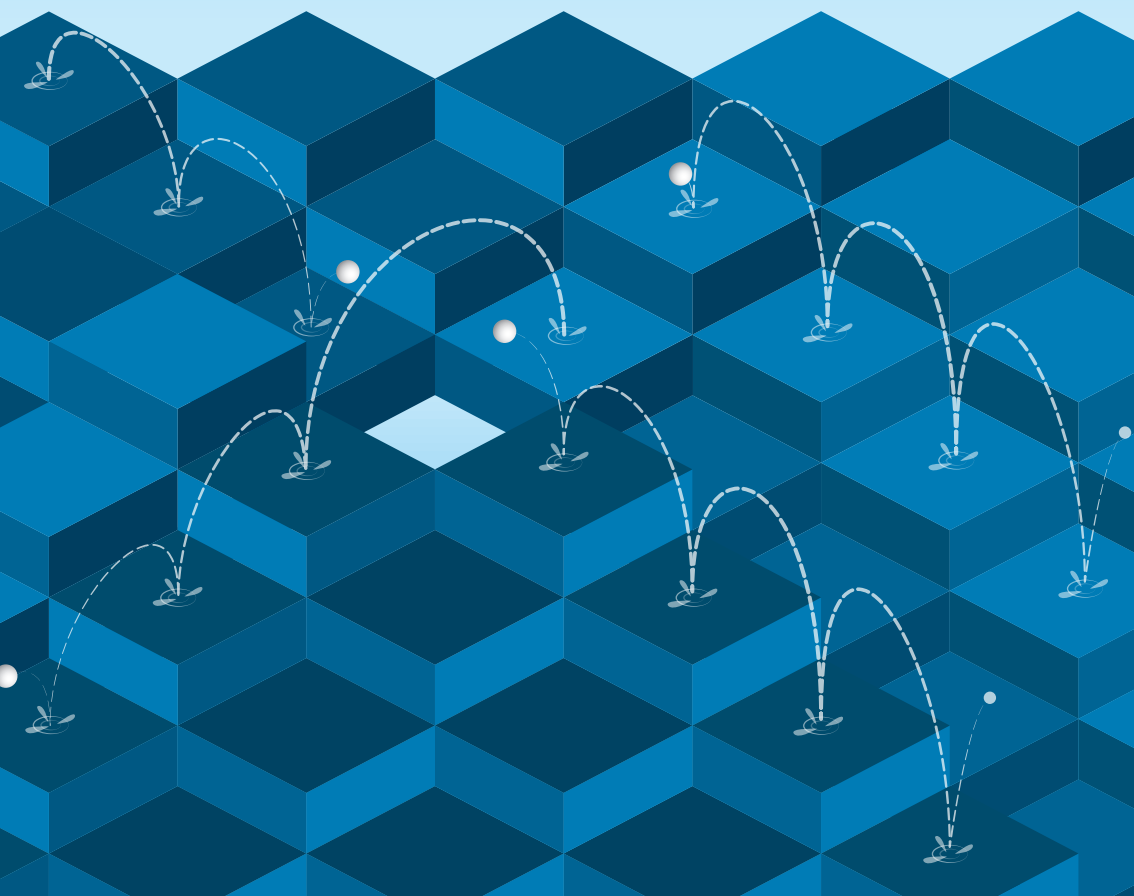# SKILLED LABOR MOBILITY AND MIGRATION

Challenges and Opportunities for the ASEAN Economic Community

EDITED BY
Elisabetta Gentile

Skilled Labor Mobility and Migration

In ample seas I sail, and depths untry'd before,
This let me further add, that Nature knows
No steadfast station, but, or ebbs, or flows:
Ever in motion; she destroys her old,
And casts new figures in another mold.

Skilled Labor Mobility and Migration

Challenges and Opportunities for the ASEAN Economic Community

Edited by

Elisabetta Gentile

Economic Research and Regional Cooperation Department, Asian Development Bank, Philippines

Notes: ADB recognizes "China" as the People's Republic of China; "Hong Kong" as Hong Kong, China; "Korea" as the Republic of Korea; "Russia" as the Russian Federation; and "Calcutta" as Kolkata.

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Foreword

Over the last four decades, the Association of Southeast Asian Nations (ASEAN) has maintained economic growth well above the global average, with gross domestic product expanding more than 5% annually. The exceptions were the 1997/98 Asian Financial Crisis and the 2008/09 Global Financial Crisis. If current growth rates continue, ASEAN will become the world's fourth-largest economy by 2030—behind the United States (US), the People's Republic of China, and the European Union.

This rapid economic growth has expanded an increasingly wealthy middle class, more willing to pay for better, higher-quality goods and services. It has fueled mass urbanization through both intra- and cross-country migration—as rural workers move to the cities and workers from less-developed areas and countries look for better opportunities in more advanced ones. Southeast Asia's urban population is expected to grow by nearly 100 million people—to some 373 million—by 2030. For example, Malaysia's urban population should reach 80% of its total population, similar to the current shares in advanced economies like the US, France, and the United Kingdom. Bangkok and Ho Chi Minh City are projected to become megacities—with 10 million people or more—joining Jakarta and Manila.

Improved living standards are closely associated with demographic change: Singapore, Thailand, Viet Nam, and Malaysia are rapidly aging. Estimates suggest Singapore's share of the population that is 65 years and older will be more than double the number of those younger than 15 by 2030, with old and young populations comparable in Malaysia by 2040. Thailand and Viet Nam will likely complete the transition from aging to aged societies—with between 14% and 20% of the population 60 years or older—in 2024 and 2039, respectively. Yet countries like the Philippines and Indonesia remain at an early stage of demographic transition, potentially benefiting from a demographic dividend over the next several decades.

Finally, rapid technological advances have the potential to disrupt labor markets. While industrial robots have been confined to routine and manual tasks for a long time, they are increasingly capable of undertaking nonroutine and cognitive tasks. We observe markets for these sophisticated robots in Indonesia, Malaysia, Thailand, and Viet Nam.

All these developments—structural transformation, urbanization, demographic change, and rapid technological advances—could disrupt labor markets and displace workers, simultaneously spurring demand for new, more highly specialized skills currently in short supply. Indeed, almost all ASEAN members report shortages in skilled labor. The ongoing transformation will likely make things worse.

Skilled worker mobility across ASEAN is a powerful way of alleviating skill shortages and transferring knowledge across borders. It is also crucial to boost productivity. When employers can choose from a broader talent pool, they can make better matches and make the best possible use of a scarce resource.

This timely book looks closely at the issue of skills mobility across the ASEAN Economic Community. It begins by taking stock of the nature and magnitude of skill flows within the region and debunking deeply held misconceptions about skilled migrants. It then assesses the economic impact of free skilled-labor flows for specific sectors and for the broader economy. Finally, it provides a wealth of policy insights into how to advance skills mobility in the region. I hope this book will enhance readers' understanding of the importance skills mobility has in fostering a more competitive, inclusive, and resilient ASEAN, as it further unlocks the opportunities and mitigates the risks brought about by the so-called "Fourth Industrial Revolution."

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Preface

This book was born out of an Asian Development Bank (ADB) technical assistance project—"Capacity Building for Developing Qualification Frameworks under the Mutual Recognition Agreements to Support the ASEAN Economic Community by 2015 and Beyond"—financed by the Japan Fund for Poverty Reduction and implemented by ADB as executing agency. Its overarching goal is to facilitate freer mobility of professionals by enhancing the capacity of key officials to implement Mutual Recognition Arrangements (MRAs) for the ASEAN Economic Community and strengthening evidence-based policy making.

Its journey began with a call for papers in 2015 to produce an edited volume—31 submissions were received. During the review process, the book started taking shape around four core areas of skills mobility: (i) its economic impact, (ii) case studies, (iii) policies and mechanisms, and (iv) the impact of higher education.

The authors of selected papers revised and updated their drafts in 2017 and 2018 as they underwent peer review. The key challenge of converting background papers to book chapters was to try to reach a broader audience, while at the same time maintaining a rigorous approach to research questions.

The book is divided into ten chapters, each revolving around the four core areas identified above. It is by no means meant to be the definitive book on skills mobility in ASEAN, but rather to start a conversation grounded in facts.

Chapter 1 opens the book by providing an overview of the latest trends and patterns of the mobility of people across ASEAN against the backdrop of regional economic integration. Next, it explores the possible roles labor mobility will play in the post-2015 ASEAN Economic Community.

Chapter 2 interprets the dynamics of ASEAN labor migration described in Chapter 1 through the lens of existing academic literature on migration. While a potential consequence of the lack of data on skilled migration is that perceptions and speculations drive the policy debate, the key findings in the literature establish a factual basis for current and future policy decisions.

Chapters 3, 4, and 5 use a computable general equilibrium (CGE)

approach to quantify the potential economic impact of skills mobility on the broader economy, the services sector, and the banking sector, respectively. The quantitative findings support the view that freer flows of skilled labor expand output and employment in ASEAN, although—as expected from any form of liberalization—there are winners and losers.

Chapter 6 focuses on the relationship between higher education and skills mobility. It investigates the role human capital stock plays as a determinant of migration and the impact of migration on postsecondary-educated human capital stock. It finds that high-skill intra-ASEAN migration is explained by the postsecondary-educated human capital stock in the source country, but not in the host country. At the same time, bilateral high-skill intra-ASEAN mobility explains the postsecondary-educated human capital stock in both source and host countries. Therefore, it concludes that high-skill ASEAN mobility could have a positive relationship with an increase in postsecondary-education investment in source countries.

Chapter 7 uses a theoretical model with migration tax to investigate how an exit tax affects both the stock and flow of migrant workers in a country. The numerical solution shows that the choice of tax influences both current and future patterns of migration. Next, the chapter discusses a regressive migration tax as an incentive to the relatively unskilled to acquire the skills needed before attempting to migrate.

Chapter 8 provides a qualitative assessment of two case studies: (i) the migration of Indonesian careworkers to Taipei,China; and (ii) the migration of Indonesian nurses and careworkers to Japan. It provides an extensive policy background for these two cases, and then attempts to draw lessons in terms of cost of migration, matching qualifications, and cultural barriers from a source country perspective.

Chapter 9 is a case study of Thailand's engineering sector, which provides a host-country perspective. It conducts a supply-side analysis using data from the 2007–2009 Thai Labor Force Surveys and finds that engineers have as good or better career prospects within Thailand in terms of formal employment and wages compared with other highly educated workers. Given Thailand's attractive work environment, it is possible that engineers from other ASEAN countries will consider engineering jobs in Thailand, implying that Thai workers should upgrade their skills to survive in a more competitive environment.

Finally, Chapter 10 gazes into the future to add to the ongoing debates on how the Fourth Industrial Revolution (4IR) will affect ASEAN in the context of skill flows and labor mobility. As barriers to communication continue to decline, two key trends emerge: (i) a clear pattern of return and circular migration, as well as transit migration; and (ii) that workers of the

4IR will more likely be self-employed and hold a portfolio of jobs. Virtual migration is also rising, although further research is required to better understand this phenomenon. Whether physical or virtual, circular or permanent, it is argued that skills mobility remains of strategic importance in supporting economic growth and inclusiveness in the region.

Abbreviations

4IR	Fourth Industrial Revolution
ACPE	ASEAN Chartered Professional Engineer
ADB	Asian Development Bank
AEC	ASEAN Economic Community
AEM	ASEAN Economic Ministers
AFAS	ASEAN Framework Agreement on Services
AFTA	ASEAN Free Trade Agreement
AKTIS	ASEAN-Republic of Korea Trade in Services Agreement
APEC	Asia-Pacific Economic Cooperation
AQRF	ASEAN Qualification Reference Framework
ASEAN	Association of Southeast Asian Nations
BAU	Business as Usual
BNP2TKI	Badan Nasional Penempatan dan Perlindungan Tenaga Kerja Indonesia (National Board for Placement and Protection of Indonesian Migrant Workers)
BP3TKI	Balai Pelayanan Penempatan dan Perlindungan Tenaga Kerja Indonesia (BNP2TKI provincial office)
CAB	Current Account Balance
CARICOM	Caribbean Community
CEPT	Common Effective Preferential Tariff
CGE	Computable General Equilibrium
CPI	Consumer Price Index
CPTPP	Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CS	computer science
eID	digital identity
EPA	Economic Partnership Agreement
EU	European Union
FDI	Foreign Direct Investment
FinTech	Financial technology
FTAP	Version of the GTAP model designed to support analysis of services liberalization
GDP	Gross Domestic Product
GATS	General Agreement on Trade in Services

GTAP	Global Trade Analysis Project
GVC	Global Value Chain
HHI	Herfindahl–Hirschman Index
HIDA	Japan's Human Resources and Industry Development Association
IDR	Indonesian Rupiah
IETO	Kantor Dagang Ekonomi Indonesia di Taipei,China (Indonesia's Economic and Trade Office to Taipei,China)
IJEPA	Indonesia-Japan Economic Partnership Agreement
ILO	International Labour Organization
ISCED	International Standard Classification of Education
IT	information technology
JICWELS	Japan International Corporation of Welfare Services
JPY	Japanese Yen
KTKLN	Kartu Tenaga Kerja Luar Negeri (Migrant Worker's Card)
LFS	Labor Force Survey
MERCOSUR	Mercado Común del Sur (Common Market of the South)
MOH	Ministry of Health
MOM	Ministry of Manpower
MOOC	Massive Online Open Course
MOU	Memorandum of Understanding
MRA	Mutual Recognition Arrangement
NAFTA	North American Free Trade Agreement
NASA	National Aeronautics and Space Administration
O*NET	Occupational Information Network
OECD	Organisation for Economic Co-operation and Development
OLI	Online Labour Index
PAP	Pembekalan Akhir Pemberangkatan (Pre-Departure Orientation Training)
PIAAC	Programme for the International Assessment of Adult Competencies
POEA	Philippine Overseas Employment Administration
PPTKIS	Pelaksana Penempatan Tenaga Kerja Indonesia Swasta (Indonesia's Private Agency for Placement of Indonesian Migrant Workers)
PRC	People's Republic of China
RCEP	Regional Comprehensive Economic Partnership
RFPE	Registered Foreign Professional Engineer
SAM	Social Accounting Matrix

SMAC   Social-Mobile-Analytics-Cloud
SOC   Standard Occupational Classification
STEM   Science, Technology, Engineering and Mathematics
SKKNI   Standar Kompetensi Kerja Nasional Indonesia
                (Indonesia's National Standard of Work Competency)
STRI   Services Trade Restrictiveness Index
TETO   Taipei,China's Economic and Trade Office to Indonesia
THB   Thai Baht
TITP   Technical Intern Training Program
TPP   Trans-Pacific Partnership
TRI   Trade Restrictiveness Index
UK   United Kingdom
UN   United Nations
US   United States
USD   United States Dollar

1. Trends and patterns in intra-ASEAN migration

Aiko Kikkawa and Eric B. Suan*

1. INTRODUCTION

Regional integration has played an essential role in driving economic and social development in many regions of the world. It generates growth by expanding markets and boosting productivity through the exchange of new ideas and production technologies. A deeply interconnected region can gain considerable efficiency by sharing natural and human resources. Through this process, development becomes more inclusive and contributes to important non-economic benefits such as regional security and political stability (ADB 2008).

A key vision of the Association of Southeast Asian Nations (ASEAN) is establishing a globally competitive region with a single market and production base—one that embraces the free flow of goods, services, investment, and skilled labor. With the establishment of the ASEAN Economic Community (AEC) in December 2015, the region has advanced its agenda and taken on new challenges to achieve deeper regional cooperation and integration. The AEC has four objectives: (i) creating a single market and production base; (ii) increasing competitiveness; (iii) promoting equitable economic development; and (iv) further integrating ASEAN within the global economy. ASEAN members have already invested considerably in building cross-border physical infrastructure and harmonizing market regulations that facilitate trade and investment.

ASEAN has succeeded in catalyzing large inflows of foreign direct investment (FDI) globally to create a highly integrated base for production and trade. The region has become one of the world's fastest-growing investment destinations—accounting for 18.5% of total global inflows in 2015 compared with just 5% in 2007 (ASEAN Investment Reports). Its combined gross domestic product (GDP) nearly doubled from 2007, while average GDP per capita grew by almost 80%—to over $5,000. ASEAN dialogues and summits have contributed to the region's relative peace and security despite its diversity in cultures, languages, and levels of economic development.

The movement of people and labor contributes to efficient and productive use of human capital and catalyzes transfer of knowledge across the region. It is an integral part of the AEC and includes policies that ease the movement of tourists, students, and skilled professionals, among others. There is a growing desire within the region to take a more proactive role to facilitate and foster labor mobility—especially in attracting, retaining, and circulating ASEAN's skilled workforce—as many members become more knowledge-based economies that require greater innovation. In addition, aging populations and changing demographics will necessitate more efficient use of human resources through regional collaboration.

This introductory chapter provides an overview of the latest trends and patterns of the mobility of people in ASEAN against the backdrop of regional economic integration. The next two sections describe the dynamics of ASEAN labor migration and how it relates to the overall framework and regional integration policies. Subsequent sections explore the possible roles labor mobility will play in the post-2015 AEC. Some policy recommendations and suggestions for future research close the chapter.

2. ASEAN MODEL OF REGIONAL INTEGRATION AND ITS LABOR MOBILITY FRAMEWORK

ASEAN economic integration process has been market-driven and outward-oriented (Hill and Menon 2014). While deepening cooperation and economic integration between members remains its primary goal, ASEAN also actively promotes relations with other countries and regions—primarily the PRC, Japan, and the Republic of Korea (ASEAN+3), and the United States (US). A key strategic goal of ASEAN—which spans the gamut from high-income to upper and lower middle-income countries, along with several low-income members—is to create a regional market with an investment climate that attracts regional and global FDI.

The ASEAN regional economic integration strategy consists of multi-layered initiatives which aim to achieve high standards of connectivity—be it physical infrastructures, institutional and policy arrangements (trade/investment agreements and standardized administrative procedure) or people-to-people interactions (in education, tourism, and skills mobility). The Master Plan on ASEAN Connectivity—for 2011–2015, currently updated through 2025—defines benchmarks and goals for each initiative.

The overall results to date have been impressive. ASEAN intraregional trade grew from $68.7 billion in 1995 to $276 billion in 2016, largely intermediary goods feeding regional value chains. Figure 1.1 compares the bilateral flows of exports between ASEAN members in 1995 and

2016: Total export = $276 billion
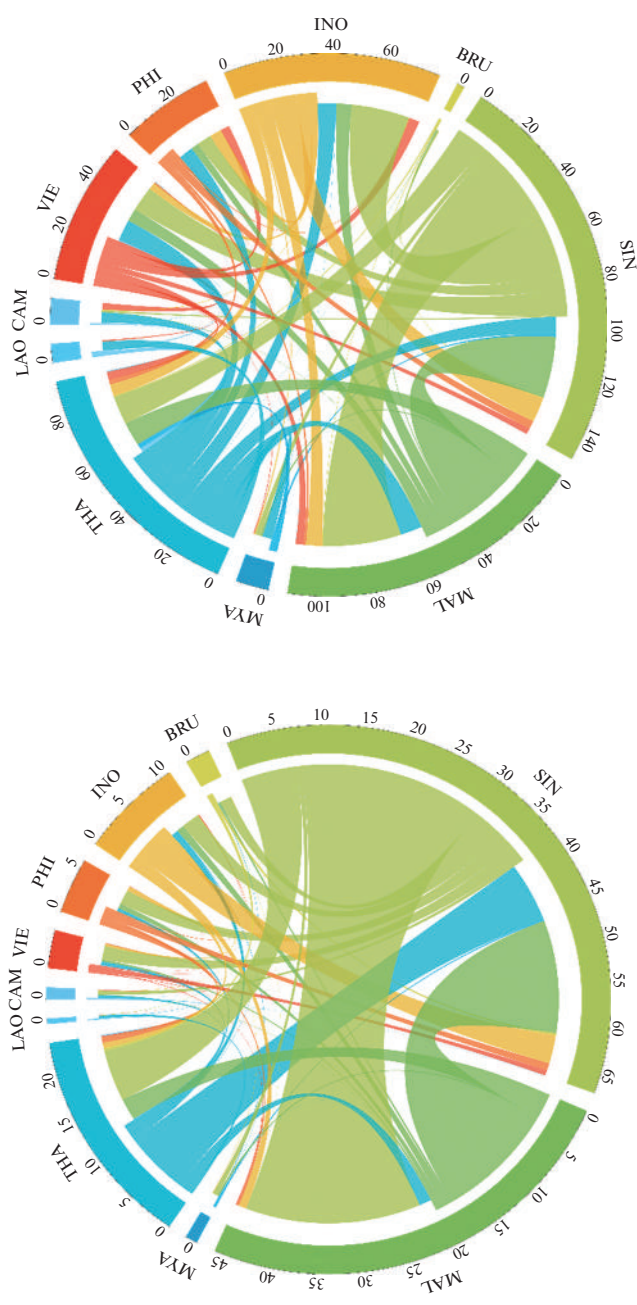
1995: Total export = $68.7 billion

Note: BRU = Brunei Darussalam; CAM = Cambodia; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MYA = Myanmar; PHI = Philippines; SIN = Singapore; THA = Thailand; VIE = Viet Nam.

Source: Authors' rendering based on Abel et al. (2014) model using the database from International Monetary Fund, *Direction of Trade Statistics*. https://www.imf.org/en/Data (accessed September 2017).

Figure 1.1 Circular flow of intra-ASEAN merchandise exports, 1995 and 2016

2016. Each strip or line represents the proportionate volume and direction of exports from origin (outer circle) to destination (inner circle). Early on, transactions among Malaysia, Singapore, and Thailand dominated intra-ASEAN trade flows. In 2016, however, regional export shares are more evenly spread across members. The region developed tightly knit production and trade linkages and emerged as one of the most integrated economic regions in the world (ADB 2017).

As for the intra-ASEAN share of goods and services trade (either for imports or exports), it remained below 30% of annual trade volumes during 1970–2016 (Figure 1.2). Major trading partners outside ASEAN are the PRC, Japan, and the US. In the meantime, ASEAN attracted large FDI inflows from advanced economies, and they accounted for 18.5% of total global FDI inflows in 2015. ASEAN's well-integrated yet open regionalism approach sets itself apart from the more institutionalized, formal regional economic groups such as the EU, offering exclusive privileges to its members.

2.1   ASEAN Initiatives on Labor Mobility

For many years, ASEAN approached labor mobility mostly as an extension of open trade and investment—more specifically through the promotion of services trade ("Mode 4," or the "movement of natural persons"), which deals with the temporary entry of skilled persons. This group of people consists of intra-cooperate transferees, investors, and highly skilled workers. Members have signed at least three relevant ASEAN-wide agreements—even if to date none has entered into force.

The ASEAN Framework Agreement on Services (AFAS) was signed in 1997, and it is quite similar to the General Agreement on Trade in Services (GATS) in terms of the coverage (ADBI 2014). However, when quantifying the level of liberalization using the Hoekman Index[1]—which quantifies the level of openness—AFAS (as of 2012) would be more open on trade in services than GATS if enacted (Fukunaga and Ishido 2015).

The two other agreements were designed specifically to promote intra-ASEAN mobility of people. The ASEAN Framework Agreement on Visa Exemption allows visa-free travel for ASEAN nationals across the region for up to 14 days. The ASEAN Agreement on the Movement of Natural Persons was signed in 2012 to further liberalize services trade across the region (Fukunaga and Ishido 2015). Again, these agreements have never been implemented. ASEAN itself admits that "progress on freer mobility of skilled labor in ASEAN has been limited" (ASEAN 2015).
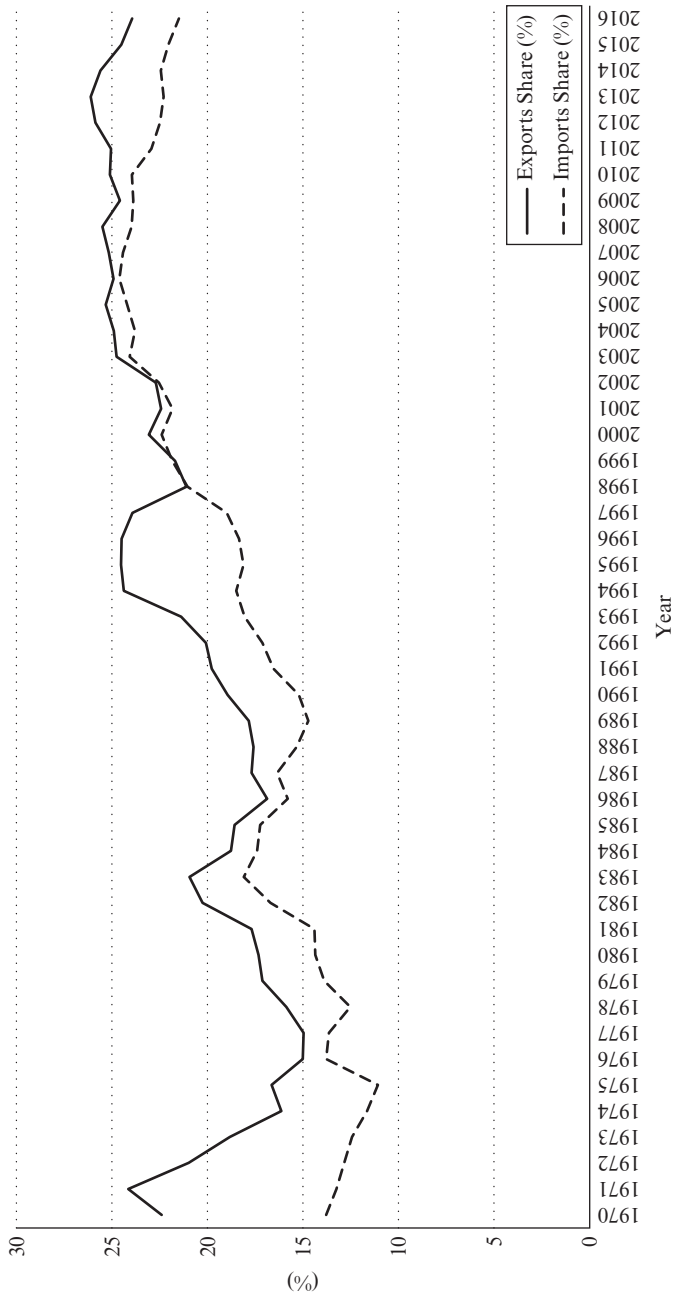
Source: ADB calculations using data from International Monetary Fund, *Direction of Trade Statistics*. https://www.imf.org/en/Data (accessed September 2017).

Figure 1.2   Share of intra-ASEAN trade in exports and imports, 1970–2016

2.2   Migrant Workers in ASEAN

Despite the stalled ASEAN skills mobility initiatives, the number of people and labor moving across ASEAN substantially increased over recent decades. Intra-ASEAN migration[2] tripled from 2.1 million in 1995 to 6.9 million in 2015 (Figure 1.3), with its share of total migrants into ASEAN rising from 57.6% in 1995 to 70.0% in 2015. ASEAN consists of countries with net migrant inflows—Brunei Darussalam, Malaysia, Singapore, and Thailand—and net outflows—Cambodia, Indonesia, the Lao People's Democratic Republic (Lao PDR), Myanmar, the Philippines, and Viet Nam. There intra-regional flows come largely within the purview of bilateral arrangements between source and host countries and labor and immigration laws of host countries, rather than ASEAN-wide initiatives.

Figure 1.4 plots the patterns of intra-ASEAN migration in 1995 and 2015—using United Nations (UN) bilateral migration stock data. Each strip or line represents the proportionate volume and direction of migration (in stock) from source (outer circle) to host (inner circle). It is clear that intra-ASEAN labor mobility is concentrated within the Greater Mekong Subregion (GMS)—migrants from Cambodia, the Lao PDR, and Myanmar to Thailand—as well as the Indonesia–Malaysia route and migration from Malaysia to Singapore.
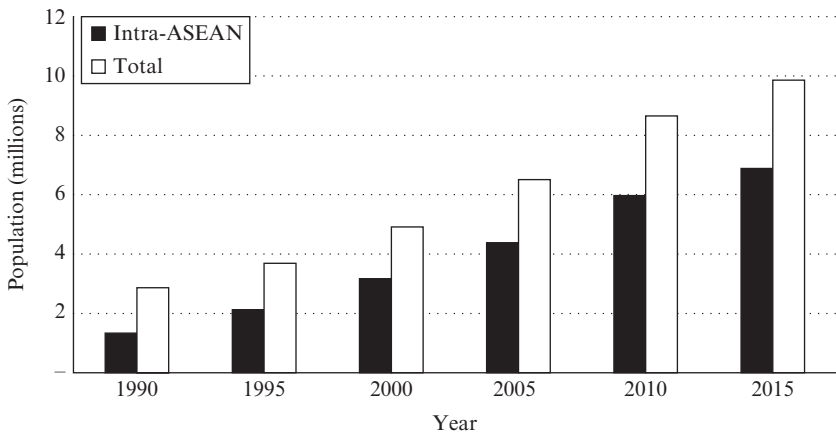
Source: United Nations Department of Economic and Social Affairs, Population Division, "International Migrant Stock: The 2015 Revision" (United Nations database, POP/DB/MIG/Stock/Rev.2015). Accessed 1 May 2016 at www.un.org/en/development/desa/population/migration/data/estimates2/index.shtml.

Figure 1.3   Migrant stock in ASEAN by region of origin, 1990–2015

2015: Total migrant stock = 6.9 million
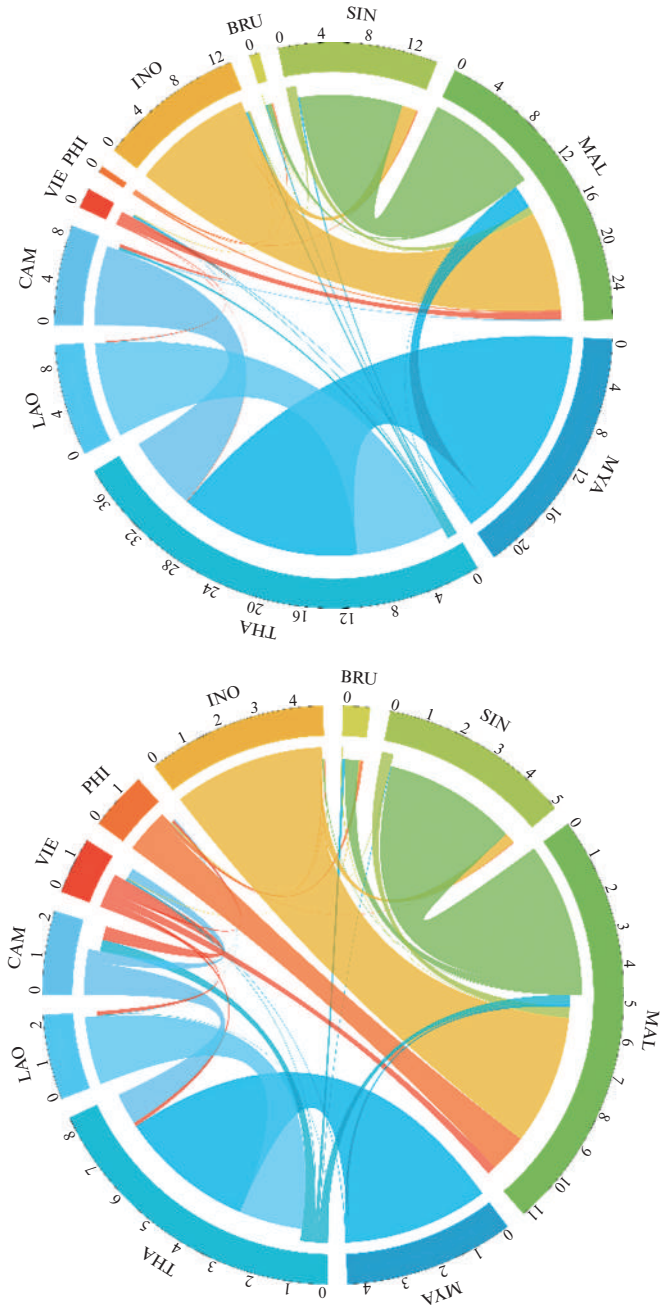
1995: Total migrant stock = 2.1 million

Note: BRU = Brunei Darussalam; CAM = Cambodia; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; MYA = Myanmar; PHI = Philippines; SIN = Singapore; THA = Thailand; VIE = Viet Nam.

Source: Authors' rendering based on Abel et.al. (2014), using the United Nations Department of Economic and Social Affairs (2015) database, Trends in International Migrant Stock: Migrants by Destination and Origin (United Nations database, POP/DB/MIG/Stock/Rev.2015).

Figure 1.4   Circular chart of intra-ASEAN migration, 1995 and 2015

Over the years, there is a modest proportional expansion of GMS labor toward Thailand where more jobs are available in agriculture, fisheries, construction, and domestic services, with the limited opportunities in Myanmar pre-economic reform driving many workers searching for jobs outside the country. Labor movement from Indonesia to Malaysia and from Malaysia to Singapore, while increasing in volume, saw its relative share decline. The official labor migration from Indonesia to Malaysia was frequently suspended during the period due to bilateral disputes. Singapore is already host to many foreign residents (46% of its current population) and has limited scope to expand its migrant intake given its topography.

It is perhaps surprising that the Philippines—one of the largest migrant source countries globally—plays a very limited role in intra-ASEAN migration. The share of Viet Nam is also small and declining. The majority of migrants from the Philippines and Viet Nam live and work outside ASEAN—primarily in the US, the Middle East, and other Asian countries/territories. Even then Figure 1.4 likely underestimates labor mobility, particularly between the Philippines and Malaysia. UN data show the number of Filipinos in Malaysia declined from 123,116 in 1995 to 21,732 in 2015. By contrast, Philippine Overseas Employment Administration (POEA) data show that the departure of workers from the Philippines to Malaysia increased from 6,768 in 1995 to 26,199 in 2015. The UN data may not consistently provide an accurate picture of labor mobility where irregular or short/circular migration is rampant or when a country reports statistics based on its own definition of international migrants.[3] Irregular migration is a sensitive topic for several ASEAN members and is rarely addressed, despite the significant implications it brings to the border regions.

While the amount of intra-ASEAN migration has grown substantially over the years, the major patterns of intra-ASEAN labor mobility have not changed dramatically. This contrasts with the trade (export) patterns discussed earlier—where networks and links have deepened across ASEAN. A major difference between goods/services trade and the mobility of people is that the former is more reciprocal than the other. Mutual dependency appears through trade, for example, in intermediary goods whereas the wage differentials tend to dictate the direction and the volume of the labor mobility.

Interestingly, large unidirectional traffic of people within ASEAN are primarily managed by the host and origin governments. For example, Thailand has a separate memoranda of understanding (MOU) with the government of Cambodia, the Lao PDR, and Myanmar, specifying procedures to formalize labor migration. Malaysia also has MOUs with several major migrant source countries—such as Indonesia—to strengthen

labor migration governance and transparency. Singapore largely sets its labor migration regulations unilaterally with its neighboring ASEAN countries Unlike the trade agreements where multilateral schemes are widely adopted, labor migration accords remains bilateral in most cases.

2.3 Wage Differentials and Remittances

The primary factor driving large cross-border and intra-ASEAN labor migration is the persistent, uneven levels of economic development across the region. The average monthly wage in Thailand is three times above neighbors Cambodia and the Lao PDR (Figure 1.5). The same is true between Malaysia and Indonesia. Singapore's high wage premium attracts workers at all skill levels from the region and beyond.

Intra-ASEAN worker remittances reached $7.8 billion in 2016 (12.7% of the total $61 billion in remittances from the world to ASEAN). Intra-regional remittance shares are high in Cambodia, the Lao PDR, Malaysia, Myanmar, and Malaysia, ranging from 56.7% to 68.0% (Figure 1.6). The overall intra-ASEAN share remains low because its three largest remittance earners—the Philippines, Indonesia, and Viet Nam—receive most from regions outside ASEAN.

2.4 Intra-ASEAN Skilled Worker Migration

The shortage of publicly available data makes it difficult to evaluate the scale of high-skilled worker migration within ASEAN. There is no integrated source of data on labor migration by skill or education level—although ongoing initiatives should fill the gap.[4] Patching together available data and information shows skilled worker migration is only a small portion of overall intra-ASEAN migration (Orbeta 2013). Its volume and share, however, is likely increasing over time.

Singapore hosts a large number of professionals and skilled workers, but comprehensive data on foreign workers by skill and nationality are not publicly available. According to the UN, there are 1.1 million Malaysians living in Singapore, with over 200,000 estimated to be tertiary-educated (World Bank 2014, p. 36). Data from the Singapore Nursing Board show an accelerating rate of health professionals migrating to Singapore from other ASEAN countries such as the Philippines and Malaysia in recent years (Table 1.1).

Aside from Singapore, the share of highly skilled migrants—defined as managers, professionals, and technicians (and associated professionals)—in ASEAN countries remains low (Table 1.2). Brunei Darussalam has a somewhat higher share at 18%, but this is not the case in other ASEAN
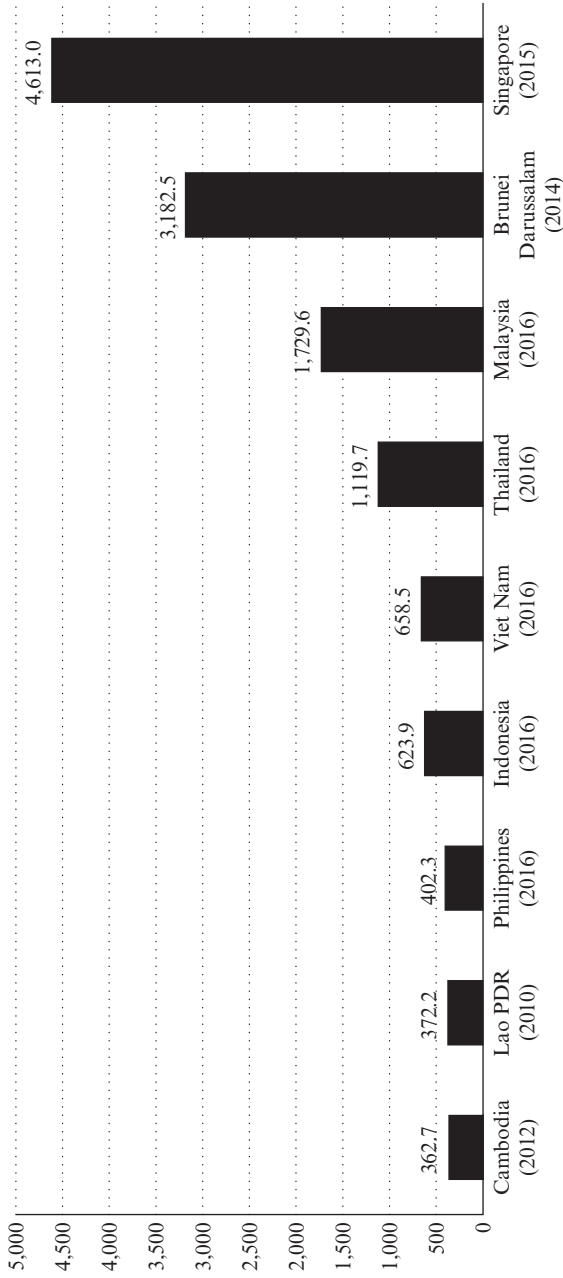
Note: Lao PDR = Lao People's Democratic Republic.

Source: International Labour Organization (ILO), Key Indicators of the Labour Market (KILM). Available: http://www.ilo.org/ilostat/faces/oracle/webcenter/portalapp/pagehierarchy/Page3.jspx?MBI_ID=435.

Figure 1.5   Average monthly earnings (in constant 2011 purchasing power parity $)
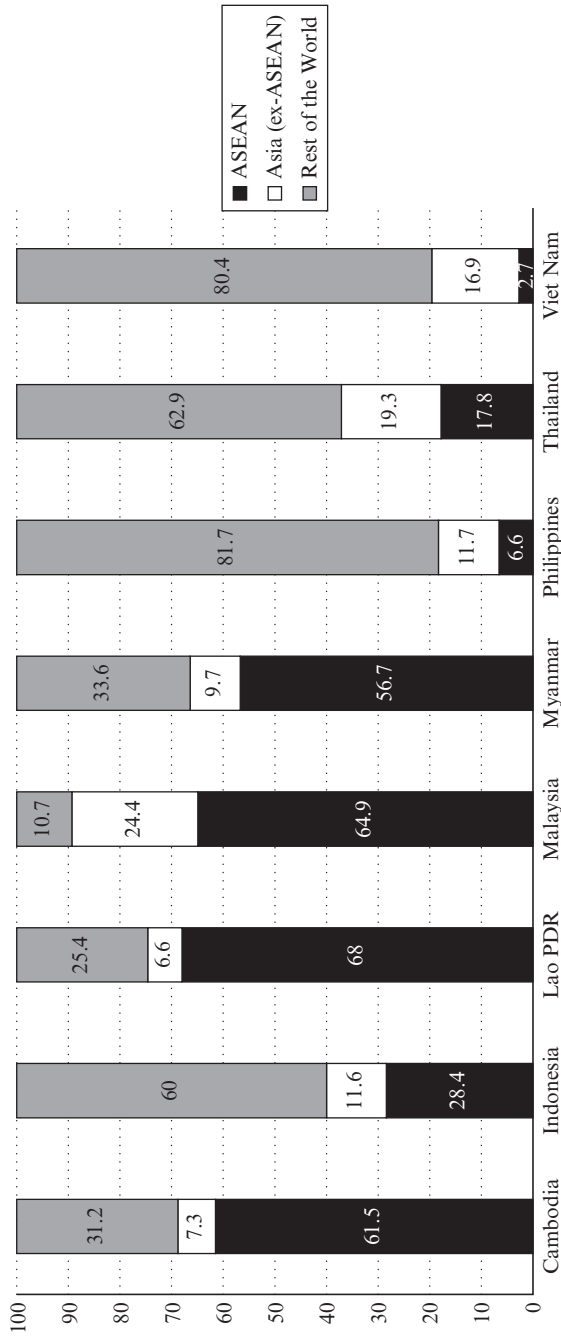
Note: Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on World Bank Migration and Remittances Data. http://www.worldbank.org/en/topic/migrationremittancesdiasporaissues/brief/migration-remittances-data (accessed November 2017).

Figure 1.6   Remittances to ASEAN members by region (% of global remittances to each member)

Table 1.1   Registered nurses in Singapore by citizenship, 2010 and 2016

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

Note: PRC = People's Republic of China.

Source: Singapore Nursing Board, Annual Reports, 2010, 2016. http://www.healthprofessio
nals.gov.sg/docs/librariesprovider4/publications/annual-report-2010_1.pdf; http://www.health
professionals.gov.sg/docs/librariesprovider4/publications/snb-annual-report-2016.pdf.

countries. There is no additional information to know how many of these
positions are held by ASEAN professionals.

2.5   Mutual Recognition Arrangements

One important step of ASEAN in facilitating regional skill mobility is
the Mutual Recognition Arrangement (MRA) initiative, which establishes
common skill and qualification recognition schemes in the region. To date,
MRAs have been signed for seven qualifications including engineering ser-
vices, nursing, architectural services, tourism, medical practitioners, dental
practitioners, and accounting services. There is a framework arrangement
for the mutual recognition of surveying qualifications, an important step
towards the signing of an MRA in surveying. Each MRA has its own
implementation modality and has made varying levels of achievement to
date (Mendoza and Sugiyarto 2015). MRAs with the most visible progress
are on architectural and engineering services, where recognized profes-
sionals have begun to register at the ASEAN level. As of March 2018, the
ASEAN Chartered Professional Engineers Register had 2,876 engineers
listed and the ASEAN Architect Register listed 475 architects (Figure 1.7).
The accountancy MRA is trying to follow these examples. Preexisting
recognition standards, such as the Asia-Pacific Economic Cooperation
(APEC) Engineer initiative contributed to the relatively quick establish-
ment of the ASEAN engineer framework (Mendoza et al. 2016).

Table 1.2 *Total workforce and migrants in high-skilled occupations* (*latest year*)

Country	Workforce			Employed Migrants in the Country		
	Total	In High-Skilled Jobs	Migrants	Migrants Share of Workforce (%)	In High-Skilled Jobs	Share of Migrants in High-Skilled Jobs (%)
Brunei Darussalam (2011)	183,700	59,200	67,700	36.9	10,700	18.1
Cambodia (2013)	8,059,600	396,300	49,200	0.6	2,700	0.7
Indonesia (2014)	114,628,000	8,144,200	98,900	0.1	. . .	. . .
Lao PDR	20,300	230,200	600	3.0	. . .	. . .
Malaysia (2014)	13,532,100	3,408,100	1,782,300	13.2	89,700	2.6
Philippines (2013)	38,118,000	9,043,000	. . .	. . .	. . .	. . .
Singapore (2014)	3,623,900	. . .	1,355,700	37.4	. . .	. . .
Thailand (2014)	38,020,400	5,392,800	1,183,800	3.1	130,300	2.4
Viet Nam (2013)	52,207,800	5,218,000	. . .	. . .	. . .	. . .

Note: Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on ILO data, 2015.

Indonesia — Engineering (ACPEs) 1,025 | Architecture (AAs) 154
Singapore — 269 | 100
Malaysia — 404 | 42
Philippines — 288 | 99
Myanmar — 390 | 12
Viet Nam — 204 | 17
Thailand — 208 | 26
Cambodia — 60 | 4
Lao PDR — 9 | 11
Brunei Darussalam — 7 | 12

■ Engineering (ACPEs)
☐ Architecture (AAs)

0   200   400   600   800   1,000   1,200   1,400
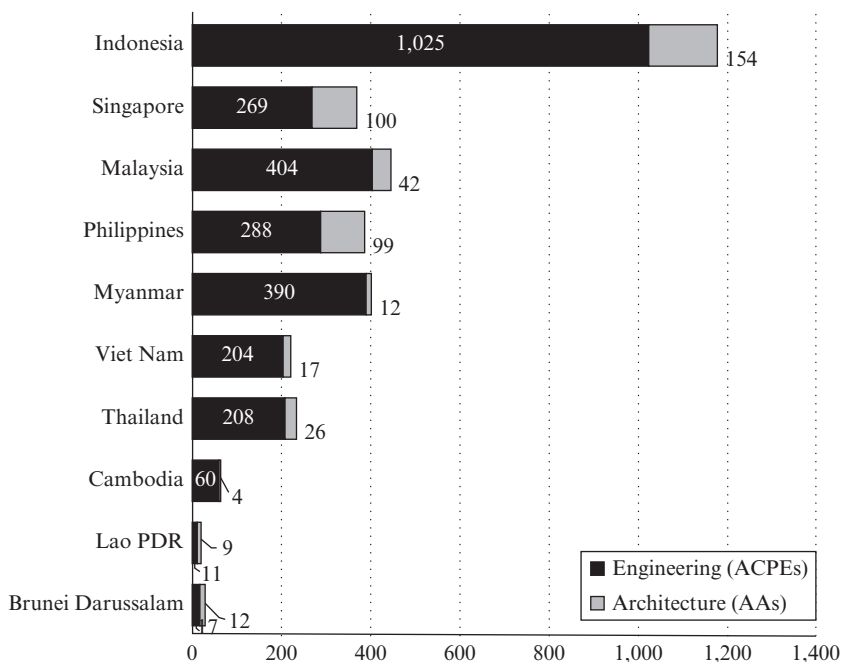
Note: ACPE = ASEAN Chartered Professional Engineers; AA = ASEAN Architect Register; Lao PDR = Lao People's Democratic Republic.

Source: ASEAN Secretariat, ILO (2017).

Figure 1.7   Mutual recognition arrangements (professionals registered as of March 2018)

Competency standards and curricula for tourism professionals were drafted and a registration system launched in 2016. In contrast to other MRAs, tourism initiatives are largely private sector-driven and use a relatively straightforward credential-recognition process. The medical and health care-related MRAs have seen limited progress in drawing up common standards; and corresponding changes in national laws and regulations are needed to allow ASEAN certified professionals to work across ASEAN.

The MRA implementation in ASEAN has been either slow or stymied in some sectors. Various challenges and obstacles stand in the way. For skills with a recognition scheme in place, there are few workers registered and certified (see, for example, Chapter 9). Coordination between respective occupational and professional groups within industries must

be strengthened to raise awareness that MRA certifications exist and to increase the pool of ASEAN-chartered professionals. Professional organizations covered by MRAs in all ASEAN counties are encouraged to build and maintain functional databases of nationally certified professionals. The next important step is to explore ways to link MRA schemes to specific job opportunities to promote skilled labor mobility. Finding ways to tailor and design admission policies based on a positive circularity principle seems to be the key. National professional associations tend to be cautious. Proving ASEAN-wide circular skilled labor mobility helps reduce the fear of regional competition and contributes to a more dynamic growth of ASEAN skills mobility.

For skill categories still trying to formulate standardized ASEAN recognition schemes, an appropriate—and non-political—task force should be established. The task force should objectively propose to government agencies how best to standardize recognition schemes—based on facts and research. As mentioned, one of the key reasons behind the slow implementation is the worry that MRAs will open the door to cheap skilled labor and threaten local jobs. Therefore, it is critical to introduce skill upgrading opportunities, and compensatory measures that enhance competitiveness and strengthen social safety nets alongside MRA implementation.

Before expanding MRAs to other skills, there is a need to clearly define guidelines on how foreign qualifications will be recognized and certified. The lessons learned from ongoing ASEAN MRA exercises should be compiled and analyzed to help develop a single platform for professionals from a wider discipline to be certified as ASEAN professionals. Synergies can be built by exchanging experiences in building the ASEAN Qualifications Reference Framework and the Committee currently tasked to harmonize domestic qualification frameworks.

3.   OUT-MIGRATION OF ASEAN WORKERS TO OTHER REGIONS

While intra-ASEAN migration has grown substantially over time, the fact remains that 60–70% of ASEAN's international migrants reside outside the region (Figure 1.8). Some 41% (5.5 million) live in other Asian host countries—including the 3.6 million based in "West Asia" (the Gulf region). Another 37% (5.0 million) are in North America, with 13% (1.7 million) in Europe (Figure 1.8). The top 5 host countries for ASEAN migrants are the US (20%), Saudi Arabia (9.8%), Australia (4.4%), Canada (4.2%), and the United Arab Emirates (4.1%).

United States, 20.3%

Thailand, 18.6%

Saudi Arabia, 9.8%

Malaysia, 7.6%

Singapore, 6.5%

Australia, 4.4%

Canada, 4.2%

United Arab Emirates, 4.1%

Bangladesh, 3.7%

United Kingdom, 1.8%

Japan, 1.8%

Hong Kong, China, 1.5%

Germany, 1.4%

Kuwait, 1.4%

France, 1.4%

Korea, Rep. of, 1.3%

Qatar, 1.0%

Netherlands, 0.9%

Italy, 0.8%

China, People's Republic of, 0.8%

Oman, 0.8%

India, 0.5%

New Zealand, 0.4%

Brunei Darussalam, 0.4%

Sweden, 0.4%

Africa, 0.2%

Asia, 27.3%

ASEAN, 34.1%

Europe, 8.6%

North America, 4.5%

Oceania, 5.2%

Latin America and Caribbean, 0.1%

ASEAN Migrants (20 M)

Population in ASEAN region (633 M)

Note: M = million people.

Source: Authors' calculations using the United Nations Department of Economic and Social Affairs database (2015), Trends in International Migrant Stock: Migrants by Destination and Origin (United Nations database, POP/DB/MIG/Stock/Rev.2015).

Figure 1.8   ASEAN migrants outside the region, 2015

Table 1.3   Tertiary-educated migrants in OECD members by country of origin, 2000–2001 and 2010–2011

Origin	2000–2001	2010–2011	% Change: 2000–2010/11
Brunei Darussalam	3,358	5,854	74.3
Cambodia	36,456	52,552	44.2
Indonesia	117,035	153,884	31.5
Lao PDR	37,469	52,035	38.9
Malaysia	101,998	169,471	66.2
Myanmar	25,170	42,090	67.2
Philippines	889,072	1,545,164	73.8
Singapore	46,327	74,658	61.2
Thailand	74,427	156,920	110.8
Viet Nam	348,141	539,099	54.9
ASEAN	1,679,453	2,791,727	66.2
Total (all countries)	18,097,377	31,133,150	72.0

Notes: ASEAN = Association of Southeast Asian Nations; Lao PDR = Lao People's Democratic Republic; OECD = Organisation for Economic Co-operation and Development.
Data refer to people aged 15 and above.

