

**International Migration, Cross-Border Labor Mobility,  
and Regional Economic Integration in Asia and the Pacific**

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# International Migration, Cross-Border Labor Mobility, and Regional Economic Integration in Asia and the Pacific

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## Abstract

International migration is considered an essential element of economic integration. Yet, the intraregional movement of people and labor in Asia and the Pacific has stagnated in recent years in contrast to the steadily rising flow of goods, services, and investment. This paper examines the key factors driving the movement of people from and within the region using bilateral international migrant stock data and evaluates whether some key indicators of economic integration between origin and destination economies have additive effects on this movement/these movements. Our analysis shows that commonly known determinants such as income differences; population size; and political, geographical, and cultural proximities between the migrant origin and destination countries are associated with greater movement, along with the growing share of older population in destination economies and the similarities in the level of educational attainment. The paper also finds that cross-border migration is affected, in varied directions, by the degree of economic integration between the origin and destination economies, especially through bilateral trade and value chain links. The offshoring of production—and hence jobs and other economic opportunities—to migrant origin countries suppresses out-migration, but the expected rise in the origin country income will eventually promote migration by relaxing financial constraints.

## Keywords

international migration, labor mobility, regional economic integration

## JEL Classification

F22, O15

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## 1 Introduction

According to standard economic theories, the free movement of people contributes to the efficient and productive use of labor and human capital and helps catalyze the transfer of knowledge and skills, which generate dynamic efficiencies. Within Asia and the Pacific, efforts to encourage labor mobility are gaining importance—especially in attracting, retaining, and circulating professional workers—as many economies transition to more skills-based and knowledge-intensive industries. In addition, the region has much to gain from facilitating labor mobility given the expectation of widening labor supply and demand mismatches associated with rapidly aging populations in some countries.

Yet experience shows that the mobility of people in Asia lags when compared to advances in goods, services, and foreign investment. Between 2001 and 2017, the intraregional share of trade in Asia remained high and grew further from 53% to 58%, and that of foreign direct investment (FDI) rose from 47% to 50%. In contrast, the intraregional share of international migration in that period declined from 43% to 35% (ADB 2018). Trade and investment and the buildup of regional value chains over the past two decades could have made movement of labor and natural resources redundant (Ducanes and Abella 2008).

Against this backdrop, this paper examines the patterns and key determinants of movement of people from and within Asia and the Pacific, and explores the association between international migration and the degree of economic integration measured by the flows of goods and investments. Our analysis, based on bilateral international migrant stock data, finds that cross-border migration is affected, in both positive and negative directions, by the degree of economic integration between the origin and destination economies, especially through bilateral trade and value chain links. The offshoring of production—and hence jobs and other economic opportunities—to migrant origin countries suppresses outmigration, but the expected rise in the origin country income will eventually promote migration by relaxing financial constraints. Empirical findings suggest that commonly known determinants of movement such as income differences; population size; and political, geographical and cultural proximities between the migrant origin and destination countries are important drivers of migration in the region and that the growing share of older population in destination economies and the similarities in the level of educational attainment trigger more migration.

The next section presents the trends and patterns of international migration in the region followed by the empirical analysis identifying the determinants of international migration both within and from the region. The analysis part of this paper will be carried out in two steps. First, based on the literature, known contributors to the movement of people are identified and are evaluated as to how they affect migration within Asia and Asia to world. Economic integration indicators are then added as covariates to examine the additive effects. The future direction of international migration and policy implications in the region are thereafter discussed.

## 2 Dynamics of International and Interregional Migration in Asia and the Pacific

The number of international migrants<sup>1</sup> worldwide was 258 million in 2017, more than one-third of whom were from Asia and the Pacific. This makes the region the largest source of international migrants, with its numbers almost doubling from 48.3 million in 1990 to 86.9 million in 2017 (Figure 1). In 2017, India had the most outmigrants with 17 million, followed by the People's Republic of China (PRC) with 10 million. The growth of migration from India and the PRC is notable—in 1990, the emigrant stock of India was 6.7 million and the PRC and 4.2 million. Other key source countries in the region are Bangladesh (7.5 million), Pakistan (6 million), and the Philippines (5.7 million).

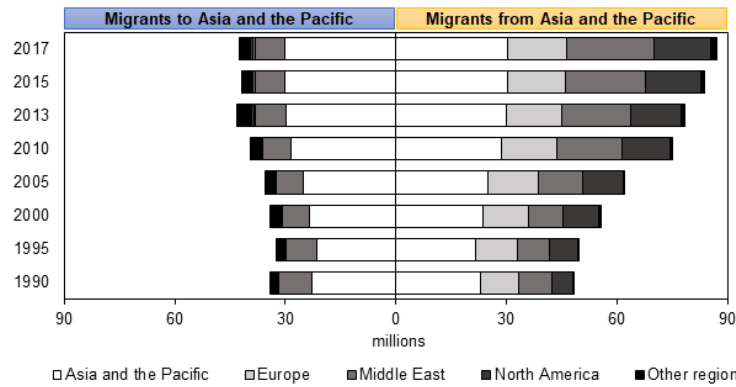
Meanwhile, the total number of migrants residing in Asia and the Pacific stands at 42.4 million, about 71% of which originated from economies within the region. Figure 2 shows the largest destination economies of Asian migrants, which include Australia (7 million), India (5 million), Thailand (3.5 million), Pakistan<sup>2</sup> (3.4 million), and Hong Kong, China (2.7 million). Some of these cross-border movements resulted from the birth of new nations and borders (like the case of many migrants from neighboring countries in India) and displacements due to conflicts (e.g., refugees from Afghanistan hosted in Pakistan). It also reflects more recent and active movement of the workforce in the region. For example, Thailand now hosts a few million migrant workers from neighboring countries including Myanmar.

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<sup>1</sup> International migrants are defined as “[the] persons who have ever changed their country of usual residence, that is to say, persons who have spent at least one year of their lives in a country other than the one in which they live at the time the data are gathered” (United Nations 1998, para. 185). The international migrants stock therefore consists of persons crossing borders for reasons such as employment, family reunification, study, and fleeing from conflict and violence. In some instances, the creation of new borders generates a large stock of international migrants as during the fall out from the collapse of the Soviet Union.

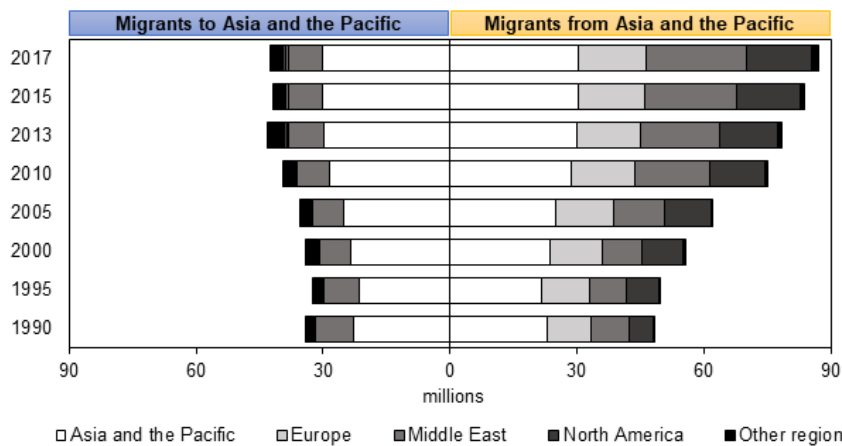
<sup>2</sup> Pakistan hosts the largest number of refugees totaling 1.85 million (as of end-2017) in the region, mainly from Afghanistan (UNHCR Population Statistics portal, [http://popstats.unhcr.org/en/overview#\\_ga=2.171769312.1130396316.1531288354-34172564.1531288354](http://popstats.unhcr.org/en/overview#_ga=2.171769312.1130396316.1531288354-34172564.1531288354) (accessed August 2018)).

**Figure 1.** Stock of International Migrants to and from Asia and the Pacific, 1990-2017



Source: ADB calculations using data from *International Migrant Stock: The 2017 Revision*. <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml> (Accessed August 2018).

**Figure 2.** International Migrant Stock and the Population Share, 2017 (%)



AUS = Australia, BRU = Brunei Darussalam, HKG = Hong Kong, China, IND = India, JPN = Japan, MAL = Malaysia, MON = Mongolia, NZD = New Zealand, PAK = Pakistan, PRC = People's Republic of China, KOR = Republic of Korea, RUS = Russia, SIN = Singapore, and THA = Thailand.  
 Source: ADB calculations using data from United Nations Department of Economic and Social Affairs, Population Division. <http://www.un.org/en/development/desa/population/> (accessed July 2018); and *International Migrant Stock: The 2017 Revision*. <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml> (Accessed August 2018).

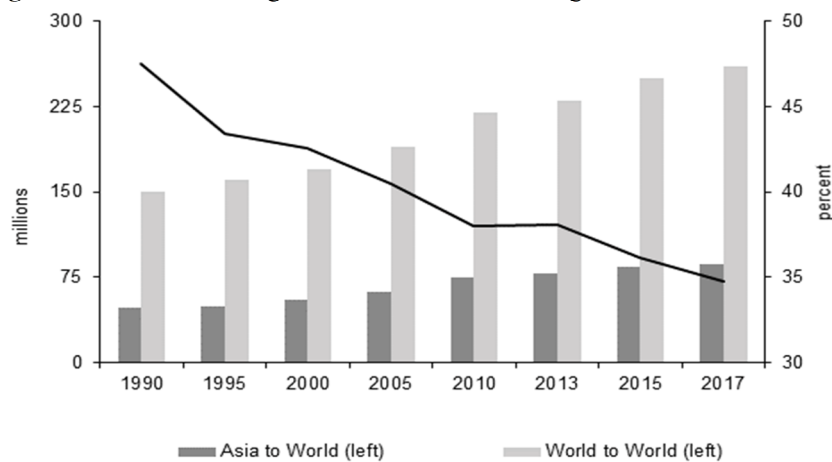
The recent pattern of international migration is increasingly driven by movement of labor, largely in anticipation of higher wages, better benefits, and career opportunities. The International Labour Organization (2015) estimated that about

89% of international migrants are over the age of 15, of which 72% are migrant workers. In Asia and the Pacific, the share of migrant workers is likely to be higher than the global average, mainly due to the large outflow of temporary and non-family migration to the Middle East and Southeast Asian destinations. It is also likely given that opportunities for settlement and family reunification are restricted in these destinations, which would otherwise lead to an increase in the share of non-working international migrants.

