OVERVIEW

Çağlar Özden and Maurice Schiff

Introduction

International migration, the movement of people across international boundaries, has enormous economic, social, and cultural implications in both origin and destination countries. It is estimated that some 180 million people (3 percent of the world's population) are living in countries in which they were not born (United Nations 2002). Among these are millions of highly educated people who moved to developed countries from developing countries that already suffer from low levels of human capital and skilled workers.[1] Furthermore, the flow of formal remittances from migrants to their relatives in their country of birth has exhibited a rapid and accelerating rate of growth. The remittance flow has doubled in the last decade, reaching $216 billion in 2004, with $150 billion going to developing countries (Ratha 2005). It surpasses foreign aid and is the largest source of foreign capital for dozens of countries.[2] As a result of these trends, migration issues have increasingly become the focus of attention, both among governments of origin and destination countries, and within the development community.

There has been extensive analysis of the impact of migration on the receiving countries' economies, especially on markets for unskilled labor (see LaLonde and Topel 1997). However, the links between migration and development issues in the sending countries have been somewhat neglected, particularly as far as empirical research is concerned (Borjas 1999). This oversight is partly due to the relatively minor role played by migration in promoting the integration of developing

countries into the world economy in the post–World War II era. In contrast to policies regulating trade and capital flows, immigration policies of destination countries continue to be highly protectionist and explain, in part, the absence of large migration flows, especially when compared with the second half of the nineteenth century. A second reason for this oversight has been the absence of systematic and reliable data on international migration patterns and migrant characteristics at either the aggregate or the household level. Fortunately, such data are finally becoming available. For instance, chapter 5 by Frédéric Docquier and Abdeslam Marfouk introduces the most comprehensive data set on the brain drain to date.

The current demographic trends in both developed and developing countries are pointing toward significant potential economic gains from migration. The labor forces in many developed countries are expected to peak around 2010 and decline by around 5 percent in the following two decades, accompanied by a rapid increase in dependency ratios. Conversely, the labor forces in many developing countries are expanding rapidly, resulting in declines in dependency ratios. This imbalance is likely to create strong demand for workers in developed countries' labor markets, especially for numerous service sectors that can only be supplied locally. There are large north-south wage gaps, however, especially for unskilled and semiskilled labor. The presence of such gaps indicates that liberalization of immigration policies can generate significant welfare gains. For instance, it has been estimated that an increase in the number of migrants equal to 3 percent of the labor force of the Organisation for Economic Co-operation and Development (OECD) countries would result in global welfare gains that surpass those obtained from the removal of all trade barriers, with significant gains for all parties involved (Walmsley and Winters forthcoming; World Bank forthcoming).

Given the size of the potential welfare gains from migration, policies need to be devised to ensure that these gains are not wasted and that their distribution satisfies the sending and receiving countries. Successful design of such policies requires detailed information and should be preceded by a systematic and careful analysis of migration patterns based on solid theory and empirical methodology, as well as lessons from past experiences.

To expand our knowledge on the effects of migration and identify migration policies, regulations, and institutional reforms that will lead to superior development outcomes, the World Bank launched the International Migration and Development Research Program, which is being conducted in the Development Economics Research Group. The Research Program is divided into a number of focus areas. The main ones include (a) the impact of migration and remittances on development indicators, including poverty and inequality, investment (in both human and physical capital), entrepreneurship, and entry into capital-intensive

activities; (b) the brain drain; (c) temporary migration, including under Mode IV of the General Agreement on Trade in Services (GATS); and (d) the links between migration, trade, and foreign direct investment (FDI).[3]

Some of the questions the research program aims to answer are as follows: How does migration affect poverty and growth, especially in the sending countries? Who are the main beneficiaries of migration and main recipients of remittances—the poor who have the most to gain or the middle classes who are more likely to have the resources needed to migrate? What are the effects of migration and remittances on investment in both physical and human capital? What are the determinants of the migration of the highly skilled workers and the effects on destination and source countries?

The eight chapters in this volume present the results of studies conducted in the first stage of the research program. These chapters are divided into two parts. Those in Part 1, ***Migration and Remittances***, examine the determinants of migration, and the impact of migration and remittances on various development indicators and measures of welfare. Among these are poverty and inequality; investments in education, health, housing and other productive activities; entrepreneurship; and child labor and education. The chapters focus on different source countries, use data collected via different methodologies, and employ different econometric tools. Their results, however, are surprisingly consistent.