Source: Batalova et al. (2017).

3.1   ASEAN Skilled Workers in Organisation for Economic Co-operation and Development (OECD) Countries

The number of skilled ASEAN migrants in OECD countries is increasing rapidly. Those with tertiary education (all ages) grew 66% between 2000 and 2010 (to 2.8 million) (Table 1.3). Tertiary educated migrants from Thailand more than doubled, followed by Brunei Darussalam (a 74.3% increase), the Philippines (73.8%), and Myanmar (67.2%). The strong networks of Filipino migrants (55% of total ASEAN migrants) and those from Viet Nam (21%) are a powerful pull factor (Batalova et al. 2017). ASEAN countries will have to increase their attractiveness as a work base if they are to compete with OECD countries in attracting the talent.

4. POST-2015: BRAIN CIRCULATION FOR A MORE "COMPETITIVE AND INNOVATIVE ASEAN"

With the establishment of the AEC in December 2015, ASEAN members are now guided by the second ASEAN Economic Community (AEC) Blueprint 2025, which lays out a broader set of goals and initiatives to further promote regional cooperation and integration. The Blueprint recognizes that ASEAN countries face new challenges and an economic agenda. The first and foremost challenge is to achieve a "competitive, innovative, and dynamic" economy across the region. For many members, this means making the transition to high-income status. This requires substantially improved productivity and efficiency; and to build an economic and business environment conducive to innovation.

ASEAN is entering the phase of economic development where skills mobility plays an increasingly critical role in entering and moving up global value chains. Mobility also helps the process of production specialization by fostering agglomeration of people and skills—where a critical mass of professionals creates communities and networks; and information, ideas, and talents are exchanged (World Bank 2009, Chapter 5). Local and foreign investors and businesses will likely demand more active involvement of the government and use the AEC to attract talent to the region.

The lack of skilled workers is a real potential bottleneck to deepening the AEC. A study suggests that as many as 25.9 million skilled jobs in Cambodia, Indonesia, the Lao PDR, and in the Philippines, Thailand, and Viet Nam can remain unfilled in 2025 (ILO and ADB 2014). For most countries, this means more than half the jobs requiring skilled workers will not find candidates with appropriate skills. Acceleration of global competition for talent may require ASEAN to achieve deeper economic integration under the AEC umbrella to share a skilled workforce. Rising wages across ASEAN may attract some overseas workers to return and local workers to stay. Yet, by 2030—with labor markets worldwide continuing to liberalize—ASEAN members are likely to face increased out-migration of skills to countries offering even higher wages (Walmsley et al. 2013).

Demographic change is another major factor in shaping ASEAN labor supply and mobility in the coming decades. Today, many ASEAN countries enjoy a demographic dividend—where labor force growth outpaces that of total population. But by 2020, ASEAN overall will begin to witness a decline in the workforce. The unique feature of ASEAN is that its members have a variety of demographic profiles. Figure 1.9 shows when each ASEAN country starts and ends its demographic dividend.[5] Five countries have ended or will soon end the period of workforce expansion
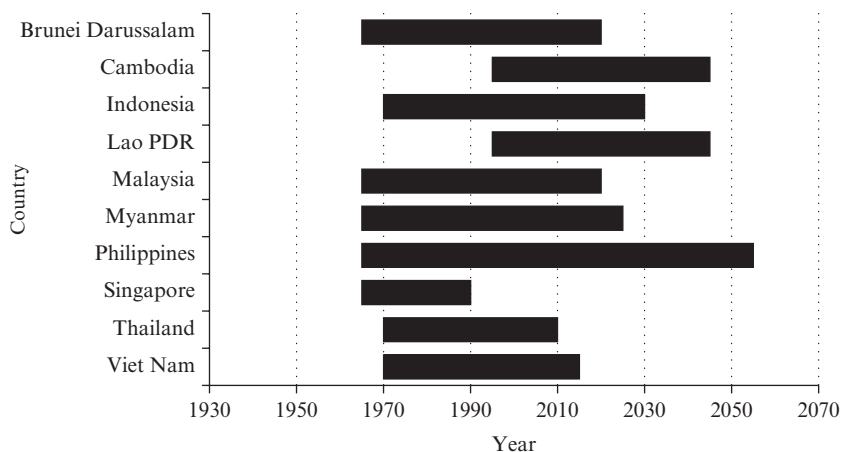
Note: Lao PDR = Lao People's Democratic Republic.

Source: United Nations Population Division, Department of Economic and Social Affairs, World Population Prospects, the 2017 Revision. https://esa.un.org/unpd/wpp/ (accessed August 2017).

Figure 1.9   Actual and projected demographic dividends among ASEAN members

(Brunei Darussalam, Malaysia, Singapore, Thailand, and Viet Nam), with three members expected to benefit from the demographic dividend for decades to come (Cambodia, the Lao PDR, and the Philippines). The two most populous countries in ASEAN, Indonesia and the Philippines, the source of many overseas workers, will continue to see their workforce grow until around 2030. These diverse population profiles also echo the need for greater intra-ASEAN labor mobility across many skill levels. It is a core tenet of a better-functioning AEC.

   Despite the range of opportunities and challenges facing members in promoting regional labor mobility, the AEC Blueprint 2025 continues to rely on mobility of skilled persons through MRAs and attracting more business visitors (provision A5 of the Blueprint, page 10). As discussed, MRAs have yet to tangibly increase professional worker mobility and that the process in many sectors has yet to receive support from the professional associations. While it is important to continue the MRA process and broaden sector coverage, bolder measures will be needed to ensure ASEAN workers at all skill levels can meet future labor demand and increase the region's competitiveness. Two issues should be tackled: (i) attracting skilled international ASEAN migrants to bring their skills and

knowledge back (or circulate) to the region; and (ii) easing worker mobility across various skill levels within the AEC.

4.1 Attracting Skilled Workers to the AEC

ASEAN remains a net exporter of human capital—many of them skilled. There is clear evidence of the exodus of skilled labor, but it also means there is a significant pool of trained, experienced ASEAN citizens outside the region that can contribute to the AEC's success. ASEAN countries may want to consider collectively introducing measures to attract skilled workers back to the region, in addition to existing programs individually run by several members to encourage their nationals to return home.

Countries worldwide have made various attempts to retain existing skilled personnel and reverse the "brain drain" by offering incentives. Program trials and errors have amassed substantial knowledge on how to run these programs more effectively (Agunias and Newland 2012). It is increasingly clear that interventions must be targeted. For example, a recent evaluation of the Malaysian Returning Expert Program shows that the program is effective in targeting those with job offers (but not for those who are undecided), suggesting that the approach to provide "last mile support" to aspiring returnees is effective in helping them decide to return (Del Carpio et al. 2016).

ASEAN members may also want to cooperate in welcoming back the skilled migrant diaspora as investors and entrepreneurs—aside from considering them a skilled workforce. Most important is creating a favorable environment for doing business. India's example in information technology (IT)-related business built a formidable reserve of trained workers that attracted diaspora investment. To encourage this kind of positive cycle in the long run, policies that "retain" skilled workers at home (preventing them leaving) should be discouraged because they become disincentives for skill acquisition and limit access to global networks that provide technology, investment, and trade opportunities (Clemens 2015).

4.2 Sharing ASEAN's Talent

ASEAN can move beyond MRAs to catalyze labor mobility by introducing more active policies that facilitate movement across a wider array of skills. For example, workers with regional qualifications may be given priority in processing job applications matching the skill or industry that best benefits members with different demographic profiles and labor market conditions. The scheme can be devised so as to maximize efficiency in sharing talent.

The need to promote circulating workers goes beyond the realm of just the highly skilled. As demographics shift across the region, so will ASEAN's surplus and deficit labor markets. The demand for semi- to lower-skilled workers is already high and may increase to meet the growing need in services, health care, and household services—a major benefit to working families across ASEAN. The scarcity of semi-skilled workers may in fact be more acute as workers' educational attainment will increase rapidly in the coming years. The growing senior populations in East Asia and other developed countries are opening large migration opportunities for middle- and low-skilled workers from ASEAN. And this can exacerbate labor shortages across ASEAN.

If the exodus of semi- and lower-skilled migrants from ASEAN continues, migrants from outside ASEAN might fill the gap. Increasing numbers of migrants from South Asia are already servicing Singapore and Malaysia. And others may join to satisfy the increasing demand. ASEAN countries will need to decide whether to develop extra-ASEAN labor migration programs, either individually or jointly.

The ASEAN Declaration of Protection and Promotion of the Rights of Migrant Workers was adopted at the 2007 ASEAN Summit. It calls for countries to strengthen measures to ensure a decent working environment for all migrant workers in the region, across all skill levels. As a follow-up to the Declaration, the Consensus of the ASEAN Instrument on the Protection and Promotion of the Rights of Migrant Workers was adopted in October 2017 at the ASEAN Leaders Summit. ASEAN members are now committed to drafting an action plan to protect all migrant workers—including those in "irregular situations." These frameworks could open the door for greater collaboration in dealing with ASEAN labor mobility more comprehensively.

5. CONCLUSION AND POLICY RECOMMENDATIONS

ASEAN economies have succeeded in deepening economic integration both regionally and globally through trade, investment, and finance—which has provided a source for development and growth in the region. There is equally a dynamic flow of labor across ASEAN and from ASEAN to the world. But, as ASEAN itself acknowledges, tangible results in facilitating labor mobility remain limited. Most policies remain in the hands of individual countries. Achieving intra-ASEAN labor mobility requires strong political will across government levels, and cooperation from employers and professional organizations. Achieving the AEC

Blueprint 2025 of a highly integrated and cohesive economy depends on these commitments.

With many ASEAN members confronting the middle-income challenge of transiting to high-income status—coupled with aging and demographic changes—there is a growing need to encourage labor mobility beyond skilled mobility and service trade facilitation. There will be growing demand from businesses and investors to attract, retain, and circulate human resources across the region.

The time is therefore ripe for ASEAN to become more active in promoting labor mobility to better balance surplus and deficit labor markets and thus boost growth across the region. While encouraging the completion and utilization of existing MRAs, ASEAN can begin to explore how lessons learned can be collated to create an umbrella scheme of skill recognition and relevant Regional Qualification Framework. It is critical to connect these qualifications to the actual mobility in sectors or occupations that benefit all members.

It is also worth considering expanding the scope and framework within ASEAN to cover labor mobility for all skill levels—including semi- and lower-skilled workers. Demand for these workers—who comprise most intra-ASEAN labor mobility and work in sectors like agriculture, fisheries, construction, caregiving, and household work—is expected to rise globally, while supply is expected to decline. ASEAN countries should encourage one another to work together to develop a regional human resource development plan and strategy. It can objectively assess the adequacy of supply and come up with measures to fill possible gaps—also considering extra-ASEAN human resource and technological innovation.

To better inform the policy process, it is critical that data on migration, migrant labor, and the region's skilled workforces be collected and made available publicly. Lack of data makes it difficult to carry out relevant research to answer key policy questions—including labor market outlook projection, and estimating the net gain or loss from labor mobility for each country and the AEC itself.

Facilitating labor mobility—when viewed from the broad perspective of the ASEAN Community and its long-term objectives—will not only contribute to growth by raising productivity, but also make that growth more inclusive and equitable (one of the four AEC objectives). UN Sustainable Development Goal (SDG) 10 also states that the facilitation of orderly, safe, regular, and responsible migration and mobility of people can reduce inequality within and among countries. It is in this spirit that ASEAN members can step up their effort to promote connectivity, including that of people and its workforce.

NOTES

* The authors would like to thank Paul Mariano for providing the circular flowcharts (Figures 1.1 and 1.4).
1. The Hoekman Index maps out the degree of liberalization in services trade under four "ASEAN+" frameworks. See Ishido (2011) for a more detailed discussion on the tool.
2. International migrants of ASEAN origin residing in other ASEAN member countries. The United Nations (UN) defines international migrants as those residing abroad for more than one year. Cross-checking national data of ASEAN members shows that international migrants in ASEAN are largely labor migrants, while others include students, family members, and displaced persons.
3. For more discussion on migration data needs in ASEAN see section 4 of Batalova et al. (2017).
4. For example, see ILO ASEAN Labor Migration Statistics, http://apmigration.ilo.org/ asean-labour-migration-statistics.
5. Demographic dividend refers to economic gains emanating from rapid growth of the working-age population. As much as 33% of the growth in East Asia from 1965 to 1990 can be attributed to favorable demographics (Bloom et al. 2000).

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2. Skilled migration in the literature: what we know, what we think we know, and why it matters to know the difference

Elisabetta Gentile*

1. INTRODUCTION

The global importance of international migration cannot be underestimated. In 2015, 3.3% of the world's population lived outside their country of origin.[1] Yet, many misconceptions about migration persist in both the literature and policy dialogue. Large-scale surveys conducted in 2018—in Germany, France, Italy, Sweden, the United Kingdom (UK), and the United States (US)—found strikingly large biases in the host's perceptions of the number and characteristics of immigrants. For example, in all countries, respondents greatly overestimate the total number of immigrants. They think immigrants are, among other things, culturally more distant, less educated, more unemployed, poorer, and more reliant on government transfers than is the case (Alesina et al. 2018). Migrants are also believed to be less skilled than those who stayed in the source country, a phenomenon that researchers call "negative selection."[2]

In reality, international migration has been increasingly restricted since the end of World War II, to the point that individuals who are not skilled—in fact, exceptionally skilled—find it difficult to seek legal employment in other countries. In fact, the increasing restrictions and regulations imposed on global migrant flows, in turn, have fueled growth in undocumented migration (Massey et al. 2005). Several Organisation for Economic Co-operation and Development (OECD) members use points-based systems that require immigrants to meet a specific set of criteria (e.g., language proficiency, educational attainment, professional or trade licenses/certifications, age, and financial situation) before they are even considered for admission.[3] Host countries then choose among eligible applicants based on their labor and economic needs.

The data confirm that emigrants globally are positively selected in terms of schooling (Hanson 2010), due to both their own circumstances and the host countries' migration systems.[4] That already calls into question two salient features of neoclassical migration models: (i) the traditional push-pull approach, as host countries have long stopped "pulling" and are now actively restricting new immigration and expelling undocumented workers; and (ii) a focus on raw labor, when data show human capital is more important—moreover, raw labor is treated as homogenous, when worker characteristics such as education, ethnicity, gender, and location are important determinants of migration.

Figure 2.1 shows the "desired emigration rate" of the population over age 25 in eight Association of Southeast Asian (ASEAN) economies for 2010. The desired emigration rate—derived by Docquier et al. (2014) using Gallup World Poll data—is defined as the share of native non-migrants who say they would be willing to emigrate (permanently or temporarily) if they had the opportunity, but remain in their country of origin.[5] This is broken down into two groups: those with a college degree (college-educated), and those without
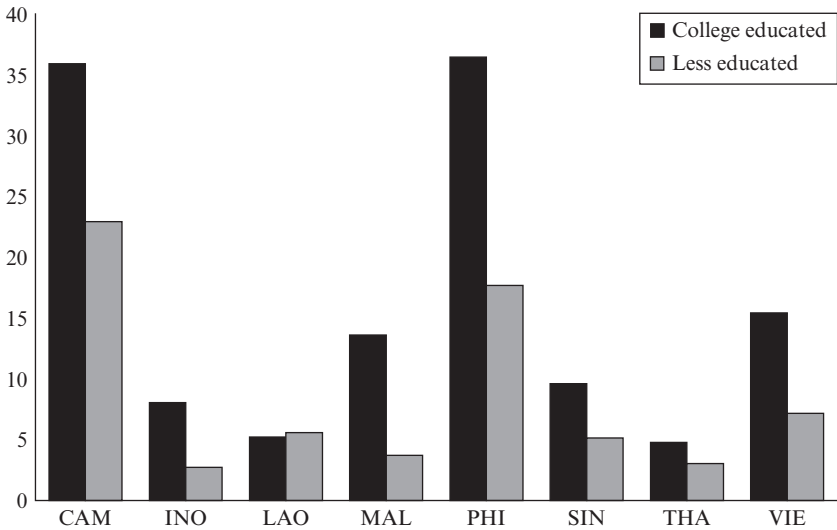
Note: CAM = Cambodia; INO = Indonesia; LAO = Lao People's Democratic Republic; MAL = Malaysia; PHI = Philippines; SIN = Singapore; THA = Thailand; VIE = Viet Nam.

Source: Docquier et al. (2014) using Gallup World Poll data.

Figure 2.1   Desired emigration rates of college-educated and less-educated individuals by country of origin (2010)

(less-educated). We can see that the desired emigration rate is much higher—in fact, twice as high—for the college-educated than for the less-educated.

Looking at actual migration, Chapter 1 shows that during 1995–2015, ASEAN almost trebled its total migrant population—from 3.7 million in 1995 to 9.9 million in 2015. This reflects the economic rise of the so-called "tiger cubs" of Malaysia and Thailand,[6] as well as the sustained growth in Singapore and Brunei Darussalam. The share of intra-ASEAN migrants to the total migrant population has grown steadily—from just below 58% in 1995 to 70% in 2015. However, only a small if growing fraction of intraregional migrants are high-skilled workers (Batalova et al. 2017): OECD members and the Gulf countries continue to exert a powerful pull on ASEAN professionals.[7]

Researchers use proxies to operationalize the concept of "skilled migrant"—which varies across countries and over time—and apply different methodologies. For example, both Card (2001) and Borjas use US Census data to investigate the impact of immigrant inflows on the labor markets of their native counterparts. However, Card compares the wage and employment opportunities of native workers in areas with high versus low immigrant concentrations, and divides workers into six different broad occupational groups with increasing skill level.[8] Borjas (2003), on the other hand, utilizes national data and sorts workers into skill groups created by interacting four education groups with eight experience groups defined in five-year intervals. Therefore, when comparing findings from the two studies, it is important to be aware not only of differences in data and methodology, but also of the way "skill" is defined and measured.

This chapter interprets the facts and trends discussed in Chapter 1 through the lens of the existing academic literature on migration. Its purpose is not to survey the entire body of relevant literature[9]—which would require a book on its own—but rather to review those works that provide useful insights for skilled labor mobility in the ASEAN Economic Community. This is particularly important given the scarcity of high-quality data on international labor flows. We are living through a nationalist resurgence on a global scale. Now, more than ever, public policy must be guided by empirical realities rather than fear of the unknown. This chapter aims to be a step in that direction.

2. EXPLAINING THE PATTERNS OF SKILLED MIGRATION

In 1986, the failure of an O-ring caused the space shuttle *Challenger* to explode just 73 seconds after launch. A simple donut-shaped rubber ring

brought down a $196 billion orbiter built using 2.5 million parts and assembled by hundreds of teams.

One might wonder what a malfunctioning seal has to do with skilled labor migration in ASEAN: rather a lot, as it turns out. Kremer (1993) used the O-ring metaphor to put forward an economic theory that has powerful implications, among other things, for global migration patterns.

Kremer proposed a production function in which production consists of a series of tasks, all of which must be completed correctly for the final product to pass quality controls. Each task can be completed at a different level of "skill"—where skill is defined as the probability that a worker will successfully complete a task, and the value of each worker's efforts depends on all other workers' skill. Contrary to the neoclassical approach, this production function does not allow quantity to be substituted for quality: going back to the space shuttle example, substituting an excellent engineer with two or more mediocre ones will negatively impact the quality of the final product. Conversely, high-skilled workers complement each other, giving rise to increasing returns to skills and even higher productivity. It is then easy to see how, under this production function, even small differences in worker skills lead to large differences in wages and output.

In light of Kremer's model, skilled workers from ASEAN prefer to migrate outside the region because, even with similar individual skills, they will be far more productive once matched up with the skilled labor force of the host country. This conclusion contradicts the neoclassical models of trade and growth. A standard neoclassical framework would predict negative selection of emigrants—as human capital has a higher marginal product (and therefore a higher return) in developing economies, where it is relatively scarce.

Borjas (1987) developed a version of the famous neoclassical model of migration known as the Roy model (Roy 1951), in which the relative payoff for skills across a given source–host country pair determines the skill composition of the migrant flow: if the return to skill is higher in the host economy than the source country, it will attract migrants from the upper tail of the skill distribution, leading to positive selection. Conversely, if the source country offers a higher payoff, then there will be negative selection because the host economy will attract individuals from the lower tail of the skill distribution.

Borjas tested his model by regressing the earnings of immigrants in the US on measures of the source country's income inequality, intended as a proxy for the rate of return to skills. He found a negative correlation and concluded that in countries with low average wages and high wage inequality—still the case in much of the developing world—there is negative selection of emigrants. However, the correlation becomes positive

and insignificant when controlling for gross national product (GNP) per capita, which comes in positive and significant. Borjas interpreted that to mean that the higher the GNP per capita in the source country, the more it resembles the host economy and the greater the skill of the immigrant flow.

Borjas (1987) was very influential, with the "negative selection hypothesis" gaining ground in public opinion as well as academia.[10] More recently, Grogger and Hanson proposed an alternative formulation of the Roy model. They evaluate migrant selection in terms of skill by comparing the probability of emigrating for those with a college education relative to those with a primary education. In this framework, there is positive selection if the absolute wage difference between the source and destination, net of skill-varying migration costs, is greater for high-skilled workers. In addition, there is positive sorting if emigrants from a given source country, say Indonesia, sort themselves across destinations by skill according to the rewards-to-skill in various destinations. If the (net) rewards-to-skill are higher in Singapore than in Malaysia, then Singapore will receive a higher-skill mix of emigrants from Indonesia than Malaysia. In other words, "higher skill-related wage differences should give destination countries an advantage in competing for skilled immigrants" (Grogger and Hanson 2011).

The data show that in 2015, more than 1 million Indonesian workers resided in Malaysia, where the average monthly wage was 3.5 times that of Indonesia, while there were only 163,000 Indonesian citizens working in Singapore, although the average monthly wage there was over 20 times that of Indonesia.[11] If wages were the only driver of migrant flows, we would expect all Indonesian workers to flock to Singapore. More likely, Indonesian workers who choose to migrate to Singapore are inherently different from those who choose to migrate to Malaysia in that they have different characteristics or preferences, or both.

The model was tested on the population of immigrants 25 years and older by source economy and education level in a sample of OECD countries as of 2000. The results show that, indeed, for a given source–host country pair, the larger the skill-related difference in earnings, the more one finds educated migrants (relative to non-migrants). In addition, the relative stock of higher-educated migrants in a host economy increases with the earnings difference between high- and low-skilled workers.

Why do Borjas (1987) and Grogger and Hanson reach such diametrically opposed conclusions? Borjas models utility in log-linear form, which explains migration in terms of *relative* wage differences. One limitation of this approach is that, given the strong curvature of the log-linear utility function, decreasing marginal returns to income matter equally, regardless of how large the absolute difference in income is. In the top panel of Figure 2.2, we can see that doubling the wage from 10 to 20 units or from

log-linear utility
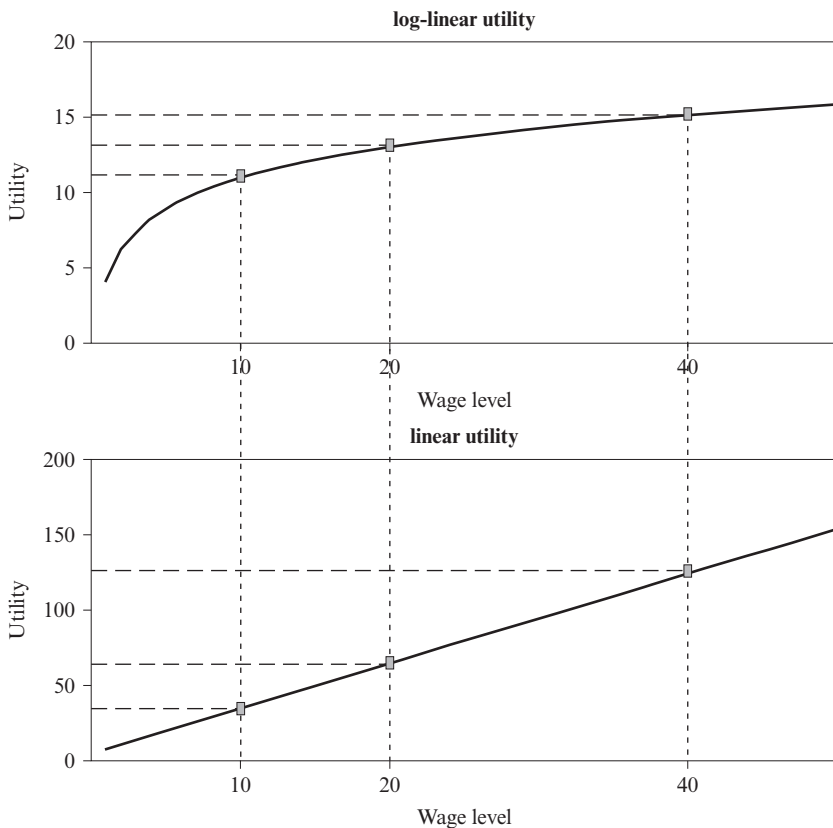
linear utility

Source: Author's calculation.

Figure 2.2   The implications of log-linear versus linear utility

20 to 40 units yields the same increase in utility, represented by the two segments marked on the vertical axis. Grogger and Hanson, on the other hand, model utility in linear form, which explains migration in terms of *absolute* wage differences. The bottom panel of Figure 2.2 shows that because the change in wage from 20 to 40 units is double that from 10 to 20 units, then the change in utility is also doubled.

Note that linear utility is also restrictive, as it implies that decreasing marginal returns to income are never an issue. However, given the very large income differences that exist between source and destination countries, linear utility is a better fit for the data, suggesting that migration responds to absolute, not relative, rewards-to-skill.

Despite the serious data limitations discussed in Chapter 1, it is widely agreed that emigration from ASEAN countries to non-ASEAN countries involves more skilled workers than intra-ASEAN migration, whereas most intra-ASEAN migration involves low-skilled workers (Ruhs 2016). Therefore, Grogger and Hanson's framework, along with Kremer's O-ring theory, provides a convincing explanation as to why skilled workers from ASEAN have historically preferred to migrate outside the region, especially to OECD countries.

A widespread concern is whether source countries will manage to achieve their full economic potential, which crucially depends on their ability to provide a sufficiently large number of skilled workers to meet the demand from high-growth sectors. For example, the Master Plan on ASEAN Connectivity 2025 (ASEAN 2016) focuses on digital technologies—particularly mobile internet, big data, cloud technology, the internet of things, automation of knowledge work, and the Social-Mobile-Analytics-Cloud (SMAC)—to unleash growth in the region (see Chapter 10). But the success of this strategy rides on a labor force with the right skills to make it happen. Indeed, "almost all of ASEAN member states report shortages of skilled labor, particularly in the priority professions identified [. . .] for the free movement of labor" (Parpart 2016). Section 3 will address this issue by discussing the controversial brain drain.

A second question is whether the outflow of human capital can be reversed, and there is positive evidence that it can. In some rapidly growing developing Asian economies, limited supply of educated and technically trained workers has led to inflows of human capital in a manner predicted by neoclassical theory. Singapore's meteoric rise from a "malarial fishing village" (Bueno 2013) to the third wealthiest country in the world (in per capita gross domestic product [GDP]) was aided by a sustained influx of foreign human capital.

Another example was Indonesia's accelerated industrialization in the 1980s, which stemmed from a government effort to open the economy and diversify from petroleum to manufactured exports (Goeltom 2007, 489–506). This "created a demand for specialists in engineering, management, finance, and other professions that could not be met locally, yielding rising returns to human capital that attracted skilled migrants from Australia, the Philippines, Europe and India, despite a 40% underemployment rate among Indonesian(s)" (Massey et al. 2005). These examples suggest that economic opportunity, along with the "right" policies, can help ASEAN countries not only retain more home-grown skilled workers, but also attract returning migrants and foreign talent.

3. THE MOST PERSISTENT MYTHS: "BRAIN DRAIN" AND "BRAIN GAIN"

As mentioned, from the mid-1900s, increasingly higher educational and skill thresholds were needed to migrate to developed countries. And many of those who managed to leave poorer countries to make a better living in advanced economies were the very ones developing countries could least afford to lose. This brain drain phenomenon has inspired a large body of academic and policy research. The early literature was based on observations from the first great post-colonial surge of skilled labor migration. The second surge—roughly 50 years later—was aided by the "third industrial revolution" and inspired a new wave of brain drain research, both theoretical and empirical.[12]

The early models (Bhagwati and Hamada 1974 is perhaps the most widely used) have had a long-lasting impact on the way we typically think about the brain drain. These are general equilibrium frameworks that model the source country labor market, whereas demand for emigrants is exogenously determined. They commonly assume a public subsidy to education, along with wage rigidity. Under these assumptions, they generally find that emigration tends to lower output and employment in sending countries, and that the losses accrued to different sectors depends on the structure of the relative wage and pre-migration employment levels across sectors.

It is intuitive to see how this class of models—meant to underscore the potential risks to developing economies from massive emigration of skilled workers—could lead to a simplistic zero-sum interpretation of the brain drain, where the source country has everything to lose and the host country everything to gain. In fact, gains and losses accrue on both sides, and the net effect can be positive for both sending and receiving countries.

3.1 Sending Countries

It is a commonly held view that skilled workers embody an investment their country made (i.e., the public subsidy to education). And when they emigrate, another country reaps the return on that investment. Desai et al. (2009), for example, estimated an annual loss of 2.5% of fiscal revenue from high-skill emigration in India. This led to calls for a tax on the income earned by skilled migrants in the destination country to the benefit of the source country (Bhagwati 1976).

It is worth mentioning that, at this point in time, the private sector's role in training the labor force was growing steadily, especially in Asia and the Pacific—where the lack of adequate government funding for education

and training led students to private providers. The private sector also responds faster to changing skill demands: for example, during the boom in demand for nursing degrees in the Philippines in the 2000s, the rapid expansion of nursing programs was largely driven by the private sector (Abarcar and Theoharides 2017).

Even if education and training were 100% publicly funded in source countries, setting negative incentives to migration, supposedly to motivate prospective migrants to stay, does not guarantee the education subsidy will not be lost. Skilled workers often cannot find positions to match their skills at home, as labor markets in many developing countries are characterized by unemployment, underemployment, and overqualification. Cronyism and ethnic fractionalization exacerbate the situation when access to already scarce employment and career development opportunities is not determined solely by merit.

Finally, Kremer's O-ring production function explains why the most highly skilled must work with each other—and have access to specialized services and high-quality equipment—to maximize their productivity (Felipe 2010, Chapter 15). Emigration is often the only way to fulfill these conditions.

In sum, these considerations show that skilled emigration is only a proximate cause of the lost subsidy; the ultimate causes are "a series of policy decisions by the government, as well as the range of factors that caused the migration choice" (Clemens 2009). Therefore, a migration tax such as the one proposed by Bhagwati would penalize migrants for what is substantially government failure.

Source countries can still benefit from skilled emigration, even when skill acquisition is publicly funded. Remittances are the most immediate way. Remittances improve the well-being of family members left behind and boost the economies of source countries through a variety of channels (see, for example, Dinkelman and Mariotti 2016; Theoharides 2018; Yang 2008). One popular misconception is that skilled migrants either do not remit or remit less, which is motivated by other misconceptions, for example: that skilled emigrants tend to spend longer periods abroad; that they are more likely to be joined by their families in host countries, and become permanent migrants who gradually lose ties with their country of origin; that quality education and specialized training in developing economies are the prerogative of affluent families, which do not require support from relatives abroad.

Two cross-country studies (Faini 2007; Niimi et al. 2008) relate the total remittances received by a given country in a given year to the share of emigrants with tertiary education. They find that remittances are positively correlated to the source country's total emigrant stock, and

negatively correlated to the share of emigrants with tertiary education. Although they interpret their results to mean that "skilled migrants do remit less" (Niimi et al. 2008), in fact they only say that countries that send a larger share of highly skilled migrants receive less in remittances than countries that send fewer skilled migrants. This negative correlation may have nothing to do with a skilled migrant's propensity to remit, but rather has structural causes.

Bollard et al. (2011) assembled an impressive micro-level database on remitting behavior—comprising data on 33,000 immigrants from developing countries from 14 surveys in 11 OECD host countries—which allowed them to study the association between a migrant's education level and their remitting behavior. They found a mixed association between education and remittances at the extensive margin (i.e., whether more-educated individuals are more likely to remit), and a strong positive relationship at the intensive margin (i.e., whether they send more when they do remit). Combining both the extensive and intensive margins showed that more-educated migrants do remit significantly more.

Contrary to the traditional view, the gains to developing countries from skilled emigration extend beyond remittances, for example to human capital formation. Brain drain "pessimists" tend to recognize return migration as the only way through which source countries can reap human capital gains, i.e., new skills acquired abroad made available to the home country. Consequently, they tend to draw a distinction between short- and long-term migration whereby only short-term migration benefits human capital formation.

The so-called "beneficial brain drain"[13] literature overcomes this limited perspective by introducing two crucial elements:

1. *Human capital accumulation is endogenous*. Because people respond to incentives, higher prospective returns to human capital in a foreign country may induce workers to acquire more through education and training.
2. *Successful emigration is not a certainty*. A fraction of those who invest in human capital to improve their odds of success will fail to secure employment abroad.

Stark et al. (1998) present a simple model in which individuals live for two periods. In the first, they split their time between work and human capital formation. In the second, they enjoy the earnings commensurate to the human capital they accumulated during the first period. They solve the model for the optimal level of human capital formation in the closed economy, and then introduce the probability of migration to a country that

offers much higher returns to education. They find that the optimal level of human capital formation is higher than in the absence of an opportunity to migrate. In other words, the home country can end up with a higher stock of human capital when migration is an option for high-skilled members of its workforce.

Mountford (1997) examines the effects of migration on income distribution and human capital accumulation using a model that divides an individual's life for three periods. In the first, an individual wants to consume and invest resources in human capital accumulation but must borrow from the capital market to do so. During the second, individuals work, repay their first period debt, consume, and save for their third period, when they are retired and use their savings to consume.

Mountford's model has two key features. First, productivity in the economy is dependent on the average level of human capital of the eldest generation; and, second, the greater the human capital accumulation of an individual's parent, the easier it is for that individual to accumulate human capital. Consequently, the chance of emigrating to a higher-wage economy can increase human capital accumulation both in the short and long run. In the short run, individuals are incentivized to accumulate more human capital because it allows them to earn a higher return, like in Stark et al. (1998). But emigration can also affect the long-run income distribution in the economy by creating a greater proportion of individuals with high levels of human capital—and "it is this long-run channel that is potentially the most powerful and most long-lasting" (Mountford 1997). Therefore, both temporary and permanent emigration of skilled labor can have permanently beneficial effects on economic growth if they alter the long-run income distribution of the economy.

A host of empirical studies support the theoretical findings in Stark et al. (1998) and Mountford (1997). Chand and Clemens (2008) used the unexpected and largely bloodless coup d'état that took place in Fiji in 1987—which triggered one of the largest, most rapid exoduses of skilled workers from any developing country in recent history—to study whether skilled emigration depletes local human capital. The new government enacted a series of economic measures that many Fijians of South Asian descent (some 50% of Fiji's population were considered "Indo-Fijians") saw as permanently harming their prospects in the country. Therefore, young Indo-Fijians began to quickly and massively invest in higher education to increase their odds of moving to other Commonwealth countries with skill-selective, points-based immigration systems (i.e., Australia, New Zealand, and Canada). The study found this increase in investment was large enough to raise Fiji's stock of human capital, net of the massive departures of skilled workers.

Shrestha exploits the change in recruitment policy for Nepalese men in the British Army. Before 1993, there were no minimum education requirements; but from 1993 onward, candidates had to have a minimum eight years of education and pass written tests in math and English. The study finds that the policy change raised human capital accumulation within Nepal, with a significant increase in those completing secondary education. Since the number of recruits—and therefore emigrants to the UK—remained constant over time, the educational levels of those who remained in Nepal increased, "as evidenced by improvements in job quality, including a shift to formal, salaried employment, as well as higher earnings in the domestic labor market" (Shrestha 2017).

Abarcar and Theoharides (2017) use changes in demand for nurses due to US immigration policy to identify the effect that large-scale emigration of Filipino nurses had on tertiary enrollment and graduation in nursing programs in the Philippines. In 2000, the US dramatically expanded the availability of visas for migrant nurses and their families. Then in 2007, it suddenly imposed restrictions on the number of these visas issued. Between 2001 and 2006, enrollment in nursing programs in the Philippines rose from 90,000 to over 400,000, and the number of nursing graduates grew from 9,000 to 70,000. The magnitude of the increase in nursing degrees was such that not all the additional nurses could migrate. After 2007, when the visas for nurses dropped, nursing enrollment and graduation declined.

Khanna and Morales (2017) use the mid-1990s' US internet boom—which led to an increase in demand for computer scientists (due to skill-selective US immigration policy)—to identify the effect large-scale emigration of India's computer scientists have on human capital investment decisions of workers and students (along with the overall performance of the information technology [IT] sector, both in India and the US). They calibrate their theoretical model of firm production, trade, and the forward-looking decision of workers and students to accumulate human capital. The results show that the prospect of migration induced Indians to switch to computer science (CS) occupations, increasing India's CS workforce and raising India's overall IT output by 5%. In the US, on the other hand, workers switched to non-CS occupations, reducing the US native CS workforce by 9% (see Section 3.2 for a discussion of this phenomenon, known as the crowding-out effect). Consumers in both countries benefited from larger overall IT output, leading to lower prices for IT products, and the combined income of both countries rose by 0.36% because of this flow of CS professionals from India to the US. The CS workers unsuccessful in migrating to the US joined the rapidly growing IT sector in India, and by the early 2000s many workers returned to India after their visas expired with newly acquired knowhow and connections.

This also brought the US-led boom to India, and by the mid-2000s India had surpassed the US in software exports.

The three examples from Fiji, Nepal, and the Philippines demonstrate that demand for skilled migrants from abroad can lead to human capital formation in the domestic economy by increasing the returns on education. That is because the prospect of migration will induce more workers to invest in human capital, and only a fraction of those workers will obtain migrant visas. The example from India goes further, illustrating the importance of diaspora networks in spurring innovation and growth in the source country. Note that skilled migrants do not have to return to their home countries to play this crucial role. Rather, with their presence in the host country, "they can serve as 'bridges' by providing access to markets, sources of investment, and expertise" (Kuznetsov and Sabel 2006).

3.2   Receiving Countries

The impact of skilled immigration on receiving countries is no less controversial. For example, one study says that "[if] lower-skilled migrants are sometimes said to take jobs that natives do not want, high-skilled migrants are usually employed in the types of jobs that many would prefer go to natives" (Regets 2001). It is a commonly held view that skilled immigrants depress labor market opportunities for their native counterparts, the so-called "crowding-out effect." Especially in countries where tertiary students pay high tuition fees, or in professions for which training is substantially provided by the private sector, skilled immigrants are viewed as "unfair competition"—as they supposedly enjoy cheaper or heavily subsidized education in their home countries. This thinking is flawed for two reasons: first, it ignores the cost of migration and other socioeconomic factors in sending countries; and, second, it considers only the direct impact of skilled immigrants on their native counterparts, thus ignoring indirect effects on the broader economy.

Unfortunately, available empirical evidence in this area is scarce, as opposed to abundant literature examining the effects of lower-skill immigrants on opportunities for lower-skill natives. Furthermore, the little evidence available is overwhelmingly focused on the US.

Early work by Grubel and Scott expresses the perception of international migration at that time: an accounting exercise in which one country "gains" brains that are "drained" out of another. They used data from the US National Science Foundation containing the numbers of scientists and engineers who emigrated to the US between 1949 and 1961, and estimated what it would have cost to bring a native American to the level of education held by the average immigrant at the time of his arrival.

They concluded that the human-capital value of these migrants was "of negligible importance relative to the size of the US stock of human and material wealth and the capacity to produce current output" (Grubel and Scott 1966). In the light of their findings, it was not surprising that the brain gain had not become a major policy issue for the US.

But, not only has the flow of skilled migrants into the US grown significantly since then, but the way we think about the impact of skilled immigration on the host economy has also substantially evolved. As hinted above, it is useful to think of the impact as having three dimensions: first, how skilled immigrants affect their native counterparts; second, their effect on the broader economy; and, third, their effect on the global economy.

Chiswick (2011) proposes a simple theoretical approach—based on the neoclassical aggregate production function—where the factors of production are capital, high-skill labor, and low-skill labor, and they are combined to produce output based on available technology. The key assumption is that high-skill immigrants are perfect substitutes for high-skill natives, whereas they complement low-skill workers and physical capital. Because of two well-known properties of the neoclassical production function—(i) factor complementarity (a combination of all three factors of production is needed to produce output) and (ii) diminishing marginal product,[14]— increasing the supply of high-skill workers through immigration (holding the supply of other factors constant) will reduce the earnings of high-skill workers while simultaneously increasing the earnings of low-skill workers and the returns to capital. Similarly, increasing the supply of low-skill workers will benefit high-skill workers and owners of capital, and hurt low-skill workers. Note that in this framework the broader economy unambiguously benefits from increasing the supply of any of the three factors of production through an increase in aggregate output.

Borjas (2003) tested the neoclassical approach using US Census data for 1960–2000. He estimated the labor market impact of immigration in the US by partitioning workers among imperfectly substitutable groups (by education and experience) while assuming perfect substitution of native and foreign-born workers within each group. He found that immigration reduced the wage and labor supply of competing native workers, even after accounting for the beneficial complementarity effects between high-skill and low-skill workers. During the period, the immigrant influx reduced the wage of the average native worker by 3.2% and the wage of college graduates by 4.9%. However, by his own admission, Borjas ignored the long-run capital adjustments induced by immigration, as well as the role played by capital-skill complementarities, and the possibility that high-skill immigration— especially in science, technology, engineering, and mathematics (STEM) fields—is an important engine for endogenous technological change.

Ottaviano and Peri (2005) build on this model in two substantial ways. First, they estimate the actual elasticities of substitution between native and foreign-born US workers in the same skill group. They find that foreign-born workers within a skill group are not perfect substitutes for US-born workers. In particular, native-born college graduates are the hardest to substitute with foreign-born college graduates. The intuition behind this finding is that jobs that require higher education tend to also require higher levels of human interaction, where language skills and knowledge of cultural norms are an advantage. Furthermore, US graduates tend to receive a US-specific education, whereas foreign graduates have to adapt their skills to US standards.

Their second contribution is to treat the accumulation of physical capital as endogenously driven by market forces that equalize real returns to capital in the long run—whereas Borjas assumed a fixed capital stock. Like Borjas, Ottaviano and Peri find negative wage elasticities to the supply of foreign workers in the same skill group. However, when they embed them into a production function that accounts for substitution and complementarity effects, they find a 2.7% increase of the average wage of US-born workers because of immigration, with US-born college graduates seeing a 3.5% increase.

Because the US is a large economy—and immigrants tend to concentrate in a few geographical areas—we cannot exclude the possibility that factor price equalization with a large unaffected geographical area may "dilute" the local effects of immigration. A small economy, on the other hand, is closer to the single labor market posited by neoclassical economic theory.

Friedberg (2001) used the 1989 lifting of travel restrictions in the former Soviet Union—which triggered a mass migration of Soviet Jews and their non-Jewish relatives and spouses to Israel—to study the effect of immigration on employment and earnings growth of native Israelis. She found a large positive effect of immigration on the wage growth of native Israelis: between 1989 and 1994, a 10% increase in employment due to Soviet immigration led to a 7.4% rise in hourly earnings of Israelis in the occupation. In addition, in high-skill occupations, for every 10% increase in occupational employment due to immigration, native wages rose by about 3%. Furthermore, Friedberg did not find any evidence of a displacement effect of immigrants on natives. Overall, the results point to the possibility of complementarity between immigrants and native workers.

One potential issue with Friedberg's findings is that the boom in Soviet immigration happened just as Israel's high-tech sector was booming, so the resulting increase in demand for high-skill workers could have offset the latent depressing effect of immigration on wages. However, Soviet

immigration is often indicated as a causal factor in the expansion of Israel's high-tech sector (Stone 1999).

We can conclude from these studies that the impact of skilled migrants on opportunities for skilled natives depends on the degree of substitutability between the two groups, which is likely to vary by sector, and even by subsector. Therefore, high substitutability between the two groups as theorized by Chiswick can be considered a worst-case scenario for skilled natives. Here, the increase in skilled labor supply through immigration leads to a decrease in earnings for natives, which in turn results in decreased incentives for natives to invest in human capital accumulation. The mechanism is symmetric to the one theorized by Stark et al. (1998) and Mountford (1997) for human capital accumulation in source countries, where prospective migration is a positive incentive for human capital accumulation (see Section 3.1). However, this neoclassical approach also assumes that higher-skill workers complement both lower-skill workers and physical capital—meaning that high-skill migrants can generate both demand for lower-skill labor and new capital investment. That, in turn, would increase demand for higher-skill workers, thus moderating the negative incentive for human capital investment in natives.

Another concern related to the influx of skilled migrants is that an increase in the enrollment of foreign students in advanced academic and training programs means fewer places for natives. However, this reasoning assumes that higher-education and training institutions have a fixed number of slots to assign, and that for every foreign applicant there is a native with the same skill level who gets crowded out. The reality is that institutions have a degree of flexibility on the number of students they admit, and when they can choose among the best of both foreign and native applicants, they raise the bar for the entire program's benefit. Furthermore, public universities in countries like the US, the UK, and Australia are increasingly reliant on the revenue provided by international students (in the face of decreasing public funding), while private universities seek international students to bolster their position in the face of increased international competition.

In 2011, growing unease among Singaporeans over foreign students "taking the place of locals" led to the government placing a cap on enrollment of international students in local universities (Davie 2014). In their call for the Singaporean government to reverse the policy, Seah and Png (2018) point out that international students, particularly those paying full tuition fees, not only help support university budgets in the face of a shrinking population, but also benefit local students and Singapore in general. They argue that international students bring diverse perspectives to class discussions and allow local students to build international networks

that become a gateway to information on employment and business opportunities abroad.

Critics also argue that foreign students who remain in the host country after graduation compete for jobs with their local peers. In his study of doctoral recipients in the US between 1968 and 2000, Borjas (2005) shows that a foreign student influx into a particular doctoral field at a particular time had a significant and adverse effect on the earnings of doctorates in that field who graduated at roughly the same time: a 10% immigration-induced increase in the supply of doctorates lowered the wage of competing workers by about 3%.

Conversely, Chellaraj et al. (2008) estimate the impact of international students in the US on innovative activity from 1965 to 2001. They find that the presence of foreign graduate students has a significant and positive impact on both future patent applications and future patents awarded to university and non-university institutions: a 10% increase in the number of foreign graduate students would raise patent applications by 4.5%, university patent grants by 6.8%, and non-university patent grants by 5.0%. They also find skilled immigration to have a positive, but smaller, impact on patenting.

Skilled immigrants, especially in STEM fields, are highly entrepreneurial. Even as employees, they develop "new techniques, products, markets and inventions, and new ways of using older ideas" (Chiswick 2011). According to the Kauffman Index of Entrepreneurial Activity, in 2016 immigrant entrepreneurs accounted for almost 30% of all new entrepreneurs in the US, up from 13.3% in 1996. Immigrants were twice as likely as natives to become entrepreneurs, with the Rate of New Entrepreneurs being 0.52% for immigrants, compared with 0.26% for natives (Fairlie et al. 2017).

Especially in OECD countries, a frequent public perception is that migrants receive a disproportionate amount of social benefits in host countries. In fact, the data show that "migrants pay more taxes and make more social contributions than they receive in benefits" (ILO 2015). Skilled immigrants, in particular, tend to have higher wage rates and pay even more taxes and receive less in benefits than low-skilled immigrants. Furthermore, as the simple framework in Chiswick discussed above shows, high-skilled immigration raises the earnings of other factors of production, with the effect of improving the net fiscal balance (taxes minus transfers) of lower-skilled workers as well.

The evidence presented so far indicates several broader economic benefits from an influx of skilled workers (or students): they often have skill profiles in high demand, and they tend to complement, rather than substitute locals. Imposing restrictions on skilled immigrants for the benefit of natives who compete directly with them in a few narrow fields

is equivalent to "skill protectionism" as, just like trade protectionism, it places the interests of a few above the economy as a whole.

To our knowledge, there is no substantive empirical evidence on the effect of skilled labor mobility on the global economy. However, it is rather intuitive to theorize a positive effect. The emergence of international production networks, and the subsequent fragmentation and specialization in production, leads to "increased employer dependence on scarce or unique skill sets" (Regets 2001). The quality of job matches increases when employers can search across borders, satisfying both employers and workers. This greater efficiency results in higher global GDP. Especially for STEM workers, the creation of international, specialized research and development centers leads to better solutions to challenging problems and reduces duplication in research and development.

4. OPPORTUNITIES AND CHALLENGES

The ASEAN region has made significant progress in human capital development, although there are large variations among members—reflecting their different stages of economic development along with differences in policies and practices. Figure 2.3 graphs the four components of the World Economic Forum's 2017 Human Capital Index—capacity, deployment, development, and know-how—for the countries in ASEAN, East Asia, and the Pacific, including global high performers like Australia, Japan, and New Zealand (Zahidi et al. 2017). Across all four dimensions, countries are scored on a scale from 0 (worst) to 100 (best).

Panel A shows the scores for capacity—the level of formal education of the current workforce that results from past educational investment. It includes the percentage of primary, (lower) secondary, and tertiary education, and the proportion of the population that has a basic level of numeracy and literacy. In this dimension, Malaysia, the Philippines, and Singapore perform solidly, while the others remain below full potential.

Panel B shows the scores for deployment—how many people actively participate in the workforce across age groups and gender—important because human capital is substantially enhanced in the workplace. It includes the labor force participation rate, unemployment rate, underemployment rate, and a measure of the gender gap in labor force participation. In this dimension, Cambodia, the Lao People's Democratic Republic (Lao PDR), Myanmar, Thailand, and Viet Nam outperform their neighbors who are top performers in the overall human capital index. However, a high degree of human capital utilization without skill diversification and

A. Capacity Subindex

B. Deployment Subindex
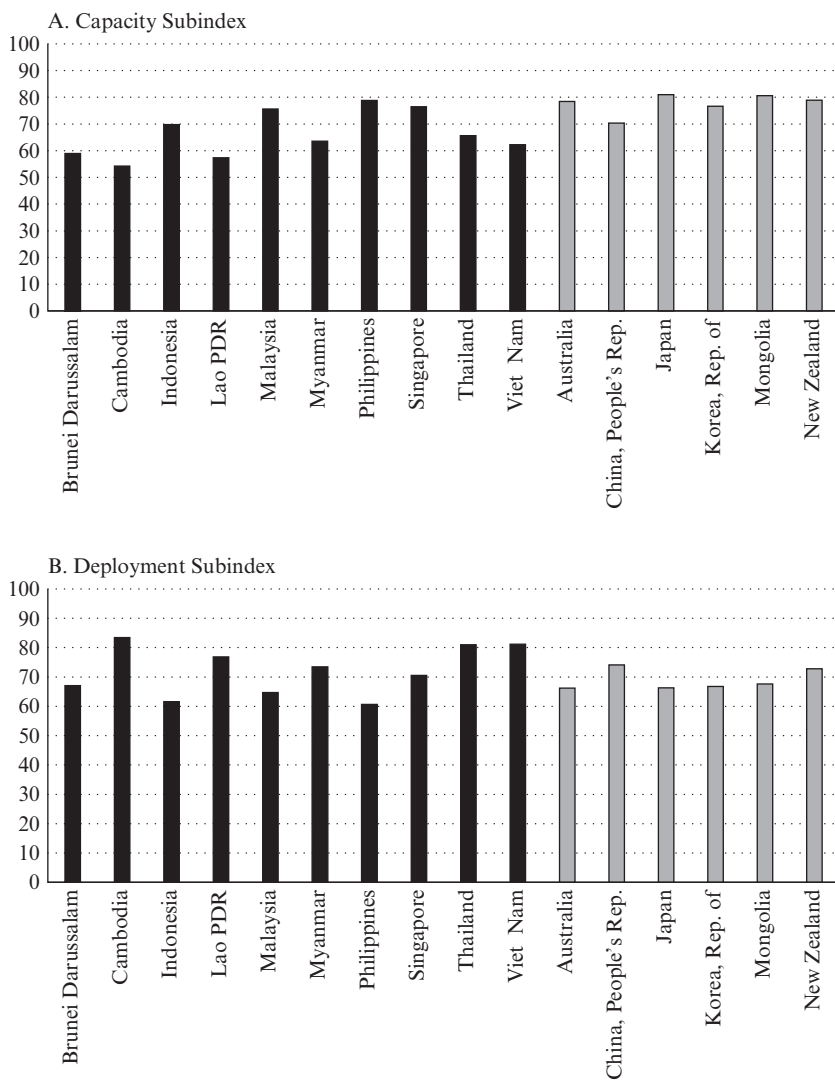
Source: Zahidi et al. (2017).

Figure 2.3   *Global Human Capital Index (2017)*

more advanced know-how is not sufficient for a country to optimize its long-term human capital potential.