Some economies in the region such as Australia and New Zealand have long operated open immigration for family reunification and employment, leading to the high share of international migrants, at over 20% of their populations. Hong Kong, China (39.2%) and Singapore (46%) are also densely populated with migrant workers and foreign residents.

While many regional economies remain hosts for most Asian migrants, intraregional migration has declined over the years. The 30.2 million Asian migrants hosted within the region in 2017 constitute only 34.7% of the total outmigration from the region, a steep drop from 47.5% in 1990 (Figure 3). In contrast, the other regions are now hosting greater numbers of Asian migrants. The proportion of Asian outmigration to the Middle East increased sharply from 17.3% (9.6 million) to 26.9% (23.4 million) from 1990 to 2017. There were also increases in migration to Europe (from 12.2 to 16.2 million) and to North America (from 9.4 to 15.4 million). Middle Eastern destinations that offer mass temporary employment opportunities for skilled and unskilled workers appear more attractive than Asian destinations, while other destinations offer skilled migration opportunities with higher pay and the possibility of permanent settlement.

**Figure 3.** International Migrant Stock and Share of Migrants from Asia

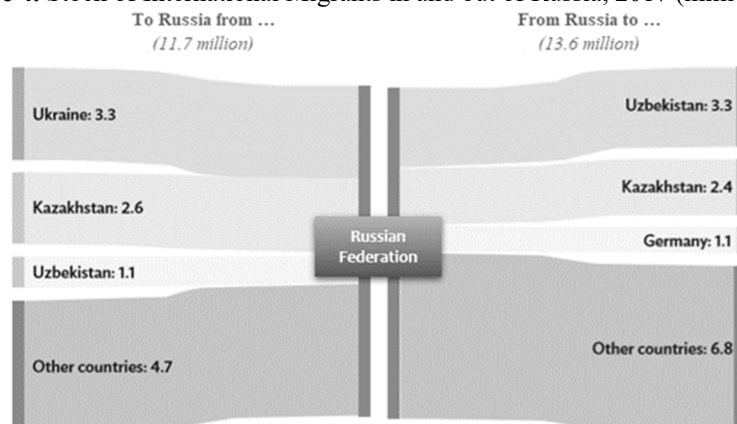


Source: ADB calculations using data from *International Migrant Stock: The 2017 Revision*. <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml> (Accessed August 2018).

## 2.1. International Migration in North East Asia

The pattern of migration and labor mobility in the North East Asian region (NEA) can be characterized by the large outmigration from the PRC and Russia. While the two countries dominate the outmigration from Asia, their patterns of outmigration are quite different. Outmigration flows less to other NEA countries, but mostly to other subregions within Asia and countries such as the United States, Ukraine, and Kazakhstan. As of 2017, Russia records the largest inbound and out-bound migrants in the NEA region, with 11.7 million and 13.6 million, respectively (Figure 4). The inbound migration pattern in Russia remains generally as it was in the 1990s. Migrants from Ukraine (3.3 million), Kazakhstan (2.6 million), and Uzbekistan (1.1 million) comprised almost 60% of total inbound migrants to Russia. Meanwhile, Uzbekistan (3.3 million), Kazakhstan (2.4 million), and Germany (1.1 million) host a majority of Russian migrants. Russian migrants in Ukraine have dropped significantly over the years while Germany is increasingly becoming the choice of destination.

**Figure 4.** Stock of International Migrants in and out of Russia, 2017 (millions)

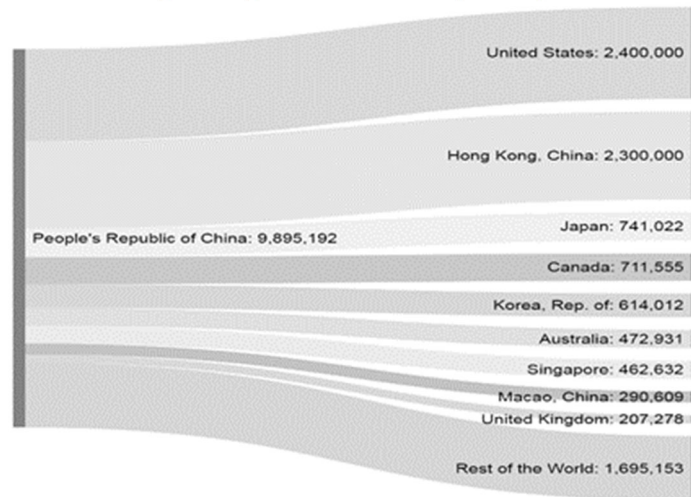


Source: ADB calculations using data from *International Migrant Stock: The 2017 Revision*. <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml> (accessed August 2018).

The large stock of international migrants across the former Soviet countries can be attributed not only to pre-existing migration, but also to the liberal trade and mobility regimes and visa-free travel regimes long in place between Russia and Central Asian countries that emerged from the Soviet collapse. As in the Middle East, the oil boom in Russia drew labor from neighboring countries. The sharp drop in oil prices in 2014, along with economic sanctions on Russia's economy, can be attributed to the decline of immigrants from Uzbekistan (by 21%) and Tajikistan (by 11%) (Ragozin 2017).

Besides Russia, the PRC also records a large share of outmigrants in the NEA region. In 2017, almost half of the country's outmigrants were living in the United States and Hong Kong, China (Figure 5). The United States hosts 2.4 million migrants from the PRC, while 2.3 million PRC outmigrants reside in Hong Kong, China. Other countries hosting many PRC outmigrants are Japan, Canada, and the Republic of Korea. It was only in 1986 that the PRC liberalized its migration policies, improving international mobility of both skilled and unskilled labor. In the years since, PRC outmigrants have continuously increased, from 4.2 million in 1990, 5.8 million in 2000, then jumping to 8.6 million in 2010 and 10 million in 2017. That surge also reflects the wealth effect on outmigration: thanks to rapid economic development in PRC, families can afford to migrate for employment and study abroad.

**Figure 5.** Stock of People's Republic of China Migrants by Destination, 2017



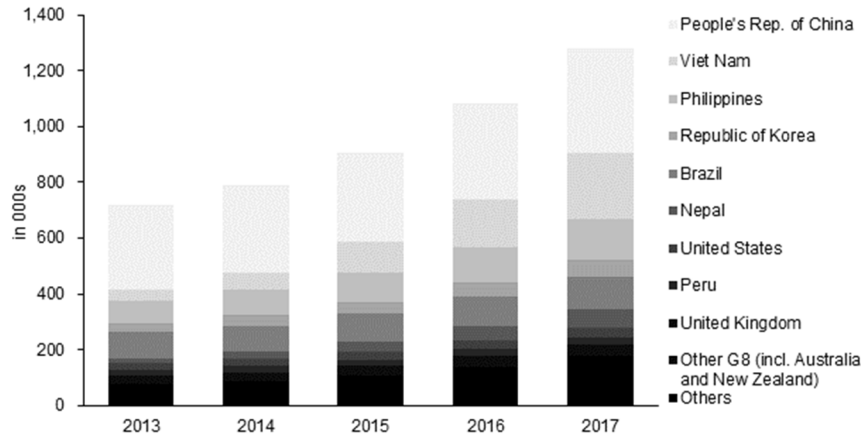
Source: ADB calculations using data from *International Migrant Stock: The 2017 Revision*. <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml> (accessed August 2018).

Unlike Russia and the PRC, Japan remains a net receiver of migrants, although the share of foreigners in the population, at 1.8% in 2017 remains far below par of the 14.1% average among high-income economies. Migrants from the PRC and the Republic of Korea remain the largest in Japan's stock of foreign workers, even as their numbers are declining (Figure 6). Meanwhile, the share of migrant workers from South and Southeast Asia, particularly the Philippines and Viet Nam, have steadily increased. Until very recently, Japan maintained relatively more restrictive migration policies, particularly for the entry of unskilled migrants. The government encouraged its industries to set up labor-intensive operations in other countries in East and Southeast Asia as an alternative (Chalamwong 2005). However, data shows that the total number of migrant workers in Japan grew at average rate of



13.5% in the five years from 2012. The case of Japan showcases how demographic factors can impact migration flows through policy changes. Faced with an aging population, and hence a declining workforce, the Japanese government has liberalized its immigration policies and acknowledged the possibility of hiring unskilled migrants in areas such as construction, agriculture and care work.

**Figure 6.** Stock of Foreign Workers in Japan by Origin Country, 2013–2017



Source: Ministry of Health, Labor, and Welfare, Japan.