The chapters in Part 2, ***Brain Drain, Brain Gain, Brain Waste***, focus on issues related to the migration of skilled workers, that is, the brain drain. Despite an extensive body of theoretical literature on the effects of the brain drain, little empirical analysis has been conducted on the topic. In chapter 5, Docquier and Marfouk present the most extensive database on bilateral skilled migration to date. The other chapters examine a number of issues associated with the brain drain that have not been emphasized in the literature so far, uncover a number of interesting and unexpected patterns, and provide answers to some of the debates.

In the next section of this overview, we review each of the eight chapters in this volume by emphasizing their contribution to the migration and development literature and highlighting the answers they provide to ongoing debates. We also call attention to other debates and questions that are likely to occupy the research agenda in the coming years, some of which will be covered in forthcoming volumes.

This volume deals essentially with economically motivated south-north migration. Before turning to the description of the chapters, it should be emphasized that other migration flows—including those by refugees and asylum seekers—are important as well. These flows are typically caused by military conflicts, civil wars, political turmoil, and ethnic and religious repression. Although refugees and asylum seekers constitute a significant share of international migration flows, the topic is not examined here. One reason is that the World Bank has no comparative

advantage in these areas, which are best dealt with by other specialized institutions—including the United Nations High Commissioner for Refugees (UNHCR), the United Nations Educational, Scientific and Cultural Organization (UNESCO), and the International Organization for Migration (IOM).

Although part of south-south migration flows consist of refugees and asylum seekers, much of it is motivated by economic factors, such as migration from Southern African countries to South Africa. Tentative figures suggest that economically motivated south-south migration flows are large, even though data are scarce and quite unreliable. Although economically motivated south-south migration is not examined here, we believe that analyses and approaches presented in this volume may be fruitfully applied to south-south migration.

Overview of the Chapters

In this section, we provide an overview of the main findings presented in the chapters in this volume. Rather than presenting the findings of each chapter individually, we examine some of the most important questions in the academic and policy debate on international migration and provide answers based on the findings in the chapters and in the literature.

What Forces Determine Migration Patterns?

Like most other economic flows, migration operates as an equilibrating mechanism. In the presence of wage inequalities, migration permits greater wage and income equality between sending and receiving regions. International labor mobility is subject to restrictive policies and high migration costs when compared with internal mobility. As a result, income levels exhibit much lower variation domestically than internationally.

The principal cause of south-north migration is, in most cases, the difference in (the present value of) expected real wages, adjusted for migration costs. These costs increase with the distance between source and destination countries, and decline with social networks in the destination country. Literature has identified the importance of networks that provide support and information to migrants who are dealing with difficulties ranging from financing the move to other struggles associated with social and cultural differences, such as language and social norms. Migration flows and remittances would be expected to rise with the difference in expected real wages and decline with migration costs. Based on a sample of 71 countries, Adams and Page (forthcoming) find that migration and remittances decline with the distance between source and destination countries.

The main sources of migrants for the European Union (EU) are the Maghreb, Middle Eastern countries, and the remaining portions of Europe to the east, while

the dominant sources for the United States are Mexico, Central America, and the Caribbean. This is indicative of the importance of distance in migration decisions, and this applies particularly to unskilled migrants who face financial constraints that permit migration only to nearby countries. Furthermore, most migrants have extensive economic and social links with their home countries, which are more difficult to maintain with more distant countries. The presence of a social network in the destination country is a significant catalyst in easing the costs of moving, especially in the transition stage. Various networks, based on family, community, ethnicity, or even nationality, are likely to help with legal barriers, lower search costs regarding jobs and housing, provide additional insurance in case of unanticipated events, and help with cultural alienation.

Chapter 1 by Jorge Mora and J. Edward Taylor contributes to the existing literature in two important dimensions by incorporating alternative destinations (internal or international) and sectors of employment (farm or nonfarm) for migrants from rural Mexico, and by including new community variables as determinants of migration. Using the 2003 National Rural Household Survey of Mexico, Mora and Taylor include individual, family, and community variables in their estimation. These variables have a distinct impact on migration decisions, depending on the destination and sector of employment. For example, schooling has a significant positive effect on internal migration to nonfarm jobs but has no effect on international migration that is predominantly to the United States.