    Panel C shows scores for development, which measures the formal education of the next-generation workforce and continued upskilling and

C. Development Subindex

D. Know-How Subindex
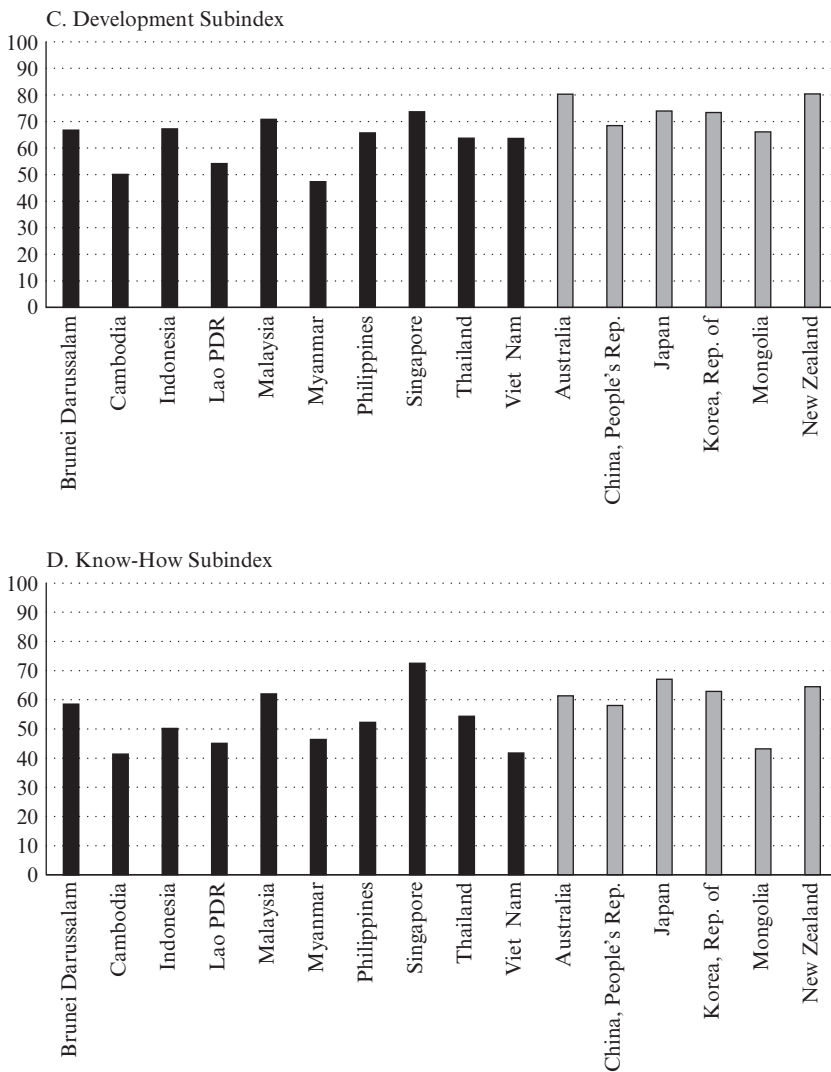
Figure 2.3   (continued)

reskilling of the current workforce. It includes net enrollment rates in primary and secondary schools, gross tertiary enrollment ratios (including both higher education and vocational training), and the gender gap in secondary enrollment for under 15 and 15–24 age groups. It also includes survey-based indicators of the quality of primary education, how well

the education system meets the needs of a competitive economy, the skill diversity of a country's recent graduates, and a measure of on-the-job training. In this dimension, Singapore and Malaysia perform ahead of the rest of ASEAN; the Lao PDR, Myanmar, and Cambodia significantly underperform their potential; with remaining members showing remarkable progress, especially in the educational attainment of their younger generations (Zahidi et al. 2017).

Finally, Panel D shows the scores for know-how, which represents the breadth and depth of specialized skills used at work. It includes the economic complexity index, which measures the relative complexity of a country's exports, representing the knowledge accumulated in a country's population as expressed in the country's industrial composition. It also includes the high-skill employment share, the medium-skill employment share, and a survey-based measure of employers' difficulty filling job vacancies. In this dimension, Singapore outperforms all countries, Malaysia and Brunei Darussalam perform relatively well, with the others behind.

ASEAN members' performance lends additional support to the argument that an influx of skilled labor can help the host country develop its long-term human capital potential, while deterring the outflow of skilled workers does not help the sending country. That is because it is not enough for source countries to "retain" skilled workers (i.e., capacity). They must be deployed in occupations that match their skill set and have opportunities to develop their skills on the job. Symmetrically, receiving countries would be depriving employers of the skills required to grow certain sectors of the economy, and natives the opportunity to learn those skills from their foreign peers.

The fact that the median age of degree-level workers in ASEAN is the mid-20s—noticeably younger than the entire workforce—means that the region could experience a "demographic dividend" from an increasingly well-educated younger population (World Economic Forum 2016). However, intra-ASEAN mobility of skilled labor is crucial for this dividend to materialize, as it alleviates skill mismatches within the region.

The digital revolution has not only helped workers overcome informational asymmetries; it has also made it easier to stay in touch with families and the communities left behind (see Chapter 10). As a result, skilled workers, especially in STEM fields, "often move from firm to firm, and from country to country, seeking opportunities to advance their skills, as well as apply their skills more fruitfully" (Chiswick 2011). If skilled workers find obstacles to intra-ASEAN mobility, they will simply go elsewhere.

The wave of populism that has taken hold in large parts of Europe, the US, and increasingly Australia has led to downsizing (or ending) programs

aimed at attracting foreign talent. This is creating a climate of uncertainty among skilled migrants. The ASEAN Economic Community, a dynamic region with a projected growth of over 5% in 2018, can set itself as a viable alternative for internationally mobile skilled workers.

Provisions for skilled labor mobility within ASEAN principally revolve around mutual recognition arrangements (MRAs) that allow a worker's skills, experience, and accreditations to be recognized across ASEAN, permitting them to work outside their home countries. However, MRAs only cover eight professions (accounting, architecture, dentistry, engineering, medicine, nursing, surveying, and tourism), which account for roughly 5% of employment in ASEAN countries (Batalova et al. 2017). There is a large fraction of internationally mobile skilled workers in vocational occupations—from dental hygienists to specialized mechanics, and electrical technicians to construction workers. An effective framework for skills mobility must include those workers.

Even in the eight professions covered by MRAs, several technical and political barriers—both national and regional—impede professionals from moving and practicing their professions in other ASEAN countries (Papademetriou et al. 2015). For Cambodia, Thailand, Myanmar, and the Lao PDR, companies must demonstrate that there will be a transfer of knowledge to local employees, and that foreign employees will eventually be replaced by locals; in Indonesia, companies must prove that the position cannot be filled by local employees; in the Philippines, foreigners are constitutionally barred from certain occupations (DS&A 2016).

Although there is substantial variation in standards across MRAs, some set the bar quite high. For example, an engineer must first hold a license to practice in their own country and have at least seven years' work experience after graduation. Only then can they apply for review to the ASEAN Chartered Professional Engineers Coordinating Committee and, if successful, work in other ASEAN countries as a "Registered Foreign Professional Engineer" (DS&A 2016).

Stringent standards for the transferability and recognition of education and training are a leading obstacle to both talent flows and talent utilization. If their qualifications are not recognized by the host country, skilled migrants take up jobs that do not utilize or that underutilize their skills, leading to what economists call "brain waste." In the US, for example, nearly 2 million immigrants with college degrees were out of work or in low-skilled jobs in 2015, thus missing out on more than $39 billion in wages, and costing the US government more than $10 billion in taxes (Batalova et al. 2016). The lack of recognition of experience and skills acquired abroad can be a powerful disincentive to migrate, given that workers think their mobility will be a drawback rather than a launching pad for their career.

Chapter 8 provides the example of Indonesian nurse candidates in Japan, who are often treated by hospitals as "nurses' assistants" and assigned as careworkers despite being trained as nurses in Indonesia.

In addition to legislation barring foreigners from certain professions, restrictive labor policies in many ASEAN countries include immigration systems that severely limit work visas for foreign professionals, or do not provide for family reunification, or restrict spouses' ability to work. Even short-term work visas—which are useful for training, seasonal, or project-based employment—can be detrimental to talent flows because they discourage both migrant workers and employers from investing in on-the-job training most relevant to the host country labor market (Chiswick 2011).

Varying visa standards across the region do not incentivize employers to hire skilled workers from within ASEAN. A consequence of the federal structure in many ASEAN countries is that different states within the same country may have different documentation requirements. Citizens of ASEAN members do not enjoy priority status, and there is no streamlined immigration process compared with citizens of non-ASEAN countries. The result is that citizens of ASEAN member states may find it easier to emigrate outside the region, and it may be relatively easier for citizens of non-ASEAN countries to obtain a work visa in the region. A preferential work-based immigration system would allow ASEAN citizens to gain access to more intraregional career opportunities, which would encourage them to remain within the region. It would also offer employers access to a larger and more diverse local talent pool, which could be tapped with minimal interference (EY 2015).

The portability of social security benefits is another challenge to talent flows in ASEAN, especially as it pertains to retirement income. Migrant workers may lose access in their home countries before they qualify for benefits in their host countries—due to nationality conditions or minimum residency requirements. Even once they fulfill residency requirements and start paying into the system, there may be minimum required contribution periods before they can enjoy full benefits; and even then, benefits may not be exportable, or exportable with significant reductions (Pasadilla 2011). It is necessary for ASEAN members to establish mechanisms, such as social security agreements, through which their social security systems can cooperate to remove restrictions and ensure portability.

Another obstacle is the lack of regional standards regulating various industries. The ASEAN aviation industry, for example, does not have common regulations for personnel licensing, training, safety and maintenance, flight operators, and air traffic management. Establishing common guidelines for industries across ASEAN could facilitate the growth of

regional businesses and industries, build a larger and more qualified labor force, and promote interconnectivity (DS&A 2016).

One final challenge relates to the significant cultural diversity that characterizes the ASEAN region. As shown in Figure 1.4, there are three main streams of intra-ASEAN migration: the Indonesia–Malaysia route and the Malaysia–Singapore route absorb about 16% of intra-ASEAN migration each; and the Cambodia, Lao PDR, and Myanmar into Thailand (i.e., TCLM) route absorbs about 55% (ILO and ADB 2014). It is no coincidence that all three routes are established between countries that are geographically and culturally close. Language differences are a major barrier to the transferability of skills. Even though migrant workers now study English for years and often speak English at work—especially in STEM occupations—they may find themselves at a disadvantage in everyday life if they do not speak the local language. As seen in Chapter 8, intensive language training, as well as training in cultural understanding, can ease migrant integration into their host communities.

Cultural differences are likely to be less and less of an impediment as urban development continues in the region, providing a more cosmopolitan environment and more services to residents. The presence of enclaves of migrants for the same host country can be an advantage in overcoming information asymmetries and provide a support system for newly arrived migrants, but enclaves can sometime constitute an obstacle to migrant integration into host countries by increasing their interaction costs with natives (Danzer and Yaman 2012). Although individual characteristics such as education and years since migration also play important roles in a migrant's level of integration, engaging with migrant communities through education, civic and cultural participation, and other services can create a vibrant exchange of ideas and stimulate growth.

5.   CONCLUSIONS

The lack of granular, consistent data on global migration flows is a serious obstacle to understanding both what drives skilled migration and how it affects source and host countries. A potential consequence is that perceptions and speculation, rather than facts, end up driving the policy debate. A review of the economic literature on migration contributes in two ways: (i) it shows how the way we think about migration has evolved over time, both in academia and society, as our understanding of this complex phenomenon deepened; and (ii) key findings establish a factual basis for policy decisions. It is worth reiterating that the literature review here is not meant to be exhaustive and the studies cited are not

necessarily the most prominent. But they are the most relevant to the ASEAN region.

Two economic models are very helpful in explaining why just a small fraction of inter-ASEAN migrants are high skilled. First, there is the O-ring theory of economic development (Kremer 1993), where high-skill workers complement each other and therefore maximize productivity as they work together and access high-quality equipment. And, second, Grogger and Hanson (2011) show that the larger the difference in earnings between source and host country for the same skill level, the more skilled migrants will be attracted (positive selection). This may help explain why the share of high-skilled intra-ASEAN migrants remains so low. Furthermore, migrants sort themselves across destinations by skill, based on the rewards-to-skill in different destinations (positive sorting), which explains why all migrants do not simply flock to the country that pays the highest wage. Note that this sorting process happens both *within* and *between* professions—in fact, the concept of "skilled worker" is a fluid one, and often applies to those profiles that are in high demand rather than those above a certain "skill threshold." For example, advanced economies with aging populations are equally eager to attract migrants who are engineers with advanced degrees and careworkers for the elderly. Therefore, the Global Commission on International Migration suggests leaving the traditional distinction between high-skill and low-skill workers behind and using the term "essential workers" instead (GCIM 2005).

For decades, skilled emigration from economically depressed areas has been viewed as detrimental to the source country. The most common argument is that skilled workers enjoy a public subsidy for their education, and when they begin to contribute back to society they do so in another country. However, skilled emigration is only the proximate cause of this loss. The ultimate causes are the inefficiencies caused by government policies and other socioeconomic conditions in the source country.

A large body of literature debunks the negative perceptions of skilled emigration: that (i) it depletes human capital in the sending country, when evidence shows that prospective migration increases the stock of human capital net of migration; that (ii) skilled migrants remit less, when evidence shows they remit significantly more; and that (iii) skilled migrants sever ties with their home countries, when diaspora networks have historically provided foreign direct investment, access to markets, technology, and expertise. This is why there have been calls to stop referring to the phenomenon as a "brain drain," which has negative connotations, in favor of a more neutral or even positive expression such as "skill flow" (Clemens 2009) or "brain circulation." In fact, as mentioned above, source countries do not need their skilled emigrants to return in order to benefit from their expertise.

Equally simplistic is the notion of "brain gain" associated with receiving countries. While early studies focused only on the social benefit of "free" human capital for the host economy, there is evidence that native workers who compete directly with foreign migrants can suffer a decrease in wages, and even be crowded out of sectors where competition with foreign workers is particularly intense. The magnitude of this effect depends on the degree of substitutability between migrant workers and foreign workers, which is likely to vary by sector. But it is also based on migrant characteristics such as country of origin, country of education, and years since migration, among others. Ottaviano and Peri (2005), for example, found that in the US foreign-born workers within a skill group are not perfect substitutes for native workers, and that foreign-born college graduates are the hardest to substitute with US-born college graduates. Therefore, we have a worst-case scenario of perfect substitutability between migrant and native skilled labor, and a best-case scenario in which foreign and native skilled workers complement each other—where the productivity boost results in a wage increase—which is what Ottaviano and Peri found for skilled workers in the US. In a world where employers are increasingly dependent on very specialized, unique skills—especially in STEM fields—the latter scenario becomes increasingly plausible. Even the so-called "crowding out effect" could be interpreted as native workers responding to incentives in the medium to long term and moving into professions where they can fully exploit their native advantage.

The breakdown of the Human Capital Index shows that optimizing a country's long-term human capital potential is a complex process that involves increasing educational attainment in the population (capacity), active participation in the workforce (deployment), continued upskilling and reskilling of the current workforce (development), and the use of advanced, specialized skills at work (know-how). Therefore, while an influx of skilled labor can help the host country build its human capital, deterring the outflow of skilled workers does not necessarily help the source country.

Numerous obstacles still block skills mobility in the region. Existing MRAs cover just a small fraction of internationally mobile skilled workers. And there remains a lack of political and public will in Southeast Asia to advance mobility even for this small group. Employers must go to great lengths to justify hiring foreign workers, and there is no preferential work-based immigration system for ASEAN citizens: visa applicants face lengthy procedures in which even states within the same country may have different documentation requirements. Workers who manage to move may lose access to social security benefits in their home countries before qualifying for benefits in their host countries. And the benefits earned in their host countries may not be exportable, or exportable with significant

reductions. Finally, the remarkable cultural and linguistic diversity of the region means adequate language and cultural training must be provided to would-be migrants to ease integration in the host country.

Ultimately, achieving the goal of real brain circulation in the region may require some "thinking outside the box." The conventional approach has been based mainly on reciprocity and mutual recognition. Reciprocity means that citizens of country A are given the opportunity to practice their profession in country B if country A offers the same privilege to citizens of country B. Mutual recognition refers to the reciprocal acceptance of measures applied in both countries. Suppose country A and country B adopt different standards to achieve the same quality of training—without an agreement, professionals from one country wanting to work in the other country need to pay two fixed costs (one associated with the standard in country A and another with the standard in B). However, if countries A and B recognize their standards (mutual recognition) as equivalent, professionals will be able to operate in both markets, paying only one fixed cost of entry.

The main challenge of attempting to foster skills mobility through reciprocity and mutual recognition in such a diverse group of countries is that the desired level of standards may differ across countries, and "setting domestic standards at a level that enhances the case for foreign recognition may lead to standards that are inappropriately 'high' from a domestic perspective" (Mattoo and Mishra 2009). That would be a problem, for example, if education and training institutions struggle to comply with the high standards or divert scarce resources to foreign recognition rather than serving the local market.

An additional concern is heterogeneity of standards within source countries. For example, it is not uncommon for developing countries to have poor-quality education and training providers coexist with internationally competitive ones, often concentrated in the capital region. The difficulty in observing the true competence levels of incoming professionals is another reason why host countries are reluctant to remove technical barriers to skills mobility.

One solution could be creating a literal "double standard"—one at a level that creates a credible case for foreign recognition, with the other at a level appropriate to domestic needs. For example, the Philippines may train nurses who are going to work abroad to a higher (or different) standard than those who are going to work domestically (Mattoo 2018). The domestic population, especially in underserved areas, would benefit because professionals trained to the "local" standard would be less likely to emigrate. At the same time, professionals who want to work abroad would train under the "export-oriented" standard, which would target specific export markets (Mattoo and Mishra 2009). Institutions could self-select

into the domestic or export-oriented standard, for example through an accreditation system, and pathways and equivalencies could be developed to give professionals the flexibility to move from one standard to another. Alternatively, the system could be examination-based. The key element would be the source country providing quality assurance through pre-migration screening and selection of would-be migrants.

The system described above may not necessarily be desirable for ASEAN. But it is an example of a more flexible approach where concerns of both source and host countries are addressed. In Chapter 10, we discuss how the Fourth Industrial Revolution will revolutionize work and worker mobility, but it is already clear that novel and flexible policy solutions will be required to rise to the challenge.

NOTES

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1.   Author's calculations based on data from United Nations (2015).
2.   The opposite scenario would be positive selection, i.e., migrants are more skilled than those who remain.
3.   Points-based immigration systems are used in Australia; Austria; Canada; Denmark; Germany; Hong Kong, China; Japan; New Zealand; the Republic of Korea; and the UK. In the US, the two main political parties have proposed their own versions of legislation that would shift the country from a predominantly "targeted occupation system"—in which employers petition for a visa on behalf of an applicant and must demonstrate that the applicant has skills that are scarce in the host country (Chiswick 2011)—to a points-based immigration system.
4.   An emigrant is someone who leaves their place of residence or country to live elsewhere, whereas an immigrant is a person who comes to a country to take up permanent residence. Therefore, an individual is an emigrant with respect to their place of origin (source country), and an immigrant with respect to their destination (host territory).
5.   The question asked was: "Ideally, if you had the opportunity, would you like to move permanently or temporarily to another country, or would you prefer to continue living in this country?" It is part of the core questionnaire. For a detailed discussion of the Gallup World Poll questions, see Gallup (2008).
6.   The economies of Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam are collectively referred to as "tiger cub economies" because they chose the same export-driven model of development that transformed the original four Asian Tigers (Hong Kong, China; the Republic of Korea; Singapore; and Taipei,China) into high-income economies within one generation.
7.   The Arab states bordering the Persian Gulf, often abbreviated as the "Gulf countries," include Bahrain, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, and the United Arab Emirates (UAE).
8.   The six occupation groups are: (i) laborers, farm workers, and low-skilled service workers; (ii) operatives and craft workers; (iii) clerical workers; (iv) sales workers; (v) managers; and (vi) professional and technical workers.
9.   For a thorough discussion of the theoretical literature on migration and relevant empirical tests, see Massey et al. (2005).

10. For an extended discussion of the studies that followed Borjas (1987), see Hanson (2010).
11. All immigration numbers come from UN (2015). Average monthly wages are International Labour Organization (ILO) estimates based on 2013 labor force surveys from ILO and ADB (2014, Tables 1–4, p. 8).
12. The third industrial revolution took place in the latter part of the 20th century and involved the ongoing automation of several manufacturing processes, as well as the establishment of global production networks aided by trade liberalization and lower transport costs. This led to lower-cost labor in developing economies becoming a suitable alternative to more mechanized production. The process was disruptive to the existing manufacturing landscape in many advanced economies, whereas many developing economies, particularly in East Asia, began to quickly catch up to the level of economic development of advanced economies.
13. Fan and Stark (2007) use this expression to refer to the branch of the literature according to which "higher prospective returns to human capital in a foreign country impinge favorably on human capital formation decisions at home." See, for example, Stark et al. (1997, 1998), Mountford (1997), and Stark and Wang (2002).
14. The law of diminishing marginal product states that while increasing the supply of one factor of production (e.g., high-skill labor) and keeping others at the same level may initially increase output, further increases in that factor will have a limited effect and will eventually have no effect, or a negative effect, on output.

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3. Economic impact of skilled labor mobility within the ASEAN Economic Community

Erwin Corong and Angel Aguiar

1. INTRODUCTION

The Association of Southeast Asian Nations (ASEAN) has been actively pursuing trade integration for over 25 years. In 1992, members signed the ASEAN Free Trade Agreement (AFTA) to increase intra-ASEAN trade and improve the region's competitiveness by eliminating intra-ASEAN tariff and non-tariff barriers by 2015.[1] The ASEAN Economic Community (AEC) was launched in 2015 with the primary aim of creating a single market and production base that would allow the free flow of goods, investments, and skilled labor within the region (ADB 2015). Although skilled labor liberalization has lagged behind trade and investment liberalization, Sugiyarto and Agunias (2014) argue that freer flows of skilled labor within ASEAN may help address the labor shortfalls and skill shortages the region currently faces.

The main objective of this chapter is to understand and quantify the potential impact on ASEAN member economies of skilled labor mobility under the AEC Mutual Recognition Arrangements (MRAs)—which took effect in 2015. As far as we are aware, no prior study has analyzed how the MRAs might impact each ASEAN economy. We fill this gap and contribute to policy research by carrying out simulation-based analyses with the aid of an economy-wide or computable general equilibrium (CGE) model to help us keep track of the likely direct and indirect effects that tariff elimination and freer mobility of skilled workers would have in their source and host countries.

CGE models are data intensive. For this study we use the GMig2 (Global Migration) Data Base and modeling framework. Both the GMig2 data and model (Walmsley et al. 2007) extend the widely used Global Trade Analysis Project (GTAP) data and model—by explicitly accounting for bilateral migration and remittances flows. The GTAP framework (Hertel

1997) has been the basis for most analysis of free trade agreements since the mid-1990s. The GTAP model relies on the GTAP Data Base, which provides an exhaustive set of accounts measuring the value of annual flows of goods and services for the world economy with regional and sectoral detail. These flows, based on official data, include bilateral trade, transport, and protection matrices that link individual country/regional economic datasets. The most recent GTAP Data Base (version 9.0) covers 140 regions (120 countries and 20 aggregated regions), 57 sectors, and 8 factors of production (Aguiar et al. 2016).

An economy-wide framework like GMig2 is the appropriate methodology to analyze how labor migration scenarios might affect the ASEAN region and each member because it accounts for micro- and macroeconomic linkages. In this study, we use GMig2 to answer two questions: (i) would intra-ASEAN skills mobility bring economic benefits to each member and the ASEAN region as a whole; and (ii) would complementary policies that reduce wage differentials between migrants and permanent residents bring further economic gains?

We find that AFTA tariff elimination—coupled with (i) a policy allowing the freer flow of skilled labor within ASEAN and (ii) improvements in the initial host country's migrant-to-permanent resident wage ratio (improved wage differentials)—would result in gross domestic product (GDP) gains for AEC economies. This is due to the increased supply of skilled labor and higher investments, exports, and consumption on the back of higher remittances sent home by migrant workers. As such, our quantitative findings support the view (for example, Sugiyarto and Agunias 2014) that freer flows of skilled labor coupled with complementary policies that reduce national-level barriers would benefit ASEAN members and the region as a whole.

This chapter is organized as follows. Section 2 describes the key features of the methodology used. Section 3 analyzes the underlying data by focusing on each AEC member's economic structure, intra-ASEAN trade, and intra-ASEAN skilled labor migration flows. Section 4 describes the policy experiments and analyzes the simulation results. Finally, Section 5 outlines the insights gleaned from the simulation results, policy implications, and our agenda for future work.

2.   METHODOLOGY

Analyzing the potential impacts of skills mobility within the AEC requires a model capable of tracing the transmission channels through which bilateral labor movements may affect each AEC member economy and

their trading partners. To do this, we employ the GMig2 model (Walmsley et al. 2009)—a multi-sector, multi-country general equilibrium model that extends the widely used GTAP modeling framework (Hertel 1997; Corong et al. 2017) by explicitly accounting for bilateral labor flows and their consequent impacts on wages and migrant remittances.

The GTAP model is a relatively standard multi-sector, multi-region CGE model. It assumes constant returns to scale, and consists of equations that define agents' behavior and optimizing decisions (such as cost minimization and profit and utility maximization), market clearing conditions, and identities that satisfy accounting constraints. Figure 3.1 presents
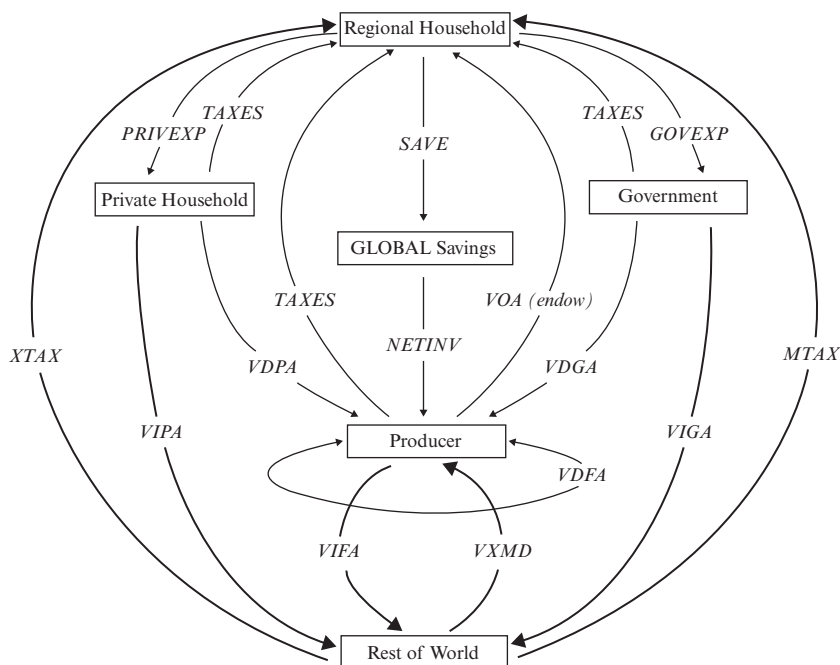
Note: GTAP = Global Trade Analysis Project; XTAX = Export tax; PRIVEXP = Private Expenditure; GOVEXP = Government Expenditure; SAVE = Saving; VOA = Value of Output; Endow = Endowment; VIPA = Value Imported Expenditure by Private Households; VDPA = Value Domestic Expenditure by Private Households; VIGA = Value Imported Expenditure by Government; VDGA = Value Domestic Expenditure by Government; VIFA = Value Imported Expenditure by Firms; VDFA = Value Domestic Expenditure by Firms; MTAX – Import tax.

Source: Brockmeier (2001).

Figure 3.1 Schematic overview of the GTAP model

a schematic representation of the GTAP modeling framework—similar to an economy's circular flow model. The figure suggests that GTAP not only allows us to trace the linkage within a country between each economic agent (firms, households, investment, and government), but also how these agents are linked to the rest of the world (see Hertel 1997; Brockmeier 2001; and Corong et al. 2017 for an updated schematic representation of the GTAP modeling framework and details on the latest version of the GTAP model).

The GMig2 model extends the core GTAP model by explicitly accounting for bilateral labor flows and their consequent impact on wages and migrant remittances. In this section, we explain just the key mechanisms affecting labor mobility; further technical details are found in Walmsley et al. (2009). The GMig2 model includes equations that track bilateral labor movements and their associated flow-on effects to each country's labor force ($LF_{i,r}$) and population ($POP_{c,r}$) flows, as shown in Equations (3.1) and (3.2).

$$LF_{i,r} = \Sigma_c \, LF_{i,c,r} \qquad\qquad (3.1)$$

$$POP_r = \Sigma_c \, POP_{c,r} \qquad\qquad (3.2)$$

These equations indicate that an increase in the number of migrant workers of skill i from source region c in host region r would result in a reduction in the labor force and population in the source region c, and a consequent increase in the labor force and population in the host region r.[2]

Note that the change in each region's population, as computed in Equation (3.2), may be more than the change in labor force. This occurs under the assumption that workers move with their families. In this chapter, we assume otherwise—that is, migrant workers do not move with their families due to the temporary nature of skills mobility within the AEC.

Moreover, there are two methods by which skills mobility within the AEC can be analyzed. The first is through three possible exogenous changes in labor supply: (i) change in the number of migrants from source region c to host region r; (ii) change in total labor supply in host region r—to simulate a proportional increase in the stock of migrants coming from various source countries c (as observed in the initial data); or (iii) change in the total supply of labor to simulate a proportional outflow of migrants to their home country.

The second method, which we use here, models skills mobility within the AEC via an endogenous mechanism that allows migrant workers to move from source country c to host region r based on real wage differences between their host ($RW_{i,c,r}$) and source countries ($RW_{i,c,c}$), as shown in Equation (3.3).

$$LF_{i,c,r} = A_{i,c,r} \times \left[\frac{RW_{i,c,r}}{RW_{i,c,c}} \right]^{\sigma_{i,c,r}} \qquad (3.3)$$

The degree to which migrants respond to real wage differences is governed by the supply elasticity parameter represented by $\sigma_{i,c,r}$. Higher (lower) values assigned to the $\sigma_{i,c,r}$ parameter results in a greater (smaller) response of migrants to real wage differences. In the absence of econometric estimates, we set $\sigma_{i,c,r}$ for skilled labor to 1.0—which means that migrants have a unitary elasticity response to real wage differences between their source and host countries. The exogenous coefficient ($A_{i,c,r}$), shown in Equation (3.3) accounts for other factors in the migration decision (such as language and other restrictions) and is calibrated from the underlying GMig2 Data Base explained below.

We use GMig2 version 9.0 data (2011 as base year), which categorizes the world economy into 57 sectors and 140 countries/regions. Like the model, the GMig2 data also extends the standard GTAP Data Base by explicitly accounting for bilateral labor flows and migrant and non-migrant wages, along with bilateral remittances. These are constructed from various data sources such as: (i) the bilateral matrix of foreign-born populations from Ozden et al. (2010); (ii) labor force participation rates from the International Labour Organization (ILO); (iii) labor skill shares from Docquier et al. (2010); and (iv) data on GDP, population, and bilateral remittances from the World Bank.

Given our focus on skills mobility—and because this study is our maiden attempt to analyze skills mobility within the AEC—we aggregate the full GMig2 Data Base to 16 countries/regions, two labor types (classified into skilled and unskilled),[3] and eight broad sectors (which include three service subsectors—business services, public and health services, and "other services"). These sectors include those occupations covered by AEC Mutual Recognition Arrangements (MRAs)—accountants, architects, dentists, engineers, medical practitioners, nurses, land surveyors, and tourism professionals. Table 3.1 shows that the aggregated GMig2 data distinguishes all AEC members except Myanmar, which in the original GTAP/GMig2 Data Base is aggregated with the "Rest of Southeast Asia" (including Myanmar and Timor-Leste).[4]

3. BENCHMARK DATA

Here we examine the underlying structure of our aggregated GMig2 Data Base. We pay particular attention to each AEC member's economic structure, intra-ASEAN trade, and intra-ASEAN skilled labor migration flows.

Table 3.1   Regional and sectoral aggregation

No.	Country/Region	Code	No.	Sector	Code
1	Australia/New Zealand	ANZ	1	Agriculture	AGR
2	East Asia	XEA	2	Forestry, fishing, and mining	PRM
3	Brunei Darussalam	BRU	3	Processed food	PFD
4	Cambodia	CAM	4	Textile and clothing	TEX
5	Indonesia	INO	5	Other manufacturing	MNF
6	Lao People's Democratic Republic (PDR)	LAO	6	Business services	OBS
7	Malaysia	MAL	7	Public and health services	OSG
8	Philippines	PHI	8	Other services	SER
9	Singapore	SIN			
10	Thailand	THA			
11	Viet Nam	VIE			
12	Rest of Southeast Asia (including Myanmar)	XSE			
13	South Asia	XSA			
14	North America	NAM			
15	European Union 27	EU			
16	Rest of the World	ROW			

Source: Authors' aggregation based on GTAP/GMig2 Data Base version 9 (see Appendix Tables 3A.1 and 3A.2 for detailed sectoral and regional concordance with the GTAP Data Base).

Table 3.2 shows both expenditure- and income-side GDP for 2011. Global GDP was $71 trillion, with North America and Europe accounting for a combined 50% share. Combined, Southeast Asian economies contributed $2 trillion (roughly 3.1%) of global GDP. Indonesia has the highest GDP among AEC members with $845 billion, followed by Thailand and Singapore with $345 billion and $274 billion, respectively.

Figures 3.2 and Figure 3.3 decompose GDP into its components for each Southeast Asian economy. The expenditure-side GDP of Indonesia, the Lao PDR, the Philippines, and the Rest of Southeast Asia is mainly anchored on consumption, while the GDP of Brunei Darussalam and Singapore is mainly driven by exports (Figure 3.2). From the income side, Figure 3.3 shows that unskilled labor accounts for a significant share of GDP for most Southeast Asian economies—except for Singapore, where the share of skilled labor income roughly equals that of capital. Much of Brunei Darussalam's income-side GDP comes from capital and indirect taxes, with the latter mostly in the form of oil royalties.

Table 3.2 Gross domestic product, 2011 ($ billion)

Country/region	Consumption	Investment	Government	Exports	Imports	GDP
Australia/New Zealand	843.4	400.7	279.5	328.8	−301.6	1,550.9
East Asia	7,251.7	5,116.1	2,435.3	4,103.6	−3,703.2	15,203.6
Brunei Darussalam	4.7	3.3	4.3	9.5	−5.0	16.7
Cambodia	10.9	2.1	0.8	9.7	−10.7	12.8
Indonesia	486.8	274.4	77.5	206.8	−199.6	845.9
Lao PDR	6.0	2.3	0.8	3.1	−4.0	8.3
Malaysia	148.3	69.9	40.8	245.8	−215.6	289.3
Philippines	175.4	44.7	23.2	69.1	−88.1	224.1
Singapore	107.3	74.8	28.6	326.1	−262.7	274.1
Thailand	198.0	93.6	47.2	252.9	−246.0	345.7
Viet Nam	108.2	42.4	9.3	97.1	−121.5	135.5
Rest of Southeast Asia	35.7	17.0	7.3	9.2	−12.6	56.5
South Asia	1,526.4	718.2	271.2	451.0	−661.2	2,305.6
North America	12,636.1	3,535.6	3,082.7	2,717.1	−3,480.8	18,490.7
European Union	10,545.5	3,343.8	3,875.9	6,923.9	−7,084.4	17,604.7
Rest of the World	8,039.5	3,056.0	2,374.2	4,400.2	−3,757.0	14,112.9
World	42,124.8	16,794.8	12,558.6	20,153.9	−20,153.9	71,477.1

Table 3.2 (continued)

Country	Unskilled Labor	Skilled Labor	Gross Capital	Indirect Taxes	Depreciation	GDP
Australia/New Zealand	233.7	356.5	284.4	452.6	223.6	1,550.9
East Asia	4,083.3	2,571.1	3,524.6	2,697.0	2,327.6	15,203.6
Brunei Darussalam	0.5	0.7	10.5	3.1	1.8	16.7
Cambodia	2.5	0.8	5.3	3.1	1.2	12.8
Indonesia	254.2	76.9	314.7	91.7	108.4	845.9
Lao PDR	1.8	0.5	3.3	1.4	1.1	8.3
Malaysia	59.3	53.0	94.4	37.4	45.1	289.3
Philippines	37.6	39.6	92.7	23.4	30.8	224.1
Singapore	25.7	88.0	94.0	20.2	46.2	274.1
Thailand	65.5	43.8	129.7	52.3	54.4	345.7
Viet Nam	34.4	16.1	31.5	31.0	22.6	135.5
Rest of Southeast Asia	13.1	4.6	22.3	8.5	8.0	56.5
South Asia	563.1	420.9	849.8	250.1	221.6	2,305.6
North America	3,319.7	4,739.9	2,621.8	5,551.1	2,258.3	18,490.7
European Union	1,880.8	2,692.5	3,494.7	7,180.0	2,356.7	17,604.7
Rest of the World	2,230.1	2,200.1	4,553.1	3,398.0	1,731.7	14,112.9
World	12,805.3	13,304.9	16,126.9	19,801.0	9,439.0	71,477.1

Note: GDP = gross domestic product; Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.

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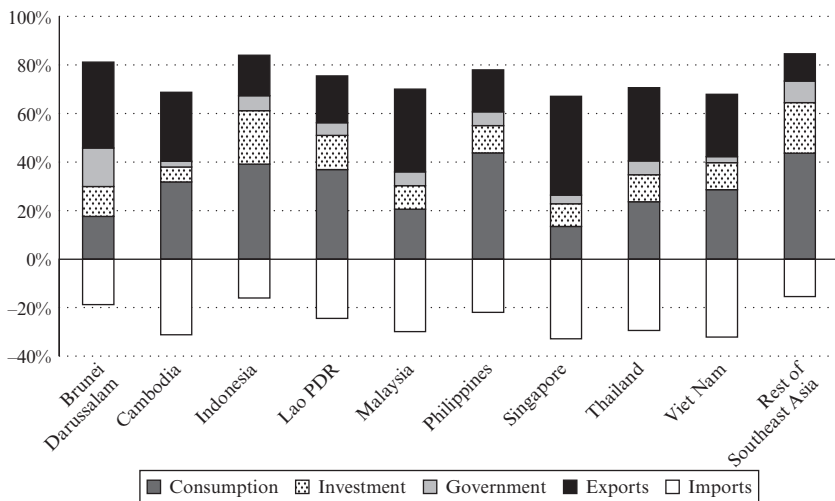
Figure 3.2   Expenditure-side gross domestic product, 2011 (% share)
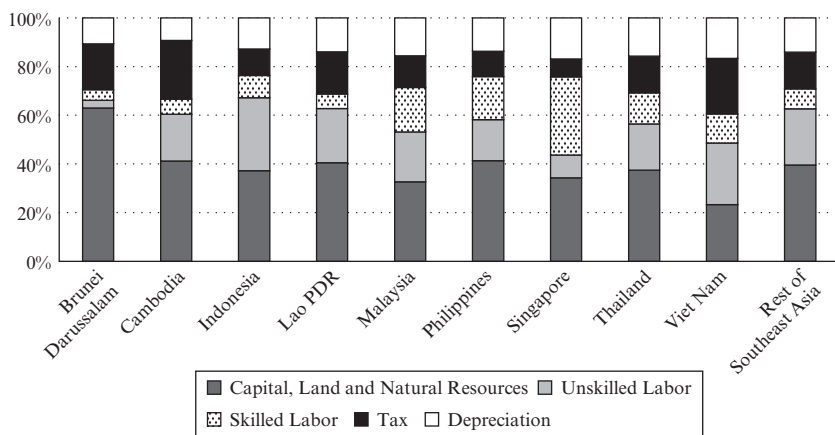
Figure 3.3   Income-side gross domestic product, 2011 (% share)
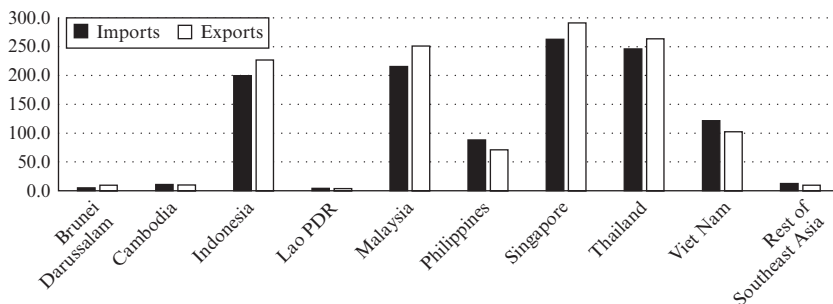
Figure 3.4   Total exports and imports, 2011 ($ billion)

Figure 3.4 shows total exports and imports for each Southeast Asian country. Total trade (exports and imports) is highest in Singapore, followed by Thailand, Malaysia, and Indonesia. In 2011, these four countries—along with Brunei Darussalam—had trade surpluses, whereas Cambodia, the Lao PDR, the Philippines, Viet Nam, and the Rest of Southeast Asia recorded trade deficits.

   Figure 3.5 shows the weighted average tariff rates faced and imposed by each Southeast Asian economy relative to all trading partners. The lighter bars show the average tariff rates faced by each country's exports, while the darker bars show the average tariff rates imposed on each country's imports. In general, both exports from and imports to Southeast Asia are
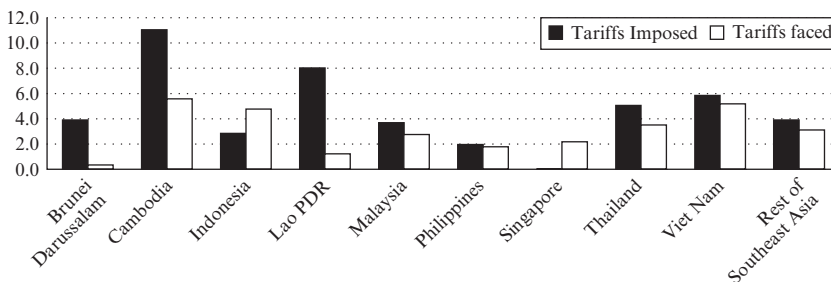
Figure 3.5   Tariffs faced and imposed, 2011 (%)

levied average tariffs of less than 6%. Exceptions are imports by Cambodia and the Lao PDR, which on average are levied at 11% and 8%, respectively.

Table 3.3 presents bilateral trade flows for each Southeast Asian economy for 2011. Row headings show exporting countries, while column headings show importing countries—consequently, row entries show the value of exports, while column entries show the value of imports. For example, Singapore's exports to Malaysia in 2011 were valued at $31.6 billion. Calculations from Table 3.3 suggest that Southeast Asian countries accounted for 5.8% of global imports and 6.1% of global exports, while intra-ASEAN trade accounted for just 1.2% of total global trade flows.

Figure 3.6 shows that Southeast Asian economies are highly specialized. Brunei Darussalam, the Lao PDR, and the Rest of Southeast Asia mainly export primary commodities such as oil and minerals, while Malaysia, the Philippines, Singapore, and Thailand mostly export manufactured goods. Textiles also account for a majority of Cambodia's exports, while exports of primary and manufactured goods account for a significant part of Indonesia's total exports. The contribution of services exports to total exports varies by country—ranging from 5% in Indonesia to 24% in Singapore.

Figure 3.7 decomposes the share of each imported commodity to total imports for each Southeast Asian economy. The region mainly imports manufactured goods, with textiles accounting for 27% and 12% of total imports of Cambodia and Viet Nam, respectively. The share of services to total imports varies, ranging from 5% in the Lao PDR to 24% in Singapore.

Table 3.4 shows bilateral skilled labor flows (in thousands of people) within ASEAN. Row headings identify source countries, while column headings define host countries. For example, there are 74,500 skilled migrants from Malaysia working in Singapore. It also shows there are 172,000 intra-ASEAN skilled migrants, with roughly 54% working in Singapore. Other major skilled migrant destinations are Thailand (14% of total intra-ASEAN skilled labor migration flows), Malaysia (11%), and Cambodia (10%). The shaded cells indicate significant bilateral labor migration flows, which we will explore in Figure 3.8 below.

Table 3.5 shows the share of skilled migrants in the host country's labor force. On average, skilled migrants account for just 11.2% of ASEAN's total skilled labor force. Brunei Darussalam has the highest skilled migrant share of its labor force (11.5%), followed by Singapore (9.5%) and Cambodia (7.7%), whereas the Rest of Southeast Asia (Myanmar and Timor-Leste) has a negligible skilled migrant share to its total labor force.

Figure 3.8 presents the composition of skilled migrants by host country, derived from the skilled migration flows shown in Table 3.4. Figure 3.8

Table 3.3 Global trade, 2011 ($ billions)

Exporter \ Importer	BRU	CAM	INO	LAO	MAL	PHI	SIN	THA	VIE	RSA	Subtotal Intra-ASEAN Exports	Add: Exports to ROW	Total Exports
Brunei Darussalam (BRU)	—	0.0	0.3	0.0	0.1	0.0	0.1	0.4	0.0	0.0	1.0	8.6	9.6
Cambodia (CAM)	0.0	—	0.0	0.0	0.1	0.0	0.1	0.2	0.5	0.0	0.9	9.3	10.1
Indonesia (INO)	0.1	0.3	—	0.0	11.7	3.8	7.9	7.2	2.4	0.3	33.7	193.3	227
Lao PDR (LAO)	0.0	0.0	0.0	—	0.0	0.0	0.0	0.7	0.5	0.0	1.3	2.3	3.6
Malaysia (MAL)	0.7	0.3	7.6	0.0	—	3.2	20.9	11.5	3.8	0.6	48.8	202.5	251.0
Philippines (PHI)	0.0	0.0	0.9	0.0	1.4	—	3.4	2.3	0.8	0.0	8.8	62.2	71.0
Singapore (SIN)	0.5	0.3	26.1	0.0	31.6	4.6	—	11.0	5.3	0.5	79.9	211.2	291.0
Thailand (THA)	0.2	2.7	11.4	2.4	14.1	4.6	7.1	—	7.3	2.6	52.5	211.1	263.7
Viet Nam (VIE)	0.0	1.7	2.5	0.2	2.4	1.6	2.4	2.1	—	0.1	12.9	89.5	102.4
Rest of Southeast Asia (RSA)	0.0	0.0	0.1	0.0	0.3	0.0	0.1	3.4	0.1	—	4.0	5.8	19.7
Subtotal: Intra-ASEAN Imports	1.5	5.3	48.9	2.7	61.5	17.9	42.0	38.8	20.7	4.1	—	—	—
Add: Imports from ROW	3.5	5.4	150.7	1.3	154.0	70.2	220.7	207.2	100.8	8.5	—	17,992.4	18,914.7
Total Imports	5.0	10.7	199.6	4.0	215.6	88.1	262.7	246.0	121.5	12.6	—	18,988.2	—

Note: Lao PDR = Lao People's Democratic Republic; ROW = Rest of World.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.
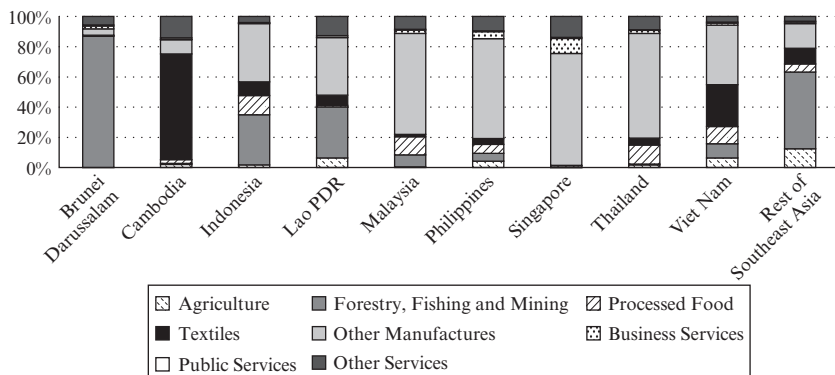
Note: Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.

Figure 3.6   Exports by commodity, 2011 (% share)

Note: Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.

Figure 3.7   Imports by commodity, 2011 (% share)

Table 3.4 Skilled migrants by home and host country, 2011 ('000s)

Host / Source	BRU	CAM	INO	LAO	MAL	PHI	SIN	THA	VIE	RSA	Total
Brunei Darussalam (BRU)	—	0.01	0.01	0.00	0.66	0.10	0.14	0.43	0.02	0.00	1.38
Cambodia (CAM)	0.00	—	0.00	0.00	0.01	0.14	0.08	1.74	0.00	0.02	2.01
Indonesia (INO)	0.25	0.03	—	0.01	5.59	1.85	9.34	0.15	1.26	0.11	18.60
Lao PDR (LAO)	0.00	0.00	0.00	—	0.01	0.15	0.01	1.99	0.00	0.02	2.17
Malaysia (MAL)	4.41	0.20	0.36	0.00	—	0.91	74.50	0.45	0.86	0.12	81.82
Philippines (PHI)	0.92	0.11	0.77	0.01	2.94	—	4.00	0.49	0.41	0.01	9.65
Singapore (SIN)	0.00	0.10	0.10	0.00	7.34	0.25	—	0.19	0.17	0.03	8.19
Thailand (THA)	0.71	8.45	0.22	0.34	1.15	0.44	2.83	—	0.24	0.04	14.43
Viet Nam (VIE)	0.00	7.87	0.67	1.20	1.04	1.31	1.04	1.99	—	0.00	15.12
Rest of Southeast Asia (RSA)	0.00	0.04	0.00	0.11	0.17	0.76	0.12	17.50	0.00	—	18.70
Total	6.30	16.81	2.14	1.67	18.92	5.90	92.06	24.93	2.98	0.35	172.06

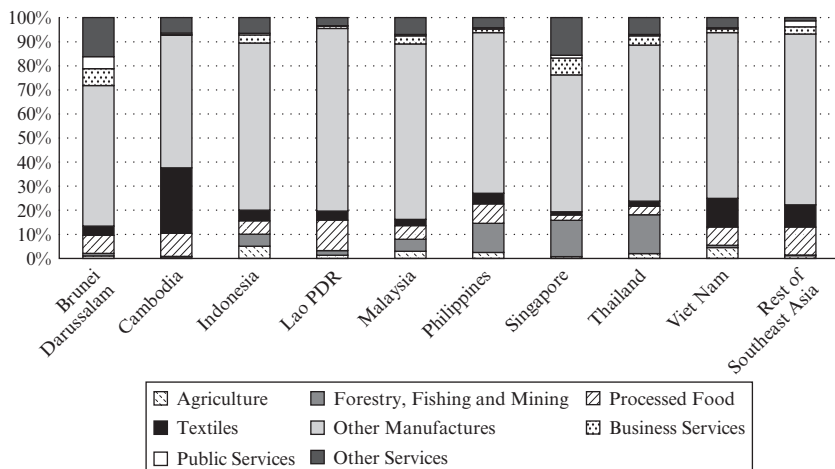*Note:*   Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.
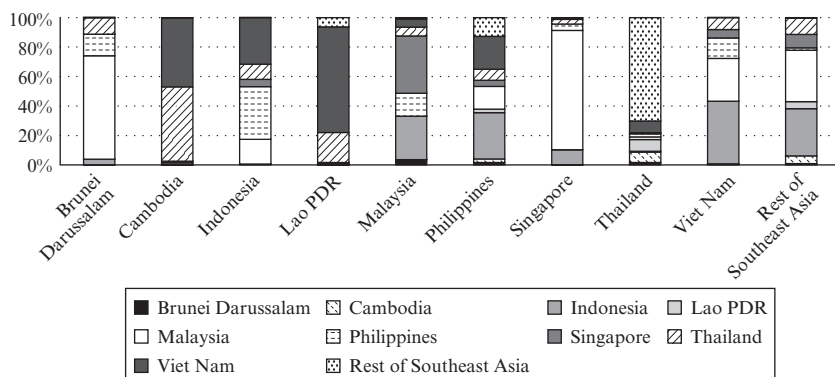
Note: Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.