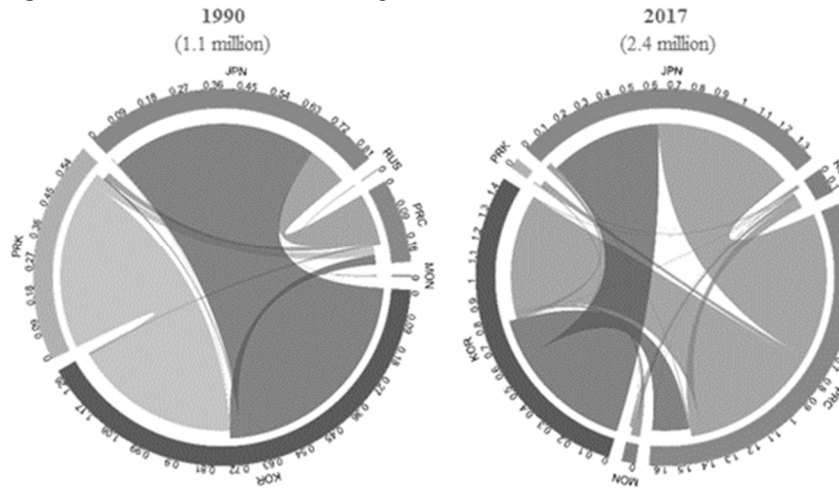
The Republic of Korea has been more open to international migration, with a balanced flow of inbound and outbound migrants. In 1991, the country implemented a policy that attracted skilled labor to address its shortages. Before this, most of the migrant population came from the PRC, the United States, and Japan. Since the liberalization policy, migrants from the PRC and the United States, among others, have increased substantially—from only 19,827 PRC migrants in 1990, it rose to 92,142 in 2000, while US migrants rose 118% during the same period from 11,713 to 25,592. In 2003, the country introduced the Employment Permit Scheme allowing the entry of unskilled foreign workers. Consequently, migrants from South and Southeast Asia have increased. For example, from an average of 17,000, the number of migrants from Viet Nam climbed to 114,000 in 2017. Also seen is the arrival of many more Chinese with Korean descent. Based on official data, international migrants in the Republic of Korea numbered 1.4 million in 2017, the highest since 2000. The main origin countries are the PRC, Thailand, and Vietnam, with a combined share of over 60% in 2017. While labor migrants account for around 27% of total migrants in the country, the lower demand for non-professional employment reduced their actual number in 2017.

Migration to and from Mongolia within the region has surged over the past decades. International migrants from the country to the rest of the world increased from only 24,000 in 1990 to nearly 68,000 in 2017. Russia totaled more than 80% of the flow in 1990, however, in recent years, the biggest movement has switched

to the Republic of Korea. In 2017, Russia's share of Mongolian migrants dropped to 31%, yet the Republic of Korea's share climbed to almost 38%, up from less than 1% in 1990. While it remains a net source of migrants, migration to Mongolia increased from less than 7,000 in 1990 to 18,000 in 2017, mostly from the PRC, followed by Russia and the Republic of Korea. Recent labor migration flow consists of a mix of skilled and unskilled Mongolians as well as students and trainees.

## **2.2. Intra-North East Asia Migration**

The share of intra-NEA regional movement of people is much smaller than total outmigration from NEA to other regions. However, the volume of intraregional migrant stock has more than doubled from 1.1 million in 1990 to 2.4 million in 2017. Figure 7 illustrates the bilateral migration flow between NEA countries in 1990 and 2017. Each strip or line represents the proportionate volume and direction of the stock of migrants from origin (outer circle) to destination (inner circle) among NEA countries in those two years. It is apparent that intra-NEA flows, which were dominated by the stock of Korean migrants in Japan and in the PRC in 1990, have since evolved to create more intricate flows of people within the region. A noticeable change is the number of migrants of PRC origin, which grew from only 0.3 million in 1990 to 1.4 million in 2017. The outflow to Japan and the Republic of Korea increased considerably over those years. Meanwhile, the mass scale of intra-Korean peninsula movement has subsided, but the Republic of Korea continues to witness an inflow and outflow of migrants within the region. What is also notable is the somewhat clearer presence of Russia and Mongolia in intra-NEA migration in recent years, with Mongolia experiencing a net outflow and Russia a net inflow. Japan continued to be the largest destination for intra-NEA movement throughout the period.

**Figure 7.** Intra-North East Asia Migration, 1990 versus 2017

PRC = People's Rep. of China, JPN = Japan, MON = Mongolia, PRK = Democratic People's Rep. of Korea, RUS = Russia, and KOR = Republic of Korea.

Numbers on outer circle are in millions presenting bilateral migrant stock among North East Asian economies.

Source: ADB calculations using data from *International Migrant Stock: The 2017 Revision*. <http://www.un.org/en/development/desa/population/migration/data/estimates2/estimates17.shtml> (accessed August 2018).

### 3 Determinants of International Labor Migration in and from Asia

#### 3.1. Theoretical Framework for Empirical Tests

Migration is triggered by a wide array of factors ranging from social, economic and demographic structures to individual preferences. At the macro or cross-country level, the gravity framework—a common tool in international trade analysis—remains widely used to assess and identify relevant factors influencing international migration. The framework assumes, as with goods and capital, that the movement of people mostly takes place in geographical, political and cultural proximities because short distance, common borders and languages, and historical relationships can reduce the financial and psychological costs of migration. Sharing a common language or cultural ties can reduce the transaction costs associated with accessing information on jobs and social amenities. These factors also often lead to the formation of migration network and diaspora communities within destination countries, which then invite subsequent waves of migration through job referrals and family reunifications (McKenzie and Rapoport 2010, Massey and Zenteno 1999). Some of the largest regional migratory flows can be explained by such proximities

(e.g., Mekong country migration mainly to Thailand, and Indonesians moving to Malaysia).

Besides structural factors, migration is an individual decision based on perceived costs and benefits. Incomes in origin and destination countries along with labor market conditions influence the decision to migrate (Clemens 2014, World Bank 2018). In principle, the wider the income gap between origin and destination countries, the higher the incentive to migrate. However, rising incomes in origin countries alone can also drive migration as they allow more people to afford the upfront costs of migrating (Martin and Taylor 1996). The persistence of unemployment and availability of employment benefits in respective economies also help explain such movement since they influence the anticipated net gain from migrating. Empirical assessment of the impact of labor-related factors on migration remains challenging, however, since migrant workers are often placed in labor markets that are segmented from the locals.

Population size in the origin and destination countries can jointly determine the scale of migration, while demographic trends can alter the volume of demand and supply of migrants (Zaiceva and Zimmermann 2014). Kim and Cohen (2010), in their analysis of migration flows to a selection of advanced countries, validate the strong influence of origin and destination countries' population size in absorbing and sending migrants, respectively. A study by Dao et al. (2018), based on nearly a half century of migration data across the world, finds that demographic factors govern migratory flows, exerting greater influence than socioeconomic factors. Advanced economies drawing significant shares of migrants of Asian origin are facing population aging and reviewing and revising their immigration systems to recruit more migrant workers in health and care services, domestic work, construction, and knowledge-intensive sectors<sup>3</sup>. Meanwhile, the rapidly growing youth workforce in migrant source countries in Asia is said to exert pressure toward outmigration, especially when unemployment among educated youth remains unabated, though their chances of migrating for work depend on the availability of jobs they are suited to in destination countries.

Whether the quality of human capital and skill level of the workforce in origin and destination countries determines the volume of bilateral migration remains an empirical question. In their pioneering work on the brain drain literature, Stark, Helmenstein, and Prskawetz (1998) presented a model encompassing the incentive to improve human capital in a developing country of origin with the prospect of employment in a developed country. If most jobs available for migrants are unskilled, increasing the quality of human capital in origin countries may lead to less migration: educated workers may be less interested in taking jobs abroad. In the case of skilled migration, narrowing of skill gaps between origin and destination countries may lead to more migration, though the total number may be small in comparison to the stream of unskilled workers. In recent years, the marked surge in migration

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<sup>3</sup> Demographic trends are different for major migrant destination countries in the Middle East, where populations remain relatively young and are still growing fast.

among high-skilled labor has become more evident. Labor migrants holding tertiary education are estimated to account for nearly half of migrants in 2010, up from only 27% in 1990 (World Bank 2018). It is therefore worthwhile to understand how changes in relative skills among countries have influenced past migratory flows, primarily attempting to examine whether migrants have complemented or substituted the local workforce.

### **3.1.1 Migration and Economic Integration**

The degree of economic integration and interconnectedness between and among countries through trade, direct investment, or the production network (value chains) can, in principle, influence the mobility of people and labor through multiple pathways. Standard trade theory suggests that trade acts as a substitute to migration by equalizing factor prices between the economies involved. Additional jobs generated by foreign direct investment (FDI) could keep workers at home. Sauvant, Mallampally, and Economou (1993) argued that FDI reduces incentives to migrate both in the short term, through employment, and in the long term, by way of improvements in economic growth and welfare. These arguments are thought to have paced the promotion of the North American Free Trade Agreement in discouraging further movement of Mexicans to the north. In their study on Mexico-US migration, Aroca and Maloney (2005) estimated at most a 2% drop in Mexican migrant flows to the US in response to doubling of FDI inflows from the US.

A growing body of evidence, however, shows a potential complementarity between FDI, trade, and migration. A positive relationship between migration and trade arises when income growth in a less-developed country is generated by trade with a more economically developed partner, relaxes financial constraints, and—as noted earlier in this paper—allows more people to migrate. Gould (1994) emphasized the importance of the business links that arise from immigration. Bahar and Rapoport (2018) provide evidence that migration promotes knowledge diffusion and so leads to trade diversification. De Simone and Manchin (2012) found that migrant networks substantially reduce information asymmetry for exporters and investors, leading to more transactions. Complementarity between skilled migration and FDI exists in the long term through the diaspora network effect (Kugler and Rapoport 2011, Tomohara 2017, Shin and Moon 2018).

## **3.2. Empirical Framework: Methods and Data**

The paper evaluates the determinants of international migration in and from Asia and the implication of economic integration in two steps. Firstly, it examines whether the social, economic, and demographic factors described in the above theoretical framework indeed influence the patterns of Asian migration, using historical bilateral international migration stock data. Selected indicators of economic integration are then added to the baseline regression to evaluate the additive effect on mobility.