These patterns are due to the fact that most migrants to the United States are employed in unskilled jobs—such as in agriculture, hospitality sectors, and home services—and investment in education (within the range of education levels in rural areas) has no impact on the type of jobs obtained. In other words, schooling in Mexico is more valued—that is, has a higher rate of return—in the domestic labor market than in the United States, a fact also observed in a different context by Çağlar Özden in chapter 7. Conversely, the wage gain is higher for less educated Mexicans who migrate to the United States rather than internally. Mora and Taylor's results parallel those of Ibarraran and Lubotsky (2005) who use the 2000 Mexican Census, and conclude that migrants are less educated than nonmigrants. Finally, migrant networks, work experience, and household wealth have significant positive effects on international migration to both farm and nonfarm sectors.

In chapter 4, David J. McKenzie finds that migrant networks raise the probability that other community members migrate internationally. Using the 1997 National Survey of Demographic Dynamics for Mexico, McKenzie finds that the effect of networks varies across the wealth distribution. If few members of the community have previously migrated, the cost of migration stays high and only relatively wealthy people manage to migrate and benefit from the network. As a larger share of the community migrates, migration costs fall and relatively poorer members migrate and benefit from the larger network as well.

Another contribution of Mora and Taylor's chapter is the analysis of the relationship between internal and international migration, on the one hand, and local economic integration through trade on the other. The analysis of the relationship between international migration and international trade has a long history, while that between local integration through trade and migration does not.[4] The authors find that local economic integration has a significantly positive impact on internal migration to the nonfarm sector but no impact on internal migration to the farm sector or international migration to either sector.

What Are the Effects of Migration and Remittances On Income, Poverty, and Inequality?

The most important development effect of migration is its direct impact on income and poverty levels in the source countries. By allowing workers to move to areas where they are more productive and valued, migration leads to a direct increase in global output and income. It has recently been estimated that increasing immigration to OECD countries by the equivalent of just 3 percent of their labor forces would generate gains that are larger than those obtained from global trade liberalization (Walmsley and Winters forthcoming; World Bank forthcoming). The gains arise mainly from the mobility of less-skilled workers, rather than from more-skilled workers, and accrue to (a) the migrants themselves, (b) to consumers and complementary factors of production (capital, land, and labor, other than the mobile type) in the recipient countries, and (c) to remittance recipients and labor in the sending country.

Remittances generally reduce poverty and alter income distribution, but the extent and direction of these effects depend on who receives them. The existing evidence on this from a variety of countries (the Philippines, the Arab Republic of Egypt, Pakistan, Mexico, India) is somewhat mixed. Among the more reliable and convincing studies are those based on household surveys. For example, the 2003 Mexico National Rural Household Survey suggests that (a) both internal and international remittances have an equalizing effect on incomes in high-migration areas but not in low-migration ones, (b) international remittances reduce rural poverty by more than internal remittances, and (c) the larger the share of households with migrants in a region, the more favorable the effect of increases in remittances on rural poverty (Mora and Taylor 2004). These results are confirmed by López Córdova (2005) who finds, for a sample of 2,400 observations comprising all municipalities in Mexico, that areas with a larger share of households receiving remittances have lower levels of poverty.

Poverty studies typically use several measures. The standard one is the level of poverty or poverty headcount, that is, the share of the population below a certain poverty level. The depth of poverty measures the average value of the gap between

the poverty line and the income of those below that line. The severity of poverty measures the average of the squared gaps, thereby giving more weight to the poorer households. For example, Gustafsson and Makonnen (1993) find that if remittances to Lesotho were completely removed, an additional 11 to 14 percent of households would be classified as poor, with an increase in the associated depth and severity of poverty as well.

Using the 2000 National Household Survey (conducted by the Instituto Nacional de Estadística) in Guatemala, Richard H. Adams Jr. finds in chapter 2 that both internal and international remittances typically reduce the level, depth, and severity of poverty. The greatest impact is on the severity of poverty, because the households in the lowest decile group receive between 50 and 60 percent of their total income from remittances.