Figure 3.8 Composition of skilled migrants by host country (%)

indicates that intra-ASEAN skilled labor migration is mainly concentrated along nine corridors: (i) Malaysia to Brunei Darussalam and Malaysia to Singapore; (ii) Thailand to Cambodia and Viet Nam to Cambodia; (iii) the Philippines to Indonesia and Viet Nam to Indonesia; (iv) Viet Nam and Thailand to the Lao PDR; (v) Singapore and Indonesia to Malaysia; (vi) Indonesia, Malaysia and Viet Nam to the Philippines; (vii) the Rest of Southeast Asia (primarily Myanmar) to Thailand; (viii) Indonesia, Malaysia and the Philippines to Viet Nam; and (ix) Indonesia, Malaysia and Thailand to the Rest of Southeast Asia (both Myanmar and Timor-Leste).

4.   POLICY SCENARIOS AND RESULTS

We conducted three policy experiments (scenarios) to analyze the potential economic impact of skilled labor mobility due to MRAs:

AFTA: Completely remove intra-ASEAN tariffs to understand the economic impact associated with AFTA alone—where skills mobility within the AEC is not allowed.

AFTA-SKILL: Endogenous labor mobility is added to the AFTA scenario. This simulates the policy of allowing skilled professionals to migrate within the AEC based on real wage differences between their source and host countries.

Table 3.5 Share of skilled migrants in host country labor force (%)

Host Source	BRU	CAM	INO	LAO	MAL	PHI	SIN	THA	VIE	RSA	Regional Average
Brunei Darussalam (BRU)	—	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Cambodia (CAM)	0.0	—	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Indonesia (INO)	0.5	0.0	—	0.0	0.2	0.0	1.0	0.0	0.0	0.0	1.2
Lao PDR (LAO)	0.0	0.0	0.0	—	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Malaysia (MAL)	8.0	0.1	0.0	0.0	—	0.0	7.7	0.0	0.0	0.0	5.3
Philippines (PHI)	1.7	0.0	0.0	0.0	0.1	—	0.4	0.0	0.0	0.0	0.6
Singapore (SIN)	0.0	0.0	0.0	0.0	0.3	0.0	—	0.0	0.0	0.0	0.5
Thailand (THA)	1.3	3.9	0.0	0.2	0.0	0.0	0.3	—	0.0	0.0	0.9
Viet Nam (VIE)	0.0	3.6	0.0	0.7	0.0	0.0	0.1	0.0	—	0.0	1.0
Rest of Southeast Asia (RSA)	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.0	—	1.2
Total	11.5	7.7	0.0	0.9	0.7	0.1	9.5	0.4	0.1	0.0	11.2

Note: Lao PDR = Lao People's Democratic Republic.

Source: Authors' calculations based on GTAP/GMig2 Data Base version 9.

*Table 3.6   Effects on gross domestic product (% change)*

Country	AFTA	AFTA-SKILL	AFTA-WAGE
Brunei Darussalam	0.19	0.20	0.81
Cambodia	0.12	0.18	0.61
Indonesia	0.02	0.02	0.50
Lao People's Democratic Republic	−0.14	−0.14	0.24
Malaysia	0.16	0.13	1.10
Philippines	0.08	0.08	1.01
Singapore	0.05	0.06	1.68
Thailand	0.06	0.06	0.76
Viet Nam	0.15	0.15	0.85
Rest of Southeast Asia	−0.01	−0.01	0.50

Note: AFTA = ASEAN Free Trade Agreement.

Source: Simulation results.

> AFTA-WAGE: This takes the AFTA-SKILL scenario and adds 5% to the initial ratio of migrant wages relative to those of permanent residents—as calibrated from the initial GMig2 Data Base. This scenario simulates an AEC-wide policy designed to improve migrant salary conditions.

The three scenarios clearly build upon each other. The AFTA scenario does not allow for bilateral labor movements, while the last two allow for skilled labor mobility within the AEC. We do this to isolate the economic impact of tariff elimination due to AFTA from those arising from the freer flow of skilled labor within the AEC.

Table 3.6 shows the GDP impact of the three policy scenarios. The first column shows that tariff eliminations due to AFTA generally result in GDP gains for AEC members. Exceptions are the Lao PDR and the Rest of Southeast Asia, which show marginal GDP contractions (−0.14% and −0.01% respectively) driven by larger imports. Among AEC members, Brunei Darussalam gains the most (0.19%), followed by Malaysia (0.16%), Viet Nam (0.15%) and Cambodia (0.12%). Other AEC members show GDP expansions below 0.1%.

GDP gains under AFTA are quite small for two reasons. First, ASEAN tariffs are already low due to successive tariff reductions over the last decade under the Common Effective Preferential Tariff (CEPT) mechanism (see Figure 3.5). Second, total intra-ASEAN trade is quite small

relative to global trade—AEC members trade more outside the region than within the community (see Table 3.3 for initial bilateral trade flows). The GDP impact on countries outside the AEC is negligible (not shown in Table 3.6), which suggests that eliminating tariffs in the AEC does not appear to cause trade diversion for the same two reasons.

To better understand and analyze the effects of these policy scenarios on skilled migrant movements, we break down the impact of the three scenarios by expenditure-side GDP (Table 3.7), by price index (Table 3.8), by the number of skilled migrants affected (Tables 3.9 and 3.10) and by the impact on trade and current account balances (Table 3.11).

Table 3.7 presents the percentage changes by expenditure-side GDP aggregate on each AEC economy. The AFTA results, shown in the upper panel, suggest that eliminating tariffs increases trade for all members. Exports increase for all countries except Viet Nam and Brunei Darussalam, as their aggregate export price index (which measures the cost of producing exports) increases more than any other AEC member (Table 3.8), resulting in reduced external demand for their exports. A comparison of the export and import percentage changes show imports growing more than exports in all AEC members. This is due to the higher demand for investment goods and imported intermediate inputs needed to support export expansion. The significant percentage growth in exports and imports for Cambodia, the Lao PDR and the Rest of Southeast Asia (see Table 3.8) should be taken with caution, as these countries have relatively small trade value flows in our initial data.[5]

Eliminating tariffs under AFTA also results in higher investment demand in all AEC members, as imported capital goods become less expensive. Investment increases the most in Viet Nam, followed by Thailand, Malaysia, Brunei Darussalam and Singapore, while the Philippines and the Rest of Southeast Asia show low investment growth rates. Again, the higher investment growth for Cambodia and the Lao PDR should be taken with caution due to their low investment flows in our initial data.

We now turn to changes in household consumption alongside changes in government demand and investments. Movements in these three aggregates are driven by our standard GTAP closure rules and regional household specification. In general, household consumption increases in all AEC economies, except for Cambodia, the Lao PDR and the Rest of Southeast Asia. Final consumption (by household and government) falls in Cambodia because, as shown in Table 3.8, the price of investment falls more than the consumer price index (CPI) and the government price index. As a result, Cambodians are encouraged to save and invest while at the same time reducing private consumption. The higher government price index also leads to a fall in government consumption. For the Lao PDR,

Table 3.7   *Real gross domestic product, expenditure side (% change from base)*

Country	Consumption	Investment	Government	Exports	Imports	GDP
		Scenario: AFTA				
Brunei Darussalam	0.69	2.37	−0.11	−0.01	1.42	0.19
Cambodia	−0.57	17.44	−0.22	6.33	8.18	0.12
Indonesia	0.06	0.37	−0.01	1.15	1.73	0.02
Lao PDR	−0.33	3.91	0.03	5.67	6.57	−0.14
Malaysia	0.28	2.47	−0.03	0.88	1.76	0.16
Philippines	0.32	0.71	0.02	1.55	2.04	0.09
Singapore	1.20	2.88	0.21	0.76	2.29	0.05
Thailand	0.21	3.91	−0.11	1.37	2.90	0.06
Viet Nam	1.29	8.84	0.03	−1.74	2.71	0.15
Rest of Southeast Asia	−0.02	0.33	−0.02	1.89	1.72	−0.01
		Scenario: AFTA-SKILL				
Brunei Darussalam	0.70	2.38	−0.09	−0.01	1.43	0.20
Cambodia	−0.54	17.48	−0.21	6.42	8.25	0.18
Indonesia	0.06	0.37	−0.01	1.15	1.73	0.02
Lao PDR	−0.33	3.91	0.03	5.68	6.57	−0.14
Malaysia	0.25	2.48	−0.04	0.91	1.81	0.13
Philippines	0.33	0.62	0.02	1.64	2.09	0.08
Singapore	1.20	2.89	0.21	0.76	2.29	0.06
Thailand	0.21	3.91	−0.11	1.37	2.90	0.06
Viet Nam	1.29	8.84	0.03	−1.74	2.72	0.15
Rest of Southeast Asia	−0.02	0.33	−0.02	1.89	1.73	−0.01
		Scenario: AFTA-WAGE				
Brunei Darussalam	1.23	2.94	1.26	0.15	1.83	0.80
Cambodia	−0.17	17.93	−0.14	7.00	8.80	0.61
Indonesia	0.48	0.82	0.25	1.34	2.18	0.50
Lao PDR	−0.01	4.14	0.21	6.23	7.10	0.24
Malaysia	1.22	4.02	0.45	1.51	2.70	1.10
Philippines	1.22	1.96	0.35	1.78	2.96	1.00
Singapore	2.83	4.98	0.83	1.94	3.58	1.66
Thailand	0.81	4.65	0.29	1.84	3.48	0.76
Viet Nam	1.97	10.21	0.16	−1.37	3.42	0.85
Rest of Southeast Asia	0.32	0.42	0.37	2.44	2.07	0.50

Note: AFTA = ASEAN Free Trade Agreement; Lao PDR = Lao People's Democratic Republic.

Source: Simulation results.

*Table 3.8   Gross domestic product price indexes, expenditure side (%
           change from base)*

Country	Consumption	Investment	Government	Exports	Imports	GDP price index
Scenario: AFTA						
Brunei Darussalam	−1.09	−0.79	−0.02	0.04	0.12	−0.49
Cambodia	−1.94	−3.36	0.87	−0.36	0.21	−2.69
Indonesia	0.26	0.25	0.42	0.23	0.12	0.30
Lao PDR	−0.05	−0.16	−0.77	−0.07	0.11	−0.24
Malaysia	0.01	0.08	0.63	0.20	0.14	0.17
Philippines	0.51	0.46	0.78	0.51	0.07	0.70
Singapore	1.07	0.89	1.54	1.02	0.02	2.00
Thailand	0.36	−0.11	1.15	0.21	0.06	0.44
Viet Nam	1.09	1.07	2.31	1.14	0.02	2.15
Rest of Southeast Asia	−0.28	−0.20	−0.17	−0.09	0.04	−0.28
Scenario: AFTA-SKILL						
Brunei Darussalam	−1.10	−0.80	−0.06	0.04	0.12	−0.50
Cambodia	−1.94	−3.38	0.78	−0.37	0.21	−2.71
Indonesia	0.26	0.25	0.42	0.23	0.12	0.30
Lao PDR	−0.05	−0.16	−0.77	−0.07	0.11	−0.24
Malaysia	0.00	0.08	0.63	0.19	0.14	0.16
Philippines	0.56	0.48	0.80	0.54	0.07	0.76
Singapore	1.07	0.89	1.54	1.02	0.02	2.00
Thailand	0.36	−0.11	1.15	0.21	0.06	0.44
Viet Nam	1.09	1.07	2.31	1.14	0.02	2.15
Rest of Southeast Asia	−0.28	−0.20	−0.17	−0.09	0.03	−0.28
Scenario: AFTA-WAGE						
Brunei Darussalam	−1.44	−1.09	−1.36	0.05	0.10	−0.98
Cambodia	−1.92	−3.45	0.12	−0.45	0.19	−2.79
Indonesia	0.17	0.14	−0.89	0.24	0.11	0.09
Lao PDR	−0.02	−0.15	−1.72	−0.10	0.09	−0.32
Malaysia	−0.16	−0.04	−0.30	0.11	0.13	−0.13
Philippines	0.50	0.49	−0.84	0.54	0.07	0.54
Singapore	0.73	0.64	0.50	0.79	0.03	1.42
Thailand	0.29	−0.17	0.01	0.16	0.07	0.19
Viet Nam	1.03	0.97	1.39	1.10	0.02	1.98
Rest of Southeast Asia	−0.37	−0.32	−1.89	−0.10	0.03	−0.60

Note: AFTA = ASEAN Free Trade Agreement; Lao PDR = Lao People's Democratic
Republic.

Source: Simulation results.

Table 3.9 Skilled migrant impact by home and host country, AFTA-SKILL scenario ('000)

Host / Source	BRU	CAM	INO	LAO	MAL	PHI	SIN	THA	VIE	RSA	Total Outflow
Brunei Darussalam (BRU)	—	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01
Cambodia (CAM)	0.00	—	0.00	0.00	0.00	-0.01	-0.01	-0.10	0.00	0.00	-0.11
Indonesia (INO)	0.00	0.00	—	0.00	0.04	0.00	0.07	0.00	0.03	0.00	0.14
Lao PDR (LAO)	0.00	0.00	0.00	—	0.00	0.00	0.00	-0.01	0.00	0.00	-0.02
Malaysia (MAL)	0.04	0.01	0.00	0.00	—	-0.01	0.07	0.00	0.02	0.00	0.13
Philippines (PHI)	0.01	0.01	0.00	0.00	0.02	—	0.02	0.00	0.01	0.00	0.07
Singapore (SIN)	0.00	0.01	0.00	0.00	-0.01	0.00	—	0.00	0.00	0.00	0.00
Thailand (THA)	0.01	0.51	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.51
Viet Nam (VIE)	0.00	0.34	-0.02	-0.01	-0.02	-0.03	-0.02	-0.03	—	0.00	0.21
Rest of Southeast Asia (RSA)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00	—	0.16
Total Inflow	0.06	0.88	-0.02	-0.01	0.02	-0.05	0.13	0.01	0.06	0.00	1.08
Net Inflow	0.07	0.99	-0.16	0.01	-0.11	-0.12	0.13	-0.50	-0.14	-0.16	—

Note: AFTA = ASEAN Free Trade Agreement; Lao PDR = Lao People's Democratic Republic.

Source: Simulation results.

Table 3.10 Skilled migrant impact by source and host country, AFTA-WAGE scenario ('000)

Host \ Source	BRU	CAM	INO	LAO	MAL	PHI	SIN	THA	VIE	RSA	Total Outflow
Brunei Darussalam (BRU)	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	−0.01
Cambodia (CAM)	0.00	—	0.00	0.00	0.00	−0.01	0.00	−0.10	0.00	0.00	−0.11
Indonesia (INO)	0.00	0.00	—	0.00	0.06	0.01	0.20	0.00	0.03	0.00	0.31
Lao PDR (LAO)	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Malaysia (MAL)	0.02	0.01	0.00	0.00	—	−0.01	0.72	0.00	0.01	0.00	0.76
Philippines (PHI)	0.01	0.01	0.00	0.00	0.02	—	0.06	0.00	0.01	0.00	0.11
Singapore (SIN)	0.00	0.01	0.00	0.00	−0.07	0.00	—	0.00	0.00	0.00	−0.07
Thailand (THA)	0.00	0.50	0.00	0.00	0.00	0.00	0.02	—	0.00	0.00	0.52
Viet Nam (VIE)	0.00	0.34	−0.02	−0.02	−0.02	−0.03	−0.01	−0.03	—	0.00	0.22
Rest of Southeast Asia (RSA)	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.31	0.00	—	0.33
Total Inflow	0.04	0.87	−0.03	−0.02	−0.01	−0.04	0.99	0.19	0.06	−0.01	2.05
Net Inflow	0.05	0.98	−0.34	−0.02	−0.77	−0.15	1.07	−0.33	−0.16	−0.34	—

Note: AFTA = ASEAN Free Trade Agreement; Lao PDR = Lao People's Democratic Republic.

Source: Simulation results.

Table 3.11 Change in trade and current account balance ($ million)

Country	Trade Balance			Current Account Balance			Net Remittances		
	AFTA	AFTA-SKILL	AFTA-WAGE	AFTA	AFTA-SKILL	AFTA-WAGE	AFTA	AFTA-SKILL	AFTA-WAGE
Brunei Darussalam	−75	−75	−79	−75	−75	−78	0	0	1
Cambodia	−320	−320	−328	−325	−326	−334	−5	−6	−6
Indonesia	−847	−853	−1297	−836	−840	−1270	11	13	28
Lao PDR	−89	−88	−93	−89	−89	−93	−0.1	−0.1	−0.03
Malaysia	−1471	−1504	−2109	−1459	−1491	−2065	12	13	44
Philippines	−429	−394	−1071	−440	−405	−1062	−11	−11	9
Singapore	−258	−258	−534	−308	−310	−600	−50	−52	−67
Thailand	−3283	−3283	−3690	−3291	−3291	−3679	−9	−8	11
Viet Nam	−3921	−3922	−4467	−3925	−3926	−4469	−4	−4	−2
Rest of Southeast Asia	−57	−57	−50	−56	−56	−47	1	1	3

Note: AFTA = ASEAN Free Trade Agreement; Lao PDR = Lao People's Democratic Republic.

Source: Simulation results.

consumption decreases because the reduction in the investment price index outweighs the reduction in the CPI—thereby encouraging investments— while government consumption rises due to the falling government price index. A higher government price index also results in reduced government consumption in Indonesia and Thailand.

The second column of Table 3.6 shows the GDP impact of our AFTA-SKILL simulation—which combines AFTA with skilled labor mobility within the AEC. Here we allow migrants to respond to real wage differences between source and host country. The results show that GDP changes are similar to those of the AFTA scenario because of limited skilled migration within the region (1,080 people; see Table 3.9). There are two reasons for this. First, we assume skilled migrants have a unitary elasticity ($\sigma_{i,c,r} = 1$), thereby tempering their response to relative wage differences between source and host country. Second, the small increase in skilled labor migration is linked to our benchmark data, which shows limited intra-ASEAN skilled migration at the base (see Table 3.4).

Nevertheless, we see that GDP expands a bit more for Cambodia (0.12% AFTA vs. 0.18% AFTA-SKILL) as migrants reduce the shortage of skilled labor, hence increasing the overall labor force. Brunei Darussalam and Singapore also increase GDP as a result of employing more skilled migrants from other ASEAN countries. As shown in the last row of Table 3.9, the higher GDP for these three AEC members is anchored on higher skilled labor intake. In terms of source country, skilled migrants to Cambodia come from Thailand and Viet Nam, while Singapore absorbs skilled workers from Malaysia and the Philippines. Malaysia, on the other hand, registers a GDP contraction because of a reduction in labor force— a net skilled migrant outflow of 1,100 (see Table 3.9).

The middle panel of Table 3.7 shows the percentage changes in each GDP aggregate from the expenditure side under the AFTA-SKILL scenario. In general, the magnitudes are similar to those under the AFTA scenario. An exception is Malaysia, which shows marginally lower household consumption changes and marginally higher export and import changes under AFTA-SKILL than under the AFTA scenario. These differences are driven by changes in Malaysia's current account balance (CAB). The net migrant outflow in Malaysia (higher outflows of skilled Malaysian workers than inflows from other AEC economies) leads to higher remittance inflows, which improve Malaysia's CAB (Table 3.11). This improvement means Malaysia's real exchange rate will depreciate less under AFTA-SKILL than under the AFTA scenario. This results in less expensive imports and thus feeds import demand. Exports expand slightly as Malaysia's export price index increases less under AFTA-SKILL (0.19% vs. 0.20% in the AFTA scenario; see Table 3.8) due to the lower cost of

imported intermediate inputs. Similarly, investments increase as imported capital goods become relatively less expensive.

The third column of Table 3.6 shows the impact on GDP of our third simulation—AFTA-WAGE—which combines AFTA-SKILL with a 5% improvement in the initial ratio of migrant wages relative to permanent residents in the host country. Here, we find the impact on GDP is both positive and much higher than in the first two scenarios. Among AEC members, Singapore gains most (a 1.6% GDP expansion), followed by Malaysia (1.10%) and the Philippines (1.01%). All other AEC members show GDP gains ranging between 0.5% and 0.8%. The Lao PDR and the Rest of Southeast Asia likewise register GDP gains, as opposed to contractions in our first two scenarios.

The GDP expansions for Brunei Darussalam, Cambodia and Singapore are again anchored on skilled labor intake (see Table 3.10). Although Indonesia, the Lao PDR, Malaysia, the Philippines, Thailand, Viet Nam and the Rest of Southeast Asia show net migrant outflows (see Table 3.10), their GDP still increases as a result of higher export sales and greater household consumption (see Table 3.7)—associated with higher remittances. Indeed, the lower panel of Table 3.7 shows that the percentage changes in each GDP aggregate from the expenditure side are all higher under AFTA-WAGE than AFTA-SKILL scenarios. Close examination of Table 3.7 reveals that consumption, exports and imports increase more under AFTA-WAGE when compared with the first two scenarios; real investment increases only slightly under AFTA-WAGE. Essentially, all these changes are influenced by changes in the current account balance. Except in Singapore, the net migrant intake under AFTA-WAGE is lower when compared with the AFTA-SKILL scenario. This is because the 5% improvement in the initial ratio of migrant wages relative to permanent host country residents' results in reduced demand for skilled migrants as they become more expensive.

Table 3.11 shows that the CAB deteriorates more than the trade balance in Cambodia, the Lao PDR, Singapore and Viet Nam. This creates real exchange rate depreciation, making exports less expensive (see Table 3.8). On the other hand, higher net remittances slightly improved the CAB relative to trade balances in Brunei Darussalam, Indonesia, Malaysia, the Philippines, Thailand, and the Rest of Southeast Asia. This reduces the real exchange rate depreciation under AFTA-WAGE when compared with the AFTA-SKILL scenario. Exports still grow significantly in these countries as their slightly lower real exchange rate depreciation means less expensive imported inputs (again compared with AFTA-SKILL), which translates into lower export price indices under the AFTA-WAGE scenario (see Table 3.8).

5.   INSIGHTS AND FURTHER WORK

In this chapter, we analyze the potential economic impact of the freer flow of skilled labor within the AEC with the aid of the GMig2 Data Base and model. We also fill a research gap by shedding light on how skilled labor mobility within the AEC might impact each ASEAN economy.

Our analysis of benchmark GMig2 data indicates that skilled migrants account for just 12% of the roughly 1.5 million intra-ASEAN migrants—and that intra-ASEAN migrants account for only a small share of ASEAN's total skilled labor force. We also find from our initial data that intra-ASEAN skilled labor migration is mainly linked to geographical proximity and cultural similarity, thus limiting bilateral labor movements to a few countries.

Our simulation results suggest that economic gains from tariff elimination under AFTA are relatively small because past tariff reductions under CEPT already reduced tariffs to low levels, and because intra-ASEAN trade remains small relative to AEC members' external trade. Nonetheless, we find that a policy allowing freer flow of skilled labor and one with a 5% increase in the initial ratio of migrant to permanent resident wages in the host country would increase GDP across AEC economies. GDP gains from the income side come from the greater supply of skilled labor, while GDP gains from the expenditure side come from higher investments and exports—as imported intermediate inputs become less expensive and higher consumption results from higher remittances sent home by migrant workers.

This is just an initial attempt to analyze the potential impact of skilled labor mobility under AEC MRAs on professional services. So far, MRAs facilitate the freer flow of eight professions—accountants, architects, dentists, engineers, medical practitioners, nurses, land surveyors and tourism professionals. An important caveat of the analysis is that the GDP gains under our two skilled mobility scenarios are likely overestimated. This is because the GMig2 data we use distinguishes only unskilled and skilled workers, with the latter representing all skilled labor types, not just those covered by existing MRAs. Therefore, further work is needed to disaggregate the eight MRA occupations from the current homogeneous skilled labor category in the GMig2 Data Base and model. Doing this would pave the way for a better understanding of the potential economic impact of freer flows of skilled labor within the AEC.

In summary, we find that the gains from freer flows of skilled labor within the AEC are maximized when complementary policies aimed at reducing national-level barriers—reducing wage differentials between migrants and permanent residents, among others—are also implemented.

Further dialogue is needed, followed by a concerted effort among AEC members to pursue accommodative domestic policies. This would maximize not only migrant welfare, but also the economic gains each AEC member stands to reap from the freer flow of skilled labor across the AEC.

NOTES

1. Under the Common Effective Preferential Tariff (CEPT) scheme, tariff elimination excludes products classified under: Temporary Exclusions, Sensitive Products and General Exclusions.
2. The "source" country/region is defined as a worker's place of origin/birth, while the "host" country/region is where that same worker currently resides/works.
3. The GMig2 Data Base only distinguishes unskilled and skilled labor types, with the latter category also including skilled labor beyond the eight professional occupations covered by MRAs.
4. We proceed under the assumption that "Rest of Southeast Asia" is part of the AEC, even with Timor-Leste included (although it remains outside ASEAN).
5. A small initial value (such as Cambodia's exports) would result in a higher percentage change growth relative to a high initial value (such as Singapore's exports). For example, if the initial exports of commodity *c* by countries A and country B are \$1 and \$10 respectively, and assuming their exports increase by 30% and 5%, then the post-simulation value of exports would be \$1.30 and \$10.50 for countries A and B respectively. Note that international trade in GMig2 follows the Armington assumption. This implies that changes in trade flows are preconditioned on initial trade shares; a country with a small initial exports share could not instantly gain a bigger market share.

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APPENDIX 3A.1   CONCORDANCE

Table 3A.1   Sectoral concordance

No.	Original Sector	Aggregated Sector	No.	Original Sector	Aggregated Sector
1	Paddy rice (pdr)	agr	30	Wood products (lum)	mnf
2	Wheat (wht)	agr	31	Paper products & publishing (ppp)	mnf
3	Cereal grains nec (gro)	agr	32	Petroleum & coal products (p_c)	mnf
4	Vegetables, fruit, nuts (v_f)	agr	33	Chemical, rubber & plastic (crp)	mnf
5	Oilseeds (osd)	agr	34	Mineral products nec (nmm)	mnf
6	Sugarcane, sugar beet (c_b)	agr	35	Ferrous metals (i_s)	mnf
7	Plant-based fibers (pfb)	agr	36	Metals nec (nfm)	mnf
8	Crops nec (ocr)	agr	37	Metal products (fmp)	mnf
9	Cattle, sheep & goats, horses (ctl)	agr	38	Motor vehicles & parts (mvh)	mnf
10	Animal products nec (oap)	agr	39	Transport equipment nec (otn)	mnf
11	Raw milk (rmk)	agr	40	Electronic equipment (ele)	mnf
12	Wool, silk-worm cocoons (wol)	agr	41	Machinery & equipment nec (ome)	mnf
13	Forestry (frs)	prm	42	Manufactures nec (omf)	mnf
14	Fishing (fsh)	prm	43	Electricity (ely)	mnf
15	Coal (coa)	prm	44	Gas manufacture & distribution (gdt)	ser
16	Oil (oil)	prm	45	Water (wtr)	ser
17	Gas (gas)	prm	46	Construction (cns)	ser
18	Minerals nec (omn)	prm	47	Trade (trd)	ser
19	Bovine meat products (cmt)	pfd	48	Transport nec (otp)	ser
20	Meat products nec (omt)	pfd	49	Water transport (wtp)	ser
21	Vegetable oils & fats (vol)	pfd	50	Air transport (atp)	ser
22	Dairy products (mil)	pfd	51	Communication (cmn)	ser

Table 3A.1 (continued)

No.	Original Sector	Aggregated Sector	No.	Original Sector	Aggregated Sector
23	Processed rice (pcr)	pfd	52	Financial services nec (ofi)	ser
24	Sugar (sgr)	pfd	53	Insurance (ins)	ser
25	Food products nec (ofd)	pfd	54	Business services nec (obs)	ser
26	Beverages & tobacco (b_t)	pfd	55	Recreational & other services (ros)	obs
27	Textiles (tex)	tex	56	Public administration (osg)	osg
28	Wearing apparel (wap)	tex	57	Dwelling (dwe)	ser
29	Leather products (lea)	tex			

Note: nec = not elsewhere classified; agr = Agriculture; prm = Forestry, fishery and mining; pfd = Processed food; tex = Textile and clothing; mnf = Other manufacturing; obs = Business services; osg = Public and health services; ser = Other services.

Source: Aggregation of the GTAP/GMig2 Data Base version 9.

Table 3A.2   Regional concordance

No.	Original Region	New Region	No.	Original Region	New Region	No.	Original Region	New Region
1	Australia	anz	48	Rest of Central America	row	95	Azerbaijan	row
2	New Zealand	anz	49	Dominican Republic	row	96	Georgia	row
3	Rest of Oceania	row	50	Jamaica	row	97	Bahrain	row
4	People's Republic of China	xea	51	Puerto Rico	row	98	Iran	row
5	Hong Kong, China	xea	52	Trinidad and Tobago	row	99	Israel	row
6	Japan	xea	53	Caribbean	row	100	Jordan	row
7	Republic of Korea	xea	54	Austria	EU	101	Kuwait	row
8	Mongolia	xea	55	Belgium	EU	102	Oman	row
9	Taipei,China	xea	56	Cyprus	EU	103	Qatar	row
10	Rest of East Asia	xea	57	Czech Republic	EU	104	Saudi Arabia	row
11	Brunei Darussalam	brn	58	Denmark	EU	105	Turkey	row
12	Cambodia	khm	59	Estonia	EU	106	United Arab Emirates	row
13	Indonesia	idn	60	Finland	EU	107	Rest of West Asia	row
14	Lao People's Democratic Republic	lao	61	France	EU	108	Egypt	row
15	Malaysia	mys	62	Germany	EU	109	Morocco	row
16	Philippines	phl	63	Greece	EU	110	Tunisia	row
17	Singapore	sgp	64	Hungary	EU	111	Rest of North Africa	row
18	Thailand	tha	65	Ireland	EU	112	Benin	row
19	Viet Nam	vnm	66	Italy	EU	113	Burkina Faso	row
20	Rest of Southeast Asia	xse	67	Latvia	EU	114	Cameroon	row
21	Bangladesh	xsa	68	Lithuania	EU	115	Côte d'Ivoire	row
22	India	xsa	69	Luxembourg	EU	116	Ghana	row
23	Nepal	xsa	70	Malta	EU	117	Guinea	row
24	Pakistan	xsa	71	Netherlands	EU	118	Nigeria	row
25	Sri Lanka	xsa	72	Poland	EU	119	Senegal	row
26	Rest of South Asia	xsa	73	Portugal	EU	120	Togo	row
27	Canada	nam	74	Slovakia	EU	121	Rest of West Africa	row

Table 3A.2 (continued)

No.	Original Region	New Region	No.	Original Region	New Region	No.	Original Region	New Region
28	United States	nam	75	Slovenia	EU	122	Central Africa	row
29	Mexico	nam	76	Spain	EU	123	South Central Africa	row
30	Rest of North America	nam	77	Sweden	EU	124	Ethiopia	row
31	Argentina	row	78	United Kingdom	EU	125	Kenya	row
32	Bolivia	row	79	Switzerland	row	126	Madagascar	row
33	Brazil	row	80	Norway	row	127	Malawi	row
34	Chile	row	81	Rest of EFTA	row	128	Mauritius	row
35	Colombia	row	82	Albania	row	129	Mozambique	row
36	Ecuador	row	83	Bulgaria	EU	130	Rwanda	row
37	Paraguay	row	84	Belarus	row	131	Tanzania	row
38	Peru	row	85	Croatia	row	132	Uganda	row
39	Uruguay	row	86	Romania	EU	133	Zambia	row
40	Venezuela	row	87	Russian Federation	row	134	Zimbabwe	row
41	Rest of South America	row	88	Ukraine	row	135	Rest of East Africa	row
42	Costa Rica	row	89	Rest of East Europe	row	136	Botswana	row
43	Guatemala	row	90	Rest of Europe	row	137	Namibia	row
44	Honduras	row	91	Kazakhstan	row	138	South Africa	row
45	Nicaragua	row	92	Kyrgyz Republic	row	139	Rest of South Africa Customs Union	row
46	Panama	row	93	Rest of Former Soviet Union	row	140	Rest of the World	row
47	El Salvador	row	94	Armenia	row			

Note: Anz=Australia and New Zealand; row = Rest of the World; xea = Rest of East Asia; brn = Brunei Darussalam; khm = Cambodia; idn = Indonesia; lao = Lao PDR; mys = Malaysia; phl = Philippines; sgp = Singapore; tha = Thailand; vnm = Viet Nam; xse = Rest of Southeast Asia; xsa = South Asia; nam = North America; EU = European Union; EFTA = European Free Trade Area.

Source: Aggregation of the GTAP/GMig2 Data Base version 9.

4. Implications of ASEAN economic integration on services: a global computable general equilibrium analysis

Kakali Mukhopadhyay*

1. INTRODUCTION

The economies of the Association of Southeast Asian Nations (ASEAN) are aware of the key role services trade can play in development. And they have made services central to their integration agenda (ASEAN-World Bank 2015). At the 5th ASEAN Summit in Bangkok in 1995, ASEAN Economic Ministers (AEMs) signed the ASEAN Framework Agreement on Services (AFAS), which requires members to enhance market access and guarantee equal national treatment for service suppliers among ASEAN countries. Another landmark framework agreement related to services trade is the 2007 ASEAN Economic Community (AEC) Blueprint. ASEAN members agreed to subsequent rounds of AFAS negotiations and schedule liberalization commitments to 2015—based on the parameters and timelines outlined in the AEC Blueprint. Detailed targets were set for integrating services markets, culminating in the free flow of services, investment and skilled labor by 2015. AFAS would substantially eliminate restrictions on services trade among ASEAN countries to improve the efficiency and competitiveness of ASEAN services suppliers and to accelerate economic growth and job creation (ASEAN-World Bank 2015).

The commitments cover services such as air transport, business, construction, distribution, education, the environment, finance, healthcare, maritime transport, telecommunications and tourism. The AEMs also concluded eight mutual recognition arrangements (MRAs) for architects, medical and dental practitioners, and engineering, nursing and tourism professionals along with framework agreements for surveyors and accountants. The MRAs enable professional service providers certified

or registered in their home country to be mutually recognized by other signatories (ASEAN-World Bank 2015).

The ASEAN Vision 2020—of a single market and production base—is an essential step toward liberalizing services trade. Its success depends on how it is implemented and measured. Identifying barriers to services trade, the degree of liberalization and regulatory reforms must be examined and analyzed. As of 2016, ASEAN members generated 37% to 74% of gross domestic product (GDP) from services, far exceeding GDP from agriculture and industry.[1] ASEAN services exports grew from $113.6 billion in 2005 to $291.9 billion in 2013—a 12.5% average annual growth. Over the same period, services imports increased from $140.7 billion to $298.6 billion (9.9% annual growth). In particular, liberalizing services trade requires policy reforms that attract investment and technology and create jobs for skilled labor (ASEAN-World Bank 2015).

On average, ASEAN services trade policies are more restricted than those of any other region in the world, except the Gulf States. The average Services Trade Restrictive Index (STRI) for the region is 60% above the global average—although restrictions vary widely across ASEAN countries and across income levels. Cambodia and Singapore have the most open policies. Myanmar and Viet Nam are also relatively open with few restrictions, while services trade in Indonesia, Thailand, the Philippines, and Malaysia is tightly restricted.

Even with AFAS in place, ASEAN countries have not moved further. While there are some instances of markets opening up, there are also instances of new restrictions. For the six ASEAN members originally surveyed in 2008, there was little change in overall policy regime through 2012. Even with AFAS and some further liberalization, the goal of free flow of services remains a long way off (ASEAN-World Bank 2015).

There are two areas, however, where progress in services integration is clear. The first is in air transport, where some steps have been taken toward a regional open sky policy. The second is in the MRAs for skilled professionals. These suggest that regionalism could have incremental value when focusing on areas not addressed multilaterally—such as in professional services and transportation.[2]

Malaysia pioneered open, private higher education by fostering cross-border trade in educational services, implementing both the requisite regulatory framework and developing quality assurance infrastructure. Singapore strengthened its position as the regional financial hub by preparing an open domestic financial sector alongside its reformed regulatory framework. Thailand has been proactive in targeting high-value-added markets. While initially focusing on tourism, it has aggressively moved into healthcare through complementary policies such as compulsory public

service for medical graduates and financial incentives for rural doctors. The Philippines has been successful in capturing a significant share of the global business process outsourcing market using a holistic approach.[3]

ASEAN has signed several services trade agreements with its "+3" partners—the People's Republic of China (PRC), Japan, and the Republic of Korea. In October 2003, Japan and ASEAN signed a general free trade agreement (FTA) framework that led to a formal FTA coming into force on 1 December 2008. ASEAN and Japan continue to work within World Trade Organization (WTO) rules to progressively eliminate discriminatory measures on services trade, facilitate entry and temporary movement of business people, and enhance cooperation for greater efficiency and competitiveness.

ASEAN and the Republic of Korea signed and implemented the ASEAN-Korea Trade in Services Agreement (AKTIS) in 2009. In January 2007, the PRC and ASEAN signed an agreement on trade in services, effective July 2007.

The ASEAN-India Free Trade Agreement in Services and Investment was signed in September 2014 and came into force in July 2015. It covers telecommunications, information technology (IT), transportation and logistics, financial services, education, real estate, business services, health and social services, and the "Mode IV" free movement of semi-skilled labor and professionals.[4] India and ASEAN set trade targets of $100 billion by 2015 and $200 billion by 2022. In 2015, however, total merchandise trade was just $58.7 billion, down 13.29% from the 2014 $67.7 billion total. During the same period, foreign direct investments (FDI) from India leapt 164%—from $606 million (2014) to $1.6 billion (2015).[5] In the other direction, ASEAN investments to India grew to $5.3 billion in 2014/15.[6] India holds a comparative advantage over the ASEAN nations in IT services, telecommunications, e-commerce, and engineering services—whereas ASEAN has the advantage in construction services, shipping and transportation, and logistics. Both are equally competitive in financial and insurance services (East Asia Forum 2013).

Using a global computable general equilibrium (CGE) framework, this chapter evaluates the effects ASEAN services trade liberalization would have in 2030 within ASEAN, between ASEAN and Japan, the Republic of Korea, the PRC, the +3 as a group, and between ASEAN and India. The Global Trade Analysis Project (GTAP) is primarily a tool for global trade analysis, and useful in studying the impact of service trade agreements. Results show that liberalizing services trade within ASEAN has a significant impact on output and trade. It finds that reducing tariffs to ASEAN's +3 partners significantly benefits ASEAN members. Moreover, it shows job creation in various service sectors across ASEAN, with the

greatest impact in trade and transport—except in smaller ASEAN members, where employment growth is higher in agriculture and semi-skilled manufacturing.

Developing an effective cooperative regulatory framework is essential to promote both bilateral cooperation and ensure long-term benefits reach all ASEAN members (Vo and Bartlett 2006). Implementing the 15-year-old AFAS requires that efficient coordination between ASEAN working committees and specialized working groups must be accelerated. Working groups have been established for six sectors—business services, construction, maritime services, telecommunications, tourism, and healthcare. Air transportation, banking, and insurance are also expected to be liberalized. The results here found that these two sectors have huge scope to generate benefits across ASEAN and its neighbors.

The rest of the chapter is organized as follows. Section 2 reviews existing studies. Section 3 explains the methodological framework, data, and defined scenarios. Section 4 discusses the results. The chapter concludes with a summary of the findings and offers several policy suggestions.

2.   LITERATURE REVIEW

The services sector is the next frontier in trade liberalization, with progress likely to bring enormous economic benefits to ASEAN. However, one major impediment is the lack of rigorous analytical work on its potential impact. Existing studies adopt different types of modelling to address the impact and consequences of liberalizing services trade. CGE models are often used to assess economy-wide effects of trade liberalization—which can be useful in policy deliberations.

Restrictions on services trade are far more complex than those on goods. Fukui and McDaniel (2010) described a set of stylized facts using CGE modelling research: they found that: (i) barriers to services trade are complex and heterogeneous across sectors; (ii) services have significant effects on downstream industries; (iii) market structure assumptions are crucial; (iv) foreign presence is often necessary for services trade; and (v) entry or fixed-cost barriers that restrict new foreign and domestic entrants are common. Benjamin and Diao (2000) studied services trade liberalization in the Asia-Pacific Economic Cooperation (APEC) forum using a global, multi-country, multi-sector applied general equilibrium model with an imperfectly competitive services sector. They applied the reduction in nontariff barriers in services by eliminating the possibility of price-discriminating oligopolistic firms between client countries within APEC. The results suggest that liberalizing services trade reinforces exist-

ing sectoral trade balances. More advanced APEC members gained the most from services trade liberalization, while developing economies gained more only if tariffs were eliminated.

Jensen et al. (2007) modelled the Russian Federation's potential accession to the WTO, including explicit treatment of foreign direct investment. They estimated economic welfare gains equivalent to 11% of GDP, and found FDI a key channel of economic benefit. In related work, Rutherford et al. (2005) found that real income effects from liberalization increased from 2% to 25%, with a decomposition of the results indicating liberalizing FDI was a principal component of welfare gains. In later work, Jensen et al. (2008) highlighted the importance of coordinated domestic regulations and trade reform in services. They used a CGE model to assess the potential impact of liberalizing regulatory barriers against foreign and domestic service providers in Tanzania. They found that the largest gains derived from liberalizing 12 nondiscriminatory barriers. In addition, their model illustrated that greater access to business services improved labor and capital productivity across all sectors of the economy—and that, in the long run, the increased productivity of capital induced capital accumulation and increased capital stock, which in Tanzania resulted in a general expansion in manufacturing.

Chadha et al. (2000) used a CGE model to assess the impact of future services trade liberalization on India's economy. They found that barriers to services trade were likely to be more complex than tariff barriers. They estimated that India's real income would rise 1.6% after services trade reform. Also using a CGE model, Robinson et al. (2002) evaluated the impact on the world economy of liberalizing services trade as technology transferred from developed countries to developing economies. They found that services trade liberalization not only directly affected global services production and trade, but also had significant implications for other economic sectors. Developed countries gained relatively more from increasing services exports compared with developing countries, while developing economies gained more from increased access to developed country markets for their manufactured export. Trade liberalization also affects an economy through growth in total factor productivity—induced by intermediate inputs, capital goods, and professional services imported into developing countries from advanced economies.

Whalley (2003) assessed quantitative studies on the potential effects liberalizing services trade has on developing countries. He highlighted the importance of firm and worker mobility, the heterogeneity of services, and the relatively large effect of capturing capital flows, typically in the form of FDI. In their study on Tunisia, Konan and Maskus (2006) also used CGE to quantify the economy-wide effects of services trade liberalization, focusing

on foreign investment in services. Their results showed that removing barriers against FDI was an essential component of potential welfare gains.

Few studies deal with ASEAN trade and investment liberalization. Ishido (2011) investigated the degree of liberalization of ASEAN services trade under four FTAs. The study found that effects differ greatly between sensitive and less sensitive sectors, and that there were sector-wide similarities across countries in commitments under each FTA studied. Dee (2012) mapped policy space in three key service sectors—air transport, maritime services (both shipping and port services), and telecommunications—attempting to find evidence on whether ASEAN Single Windows help achieve the broader revised Kyoto Convention objectives on customs procedures.

This chapter helps determine what is needed in each ASEAN member to effectively liberalize services trade. Most ASEAN countries are relatively transparent about their trade regulations. Yet very few assess the results of reforms, for example, in the time needed to clear customs.

3.   ANALYTICAL FRAMEWORK

The GTAP CGE modelling framework is one of the best ways of analyzing the economic consequences of multilateral trade agreements, as it integrates national, regional, and global linkages both by product and input markets. A CGE model consists of a system of equations that describes an economy as a whole and the interactions among its various parts. The equilibrium obtained from CGE models satisfies important macroeconomic and market clearing constraints like the equality of aggregate supply and demand for goods and services, full employment, and capital stock and equality/ratio of national or global savings to investment. The structure of the GTAP model is specified and described in Hertel (1997) and Mukhopadhyay and Thomassin (2010, p.209). The model includes industries, households, governments, and global links across economies through trade. Prices and quantities are generated simultaneously in both factor and commodity markets. These models begin by classifying variables in the equation as exogenous and endogenous (Burfisher 2012). The details of the model are described in Appendix 4A.1.

Experiments in CGE modelling are conducted by creating shocks to exogenous variables—by creating disequilibrium—in the models. The CGE model equations then determine new values for all the endogenous variables, creating a new equilibrium where supply across the economy once again equals demand at a new set of prices. The simulations give comparative static results—the models study the impact that changes in exogenous parameters (shocks) have on allocating goods among consum-

ers and resources among productive activities, along with the consequences for economic efficiency. The models compare alternative equilibrium states without considering the path between the two states. Thus, the models do not have an explicit time dimension. They are used to represent different time frames by changing the microeconomic elements of the closure.[7] The results of static simulations are often interpreted as representing what the economic system would look like if the new policy had been in place in the base year after relevant adjustments had taken place (Gilbert 2001).

This chapter uses the GTAP database, which includes input-output tables, bilateral trade flows, transport costs, information on tariff and nontariff barriers, and all other data included in the Social Accounting Matrices (SAM) used in CGE models (Burfisher 2012).

A standard GTAP model selects exogenous variables assuming there is full employment in factor markets. This is a neoclassical approach whereby the endowments of productive factors are fixed, allowing market prices to adjust so as to maintain full employment. But full employment is rarely achieved in the real world, particularly for unskilled labor in developing countries.[8] Hence, the simulations conducted here replace the assumption of full employment with unemployment for unskilled labor for all the countries/regions under consideration. This is done by swapping the fixed endowment of unskilled labor in all ASEAN countries and India, the PRC, Japan, and the Republic of Korea with fixed real wages of unskilled labor.[9] Thus, market prices of unskilled labor no longer adjust to ensure full employment, but instead capture unemployment with respect to unskilled labor in each economy.

3.1   Data Aggregation

As the main purpose here is to analyze the possible economic impact of liberalizing ASEAN service trade, aggregation is done on the original database. The 129 regions in the original database were aggregated into 14 regions with a focus on ASEAN.[10] In addition to regional aggregation, sectors in the GTAP 8 database are aggregated based on the proposed service tariffs used (Narayanan et al. 2012). With the broad disaggregation of service sectors considered,[11] the original 57 sectors are aggregated into 30 sectors. The detail aggregation scheme of regions and sectors are given in Appendix 4A.2.

3.2   Experimental Design

Six scenarios were simulated to analyze the impact of services trade liberalization within ASEAN. The initial benchmark equilibrium was based

on the 2007 model to create counterfactual equilibrium benchmarks—the Business as Usual (BAU) scenario—for 2014 and 2030 through a recursive process using estimated macroeconomic variables (Fouré et al. 2010).[12] New structures are generated for 2007–2014 and 2014–2030 using macroeconomic shocks for the key variables. The exogenous shocks include capital, population, skilled labor, unskilled labor, and total factor productivity. The projection of each economy to 2014 is made using the actual growth rate for each variable. The projection growth rate for total factor productivity for non-agricultural sectors is sourced from Fouré et al. The growth rate for total factor productivity for agriculture is based on the estimations of Ludena et al. (2007). The population growth rate projection was taken from United Nations (2012). Growth rates for skilled labor, unskilled labor, and capital are taken from Fouré et al. GDP is endogenously determined to accommodate the combination of these exogenous shocks.

Results provide a projection for the global economy in 2014 that is in equilibrium. The forecast economy in 2014 is the starting point for subsequent simulation exercises. This forecasting procedure is also applied to update each economy studied to 2030.

Actual tariff equivalents of nontariff barriers on services applied on the model come from Lee and Itakura (2013) before reducing barriers. *Ad valorem* tariff equivalents of nontariff barriers in nine service sectors are computed as weighted averages of the gravity-model estimates of Wang et al. (2009) and the values employed by the Michigan Model of World Production and Trade (see, for example, Brown et al. 2010). The full reduction in service trade barriers was applied to six scenarios at 2030:

1. S-ASEAN—tariff reductions of selected service sectors within ASEAN;
2. S-ASEAN+3—tariff reductions of selected service sectors within ASEAN and between ASEAN and the PRC/Japan/Republic of Korea;
3. S-ASEAN+Japan—tariff reductions of selected service sectors between ASEAN and Japan;
4. S-ASEAN+Republic of Korea—tariff reductions of selected service sectors between ASEAN and the Republic of Korea;
5. S-ASEAN+PRC—tariff reductions of selected service sectors between ASEAN and the People's Republic of China; and
6. S-ASEAN+India—tariff reductions of selected service sectors between ASEAN and India.

4. RESULTS AND DISCUSSION

This section examines six scenarios of how ASEAN countries would be affected by liberalizing services trade. Figures 4.1 to 4.6 show the impact service trade liberalization would have on output, exports and imports in 2030, as well as its implications on employment generation for skilled and unskilled labor in the member countries.

4.1 Economic Impact

Reducing barriers to services trade within ASEAN (scenario 1) has a significant positive impact on output in all ASEAN countries. Total ASEAN output in 2030 under scenario 1 increases $295.8 billion (10.2%)
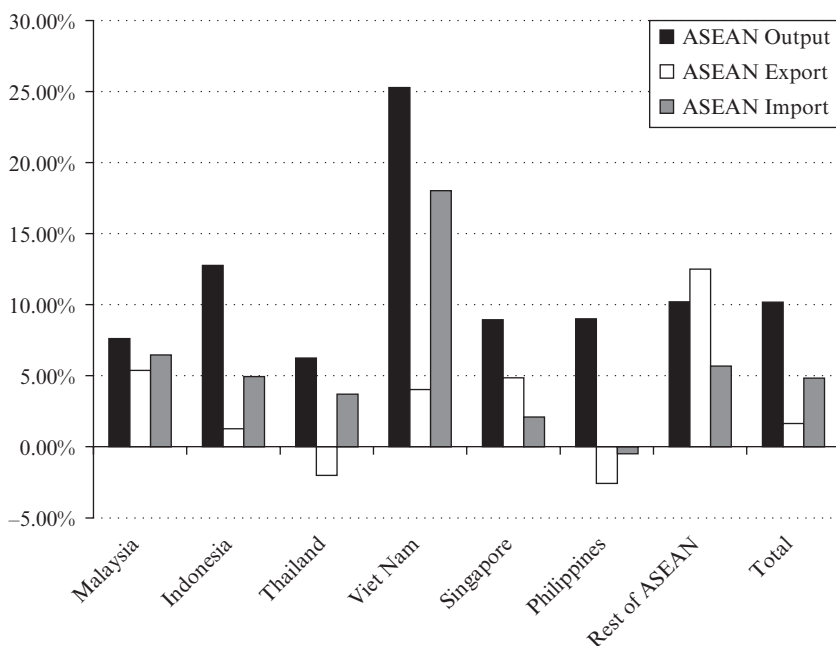
Note: * S-ASEAN = tariff reductions of selected service sectors within ASEAN compared with Business as Usual (no liberalization).

Source: Author's calculations.