The empirical model follows the standard gravity model below:

$$Migration_{ijt} = \alpha + \beta_1 Economic_{ijt} + \beta_2 Demographic_{ijt} + \beta_3 Skills_{ijt} + \beta_4 Gravity_{ijt} + \theta_i + \omega_j + \delta_t + \varepsilon_{ijt} \quad (1)$$

where  $Migration_{ijt}$  is a bilateral stock of international migrants (expressed in logs) from origin country  $i$  to destination country  $j$  in year  $t$ . The stock of international migrants is taken from UN Population Division of the Department of Economic and Social Affairs, with data available in 5-year intervals from 1950—2015.

The analysis focuses on migration from Asia and the Pacific to major global destinations (Route 1: Asia to World) and within Asia (Route 2: Asia to Asia). Based largely on data availability, the empirical analysis is conducted on bilateral stock of migrants from 26 ADB developing member countries in Asia plus Russia<sup>4</sup> to 30 major destination economies<sup>5</sup> (Route 1). This route involves 433 origin-destination country pairs in six 5-year intervals. These major destination economies host more than 80% of the total Asian outmigrants. Intra-Asia migration (Route 2) in 12 major destination economies in Asia and the Pacific involves 147 unbalanced panel migration routes.

The UN data reports migrant stocks and related information from most member countries and territories; however, the quality of data varies across countries. To overcome any estimation bias arising from measurement discrepancies in reporting formats of migrant stocks across countries, migration routes involving less than 500 migrants are excluded<sup>6</sup>. To capture the forces driving international labor (hence economic) migration, the stock of refugee population from the migrant stocks is subtracted<sup>7</sup>.

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<sup>4</sup> These are: Armenia, Bangladesh, Brunei Darussalam, Cambodia, the People's Republic of China, Fiji; Hong Kong, China; India, Indonesia, Kazakhstan, Republic of Korea, Kyrgyz Republic, Lao PDR, Malaysia, Maldives, Myanmar, Mongolia, Nepal, Pakistan, Philippines, Russia, Singapore, Sri Lanka, Thailand, Tajikistan, and Viet Nam.

<sup>5</sup> These include Armenia, Australia, Bahrain, Canada, the People's Republic of China, France, Germany, Greece; Hong Kong, China; Israel, Italy, Japan, Republic of Korea, Kuwait, Malaysia, the Netherlands, Nepal, New Zealand, Oman, Qatar, Russia, Saudi Arabia, Singapore, Spain, Sweden, Thailand, Ukraine, United Arab Emirates, United Kingdom, and the United States.

<sup>6</sup> Some countries report on major migration routes only, leaving other bilateral migration information empty, while other countries provide comprehensive information.

<sup>7</sup> While refugees and labor migrants face similar factors, the weights given by each group to specific factors in deciding to move may differ significantly. In a recent policy report, the World Bank (2018) found evidence that geographic forces shape the distribution of refugees more than economic factors, while the opposite is found for international migrants overall. Nonetheless, the main results remain unchanged with or without refugee stock.

Aligned with existing empirical works, migration determinants are categorized in four general forces: (i)  $Economic_{ijt}$ , (ii)  $Demographic_{ijt}$ , (iii)  $Skills_{ijt}$ , and (iv)  $Gravity_{ij}$ .  $Economic_{ijt}$  variables such as per capita GDP of origin economies and income gap (calculated as the difference in the log of per capita GDP of the destination-origin pairs) are sourced from the World Development Indicators database of the World Bank. These variables attempt to grasp (capture is repetitive) how economic conditions and differences in development levels and economic opportunities influence international migration from Asia and the Pacific. While it is worth considering wages and labor market conditions, these details were not used due to their absence, both for many of the ADB developing member countries and in earlier periods.

$Demographic_{ijt}$  include the total population (in logs) in origin and destination economies, which control for country size, indicating capacity to send or receive international migrants, and old-age dependency ratios of destination economies. The old-age dependency ratio in destination economies is added as an attempt to capture how aging is shaping the migration pattern from the region. The growing number of elders in destination countries is expected to draw migration, alongside the growing youth population in developing Asian economies. Data are sourced from the latest revision of the UN World Population Prospects. Population data are adjusted by deducting the total number of international migrants from the respective countries.

To empirically assess whether the human capital and skills level of origin and destination countries affect the migration pattern in Asia,  $Skills_{ijt}$  is incorporated in the model. Without constraints to labor migration and differences in qualifications, and where available jobs for migrants predominantly require low-skilled labor, improvement in human capital and skills in origin economies may reduce migration. The opposite can be expected when opportunities are open for skilled labor. Therefore, the skills gap is seen as one of the strong/powerful/strongest forces in international migration. This variable is measured as the difference in average years of schooling of the population ages 15 and over between the destination and origin economies. The Barro and Lee (2013) dataset on educational attainment is used, which is available in 5-year intervals from 1950-2010, with projected educational attainment from Barro and Lee (2015) supplying missing information for 2011-2015.

$Gravity_{ij}$  are dyadic variables such as distances between capitals, contiguity (shared borders), common official languages, and colonial relationships that attempt to capture the economic and psychological costs associated with international migration. Intuitively, closer bilateral routes tend to have lower transportation costs which, among other factors, allows people to move with ease. Common and official language, and strong historical ties facilitate migration by way of networks and the ease of assimilation within communities. Data for this are sourced from the Centre d'Etudes Prospectives et d'Informations Internationales<sup>8</sup>.

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<sup>8</sup> Gravity data can be downloaded from the following link:

To control for unobservable time-invariant characteristics that may affect international migration patterns,  $\alpha_i$  and  $\omega_j$  are added referring to the origin country and the destination country fixed effects, along with time dummies  $\delta_t$  to account for time-variant effects. All parameters are estimated using the Ordinary Least Squares (OLS) method with cluster-robust standard errors. Fixed effects (exploiting within-bilateral migration variation) and generalized estimating equations (GEE), which is a semi-parametric estimation<sup>9</sup>, provide alternative and robust estimates that control for unobserved heterogeneity and bilateral specific correlation outcome variables in the model.

### 3.2.1 Evaluating the Trade-FDI-Migration Link

To gain insight into the relationship between international migration and the degree of economic integration between the origin and destination countries, Equation 1 is extended in two variants (Model 1 and 2), adding separately as regressors the bilateral specific variables measuring (i) trade, (ii) investment, and (iii) cross-border production chain links. Model 1 evaluates the overall relationship between migratory flow and integration variables, while Model 2 gives a crude measure of the indirect income channel that may explain such link. The second model makes it necessary to use an interaction term of integration variables and per capita GDP of sending Asian economies plus Russia. The extended model is estimated using fixed-effects and GEE for robustness. An advantage of the fixed effect technique is that it does not require the assumption of no correlation between the time-invariant dyadic variables with the unobservable heterogeneity, as it does for OLS estimations. Despite estimating no coefficients for time-invariant dyadic gravity components, the fixed effect estimation flexibly accounts for the unobserved time-varying variables that influence bilateral migration routes in different ways.

The depth of trade link is given by the value of bilateral merchandise trade (exports plus imports) expressed as a percentage of the origin country's GDP. Bilateral merchandise trade (in millions of US dollars), summing exports and imports, are sourced from the International Monetary Fund's Direction of Trade Statistics. Contemporaneous 5-year interval information is gathered from 1990–2015 in line

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[http://www.cepii.fr/CEPII/en/bdd\\_modele/presentation.asp?id=8](http://www.cepii.fr/CEPII/en/bdd_modele/presentation.asp?id=8)

<sup>9</sup> Among the strand of GEE specifications, an exchangeable working correlation structure is used based on the test result of Cui and Qian (2007) Quasi-likelihood under Independence model criterion. The GEE approach would effectively deal potential bias associated with bilateral-specific correlations of outcome variables within panel over the period of observations. Horrocks (1997) noted that failure to consider the correlation existing within the panel invalidates the standard errors of the parameter estimates. Hanley et al. (2003) noted that the GEE method of parameter estimation is more efficient for statistical hypothesis testing involving correlated panel data and a number of binary responses, in which the study here includes the gravity variables of contiguity, colonial relationship, and language.



with the bilateral migration stock data. Investment link is measured by the net bilateral FDI flows<sup>10</sup> (in \$ millions) from the destination country, expressed as the share of the origin country's GDP. Net bilateral FDI flows to origin economies refers to the consolidated FDI using available sources such as UNCTAD, ASEAN, Eurostat, and various national reports. The extent of international production sharing is measured by the foreign value added embedded in exports (simply, vertical specialization) of the origin country from the destination country, expressed as a percentage of the origin country's total gross exports<sup>11</sup>. Limited data availability in earlier periods and in some ADB developing member countries result in substantial loss in the number of observations; therefore samples to carry out analysis vary with that of the baseline model.

The intention of the exercise is to examine the presence of a statistically significant association between the scale of bilateral migrant stock and the prevailing determinants based on existing literature, which does not confirm causal relationship. Likewise, other determinants of international labor migration for which data availability remains a challenge should be noted: for example, immigration policy regimes and changes, particularly related to labor migration, in destination economies that shape and redirect cross-border migration<sup>12</sup>. The influence of quality of life measures in destination economies is another variable not captured in the model, although use of the income gap may solve part of this. Last but not least, given the analysis involves only international migration from developing economies in Asia to selected locations, it does not consider the interplay with the supply and demand from other regions, which could be alternative destinations for migrants.

### 3.3. Empirical Findings

Table 1 presents estimates of Equation 1 evaluating the determinants of international migration and workforce from Asia to the World (Route 1) and within Asia (Route 2) based on OLS and fixed effect models. The results validate the strong influence of economic factors in shaping international migration from Asia. As predicted, the income gap between destination and origin countries, measured by respective real per capita GDP, is positively associated with the volume of bilateral migration. Elasticity of income gap to migration is higher in within Asia migration.

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<sup>10</sup> Following the 5-year dataset of bilateral migration, the 5-year average is derived for net FDI flows in origin economies. Limited availability for years 2001 to 2017 leaves data points for 2005, 2010, and 2015.