Chapter 3 by Dean Yang and Claudia A. Martínez exploits an exogenous event, namely the exchange rate shocks that occurred during Asia's currency crisis in the late 1990s, to examine the impact on poverty in the Philippines. They find that an appreciation of the currency in destination countries relative to the Filipino peso leads to an increase in remittance received by the related households and to a reduction in their poverty. They also find spillover effects to other households, including to those without migrant members, whose poverty falls as well.

In addition to McKenzie's results on the importance of larger migrant networks in raising the probability of other community members migrating, the dynamic patterns he identifies also have important implications for poverty and inequality concerns. For example, inequality tends to increase when migrant networks are small and migration costs are high, because only the better-off community members can afford to migrate. As migration spreads, the increasing network size and associated decline in migration costs enable more of the poorer members to migrate. This tends to reduce poverty and inequality. The evidence suggests that there might be an inverse-U-shaped relationship between migration and inequality.

What is the Impact of Migration and Remittances On Household Human capital (Education, health) and Physical Capital Accumulation, Other Productive Investments, Child Labor and Education, and Entrepreneurship?

After we establish that the remittances increase income levels considerably, especially for the poor, the next question naturally becomes how this income is spent. Remittance recipients typically say that they invest the money received. Because money is fungible, they may simultaneously reduce their investment from other sources of income, so that total investment may increase by less than the investment from remittances or may not increase at all. Glytsos (2002) finds that investment increases with remittances in six of the seven Mediterranean countries he

analyzes. Similar results are shown by Leon-Ledesma and Piracha (2004) for Eastern European countries during the 1990s, by Woodruff and Zenteno (2001) for microenterprises in urban Mexico, and by McCormick and Wahba (2003) for small enterprises in Egypt. There is also substantial evidence of increased housing construction because of increased remittances.

In his seminal paper, Lucas (1987) shows that, in the case of migration to South Africa from neighboring countries' agricultural sector, recipients of remittances worked fewer hours in agriculture but substituted their labor with other inputs, including hired labor, which resulted in an increase in productivity levels. Similarly, Rozelle, Taylor, and de Brauw (1999) look at the joint impact of migration and increased remittances in rural productivity in China. They find that migration has a negative effect caused by reduced family labor but this is again compensated by access to capital through increased remittances.

In addition to increased investment in physical capital because of remittances, investment in human capital (especially via increased education and health/nutrition expenditure) may also increase. The latter is likely to be more important for long-term growth prospects of developing countries. Cox-Edwards and Ureta (2003) show that remittances increase schooling in El Salvador, and that these remittances have a much larger impact on the hazard rate of leaving school—around 10 times higher in urban and 2.6 times higher in rural areas—than other sources of income. Duryea, López Córdova, and Olmedo (2005) find that an increase in the share of households receiving remittances in a municipality results in better schooling and health.

In chapter 2 on Guatemala, Adams analyzes how the receipt of internal and international remittances (from the United States) affects the marginal spending behavior of households on various consumption and investment goods. Adams finds that households receiving remittances spend more on investments (such as education, health, and housing) and less on consumption (food and consumer goods, durables) than do households receiving no remittances. In particular, spending on education, which is a key issue in development efforts, shows important variation. Households receiving internal and international remittances spend at the margin 45 and 58 percent more, respectively, than do households with no remittances. Adams finds that remittance-receiving households spend more at the margin on housing.

Most studies in the literature suffer from a severe endogeneity bias. Even if we observe a positive correlation between migration and remittances on the one hand and investment on the other, we do not know a priori whether investment increased because of migration and remittances—that is, whether migration and remittances cause investment—or whether migration and remittances reflect a prior decision to increase investment, with the migrants selected from a biased sample of households that face better investment opportunities—that is, whether

investment causes migration and remittances. One resolution of this dilemma is to study exogenous changes in migration or remittance flows. The major exchange rate changes of the 1997–98 Asian crises provide such an opportunity, and chapter 3 by Yang and Martínez, which is based on a survey of Filipino households, exploits it successfully. They find that unanticipated increases in remittances lead to enhanced human capital accumulation and entrepreneurship in origin households, with less child labor, greater child schooling, more hours worked in self-employment, and a higher rate of entry into capital-intensive enterprises. The latter is greater for lower-income than for higher-income households, suggesting that this effect is related to alleviation of credit constraints.