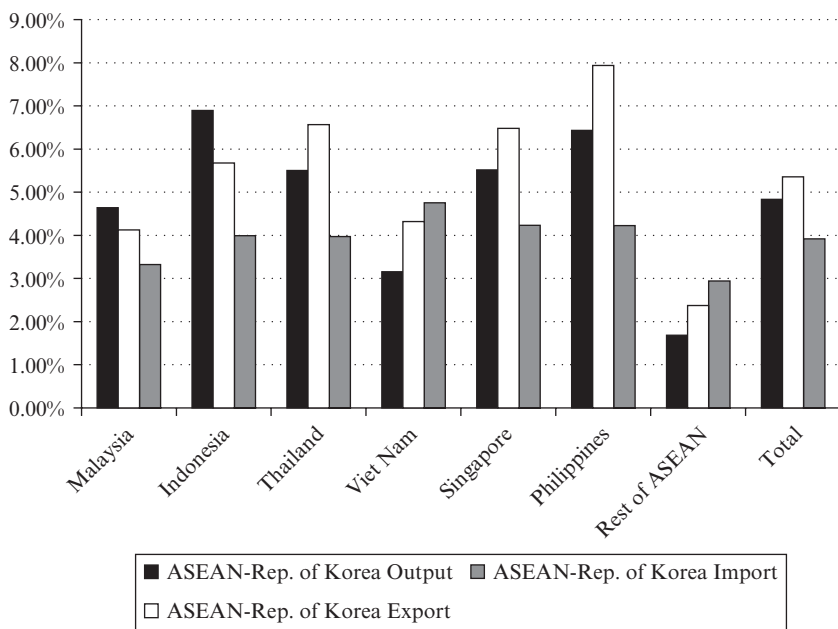*Figure 4.1* *Scenario 1—impact of service trade liberalization in 2030 within ASEAN compared to BAU 2030* (%)*
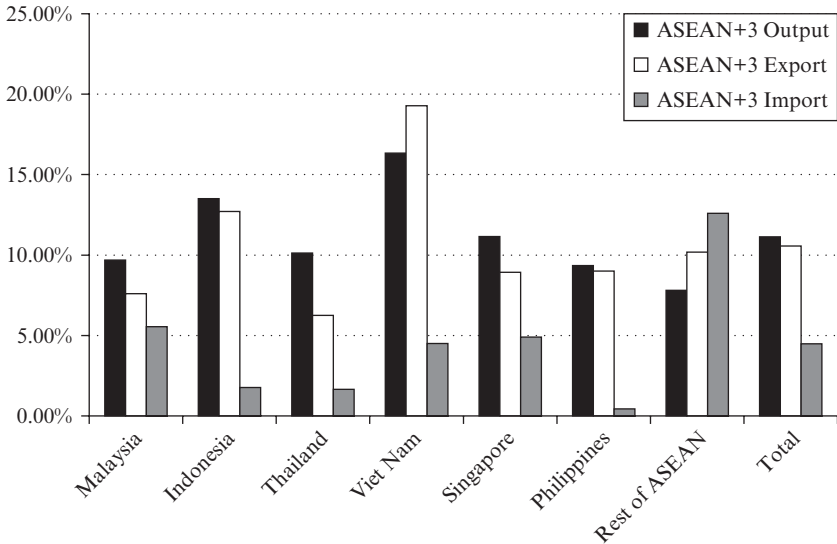
Note: * S-ASEAN+3 = tariff reductions of selected service sectors within ASEAN and between ASEAN and the People's Republic of China, Japan and the Republic of Korea compared with Business as Usual (no liberalization).

Source: Author's calculations.

Figure 4.2   Scenario 2—impact of service trade liberalization in 2030 within ASEAN+3 compared to BAU 2030* (%)

above the BAU 2030 scenario. Indonesia contributes most, with output rising $107.4 billion (up 12.8%). Viet Nam's output increases $38.5 billion (25.3%). Service tariff reductions among the +3 countries in addition to intra-ASEAN service liberalization (scenario 2) would also have significant impact. Output under scenario 2 increased 11.1% above the BAU 2030 benchmark, slightly higher than the increase under scenario 1. Under the ASEAN+3 scenario, Viet Nam's output rises 16.3%, followed by Indonesia, Singapore and Thailand.

ASEAN countries could expect an additional 4.2% growth in output under the ASEAN-Japan service trade liberalization scenario 3. Singapore shows the highest growth (8.15%), while the Rest of ASEAN would grow slowest (2.62%).

Under the ASEAN-Republic of Korea scenario 4, ASEAN's total output growth rises 4.83%. The highest growth is in Indonesia (6.89%), followed by the Philippines, Singapore and Thailand.
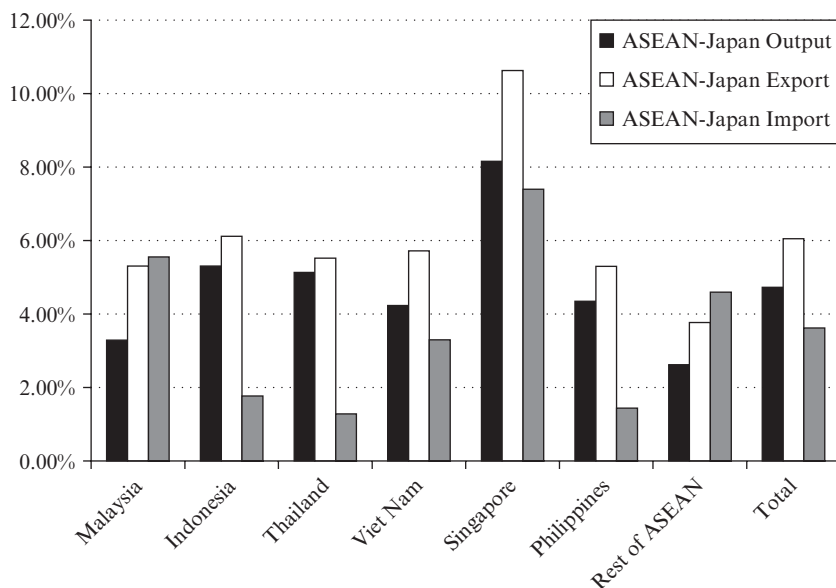
Figure 4.3 *Scenario 3—impact of service trade liberalization in 2030 within ASEAN and Japan compared to BAU 2030* (%)*

A 3.99% increase in output growth is expected for ASEAN in the case of the ASEAN-PRC scenario 5. Singapore rises 7.12%, with the lowest growth in Malaysia (2.14%). The rest of ASEAN ranges from 3.56% to 4.65%.

Under the ASEAN+India scenario 6, most ASEAN countries gain from services trade liberalization. The expected output growth is most noticeable in Singapore (8.34%), Viet Nam (7.29%) and Indonesia (6.34%).

4.2 Sectoral Output Impact

Analyzing changes in output by sector shows that, as might be expected, services[13] get the biggest boost from a cut in service tariffs. In the S-ASEAN scenario 1, the services sector sees the largest increase in output in all ASEAN members when compared with the BAU 2030 benchmark. In Indonesia, services output rose the most ($89.8 billion). However, output

Note: * S-ASEAN+Republic of Korea = tariff reductions of selected service sectors between ASEAN and Republic of Korea compared with Business as Usual (no liberalization).
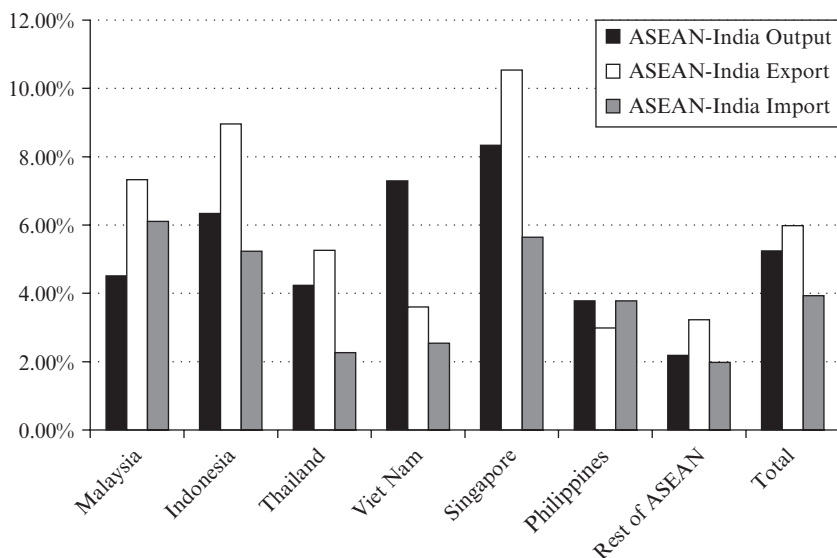
Source: Author's calculations.

Figure 4.4   *Scenario 4—impact of service trade liberalization in 2030 within ASEAN and the Republic of Korea compared to BAU 2030* (%)*

in several other sectors decline under scenario 1. For example, output in petroleum and coal products in Singapore and Indonesia drops $2.2 billion and $1.8 billion respectively. In Thailand, chemicals, rubber and plastics decline $2.9 billion, while the electronics sector in the Philippines decreases $1.5 billion. Nonetheless, these reductions are far smaller than the gains in overall services output. Additional tariff reduction under the S-ASEAN+3 scenario 2 did not appear to have any significant sectoral impact. In Indonesia, services output increased $2.1 billion. Overall, a similar services sector growth pattern was observed in the case of scenarios 3, 4, 5, and 6. However, a much bigger impact is seen on transport and financial services. Among service subsectors, the highest output increase occurs in financial services under the ASEAN–Japan scenario 3, construction and utilities in
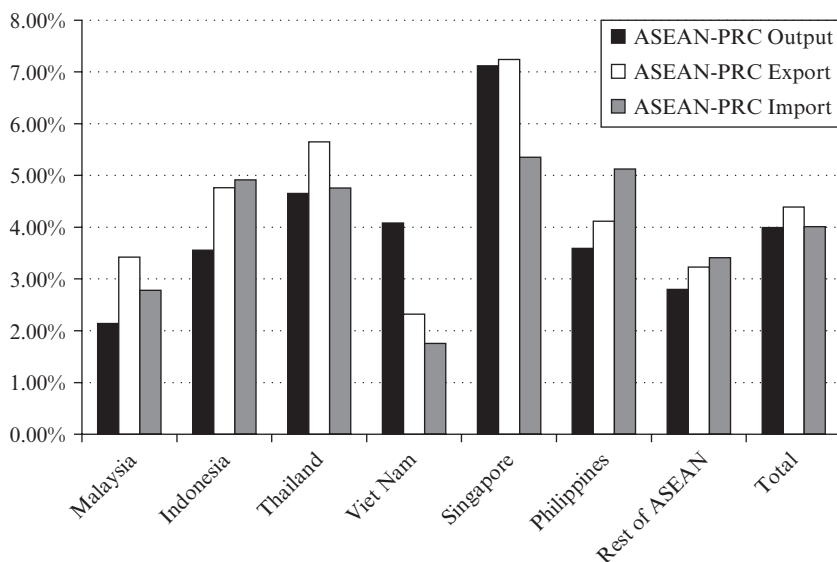
Note: * S-ASEAN+PRC = tariff reductions of selected service sectors between ASEAN and the People's Republic of China compared with Business as Usual (no liberalization).

Source: Author's calculations.

Figure 4.5 *Scenario 5—impact of service trade liberalization in 2030 within ASEAN and the People's Republic of China compared to BAU 2030* (%)*

the ASEAN-Republic of Korea scenario 4, and trade and transportation under ASEAN-PRC scenario 5.

4.3 Trade Impact

The tariff reductions under the six scenarios show that liberalizing services trade will have a small but positive impact on exports and imports. ASEAN exports rise $14 billion (1.65%) under the S-ASEAN scenario 1 compared with the BAU 2030 benchmark. The impact on individual countries, however, varies significantly. Malaysia, Singapore and the Rest of ASEAN see exports increase significantly, growing 5.4%, 4.9% and 10.2%, respectively. Exports from the Philippines and Thailand, on the other hand, would decline marginally. The additional tariff reductions applied under the S-ASEAN+3 scenario 2 does not have much additional impact. Total ASEAN exports rise $26.1 billion

Note: * S-ASEAN+India = tariff reductions of selected service sectors between ASEAN and India compared with Business as Usual (no liberalization).

Source: Author's calculations.

Figure 4.6 *Scenario 6—impact of service trade liberalization in 2030 within ASEAN and India compared to BAU 2030* (%)*

and $2.1 billion compared with the BAU 2030 benchmark and S-ASEAN scenario 1, respectively. Most ASEAN members, including the Philippines and Thailand, gain in exports. Viet Nam receives the highest export boost under the S-ASEAN+3 scenario 2 (up 19.27%), with other members' exports increasing from 6.25% to 10.18% (Indonesia's exports rise 12.71% over the benchmark). The ASEAN–Japan scenario 3 receives an additional 6.05% export boost, while the ASEAN-Republic of Korea and ASEAN-PRC scenarios 5 and 6 also show export growth of 5.35% and 4.39% respectively. Singapore gained in terms of exports from the ASEAN-Japan and ASEAN-PRC scenarios 3 and 5, while the Philippines increases exports under the ASEAN-Republic of Korea scenario 4. Under the S-ASEAN+India scenario 6, Singapore's exports gain 10.54%, followed by Indonesia (8.96%) and Malaysia (7.33%).

The benefits under the ex-ASEAN scenarios show some variations. For example, services trade volumes between Japan and ASEAN are considerably smaller than merchandise trade. However, Japan's services exports to

ASEAN are more than its imports. Japan-ASEAN services trade remains highly concentrated on Singapore, which accounts for more than half of both exports and imports of services between Japan and ASEAN.

ASEAN is the Republic of Korea's second-largest trading partner after the PRC. Two-way trade between the Republic of Korea and ASEAN—$131 billion in 2012—benefited substantially from AKTIS. ASEAN is the Republic of Korea's top foreign investment destination. In 2012, the Republic of Korea invested $4.3 billion in ASEAN. The top two destinations for the Republic of Korea's FDI to ASEAN were the Philippines and Indonesia.

Under scenario 4, ASEAN's share of the Republic of Korea's services exports increases 15%, while imports of services from ASEAN rises 13%. It is also clear from historical trade data that the Republic of Korea's services trade with ASEAN has consistently grown since 2006. Most ASEAN countries—Indonesia, Malaysia, the Philippines, Singapore, Thailand and, to some extent, Viet Nam—benefit from AKTIS.

4.4   Sectoral Trade Impact

A sectoral-level analysis of the changes in ASEAN exports under the six scenarios show different sectors react differently across countries. Results reveal that most services exports under the five ASEAN+ scenarios increase compared with the benchmark BAU and S-ASEAN scenarios. In the S-ASEAN scenario 1, Singapore's $9.8 billion growth in services exports was more than double the $4.3 billion drop in petroleum and coal product exports. Services would gain most—$9.5 billion in exports over the BAU scenario, the largest component of Singapore's export growth.

Electronics also played an important part in export gains in Malaysia and Indonesia, growing $5.8 billion and $4.5 billion, respectively under S-ASEAN scenario 1. Similar trends are seen under S-ASEAN+3 scenario 2, but with much smaller gains compared with the S-ASEAN scenario 1—$198 million for Malaysia and $233 million for Indonesia. These results indicate that indirect effects of tariff reductions under S-ASEAN and S-ASEAN+3 scenarios 1 and 2 are behind the rise in export volumes.

Financial services are an important component of Japan-ASEAN trade in services (scenario 3). In fact, financial services are key to overall trade competitiveness and entry into global value chains. Malaysia, Indonesia and Singapore show important gains. This is true for services itself as well as for manufacturing and production activities where services are inputs. Although Japan has invested in ASEAN services like banking and logistics (Biswas 2014), there remains huge potential for further liberalizing services trade in both directions (Sato 2014). Thus far, however, liberalizing

ASEAN services trade has been far less successful than liberalizing trade in goods (Versetti and Heal 2015).

Construction, utilities, and other private and government services play a key role in ASEAN-Republic of Korea trade (scenario 4). Currently, the Republic of Korea exports significant amounts of construction services to ASEAN. ASEAN is also the Republic of Korea's second most popular tourist destination (after the PRC). Thus, so far, construction, banking and tourism have seen the biggest boost from AKTIS. This is particularly true for Malaysia, Indonesia and the Philippines (Tongzon and Cheong 2016).

The Republic of Korea is expected to export more construction services to Malaysia, while Malaysia will export more healthcare and tourism services to the Republic of Korea. GTAP categorizes healthcare and tourism under "other private and government services." These subsectors are covered by AKTIS with substantial liberalization commitments from both sides. Thus, it is likely growing trade flows in these subsectors will flow from AKTIS. But the increase in tourists visiting the Philippines and Philippine professionals migrating to work in the Republic of Korea was unlikely due to AKTIS. Financial sector exports between the Philippines and the Republic of Korea likely increased due to AKTIS. AKTIS has also led to more robust trade with Singapore. Two-way trade between Singapore and the Republic of Korea has also grown due to their bilateral FTA, which came into force in 2006 (Tongzon and Cheong 2016).

In ASEAN, many sectors have gained since the 2007 PRC-ASEAN trade in services agreement. The ASEAN-PRC scenario 5 shows that construction, sea transportation, communications and financial services will increase for the PRC, while air and sea transportation, communications, financial services, construction and utilities, and other private and government services will grow for ASEAN members.

Currently, half of PRC-ASEAN trade is carried by sea—trade volumes increased 22.7% since 2010 and will likely continue to expand. As trade increases, so should financial services (Yang 2009).

The PRC-ASEAN services agreement has increased services trade, although differences in development among ASEAN members lead to varying gains. For example, Singapore attracts investments in knowledge-intensive services, while it invests in high-technology services—such as construction, electric power and "eco cities" in the PRC.

For ASEAN-India services trade (scenario 6), the results support the findings of the Deloitte and Federation of Indian Chambers of Commerce and Industry joint study (East Asia Forum 2013), which showed that computer and information services, telecommunications, e-commerce and engineering services will benefit India. Financial and insurance services will

benefit both, while ASEAN members would benefit more in construction, engineering, shipping and transportation services. ASEAN investment in India would likely concentrate in energy, transport and logistics. Overall, India has an advantage in the services sectors over the ASEAN nations.

The effect of trade liberalization on imports is also significant. In the S-ASEAN scenario 1, total imports into ASEAN increases 4.8% over the BAU 2030 benchmark. Most ASEAN countries see imports rise. Viet Nam has the largest increase, $12.6 billion (18.0%), followed by Malaysia at $9.9 billion (6.5%). The Philippines would see a marginal rise of $1.7 billion. Additional tariff reduction in the S-ASEAN+3 scenario 2 has a marginal (2.7%) rise in imports over the benchmark. Imports into the Rest of ASEAN, Viet Nam and Malaysia increase 2.3–5% over the BAU2030 benchmark, while imports into the Philippines decline less than 1%. In the case of the ASEAN-India scenario 6, ASEAN's additional import growth ranges between 2.2% and 6.4%.

Services and machinery equipment dominate the increase in imports into most ASEAN nations under the S-ASEAN and S-ASEAN+3 scenarios 1 and 2. In Thailand, imports of services rise $7.0 billion—the largest share of the increases. Services are also highest in Indonesia, Viet Nam and Singapore. In Malaysia and the Philippines, machinery equipment contributes most to the import increase. In Malaysia, machinery equipment imports rise $5.3 billion.

Several sectors show declines under the S-ASEAN import scenario 1. In Singapore, oil declines $1.3 billion. In the Philippines electronics decrease $1.5 billion. Under the S-ASEAN+3 scenario 2, several sectors increase above the S-ASEAN scenario 1 rise. For example, services imports into Thailand rise $0.4 billion, while machinery equipment imports to Malaysia increase marginally ($23 million).

4.5 Welfare Impact

Aside from the increase in output and trade from liberalizing services trade under the six scenarios, ASEAN also receives an overall welfare gain (Figure 4.7). In the S-ASEAN scenario 1, total welfare rises $4.0 billion over the BAU 2030 benchmark—though unevenly distributed. Indonesia captures the largest gain ($860 million), followed by Malaysia ($796 million) and Viet Nam ($716 million). Under the ASEAN+3 scenario 2, ASEAN members gain $6.6 billion. Viet Nam gains most ($1.2 billion), followed by Singapore and Indonesia (both $1.2 billion).

Welfare gains in Indonesia are primarily in technology, while in Singapore it is in terms of trade. Much larger welfare gains accrue under the S-ASEAN+3 scenario 2, despite the marginal effects on output,
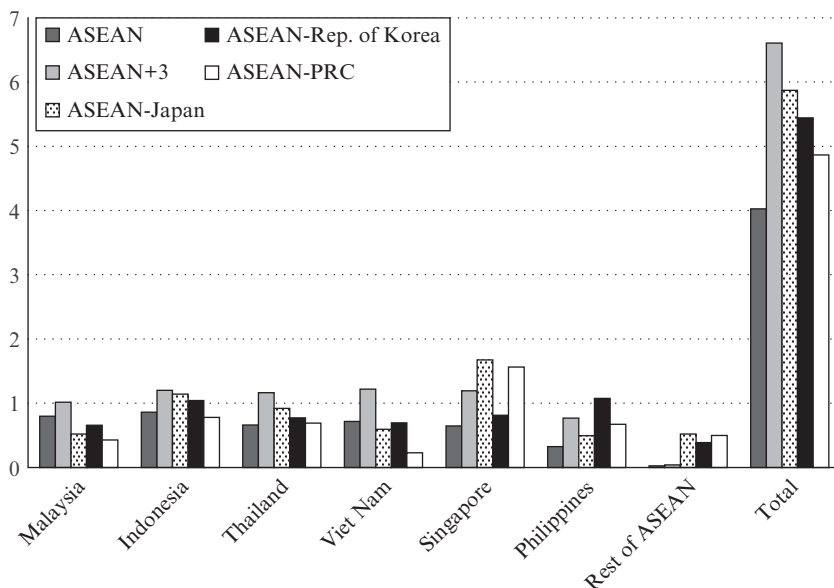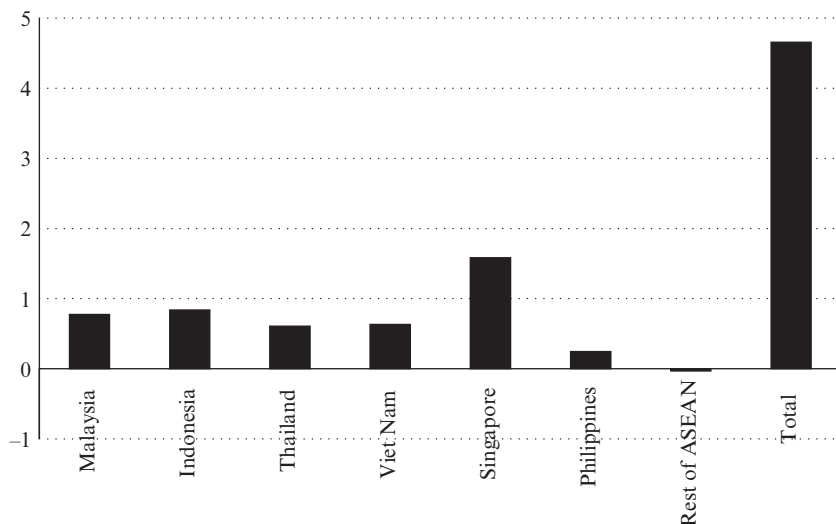
Note: ASEAN = Association of Southeast Asian Nations, BAU = Business as Usual, PRC = People's Republic of China.

Source: Author's calculations.

Figure 4.7   Welfare change under scenarios 1–5 compared with the BAU 2030 benchmark ($ billion)

exports and imports. Most of the additional welfare gains flow to Viet Nam, while the total for Thailand, Indonesia and Singapore is $1.1 billion.

The other scenarios also show welfare gains considerably above the S-ASEAN scenario 1. The highest welfare gain flows from the ASEAN-Japan scenario 3 ($5.8 billion), followed by the ASEAN-Republic of Korea scenario 4 ($5.4 billion). Welfare gains under the ASEAN-PRC and ASEAN-India scenarios 5 and 6 are also significant (above $4 billion). With the exception of the ASEAN-Republic of Korea scenario 4, Singapore leads in welfare gains followed by Indonesia. Under scenario 4, the Philippines receive the most significant welfare gain ($1.1 billion). The main source of welfare gains remains technology. Singapore is expected to gain most under the ASEAN-India scenario (Figure 4.8).

Note: ASEAN = Association of Southeast Asian Nations, BAU = Business as Usual.

Source: Author's calculations.

Figure 4.8   *Welfare change under the ASEAN-India scenario 6 compared with the BAU 2030 benchmark ($ billion)*

4.6   Social Implications—Skilled vs. Unskilled Labor

Service trade liberalization is expected to have a considerable impact on employment. The removal of service trade barriers would significantly benefit the ASEAN population as it would lead to greater specialization and division of labor—as each member concentrates on producing goods and services where it holds comparative advantage (see Appendix 4A.3). Liberalizing services trade would have both positive and negative effects depending on a member's employment structure. For example, higher-income groups may benefit from more highly competitive markets as they expand production networks. In Thailand, the largest increases are projected for retail sales and semi-skilled services linked to high trade and transport growth. Unskilled workers—many of whom would be employed in the informal sector—also gain.[14] The highest projected wage growth rates fall under a variety of occupations related to trade, transport and construction in the Philippines, Indonesia and Viet Nam.

Employment gains vary widely across scenarios and by country (Table 4.1). Singapore is expected to gain most in skilled-labor employment

Table 4.1 Comparative impact of economic indicators under the six service trade liberalization scenarios

Scenario	Total output increase over BAU	Countries with highest output growth over BAU	Export	Countries with highest export growth over BAU	Import	Welfare	Skilled labor	Semi-skilled labor
1. Within ASEAN	10%	Viet Nam (25%)	2%	Rest of ASEAN (12%)	4.8%	Indonesia	Singapore	Thailand
2. ASEAN+3	11.14%	Viet Nam (16.3%)	10.56%	Viet Nam (19.27%)	4.49%	Viet Nam	Singapore	Thailand
3. ASEAN-Japan	4.2%	Singapore (8%)	6%	Singapore (11%)	3.8%	Singapore	Singapore	Indonesia
4. ASEAN-Republic of Korea	4.8%	Indonesia (6.8%)	5.1%	Philippines (7.9%)	3.9%	Philippines /Indonesia	Philippines	Thailand
5. ASEAN-PRC	4%	Singapore (7%)	4.1%	Singapore (7.1%)	3.9%	Singapore	Singapore	Philippines
6. ASEAN-India	5%	Singapore (8%)	6%	Singapore (10%)	3.8%	Singapore	Singapore	Thailand

Note: ASEAN = Association of Southeast Asian Nations, BAU = Business as Usual, PRC = People's Republic of China.

Source: Author's calculations.

under most scenarios (scenarios 1, 2, 3 and 6). Appendix 4A.3 shows the extent to which additional skilled employment generation rises in comparison with other ASEAN countries. This makes sense given Singapore's high-skill production base—it accounts for half the total volume of high-skill manufacturing exports. Singapore's high-skill technology-intensive manufactured exports rose from 36% to 48% between 2000 and 2012. The impact on unskilled labor is marginal.

Compared with other ASEAN members, Thailand and the Philippines see relatively high employment generation for skilled laborers. The Philippines also appears to have the highest skilled employment generation under the ASEAN-Republic of Korea scenario 4. It also has highest employment gains for unskilled labor under most scenarios. Thailand shows significant positive gains in employment in both skilled and semi-skilled sectors under the various scenarios. The gains are equal under the ASEAN-Republic of Korea scenario 4. Skilled laborers benefit more under the ASEAN-Japan, PRC and India scenarios (3, 5 and 6).

Indonesia's employment generation is minimal under the ASEAN scenario 1, but shows the largest gain for semi-skilled workers under the ASEAN-Japan scenario 3. In general, the results across ASEAN are in line with the levels of skilled versus semi-skilled labor these members produce.

It is important to note, however, that in less-developed ASEAN members, many high-skilled employment opportunities are filled by inadequately qualified laborers. This widens the scope for inefficiency and a potential productivity gap in the services—an argument for the low absolute numbers generated by the GTAP model against the BAU 2030 benchmark. As the analysis indicates, Singapore is expected to gain most under the various scenarios, with Viet Nam and Indonesia also likely to benefit under several scenarios.

5.   CONCLUSION

The ASEAN region is one of the most dynamic, rapidly growing regions in the world. The Asian Development Bank projects that Indonesia, Malaysia, the Philippines, Thailand and Viet Nam—with a population of 525 million and a $2.8 trillion combined GDP—are expected to grow almost 6% per annum between now and 2030. The launch of the ASEAN Economic Community (AEC) in 2015 was an important, significant step in promoting and further accelerating growth within the region by removing tariff barriers between members. Yet, there are few studies that analyze the long-term impact of ASEAN integration focusing on liberalizing service trade. This chapter helps fill this void by assessing its impact on the region.

The results of the projections here indicate that service trade liberalization within ASEAN would have a significant impact on output and trade. Further, by extending tariff reductions to the +3 nations of the PRC, Japan and the Republic of Korea brings significant added benefits to ASEAN. By 2030, service trade liberalization would increase output by $29.6 billion, exports by $14.0 billion and imports by $36.8 billion over the benchmark Business as Usual scenario. Service sector output in Indonesia would rise by $89.8 million, ten times more than the second-highest estimated increase of $8.9 million, registered in rice cultivation. This trend is seen throughout ASEAN, indicating that the effect of service tariff cuts is largely limited to services.

Liberalization in services trade also brings welfare gains, although not evenly distributed among members. Extending service tariff reductions to the +3 countries, collectively and individually, results in an additional marginal rise in output, exports and imports, but a much greater boost in welfare. ASEAN+3 agreements also show welfare gains for almost all ASEAN members, particularly Singapore and Indonesia. But despite the complementarities, trade in services between India and ASEAN still faces considerable challenges. The ASEAN-India services and investment agreement provides opportunities for ASEAN nations to access India's markets in energy, transport and logistics, while India can access ASEAN markets in consultancies, software, maintenance and installation, education, health and social work. Employment growth would be the greatest in trade and transport in all countries except the Rest of ASEAN countries, where employment growth would be higher in agriculture and semi-skilled manufacturing.

Large projected employment growth in trade and transport in all countries implies that a large share of this employment growth is linked to the informal sector. These results are not surprising, as any regional integration initiative can be expected to have asymmetric effects on factors of production within and across service industries. These depend on a variety of factors, including the skills structure of the workforce, factor composition of industries, economies of scale and supply chain linkages. In addition, service trade liberalization appears to have a positive impact on employment generation in all ASEAN member countries across all scenarios tested. While Singapore is expected to see the highest generation of skilled employment, Thailand and the Philippines have the highest demand rise for semi-skilled laborers—in keeping with the general orientation of these economies. The analysis of the effect of service trade liberalization on employment leaves questions regarding the scope for raising potential gains through human capital development and enhancing productivity across economic sectors.

In conclusion, there is great potential for cooperation in service trade between ASEAN, East Asia and India. If all parties work to increase collaboration, standardize resource availability, build systems and coordinate relevant policies there would be a better chance for all members to gain evenly. How this would work best is an area for further study.

NOTES

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1. http://asean.org/asean-economic-community/sectoral-bodies-under-the-purview-of-aem/services/.
2. In professional services, domestic regulations are not yet aligned with ASEAN MRAs—some required bilateral negotiations to make them operational. In air transport, further liberalization will be needed for a truly integrated regional air transport services market. In finance, ASEAN members are working to deepen financial services integration. There are initiatives to strengthen and harmonize capital market disclosure standards. And the ASEAN Banking Integration Framework (ABIF) aims in part to promote intraregional trade and investment (ASEAN-World Bank 2015).
3. Competitive salaries and low compensation costs, a large pool of qualified talent, low telecommunication and real estate costs, investment incentives, and fostering tertiary education have been keys to its success.
4. Mode IV access refers to the Restriction on Work Permits and Uniform Qualification Recognition under the FTA that allows greater flexibility in obtaining specified longer-term visas and work permits. While Mode IV access may also cover ASEAN MRAs, they may still require further agreements between India and each ASEAN member (https://www.dfdl.com/wp-content/uploads/2015/04/IPBA_Journal_India-ASEAN_FTA_in_services_and_investments_countdown_to_implementation.pdf).
5. ASEAN Trade Statistics Database as of July 2016.
6. Share of ASEAN in total FDI flow was 21.6%.
7. Neoclassical closure assumes that investment is equalized with savings at a level that guarantees full employment. This rule is essential for the neoclassical model.
8. With the exception of Singapore, all ASEAN members are developing countries.
9. Thus, the endowment of unskilled labor—fixed in a standard GTAP model with market prices adjusting to maintain full employment—is replaced with fixed real wages.
10. The Lao People's Democratic Republic (Lao PDR), Cambodia and the "Rest of Southeast Asia" (Myanmar, Brunei Darussalam and Timor-Leste) comprise "Rest of ASEAN."
11. Construction and utilities, trade, sea transport, air transport, other transport, communications, financial services, other private services and government services.
12. To carry out the desired projections and simulations, it was decided to update the static GTAP model with a 2007 base year to 2030. The process uses recursive updating based on forecasting a country's (region's) economy by exogenously shocking the baseline model with projections of macroeconomic variables.
13. See note 11.
14. Particularly construction workers.

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APPENDIX 4A.1   MODEL DESCRIPTION

The Global Trade Analysis Project (GTAP) model incorporates both demand and supply in its specifications (Hertel 1997). On the demand side, the model uses a Cobb–Douglas aggregate utility function to allocate regional household expenditure among private expenditure, government expenditure and savings along a constant budget share to provide an indicator of welfare for the regional household. Here, a representative household in each region maximizes constant difference of elasticity expenditure (CDE) functions calibrated to an income level and elasticity of demand that vary according to a region's level of development and consumption pattern.

On the supply side, firms combine primary factors and intermediate goods using the Leontief production structure and a constant return-to-scale technology to produce final goods in a perfectly competitive environment. The final goods produced are then sold to both private households and government. There are five primary factors of production in the model—capital, land, natural resources, skilled and semi-skilled labor. The GTAP model uses a nested constant elasticity of substitution (CES) function to determine firm demand for primary and intermediate inputs. The GTAP model utilizes the Armington approach to goods and services. With this approach, goods and services are differentiated by region of origin and are imperfect substitutes. Using this method, an optimal combination of imported and domestic goods can be calculated to be used in production. The GTAP model also incorporates two global sectors apart from regional sectors: (i) the global banking sector that facilitates global savings and investments; and (ii) global transportation to account for the difference between free on board (fob) and cost, insurance and freight (cif) values. In addition, domestic support and trade barriers (tariff and nontariff) are measured in *ad valorem* equivalents. The equilibrium nature of the model is derived from the accounting relationship that makes up the model. For the closure to work, the number of endogenous variables considered has to be equal to the number of equations used. This is a necessary but not a sufficient condition. The choice of exogenous variable will help determine whether the model is in general or partial equilibrium. Finally, in a standard GTAP closure, all markets are in equilibrium, with all firms earning zero profit and regional household on its budget constraint.

Table 4A.1   GTAP 8 database sectors and sectoral aggregation

Number	Code	Sector in GTAP	Name of the aggregated sector	Number
1	PDR	Paddy rice	Agriculture	1
2	WHT	Wheat	Agriculture	1
3	GRO	Cereal grains, nec	Agriculture	1
4	V_F	Vegetables, fruit, nuts	Agriculture	1
5	OSD	Oilseeds	Agriculture	1
6	C_B	Sugarcane, sugar beet	Agriculture	1
7	PFB	Plant-based fibers	Agriculture	1
8	OCR	Crops, nec	Agriculture	1
9	CTL	Bovine cattle, sheep, and goats, horses	Livestock and livestock products	2
10	OAP	Animal products, nec	Livestock and livestock products	2
11	RMK	Raw milk	Livestock and livestock products	2
12	WOL	Wool, silk-worm cocoons	Livestock and livestock products	2
13	FRS	Forestry	Forestry	3
14	FSH	Fishing	Fishing	4
15	COA	Coal	Fuel mineral	5
16	OIL	Oil	Fuel mineral	5
17	GAS	Gas	Fuel mineral	5
18	OMN	Minerals, nec	Fuel mineral	5
19	CMT	Bovine meat products	Livestock and livestock products	2
20	OMT	Meat products, nec	Livestock and livestock products	2
21	VOL	Vegetable oils and fats	Vegetable oils and fats	6
22	MIL	Dairy products	Dairy products	8
23	PCR	Processed rice	Processed rice	8
24	SGR	Sugar	Sugar	7
25	OFD	Food products, nec	Food products and beverages	8
26	B_T	Beverages and tobacco products	Food products and beverages	8
27	TEX	Textiles	Textile and wearing apparel	9
28	WAP	Wearing apparel	Textile and wearing apparel	9
29	LEA	Leather products	Leather products	10

Table 4A.1   (continued)

Number	Code	Sector in GTAP	Name of the aggregated sector	Number
30	LUM	Wood products	Wood products	11
31	PPP	Paper products, publishing	Paper products, publishing	12
32	P_C	Petroleum, coal products	Petroleum, coal products	13
33	CRP	Chemical, rubber, plastic products	Chemical, rubber, plastic products	14
34	NMM	Mineral products, nec	Mineral products, nec	15
35	I_S	Ferrous metals	Metal and metal products	16
36	NFM	Metals, nec	Metal and metal products	16
37	FMP	Metal products	Metal and metal products	16
38	MVH	Motor vehicles and parts	Motor vehicles and parts	17
39	OTN	Transport equipment, nec	Transport equipment nec	18
40	ELE	Electronic equipment	Electronic equipment	19
41	OME	Machinery and equipment, nec	Machinery and equipment, nec	20
42	OMF	Manufactures, nec	Manufactures, nec	21
43	ELY	Electricity	Construction and utilities	22
44	GDT	Gas manufacture, distribution	Construction and utilities	22
45	WTR	Water	Construction and utilities	22
46	CNS	Construction	Construction and utilities	22
47	TRD	Trade	Trade	23
48	OTP	Transport, nec	Transport, nec	24
49	WTP	Water transport	Water transport	25
50	ATP	Air transport	Air transport	26
51	CMN	Communication	Communication	27
52	OFI	Financial services, nec	Financial services, nec	28
53	ISR	Insurance	Other private services	29
54	OBS	Business services, nec	Other private services	29
55	ROS	Recreational and other services	Other private services	29

Table 4A.1   (continued)

Number	Code	Sector in GTAP	Name of the aggregated sector	Number
56	OSG	Public Administration, Defense, Education, Health	Government Services	30
57	DWE	Dwellings	Government Services	30

Note: nec = not elsewhere classified.

Source: Original GTAP database is from Narayanan et al. (2012).

APPENDIX 4A.2　AGGREGATION SCHEME OF REGION AND SECTORS

Table 4A.2　Economies and regions in GTAP 8 database and regional aggregation

Number	Original region	Aggregated region
1	Australia	Australia & New Zealand
2	New Zealand	Australia & New Zealand
3	Rest of Oceania	Rest of World
4	People's Republic of China	People's Republic of China
5	Hong Kong, China	Rest of World
6	Japan	Japan
7	Republic of Korea	Republic of Korea
8	Mongolia	Rest of World
9	Taipei,China	Rest of World
10	Rest of East Asia	Rest of World
11	Cambodia	Rest of ASEAN
12	Indonesia	Indonesia
13	Lao People's Democratic Republic	Rest of ASEAN
14	Malaysia	Malaysia
15	Philippines	Philippines
16	Singapore	Singapore
17	Thailand	Thailand
18	Viet Nam	Viet Nam
19	Rest of Southeast Asia	Rest of ASEAN
20	Bangladesh	Rest of World
21	India	India
22	Nepal	Rest of World
23	Pakistan	Rest of World
24	Sri Lanka	Rest of World
25	Rest of South Asia	Rest of World
26	Canada	Rest of OECD
27	United States of America	Rest of OECD
28	Mexico	Rest of OECD
29	Rest of North America	Rest of World
30	Argentina	Rest of World
31	Plurinational Republic of Bolivia	Rest of World
32	Brazil	Rest of World
33	Chile	Rest of OECD
34	Colombia	Rest of World
35	Ecuador	Rest of World
36	Paraguay	Rest of World
37	Peru	Rest of World
38	Uruguay	Rest of World

Table 4A.2   (continued)

Number	Original region	Aggregated region
39	Venezuela	Rest of World
40	Rest of South America	Rest of World
41	Costa Rica	Rest of World
42	Guatemala	Rest of World
43	Honduras	Rest of World
44	Nicaragua	Rest of World
45	Panama	Rest of World
46	El Salvador	Rest of World
47	Rest of Central America	Rest of World
48	Caribbean	Rest of World
49	Austria	Rest of OECD
50	Belgium	Rest of OECD
51	Cyprus	Rest of World
52	Czech Republic	Rest of OECD
53	Denmark	Rest of OECD
54	Estonia	Rest of OECD
55	Finland	Rest of OECD
56	France	Rest of OECD
57	Germany	Rest of OECD
58	Greece	Rest of OECD
59	Hungary	Rest of OECD
60	Ireland	Rest of OECD
61	Italy	Rest of OECD
62	Latvia	Rest of World
63	Lithuania	Rest of World
64	Luxembourg	Rest of OECD
65	Malta	Rest of World
66	Netherlands	Rest of OECD
67	Poland	Rest of OECD
68	Portugal	Rest of OECD
69	Slovakia	Rest of OECD
70	Slovenia	Rest of OECD
71	Spain	Rest of OECD
72	Sweden	Rest of OECD
73	United Kingdom	Rest of OECD
74	Switzerland	Rest of OECD
75	Norway	Rest of OECD
76	Rest of EFTA	Rest of World
77	Albania	Rest of World
78	Bulgaria	Rest of World
79	Belarus	Rest of World
80	Croatia	Rest of World

Table 4A.2   (continued)

Number	Original region	Aggregated region
81	Romania	Rest of World
82	Russian Federation	Rest of World
83	Ukraine	Rest of World
84	Rest of Eastern Europe	Rest of World
85	Rest of Europe	Rest of World
86	Kazakhstan	Rest of World
87	Kyrgyz Republic	Rest of World
88	Rest of Former Soviet Union	Rest of World
89	Armenia	Rest of World
90	Azerbaijan	Rest of World
91	Georgia	Rest of World
92	Bahrain	Rest of World
93	Islamic Republic of Iran	Rest of World
94	Israel	Rest of World
95	Kuwait	Rest of World
96	Oman	Rest of World
97	Qatar	Rest of World
98	Saudi Arabia	Rest of World
99	Turkey	Rest of OECD
100	United Arab Emirates	Rest of World
101	Rest of Western Asia	Rest of World
102	Egypt	Rest of World
103	Morocco	Rest of World
104	Tunisia	Rest of World
105	Rest of North Africa	Rest of World
106	Cameroon	Rest of World
107	Côte d'Ivoire	Rest of World
108	Ghana	Rest of World
109	Nigeria	Rest of World
110	Senegal	Rest of World
111	Rest of Western Africa	Rest of World
112	Central Africa	Rest of World
113	South Central Africa	Rest of World
114	Ethiopia	Rest of World
115	Kenya	Rest of World
116	Madagascar	Rest of World
117	Malawi	Rest of World
118	Mauritius	Rest of World
119	Mozambique	Rest of World
120	United Republic of Tanzania	Rest of World
121	Uganda	Rest of World
122	Zambia	Rest of World

Table 4A.2   (continued)

Number	Original region	Aggregated region
123	Zimbabwe	Rest of World
124	Rest of Eastern Africa	Rest of World
125	Botswana	Rest of World
126	Namibia	Rest of World
127	South Africa	Rest of World
128	Rest of South African Customs Union	Rest of World
129	Rest of World	Rest of World

Note: ASEAN = Association of Southeast Asian Nations, OECD = Organisation for Economic Co-operation and Development, EFTA = European Free Trade Association.

Source: Original GTAP database is from Narayanan et al. (2012)

APPENDIX 4A.3   IMPACT OF SERVICE TRADE LIBERALIZATION TO LABOR SECTOR

Table 4A.3   Scenario 1: ASEAN—tariff reductions of selected service sectors within ASEAN (%)

	Semi-skilled Labor	Skilled Labor
1. Malaysia	0.173	0.2348
2. Indonesia	0.0963	0.0822
3. Thailand	0.4395	0.4117
4. Viet Nam	0.2065	0.1813
5. Singapore	0.2928	0.4261
6. Philippines	0.0978	0.1332
7. Rest of ASEAN	0.2089	0.4318

Table 4A.4   Scenario 2: ASEAN+3—tariff reductions of selected service sectors within ASEAN and between ASEAN and the PRC-Japan-Republic of Korea (%)

	Semi-skilled Labor	Skilled Labor
1. Malaysia	0.3184	0.3421
2. Indonesia	0.2044	0.1598
3. Thailand	0.935	0.7803
4. Viet Nam	0.3742	0.1828
5. Singapore	0.309	0.9171
6. Philippines	0.1495	0.1586
7. Rest of ASEAN	0.2246	0.3869

Table 4A.5   Scenario 3: ASEAN+Republic of Korea—tariff reductions of selected service sectors between ASEAN and the Republic of Korea (%)

	Semi-skilled Labor	Skilled Labor
1. Malaysia	0.209	0.521
2. Indonesia	0.410	0.611
3. Thailand	0.382	0.742
4. Viet Nam	0.109	0.420
5. Singapore	0.311	0.829
6. Philippines	0.519	0.721
7. Rest of ASEAN	0.360	0.431

Table 4A.6   *Scenario 4: ASEAN + Japan—tariff reductions of selected service sectors between ASEAN and Japan (%)*

	Semi-skilled Labor	Skilled Labor
1. Malaysia	0.212	0.712
2. Indonesia	0.344	0.672
3. Thailand	0.609	0.621
4. Viet Nam	0.441	0.782
5. Singapore	0.311	0.733
6. Philippines	0.572	0.809
7. Rest of ASEAN	0.107	0.209

Table 4A.7   *Scenario 5: ASEAN + the People's Republic of China (PRC)—tariff reductions of selected service sectors between ASEAN and the PRC (%)*

	Semi-skilled Labor	Skilled Labor
1. Malaysia	0.176	0.651
2. Indonesia	0.672	0.812
3. Thailand	0.565	0.721
4. Viet Nam	0.334	0.503
5. Singapore	0.140	0.973
6. Philippines	0.292	0.422
7. Rest of ASEAN	0.120	0.186

Table 4A.8   *Scenario 6: ASEAN+India—tariff reductions of selected service sectors between ASEAN and India (%)*

	Semi-skilled Labor	Skilled Labor
1. Malaysia	0.21	0.2421
2. Indonesia	0.344	0.253
3. Thailand	0.435	0.5803
4. Viet Nam	0.1742	0.2828
5. Singapore	0.209	0.7243
6. Philippines	0.2495	0.2586
7. Rest of ASEAN	0.3246	0.1869

5. Employment effects of removal of restrictions on the movement of natural persons in the ASEAN banking sector

Huong Dinh*

1. INTRODUCTION

The Association of Southeast Asian Nations (ASEAN) Economic Community (AEC) envisions a single market and production base of more than 625 million people. It would be the third largest economy in Asia and the seventh largest worldwide. Despite clear aspirations of "a free flow of skilled labor" (Papademetriou et al. 2015; Almekinders et al. 2015), progress has been slow and uneven. To accelerate this process, understanding current barriers to skilled labor mobility and gathering evidence of the benefits of freer movement of professionals within ASEAN is essential.

The banking sector is a good case study. Banking remains the most important channel for providing credit in ASEAN. On aggregate, it accounted for 82% of total financial system assets within ASEAN in 2009 (ADB 2013) and provides mostly national capital flows to all economic sectors. Over the past two decades, ASEAN members have made significant trade reforms in the banking sector to promote greater market access and provide operational flexibility—via both domestic reform and regional and global trade integration. These include the World Trade Organization (WTO) General Agreement on Trade in Services (GATS) commitments, the ASEAN Banking Integration Framework, the AEC Blueprint, and the ASEAN Agreement on the Movement of Natural Persons.[1]

According to the AEC Blueprint, several ASEAN countries (especially Cambodia, the Lao People's Democratic Republic, and Viet Nam) committed to removing restrictions on banking services by 2015.[2] However, restrictions on labor mobility in banking remain significant. As a skilled-labor intensive sector, banks would benefit from the freer movement of professionals. Increased skills mobility can mitigate the mismatch between supply

and demand for labor. It also reduces the costs of providing skilled labor, thereby encouraging banking sector expansion. Banks have linkages with all other industries—especially export-oriented industries—so expanding the banking sector should have non-trivial flow-on effects from both supply and demand perspectives. On the supply side, banking sector growth would lead to a reduction in the price of financial services, reducing production costs for any industries using financial services as inputs, thereby expanding their supply. On the demand side, growth would raise banking demand for other sectors' products, thus encouraging industrial expansion as well.

This chapter evaluates the economy-wide output and employment effects of removing restrictions on the movement of natural persons in ASEAN's banking sector—a key step in freeing skilled labor. We examine how skilled labor mobility in banking would change employment across ASEAN industries in total employment and employment structure in two settings: (i) when both unskilled and skilled labor rarely shift from one industry to another; and (ii) when only unskilled labor is slow to shift. These simulations enable us to see how labor mobility impacts output and employment. Although banking trade reform here is applied only to skilled labor for foreign direct investment (FDI) financial services providers, its effects are transmitted through price markups and productivity gains (as shown in Section 3), which in turn impact production and the demand for inputs—including unskilled and skilled labor. In the simulations, we assume *variable* labor supply for two reasons. First, a significant proportion of ASEAN's labor force is informal, and thus not captured in input–output tables—though from time to time labor transfers from informal to formal markets. The second reason is that ASEAN's population is generally young and growing, thus increasing labor supply.

Section 2 reviews current regulatory barriers to trade in banking services—including restrictions on the movement of natural persons in ASEAN. Section 3 describes the first-round (direct) impact of trade barriers in banking services on bank performance—both conceptually and empirically. Section 4 outlines the methodology for measuring economy-wide effects of removing restrictions on people mobility. Details of the data for simulation are described in Section 5. The results of the simulations are discussed in Section 6, while Section 7 concludes.

2. CURRENT RESTRICTIONS LIMITING BANKING SECTOR GROWTH

Despite efforts to better integrate the banking sector, ASEAN bank penetration in the region is slow (Yamanaka 2013). One of the main causes

is barriers to trade in the banking sector—regulations against the entry and operation of ASEAN banks in other member economies (Yamanaka 2013). Based on Dee and Dinh (2009), this section discusses the restrictions on intra-ASEAN banking services.

Following the framework for assessing barriers to trade in banking services developed by McGuire and Schuele (2000), Dinh (2008) and the World Bank (undated), Dee and Dinh (2009) upgraded a questionnaire that evaluates non-prudential regulations restricting ASEAN's banking services—as delivered through the four modes of supply: (i) cross-border; (ii) movement of consumers; (iii) commercial presence; and (iv) movement of individual bank personnel, particularly intra-corporate transferees. Questionnaire responses as supplied by relevant country researchers are quantified from 0 (lowest) to 1 (highest) in terms of restriction severity for each type of regulation. The scores are then aggregated to produce summary trade restrictiveness indexes (TRIs) using the weights produced in Dinh's (2008) study. This is based on the understanding that prudential regulation has a legitimate regulatory purpose and is not the target of an AEC Blueprint liberalization initiative (which is not to say that prudential regulations could not be improved in ASEAN countries).

Figure 5.1 shows the variation in restrictions affecting banking services across ASEAN countries. Except for Singapore, Malaysia, and Indonesia,
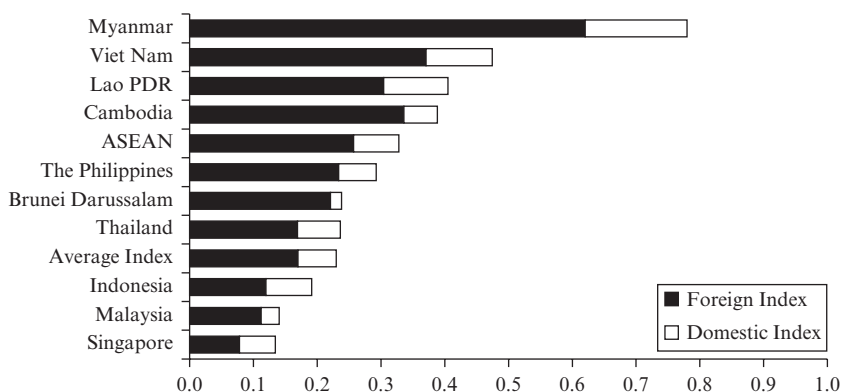
Notes:
ASEAN = Association of Southeast Asian Nations; Lao PDR = Lao People's Democratic Republic.
"0" indicates no restriction; "1" indicates total restriction.