<sup>11</sup> It is available in various years: 2000, 2005, 2008, 2011–2017. To be consistent with the bilateral migration data, 5-year interval information is used for 2000, 2005, and 2015. The information in 2011 is an alternative for the missing 2010 data, noting little variation expected in annual terms. This information is available from the ADB's Statistical Database System: <https://sdbs.adb.org/sdbs/jsp/GVC/GVCLanding.jsp>.

<sup>12</sup> For example, that of Ruhs (2018), or the DEMIG POLICY data compiled by the International Migration Institute of the University of Oxford either cover a limited number of destination countries in Asia or do not come in sufficient time series.

If the income gap widens by 10%, intraregional migration can be expected to increase by about 6%, while the elasticity in Asia to world migration is lower, at 2-4% depending on the specification. The estimates also reveal the positive relationship between international labor migration and income levels in origin countries in Asia, which generally supports the idea that rising income in origin economies helps reduce financial constraints and so encourages migration.

The results also offer insights into the significant influence of population size and ongoing demographic trends. Theoretically consistent, larger countries opt to receive more migrants, while smaller developing economies tend to send more (Hanson 2008). It is interesting to note that the influence of country size in Asian migration flow is almost proportional in Route 1, with Route 2 even exhibiting elasticity above 1. These results only support the significant migration flow from Asia, considering that it amounts to about a third of global migration volumes.

The results also show how aging shapes Asian labor migration. Using old-age dependency ratios to capture both the interplay of the older and working-age population, estimates show an almost 5% increase in migration stock from Asia given a one-percentage point increase in the ratio, keeping other factors constant. It is even higher for intra-Asian migration, at 6.5%. The rapid population aging experienced in major destination economies, especially in Asia, is expected to further drive migration due to the region's demographic diversity. Many migrant origin countries in Southeast and South Asia continue to enjoy a demographic dividend. Population aging can also contribute to making public opinion more open to immigration (Nakata 2017).

The estimates from the analysis also provide an insight into the likely role that improvement in human capital among origin countries can play in the region's migration activities. Earlier in the section, two possible scenarios were provided for how the skills gap could either drive or stymie migration, which depends heavily on the skills requirements in relevant sectors from destination economies and the compatibility of education and skills levels between the origin and destination countries. The results indicate that the larger the skills gap, the smaller the migrant stock. This points to great potential for origin countries whose workforces are acquiring more education and training to meet the demand for skilled workers abroad (conditional on other factors such as immigration policies).

Consistent with standard gravity models of international migration, variables indicating geographic distance and cultural and historical proximity explain cross-border movement intimately. As expected, greater bilateral distances record lower migration, while contiguity tends to be associated with more migration. It comes with no surprise that higher migration is recorded where origin-destination countries have a common official or primary language and a colonial relationship. These factors not only cut the initial direct and indirect cost of migration but also help migrants assimilate in destination communities. Estimates from GEE also generate findings similar to the baseline estimates from pooled OLS and fixed effects models (see Appendix 1).

**Table 1.** Drivers of International Labor Migration from and within Asia

Variables	Baseline		With Bilateral FE	
	Route 1 (Asia to World)	Route 2 (Asia to Asia)	Route 1 (Asia to World)	Route 2 (Asia to Asia)
<b>Economic factors</b>				
Income gap between origin and destination economies	0.401*** (0.148)	0.648** (0.267)	0.240*** (0.063)	0.583*** (0.114)
Real per capita GDP in origin economies, <i>in logs</i>	0.421** (0.183)	0.874*** (0.334)	0.283*** (0.078)	0.807*** (0.151)
<b>Demographic factors</b>				
Total population in destination economies, <i>in logs</i>	0.923*** (0.249)	2.042** (0.966)	1.113*** (0.115)	1.957*** (0.462)
Total population in origin economies, <i>in logs</i>	0.056 (0.347)	-0.285 (0.509)	-0.411** (0.163)	-0.283 (0.306)
Old-age dependency ratio in destination economies	0.046*** (0.008)	0.065*** (0.012)	0.055*** (0.005)	0.065*** (0.009)
<b>Skills complementarity</b>				
Gap between origin and destination economies in average years of schooling	-0.510** (0.202)	-0.556* (0.283)	-0.589*** (0.099)	-0.970*** (0.164)
<b>Gravity variables</b>				
Distance between capitals, <i>in logs</i>	-1.520*** (0.149)	-1.375*** (0.264)		
Contiguity	1.039** (0.427)	0.848* (0.486)		
Common official of primary language	0.707*** (0.240)	0.609* (0.337)		
Colonial relationship	2.682*** (0.263)	1.739*** (0.530)		
Constant	3.891 (6.667)	-13.270 (16.295)	-5.918* (3.443)	26.517*** (9.055)
Year dummies	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes
Origin-destination country FE	No	No	Yes	Yes
Number of observations	2,276	816	2,276	816
R-squared	0.639	0.634	0.475	0.512
Number of bilateral routes			433	147

OLS = Ordinary Least Squares, FE = fixed effects

Robust standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' estimates.

### 3.3.1 Cross-border Migration and Economic Integration: Substitute or Complement?

Tables 2 through 4 present fixed effect estimates of the coefficients evaluating the link between economic integration and international migration from and within Asia (Route 1 and 2). It does so by evaluating the overall effect (Model 1) and its pathways (Model 2)<sup>13</sup>. The depth of trade ties between origin and destination countries is found to substitute and complement migration depending on the pathways, with overall (net) positive impact on the size of bilateral migrant stock (Table 2). The results are consistent with the hypothesis that enhanced trade links reduce migration motives on one hand, and push more flows on the back of rising per capita income, and hence financial capacity to migrate, in countries of origin on the other. Such pattern holds strongly on overall migration flows from Asia and less on the intra-Asian movement, which explains the large net positive coefficient in Route 2 from the first model.

**Table 2.** Asian Regional and Global Migration and Trade

Variables	Model 1		Model 2	
	Route 1	Route 2	Route 1	Route 2
Bilateral trade (% of GDP)	0.030*** (0.003)	0.036*** (0.004)	-0.043** (0.018)	-0.019 (0.028)
<i>Interaction with (log) real per capita GDP in origin economies</i>			0.008*** (0.002)	0.005* (0.003)
Year dummies	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes
Origin-destination country FE	Yes	Yes	Yes	Yes
Number of observations	2,200	803	2,200	803
R-squared	0.512	0.571	0.517	0.574
Number of bilateral routes	432	147	432	147

FE = fixed effects

Notes: Similar set of regressors from the baseline model as well as a constant term is included in estimation, but is not reported. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' estimates.

In contrast, results using FDI or value chain links do not indicate decisive trends in the association. Tables 3 and 4 suggest that the cross-border investment or value chains themselves may not have direct impact, but the impact is expressed

<sup>13</sup> Regression outcome of all variables are reported in Appendices 2 through 4, along with results using the alternative estimation (i.e., GEE). They are largely consistent with fixed effects estimates.

through the trade channel. One interesting observation is that the degree of integration in production network and supply chain between origin and destination economies is found to have strong substitution effect in intraregional migration. This intuitively explains the relatively low rate of intraregional share of migration in the region, which boasts strong regional value chain networks.

**Table 3. Asian Regional and Global Migration and Foreign Direct Investment**

Variables	Model 1		Model 2	
	Route 1	Route 2	Route 1	Route 2
Net bilateral foreign direct investment (% of GDP)	0.014 (0.016)	0.030 (0.022)	-0.075 (0.069)	-0.086 (0.087)
<i>Interaction with (log) real per capita GDP in origin economies</i>			0.011 (0.008)	0.015 (0.011)
Year dummies	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes
Origin-destination country FE	Yes	Yes	Yes	Yes
Number of observations	1,013	373	1,013	373
R-squared	0.513	0.457	0.514	0.461
Number of bilateral routes	350	126	350	126

FE = fixed effects

Notes: Similar set of regressors from the baseline model as well as a constant term is included in estimation, but is not reported. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' estimates.

**Table 4. Asian Regional and Global Migration and Regional Production Networks**

Variables	Model 1		Model 2	
	Route 1	Route 2	Route 1	Route 2
Bilateral vertical specialization (% of gross exports)	-0.007 (0.017)	-0.046 (0.028)	-0.183 (0.123)	-0.505** (0.202)
<i>Interaction with (log) real per capita GDP in origin economies</i>			0.022 (0.015)	0.056** (0.025)
Year dummies	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes
Origin-destination country FE	Yes	Yes	Yes	Yes
Number of observations	861	293	861	293
R-squared	0.401	0.372	0.403	0.389
Number of bilateral routes	264	88	264	88

FE = fixed effects

Notes: Similar set of regressors from the baseline model as well as a constant term is included in estimation, but is not reported. Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

Source: Authors' estimates.

The nexus between economic integration and migration is complex; the direction of linkage and the strength of substitution and complementation is contingent on many other factors including the income channel, which this paper focuses on. Nonetheless, results provide empirical evidence of the overall positive and complementary influence of increasing connectedness within the region, particularly via trade, in the cross-border migration of people and labor. Meanwhile, the substitution relationship is more pronounced through value chain links among Asian economies, including Russia, which is largely attributed to the effective transfer of economic opportunities within the migrant country, thereby reducing attractiveness of leaving in search of jobs abroad.

### 3.4. Robustness Checks

One possible source of bias in the estimation is that previous migrant stock may be correlated with current migration because the presence of migrant communities in the destination could encourage further movement of people from the origin country. The model partly considers this network effect through dyadic variables such as colonial ties and shared language, but a concern remains that error terms may be systematically correlated across the migration routes, generating biased estimates.