Whether such investment stimulates growth remains unproven as yet. Endogenous growth theory is based on the hypothesis that human capital (such as education and health) generates positive externalities (Lucas 1988) and further discussion of this issue is provided in the next section of this overview. Some migration research also suggests that it does generate these positive externalities (Adams and Page forthcoming), while other work suggests that remittances induce reductions in recipients' labor supply (Chami, Fullenkamp, and Jahjah 2005), which the authors interpret as lowering the rate of growth.[5] However, the decline in labor supply because of remittances may lead to higher productivity, as shown by Rozelle, Taylor, and de Brauw (1999) and Lucas (1987).

In chapter 4, McKenzie also looks at the impact of migration, rather than remittances, on education attainment in Mexico, with endogenous migration flows instrumented by historic migration rates, which are shown to be exogenous. Contrary to some of existing studies and other chapters in this volume, he finds that children ages 16 to 18 in migrant households have lower levels of schooling compared with nonmigrant households. McKenzie's result is similar to Mora and Taylor's finding in chapter 1, namely that schooling has no effect on incentives for international migration from rural Mexico. Both results are likely to be due to the special situation of Mexican immigrants in the U.S. labor market. These immigrants tend to be placed in low-skill jobs that do not require education. Thus, people with a greater potential to migrate to the United States have less incentive to invest in education.[6] Whether these results apply to other developing countries that are major sources of migration or whether they are specific to the case of Mexico is an issue that has to be more carefully examined in the future.

What Are the Regional Differences and the Dynamics of the Brain Drain?

Part 2 of the volume focuses on the effects of migration of educated and skilled people from developing to developed countries (the brain drain). The brain drain is one of the most recognizable phrases in the development literature and policy

debates. With economic research providing increased evidence on the importance of human capital in the development process, the brain drain has become one of the more important areas of concern. At the heart of this concern is the view that highly educated workers generate positive externalities for society and these are lost when they emigrate.

Among the positive externalities that are lost with the emigration of educated workers are (a) the positive effects on the productivity of colleagues, employees, and other workers; (b) the provision of key public services with positive externalities, such as education and health, particularly for transmissible diseases; (c) the fiscal externalities associated with the fact that the taxes they pay are larger than the value of the public services they consume and the public funds invested in their education; and (d) their contribution to the debate on important social issues and their impact on policy and institutions.

Reliable and extensive data with which to find answers to the theoretical questions and policy debates on the brain drain have only just become available. A major contribution of the World Bank International Migration and Development Research Program to the brain-drain literature is the new database created by Docquier and Marfouk. This database is presented in chapter 5. Their work represents the most comprehensive and rigorous database on the brain drain to date and provides consistent measures of the brain drain from individual sending countries to individual destination countries—that is, bilateral measures of the brain drain—as well as regional and global aggregations. It is based on census and survey data collected from all OECD destination countries and provides brain-drain figures by education attainment for 1990 and 2000, covering 174 countries for 1990 and 195 countries for 2000 as well as 36 dependent territories.[7] An early version of this database was published in Docquier and Marfouk (2004) and was followed by a brain-drain study by Dumont and Lemaître (2004) for 2000, which covers a smaller number of countries and uses somewhat different definitions of international migration.[8]

The debate on the brain drain and its impact on source and destination countries is an old one and it has been mostly based on theoretical analysis and anecdotal evidence. A database on the 1990 brain drain to the United States was published by Carrington and Detragiache in 1999. Docquier and Marfouk's vastly expanded database in chapter 5 provides comprehensive measures that will enable researchers and policy makers to improve their analysis of the brain drain, obtain valuable insights into its social and economic impact, and improve the design of policies to deal with these issues.

Initial analysis reveals that there are large differences in the regional distributions of the brain drain and their dynamics. For example, the largest number of educated migrants comes from Europe and South and East Asia. The highest

migration rates, in terms of the proportion of the total educated force, are from Africa, the Caribbean, and Central America. Some of the numbers are truly staggering, especially for small and isolated countries. For example, many Central American and island nations in the Caribbean had more than 50 percent of their university-educated citizens living abroad in 2000. Although the share of skilled workers in the total labor force in Sub-Saharan Africa is only 4 percent, these workers comprise more than 40 percent of all migrants. As a result, close to 20 percent of all skilled workers have emigrated out of Sub-Saharan African countries, excluding South Africa.