Source: Dee and Dinh (2009).

Figure 5.1   Level of restrictions on banking services

all ASEAN countries have TRIs over 0.20. The ASEAN TRI average is 0.33—0.1, which is above the 2006 average of 36 countries as calculated in Dinh (2008). The two least restrictive countries are Singapore and Malaysia, with TRIs just above 0.1. Figure 5.1 also indicates that Myanmar and Viet Nam are the two most restrictive countries, with TRIs averaging more than 4.5 times those of Singapore and Malaysia.

Figures 5.2 and 5.3 present the prevalence of restrictions affecting FDI and domestic banks. Cross-border banking services are restricted in most ASEAN countries, while those supplied through consumer movement are limited in just a few countries. The figures indicate that broader banking services are also generally limited. Limits on operation expansion and ownership of non-financial firms are relatively common.

Figure 5.2 suggests that restrictions on the movement of people in providing services are high. At least 70% of ASEAN countries have nationality and residency requirements for the Board of Directors, restricting their stay in the host country. For example, Brunei Darussalam requires at least half of the Board of Directors of a foreign-owned bank to be nationals. In Cambodia, up to 10% of employees can be foreigners if the entity has more than ten employees. In Viet Nam, nationals must make up at least 20% of the Board of Directors.

3. FIRST-ROUND IMPACT OF RESTRICTIONS ON THE BANKING SECTOR

This section provides a conceptual framework for measuring first-round (direct) impacts of restrictions on the banking sector—which can be cost-escalating and/or rent-creating. We also present empirical estimates of the impacts.

3.1   Cost-Escalating Impacts

Barriers to trade in banking services can increase banks' real resource costs (Llewellyn 1986; Gowland 1990; Benston and Kaufman 1996). The key to this problem is that regulations can act as barriers, limiting competition between service providers and preventing economies of scale and scope. This can discourage service providers from operating at their lowest possible costs (Warren and Findlay 2000; Dinh 2013; Dee and Dinh 2008). The supply curve shifts upward, increasing the unit cost of service and creating a wedge between costs "with" and "without" restrictions.

Figure 5.4 shows the banking market before and after the imposition of cost-escalating restrictions. Without restrictions, the banking market
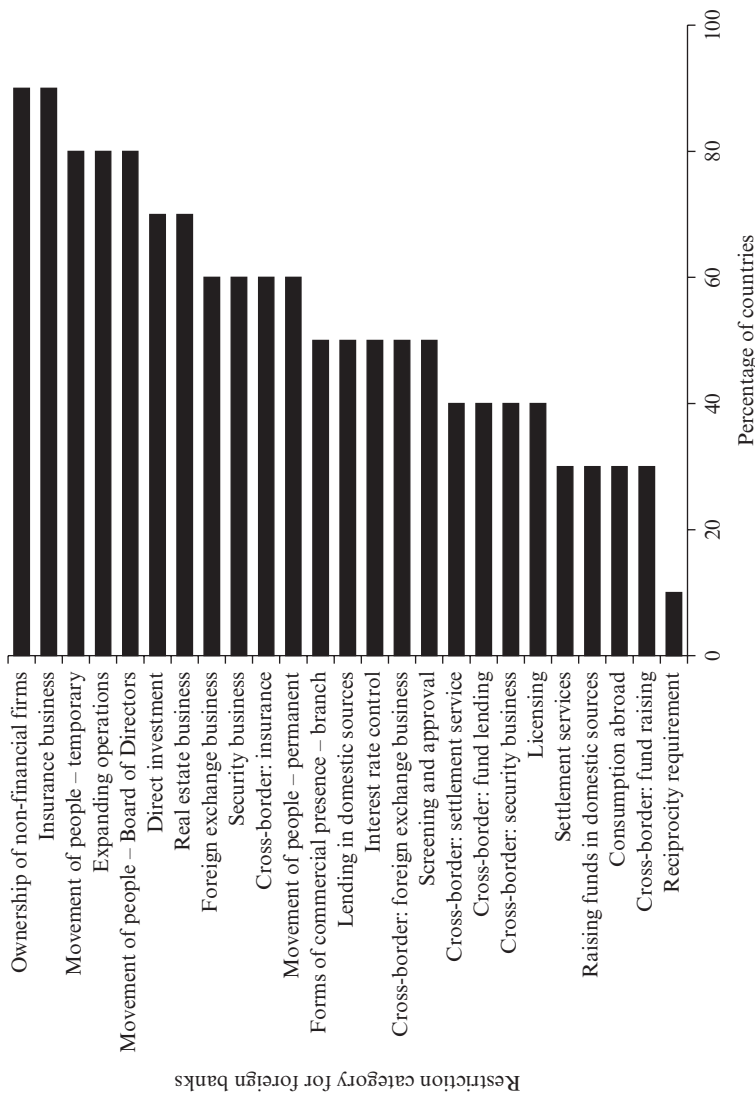
Source: Dee and Dinh (2009).

Figure 5.2 Share of ASEAN countries restricting FDI banking, by restriction category
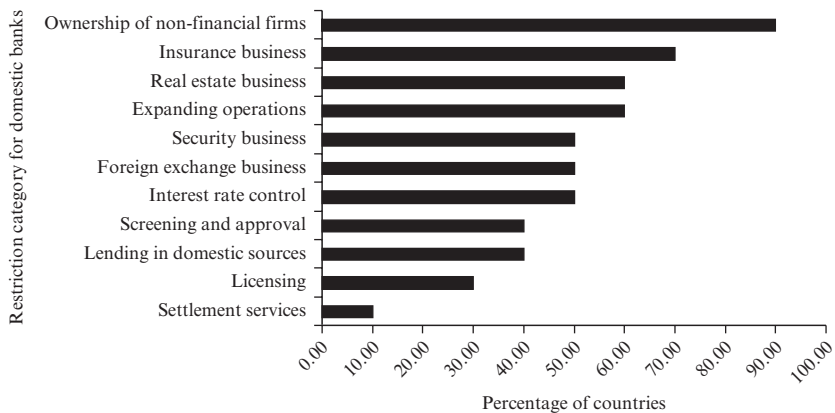
Source: Dee and Dinh (2009).

Figure 5.3 *Share of ASEAN countries restricting domestic banks, by restriction category*
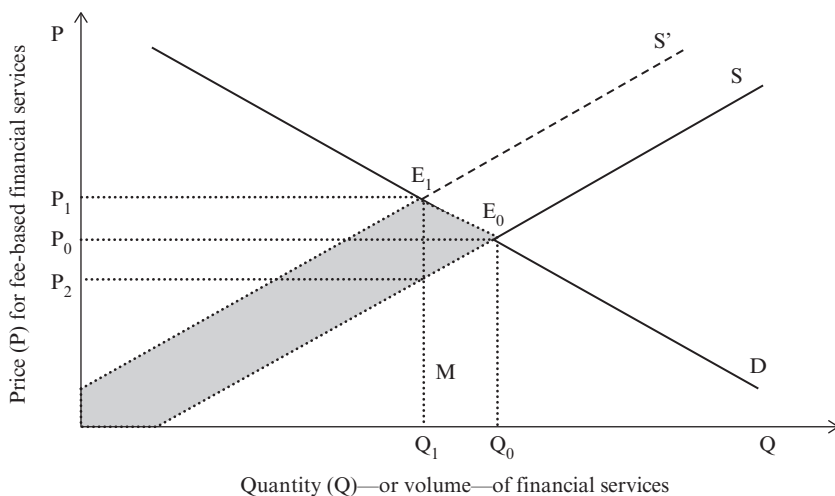
Note: S = supply; D = demand; E_0 = Equilibrium without trade barriers; E_1 = Equilibrium with trade barriers; M = the point to identify the supply price at quantity Q_1 when there are no trade barriers.

Source: Dinh (2011).

Figure 5.4 *Cost-escalating effects of trade barriers in banking services*

is in equilibrium at E_0 with price P_0 and output Q_0. With cost-escalating restrictions, banks need to use more real resources for the same output, shifting the supply curve upward, which increases the price to P_1 and reduces output to Q_1. The cost-escalating effects create a deadweight loss to society—represented by the shaded area. This loss occurs to both producers and consumers. The producer loss comes from both increased real resource costs and reduced output, whereas the consumer loss results from both increased price and reduced consumption quantity. Interestingly, in this case, there is a rise in price, but banks gain no price markup or economic rents.

3.2 Rent-Creating Impacts

Non-prudential regulations can also create rents for banks. They may serve the interests of the regulated banks rather than their customers (Llewellyn 1986, 1999; Benston and Kaufman 1996). This is because some restrictions may create more market power for incumbent banks, enabling them to inflate the price of financial services while real resource costs remain unchanged. As a result, banks receive higher price markups—economic rent. This rent is akin to a tax on consumers, which makes the supply curve shift upward, but the revenue flows to the incumbent banks rather than to the government (Dee 2005). A typical example would be an interest rate ceiling that creates an artificial scarcity of credit, encouraging banks to charge borrowers extra fees in addition to interest rates, thereby creating a rent for banks.

Figure 5.5 shows the banking market before and after the imposition of rent-creating barriers. Without restrictions, the banking market is in equilibrium at E_0 with price P_0 and output Q_0. With rent-creating restrictions, banks can charge their customers a higher price at every output level, despite no change in real resource costs. This is also equivalent to an upward shift in the supply curve, resulting in new equilibrium E_1. At the new equilibrium, the price rises to P_1 and output falls to Q_1. The rent-creating measures create a deadweight loss to society as represented by the shaded triangular area. The loss also consists of consumer and producer losses. The consumer loss results from both the increased price and reduced consumption quantity, while the producer loss comes only from the reduced output. In this case, the banks gain the entire price markup (P_1-P_2)—or economic rent.

3.3 Empirical Results

Dinh (2013) examines whether barriers to trade in banking services create rents and/or raise real costs. The study uses panel accounting
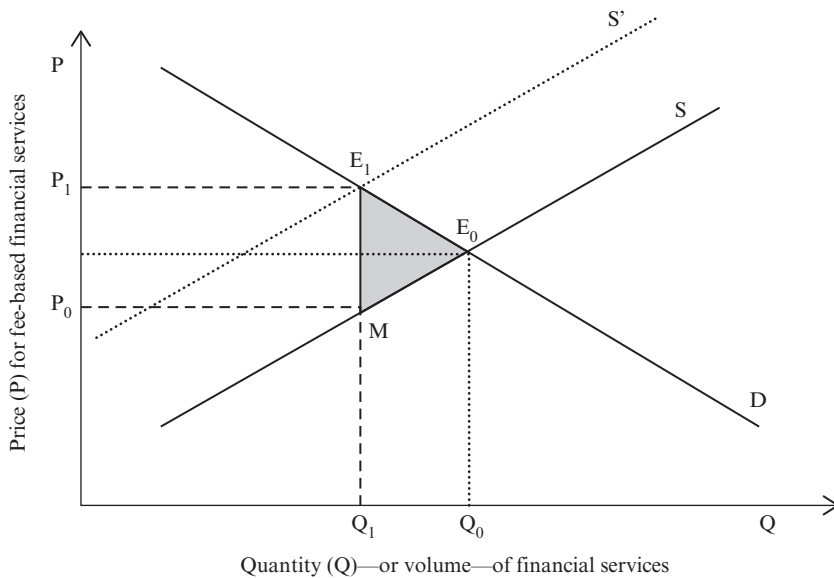
Note: S = supply; D = demand; E_0 = Equilibrium without trade barriers; E_1 = Equilibrium with trade barriers; M = the point to identify the supply price at quantity Q_1 when there are no trade barriers.

Source: Dinh (2011).

Figure 5.5 Rent-creating impact of trade barriers in banking services

data of 7,314 commercial banks in 28 countries over 1997–2006 from Bankscope (produced by Fitch IBCA), and restrictiveness indexes in banking services constructed by Dinh (2008). Dinh adopts the Symmetric McFadden function forms for unit cost and unit profit as the key outcome variables—as this functional form is flexible, parsimonious, and regular. Dinh also applies the fixed-effect regression models with treatment of serial correlation. The Dinh (2013) results show that restrictions on bank establishment and operation—such as licensing requirements, government ownership, and restrictions on the movement of natural persons—are statistically positive determinants of both cost and profit at the 1% level of significance. In other words, restrictions on establishment and operation are both cost-escalating and rent-creating. Specifically, a 1 percentage point increase in the trade restrictiveness index on establishment and operation is estimated to raise total costs by 1.9% and improve profits by 4.8%.

4. METHODOLOGY OF MEASURING ECONOMY-WIDE IMPACTS OF REMOVING RESTRICTIONS ON THE MOVEMENT OF NATURAL PERSONS

The methodology involves taking the following steps:

1. *Calculating banking services trade-restrictiveness indexes.* Calculating these indexes for ASEAN and the rest of the word are conducted under (i) current policy settings and (ii) after removing restrictions on the movement of natural persons in the banking sector. It uses the template for measuring trade barriers in banking services and weights (the relative importance of each restriction) produced in Dee and Dinh (2009), Dinh (2011), and Dinh (2013). The current trade regime provides the baseline scenario, while the removal of restrictions on the movement of natural persons gives the counterfactual simulation policy change. Removing restrictions on the movement of natural persons is important to the banking industry as it is skilled-labor intensive.

2. *Calculating productivity and tax equivalents.* This calculation is a crucial step in estimating first-round effects of banking services trade barriers before and after removal of restrictions on the movement of natural persons—using the regression results produced in Dinh (2013). The *productivity equivalent* is measured as the percentage change in total cost of bank operations due to cost-escalating barriers to trade in banking services, compared with a scenario with no barriers. The *tax equivalent* is the percentage change in price markup caused by rent-creating barriers. As found in Dinh (2013), barriers to bank establishment and operation are associated with both higher costs and profits, so are modelled as productivity and tax equivalents.

3. *Applying the FTAP model.* As in Dinh (2012), we use the FTAP model—a comparative static, computable general equilibrium model of the world economy developed in stages from the Global Trade Analysis Project (GTAP) model—to measure the long-term economy-wide employment impact of trade reform in the ASEAN banking sector. Hanslow et al. (2000) highlight some key improvements in FTAP compared with GTAP. FTAP includes a treatment of FDI, thus allowing differentiation of the impacts of liberalizing restrictions on domestic banks from those on foreign ones. The FTAP model features firm-level product differentiation with large-group monopolistic competition and increasing returns to scale. It also allows for capital accumulation and international borrowing and lending (for more details, see the Appendix 5A.1: the FTAP model). As employment is the focus of this chapter, we allow labor supply in the economy

to change—rather than fixing labor supply, as in the few studies on economy-wide impacts of liberalizing services trade (e.g., Dinh 2012; Verikios and Zhang 2000). The FTAP model is applied as follows.

4.1 Model Database Preparation

This chapter uses data mainly from the GTAP 7 Data Base. This dataset provides individual country input–output tables as well as detailed data on bilateral trade, transport, and merchandise trade protection for 113 regions and 57 sectors in 2004 (Narayanan and Walmsley 2008).[3] The country input–output tables account for the inter-sectoral linkages within regions, while the other data included show economic linkages between regions. For research purposes and given limited data of sector-specific foreign ownership shares in ASEAN, the GTAP 7 database is aggregated into two regions (ASEAN and the Rest of the World) and 32 sectors (for more details see Appendix Table 5A.1). This baseline data retains restrictions on the movement of natural persons in the ASEAN banking industry. This baseline data will be compared with simulated data to see what impact the policy change has.

The GTAP database aggregates banks with other financial intermediaries, so we treat banking services as universal to the entire financial sector. Given the dominance of banks in ASEAN's financial sector, we expect the results will be reliable.

4.2 Injection of Current Barriers Estimates

As the GTAP model does not reflect prevailing trade barriers in banking services, we inject the tax equivalent of ASEAN and Rest of the World banking sectors into the model. The tax equivalent is injected into the model as an implicit output tax—the rents from this tax shock flow to the banking sector rather than to the government. For foreign invested firms, a part of this rent is modelled to be taxed before repatriation. The productivity equivalent does not need to be injected into the model at this stage as it is inherent in bank cost structures.

4.3 Simulation

The final step is to simulate the effects of removing all restrictions on the movement of natural persons—the mobility of skilled labor across countries in the region. This trade reform is modelled as a reduction in output tax and a gain in technical change in FDI financial institutions as it is applied only to this service provider group. The simulation is conducted in

two macroeconomic settings: (i) restricted labor mobility (both unskilled and skilled labor) across industries within a country; and (ii) unrestricted skilled labor mobility across industries within a country. In both settings, capital is assumed to be imperfectly mobile between industries within the region and between regions. The model allows for capital accumulation and international borrowing and lending.

5.   DATA USED FOR SIMULATION

5.1   Trade Restrictiveness Indexes

Table 5.1 presents the key data for simulation as generated using the methodology described above. They include trade restrictiveness indexes (TRIs) for establishment and operation for domestic banks and FDI banks in ASEAN before and after each trade reform. The table also shows the corresponding productivity and tax equivalents.

5.2   Employment Structure before Simulation

Table 5.2 shows the employment payment structure by industry and sector in ASEAN (before simulation) using the GTAP 7 Data Base. In 2004, all 32 aggregated industries paid employees $287 billion—74% for unskilled

Table 5.1   Key data for simulation

Item	Before		After		Change	
	FDI banks	Domestic banks	FDI banks	Domestic banks	FDI banks	Domestic banks
TRI (0 = No restriction, 1 = Highest restriction)	0.26	0.08	0.20	0.08	−0.02	0.00
Productivity equivalent (% change)	48.80	14.43	44.87	14.43	−3.92	0.00
Tax equivalent (% change)	20.76	7.98	19.61	7.98	−1.15	0.00

Note: FDI = foreign direct investment; TRI = trade restrictiveness index; Productivity equivalent = percentage change in productivity due to higher costs from trade barriers; Tax equivalent = percentage change in price markup from trade barriers—similar to a tax, but with revenue flowing to banks rather than government.

Source: Author's calculation.

labor. Among sectors, services contributed most (54.7%), followed by manufacturing (32.8%) and agriculture and mining (12.5%). Services also accounted for most in skilled labor (75%). Domestic firms made up 83% of employee payments, although they comprised 65% of capital costs. Financial services accounted for 3.2% of employee payments, or 6% of the service sector total.

5.3   Linkages between Financial Services and Other Industries

As shown in Table 5.3, financial services are inputs for all industries. Its share in others' total costs ranges from 0.3% to 12.7%. The five industries with the highest share of financial services as inputs are coal, oil and gas mining (12.7%); trade (11.3%); insurance (9.6%); other businesses (9.6%); and communication (9.4%). The five industries using financial services least are petroleum and coal products (0.3%); wearing apparel (1.6%); iron, steel and non-ferrous metals (1.6%); leather products (1.6%); and recreational and other services (1.8%).

The five largest customers of the financial industry (measured by share of financial industry output) are trade (16.5%); other businesses (7.5%); electronic equipment (7.2%); chemical, rubber, plastic products (6.3%); and food and beverages and tobacco manufacture (4.6%). The five customers accounting for the least (less than 0.5% of total industry output) are water; other mining; forestry; petroleum, coal products; and leather products.

6.   RESULTS AND DISCUSSION

This section first discusses how trade reform would impact industry output under two different macroeconomic settings—restricted skilled and unskilled labor mobility, and unrestricted skilled labor mobility. It then examines changes in (i) industry output prices, (ii) factor prices, (iii) industry employment, and (iv) allocation of increased employment.

6.1   Projected Output Changes

Trade reform leads to increased output in both domestic and foreign-invested firms in all industries except financial services, where the expansion is only observed in foreign banks (Table 5.4). Foreign-invested institutions increase output most, while domestic counterparts stall (when both labor types are restricted) or contract (when at least one type increases labor mobility). Specifically, when both types of labor are restricted, output growth in domestic and foreign financial institutions are

Table 5.2   ASEAN employment payment structure, 2004 ($ million)

Industry/Sector	Domestic firms				FDI firms	
	Unskilled	Skilled	Total	Share of total sector employees (%)	Unskilled	Skilled
Agriculture and mining	*33,764*	*1,118*	*34,882*	*97.0*	*849*	*248*
Agriculture	27,077	155	27,232	100.0	0	0
Forestry	2,880	25	2,905	100.0	0	0
Coal, oil, gas mining	2,635	573	3,208	93.6	179	39
Other mining	1,172	365	1,537	63.7	669	209
Manufacturing	*66,972*	*15,791*	*82,763*	*87.9*	*9,033*	*2,401*
Food and beverages and tobacco manufacture	11,103	1,781	12,884	90.1	1,215	195
Textiles	4,079	701	4,780	98.6	60	10
Wearing apparel	2,786	414	3,200	98.8	35	5
Leather products	1,784	304	2,087	96.9	56	10
Wood products	3,351	459	3,810	96.8	110	15
Paper products, publishing	1,938	592	2,530	83.6	380	116
Petroleum, coal products	607	170	777	86.8	92	26
Chemical, rubber, plastic products	9,067	2,831	11,898	79.3	2,361	737
Mineral products nec	2,156	506	2,663	91.0	213	50
Iron, steel, and non-ferrous metals	1,924	459	2,383	95.0	101	24
Fabricated metal products	2,000	532	2,532	93.2	147	39
Motor vehicles and parts	1,735	404	2,140	57.3	1,291	301
Transport equipment nec	2,155	645	2,800	92.4	177	53
Electronic equipment	15,315	4,221	19,536	96.7	521	143
Machinery and equipment nec	4,246	1,361	5,606	68.4	1,965	630
Manufactures nec	2,724	413	3,137	89.7	311	47
Services	*74,684*	*47,188*	*121,872*	*77.5*	*27,471*	*7,961*
Electricity and gas production and distribution	2,763	1,585	4,347	98.0	57	33
Water	206	119	325	99.3	1	1
Construction	12,760	2,654	15,414	96.2	506	105
Trade	11,374	2,063	13,437	35.5	20,661	3,747
Air, land transport	9,365	2,459	11,825	98.3	163	43
Water transport	1,605	474	2,079	97.7	38	11

		ASEAN Total					
Total	Share of total sector employees (%)	Unskilled	Share of total sector employees (%)	Skilled	Share of total sector employees (%)	Total emp.	% of total emp.
1,097	*3.0*	*34,613*	*96.2*	*1,366*	*3.8*	*35,979*	*12.5*
0	0.0	27,077	99.4	155	0.6	27,233	9.5
0	0.0	2,880	99.1	25	0.9	2,905	1.0
218	6.4	2,814	82.1	612	17.9	3,426	1.2
878	36.3	1,841	76.2	574	23.8	2,415	0.8
11,434	*12.1*	*76,005*	*80.7*	*18,192*	*19.3*	*94,197*	*32.8*
1,410	9.9	12,318	86.2	1,976	13.8	14,294	5.0
70	1.4	4,139	85.3	711	14.7	4,850	1.7
40	1.2	2,821	87.1	419	12.9	3,240	1.1
66	3.1	1,840	85.4	313	14.6	2,153	0.7
125	3.2	3,461	88.0	474	12.0	3,935	1.4
497	16.4	2,318	76.6	708	23.4	3,026	1.1
118	13.2	699	78.1	196	21.9	894	0.3
3,098	20.7	11,428	76.2	3,568	23.8	14,996	5.2
263	9.0	2,369	81.0	556	19.0	2,925	1.0
125	5.0	2,025	80.7	483	19.3	2,508	0.9
186	6.8	2,147	79.0	571	21.0	2,718	0.9
1,591	42.7	3,026	81.1	705	18.9	3,731	1.3
229	7.6	2,332	77.0	697	23.0	3,029	1.1
664	3.3	15,836	78.4	4,364	21.6	20,200	7.0
2,595	31.6	6,211	75.7	1,991	24.3	8,202	2.9
359	10.3	3,036	86.8	460	13.2	3,495	1.2
35,431	*22.5*	*102,155*	*64.9*	*55,149*	*35.1*	*157,304*	*54.7*
90	2.0	2,820	63.5	1,618	36.5	4,437	1.5
2	0.7	208	63.4	120	36.6	327	0.1
611	3.8	13,266	82.8	2,759	17.2	16,025	5.6
24,409	64.5	32,035	84.6	5,810	15.4	37,846	13.2
206	1.7	9,528	79.2	2,502	20.8	12,031	4.2
49	2.3	1,643	77.2	485	22.8	2,128	0.7

Table 5.2   (continued)

Industry/Sector	Domestic firms				FDI firms	
	Unskilled	Skilled	Total	Share of total sector employees (%)	Unskilled	Skilled
Communication	1,792	1,193	2,985	89.5	211	140
Financial services nec	3,469	2,374	5,843	63.5	1,997	1,367
Insurance	314	209	523	25.7	908	604
Other business services	6,260	3,988	10,248	68.7	2,854	1,818
Recreational and other services	4,996	2,995	7,991	99.7	14	8
Public administration and defense, education, health	19,779	27,076	46,856	99.7	61	83
Total	175,420	64,098	239,518	83.3	37,353	10,609

Note: ASEAN = Association of Southeast Asian Nations; nec = not elsewhere classified.

Source: Author's calculation from GTAP 7 Data Base.

−0.003% and 5.66%, respectively. When only unskilled labor is restricted, the corresponding figures are −0.77% and 8.4%.

This result can be explained by the fact that trade reform in foreign-invested financial institutions reduces output tax and creates productivity gains in these firms. A decline in output tax on foreign-invested financial services reduces their supply price, which is equivalent to the expansion in supply. A productivity gain leads to reduced production costs, which also raises supply. Both shocks expand FDI financial institution output and thus reduce their market price, making their services less costly than domestic counterparts. Financial services from FDI institutions thus substitute those from domestic firms, creating a crowding-out effect (an expansion of FDI institutions comes at the expense of their counterparts). The expansion of FDI institutions raises their demand for labor. When labor mobility is restricted, any increased demand for labor must be met by an increase in labor supply. If labor can move freely, at least part of the increased demand can be filled by attracting labor from domestic institutions—which further increases the crowding-out effects on domestic counterparts.

Expanding FDI financial firms also triggers an expansion of other industries through spill-over effects. As shown in Table 5.3, the financial industry uses the output of all other sectors as inputs—and all industries use financial services as an input in production. The expansion of other

		ASEAN Total					
Total	Share of total sector employees (%)	Unskilled	Share of total sector employees (%)	Skilled	Share of total sector employees (%)	Total emp.	% of total emp.
351	10.5	2,003	60.0	1,333	40.0	3,336	1.2
3,364	36.5	5,466	59.4	3,741	40.6	9,207	3.2
1,513	74.3	1,222	60.0	813	40.0	2,035	0.7
4,672	31.3	9,114	61.1	5,806	38.9	14,920	5.2
22	0.3	5,010	62.5	3,003	37.5	8,013	2.8
143	0.3	19,840	42.2	27,159	57.8	46,999	16.3
47,962	16.7	212,773	74.0	73,341	26.0	287,480	100

industries thus occurs in two ways: (i) FDI financial firms will increase their demand for other industry outputs; and (ii) lower market prices for financial services will reduce production costs for industries using financial services as inputs. When both types of labor are restricted, the industry output growth ranges from 0.06% to 0.48%. The industries with the highest growth are public administration, defense and health; recreational and other services; and transport equipment not elsewhere classified (nec). The least growth occurs in coal, oil, gas mining. When only unskilled labor is restricted, the output growth ranges from 0.05% to 0.43%. Again, the most expansion is in public administration, defense and health; recreational and other services; and transport equipment nec. The least growth occurs in coal, oil, gas mining.

6.2   Projected Output Price Changes

In all settings, output prices in financial services decline most in both domestic and foreign-invested institutions (Table 5.5). The price fall of FDI institutions comes from their output expansion, while domestic counterpart prices fall from their contraction due to the crowding-out effect. When both unskilled and skilled labor types lack mobility between industries (and also countries) in the region, the price of financial services falls by 0.94% for domestic institutions and 1.49% for FDI counterparts. When only skilled labor can move, the reduction is even higher—1.09% and 1.96%, respectively.

*Table 5.3   Linkages between financial services and other industries in
ASEAN, 2004*

Industry/Sector	Share of financial services in production cost			Share of total financial service output		
	Domestic firms	FDI firms	All firms	Domestic firms	FDI firms	All firms
Agriculture and mining						
Agriculture	2.7	2.7	2.7	2.4	0.0	1.7
Forestry	5.1	5.1	5.1	0.3	0.0	0.2
Coal, oil, gas mining	12.7	12.7	12.7	2.9	0.5	2.3
Other mining	2.2	2.2	2.2	0.2	0.3	0.2
Manufacturing						
Food and beverages and tobacco manufacture	2.1	2.1	2.1	5.7	1.7	4.6
Textiles	2.4	2.4	2.4	2.2	0.1	1.6
Wearing apparel	1.6	1.6	1.6	1.0	0.0	0.7
Leather products	1.6	1.6	1.6	0.6	0.1	0.5
Wood products	5.0	5.0	5.0	2.3	0.2	1.7
Paper products, publishing	2.7	2.7	2.7	1.1	0.6	1.0
Petroleum, coal products	0.3	0.3	0.3	0.4	0.2	0.4
Chemical, rubber, plastic products	3.2	3.2	3.2	6.9	4.8	6.3
Mineral products nec	3.2	3.2	3.2	1.1	0.3	0.9
Iron, steel, and non-ferrous metals	1.6	1.6	1.6	1.1	0.2	0.8
Fabricated metal products	2.2	2.2	2.2	1.2	0.2	0.9
Motor vehicles and parts	2.3	2.3	2.3	1.0	2.0	1.3
Transport equipment nec	2.3	2.3	2.3	0.7	0.2	0.5
Electronic equipment	1.9	1.9	1.9	9.6	0.9	7.2
Machinery and equipment nec	2.1	2.1	2.1	2.4	3.1	2.6
Manufactures nec	3.4	3.4	3.4	2.1	0.7	1.7
Services						
Electricity and gas production and distribution	2.4	2.4	2.4	1.7	0.1	1.3
Water	3.5	3.5	3.5	0.1	0.0	0.1
Construction	2.6	2.6	2.6	4.6	0.5	3.5
Trade	11.3	11.3	11.3	8.0	39.4	16.5
Air, land transport	2.8	2.8	2.8	4.4	0.2	3.2
Water transport	2.6	2.6	2.6	1.6	0.1	1.2

Table 5.3   (continued)

Industry/Sector	Share of financial services in production cost			Share of total financial service output		
	Domestic firms	FDI firms	All firms	Domestic firms	FDI firms	All firms
Communication	9.4	9.4	9.4	1.2	0.4	0.9
Financial services nec	50.8	50.8	50.8	21.6	31.1	24.2
Insurance	9.6	9.6	9.6	0.4	3.5	1.3
Other business services	9.6	9.6	9.6	7.1	8.7	7.5
Recreational and other services	1.8	1.8	1.8	1.1	0.0	0.8
Public administration and defense, education, health	2.6	2.6	2.6	3.0	0.0	2.2

Note: ASEAN = Association of Southeast Asian Nations; FDI = foreign direct investment; nec = not elsewhere classified.

Source: GTAP 7 Data Base.

Trade reform also impacts the output prices of other industries through both the industry's supply and demand. As mentioned above, on the one hand, trade reform raises the demand for other industries' output, which in turn increases their market price. On the other hand, trade reform increases the industry's supply, which reduces the supply price. If the expansion in supply is big enough to outweigh the rise in demand, then the market price will fall, and vice versa. In our simulations, a fall in market price is observed in 20 industries (when movements in both labor types are restricted) and 21 industries (when only unskilled labor is restricted).

6.3   Projected Wage and Capital Price Changes

In all simulations, changes in factor prices are the same for domestic and FDI firms within each industry (except in financial services), as they share the same cost structure and are affected equally by trade reform. As discussed, in financial services, trade reform creates a crowding-out effect on domestic firms—price changes are expected to be different between domestic and FDI players when use of factor endowments is restricted.

The change in factor price is caused by two competing effects. The expansion raises the demand for endowments, thereby raising the factor price. With endogenous endowments (total variable labor supply and

Table 5.4   Change in industry output (%)

Industry/Sector	Restricted labor mobility		Unrestricted skilled labor mobility	
	Domestic firms	FDI firms	Domestic firms	FDI firms
Agriculture and mining				
Agriculture	0.17	0.17	0.18	0.18
Forestry	0.21	0.21	0.22	0.22
Coal, oil, gas mining	0.06	0.06	0.05	0.05
Other mining	0.19	0.19	0.16	0.16
Manufacturing				
Food and beverages and tobacco manufacture	0.21	0.21	0.22	0.21
Textiles	0.21	0.21	0.22	0.22
Wearing apparel	0.21	0.21	0.21	0.21
Leather products	0.21	0.21	0.21	0.21
Wood products	0.23	0.23	0.26	0.26
Paper products, publishing	0.21	0.21	0.21	0.21
Petroleum, coal products	0.17	0.17	0.19	0.18
Chemical, rubber, plastic products	0.23	0.23	0.25	0.25
Mineral products nec	0.21	0.21	0.21	0.20
Iron, steel, and non-ferrous metals	0.20	0.20	0.19	0.19
Fabricated metal products	0.24	0.24	0.25	0.25
Motor vehicles and parts	0.22	0.22	0.23	0.23
Transport equipment nec	0.26	0.26	0.25	0.25
Electronic equipment	0.20	0.20	0.21	0.21
Machinery and equipment nec	0.24	0.24	0.24	0.24
Manufactures nec	0.24	0.24	0.27	0.27
Services				
Electricity and gas production and distribution	0.21	0.21	0.24	0.24
Water	0.14	0.13	0.14	0.14
Construction	0.21	0.21	0.18	0.17
Trade	0.24	0.24	0.28	0.27
Air, land transport	0.21	0.21	0.21	0.21
Water transport	0.21	0.21	0.22	0.22
Communication	0.17	0.16	0.15	0.15
Financial services nec	*0.00*	*5.66*	*−0.77*	*8.40*
Insurance	0.24	0.24	0.29	0.29
Other business services	0.14	0.14	0.13	0.13
Recreational and other services	0.31	0.31	0.29	0.29
Public administration and defense, education, health	0.48	0.48	0.43	0.43

Table 5.4   (continued)

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accumulating capital in this case), excessive demand can be relaxed by a higher endowment supply in the long run, thereby reducing factor prices. When endowments move restrictedly from one industry to another, excessive demand for endowments can only be met by an increase in supply. If the expansion in total supply of endowments is big enough to outweigh the increase in demand, a fall in factor price would occur—or a rise otherwise. As a result, different changes in factor prices can be observed across industries. When endowments are mobile, excessive factor demand can also be met by attracting factors from other industries until the endowment market clears. Consequently, a uniform change in factor price can be observed across industries.

6.3.1   Restricted labor mobility (Table 5.6a)

When both types of labor are restricted and capital is less than perfectly mobile between industries, the price of these endowments changes differently across industries. Except in financial services, a fall in labor price occurs in ten industries (for unskilled labor) and 26 industries (for skilled labor). In domestic financial firms, wages fall 1.75% for unskilled labor and 1.94% for skilled labor—labor demand falls due to the drop in production. By contrast, in FDI counterparts, wages increase 8.76% for unskilled labor and 8.55% for skilled labor—as increased labor demand outweighs increased labor supply. Except in construction and domestic financial institutions, industries face higher prices for capital (ranging from 0.17% to 0.83%) as well as a higher relative price of capital to labor. By contrast, construction and domestic financial institutions see a fall in capital costs and lower relative price of capital to labor.

6.3.2   Unrestricted skilled labor mobility (Table 5.6b)

As unskilled labor mobility is restricted, price changes vary between industries. Except for financial services, nine other industries see lower capital costs. In financial services, the price of capital falls by 2.72% in domestic institutions, while it increases by 10.8% in FDI counterparts—their

Table 5.5   Change in market price of industry output (%)

Industry/Sector	Restricted labor mobility		Unrestricted skilled labor mobility	
	Domestic firms	FDI firms	Domestic firms	FDI firms
Agriculture and mining				
Agriculture	0.04	0.04	0.04	0.04
Forestry	−0.05	−0.05	−0.05	−0.05
Coal, oil, gas mining	0.03	0.03	0.03	0.03
Other mining	−0.01	−0.01	0.00	0.00
Manufacturing				
Food and beverages and tobacco manufacture	−0.01	−0.01	−0.01	−0.01
Textiles	−0.01	−0.01	−0.01	−0.01
Wearing apparel	−0.02	−0.02	−0.02	−0.02
Leather products	−0.03	−0.03	−0.02	−0.02
Wood products	−0.06	−0.06	−0.05	−0.05
Paper products, publishing	0.00	0.00	0.00	0.00
Petroleum, coal products	0.04	0.04	0.04	0.04
Chemical, rubber, plastic products	−0.02	−0.02	−0.02	−0.02
Mineral products nec	−0.02	−0.02	−0.02	−0.02
Iron, steel, and non-ferrous metals	0.00	0.00	−0.01	−0.01
Fabricated metal products	−0.01	−0.01	−0.02	−0.02
Motor vehicles and parts	0.00	0.00	−0.01	−0.01
Transport equipment nec	0.00	0.00	−0.01	−0.01
Electronic equipment	−0.05	−0.05	−0.03	−0.03
Machinery and equipment nec	−0.01	−0.01	−0.02	−0.02
Manufactures nec	−0.01	−0.01	−0.02	−0.02
Services				
Electricity and gas production and distribution	0.24	0.24	0.18	0.18
Water	0.17	0.17	0.19	0.19
Construction	−0.21	−0.21	−0.12	−0.12
Trade	0.03	0.03	0.01	0.01
Air, land transport	−0.01	−0.01	−0.01	−0.01
Water transport	−0.04	−0.04	−0.05	−0.05
Communication	0.04	0.04	0.05	0.05
Financial services nec	*−0.94*	*−1.49*	*−1.09*	*−1.96*
Insurance	0.02	0.02	0.00	0.00
Other business services	0.05	0.05	0.05	0.05
Recreational and other services	−0.01	−0.01	0.00	0.00
Public administration and defense, education, health	−0.06	−0.06	−0.03	−0.03

Table 5.5   (continued)

demand curve moves in the opposite direction. The price of skilled labor drops 0.03% uniformly, as skilled labor can move freely between industries and the increased labor supply is above increased labor demand.

The percentage change in the relative price of labor to capital—as measured by the difference in the percentage change in the labor price and that in the capital price—is shown in Table 5.7. Regardless of restrictions on labor mobility across industries, a reduction in the relative price of unskilled labor to capital occurs in only around one-third of the 32 industries, while a drop in the relative price of skilled labor to capital is observed in more than two-thirds of the industries. In other words, the costs of skilled labor become relatively less expensive than capital and unskilled labor if restrictions on the movement of natural persons are removed. Skilled labor becomes more affordable.

6.4   Projected Employment Growth by Industry (Table 5.8)

6.4.1   Restricted labor mobility
When labor mobility is restricted between industries, any increased demand for labor driven by trade reform can only be met by an increase in labor supply. There is thus a uniform change in employment growth across industries and domestic and FDI firms, including domestic financial institutions—where a drop in output is observed. The growth in employment in domestic financial institutions comes from the relatively less expensive cost of labor as opposed to capital—so the increased labor supply in this group is fully absorbed and replaces capital. Skilled labor grows more than unskilled labor (0.61% versus 0.36%) as the financial sector trade reform is skilled-labor intensive.

6.4.2   Unrestricted skilled labor mobility
With unskilled labor restricted between industries, there will be uniform growth in unskilled employment across industries (0.39%). But with free skilled labor mobility between industries, increased demand for labor in one

Table 5.6a   Projected change in price of labor and capital, restricted labor mobility (%)

Industry/Sector	Domestic firms			FDI firms		
	Unskilled	Skilled	Capital	Unskilled	Skilled	Capital
Agriculture and mining						
Agriculture	−0.81	−1.88	0.44	−0.81	−1.89	0.44
Forestry	−0.83	−2.05	0.51	−0.83	−2.04	0.51
Coal, oil, gas mining	−1.41	−2.62	0.17	−1.41	−2.62	0.18
Other mining	−0.86	−2.08	0.49	−0.86	−2.07	0.49
Manufacturing						
Food and beverages and tobacco manufacture	0.02	−0.20	0.29	0.02	−0.20	0.29
Textiles	0.06	−0.13	0.30	0.06	−0.13	0.30
Wearing apparel	−0.03	−0.23	0.22	−0.03	−0.23	0.22
Leather products	−0.08	−0.27	0.18	−0.08	−0.27	0.18
Wood products	0.09	−0.11	0.33	0.09	−0.11	0.33
Paper products, publishing	0.05	−0.14	0.30	0.05	−0.14	0.30
Petroleum, coal products	0.41	0.22	0.63	0.42	0.22	0.63
Chemical, rubber, plastic products	0.17	−0.02	0.41	0.17	−0.02	0.41
Mineral products nec	0.01	−0.19	0.25	0.01	−0.19	0.25
Iron, steel, and non-ferrous metals	−0.01	−0.21	0.23	−0.02	−0.21	0.23
Fabricated metal products	0.13	−0.06	0.37	0.13	−0.06	0.37
Motor vehicles and parts	0.19	0.00	0.43	0.20	0.00	0.43
Transport equipment nec	0.07	−0.12	0.31	0.07	−0.12	0.31
Electronic equipment	−0.02	−0.22	0.23	−0.02	−0.22	0.23
Machinery and equipment nec	0.14	−0.05	0.38	0.14	−0.05	0.38
Manufactures nec	0.32	0.12	0.55	0.32	0.12	0.55

Services

Electricity and gas production and distribution	0.62	0.43	0.83	0.63	0.43	0.83
Water	0.09	−0.11	0.33	0.09	−0.11	0.33
Construction	−0.63	−0.80	−0.36	−0.63	−0.81	−0.35
Trade	0.34	0.20	0.52	0.34	0.20	0.52
Air, land transport	0.02	−0.13	0.21	0.02	−0.13	0.21
Water transport	0.13	−0.02	0.31	0.13	−0.02	0.31
Communication	−0.02	−0.22	0.23	−0.02	−0.22	0.23
Financial services nec	*−1.75*	*−1.94*	*−1.25*	*8.76*	*8.55*	*7.53*
Insurance	0.38	0.18	0.60	0.38	0.18	0.60
Other business services	0.05	−0.15	0.29	0.05	−0.15	0.29
Recreational and other services	0.03	−0.17	0.27	0.03	−0.17	0.27
Public administration and defense, education, health	0.06	−0.14	0.30	0.06	−0.14	0.30

Table 5.6b   Projected change in price of labor and capital, unrestricted skilled labor mobility (%)

Industry/Sector	Domestic firms				FDI firms			
	Unskilled	Skilled	Capital		Unskilled	Skilled	Capital	
Agriculture and mining								
Agriculture	−0.88	−0.03	0.48		−0.89	−0.03	0.49	
Forestry	−0.91	−0.03	0.57		−0.91	−0.03	0.57	
Coal, oil, gas mining	−1.59	−0.03	0.16		−1.60	−0.03	0.17	
Other mining	−1.15	−0.03	0.42		−1.16	−0.03	0.42	
Manufacturing								
Food and beverages and tobacco manufacture	0.03	−0.03	0.33		0.03	−0.03	0.33	
Textiles	0.07	−0.03	0.34		0.07	−0.03	0.34	
Wearing apparel	−0.02	−0.03	0.25		−0.02	−0.03	0.25	
Leather products	−0.08	−0.03	0.20		−0.08	−0.03	0.20	
Wood products	0.17	−0.03	0.43		0.17	−0.03	0.43	
Paper products, publishing	0.06	−0.03	0.32		0.06	−0.03	0.33	
Petroleum, coal products	0.36	−0.03	0.60		0.36	−0.03	0.61	
Chemical, rubber, plastic products	0.20	−0.03	0.45		0.20	−0.03	0.45	
Mineral products nec	0.01	−0.03	0.28		0.00	−0.03	0.28	
Iron, steel, and non-ferrous metals	−0.04	−0.03	0.24		−0.04	−0.03	0.24	
Fabricated metal products	0.12	−0.03	0.38		0.12	−0.03	0.38	
Motor vehicles and parts	0.19	−0.03	0.44		0.19	−0.03	0.45	
Transport equipment nec	0.03	−0.03	0.30		0.03	−0.03	0.30	
Electronic equipment	0.05	−0.03	0.32		0.05	−0.03	0.32	
Machinery and equipment nec	0.11	−0.03	0.37		0.11	−0.03	0.37	
Manufactures nec	0.35	−0.03	0.60		0.35	−0.03	0.60	

Services				
Electricity and gas production and distribution	0.45	−0.03	0.69	0.45	−0.03	0.69
Water	0.11	−0.03	0.37	0.10	−0.03	0.37
Construction	−0.35	−0.03	−0.07	−0.35	−0.03	−0.07
Trade	0.33	−0.03	0.52	0.33	−0.03	0.52
Air, land transport	0.03	−0.03	0.24	0.03	−0.03	0.24
Water transport	0.11	−0.03	0.31	0.11	−0.03	0.31
Communication	−0.03	−0.03	0.24	−0.03	−0.03	0.25
Financial services nec	*−2.72*	*−0.03*	*−2.06*	*10.78*	*−0.03*	*9.36*
Insurance	0.37	−0.03	0.61	0.37	−0.03	0.61
Other business services	0.04	−0.03	0.30	0.03	−0.03	0.31
Recreational and other services	0.01	−0.03	0.28	0.01	−0.03	0.29
Public administration and defense, education, health	0.06	−0.03	0.33	0.06	−0.03	0.33

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Table 5.7 Projected change in relative price of labor to capital (%)

Industry/Sector	Restricted labor mobility				Unrestricted skilled labor mobility			
	Domestic firms		FDI firms		Domestic firms		FDI firms	
	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled
Agriculture and mining								
Agriculture	0.43	−4.31	−1.85	−4.33	−1.83	−0.07	−1.82	−0.07
Forestry	0.41	−3.98	−1.63	−4.02	−1.59	−0.06	−1.60	−0.06
Coal, oil, gas mining	0.54	−15.31	−8.07	−14.98	−9.67	−0.20	−9.32	−0.19
Other mining	0.41	−4.22	−1.76	−4.24	−2.75	−0.08	−2.75	−0.08
Manufacturing								
Food and beverages and tobacco manufacture	−0.09	−0.69	0.06	−0.69	0.09	−0.10	0.09	−0.10
Textiles	−0.46	−0.44	0.20	−0.44	0.21	−0.10	0.21	−0.10
Wearing apparel	0.15	−1.06	−0.16	−1.06	−0.09	−0.13	−0.09	−0.13
Leather products	0.28	−1.56	−0.44	−1.55	−0.38	−0.16	−0.38	−0.16
Wood products	−0.81	−0.33	0.26	−0.33	0.40	−0.08	0.39	−0.08
Paper products, publishing	−0.38	−0.48	0.18	−0.48	0.18	−0.10	0.18	−0.10
Petroleum, coal products	1.90	0.35	0.66	0.35	0.60	−0.05	0.60	−0.05
Chemical, rubber, plastic products	−7.61	−0.06	0.43	−0.05	0.44	−0.07	0.43	−0.07
Mineral products nec	−0.04	−0.74	0.03	−0.74	0.02	−0.12	0.01	−0.12
Iron, steel, and non-ferrous metals	0.07	−0.90	−0.06	−0.90	−0.15	−0.14	−0.15	−0.14
Fabricated metal products	−2.15	−0.17	0.36	−0.17	0.32	−0.09	0.32	−0.08
Motor vehicles and parts	−150.19	0.00	0.46	0.00	0.42	−0.07	0.42	−0.07
Transport equipment nec	−0.59	−0.39	0.23	−0.39	0.10	−0.11	0.09	−0.11
Electronic equipment	0.11	−0.97	−0.10	−0.97	0.15	−0.10	0.15	−0.10
Machinery and equipment nec	−2.65	−0.14	0.38	−0.14	0.29	−0.09	0.29	−0.09
Manufactures nec	2.60	0.23	0.59	0.23	0.59	−0.05	0.59	−0.05

Services

Electricity and gas production and distribution	1.46	0.52	0.76	0.52	0.66	−0.05	0.66	−0.05
Water	−0.80	−0.33	0.27	−0.33	0.29	−0.09	0.28	−0.09
Construction	0.78	2.26	1.79	2.29	4.69	0.44	4.91	0.45
Trade	1.75	0.38	0.67	0.38	0.63	−0.06	0.63	−0.06
Air, land transport	−0.17	−0.60	0.10	−0.60	0.14	−0.14	0.13	−0.14
Water transport	−6.29	−0.06	0.40	−0.06	0.34	−0.10	0.34	−0.10
Communication	0.09	−0.94	−0.09	−0.94	−0.12	−0.13	−0.12	−0.13
Financial services nec	*0.90*	*1.56*	*1.16*	*1.14*	*1.32*	*0.02*	*1.15*	*0.00*
Insurance	2.08	0.30	0.63	0.30	0.60	−0.05	0.59	−0.05
Other business services	−0.34	−0.50	0.17	−0.50	0.12	−0.11	0.11	−0.11
Recreational and other services	−0.16	−0.62	0.10	−0.62	0.05	−0.11	0.05	−0.11
Public administration and defense, education, health	−0.45	−0.45	0.20	−0.44	0.18	−0.10	0.18	−0.10

Notes:
FDI = foreign direct investment; nec = not elsewhere classified.
The numbers in the table should be read as a percentage. For example, under the assumption of restricted labor mobility between industries, the removal of restrictions on the movement of natural persons would reduce the relative price of skilled labor to capital in domestic agriculture firms by 4.31%.

Source: Author's simulation using GTAP 7 Data Base.

Table 5.8 *Projected employment growth by industry (%)*

Industry/Sector	Restricted labor mobility				Unrestricted skilled labor mobility			
	Domestic firms		FDI firms		Domestic firms		FDI firms	
	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled	Unskilled	Skilled
Agriculture and mining								
Agriculture	0.36	0.61	0.36	0.61	0.39	0.20	0.39	0.20
Forestry	0.36	0.61	0.36	0.61	0.39	0.21	0.39	0.21
Coal, oil, gas mining	0.36	0.61	0.36	0.61	0.39	0.08	0.39	0.07
Other mining	0.36	0.61	0.36	0.61	0.39	0.17	0.39	0.16
Manufacturing								
Food and beverages and tobacco manufacture	0.36	0.61	0.36	0.61	0.39	0.46	0.39	0.46
Textiles	0.36	0.61	0.36	0.61	0.39	0.52	0.39	0.52
Wearing apparel	0.36	0.61	0.36	0.61	0.39	0.40	0.39	0.40
Leather products	0.36	0.61	0.36	0.61	0.39	0.34	0.39	0.33
Wood products	0.36	0.61	0.36	0.61	0.39	0.65	0.39	0.65
Paper products, publishing	0.36	0.61	0.36	0.61	0.39	0.51	0.39	0.51
Petroleum, coal products	0.36	0.61	0.36	0.61	0.39	0.89	0.39	0.89
Chemical, rubber, plastic products	0.36	0.61	0.36	0.61	0.39	0.68	0.39	0.68
Mineral products nec	0.36	0.61	0.36	0.61	0.39	0.44	0.39	0.44
Iron, steel, and non-ferrous metals	0.36	0.61	0.36	0.61	0.39	0.39	0.39	0.39
Fabricated metal products	0.36	0.61	0.36	0.61	0.39	0.59	0.39	0.59
Motor vehicles and parts	0.36	0.61	0.36	0.61	0.39	0.67	0.39	0.67
Transport equipment nec	0.36	0.61	0.36	0.61	0.39	0.47	0.39	0.47
Electronic equipment	0.36	0.61	0.36	0.61	0.39	0.49	0.39	0.49
Machinery and equipment nec	0.36	0.61	0.36	0.61	0.39	0.57	0.39	0.57
Manufactures nec	0.36	0.61	0.36	0.61	0.39	0.88	0.39	0.88

Services								
Electricity and gas production and distribution	0.36	0.61	0.36	0.61	0.39	1.01	0.39	1.01
Water	0.36	0.61	0.36	0.61	0.39	0.57	0.39	0.56
Construction	0.36	0.61	0.36	0.61	0.39	−0.05	0.39	−0.06
Trade	0.36	0.61	0.36	0.61	0.39	1.00	0.39	1.00
Air, land transport	0.36	0.61	0.36	0.61	0.39	0.50	0.39	0.50
Water transport	0.36	0.61	0.36	0.61	0.39	0.63	0.39	0.63
Communication	0.36	0.61	0.36	0.61	0.39	0.40	0.39	0.39
Financial services nec	*0.36*	*0.61*	*0.36*	*0.61*	*0.39*	*−2.99*	*0.39*	*14.26*
Insurance	0.36	0.61	0.36	0.61	0.39	0.90	0.39	0.90
Other business services	0.36	0.61	0.36	0.61	0.39	0.48	0.39	0.48
Recreational and other services	0.36	0.61	0.36	0.61	0.39	0.45	0.39	0.45
Public administration and defense, education, health	0.36	0.61	0.36	0.61	0.39	0.51	0.39	0.50

Notes:
FDI = foreign direct investment; nec = not elsewhere classified.
The numbers in the table should be read as a percentage. For example, under the assumption of restricted labor mobility between industries, the removal of restrictions on the movement of natural persons would increase the employment of skilled labor in domestic agriculture firms by 0.61%.