To address the issue, a model is specified which uses the first differences (which refers to 5-year change) in the bilateral (origin-destination) migration stock,  $\Delta Migration_{ijt}$ , as the dependent variable, in accordance with Hanson and McIntosh (2016) and Campos (2017):

$$\Delta Migration_{ijt} = \alpha + \beta_1 Economic_{ijt} + \beta_2 Demographic_{ijt} + \beta_3 Skills_{ijt} + \beta_4 Gravity_{ijt} + \delta_t + \epsilon_{ijt} \quad (2)$$

Similar regressors from Equation 1 are used, except for the old-age dependency ratio in destination economies and skills gap, which like the dependent variable are also expressed as 5-year changes. Economic factors include real per capita GDP of the origin country and the difference in log per capita GDP between that and destination economies. The demographic factors include log of total population in origin and destination economies and the 5-year change in old-age dependency ratio in destination countries. Changes in skills gap between origin and destination economies are also included. The same gravity variables are used, alongside the time dummies  $\delta_t$ . Equation 2 is estimated using OLS, weighted by the size of bilateral migration stock. While interpretation of the coefficients differs with that of the baseline model, it is expected to retain features of the general hypothesis on the determinants of migration.

Appendices 5 through 8 present estimates of Equation 2 that yield findings similar to the baseline results, although with less explanatory power given by smaller R-squared. Appendix 5 shows which among the identified factors help explain historical changes in international migration. The coefficients bear consistent signs with the baseline results, but fewer generate statistically significant estimates.

Among them are income gap, old-age dependency ratio in destination economies, and geographical distance. In line with the baseline results in Equation 1, a larger increase in migration stock is expected if the income gap further widens. The income effect, which drives migration by reducing financial constraints, also seems to be at play but is inconclusive because of unstable signs observed in the two routes. The alternative model also captures how demographic transition is shaping international migration patterns. Distance remains a negative force though is generally weaker, which can be attributed to a gradual reduction in transportation and communication costs.

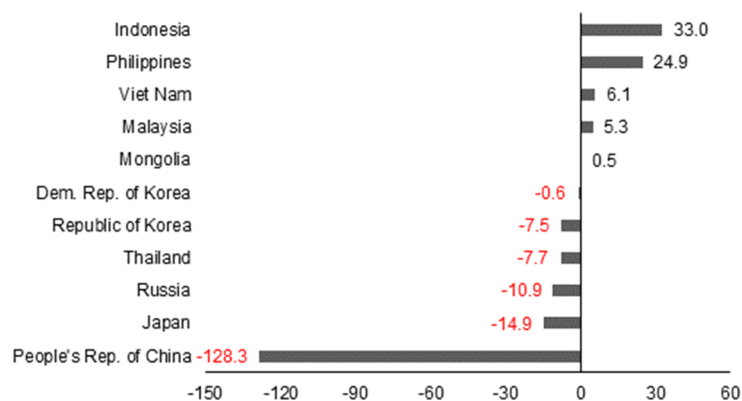
Meanwhile, Appendix Tables 6 through 8 show results evaluating the relationship between economic integration and international migration. The general findings remain consistent with the baseline results. Both trade (Appendix 6) and FDI (Appendix 7) have overall complementary links with migratory flows through the income channel. In contrast, especially in intra-Asia migration, regional production networks exert an overall substitution effect on international migration (Appendix 8).

## **4 Future Migration Flows in and from Asia and the Pacific**

### **4.1 Demographic Changes and Population Aging**

Many economies in Asia and the Pacific region are undergoing fundamental demographic changes that pose both opportunities and challenges to their economic management. Population growth in the region continues to slow, although at a varying degree across economies. The age structure is becoming less dynamic and older. This transition is expected to accelerate and may influence migration in coming decades. The empirical exercises above highlight a pattern that holds important policy implication for the region. Diverse demographic trends in the region should be geared toward skills complementarity in labor markets, particularly as the number of educated youths entering the workforce continues to grow in many of its developing economies.

Aging and demographic changes in some Asian economies could be a powerful accelerant of labor mobility within the region. For example, the NEA region presents an interesting case for Asia's aging and shrinking working-age population. In the coming decades, the PRC will need more workers to compensate for an expected decline of 128.3 million in working-age population between 2017 and 2040 (Figure 8). That decline is followed by Japan (-14.9 million) and Russia (-10.9 million).

**Figure 8.** Change in Working-age Population, 2017–2040 (millions)

Source: ADB calculations using data from United Nations Department of Economic and Social Affairs, Population Division. <http://www.un.org/en/development/desa/population/> (accessed July 2018).

On the other hand, most economies in Asia and the Pacific can expect significant increases in their working-age populations by 2030. Papua New Guinea will experience 33.0% growth in available workforce, followed by Lao PDR (25.1%) and the Philippines (21.9%). This variation in demographic transition and the speed of aging opens opportunities for more efficient allocation of the workforce through international labor migration.

In the NEA region, the PRC and the Republic of Korea have witnessed large outflows of people, but future outmigration may diminish owing to aging population. PRC migrants will likely decline due to rising local wages, while many PRC migrants are expected to return home to care for elderly parents. Demand for foreign workers in major destination countries like Japan is expected to increase and be filled by migrants from countries outside NEA. This may make the NEA region a net receiver of immigrants with a declining share of intraregional migration.

As population aging progresses among Asia's developed countries, gaps in labor supply such as in health care are being tackled through increased migration. In Singapore, the number of foreign nurses increased nearly threefold from 3,399 in 2010 to almost 10,000 in 2016, most coming from the Philippines (Table 5). Meanwhile, Japan has announced that it will receive 10,000 care workers from Viet Nam by 2020. It is expected that migrant workers meeting the needs of aging societies will add momentum as aging progresses rapidly in many East and Southeast Asian countries.



**Table 5.** Registered Nurses in Singapore by Citizenship, 2010 and 2016

Nationality	2010	Share to total	Foreign share	2016	Share to total	Foreign share
Local	18,176	84.2		21,936	69.4	
Foreign	3,399			9,679		
<i>Malaysia</i>	468	2.2	13.8	2,230	7.1	23.0
<i>PRC</i>	578	2.7	17.0	955	3.0	9.9
<i>Philippines</i>	1,760	8.2	51.8	4,942	15.6	51.1
<i>India</i>	220	1.0	6.5	544	1.7	5.6
<i>Myanmar</i>	165	0.8	4.9	742	2.3	7.7
<i>Others</i>	208	1.0	6.1	266	0.8	2.7
Total	21,575	100.0		31,615	100.0	

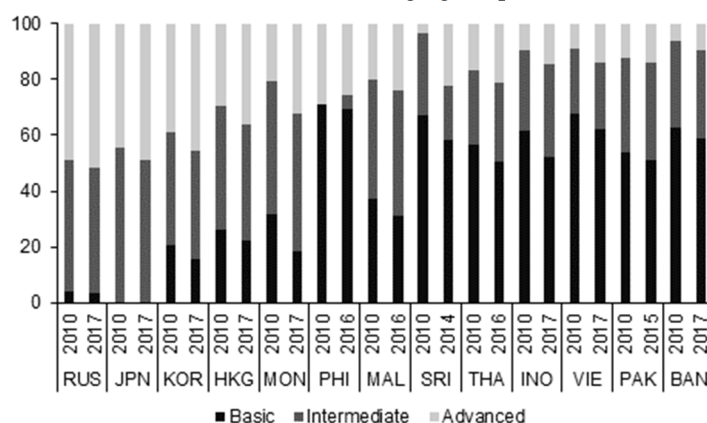
PRC = People's Republic of China.

Source: Singapore Nursing Board, Annual Reports for 2010 and 2016.

## 4.2 International Migration of the Skilled Workforce

Our estimation results suggest that the improvement in human capital in Asia and the Pacific, by narrowing the skills gap with major destination economies in and outside the region, can lead to more cross-border migration. This suggests that there will be a greater flow of skilled migrants from and within region as education attainment gaps are rapidly closing between major origin and destination economies, even in a short span of time (Figure 9).

Labor mobility will provide valuable opportunities, particularly for an educated workforce, to acquire on-the-job skills training and experience in locations that may enjoy more advanced technologies. Enhanced skills mobility will also help address youth unemployment and underutilization of skills, both frequently observed in developing countries. Policies that promote the portability of skills (such as mutual recognition of qualification and certification) can also facilitate the movement of talent.

**Figure 9. Educational Attainment of Working-age Population**

BAN = Bangladesh, HKG = Hong Kong, China, INO = Indonesia, JPN = Japan, MAL = Malaysia, MON = Mongolia, PAK = Pakistan, PHI = Philippines, KOR = Republic of Korea, RUS = Russia, SRI = Sri Lanka, THA = Thailand, and VIE = Viet Nam.

Source: ADB calculations using data from International Labour Organization. ILOSTAT. <https://www.ilo.org/ilostat/> (accessed 07 August 2018).

## 5 Conclusions and Policy Implications

International migrants from Asia and the Pacific still account for the largest share of the global movement of people and labor. It is apparent, though, that such movement is shifting more and more toward other regions, particularly the Middle East, consequently narrowing the share of intra-Asia migration. Nevertheless, some patterns from and within the NEA region are noticeable. Movement of people from the PRC to Japan and the Republic of Korea increased substantially. Russia and Mongolia also had increasing shares of intra-NEA migration in recent years.

The paper identifies and validates key driving forces of international migration from and within the region. Economic factors prompt the movement of people in two tracks. A widening income gap between the origin and destination economies tends to drive more migration, while the rise in income of the origin countries reduces financial constraint for settling on migration. Migration flows also gravitate more toward destinations that present lower direct and indirect (social, cultural and psychological) costs of relocation. The growing share of older population in destination economies and the similarities in the level of educational attainment are also associated with greater movement.

Empirical results provide interesting insight into how economic integration shapes the cross-border movement of people and labor from the region. Deeper trade, investment, and production ties between countries could substitute cross-border migration within the region. However, the corresponding increase in income and related economic opportunities in origin economies resulting from deepening

economic integration could eventually induce or complement cross-border migration, possibly by relaxing the financial constraints on such movements.