The situation in Asia is slightly different. Skilled workers account for nearly 50 percent of all migrants. However, because the overall migration rate is much lower for a variety of reasons, only 6 percent of all educated workers have migrated abroad. Chapter 5 also provides interesting insights into the labor markets of receiving OECD countries. For example, in Australia, Canada, and New Zealand, migrants form around 20 percent of the labor force (the percentages are 11.7 percent for the United States and 6.7 percent for the EU). The ratio of immigrants with tertiary education is much higher in the first three countries when compared with the native population, whereas the gap is narrower for the United States and the EU. Another interesting although mostly overlooked fact is that a large number of educated citizens from OECD countries are also migrants. For instance, millions of people from EU countries live abroad, mostly within other EU countries. As a result, the net brain migration to the EU is close to zero, whereas it is quite high for the United States, Canada, Australia, and New Zealand.

What Is the Impact of Migration on the Brain-Drain Induced "Brain Gain"?

In chapter 6, Maurice Schiff provides a critical examination of the main findings of the new brain-drain literature. The new brain-drain literature argues that, because skilled wages are typically higher in destination countries, the brain drain raises the expected benefit from education and induces additional investment in education. The increase in the average level of education is referred to as the "brain gain." A key issue in that literature is the identification of the conditions under which the brain gain dominates the brain drain and results in a net increase in the level of education. This is referred to as a "beneficial brain drain," which is thought to lead to an increase in welfare and growth. Some of the seminal papers in that literature include Mountford (1997); Stark, Helmenstein, and Prskawetz (1997, 1998); and Beine, Docquier, and Rapoport (2001, 2003).

The results of the new brain-drain literature are based on static partial equilibrium analysis and on the assumptions that (a) only skilled individuals

migrate, (b) migrants obtain the same jobs and are paid the same wages as natives with comparable skills, (c) risk-neutral preferences exist; and, for most studies, (d) abilities are homogeneous. Based on partial equilibrium analysis, chapter 6 by Schiff finds that the brain gain is smaller than that obtained in the new brain-drain literature. The reasons for this difference include the following: unskilled individuals also benefit from migration, migrants earn less than natives, individuals are likely to be averse to risk, and abilities are likely to be heterogeneous.

The situation in which migrants earn less than natives with the same skills has been referred to as a "brain waste," a topic that is examined by Özden in chapter 7. An extreme case of brain waste, whereby an increase in education has no impact on the income earned in the destination country, is examined by McKenzie in chapter 4. McKenzie shows that such a situation results in a negative brain gain or net brain loss (over and above the loss because of the brain drain itself).

In chapter 6, Schiff also examines the brain-gain issue from a general equilibrium viewpoint, which also finds a smaller impact on the brain gain and on welfare and growth. This is due to the fact that a brain gain implies that additional resources are allocated to education and fewer resources are available for other uses, including health, so that the human capital gain is likely to be smaller than the brain gain and might even be negative. Moreover, even if the human capital gain is unchanged, some of the other uses such as public goods, and for which fewer resources are available, may also generate positive externalities, implying a smaller impact on welfare and growth. Finally, dynamic partial and general equilibrium analyses show that a beneficial brain drain cannot prevail in the steady state.

Are the Skills of the Skilled Migrants Fully Utilized in the Destination Countries or Is Migration Leading to Brain Waste?

To obtain a deeper understanding of the brain-drain phenomenon, cross-country studies should be complemented by country-level studies. Chapter 7 by Özden deals with the brain drain to the United States. He finds striking differences in the labor market placement among highly educated immigrants from different countries, even after controlling for their age, experience, and education. Specifically, immigrants from Latin America and Eastern Europe are more likely to end up in unskilled jobs in the United States compared with immigrants from Asia, the Middle East, and Sub-Saharan Africa. The placement of educated immigrants in unskilled jobs is referred to as the brain waste. A large part of the variation in the brain waste can be explained by variables that influence human capital in the home country of the immigrants, such as education expenditure.

