and can be substantial—perhaps even more so at a sub-regional level.

Developing countries benefit from two channels. First, the now scarcer labor enjoys greater returns, to the tune of $148 billion, offset only marginally by a decline in returns to capital. The second channel is net remittance increases, some $77 billion in nominal terms. Government expenditures for the remaining population also increase since they are constant as a share of GDP.

The new migrants see a huge increase in net nominal labor income—almost $500 billion. Nearly 20 percent of this is sent back to their home countries. They also benefit from an increase in government expenditures of some $144 billion, bringing their net income increase in nominal terms to $520 billion. For the world as a whole, the aggregate benefit from more efficient international labor allocation is $765 billion.

Table A1: Increase in nominal expenditures on private and public goods and services, $2001 million

	Capital	Labor	Remit-tances	Sub-total	Govern ment	Total
Developed countries						
Natives and other high income migrants	228	-88	1	141	-52	88
Developing country migrants	0	-118	22	-96	-4	-99
Total	228	-206	22	45	-56	-11
Developing countries						
All households that don't migrate	-9	148	77	217	40	257
New migrants	0	476	-100	376	144	520
Global	219	418	0	637	128	765

When evaluated at constant prices, real income gains decline from $765 billion to $604 billion. In the case of high-income countries, the drop in domestic prices induced by the increased labor raises the gains in real terms—so that instead of a total loss of $11 billion, there is a gain of some $28 billion. For developing countries, the price impacts go in the opposite direction taking their net gains to $134 billion in real terms instead of $257 billion in nominal terms. For the new migrants, the largest single adjustment is the benefit of government services—taking their net down from $520 billion to $443 billion. The price adjustment to remittances is some what surprising since it doesn't have much of an impact. This is due to aggregation across different regions with different propensities to remit and different price impacts.

Table A2: Increase in real expenditures on private and public goods and services, $2001 million

	Capital	Labor	Remit-tances	Sub-total	Govern ment	Total
Developed countries						
Natives and other high income migrants	212	-92	1	121	-4	117
Developing country migrants	0	-112	24	-89	0	-89
Total	212	-204	24	32	-4	28
Developing countries						
All households that don't migrate	-50	94	75	119	15	134
New migrants	0	445	-100	345	97	443
Global	161	334	0	496	108	604

The final adjustment is to the increase in net real income accruing to the new migrants when adjusting for the higher prices in their country of destination. This is shown in Table 3. Most of the entries are identical in both tables 2 and 3 save for the income and government benefit columns. When adjusted for price differentials, income to the new migrants (in real terms) declines from $443 billion to $253 billion and government benefits drop from $97 billion to $40 billion. In total, the net benefit to the new migrants[10] drops to $193 billion from $443 billion, with a final global gain of $355 billion—an increase of 0.7% of relative to the baseline (in 2025).

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[10] Assuming the welfare benefits of the remittances accrue to households in the country of origin and not the migrant.

Table A3: Increase in real expenditures on private and public goods and services with PPP adjustment, $2001 million

	Capital	Labor	Remit-tances	Sub-total	Government	Total
Developed countries						
Natives and other high income migrants	212	-92	1	121	-4	117
Developing country migrants	0	-112	24	-89	0	-89
Total	212	-204	24	32	-4	28
Developing countries						
All households that don't migrate	-50	94	75	119	15	134
New migrants	0	253	-100	153	40	193
Global	161	143	0	304	51	355