Source: Author's simulation using GTAP 7 Data Base.

industry will be met by both an increase in labor supply and the absorption of labor from industries with lower labor costs. This process continues until there is no arbitrage in labor price across industries. As a result, we observe various levels of employment growth in skilled labor across industries. In domestic financial institutions, skilled labor is substituted by unskilled labor—as the price of skilled labor is relatively more expensive than unskilled labor, skilled labor employment drops 3%. By contrast, in FDI counterparts, skilled labor is relatively less expensive than unskilled labor, so skilled labor employment increases 14.26%. In other industries, the highest employment growth for skilled labor is in electricity, gas production and distribution; trade; and insurance, while the least occurs in coal, oil, gas mining; other mining; and agriculture. For ASEAN as a whole, trade reform expands total employment by 0.47%, higher than labor mobility is restricted.

7.   CONCLUSIONS

Using the FTAP-ASEAN model and GTAP 7 Data Base, this chapter shows that removing restrictions on the movement of natural persons in ASEAN's banking sector could have non-trivial impacts on output and employment across industries regardless of labor mobility assumptions. Although removing restrictions on the movement of individual bank personnel crowds out domestic financial institutions, this trade reform would expand production and employment in all industries. The benefits of trade reform would be even higher with unrestricted skilled labor mobility across industries.

Freeing skilled labor mobility by removing restrictions on the movement of natural persons across countries in the region would make skilled labor more accessible and affordable. This trade reform would mostly benefit employment in financial services and industries with the lowest relative price of labor to capital. Services would gain most in terms of job creation and would also absorb most of the increased labor supply—followed by manufacturing and agriculture and mining.

Our results suggest that removing restrictions on the movement of natural persons and facilitating labor mobility will help mobilize a significant proportion of labor in ASEAN's informal market and help absorb the growing labor force as well. The results support policies that will allow freer flows of skilled labor under the ASEAN Economic Community. It makes sense that restrictions on labor mobility in banking should be removed.

Apart from the banking industry, restrictions on labor mobility remain pervasive across services. There is room for further research to compare the impact of freeing up labor mobility across different services sectors.

Given our modelling features, the projected results presented here need

to be interpreted with some caveats. First, we assume full employment. In most ASEAN countries, unemployment remains high and there are transaction costs of moving labor from one sector to another. The employment change due to trade reform is likely smaller in the short term than projected results in the long run. Second, we assume the ratio of skilled to unskilled labor is unchanged before and after restrictions are removed. In the long run, with better technology, education and training, demand for skilled labor will rise faster than unskilled labor demand. Further research that takes into account unemployment and the increasing ratio of skilled to unskilled labor is thus needed.

NOTES

*   The author would like to thank Ha Pham for his constructive comments and suggestions.
1.   The Movement of National Persons is one of four modes of services trade identified by the WTO GTAS. For example, a foreign national provides a service within economy A as an independent supplier (such as a consultant or health worker) or employee of a service supplier (like consultancy firms, hospitals, or construction companies).
2.   Cambodia, the Lao People's Democratic Republic and Viet Nam committed to remove restrictions on (i) acceptance of deposits and other repayable funds from the public; (ii) all types of lending; (iii) financial leasing; (iv) payment and money transmission services; and (v) guarantees and commitments. Myanmar also committed itself to removing the last restriction.
3.   Compared to GTAP 9 Data Base, GTAP 7 has 37 fewer regions but is sufficient for this study.

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APPENDIX 5A.1   THE FTAP MODEL

In order to measure the economy-wide effects of removing restrictions on the movement of natural persons in the ASEAN banking sector, it is important to use a model capable of tracing flow-on effects of each policy change to all other sectors within and across countries. One available model is the Global Trade Analysis Project (GTAP) model—a multi-regional and multi-sectoral computable general equilibrium model. However, the GTAP model does not reflect prevailing trade barriers in banking services, preventing an impact assessment of trade liberalization. The static version of this model also does not include a treatment of foreign ownership, making it impossible to differentiate the flow-on effects of liberalizing restrictions on domestic banks from those on foreign banks.

The FTAP model deals with these limitations. Following Hanslow et al. (2000), this appendix describes the structure of the FTAP model—a comparative static, computable general equilibrium model of the world economy that was developed in stages from the GTAP model. The key contribution of FTAP is that it includes a treatment of foreign direct investment (FDI) on a bilateral basis. In addition, FTAP has extra coding to facilitate analyzing trade liberalization in services. For example, it allows the revenue from the tax equivalents of services trade barriers to flow to the private sector rather than to the government. It incorporates increasing returns to scale and large-group monopolistic competition in all sectors. And it allows for capital accumulation and international borrowing and lending.

In FTAP, agents demand commodities based upon location and ownership of individual firms as shown in Figure 5A.1. End-user agents—households and governments—choose among final goods and services, while firms choose among intermediate inputs, investment goods, and primary factors (land, skilled and unskilled labor, capital, and natural resources). Agents in FTAP are assumed to make choices first among commodities from domestic and foreign locations as in GTAP, but with a different Constant Elasticity of Substitution (CES) elasticity of 5. The import of goods or services is then selected among foreign locations with a CES elasticity of 10. FTAP then assumes that agents make choices among products or services by ownership with a CES elasticity of 10, after making a decision regarding location. Finally, agents make choices among individual firms within a particular location and ownership with a CES elasticity of 15. These higher elasticities in FTAP compared with those in GTAP accord better with the notion of firm-level product differentiation associated with large-group monopolistic competition (Francois et al. 1995). They are also more consistent with engineering studies of the extent of economies of scale, and hence product differentiation.
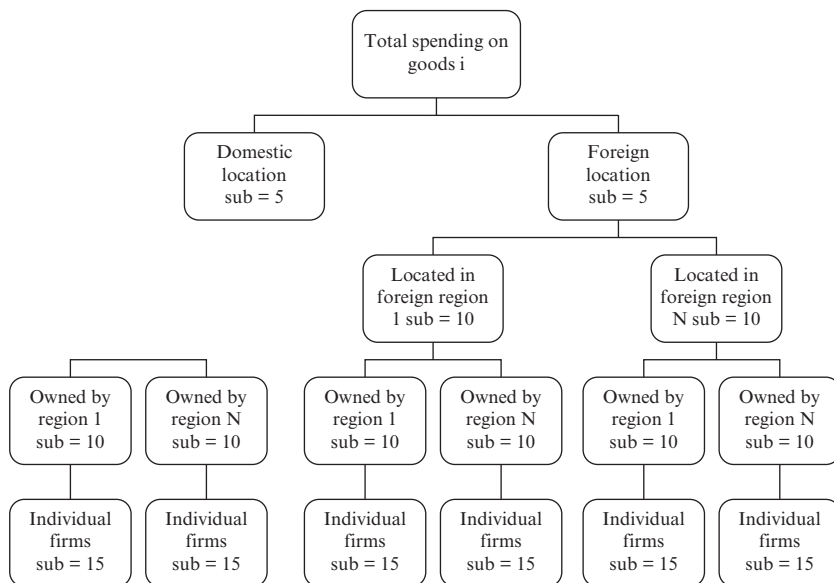
Note: CES = Constant Elasticity of Substitution.

Source: Adapted from Figure 2.2 of Hanslow et al. (2000).

*Figure 5A.1   CES nesting structure of commodity preferences in a host
              country*

Following Petri (1997), choices for allocating wealth in FTAP are first made
across types of asset—bonds, land, natural resources, and capital—with a
Constant Elasticity of Transformation (CET) elasticity of 1. As land and
natural resources are fixed and perfectly immobile between regions, the
choice of wealth is really between bonds and capital. In FTAP, the choice
of bonds does not depend on who issues them, implying perfectly arbitrage
in the rate of return on bonds. The choice of capital is first made among
sectors (various primary, secondary, and tertiary sectors) with a CET of
1.2. The choice is then made among locations with a CET of 1.3. When a
foreign location is chosen, the choice is finally made among specific foreign
regions with a CET of 1.4. This nested structure of capital choice reflects
the assumption of imperfect capital mobility between regions and between
sectors within each region. Although values of the chosen CET parameters
at each "node" of the nesting structure seem to be small, there is a great
degree of flexibility in the way that choices at the final level are made.
The semi-elasticity of transformation between foreign locations can easily
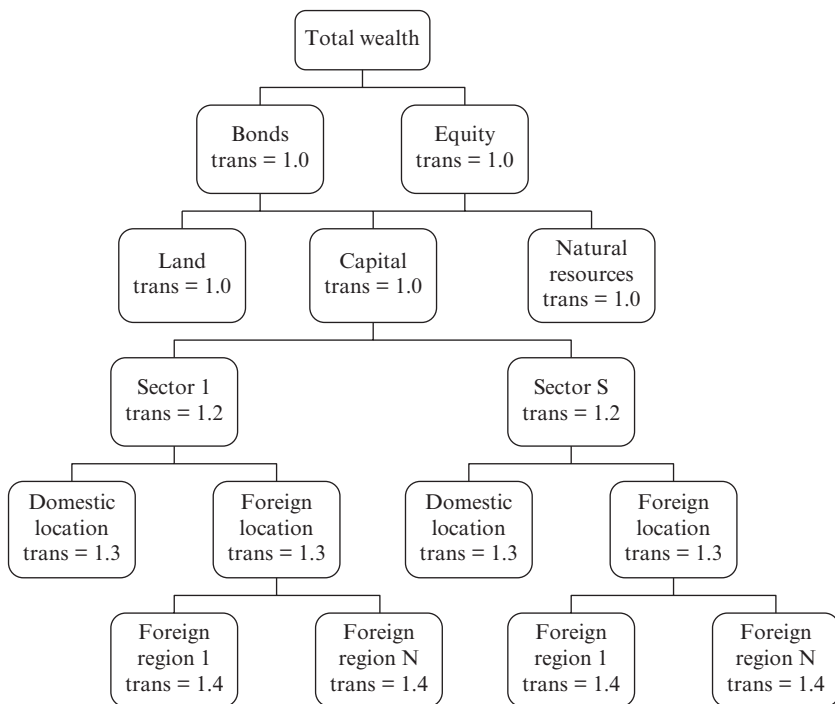
Note: CET = Constant Elasticity of Transformation.

Source: Adapted from Figure 2.2 of Hanslow et al. (2000).

Figure 5A.2   CET nesting structure of wealth supply in a home region

reach 20—and even up to 60 (Hanslow et al. 2000). The variation across regions in the implied elasticity comes from both the number of nests and the different initial shares of assets in various regional portfolios.

In FTAP, it is assumed that the current period investment, which is formed from savings, can be added up to the next period capital stock, allowing capital stocks to accumulate over time. It is also assumed that net bond holdings of each region can adjust to finance the expansion of capital that cannot be financed by domestic savings. This treatment of capital enables FTAP to provide a long-term snapshot view of the economy-wide effects of trade liberalization ten years after the reform has occurred. This treatment of international capital mobility was developed by McDougall (1993) and incorporated into GTAP by Verikios and Hanslow (1999). The structure of preferences for investors is depicted in Figure 5A.2.

Table 5A.1　　List of aggregated sectors for simulation

ID	Sector	Description
1	Agriculture	Paddy Rice: rice, husked and un-husked. Wheat: wheat and meslin. Other Grains: maize (corn), barley, rye, oats, other cereals, cassava, truffles. Oilseeds: oilseeds and oleaginous fruit; soybeans, copra. Cane & Beet: sugarcane and sugar beet. Plant Fibers: cotton, flax, hemp, sisal and other raw vegetable materials used in textiles. Other Crops: live plants; cut flowers and flower buds; flower seeds and fruit seeds; vegetable seeds, beverage and spice crops, unmanufactured tobacco, cereal straw and husks, unprepared, whether or not chopped, ground, pressed or in the form of pellets; Swedes, mangolds, fodder roots, hay, lucerne (alfalfa), clover, sainfoin, forage kale, lupines, vetches and similar forage products, whether or not in the form of pellets, plants and parts of plants used primarily in perfumery, in pharmacy, or for insecticidal, fungicidal or similar purposes, sugar beet seed and seeds of forage plants, other raw vegetable materials. Cattle: cattle, sheep, goats, horses, asses, mules, and hinnies; and semen thereof. Other Animal Products: swine, poultry and other live animals; eggs, in shell (fresh or cooked), natural honey, snails (fresh or preserved) except sea snails; frogs' legs, edible products of animal origin nec, hides, skins and furskins, raw hides and skins, insect waxes and spermaceti, whether or not refined or colored. Raw milk. Wool: wool, silk, and other raw animal materials used in textile. Fishing: hunting, trapping and game propagation including related service activities, fishing, fish farms; service activities incidental to fishing
2	Forestry	Forestry: forestry, logging and related service activities
3	Coal, oil, gas mining	Coal: mining and agglomeration of hard coal, lignite and peat. Oil: extraction of crude petroleum and natural gas (part), service activities incidental to oil and gas extraction excluding surveying (part). Gas: extraction of crude petroleum and natural gas (part), service activities incidental to oil and gas extraction excluding surveying (part)
4	Other mining	Other Mining: mining of metal ores, uranium, gems; other mining and quarrying
5	Food and beverages and tobacco manufacture	Cattle Meat: fresh or chilled meat and edible offal of cattle, sheep, goats, horses, asses, mules, and hinnies. Raw fats or grease from any animal or bird. Other Meat: pig meat and offal. Preserves and preparations of meat,

Table 5A.1 (continued)

ID	Sector	Description
		meat offal or blood, flours, meals and pellets of meat or inedible meat offal; greaves. Vegetable Oils: crude and refined oils of soya-bean, maize (corn), olive, sesame, groundnut, olive, sunflower-seed, safflower, cotton-seed, rape, colza and canola, mustard, coconut palm, palm kernel, castor, tung jojoba, babassu and linseed, perhaps partly or wholly hydrogenated, inter-esterified, re-esterified or elaidinized. Also margarine and similar preparations, animal or vegetable waxes, fats and oils and their fractions, cotton linters, oil-cake and other solid residues resulting from the extraction of vegetable fats or oils; flours and meals of oilseeds or oleaginous fruits, except those of mustard; degras and other residues resulting from the treatment of fatty substances or animal or vegetable waxes. Milk: dairy products. Processed Rice: rice, semi- or wholly milled. Sugar Other Food: prepared and preserved fish or vegetables, fruit juices and vegetable juices, prepared and preserved fruit and nuts, all cereal flours, groats, meal and pellets of wheat, cereal groats, meal and pellets nec; other cereal grain products (including corn flakes); other vegetable flours and meals; mixes and doughs for the preparation of bakers' wares, starches and starch products; sugars and sugar syrups nec; preparations used in animal feeding; bakery products, cocoa, chocolate and sugar confectionery; macaroni, noodles, couscous and similar farinaceous products; food products nec. Beverages and Tobacco products
6	Textiles	Textiles: textiles and man-made fibers
7	Wearing apparel	Wearing Apparel: clothing, dressing and dyeing of fur
8	Leather products	Leather: tanning and dressing of leather; luggage, handbags, saddlery, harness and footwear
9	Wood products	Lumber: wood and products of wood and cork, except furniture; articles of straw and plaiting materials
10	Paper products, publishing	Paper & Paper Products: includes publishing, printing and reproduction of recorded media
11	Petroleum, coal products	Petroleum & Coke: coke oven products, refined petroleum products, processing of nuclear fuel
12	Chemical, rubber, plastic products	Chemical Rubber Products: basic chemicals, other chemical products, rubber and plastics products
13	Mineral products nec	Non-Metallic Minerals: cement, plaster, lime, gravel, concrete

Table 5A.1   (continued)

ID	Sector	Description
14	Iron, steel, and non-ferrous metals	Iron & Steel: basic production and casting. Non-Ferrous Metals: production and casting of copper, aluminum, zinc, lead, gold, and silver
15	Fabricated metal products	Fabricated Metal Products: sheet metal products, but not machinery and equipment
16	Motor vehicles and parts	Motor Vehicles: cars, lorries, trailers and semi-trailers
17	Transport equipment nec	Other Transport Equipment: manufacture of other transport equipment
18	Electronic equipment	Electronic Equipment: office, accounting and computing machinery, radio, television and communication equipment and apparatus
19	Machinery and equipment nec	Other Machinery & Equipment: electrical machinery and apparatus nec; medical, precision and optical instruments; watches and clocks
20	Manufactures nec	Other Manufacturing: includes recycling
21	Electricity and gas production and distribution	Electricity: production, collection and distribution. Gas Distribution: distribution of gaseous fuels through mains; steam and hot water supply
22	Water	Water: collection, purification and distribution
23	Construction	Construction: building houses factories offices and roads
24	Trade	Trade: all retail sales; wholesale trade and commission trade; hotels and restaurants; repairs of motor vehicles and personal and household goods; retail sale of automotive fuel
25	Air, land transport	Other Transport: road, rail; pipelines, auxiliary transport activities; travel agencies. Air transport
26	Water transport	Water transport
27	Communication	Communications: post and telecommunications
28	Financial services nec	Other Financial Intermediation: includes auxiliary activities but not insurance and pension funding (see next)
29	Insurance	Insurance: includes pension funding, except compulsory social security
30	Other business services	Other Business Services: real estate, renting and business activities. Dwellings: ownership of dwellings (imputed rents of houses occupied by owners)
31	Recreational and other services	Recreation & Other Services: recreational, cultural and sporting activities, other service activities; private households with employed persons (servants)

Table 5A.1   (continued)

ID	Sector	Description
32	Public administration and defense, education, health	Other Services (Government): public administration and defense; compulsory social security, education, health and social work; sewage and refuse disposal, sanitation and similar activities; activities of membership organizations nec; extra-territorial organizations and bodies

Note: nec = not elsewhere classified.

Source: Adapted from Narayanan and Walmsley (2008).

With a treatment of ownership in the model, FTAP is able to control for many benefits of FDI that GTAP cannot. For example, FTAP reflects how FDI can relax domestic constraints on capital. It also captures how FDI contributes to product diversification as well as product specialization, where a particular industry has a comparative advantage. However, the current FTAP model has yet to capture the transfer of skills, technology, and management know-how from FDI to local firms.

It is also important to note some assumptions about factors of production in FTAP. Skilled and unskilled workers are perfectly mobile between industries. Consequently, prices of each type of labor are uniform across industries within each economy. Because of the behavior of asset holders, capital is less than perfectly transformable between industries, thus allowing rental prices to differ across industries. Land is supplied with a transformation elasticity of 1, as this factor is used only in the agricultural sector. The elasticity of transformation of natural resources between industries is so small that the supply of this factor to each industry is essentially fixed. (Natural resources are inputs in agriculture; forestry, coal, oil, and gas mining; and other mining.) This assumption comes from the fact that natural resources are irrecoverable; when it is already used in this industry, it cannot be transferred to another industry. Consequently, the rental prices of land and natural resources can vary from industry to industry. This chapter uses the FTAP model, Version 2_7a by Dee (2010) to measure the economy-wide output and employment effects of trade liberalization in the ASEAN banking sector.

6. Skills mobility and postsecondary education in the ASEAN Economic Community
Maki Kato

1. INTRODUCTION

Understanding the structure, causes, and impact of high-skilled intraregional labor mobility is an important precursor to building migration policy. Intra-ASEAN mobility has increased in recent years. In 2013, for example, 70% of the 9.5 million migrants living in ASEAN countries came from other ASEAN countries, far above the 40% in 1990 (Papademetriou et al. 2016). However, the intra-ASEAN migrant profile is incomplete because of the absence of sufficient, adequate, and appropriate data. Yet, despite these data obstacles, two intra-ASEAN migration characteristics are clear: (i) low-skilled workers comprise the majority of migrants; and (ii) the concentration of migration flows occur over a few main bilateral corridors. There is little available evidence as to whether these characteristics are ASEAN-specific or shared with other economic or trade communities. Therefore, this chapter tries to clarify ASEAN's migration characteristics by comparing these characteristics with other economic communities.

The analysis uses a high-skilled migration dataset with non-Organisation for Economic Co-operation and Development (non-OECD) countries as migrant hosts. Several comprehensive datasets of source/host migrations are available (Özden et al. 2011; Docquier and Marfouk 2004, 2006). However, only the latest from Artuc et al. (2015)—which includes non-OECD hosts and educational levels—is sufficient for the analysis here, even though it includes only two time points (1990 and 2000). While Asian countries such as India and the People's Republic of China (PRC) were included in the analysis, ASEAN was not.

After exploring the basic features of ASEAN migration, this chapter investigates the relationships between high-skilled labor migration (high-skill migration) and people (human capital) with postsecondary education. Considering the commonalities between mobility and human

capital development, the chapter examines (i) the role of human capital stock as determinants of migration and (ii) the impact of migration on postsecondary-educated human capital stock. International migration and education share common factors, as both invest in human agents whose decisions are intertwined in many dimensions (Dustmann and Glitz 2011). For instance, wage differences are the main drivers of both migration and education. From the perspective of capabilities proposed by Sen (1999), de Haas (2009) pointed out the general mechanism by which migration and human development are interrelated, the necessity of human development for migration, and the potential of migration for well-being and enhancing freedom. It is thus appropriate to discuss the cause and impact of high-skill migration together with postsecondary education.

As described in the literature review below, previous studies investigated these relationships empirically. But there is room for improvement. Few studies analyzed the ASEAN situation with a focus on intraregional mobility. The estimation model can be improved to consider the scope of effect and heterogeneity of countries and regions. Although the discussion of migration effects usually focuses on source countries, this chapter covers both source and host countries because migrants generate significant impacts on the native populations of host countries by participating in local capital and labor markets, as shown by Borjas (1994). Both source and host countries could have positive and negative impacts on various aspects—such as human capital, labor markets, and science and technology (Cervantes and Guellec 2002)—while several empirical studies show inconclusive results (Dustmann and Glitz 2011).

The definition of high-skill migration is complex. For instance, Papademetriou et al. (2016) define high-skill workers as individuals with a university education or equivalent professional experience. ASEAN members target high-skill migrants in eight professions—engineering, nursing, architecture, medicine, dentistry, tourism, surveying, and accounting. Considering the currently ambiguous definition—and viewed from a macro-perspective—this chapter defines high-skill individuals as those with postsecondary education and low-skill individuals as generally less educated. The definition of migration follows the one in the dataset provided by Artuc et al. (2015), where migration is measured on the country of birth as opposed to citizenship, which can change over time.

Thus, this chapter aims to clarify how high-skill migration is related to postsecondary education within ASEAN by comparing the relationship with other regional communities. Artuc et al.'s dataset for 1990 and 2000 is used for empirical analysis and estimation. The results show that intra-ASEAN migration was responsible for the lowest proportion of high-skill migration and the second-highest concentration of bilateral corridors among the four

regional communities examined—ASEAN, the Mercado Común del Sur (Common Market of the South, or MERCOSUR), the North American Free Trade Agreement (NAFTA), and the European Union (EU). High-skill intra-ASEAN migration is explained by the postsecondary-educated human capital stock in the source country, but not in the host country. However, bilateral high-skill intra-ASEAN mobility explains the postsecondary-educated human capital stock in both source and host countries. Therefore, high-skill ASEAN mobility could have a positive relationship with an increase in postsecondary education investment in source countries. These results indicate a need to encourage high-skill intra-ASEAN migration because of its positive effect on postsecondary education.

Section 2 describes the relevant literature and introduces research questions. Section 3 explains the model and dataset. Section 4 summarizes the results, and Section 5 concludes.

2. LITERATURE REVIEW AND RESEARCH QUESTIONS

High-skill migration, but not migration itself, has increased rapidly worldwide. In 2010, the 214 million international migrants represented only 3% of the world population, and increased only modestly compared with the accelerating global population growth (King 2012). The increase in the migration rate was just 0.4 of a percentage point from 1960 to 2005 (2.5–2.9% of the population) compared with trade, which increased threefold over the same period. However, high-skill migration shows a different picture. High-skill migrants to OECD countries increased at the same rate as trade (Docquier and Rapoport 2012). Following these trends, Clemens et al. (2014) show that the number of studies about migration and development grew sharply, and the topic has emerged as a proper research subfield. Most past studies focused on single hosts in the wealthiest nations (Kim and Cohen 2010); however, the improved Artuc et al. (2015) dataset made possible research targeting multiple hosts, including non-OECD countries.

Several reports and papers discuss high-skill migration in ASEAN countries (most published recently) and attempt to provide policy recommendations. As mentioned, these studies show that low-skill workers comprise the majority of migrants—in 2007, low-skill workers comprised 87% of intra-ASEAN migrants and 73% of global migrants (Orbeta 2013). They also show that migration flows concentrate within a few main bilateral corridors. Based on United Nations data from 2013, the top five corridors (from 57 intra-ASEAN corridors) represent around 88% of the total (Sugiyarto and Agunias 2014).

Comparisons with other economic communities are useful. Jurje and Lavenex (2015) compared mobility commitments in trade agreements to explore the labor mobility model in ASEAN countries with those of MERCOSUR, NAFTA, and the EU. While they used interview and documentary survey data to discuss the prospects for deeper labor market cooperation—including service-related mobility—additional empirical analysis on high-skill migration in ASEAN countries would help; even though simple data comparisons are insufficient considering the various historical, cultural, and socioeconomic backgrounds of the regional communities. Mobility policies or commitments, especially in host countries, also influence decisions to migrate. This leads to the first research question:

Research question 1 Are the high-skill intra-ASEAN migration characteristics—of (i) fewer high-skill migrants than low-skill migrants and (ii) migration concentrated in just a few main corridors—shared by other regional communities?

Although no single theory captures the complexity of migration, several theories of the determinants of migration have developed over the last 50 years (King 2012). One is the push-and-pull theory, where push factors describe migration from a source country or region because of poverty, political repression, or income level, and migration driven by pull factors such as better income or job opportunities in the host country. Piore (1979) found that migration was primarily driven by pull rather than push factors. The push-and-pull theory was followed by a neoclassical theory based on utility maximization; and then by a network theory, which moved beyond previous impersonal theories and connected individual and sociocultural reasons for migrating (Faist 1997). However, pull factors—such as wage differences between regions—remain crucial in driving migration (Mayda 2010; Clark et al. 2007; Grogger and Hanson 2011).

High-skill workers tend to migrate to OECD countries. In 2000, 72.6% of the 28.8 million high-skill workers worldwide migrated to OECD countries, while 46.1% of the 83.1 million low-skill workers globally migrated to the same countries (Artuc et al. 2015). Asian migrants followed these trends (ADBI 2014). Wage differentials and the accumulation of human capital (knowledge and experience) make OECD countries attractive. In theory, the neoclassical growth model predicts a human capital flow from abundant to scarce regions. But more evident in practice is the "brain drain" from scarce to abundant regions (Lucas 1988).

Using United States (US) data, Moretti (2013) empirically showed that postsecondary-educated workers move to regions with a greater accumulation of human capital. This could be because postsecondary-educated

people are more mobile as they seek distant educational or market opportunities (Wozniak 2010). While derived from domestic migration in the US, the argument might extend to international migration. This leads to the second research question:

Research question 2   Does high-skill intra-ASEAN migration positively relate to postsecondary-educated human capital in both source and host countries?

The impact of migration, especially on source countries, has been the main theme for much of the literature. However, the impact of international migration on human capital investment remains inconclusive.[1] Concerning the "beneficial brain drain" (Mountford 1997), some studies point to a remittance effect (Rapoport and Docquier 2006; Yang 2008) and prospects of better job opportunities abroad (Stark et al. 1997) as reasons to invest in further education. This has gained popularity recently after a series of macro-empirical studies by Beine et al. (2001, 2008, and 2010). The positive country-level impact was confirmed empirically in Cape Verde (Batista et al. 2012), Tonga and Papua New Guinea (Gibson and McKenzie 2011), and Africa (Easterly and Nyarko 2009)—although the first two studies covered sparsely populated island states with a heavy migration impact. However, several studies question the effect of "brain gain" through brain drain. For instance, based on partial and general equilibrium models, Schiff (2005) concluded that the brain gain actually resulted in smaller human capital gains and had a negative impact on human capital stock. Empirical analyses by Lucas (2007) and Checchi et al. (2007) had similar results.

Considering the inclusiveness of the effect of migration on human capital development, heterogeneity is assumed to be related. Reviewing migration and development literature from a theoretical perspective, de Haas (2010) concluded the picture was more nuanced. In some cases, migration has a positive effect, but in others there is no effect, or even a negative effect. Bhagwati (2009) described the diversity of impacts on source countries based on their level of human capital. These contradictory empirical results show that migration rarely has a uniform impact—the brain drain was massive only in small or very poor countries (de Haas 2010).

Heterogeneous determinants for enrollment in postsecondary education are another impact of migration. In addition to individual incentives, there are several other determinants for enrolling in postsecondary education. For example, in Japan these determinants include intertwined micro, mezzo, and macro student socioeconomic factors—such as household income, parent jobs and educational careers, university capacity in student home towns and education costs, job availability after graduation, and

regional cultural and historical factors (Kato 2016). At the micro level, according to Eccles (1994, 2005), expectancy–value theory shows major career choices are directly influenced by the deeply intertwined factors of psychological ability, competence, and subjective task value. Thus, the decision for postsecondary education enrollment could depend on complex conditions where incentives only play a partial role. This chapter tries to analyze the impact of migration on postsecondary enrollment in ASEAN by comparing country or regional heterogeneity—giving rise to the third research question:

Research question 3   Does high-skill intra-ASEAN migration influence postsecondary education enrollment in both source and host countries?

3.   MODEL AND ESTIMATION METHOD

The first research question on ASEAN skill levels and migration corridors can be analyzed using descriptive statistics and research, as described in the Section 5 results below. The second and third require estimation models, which are discussed here.

The first model estimates the relationship between high-skill intra-ASEAN migration and postsecondary-educated human capital (Model (6.1)).

For bilateral skill migration, the gravity model—widely used by recent international migration studies—is used because of better access to improved bilateral data (Ramos 2016). Previous empirical studies using the gravity model include those exploring the determinants of international mobility (Kim and Cohen 2010; Beine et al. 2014) and bilateral knowledge networks (Maggioni and Uberti 2009).

The gravity model views migration as directly proportional to a country's population size or income and inversely proportional to the physical distance between the two countries. The model takes account of some variables, including language, culture, and shared history—such as former colonial links (Mayda 2010). Beine et al. (2014) also identified a significant network effect and destination appeal—such as university quality in host countries and number of international students. This chapter refers to the model proposed by Beine et al. (2014) because of the similarity between study targets.

The model for bilateral skill migration is defined as follows:

$$\text{Skill} migration_{(i,j,t)} = \alpha_0 + \alpha_1 \, \text{Relationship}_{(i,j,t)} + \alpha_2 \, \text{ODspecific}_{(i,j,t)} + \alpha_3 \, \text{Regiondum}_{(i,j)} + v_{(i,j)} + \varepsilon_{(i,j,t)} \tag{6.a}$$

where Skill*migration*$_{(i,j,t)}$ denotes the number of migrants from source country i to host country j ($i \neq j$) in time t, $v_{(i,j)}$ shows the unobserved bilateral factors, $\varepsilon_{(i,j,t)} \sim IN(0, \partial^2)$ is an error term, and α_0 a constant. The relationships of bilateral countries are captured as Relationship$_{(i,j,t)}$, source- and host-country specific as ODspecific$_{(i,j,t)}$, and a regional dummy as Regiondum$_{(i,j)}$.

These relationships include the distance and existing networks between the two countries. Although the analysis for developing countries shows that high-skill migration is less sensitive to geographic distance (Docquier and Rapoport 2012)—probably because of the development of transportation and communication technologies—it is worthwhile to investigate the impact of distance at the regional level. Beine et al. (2014) described the network as the total migration stock from the source country i to host country j. However, in this chapter the network is substituted by trade due to data limitations.

Beine et al. (2014) also included only host-specific variables such as skill prices for the specific factors considered. However, the model used here includes both source- and host-specific variables, such as the impact of economic level. Concerning source-specific factors, data from 1990 to 2000 confirm that middle-income countries have the highest average rates of high-skill migration to OECD countries—because people in these high-income countries have less incentive to emigrate and people in low-income countries have liquidity constraints (Beine et al. 2007). Martin (1996) confirmed an inverted U-shaped relationship or hump hypothesis between high-skill migration and income. Given these differences, Relationship$_{(i,j,t)}$, ODspecific $_{(i,j,t)}$, and Regiondum$_{(i,j)}$ in Model (6.a) are replaced as follows:

$$\ln\text{Skill}migration_{(i,j,t)} = \beta_0 + \beta_1 \ln Dist_{(i,j)} + \beta_2 \ln Trade_{(i,j)} + \beta_3 Lang_{(i,j)}$$
$$+ \beta_4 Col_{(i,j)} + \beta_5 \ln\max\{Income_{(j,t)} - Income_{(i,t)}, 0\} + \beta_6 \ln\max\{Hcapital_{(j,t)}$$
$$- Hcapital_{(i,t)}, 0\} + \beta_7 \ln Income_{(j,t)} + \beta_8 \ln Income_{(i,t)} + \beta_9 \ln Hcapital_{(j,t)}$$
$$+ \beta_{10} \ln Hcapital_{(j,t)} + \beta_{11} Regiondum_{(i,j)} + v_{(i,j)} + \varepsilon_{(i,j,t)} \quad\quad (6.1)$$

In replacing Relationship$_{(i,j,t)}$, $Dist_{(i,j)}$, denotes physical distance and $Trade_{(i,j,t)}$, shows trade flows between the two countries. Language is captured as $Lang_{(i,j)}$ and former colonial ties as $Col_{(i,j,t)}$. Bilateral differences are denoted as $\{Income_{(j,t)} - Income_{(i,t)}, 0\}$ for income differences and $\max\{Hcapital_{(j,t)} - Hcapital_{(i,t)}, 0\}$ for human capital differences, which were modified to either take the greater value of the surplus of hosts or zero because the migration decision depends on the relative conditions of the paired countries.

In replacing $ODspecific_{(i,j,t)}$, $Income_{(i,t)}$, $Income_{(j,t)}$ denotes income level and denotes human capital level.

$Regiondum_{(i,j)}$ shows the regional dummy, whether migration is intraregional within each of the four regional communities (1) or not (0).

In Model (6.1), the coefficient of most independent variables (from β_2 to β_{10}) are expected to be positive and significant. For $Relationship_{(i,j,t)}$ they are $Trade_{(i,j,t)}$, $Lang_{(i,j)}$, $Col_{(i,j)}$, $\max\{Income_{(j,t)} - Income_{(i,t)}, 0\}$, $\max\{Hcapital_{(j,t)} - Hcapital_{(i,t)}\}$; for $ODspecific_{(i,j,t)}$, they are $Income_{(i,t)}$, $Income_{(j,t)}$ and $Hcapital_{(i,t)}$, $Hcapital_{(j,t)}$, assuming a bigger flow is observed within the resource-rich countries. As usual, $Dist_{(i,j)}$ (β_1) is expected to be negative and significant, and for $Regiondum_{(i,j)}$, (β_{11}) is expected to be significant in the case of regional differences in flows.

Nine models were used to conduct the estimation: the overall world migration flows, and intra- and out-migration flows from ASEAN, MERCOSUR, NAFTA, and the EU.

The second model—which deals with Research Question 3—estimates how high-skill intra-ASEAN migration influences postsecondary education enrollment (Model (6.2)). The model is assumed as a simple production function. Considering the two-way causal relationship between human capital stock and economic development (Kato and Ando 2007), income level is added as an independent variable with a relationship to postsecondary-educated human capital stock. Because this chapter assumes the effect of high-skill migration on source and host countries, the variables describing postsecondary-educated human capital stock, income level, and skill migration are treated as a product of those variables in source and host countries, or

$$\ln (\Delta Hcapital_{(i)} * \Delta Hcapital_{(j)}) = \beta_0 + \beta_1 \ln (\Delta Skillmigration_{(i)} * Skillmigration_{(j)}) + \beta_2 \ln(\Delta Income_{(i)} * \Delta Income_{(j)}) + v_{(i,j)} + \varepsilon_{(i,j)} \qquad (6.2)$$

The coefficients of the independent variables in Model (6.2) (β_1, β_2) are expected to be positive.

3.1 Estimation Method

One of the challenges in using the gravity model (Research Question 2) is how to deal with the potential presence of zero or negative values in the case of net or no change in migrant flows. While alternative count data models may be used—such as Poisson, negative binominal, and zero-inflated models (Ramos 2016)—a count data model is used with some identification tests to determine which distribution pattern works.

The dependent variable in Model (6.1) uses panel data; therefore, a panel

estimation method can be applied, which assumes either fixed or random effects. The fixed effect is appropriate when the existence of a country- or corridor-specific effect is assumed. Alternatively, Hausman test results can decide whether the fixed or random effect is appropriate. However, due to a one-time point influential dummy such as distance, the random-effect model is used—as the fixed-effect model loses the one-time point data. One of the advantages of using panel data is that it is less likely to have multi-collinearity problems, which could easily happen for Model (6.1)—because of the independent variables such as income and postsecondary-educated human capital stock. However, models using different combinations of independent variables were estimated to check for robustness. The ordinary least squares method was used in Model (6.2), which is based on the production function and where data time points are one.

4. DATA

Table 6.1 describes the data used. It merges four datasets with a variety of countries and various levels of data availability. The high-skill migration dataset from Artuc et al. (2015) initially included 195 countries, which was reduced here to 186. The dataset provides the number of postsecondary-educated bilateral migrant stock and direction of migration. It was the first to develop a global human capital migration map including non-OECD countries as hosts, which differs completely from previous studies that targeted high-skill migrant movement to OECD countries. The dataset used here found that non-OECD hosts account for one-third of high-skill migration worldwide, with a higher proportion of postsecondary-educated people immigrating to OECD countries.

5. RESULTS

5.1 Characteristics of High-Skill Intra-ASEAN Migration (Research Question 1)

5.1.1 High-skill migration in regional communities

Table 6.2 offers an overview of four regional communities—ASEAN, MERCOSUR, NAFTA, and the EU. ASEAN has the largest population yet the smallest economic output. Members with smaller populations and lower economic levels have a greater migration impact than those that are larger and higher income. In 2010, the average proportion of the ASEAN postsecondary-educated population ranked third—MERCOSUR had the

Table 6.1   Data description and variable sources

Variable name	Description	Source
Skillmigration	Number of postsecondary-educated migrants and direction of migration	Comprehensive migration matrixes by education level and gender (1990–2000) Database Version 2 (April 2013), analyzed by Artuc et al. (2015) (see http://perso.uclouvain.be/frederic.docquier/oxlight.htm)
Income	Per capita gross national income based on purchasing power parity (in USD)	World Bank *World Development Indicators* (see http://data.worldbank.org/products/wdi)
Hcapital	Postsecondary-educated people aged 15 years and over in 2010	Barro-Lee Educational Attainment Dataset (see http://www.barrolee.com/)
Dist	Distance between two countries based on distance between their largest cities, where intercity distance is weighted by city's share of overall population	Centre d'Etudes Prospectives et d'Informations Internationales (CEPII) data: dist-cepii (see http://www.cepii.fr/)
Trade	Annual export and import of goods between two countries (in USD). Data for 1990 are unavailable at the country level—1995 data were substituted.	United Nations Comtrade Database (see https://comtrade.un.org/)

Note: Data accessed 14 February 2017.

smallest enrollment ratio for postsecondary education. This could relate to the proportion of skilled workers among total migrants.

Table 6.3 shows the high-skill migration for the four regional communities in 1990 and 2000. The Herfindahl–Hirschman Index (HHI)—usually used to show market share—shows the concentration of bilateral migration corridors.[2] ASEAN has some differences and commonalities with other regions. For instance, the number of high-skill intra-ASEAN migrants was less than out-migrants in 2000. The proportion of intraregional migrants to extra-regional migrants was 0.97 (ASEAN), 3.88 (MERCOSUR), 190.10

Table 6.2 Regional community overview

Name of regional community	ASEAN	NAFTA	MERCOSUL	EU
Number of countries	10	3	6	28
Names of members	Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, the Philippines, Singapore, Thailand, Viet Nam	Canada, Mexico, United States	Argentina, Bolivia, Brazil, Paraguay, Uruguay, Venezuela	Austria, Belgium, Bulgaria, Croatia, Czech Republic, Cyprus, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovenia, Slovakia, Spain, Sweden, United Kingdom
Population (millions)	597.91	460.87	276.63	495.26
Total regional GDP (USD trillion)	2.135	17.985	3.31	17.552
GDP per capita (USD)	3,571	39,025	11,964	35,440
Total trade (export and import) (USD trillion)	2.493	5.38	0.847	11.813
Proportion of tertiary education graduates aged 15 years and over in 2010	7.5	19.7	4.5	13.5
Gross tertiary education enrollment ratio in 2010	25.15	60.02	50.85	65.88

Notes:
ASEAN = Association of Southeast Asian Nations; MERCOSUR = the Mercado Común del Sur (Common Market of the South); NAFTA = North American Free Trade Agreement; EU = European Union (excludes Estonia); GDP = gross domestic product; USD = United States dollar. Data on 2010 postsecondary gross enrollment were unavailable for Myanmar (replaced with 2011 data), Bolivia (2007), Venezuela (2009), and Germany (2013). Singapore postsecondary gross enrollment based on 2012 Japan Embassy document, http://www.sg.emb-japan.go.jp/Japanese/gaikyo.pdf. Canada excluded from NAFTA calculations. Brazil is net 2010 enrollment ratio from MEXT Japan.

Sources: Population, GDP, and trade data are from Ministry of Foreign Affairs, Japan, 2015 (http://www.mofa.go.jp/mofaj/files/000127169.pdf, latest data published 2016; complete statistics for EU28 are available at the europa.eu portal; postsecondary-educated human capital from Barro and Lee (2013); gross enrollment ratio calculated from World Bank *World Development Indicators*.

Table 6.3   Migration in 1990 and 2000: ASEAN, MERCOSUR, NAFTA, EU

Region	ASEAN		MERCOSUR		NAFTA		EU	
Variables	Intra	Out	Intra	Out	Intra	Out	Intra	Out
Number of high-skill migrants in 2000	1,278	1,314	1,587	409	171,451	902	2,468	1,063
Share of high-skill migrants in 2000	10.41%	44.53%	23.06%	33.42%	21.05%	56.48%	21.55%	39.36%
Increase in high-skill migrants between 1990 and 2000 (%)	2.13	1.80	1.50	2.07	1.79	1.61	1.89	1.23
Increase in low-skill migrants between 1990 and 2000 (%)	1.36	1.53	1.05	2.84	2.07	1.13	1.07	0.93
Number of observations	100	1,750	36	1,074	9	546	784	4,396
Herfindahl–Hirschman Index (HHI)	2876.39	—	786.79	—	4449.86	—	166.76	—

(NAFTA), and 2.32 (EU). Although large intraregional migration within NAFTA and EU members is understandable given host countries are major OECD members—such as the United States in NAFTA countries and the United Kingdom and Germany in the EU—MERCOSUR also had more intraregional high-skill migrants than extra-regional migrants. However, all regional communities had higher proportions of high-skill extra-regional migrants than intraregional migrants. The difference of the proportion between intra- and extra-regional migrant mobility was biggest in ASEAN; the proportion of intra- (10.41%) versus extra-regional migrant mobility (44.53%) is 4.28. Among other regions, the highest proportion was 2.68 in NAFTA; the lowest was 1.45 in MERCOSUR.

Between 1990 and 2000 intra-ASEAN high-skill migration showed the highest increase (213%), higher than extra-regional migrant mobility (180%). The EU and NAFTA also had bigger increases in intraregional migration than extra-regional migration. High-skill migration increases were higher than low-skill migration increases in ASEAN and the EU. High-skill mobility in intraregional migration increased more than high-skill extra-regional migrant mobility, except in NAFTA.

In terms of bilateral intraregional migration corridors, the HHI was high in ASEAN (2,876.39) and NAFTA (4,449.86)—both of which are categorized as having high oligopoly tendencies. The HHI was lowest in the EU (166.76), followed by MERCOSUR (786.79), both categorized as having low-level oligopolies with greater competition.

5.1.2   Corridors of high-skill migration within ASEAN

Table 6.4a presents the top 10 corridors of intra-ASEAN migration in 1990 and 2000. Total migration more than doubled (118%) during the period. In both 1990 and 2000, the top 10 corridors covered more than 85% of total intraregional high-skill migration. The top corridor—from Malaysia to Singapore—more than tripled. In 2000, just over half of the total ASEAN high-skill migration (52%) was through this corridor, an increase of almost 20% from 1990. And with ASEAN admitting Viet Nam in 1995, the Lao PDR and Myanmar in 1997, and Cambodia in 1999, new high-skill migration corridors developed over the decade.

Table 6.4b shows the top 10 corridors for ASEAN extra-regional migration in 1990 and 2000. Total extra-regional migration increased 78% over the period. The top 10 corridors account for some 75% of the total in both 1990 and 2000. The top seven corridors held the same rank between 1990 and 2000. The US was the most popular host, with others prominent because of their colonial history (Indonesia–the Netherlands), geographical proximity (Australia as host), and migration experience (the Philippines–Saudi Arabia).

Table 6.4c describes the top 10 corridors of migration into ASEAN in

Table 6.4a Top 10 corridors of high-skill intra-ASEAN migration

Rank	2000				1990			
	Source	Host	Skill migration stock	%	Source	Host	Skill migration stock	%
1	Malaysia	Singapore	66,452	51.99	Malaysia	Singapore	19,005	31.61
2	Singapore	Malaysia	8,400	6.57	Philippines	Malaysia	9,273	15.42
3	Indonesia	Singapore	6,952	5.44	Indonesia	Malaysia	8,736	14.53
4	Malaysia	Brunei Darussalam	6,135	4.80	Myanmar	Thailand	5,298	8.81
5	Viet Nam	Cambodia	6,018	4.71	Malaysia	Brunei Darussalam	3,729	6.20
6	Indonesia	Malaysia	5,650	4.42	Indonesia	Singapore	1,820	3.03
7	Indonesia	Philippines	3,689	2.89	Thailand	Malaysia	1,688	2.81
8	Philippines	Malaysia	3,650	2.86	Singapore	Malaysia	1,242	2.07
9	Thailand	Cambodia	3,269	2.56	Philippines	Brunei Darussalam	725	1.21
10	Malaysia	Philippines	2,974	2.33	Thailand	Brunei Darussalam	489	0.81
Subtotal			113,189	88.55			52,005	86.50

Note: ASEAN = Association of Southeast Asian Nations.

Source: Calculations based on data from Artuc et al. (2015).

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Table 6.4b Top 10 corridors of high-skill ASEAN extra-regional migration

Rank	2000				1990			
	Source	Host	Skill migration stock	%	Source	Host	Skill migration stock	%
1	Philippines	United States	833,958	36.27	Philippines	United States	496,276	38.87
2	Viet Nam	United States	347,127	15.10	Viet Nam	United States	132,697	10.39
3	Philippines	Canada	154,960	6.74	Philippines	Canada	74,335	5.82
4	Indonesia	Netherlands	78,548	3.42	Indonesia	Netherlands	53,207	4.17
5	Viet Nam	Australia	57,970	2.52	Viet Nam	Australia	43,860	3.43
6	Thailand	United States	57,375	2.50	Thailand	United States	37,705	2.95
7	Philippines	Australia	51,487	2.24	Philippines	Australia	37,036	2.90
8	Viet Nam	Canada	49,790	2.17	Malaysia	Australia	35,366	2.77
9	Philippines	Saudi Arabia	41,654	1.81	Philippines	Saudi Arabia	28,688	2.25
10	Lao People's Democratic Republic	United States	41,440	1.80	Indonesia	United States	26,385	2.07
Subtotal			1,714,309	74.56			965,555	75.62

Note: ASEAN = Association of Southeast Asian Nations.

Source: Calculations based on data from Artuc et al. (2015).

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Table 6.4c Top 10 corridors of high-skill ASEAN in-migration

Rank	2000				1990			
	Source	Host	Skill migration stock	%	Source	Host	Skill migration stock	%
1	People's Republic of China	Singapore	30,567	18.96	People's Republic of China	Philippines	23,725	17.71
2	India	Singapore	17,593	10.91	United States	Philippines	18,263	13.63
3	People's Republic of China	Philippines	11,376	7.06	People's Republic of China	Thailand	12,625	9.42
4	United States	Philippines	10,678	6.62	People's Republic of China	Indonesia	11,276	8.42
5	United Kingdom	Philippines	7,226	4.48	United Kingdom	Philippines	7,679	5.73
6	Japan	Thailand	6,317	3.92	People's Republic of China	Malaysia	5,615	4.19
7	India	Malaysia	5,600	3.47	People's Republic of China	Singapore	4,991	3.73
8	Bahrain	Philippines	4,794	2.97	Japan	Philippines	4,760	3.55
9	Japan	Malaysia	3,950	2.45	People's Republic of China	Myanmar	2,807	2.10
10	Hong Kong, China	Thailand	3,028	1.88	India	Philippines	2,354	1.76
Subtotal			101,129	62.73			94,095	70.24

Note: ASEAN = Association of Southeast Asian Nations.

Source: Calculations based on data from Artuc et al. (2015).

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1990 and 2000. The increase was 7% over the decade, below the growth of both intraregional and extra-regional migration of high-skill migrants. On one hand, the slow growth was because of a decrease in high-skill migration to the Philippines. On the other hand, Singapore became far more attractive as a host for migrants from the People's Republic of China (PRC) and India. In addition, corridors grew more diverse over the period. For example, the PRC as source country appeared six times in 1990 and twice in 2000, while the Philippines as a host country appeared five times in 1990 and three times in 2000.

5.2 The Relationship between High-Skill Intra-ASEAN Migration and Postsecondary-Educated Human Capital (Research Question 2)

For Model (6.1), deviance and Pearson goodness-of-fit tests were conducted to decide the count data model distribution (deviance: goodness-of-fit = 9199.468, $p > \chi^2$ (7823) = 0.0000; Pearson: goodness-of-fit = 7672.638, $p > \chi^2$ (7823) = 0.8858). Although the results of these two tests are inconsistent, the Pearson test supports the use of Poisson distribution. The Vuong test was then conducted, with the results supporting the use of the zero-inflated model (z = 32.36, p > z = 0.0000). Therefore, the zero-inflated Poisson regression is appropriate for Model (6.1) and the panel data estimation with random effect. The results are in Table 6.5, showing R^2 higher in the panel data estimation shown from columns (1) to (8) than the zero-inflated Poisson estimation shown from columns (9) to (16). Although the significance and sign of coefficients are similar between the two estimation types (with some exceptions), the results estimated by panel data is better.

From the estimation results targeting the entire data shown as World in column (1), the coefficient of four regional dummy variables does not show any significant result. However, the cross term of human capital stock in ASEAN countries does show significant results, indicating that the human capital stock in either ASEAN source or host countries has a different relationship with high-skill migration to other regions.