Ultimately, questions about the net effect of economic integration on cross-border labor movement can be tackled empirically. Meanwhile, economic benefits from regional cooperation and integration offer broader choices for citizens to maximize their welfare. Further studies would also be needed to explain the impact of cross-border labor mobility on economic opportunities and growth. From a policy viewpoint, given the political sensitivity of international migration, it is important to understand the impact of trade and investment on employment, both in origin and destination economies.

Further, consistent with migration literature, demographic variables go a long way in explaining the movement of people and labor. Among them, the aging populations of prominent destination economies tend to be associated with higher immigration, which could be explained by shortage of labor and skills, among other factors. This finding may be very relevant for Asia and the Pacific. The diversity of demographic trends across the region could be leveraged toward skills complementarity in labor markets. As such, the region's economies should work together on a regional policy that could encourage better allocation of labor and skills.

Asia and the Pacific stands to gain from reducing hurdles to the interregional migration of talent, moving away from being an area of net emigration of skilled workers. Promoting the portability of skill through skills recognition schemes and creating a business environment that is friendly to foreign entrepreneurs and investors can facilitate the process. Increased business and academic dialogue and tourism can also contribute to removing cultural and language barriers that in some areas/sectors are persistent. The gains are potentially large in promoting skilled labor mobility, which have received limited encouragement and promotion to date.

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**Appendix 1**  
GEE Estimates of the Gravity Model of Migration

Variables	GEE	
	Route 1	Route 2
<b>Economic factors</b>		
Income gap between origin and destination economies	0.247*** (0.067)	0.586*** (0.114)
Real per capita GDP in origin economies, in logs	0.291*** (0.083)	0.811*** (0.152)
<b>Demographic factors</b>		
Total population in destination economies, in logs	1.103*** (0.122)	1.962*** (0.464)
Total population in origin economies, in logs	-0.393** (0.172)	-0.284 (0.307)
Old-age dependency ratio in destination economies	0.055*** (0.005)	0.065*** (0.009)
<b>Skills complementarity</b>		
Gap between origin and destination economies in average years of schooling	-0.587*** (0.105)	- 0.950*** (0.165)
<b>Gravity variables</b>		
Distance between capitals (in logs)	-1.512*** (0.148)	- 1.366*** (0.241)
Contiguity	1.215*** (0.328)	0.928** (0.385)
Common official of primary language	0.565** (0.247)	0.606* (0.350)
Colonial relationship	2.790*** (0.288)	1.674* (1.002)
Constant	10.253*** (3.578)	-11.143 (8.441)
Year dummies	Yes	Yes
Origin country FE	Yes	Yes
Destination country FE	Yes	Yes
Observations	2,276	816
Number of bilateral routes	433	147

FE = fixed effects, GEE = generalized estimating equation.  
Standard errors in parentheses. \*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix.2** Baseline and Full Results: Trade and Migration

Variables	FE				GEE			
	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>								
Income gap between origin and destination economies	-0.078 (0.068)	0.168 (0.113)	-0.091 (0.068)	0.189* (0.113)	-0.049 (0.078)	0.213* (0.115)	-0.055 (0.078)	0.224* (0.116)
Real per capita GDP in origin economies, in logs	-0.004 (0.092)	0.328** (0.155)	-0.009 (0.091)	0.357** (0.156)	0.020 (0.106)	0.371** (0.159)	0.018 (0.106)	0.386** (0.159)
<b>Demographic factors</b>								
Total population in destination economies, in logs	0.919*** (0.115)	1.517*** (0.453)	0.935*** (0.114)	1.490*** (0.452)	0.917*** (0.133)	1.496*** (0.465)	0.925*** (0.133)	1.481*** (0.464)
Total population in origin economies, in logs	-0.173 (0.185)	-0.030 (0.306)	-0.147 (0.184)	0.002 (0.306)	-0.175 (0.215)	-0.064 (0.314)	-0.163 (0.214)	-0.046 (0.313)
Old-age dependency ratio in destination economies	0.050*** (0.005)	0.066*** (0.009)	0.050*** (0.005)	0.064*** (0.009)	0.050*** (0.006)	0.066*** (0.009)	0.050*** (0.006)	0.064*** (0.009)
<b>Skills complementarity</b>								
Gap between origin and destination economies in average years of schooling	-0.577*** (0.095)	-0.921*** (0.152)	-0.602*** (0.095)	-0.928*** (0.152)	-0.572*** (0.111)	-0.901*** (0.156)	-0.585*** (0.110)	-0.906*** (0.156)
<b>Economic cooperation and integration and migration</b>								
Bilateral trade (% of GDP)	0.030*** (0.003)	0.036*** (0.004)	-0.043** (0.018)	-0.019 (0.028)	0.027*** (0.003)	0.031*** (0.004)	-0.007 (0.020)	0.000 (0.028)
Interaction with (log) real per capita GDP in origin economies			0.008*** (0.002)	0.005* (0.003)			0.004* (0.002)	0.003 (0.003)
Constant	-3.906 (3.995)	-19.476** (9.496)	-4.519 (3.979)	-19.743** (9.476)	11.480*** (4.447)	-6.035 (9.029)	11.332** (4.439)	-6.078 (9.008)
Gravity variables	No	No	No	No	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,200	803	2,200	803	2,200	803	2,200	803
R-squared	0.512	0.571	0.517	0.574				
Number of bilateral routes	432	147	432	147	432	147	432	147

FE = fixed effects, GEE = generalized estimating equation.

Standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



### Appendix 3 Baseline and Full Results: Foreign Direct Investment and Migration

Variables	FE		GEE		GEE			
	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>								
Income gap between origin and destination economies	-0.167** (0.069)	-0.042 (0.140)	-0.180** (0.070)	-0.073 (0.141)	-0.168*** (0.054)	-0.045 (0.151)	-0.180*** (0.054)	-0.072 (0.152)
Real per capita GDP in origin economies, in logs	-0.086 (0.100)	0.127 (0.200)	-0.101 (0.100)	0.084 (0.202)	-0.087 (0.077)	0.124 (0.216)	-0.100 (0.078)	0.085 (0.218)
<b>Demographic factors</b>								
Total population in destination economies, in logs	0.370*** (0.098)	-0.020 (0.582)	0.370*** (0.097)	-0.019 (0.581)	0.371*** (0.076)	-0.050 (0.627)	0.371*** (0.075)	-0.048 (0.626)
Total population in origin economies, in logs	0.397* (0.240)	0.480 (0.461)	0.406* (0.240)	0.514 (0.461)	0.398** (0.186)	0.487 (0.496)	0.406** (0.186)	0.516 (0.496)
Old-age dependency ratio in destination economies	0.014*** (0.005)	0.000 (0.008)	0.013*** (0.005)	-0.000 (0.008)	0.013*** (0.004)	0.000 (0.009)	0.013*** (0.004)	-0.000 (0.009)
<b>Skills complementarity</b>								
Gap between origin and destination economies in average years of schooling	-0.017 (0.111)	0.039 (0.201)	-0.015 (0.111)	0.043 (0.201)	-0.015 (0.086)	0.052 (0.216)	-0.013 (0.086)	0.056 (0.216)
<b>Economic cooperation and integration and migration</b>								
Net bilateral foreign direct investment (% of GDP)	0.014 (0.016)	0.030 (0.022)	-0.075 (0.069)	-0.086 (0.087)	0.016 (0.012)	0.036 (0.023)	-0.070 (0.053)	-0.069 (0.094)
<i>Interaction with (log) real per capita GDP in origin economies</i>			0.011 (0.008)	0.015 (0.011)			0.011* (0.006)	0.013 (0.011)
Constant	-2.884 (4.792)	0.504 (13.451)	-2.893 (4.789)	0.284 (13.427)	14.026*** (3.809)	10.816 (12.678)	14.031*** (3.799)	10.661 (12.658)
Gravity variables	No	No	No	No	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,013	373	1,013	373	1,013	373	1,013	373
R-squared	0.513	0.457	0.514	0.461				
Number of bilateral routes	350	126	350	126	350	126	350	126

FE = fixed effects, GEE = generalized estimating equation.

Standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix 3** Baseline and Full Results: Foreign Direct Investment and Migration

Variables	FE				GEE			
	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>								
Income gap between origin and destination economies	-0.167** (0.069)	-0.042 (0.140)	-0.180** (0.070)	-0.073 (0.141)	-0.168*** (0.054)	-0.045 (0.151)	-0.180*** (0.054)	-0.072 (0.152)
Real per capita GDP in origin economies, in logs	-0.086 (0.100)	0.127 (0.200)	-0.101 (0.100)	0.084 (0.202)	-0.087 (0.077)	0.124 (0.216)	-0.100 (0.078)	0.085 (0.218)
<b>Demographic factors</b>								
Total population in destination economies, in logs	0.370*** (0.098)	-0.020 (0.582)	0.370*** (0.097)	-0.019 (0.581)	0.371*** (0.076)	-0.050 (0.627)	0.371*** (0.075)	-0.048 (0.626)
Total population in origin economies, in logs	0.397* (0.240)	0.480 (0.461)	0.406* (0.240)	0.514 (0.461)	0.398** (0.186)	0.487 (0.496)	0.406** (0.186)	0.516 (0.496)
Old-age dependency ratio in destination economies	0.014*** (0.005)	0.000 (0.008)	0.013*** (0.005)	-0.000 (0.008)	0.013*** (0.004)	0.000 (0.009)	0.013*** (0.004)	-0.000 (0.009)
<b>Skills complementarity</b>								
Gap between origin and destination economies in average years of schooling	-0.017 (0.111)	0.039 (0.201)	-0.015 (0.111)	0.043 (0.201)	-0.015 (0.086)	0.052 (0.216)	-0.013 (0.086)	0.056 (0.216)
<b>Economic cooperation and integration and migration</b>								
Net bilateral foreign direct investment (% of GDP)	0.014 (0.016)	0.030 (0.022)	-0.075 (0.069)	-0.086 (0.087)	0.016 (0.012)	0.036 (0.023)	-0.070 (0.053)	-0.069 (0.094)
<i>Interaction with (log) real per capita GDP in origin economies</i>			0.011 (0.008)	0.015 (0.011)			0.011* (0.006)	0.013 (0.011)
Constant	-2.884 (4.792)	0.504 (13.451)	-2.893 (4.789)	0.284 (13.427)	14.026*** (3.809)	10.816 (12.678)	14.031*** (3.799)	10.661 (12.658)
Gravity variables	No	No	No	No	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,013	373	1,013	373	1,013	373	1,013	373
R-squared	0.513	0.457	0.514	0.461				
Number of bilateral routes	350	126	350	126	350	126	350	126

FE = fixed effects, GEE = generalized estimating equation.

Standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix 4** Baseline and Full Results: Global Value Chains and Migration

Variables	FE				GEE			
	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>								
Income gap between origin and destination economies	0.001 (0.121)	-0.162 (0.278)	-0.031 (0.122)	-0.302 (0.282)	-0.002 (0.162)	-0.232 (0.301)	-0.025 (0.165)	-0.356 (0.304)
Real per capita GDP in origin economies, in logs	0.533*** (0.178)	0.359 (0.391)	0.478*** (0.182)	0.162 (0.396)	0.534** (0.240)	0.312 (0.423)	0.493** (0.245)	0.132 (0.428)
<b>Demographic factors</b>								
Total population in destination economies, in logs	0.375 (0.519)	-1.536 (1.350)	0.363 (0.519)	-1.712 (1.338)	0.300 (0.698)	-1.864 (1.460)	0.289 (0.700)	-2.012 (1.446)
Total population in origin economies, in logs	-0.086 (0.390)	-0.078 (0.772)	-0.056 (0.390)	0.081 (0.766)	-0.055 (0.527)	-0.027 (0.836)	-0.033 (0.528)	0.112 (0.830)
Old-age dependency ratio in destination economies	0.030*** (0.009)	-0.015 (0.026)	0.029*** (0.009)	-0.023 (0.026)	0.028** (0.013)	-0.020 (0.028)	0.028** (0.013)	-0.028 (0.028)
<b>Skills complementarity</b>								
Gap between origin and destination economies in average years of schooling	-0.433*** (0.165)	-0.987*** (0.323)	-0.405** (0.166)	-0.926*** (0.320)	-0.398* (0.222)	-0.946*** (0.350)	-0.377* (0.224)	-0.891** (0.347)
<b>Economic cooperation and integration and migration</b>								
Bilateral vertical specialization (% of Gross Exports)	-0.007 (0.017)	-0.046 (0.028)	-0.183 (0.123)	-0.505** (0.202)	0.004 (0.022)	-0.030 (0.030)	-0.129 (0.155)	-0.456** (0.212)
<i>Interaction with (log) real per capita GDP in origin economies</i>			0.022 (0.015)	0.056** (0.025)			0.017 (0.019)	0.052** (0.026)
Constant	-0.106 (12.103)	36.646 (32.173)	0.066 (12.093)	38.770 (31.842)	18.532 (15.966)	59.529* (33.844)	18.540 (16.006)	60.515* (33.478)
Gravity variables	No	No	No	No	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Origin country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Destination country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	861	293	861	293	861	293	861	293
R-squared	0.401	0.372	0.403	0.389				
Number of bilateral routes	264	88	264	88	264	88	264	88

FE = fixed effects, GEE = generalized estimating equation.

Standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix 5**  
Robustness: Determinants of Migration

Variables	Route 1	Route 2
<b>Economic factors</b>		
Income gap between origin and destination economies	0.057*** (0.019)	0.008 (0.032)
Real per capita GDP in origin economies, <i>in logs</i>	0.011 (0.022)	-0.022 (0.028)
<b>Demographic factors</b>		
Total population in destination economies, <i>in logs</i>	0.006 (0.010)	0.042 (0.026)
Total population in origin economies, <i>in logs</i>	-0.006 (0.006)	-0.025** (0.010)
5-year change in old-age dependency ratio in destination economies	0.278*** (0.080)	0.987*** (0.273)
<b>Skills complementarity</b>		
5-year change in skills gap between origin and destination economies	-0.137 (0.174)	-0.160 (0.291)
<b>Gravity variables</b>		
Distance between capitals (in logs)	-0.056** (0.023)	0.012 (0.040)
Contiguity	-0.064 (0.044)	-0.034 (0.064)
Common official of primary language	-0.010 (0.025)	-0.007 (0.076)
Colonial relationship	-0.169*** (0.034)	-0.440*** (0.101)
Constant	0.514** (0.214)	0.026 (0.702)
Year dummies	Yes	Yes
Observations	1,872	674
R-squared	0.219	0.269

Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix 6**  
Robustness: Trade and Migration

Variables	Model 1		Model 2	
	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>				
Income gap between origin and destination economies	0.052*** (0.020)	0.014 (0.029)	0.059*** (0.019)	0.024 (0.028)
Real per capita GDP in origin economies, <i>in logs</i>	0.006 (0.022)	-0.037 (0.028)	-0.001 (0.024)	-0.042 (0.029)
<b>Demographic factors</b>				
Total population in destination economies, <i>in logs</i>	-0.002 (0.011)	0.006 (0.016)	0.002 (0.011)	0.007 (0.016)
Total population in origin economies, <i>in logs</i>	0.002 (0.007)	-0.008 (0.010)	-0.001 (0.007)	-0.013 (0.010)
5-year change in old-age dependency ratio in destination economies	0.265*** (0.073)	0.801*** (0.249)	0.275*** (0.074)	0.811*** (0.246)
<b>Skills complementarity</b>				
5-year change in skills gap between origin and destination economies	-0.112 (0.164)	-0.151 (0.273)	-0.062 (0.159)	-0.071 (0.275)
<b>Economic cooperation and integration and migration</b>				
Bilateral trade (% of GDP)	0.004* (0.002)	0.005* (0.003)	-0.009 (0.007)	-0.007 (0.009)
<i>Interaction with real per capita GDP in origin economies</i>			0.001 (0.001)	0.001 (0.001)
Constant	0.450** (0.213)	0.597 (0.553)	0.532** (0.215)	0.775 (0.547)
Gravity variables	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	1,861	671	1,861	671
R-squared	0.233	0.312	0.237	0.318

Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix 7**  
Robustness: Foreign Direct Investment and Migration

Variables	Model 1		Model 2	
	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>				
Income gap between origin and destination economies	0.009 (0.027)	-0.010 (0.046)	0.014 (0.026)	-0.006 (0.048)
Real per capita GDP in origin economies, <i>in logs</i>	-0.043** (0.022)	-0.050 (0.036)	-0.047** (0.022)	-0.053 (0.037)
<b>Demographic factors</b>				
Total population in destination economies, <i>in logs</i>	-0.022** (0.011)	0.046 (0.033)	-0.021** (0.011)	0.041 (0.037)
Total population in origin economies, <i>in logs</i>	0.001 (0.007)	-0.022 (0.014)	0.002 (0.007)	-0.021 (0.014)
5-year change in old-age dependency ratio in destination economies	0.277** * (0.073)	0.775** * (0.299)	0.282** * (0.071)	0.759* * (0.308)
<b>Skills complementarity</b>				
5-year change in skills gap between origin and destination economies	-0.167 (0.245)	-0.434 (0.327)	-0.115 (0.237)	-0.409 (0.344)
<b>Economic cooperation and integration and migration</b>				
Net bilateral foreign direct investment (% of GDP)	0.041** * (0.013)	0.021** (0.010)	-0.052 (0.043)	-0.016 (0.050)
<i>Interaction with real per capita GDP in origin economies</i>			0.012* (0.006)	0.005 (0.007)
Constant	1.119** * (0.290)	0.213 (0.859)	1.133** * (0.292)	0.358 (0.976)
Gravity variables	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	982	367	982	367
R-squared	0.278	0.284	0.283	0.285

Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

**Appendix 8**  
Robustness: Global Value Chains and Migration

Variables	Model 1		Model 2	
	Route 1	Route 2	Route 1	Route 2
<b>Economic factors</b>				
Income gap between origin and destination economies	0.019 (0.031)	0.030 (0.055)	0.016 (0.031)	0.049 (0.056)
Real per capita GDP in origin economies, <i>in logs</i>	-0.018 (0.033)	-0.015 (0.057)	-0.017 (0.034)	-0.029 (0.058)
<b>Demographic factors</b>				
Total population in destination economies, <i>in logs</i>	-0.002 (0.019)	-0.040 (0.037)	-0.002 (0.019)	-0.038 (0.037)
Total population in origin economies, <i>in logs</i>	0.004 (0.007)	-0.002 (0.015)	0.004 (0.007)	-0.003 (0.015)
5-year change in old-age dependency ratio in destination economies	0.435* (0.245)	1.111 (0.719)	0.451* (0.238)	1.324* (0.728)
<b>Skills complementarity</b>				
5-year change in skills gap between origin and destination economies	-0.163 (0.244)	-0.112 (0.379)	-0.178 (0.250)	0.073 (0.365)
<b>Economic cooperation and integration and migration</b>				
Bilateral vertical specialization (% of Gross Exports)	-0.009 (0.011)	-0.013 (0.017)	0.005 (0.033)	-0.184* (0.099)
<i>Interaction with real per capita GDP in origin economies</i>			-0.002 (0.004)	0.019* (0.011)
Constant	0.599 (0.450)	1.639 (1.067)	0.593 (0.453)	1.626 (1.060)
Gravity variables	Yes	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes	Yes
Observations	834	288	834	288
R-squared	0.205	0.328	0.205	0.337

Robust standard errors in parentheses.

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1