A second set of factors also affects the skill distribution of migrants. U.S. migration policies and proximity to the United States enable educated Latin American

workers—mainly from Mexico and Central America—to migrate although they might not qualify for skilled jobs. Migration to Western Europe tends to be easier for Africans and Eastern Europeans. As a result, only highly qualified (or the most qualified) migrants—that is, those who can obtain skilled jobs in the United States—from distant countries, will find it in their interest to migrate to the United States because skilled wages and upward mobility are typically higher than in other OECD countries. Conversely, a large share of immigrants, especially those from Latin America who can migrate at a relatively low cost, may not be qualified for skilled jobs in the United States even if they have college degrees. They nevertheless choose to migrate because unskilled wages in the United States are typically higher than skilled wages in their home countries. This observation, employment of educated migrants in unskilled jobs in the destination countries, naturally has important policy implications.

In an extension paper, Mattoo, Neagu, and Özden (2005) argue that another part of the brain waste can be explained by informational asymmetry—that is, by the fact that employers in the United States have limited information about the quality of education in a number of sending countries—and by excessive restrictions to entry in various professions, including medicine and nursing. They recommend that information on the quality of education in the sending countries be improved and disseminated more widely, and that the excessive restrictions imposed by various professional associations be relaxed.

What Are the Contributions of Skilled Migrants and Foreign Students to the Destination Country?

In chapter 8, Gnanaraj Chellaraj, Keith E. Maskus, and Aaditya Mattoo examine the impact of international students and skilled immigration in the United States on innovative activity. The main specification is based on a three-equation model of idea generation in which the dependent variables are total patent applications, patents awarded to U.S. universities, and patents awarded to other U.S. entities, each scaled by the domestic labor force. Results indicate that international graduate students have a significant and positive impact on future patent applications, as well as on future patents awarded to university and nonuniversity institutions, and that skilled immigrants have a similar although substantially smaller impact.

The central estimates indicate that a 10 percent increase in the number of foreign graduate students raises patent applications by 4.7 percent, university patent grants by 5.3 percent, and nonuniversity patent grants by 6.7 percent. Thus, reductions in the inflow of foreign graduate students and skilled migrants to the United States—partly because of increased security concerns following the September 11, 2001, terrorist attacks—are most likely to have significantly negative effects on future U.S. innovative activity.

Implications

This volume covers a diverse range of issues and provides a large number of results that aim to answer some of the questions that are high on the international migration research and policy agenda.

Part 1 of the volume shows that migration and remittances (a) reduce poverty of recipient households, (b) increase investment in human capital (education and health) and other productive activities, (c) reduce child labor and raise child education, and (d) increase entrepreneurship. Additional findings include the fact that (a) the impact of remittances on investment in human capital and other productive activities is greater than that from other sources of income, and (b) income gains may also accrue to households without migrants. Based on these studies, migration and remittances appear to have a positive impact on the development and welfare of the sending countries. Another set of findings pertain to the importance of networks and other community variables as determinants of internal and international migration. This suggests that the design of sending countries' migration policies needs to take these community effects into account.

Part 2 of the book deals with various aspects of the brain drain. Skilled individuals tend to generate benefits for their household and the rest of the society. The research presented in this volume contributes to the debate on the brain drain at many levels: (a) the first and most comprehensive database on the migration patterns by level of education is presented, and the data reveal extremely high brain-drain levels for some of the poorest and more isolated small countries in Sub-Saharan Africa and the Caribbean; (b) the hypothesis of the new brain-drain literature that a brain drain may increase the sending country's level of education and welfare is shown to be unlikely to hold; (c) the skill levels of the jobs held by a large share of the educated migrants are shown to be lower than expected from their level of education, mainly because of the relatively lower quality of their education as well as entry restrictions imposed by various professional associations in the destination country; and (d) foreign students and workers with the appropriate human capital for holding high-skill jobs provide significant positive effects on innovative activity in the United States.

The findings in this volume have a number of implications. Relaxation of restrictions on migration should generate significant welfare gains for both sending and destination countries. Among them is an increased investment in human capital in source countries, a key determinant of long-term development and growth. Excessive restrictions are likely to be very costly, especially for source countries when applied to unskilled migrants, and for destination countries when applied to skilled migrants and students. Given the important gains from migration and remittances for sending countries, governments should aim to reduce or

remove the transactions costs and other barriers to sending remittances, which can be quite substantial.

Linkages between education and migration appear in almost every chapter in this volume, from the impact on education spending in the source country to the brain drain. Given the extent of the brain drain in a number of the poorest developing countries and the large negative impact that the departure of (highly) skilled labor may generate, destination countries that are concerned with these issues should cooperate with these source countries to find solutions to some of these problems.

Once the migrants arrive in the destination country, it is important that their human capital be properly employed for both sending and destination countries, as well as for the migrants themselves. Source countries should improve the quality of the information on their education programs and, in cooperation with destination countries, disseminate that information more widely to potential employers. Doing so would improve the quality of the jobs that educated migrants obtain in destination countries. Also, destination countries and migrants with the appropriate skills would benefit from the relaxation of entry restrictions imposed by various professional associations.

As is true in other areas of the international economic arena, such as trade and capital flows, cooperation and coordination on policy issues by governments is necessary to realize the potential welfare gains for all parties involved. Migration is one area in which there is ample room for improvement.

Future Research

The studies in this volume have addressed two of the major issues—the determinants and impact of migration and remittances, and the brain drain—examined in the International Migration and Development Research Program of the World Bank. Other issues addressed by the World Bank Research Program include temporary migration and Mode IV; the links among FDI, migration, and trade; the brain drain of health care providers; migrants in the destination countries and return migration; and social protection issues. These studies will be published in future volumes.

An important lacuna within the migration and development literature is the absence of high-quality data. Household surveys are among the main data sources used in migration research. The chapters in the first part of this volume rely on data from household surveys conducted by official statistical agencies or as part of the World Bank's Living Standards Measurement Study (LSMS). Although the latter studies include questions on remittances, they were not designed to deal

specifically with migration issues. A major item on the agenda of the World Bank Research Program is the expansion of the migration database. The research program has already generated a more extensive data set of country-level data on the brain drain (chapter 5), and household surveys that include a separate migration module will be conducted in a number of developing countries.

Endnotes

1. This brain drain is generally viewed as having a negative impact on sending countries, although alternative views exist. These are addressed in Part II of the volume.

2. Because of unrecorded remittance flows through formal and informal channels, their true size is likely to be much higher. Note that remittances are generally viewed as having a positive impact on migrant-sending countries, although some have expressed concern about their impact on inequality and the degree to which they are invested. The latter may in part be due to the definition of investment, because it typically excludes investment in human capital (such as education, health, and food in the case of malnutrition).

3. Additional research is being conducted on (a) the economic and other conditions of migrants in the receiving countries; (b) the economic conditions (that is, type of activity, income) of return migrants in their country of origin compared with similar nonmigrants; (c) the brain drain of health care providers; and (d) the links among migration, trade, and FDI. The results of these studies will be published in additional volumes. Other areas of research are carried out in other World Bank units, including security (money laundering and financing terrorism), social protection issues and governance, implications for migration of differential population growth rates in source and destination countries, and social security in destination countries.

4. In a classic paper, Mundell (1957) showed that international trade and migration are substitutes, with barriers to trade generating the same outcomes as equivalent barriers to migration. More recent contributions have shown conditions under which complementarity obtains. Markusen (1983) obtains such results by sequentially changing the basic assumptions of the Heckscher-Ohlin model one by one. Once migration costs are incorporated in the Heckscher-Ohlin model, trade is likely to be a complement to migration (Schiff 1996) or a complement for unskilled labor and a complement for skilled labor migration (Lopez and Schiff 1998). Complementarity is obtained by Rauch and coauthors in a series of papers on the impact of ethnic diasporas on international trade, and it is also obtained when the international provision of services requires establishment (see Rauch 2001 for an extensive review).

5. A reduction in income should not be confused with a reduction in welfare. With leisure being a normal good, an increase in income associated with migration and remittances will result in an increase in the amount of leisure and a reduction in labor supply. Moreover, a reduction in income is a level effect, and it is not clear why or how it should affect the growth rate.

6. The impact of migration on the brain gain in this case is examined in chapter 6.

7. Seminal work by Carrington and Detragiache (1999) resulted in a new data set on the brain drain for 1990. It was, however, limited to the United States as a destination country—with the authors assuming that the brain-drain data for the United States applied to the other OECD countries as well—and to a smaller number of source countries.

8. Docquier and Marfouk's bilateral brain-drain data are available from the editors upon request.

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