The similarities and differences between ASEAN countries and other regions appear in the relationship between bilateral countries. First, the coefficient of distance variable for intra-ASEAN mobility shown in column (3) is negative and significant, and that of extra-ASEAN migration in column (4) is insignificant—the same tendency as that for the EU. This differs from expectations, which assumes negative and significant coefficients of the distance variable for any migration type. This result means that distance matters for intra-ASEAN and intra-EU migration, but not for extra-regional migration. The coefficient of trade is significant

and positive for intra-ASEAN mobility in column (3). Trade seems to have little relationship with skill migration within ASEAN countries, which again differs from expectations as well as the results of Jurje and Lavenex (2015). The common official language is also positive and significant for both intra- and extra-ASEAN migration—as with the EU. For source- and host-specific characteristics, the coefficient of income in the host variable has—as expected—positive and significant results for all four regions and the world. Income in source is positive and significant for intra-ASEAN and extra-NAFTA migration, but negative and significant in both intra- and extra-EU migrations in columns (7) and (8). Against expectations, human capital in the host variable shows insignificant results. However, the source variable includes various regions and types of migration— the world, extra-ASEAN migration, intra- and extra-EU migration are positive and significant, while extra-NAFTA migration is negative and significant. Income and human capital stock differences between source and host countries do not show any significant results except for the world estimation—these differences have little influence on intraregional migration, but could have some relationship with income and human capital levels in both source and host countries.

In summary, when migrating within ASEAN, high-skill workers from higher-income countries move to nearby countries with relatively higher incomes and common languages. The migration flow is irrespective of trade in ASEAN countries—which differs from the relationship in MERCOSUR, NAFTA, and the EU.

In Table 6.6, the estimation results for different combinations of independent variables in Model (6.1)—targeting high-skill intra-ASEAN migration—are shown from columns (17) to (22). Results on targeting high-skill intra-EU migration are in columns (23) to (28). The average of R^2 is 0.457 in ASEAN countries and 0.702 in the EU, which indicates that the current education and economy-focused model had a better fit for the EU—although the number of observations between the two datasets is on average 72 and 694, respectively. Here, the results of distance and official language have the same sign and significance as all the results. The coefficient of the income difference variable does not show any significant result, but that of the human capital difference is significant for the model without source- and host-specific variables. Human capital in the host variable shows an insignificant result in column (23), and that of host shows positive and significant results at the 1% level in column (21). These results indicate that high-skill migration has a positive relationship with human capital in the source country, but not the host country within ASEAN and the EU. The coefficient of income level in either source or host country is also significant.

Table 6.5 Estimation results for Model (6.1) combined

Method				Panel with random effect				
Model (6.1)	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Target	World	World	Intra-ASEAN	Out ASEAN	Out MERCOSUL	Out NAFTA	Intra-EU	Out EU
Independent variables								
Distance	−0.6091***	−0.6068***	−1.7348***	0.08	−1.3343***	−0.8794***	−0.6194***	0.01
	(−18.67)	(−20.67)	(−3.15)	(0.35)	(−5.26)	(−4.22)	(−5.82)	(0.08)
Income difference	0.0626***	0.0629***	−0.28	0.05	0.01	0.11	−0.03	0.1765***
	(3.16)	(3.18)	(−1.21)	(0.69)	(0.15)	(0.67)	(−0.47)	(3.32)
Hcapital difference	−0.0586***	−0.0600***	0.10	−0.1099*	−0.07	−0.07	0.03	−0.05
	(−3.16)	(−3.23)	(0.39)	(−1.75)	(−0.93)	(−0.65)	(0.56)	(−0.96)
Trade	0.2099***	0.2098***	0.13	0.2167***	0.1537***	0.3539***	0.3371***	0.2585***
	(20.42)	(20.50)	(1.06)	(5.47)	(3.00)	(6.57)	(7.35)	(7.72)
Hcapital in destination	0.03	0.03	−0.15	−0.11	0.05	0.00	0.15	0.01
	(1.16)	(1.32)	(−0.68)	(−1.04)	(0.51)	(−0.02)	(1.37)	(0.22)
Hcapital in origin	0.3739***	0.3719***	0.01	0.3025***	0.09	−2.4315***	0.7794***	0.7552***
	(13.53)	(13.48)	(0.04)	(2.96)	(0.43)	(−3.26)	(6.89)	(6.12)
Income in destination	0.6103***	0.6080***	0.5800*	0.9201***	0.8454***	0.4177***	0.4838***	0.5027***
	(20.52)	(20.45)	(1.80)	(7.31)	(6.56)	(3.63)	(4.32)	(7.36)
Income in origin	−0.0889***	−0.0872***	1.1256***	−0.16	0.14	2.9479***	−0.2935**	−0.5022***
	(−2.80)	(−2.75)	(2.65)	(−1.07)	(0.73)	(3.84)	(−2.45)	(−3.98)
Four regional community dummy	0.01							
	(0.21)							

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Official common language	1.4160*** (21.84)	1.4169*** (22.22)	2.0323** (2.53)	1.3229*** (3.82)	0.19 (0.47)	0.8304*** (3.94)	1.2426*** (4.23)	1.0800*** (4.38)
Colony relation	1.6647*** (12.19)	1.6680*** (12.22)	0.00 (.)	3.2622*** (4.06)	2.4924*** (3.07)	1.4437** (2.30)	1.3805*** (4.42)	1.4724*** (5.08)
Hcapital in ASEAN destination		−0.1730* (−1.72)						
Hcapital in ASEAN origin		0.1902** (2.05)						
Constant	−14.1655*** (−20.74)	−14.1863*** (−20.85)	−21.0553** (−2.56)	−22.8026*** (−6.19)	−13.1476*** (−3.13)	−50.9020*** (−5.26)	−14.1131*** (−5.90)	−15.1309*** (−7.28)
Inflate trade								
Inflate constant								
Adj. R-squared	0.53	0.53	0.52	0.53	0.61	0.60	0.73	0.44
N	7,835	7,835	64	572	304	419	648	1,501

Table 6.5 (continued)

Method					Poisson			
Model (6.1)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Target Independent variables	World	World	Intra-ASEAN	Out ASEAN	Out MERCOSUL	Out NAFTA	Intra-EU	Out EU
Distance	−0.1739***	−0.1754***	−0.2539**	−0.06	−0.3460***	−0.2790***	−0.1690***	−0.0797***
	(−23.63)	(−28.04)	(−2.05)	(−1.33)	(−5.06)	(−5.63)	(−5.79)	(−4.38)
Income difference	0.0160***	0.0166***	−0.08	−0.03	0.01	0.02	0.00	0.0544***
	(2.86)	(2.97)	(−1.42)	(−1.48)	(0.66)	(0.37)	(0.07)	(3.90)
Hcapital difference	−0.0194***	−0.0204***	0.09	−0.0321*	−0.0454*	−0.0619*	0.01	−0.0277**
	(−3.56)	(−3.75)	(1.26)	(−1.75)	(−1.89)	(−1.67)	(0.36)	(−2.05)
Trade								
Hcapital in destination	0.01	0.01	−0.08	−0.0554*	0.06	0.00	0.05	−0.01
	(1.29)	(1.55)	(−1.48)	(−1.82)	(1.60)	(−0.13)	(1.23)	(−0.33)
Hcapital in origin	0.0959***	0.0948***	0.00	0.1066***	0.02	−0.6799***	0.1278***	0.1331***
	(12.66)	(12.61)	(0.06)	(3.58)	(0.33)	(−3.26)	(3.16)	(3.74)
Income in destination	0.1858***	0.1850***	0.1704**	0.3214***	0.2084***	0.1634***	0.1271***	0.1924***
	(23.28)	(23.27)	(2.13)	(9.73)	(4.83)	(5.34)	(3.59)	(11.10)
Income in origin	0.0146*	0.0157**	0.2707**	−0.04	0.08	0.8872***	0.01	−0.03
	(1.86)	(2.02)	(2.11)	(−0.84)	(1.53)	(4.06)	(0.21)	(−0.87)
Four regional community dummy	0.01							
	(1.01)							
Official common language	0.3325***	0.3311***	0.3471**	0.2881***	0.02	0.2188***	0.1779**	0.2814***
	(22.18)	(22.44)	(2.34)	(4.16)	(0.12)	(4.18)	(2.31)	(5.42)

Colony relation	0.2455***	0.2469***	0.00	0.4072***	0.4851**	0.06	0.2823***	0.2632***
	(9.96)	(10.01)	(.)	(3.73)	(2.57)	(0.52)	(3.56)	(4.81)
Hcapital in ASEAN destination	−0.0636***							
	(−2.72)							
Hcapital in ASEAN origin	0.0711***							
	(3.28)							
Constant	−3.8844***	−3.8929***	−5.1222*	−4.9504***	−4.0102***	−13.5749***	−3.1427***	−4.9545***
	(−22.38)	(−22.43)	(−1.96)	(−4.75)	(−3.09)	(−4.82)	(−4.39)	(−9.93)
Inflate trade	−0.2703***	−0.2701***	−2339.85	−0.3361***	−0.3046**	−0.4644***	−0.94	−0.2896***
	(−16.34)	(−16.32)	(−0.00)	(−5.54)	(−2.13)	(−3.29)	(−0.77)	(−7.21)
Inflate constant	1.4638***	1.4593***	34054.16	3.0938***	1.49	5.1696**	8.79	2.3658***
	(5.81)	(5.79)	(0.00)	(3.29)	(0.74)	(2.14)	(0.46)	(3.58)
Adj. R-squared	0.156	0.157	0.035	0.172	0.163	0.115	0.149	0.143
N	7,835	7,835	64	572	304	419	648	1,501

Notes:
ASEAN = Association of Southeast Asian Nations; MERCOSUR = the Mercado Común del Sur (Common Market of the South); NAFTA = North American Free Trade Agreement; EU = European Union.
Values are the average of bilateral corridors. "Intra" means migration within the region; "Out" means migration from one region to another. * p < 0.10, ** p < 0.05, *** p < 0.01, intra-MERCOSUR and intra-NAFTA were omitted because of the limited number of observations.

Source: See Table 6.1.

Table 6.6 Estimation results for Model (6.1) by region

Model (6.1) Target Independent variables	Panel with random effect					
			Intra-ASEAN			
	(17)	(18)	(19)	(20)	(21)	(22)
distance	-1.0283**	-1.7555***	-1.8545***	-0.8789	-1.4647***	-1.1463*
	(-1.97)	(-3.34)	(-4.11)	(-1.57)	(-2.74)	(-1.90)
income difference		-0.26		0.33	-0.21	0.26
		(-1.17)		(1.59)	(-0.87)	(1.20)
Hcapital difference	0.0123			0.2501	0.0948	0.2154
	(0.05)			(0.96)	(0.37)	(0.85)
trade	0.2389**	0.133		0.3765***	0.2998***	0.1982
	(2.47)	(1.08)		(3.60)	(3.02)	(1.41)
Hcapital in destination	0.1712		0.1325			-0.2773
	(1.37)		(0.79)			(-1.16)
Hcapital in origin	0.5409***		0.4604***		0.0132	
	(3.31)		(2.76)		(0.05)	
income in destination		0.4104**	0.4076*			0.7564**
		(2.15)	(1.81)			(2.10)
income in origin		1.1872***	0.3954*		1.1553***	
		(4.49)	(1.85)		(2.66)	
official common language	2.3677***	2.0629***	2.6598***	1.7160**	1.8809**	1.8210**
	(2.83)	(2.61)	(3.88)	(1.97)	(2.33)	(2.00)
colony relation	0	0	0	0	0	0
	(.)	(.)	(.)	(.)	(.)	(.)
_cons	-2.1277	-19.2525***	-9.9657*	-7.8524	-16.4990**	-15.4098**
	(-0.49)	(-3.19)	(-1.73)	(-1.22)	(-2.19)	(-2.07)
R-squared	0.4197	0.5032	0.5343	0.3975	0.4963	0.3897
N	78	64	99	64	64	64

| Model (6.1) | Panel with random effect | | | | | |
| Target | | | Intra-EU | | | |
Independent variables	(23)	(24)	(25)	(26)	(27)	(28)
distance	−0.6543***	−0.6509***	−0.9198***	−0.3717***	−0.3764***	−0.4664***
	(−6.26)	(−5.86)	(−9.31)	(−3.17)	(−3.30)	(−4.17)
income difference	0.0138	−0.01		0.06	0.1089*	0.01
	(0.31)	(−0.18)		(0.85)	(1.72)	(0.17)
Hcapital difference				0.2129***	0.1269**	0.1760***
				(3.46)	(2.11)	(2.99)
trade	0.3862***	0.2592***		0.6506***	0.6800***	0.5151***
	(10.24)	(5.62)		(19.92)	(19.22)	(14.77)
Hcapital in destination	0.6055***		0.1417			0.1371
	(11.30)		(1.57)			(1.17)
Hcapital in origin	0.3949***		0.4486***		0.9245***	
	(7.24)		(4.93)		(7.57)	
income in destination		0.6983***	0.7575***			0.2734**
		(12.17)	(8.83)			(2.44)
income in origin		0.4687***	0.2762***		−0.8243***	
		(8.02)	(3.26)		(−6.97)	
official common language	1.1811***	1.1901***	1.6001***	0.6630**	0.7901**	0.8648***
	(3.88)	(3.88)	(5.70)	(2.02)	(2.48)	(2.76)
colony relation	1.3303***	1.5396***	1.4027***	1.1351***	1.0273***	1.2205***
	(4.14)	(4.72)	(4.62)	(3.24)	(3.02)	(3.66)
_cons	−11.3998***	−24.9716***	−22.6377***	−9.3892***	−1.437	−13.1956***
	(−11.04)	(−14.39)	(−12.22)	(−6.86)	(−0.80)	(−7.32)
R-squared	0.7108	0.7044	0.7018	0.6826	0.707	0.7074
N	696	648	875	648	648	648

Notes:
ASEAN = Association of Southeast Asian Nations; MERCOSUR = the Mercado Común del Sur (Common Market of the South); NAFTA = North American Free Trade Agreement; EU = European Union.
* p < 0.10, ** p < 0.05, *** p < 0.01, intra-MERCOSUR and intra-NAFTA results were omitted because of limited observations.

Source: See Table 6.1.

5.3   How High-Skill Intra-ASEAN Migration Influences Postsecondary Education Enrollment (Research Question 3)

Model (6.2) was estimated using the ordinary least squares method (Table 6.7). The adjusted R^2 is low, which suggests the need to either include additional independent variables or modify the model or estimation method. All results show the coefficients of high-skill migration variables are positive and significant at 1%. This was expected. The change in high-skill migration has a positive relationship with the change in human capital stock, which indicates the probability that inter-country migration drives the accumulation of human stock in both source and host countries. The coefficient of the income change variable is insignificant except for the world, which is positive and significant, and extra-ASEAN and intra-EU migration, which are negative and significant. This was unexpected. One interpretation is that it results from economic stagnation and an increase in postsecondary education enrollment in host countries—such as in Japan recently. But this needs to be confirmed.

6.   CONCLUSIONS

This chapter clarifies two main points to the literature on high-skill migration within ASEAN. It clarifies the nature of high-skill migration and the relationship between high-skill migration and postsecondary education. The analysis is based on the latest available dataset from 1990 and 2000 provided by Artuc et al. (2015).

First, intra-ASEAN migration was responsible for the lowest proportion of high-skill migration and the second-highest concentration of bilateral corridors among four regional communities—ASEAN, MERCOSUR, NAFTA, and the EU. The findings clarify migration characteristics as indicated by previous studies. In both 1990 and 2000, the concentration of migrants in the top 10 bilateral corridors accounted for more than 85% of the intraregional high-skill migration. In 2000, just over half of total migration flowed from Malaysia to Singapore, up from less than one-third in 1990. Also, there was a modest increase of immigrants into ASEAN countries, but the number of high-skill migrants leaving ASEAN and intra-ASEAN migration nearly doubled.

Second, the results indicate that human capital stock in source countries—not in host countries—may explain high-skill intra-ASEAN migration. However, bilateral high-skill intra-ASEAN mobility explains postsecondary-educated human capital stock in both source and host countries; therefore, high-skill ASEAN mobility could have a positive

Table 6.7 Estimation results for Model (6.2)

Method			Ordinary Least Squares (OLS)				
Model (6.2)	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Target	World	intra-ASEAN	out ASEAN	out MERCOSUL	out NAFTA	intra-EU	out EU
Independent variables							
Skillmigration	0.2858***	0.2625***	0.2801***	0.3310***	0.2748***	0.3794***	0.3236***
	(28.33)	(3.43)	(7.61)	(5.35)	(7.82)	(22.31)	(16.49)
Income	0.1422***	−0.39	−0.3312***	−0.32	0.09	−0.1367**	−0.06
	(5.66)	(−1.51)	(−3.32)	(−1.50)	(0.88)	(−2.09)	(−1.00)
Regional community	−0.2787***						
	(−8.06)						
constant	20.6136***	28.1446***	29.2921***	27.5341***	22.7289***	23.3611***	23.6247***
	(53.85)	(6.96)	(18.36)	(8.16)	(14.26)	(20.65)	(24.86)
Adj. R-squared	0.28	0.27	0.31	0.23	0.32	0.62	0.34
N	2,738	28	130	89	169	314	571

Notes:
ASEAN = Association of Southeast Asian Nations; MERCOSUR = the Mercado Común del Sur (Common Market of the South); NAFTA = North American Free Trade Agreement; EU = European Union.
Values are the average of bilateral corridors. "Intra" means migration within the region; "Out" means migration from one region to another.
* p < 0.10, ** p < 0.05, *** p < 0.01, intra-MERCOSUR and intra-NAFTA were omitted because of limited observations.

Source: See Table 6.1.

two-way relationship with greater investment in postsecondary education in source countries.

There are several policy implications. First, there are reasons to encourage high-skill intra-ASEAN migration: (i) it tends to increase postsecondary education enrollment in source countries—given the low level of current high-skill intra-ASEAN mobility compared with MERCOSUR, NAFTA, and the EU. Therefore, high-skill intra-ASEAN migration benefited the accumulation of human capital from 1990 to 2000 throughout the region, compared with the three other regions. It makes sense to discuss migration and postsecondary education policies together.

Second, high-skill migration into ASEAN should be investigated further as there was only a modest increase compared with both intra-ASEAN and extra-regional migration. This goes beyond the AEC's focus on intra-ASEAN migration. However, high-skill migration to ASEAN relates directly to its competitiveness—and could relate to intra-ASEAN migration as it picks up. Trends have likely changed since 2000. Longer time series data would make analysis available for causality relationships between regional high-skill migration and postsecondary-educated human capital accumulation. Also, international study makes a difference. The rise in international study is an important driver for high-skill migration in Asia (ADBI 2014) and could be for ASEAN in particular.

NOTES

1. This is understandable as the policy and research debate on migration and development has swung back and forth like a pendulum (de Haas 2012).
2. The HHI is calculated as HHI = $s1^2 + s2^2 + s3^2 + \ldots + sn^2$ (where sn is the market share of the ith firm). If the firm has 100% market share, HHI equals 10,000 (100^2), indicating a monopoly.

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7. Institutionalized costs and international migration patterns
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1. INTRODUCTION

Analyzing cross-border labor migration has been one of the most complex yet interesting subjects for research in labor economics, international economics, and public economics, among others. It also delves into the political economy and strongly influences public policy in different countries. Furthermore, the need to understand the scope and dynamics of labor migration with diverse impacts on source and host countries spans various disciplines and school of thoughts. This chapter focuses on investigating the influence of source country policies on emigration patterns. A dedicated public policy is expected to facilitate collection of tax revenues and use them further to compensate for any unwarranted impact of labor migration—such as "brain drain." There appears to be a deterministic pattern of migration from source countries when migrants face institutional costs such as exit taxes (payable at the time of leaving a country). The reference to exit taxes is by no means a policy designed to curb emigration from source countries. Instead, they can be used to improve the stock of human capital in source countries—with established welfare implications (Stark and Wang, 2002)—and could eventually promote more skilled than unskilled emigration from developing countries. In particular, they could be used to create incentives for relatively unskilled workers to learn new skills and then consider emigration. To understand the scope of this policy, this chapter surveys studies covering the established relationship between trade, public policies, and labor mobility. Those focused more on the observed complementarity between trade and migration are discussed.

One of the reasons for this emphasis is that labor migration increasingly emanates from developing economies, which individually and collectively have also seen international trade rise substantially with more advanced host economies during the period studied. Indeed, the relationship between trade and migration is not only borne out by statistical analysis, but also suggests distinctive patterns of migration across countries.

Section 2 reviews related studies; Section 3 discusses the policy background; Section 4 develops a model with migration tax and applies numerical solutions, while Section 5 concludes.

2.   THE LITERATURE

Hypotheses on the relationship between migration patterns and possible determinants have been widely studied. For example, several argue that the presence of asymmetric information between source and host countries is an important criterion influencing migration patterns. Another line of argument posits that the availability of public goods in advanced economies often acts as a magnet attracting migrants. It is also well known that—apart from pull factors—economic and/or political instability in source countries can often push workers to migrate (a detailed survey and modeling of these and related issues are available in Acharyya and Kar, 2014; Beladi and Kar, 2015). These and several other lines of discussion define the scope of this chapter.

Many studies show that international trade and labor migration are complements rather than substitutes, at least in the short run (see Schiff, 1994; Marjit and Beladi, 2002; Schiff, 1996; Narayan and Smyth, 2006; Kugler and Rapoport, 2011, among others). In general, this implies that trade liberalization will temporarily lead to more migration—not less—and create a short-run migration hump. Existing studies offer at least three plausible explanations for this positive relationship. First, by creating new employment in source countries, trade liberalization provides families with a means to finance international migration, which they could not afford otherwise. Second, as factor usage can shift in affected sectors following trade reforms, there would be some economic costs involved in transferring resources from one sector to another. This can cause transitional unemployment and therefore encourage more workers to emigrate. And, third, if the most protected import-competing sectors in the economy are labor intensive, then trade liberalization could boost unemployment, generating a push factor for worker migration (mainly unskilled) or create an incentive to boost training.

2.1   Migration among ASEAN Members

The short-run complementarity between trade and migration following trade reform will increase migration above the usual quasi-concave trend line. Conversely, over the long run, substitutability between trade and migration will cause the hump to slide downward. It is crucial to note

that most of these studies provide fairly scant information on how the migration pattern differs across skill types. For example, expansion of trade within the Association of Southeast Asian Nations (ASEAN) could also lead to greater skilled labor mobility. It is important to enquire if other factors—such as institutional costs associated with migration—offer complementary explanations.

Even when opportunities for migration are available, associated costs can often be restrictive and alter perspectives of expected relationships. Therefore, quantifying the cost range for these relationships could be useful for policymakers either for or against greater worker mobility in many countries. In fact, knowing these institutional costs can better measure the exact amount of wage premium needed before skilled and unskilled workers decide against migrating. Notably, migration costs can take many forms and operate through an individual worker's preferences. For example, Faini and Venturini (1993a, b) discuss how rising incomes make the cost of leaving one's own country onerous, as seen for migrants moving from south to north Italy or within Portugal. The specific cost examined in this chapter is a tax paid by migrants differing by skill type. It is important to mention that the few studies that investigate this possibility do not agree on whether these policies are socially desirable or which skill type should be preferred. Indeed, for many policymakers the issue of migration taxes on skill types remains moot. They are both sensitive topics within ASEAN. Yet, their relevance for ASEAN migration is noteworthy—the Philippines previously used these policies.

Also, it is important to remember that education is often not a good predictor of skill development or attainment—using the skilled versus unskilled categorization of workers has its inherent problems. Nevertheless, this chapter offers some observations on migration patterns of skilled versus unskilled labor for a select number of ASEAN countries. These show that in recent years skilled workers tend to migrate more than unskilled workers. Across skill types, pull and push factors may substantially differ and may be influenced by several country-specific factors. For example, using British Panel Data, Rabe and Taylor (2012) show that workers decide to migrate based on pull factors—such as expected wage, employment opportunities, and housing prices prevalent at the destination. Individual characteristics observed (with unobserved heterogeneity corrected) at the source matter very little. Fafchamps and Shilpi (2013) use the Nepal Living Standard survey to show that migrants prefer less variation in terms of ethnic background of groups at host destinations; prefer high-density areas with more public amenities; and feel comfortable in places where many speak their language. Compared with these, several studies show that lack of opportunities, or political and/or

religious persecution, influences emigration much more than host-country characteristics. All of these represent different forms of costs. The continuing Syria–Europe migration (asylum seekers/refugees) is an example of the push factors causing migration.[1]

It seems that the choice of migration by skill type and how it responds to changes in trade patterns may alter significantly when accounting for skill distribution. It might also require additional explanations beyond the trade–migration link. There is some apprehension (Gois, 2015) that migration into or within the ten-member ASEAN region sometimes qualifies as "irregular" migration—mostly women domestic workers (or in other sectors) not included as those typically engaged in manufacturing and services. This may have to do with distribution of skills across migrant cohorts. ASEAN members largely acknowledged this by adopting the Agreement on the Promotion and Protection of the Rights of Workers (2012), through an initiative of the Law Reform Commission of Thailand. The Agreement harbors a broader vision in that it should be applicable to all workers—recognizing the equal status of migrant workers, particularly those engaged in caregiving and domestic work. Negotiations focused on building consensus among ASEAN members in each article of the draft. The Agreement was finalized in October 2015. Recent developments thus allow a deeper look into the causes behind observed migration patterns beyond that predicted by international trade. Also important to policy-makers is whether observed migration trends are welfare enhancing for host and/or source countries. On the one hand, if more skilled migrants join the workforce of a given country, productivity and output should improve. On the other hand, as there may be complementarity within migrant groups by skill type, relatively unskilled migrants may follow skilled migrants, with very different implications for the labor market and for development trajectories.

3. THE POLICY BACKGROUND OF MIGRATION TAXES

The existence of pure asymmetric information in cross-border labor markets implies that employers in the migrant country cannot discern the true skill type and productivity of immigrant job seekers, at least initially. This could lead to wage pooling across skill types.[2] Pooling is the weighted average of respective payoffs across skill types. Pooling equilibrium can result from cultural and physical distances between source and origin countries because information is not readily interpretable and information systems between the two (or multiple) countries differ significantly. It may

also happen when workers are relatively young, without experience, and lack credentials to prove their productive capacity at time of entry.

Large "north–south" migrations beyond past colonial and later Commonwealth connections usually suffer from this information distortion. But the problem is quite generic and could also apply to rural–urban migration, where skill levels are not interpreted uniformly. The information asymmetry may also occur across sectors located in more than one country, given differences in work culture, nature of entrepreneurship practiced across locations, and adaptability of potential migrants. The last of these often translates into a discount factor (as in Katz and Stark, 1987). According to this specification, the more distant cultural and traditional practices are—considerable differences in food habits or the high cost of living away from family and friends, for example—the more they accumulate into a discount factor. The larger the inverse of the discount factor, the lower the post-migration income compared with pre-migration returns. The rate of discount should be much lower for migration between less heterogeneous countries. However, some asymmetric information-related costs can be reduced by "signals" from prospective immigrants—information or readily verifiable credentials sent out at a cost. These signal costs could nonetheless be restrictive for certain sections of the population. Alternatively, foreign employers use screening devices (mechanisms to isolate the more productive from the less productive) to sort workers prior to offering jobs. At the same time, there is no uniform screening device globally that can help measure the productivity of immigrant job seekers on the spot.

Currently, despite the availability and transmission of huge amounts of information via electronic media, asymmetric information continues to be a dominant feature of the host country's migrant labor market.[3] Thus, in many cases employers prefer to administer a spot-market-pooled wage for both skilled and unskilled workers. In this regard, Katz and Stark (1987) showed that across a continuum of skills, the pooled wage offer in the host country may fail to attract high-skilled workers. In that case, signaling by high-skilled workers directly could be the only feasible tool to restore information symmetry and guarantee appropriate labor market returns by skill type.

We argue that despite asymmetric information and the initial disadvantage faced by skilled workers, the wage premium generally has been sufficient to create brain drain from developing countries. Decades of research have engaged with corrective mechanisms and some of these find their way back into concurrent debates. The urge to relocate in the Republic of Korea; Hong Kong, China; or Singapore for ASEAN migrants is directly attributed to this income incentives leading to brain drain. Indeed, flows would be much greater when information symmetry returns over time, via

networks, reputation, and language proficiency, among others. There may however, be specific selection processes for migrants to more advanced economies. Point-based immigration systems—adopted in Australia, for example—directly favor more skilled workers. In this chapter the example of exit taxes is used as a form of cost—given their renewed importance and relevance in less-developed economies' policies (Bradford, 2013 and Desai et al., 2009, 2004 discuss this clearly and in considerable depth).

The reason for invoking exit taxes here is two-fold. First, the skill-specific exit taxes are based on citizenship rather than residence. This follows, for example, the United States (US), Philippines, and Eritrea model. There were two economic and legal issues that motivated Jagdish Bhagwati's initial recommendation for using exit taxes (see Bhagwati, 1987, p. 53). These include no representation without taxation and a brain drain reversal. Depending on the complexity of cross-country agreements and administrative costs, it can also be considered an income tax on foreign-earned income—an additional cost for prospective emigrants. The Philippines raised $23 million between 1973 and 1976 using a 1–3% flat tax. Presently, US citizens on average repatriate $100 billion in foreign-earned income annually.

Second, the revenue implications of skill-specific taxes are calculated when migration is sensitive to tax rates. This can help determine whether the fiscal implications of exit taxes are at odds with evolving migration patterns. Instead of exit tax rates, migration-related remittances and deposits could also be taxed, as in the Philippines: 50% of overseas foreign workers' (OFWs) foreign currency deposits held jointly with a spouse or any other family member are liable to a 7.5% tax. In many countries, including India (the largest recipient of migrant remittances), nonresident foreign currency deposits are tax exempt if the worker is away from the country for at least 189 days. The Philippines' top host destinations for OFWs include Saudi Arabia; the United Arab Emirates; Hong Kong, China; Qatar; Singapore; and Kuwait, among others. In these destinations migration is encouraged to the extent it delivers back a portion of what would be lost in revenues otherwise. Naturally, if high-skilled migrants remit to home, revenues could be much greater even with lower tax rates. Eritrea, however, is restricted by the United Nations (UN) from collecting migrant taxes as a sanction against the current regime. Yet Eritrean embassies reportedly continue to collect a 2% diaspora tax in many countries. The policy is clearly engrained in the US since 2008, when Internal Revenue Code (IRC) 877A expatriation rules were enacted such that:

> (i) the average annual net income tax for the 5 years ending before the date of expatriation or termination of residency is more than a specified amount

adjusted for inflation ($151,000 for 2012, $155,000 for 2013, $157,000 for 2014, and $160,000 for 2015);
(ii) the nonresident's net worth is $2 million or more on the date of expatriation or termination of residency; or
(iii) the nonresident fails to certify on Form 8854 that he/she have complied with all US federal tax obligations for the 5 years preceding the date of expatriation or termination of residency.

To summarize, exit taxes were first recommended by Bhagwati and Partington (1976) and faced several legal, political, and economic controversies. In fact, there are many arguments for and against migrant taxes. Briefly, Bhagwati (1979, 1987) proposed using migrant tax revenue for development spending and to address the politically sensitive issue of representation without taxation. Similarly, Straubhaar and Wolburg (1998) discussed the legitimacy of taxing skilled emigration. A few countries also numerically evaluated taxing schemes. For example, an exit tax for H1-B workers[4] from India to the US alone (Desai et al., 2004) at the rate of $10,000 per H1-B worker can generate $500 million, with revenues supporting education (skill development) at various levels.[5] Importantly, the revenue implications of emigration by various skill levels are not discussed in this literature. The model here intends to capture this possibility.

4.   MODEL AND RESULTS

Let there be a continuum of skilled workers denoted by $S \in [0, \overline{S}]$ originating in a developing country (P). They earn $w_P(S)$ at the source and, if they migrate successfully to a developed country (R), they earn wage $w_R(S)$ if their skill level is interpreted with symmetric information: $w_R(S) > w_P(S) \forall S$. As worker productivity is not known with symmetry, risk-averse employers offer pooled wage $\overline{W}(S)$ to all workers migrating from the developing to the developed country, at least until the true productivity of the worker is revealed. The measure of this pooled wage is given by

$$\overline{W}(S) = \frac{\displaystyle\int_0^S w_R(S) F(S)\, ds}{\displaystyle\int_0^{\overline{S}} F(S)\, ds} \tag{7.1}$$

Presently S is defined over one type of occupation only—say, engineers (but could be extended to include other types)—and the distribution

captures variation in their skill level. Also, $\overline{S}$ is assumed to be the top skill level migrating and $F(S)$ is the probability density function of the distribution of skill. However, each worker receives an average of the entire group because individual skill levels are not known with certainty. Suppose the average wage in (7.1) corresponds exactly with a skill level S^*. Therefore, $S > S^*, \forall S \in [S^*, \overline{S}]$ workers shall not migrate, while $S \leq S^*, \forall S \in [0, S^*]$ workers would certainly consider migrating, but this would truncate the highest skill level migrating under asymmetric information to $S^* < \overline{S}$.

This could get more complicated. Consider a skill-invariant discount factor applied on post-migration wage, $0 < k < 1$. Then, a worker computes $[k W_R(S) - W_P(S)]$ to decide whether to migrate or not. The worker migrates if $k W_R(S) > W_P(S)$. The gap is non-decreasing in S.[6] Importantly, there may be multiple values of S for which $[k W_R(S) - W_P(S) = 0]$. However, if information were symmetric to begin with, then the true wage of those who did not migrate under asymmetric information would be higher, or $k W_R(S^*) \geq k \overline{W}_R(S^*)]$ if S^* is the top migrating group. Consequently, all $S \geq S^*$ should always migrate under symmetric information when S^* was the top migrating group under asymmetric information. One can see that the migration pattern changes considerably by allowing more skilled workers to migrate when the regime of asymmetric information across countries switches to symmetric information.

Suppose that informational symmetry is reinstated through signaling by individual workers at a fixed cost C. This could take the form of training with country-specific relevance, qualifying in a global competitive examination, or acquiring advanced language abilities, among others. Earlier, it was shown that the opportunity to signal allows more skilled workers to migrate (see Katz and Stark, 1987). More specifically, it was claimed that if skill type S^* invests in the device and migrates, then all $S > S^*$ should ideally do the same. The signal helps bypass the wage-related disadvantage faced by skilled workers distributed in a continuum of skill levels. A numerical example presently argues that including migrant income taxes on actual earnings at the host country complicates—or even reverses—the migration pattern. This first requires choosing an appropriate tax rate based on the objective function of the tax authority. Here, one can safely assume the government intends to maximize tax revenues.[7]

So, in addition, consider that a tax rate t_S is imposed on skill type S on a prospective migrant's foreign-earned income $W_R(S)$. Note that the provision of signaling allows skill type S to treat $W_R(S)$ as the relevant wage instead of $\overline{W}(S)$ when deciding whether to migrate or not. Therefore, using the above conditions, a skill type S migrates, *iff*,

$$k W_R(S) - C - t_S W_R(S) \geq W_P(S) \tag{7.2}$$

Table 7.1   Skill groups and wages

	Skill Group		
Wages	I	II	III
$W_P(\$)$	1	3	10
$W_R(\$)$	2	6	20
Proportion in population	3/10	3/10	4/10

Source: Katz and Stark (1987).

A skill type S will migrate if the tax rate is

$$t_S^* \leq \left[k - \frac{W_P(S) + C}{W_R(S)} \right] \tag{7.3}$$

To verify the applicability of these tax schemes, recall Table 1 from Katz and Stark (1987). There are three distinct (discrete) skill types that would consider migrating for work—I, II, and III (Table 7.1). The hourly wage for types I, II, and III at home are $1, $3, and $10, respectively. The same in the foreign country are $2, $6, and $20, respectively. The proportion of type I skill in the workforce is 0.3, that of type II is 0.3, and for group III it is 0.4. Migration of skill level from P matches the distribution $F(S)$ in R.

Using Equation (7.1), under pure asymmetric information the average wage payable to all workers in R is $\overline{W}(S) = \$10.4 [= 2*0.3 + 6*0.3 + 20*0.4]$, when the top skill type migrating is III. With a discount factor, $k=0.6$, it is immediately seen that group III earns $0.6 \times 10.4 = \$6.24 < W_P(III) = \$10$ and does not migrate under pure asymmetric information. If group III does not migrate, then the highest level migrating is group II. The average wage at the destination becomes $\overline{W}(S) = \$4$, as the workforce now consists of two types of skill level only. Their individual productivities are not known by employers in R. After discount, the hourly wage of type II falls below $3 and dissuades them from migrating. It turns out that only group I migrates, as it earns $0.6 \times \$2 = \$1.2 < W_P = \$1$.

Now consider signaling by prospective migrants. Let the fixed cost of signaling be $C=\$1.8$, once the workers signal they expect to receive the true wage in R instead of the pooled wage. Therefore, skill type I will not signal because these workers cannot get less than $2, which, after discounting with $k = 0.6$, allows them to migrate. Group II would not invest in signaling since $W_R(II) = 0.6 \times \$6 - \$1.8 = \$1.8 < W_P(II) = \$3$. These workers will not migrate unless they have a rather small measure for k. Finally, group III invests in signaling as they earn $0.6 \times \$20 - \$1.8 = \$10.2 > W_P = \$10$. Thus, signaling allows skill types I and III to migrate, while type II stays home.

This is different from pure asymmetric information, when only group I migrated. This part of the model is already available in previous studies. The reason for reporting it is the possibility that a migration tax could change this pattern. The possible outcomes including a migration tax have not been discussed previously, or looked at by policymakers. In terms of the tax rates to be imposed, it is easy to see that using a progressive migration tax rate may lead back to the case under pure asymmetric information.

So, using Equation (7.2) and Table 7.1, group I shall continue to migrate, if $t_I^* \leq 0.1$ and group III shall continue to migrate, if, $t_{III}^* \leq 0.01$. t_I^* is calculated in the following way: holding $k = 0.6$, from Equation (7.3) $t_I^* \leq [0.6 - \frac{1+0}{2}] = 0.1$, as $C_I = 0$ (because type I does not signal), $W_P(I) = 1$, and $W_R(I) = 2$. This would be the same if asymmetric information existed because, as shown above, only type I workers migrate under no information. Overall, type I does not migrate if the tax rate imposed on them exceeds 10%, while group III does not migrate if the tax rate imposed on them exceeds 1%.

Finally, the onus lies in finding the precise conditions that can sustain this type of tax scheme. The migration tax should be regressive (meaning the tax rate falls as income rises) so long as the government upholds the principle of revenue maximization. Consider the objective function of the government as

$$Max\ T = \int_0^S t_S^*\, W_R(S)\, F(S)\, ds \tag{7.4}$$
$$subject\ to:\ t_S^* \leq \bar{t}_S$$

where $\bar{t}_S$ is the maximum rate that can be imposed for a particular type at which the individuals are indifferent as to whether to migrate or not. This added specification in (7.4) now offers a modified set of conditions displayed in Table 7.2. Note that, if type I and III both migrate, then the tax rate needs to be different as calculated above, or both brought down to the lower of the two rates if it has to be uniform (no difference in tax rates across skill types). So, the policymaker can choose from a feasible set of tax rates such as: (i) a uniform tax rate; (ii) a progressive tax rate (the tax rate rises as income rises); or (iii) a regressive tax rate. However, the revenue implications of each are markedly different. This can be seen below, where the choice of tax rates both dictates the migration pattern and generates revenue.

Case 1: Using the specifications in Table 7.1, suppose a uniform tax rate is imposed. The total tax revenue accruing to the government (Equation 7.3) when type I and III migrate is given by

$T = X_I t_I^* W_R(I) + X_{III} t_{III}^* W_R(III) = 0.3 \times 0.01 \times 2 + 0.4 \times 0.01 \times 20$
$= \$0.086$ *where,* X_S = *proportion in population,* $S \in [I, II, III]$; $t_I^* = t_{III}^*$
$= 0.01(1\%)$ (7.5)

Case 2: If the tax rate is progressive and yet allows migration of both types I and III, then the maximum tax rate across all groups would be one that makes type III indifferent as to whether to migrate or not, or $t_{III}^* = 0.01(1\%)$ according to the example in Equation (7.5). Naturally, the tax imposed on type I has to be lower. Evidently, the revenue generated cannot be more than that in case 1.

Case 3: If a uniform tax is imposed on both types I and III, but the rate is the same as that imposed on type I in Equation (7.5), then type III refrains from migrating. The tax revenue is lower than in cases 1 and 2 and is the same as that collected under pure asymmetric information.

Case 4: Finally, as already discussed, if the tax rates are regressive, the revenue is maximized.

These cases are estimated numerically in Table 7.2.

Overall, if potential migrants use a signaling device to reinstate informational symmetry (such that skill types I and III both migrate), then the tax authority earns maximum revenue from imposing migrant taxes if and only if the tax scheme is regressive ($\frac{dt_S^*}{dS} < 0$). In other words, based on the earlier discussion about the principle of exit taxes in Section 3, the numerical results show that a lower tax rate imposed on higher-skilled workers could maximize revenue collection at the time of exit. Similarly, if exits and

Table 7.2   Tax rates, migration decisions, and tax revenues

Information Regime	Tax Rate		Skill Type		Total Tax Revenue (Tax type)
	t_I	t_{III}	I	III	
Pure Asymmetry	10%*	NA	Migration	No Migration	$0.060
Signaling	1%	1%*	Migration	Migration	$0.086 (Low Uniform)
	0.5%	1%*	Migration	Migration	$0.083 (Progressive)
	10%*	10%	Migration	No Migration	$0.060 (High Uniform)
	10%*	1%*	Migration	Migration	$0.140 (Regressive)***

Note: * Maximum tax rate for S; *** Maximum Tax Revenue.

Source: Author's calculations.

inward remittances are both taxed, then a regressive structure could again be better at generating revenues for the source country.

Instead, suppose that revenue maximization is not the sole objective of the government, and it additionally uses policy to completely restrict skilled workers' emigration from the country. The tax scheme may then be progressive, such that group I is taxed at 10% but group III is taxed above 10% (with revenue earned only $0.06). Consequently, type III would not find migration profitable. This is a situation where the top skill group migrating under asymmetric information, but with signaling, is not higher than that under pure asymmetric information. Conversely, unskilled migration may be completely restricted by imposing a strongly regressive tax rate ($\geq$10% for group I and 1% for III). The results provide consequences for income distribution in the source country. This deserves future attention.

5. CONCLUSIONS

This chapter merges two previously disjointed angles of study. One is about migration patterns under asymmetric information; the other is about migration taxes as a viable policy instrument for supporting development expenditures in less developed countries. This tax policy is used to investigate the plausible patterns of migration across skill types when asymmetric information exists between source and host countries. An example is provided that shows evolving migration patterns could differ from those generally observed when migration taxes and asymmetric information regarding the true productivity level of immigrant labor exist.

The results obtained here show that policymakers can use migration taxes as an instrument to influence both the stock and flow of migrant workers in a country. The large outflow of skilled workers from less developed countries and their concentration in a few chosen locations attract capital and could create considerable disparities in regional economic outcomes. In the contemporary world of technology-driven production, demand for skilled workers has increased substantially. However, disparities in infrastructure do not allow skilled workers to take advantage of these improvements in most locations. Skill's mobility through migration is often a response to this inability of the source country to retain its best talent. Obviously, the "brain drain" of skilled workers implies a loss on several fronts, but may also have some positive impact on remaining workers. The peer effect of skilled workers migrating to a more prosperous location and earning a higher income positively influences subsequent generations to acquire appropriate skills. While that might more than compensate for any loss in current output, a country could use many other policies that better

control outcomes. One of these might be a migration tax as discussed in this chapter. The choice of tax not only influences the pattern of migration but is also expected to influence future choices. In particular, the proposed regressive migration tax offers incentives to the relatively unskilled to acquire skills before attempting to migrate. As a final caveat, we need to appreciate that the possibility explored here is just one of many competing procedures that could be adopted to influence migration patterns and facilitate skill acquisition at the same time.

NOTES

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1. See also Docquier and Rapoport (2012) and Beine et al. (2008) for elegant surveys.
2. See Beladi and Kar (2015), Friedberg (2000), Chau and Stark (1999), Katz and Stark (1989, 1987), Kwok and Leland (1982), among others.
3. Borjas (2000) shows that foreign-born teaching assistants (and their communication skills) are often less preferred to native teaching assistants by United States (US) under-graduates. It is well known that US universities make substantial use of a well-developed screening mechanism when offering admission and financial aid to such foreigners. Cultural distance (at least on arrival), despite high merit among the foreign-born teaching assistants, remains a disquieting factor for such jobs.
4. The H-1B is a visa in the United States under the Immigration and Nationality Act, section 101(a)(15)(H) that allows U.S. employers to temporarily employ foreign workers in specialty occupations. A specialty occupation requires the application of specialized knowledge and a bachelor's degree or the equivalent of work experience. The duration of stay is three years, extendable to six years; after which the visa holder may need to reapply. Laws limit the number of H-1B visas that are issued each year: 180,440 new and initial H1-B visas were issued in 2017. Employers must generally withhold Social Security and Medicare taxes from the wages paid to employees in H-1B status. https://www.uscis.gov, Department of Homeland Security, Government of United States (retrieved, March 18, 2019).
5. Migration taxes are just one of many migration control measures tried either by source or host countries. For example, Thum (2004) modeled rich country governments to choose the level of public goods provision preferred by immigrants. These are determined by the median voter's income at home. Lower provision is considered a discriminatory tax on immigrants, and thus dissuades immigration.
6. The value of k may be decreasing in S because the top skill groups in P often follow similar lifestyles as their counterparts in R. This could lead to a non-monotonic migration pattern.
7. If the tax is collected in R under some tax-sharing agreement between R and P (as per the initial proposal), then it further supports the cause for revenue maximization, because of the high administrative costs involved.

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8. Expanding skilled-worker mobility: comparing the migration of Indonesian careworkers to Taipei,China and Indonesian nurses and careworkers to Japan

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1. INTRODUCTION

The movement of better-educated people shapes today's international worker migration. For example, when matching education with job level, some 65% of economically active migrants who have moved to developed countries are classified as "highly skilled." Among those are tertiary-educated health workers in professional jobs—such as nurses, physicians, dentists, pharmacists, and laboratory technicians (Stillwell et al. 2004, Khadria 2010). In addition, many countries with aging populations and worker shortages have attracted large numbers of careworkers—"skilled" workers with specific sets of competencies such as care for the elderly or chronically ill.[1]

According to the National Board for Placement and Protection of Indonesian Migrant Workers (*Badan Nasional Penempatan dan Perlindungan Tenaga Kerja Indonesia* or BNP2TKI),[2] Indonesian care-workers and health workers are important contributors to both regional and international labor markets. In 2016, 54,160 Indonesian careworkers were placed abroad—23.1% of the country's migrant worker total. For the first time, careworkers were the largest overseas placement group among Indonesian migrant workers by occupation, surpassing domestic workers, which has fallen dramatically since 2011—from 267,733 in 2011 to 45,309 in 2016 (BNP2TKI 2016a). Indonesian careworkers mostly migrate to the Middle East; Malaysia; Singapore; the People's Republic of China (PRC); Hong Kong, China; Japan; and Taipei,China (Asato 2009, Carlos 2009, Lan 2016).

The number of Indonesian nurses placed abroad is much smaller, and

does not rank in the Top 25 BNP2TKI overseas placement occupation categories. According to the Ministry of Health (*Kementerian Kesehatan* [MOH]), Indonesia sent 1,496 nurses abroad in 2011, 1,636 in 2012 and 1,161 in 2013, when placements were regulated, facilitated and supervised by the ministry (MOH 2015). Major host countries include Australia, Canada, the United States (US), Saudi Arabia, Qatar and Japan (JICA 2012).

Indonesia and host countries generally take a collaborative approach in managing migration of careworkers and nurses via bilateral agreements and memoranda of understanding (MOUs) (Go 2007). For example, Indonesia has a bilateral agreement and MOU to send careworkers and nurses to Japan under the Indonesia-Japan Economic Partnership Agreement (IJEPA), while Indonesia and Taipei,China signed an MOU covering careworkers (Migrant Forum in Asia 2014).

This collaborative approach has also been adopted by Indonesia in managing health workers overall—including nurses, dentists, and physicians—under the Association of Southeast Asia Nations (ASEAN) Economic Community (AEC) framework. In facilitating skilled-worker mobility, ASEAN members signed six Mutual Recognition Arrangements (MRAs) which cover nurses, physicians, and dentists, among others—under the ASEAN Qualification Reference Framework (AQRF) (Papademetriou et al. 2015).

Migration of Indonesia's careworkers to the two hosts differ in terms of reception policies, mechanisms, and Indonesia's recruitment/placement services procedures, placement costs, and migrant worker qualifications. Also, Indonesia's careworkers to Taipei,China as well as nurses and careworkers to Japan are constrained by financial and nonfinancial barriers. In Taipei,China, they face financial barriers from placement costs and Indonesia's placement cost financing system. In Japan, cultural differences and lack of language proficiency are the main nonfinancial barriers causing problems in the workplace.

Existing studies on migration of Indonesian careworkers to Taipei,China (Pawestri 2012, Yuniarto 2015, Lan 2016) and Indonesian nurses and careworkers to Japan (Asato 2009, Carlos 2009, Lan 2016) do not comprehensively compare acceptance polices, migration mechanisms, recruitment and placement service procedures, placement costs, and placement cost financing systems. Pawestri focused on job satisfaction of Indonesian careworkers in Taipei,China, while Yuniarto researched the socio-economic implications of worker migration to Taipei,China (such as "debt bondage"), and Lan compared recruitment and training of Indonesian migrant careworkers in Taipei,China and Japan. Asato examined early mobility of Indonesian nurses and careworkers to Japan under the Indonesia-Japan

Economic Partnership Agreement (IJEPA) from the source country's perspective, and Carlos researched migration of Indonesian and Filipino careworkers to Japan from the host country's perspective.

The comparison is useful for several reasons. First, many countries classify their careworker equivalent as a skilled worker, and nurse as highly skilled—providing useful reference points for skilled-worker mobility under the AEC framework. Second, examples of established policy, mechanisms, and placement procedures involving Indonesian careworkers and nurses to Japan and careworkers to Taipei,China are useful as AEC labor mobility expands. Third, Taipei,China and Japan were among the Top 25 host destinations for Indonesian migrant workers in 2013–2015, with the increasing number of careworkers increasingly important to both (BNP2TKI 2016a). Fourth, both Japan and Taipei,China have rapidly aging populations that increase demand for migrant careworkers and nurses. According to a summary report of the 2015 national census, the number of elderly in Japan aged 65 or older accounted for 26.7% of the 127.11 million population, up from 23% in 2011. In Taipei,China, the population aged 65 or over approached 12.5% as of November 2015, up from 11% in 2012 (Lan 2016, Yoshida 2016, Chen and Low 2016). Finally, easing financial and nonfinancial barriers to skilled migration can help the AEC reach its goal of freer labor mobility.

This chapter adds to these studies by focusing on several issues: (i) the management of Indonesia's healthcare worker migration to Taipei,China and Japan—especially reception policies, migration mechanisms, and recruitment and placement service procedures; (ii) components of placement costs, factors that cause high placement costs for Indonesia's careworkers in Taipei,China, and efforts by the source country government to reduce them; and (iii) nonfinancial barriers that affect mobility of Indonesia's nurses and careworkers to Japan and host government measures.

Section 2 defines skilled and highly skilled workers, reception programs in host destinations for nurses and careworkers, and debt-financed migration. Section 3 discusses Indonesian careworker migration in Taipei,China. Indonesian careworkers and nurses to Japan are examined in Section 4. Section 5 compares Indonesian nurse and careworker migration to Japan and careworker migration to Taipei,China—and policy measures that can reduce barriers to mobility. Section 6 concludes with some lessons learned from the two cases, research limitations, and the value of further research. The chapter uses a descriptive approach to compare the movement of nurses and careworkers to Japan under IJEPA with mobility of careworkers to Taipei,China. Most of the data used are qualitative or secondary data sourced from government statistics issued by public institutions,

documents released by government and private institutions, academic studies, and the media.

2. RECEPTION PROGRAMS FOR SKILLED WORKERS AND DEBT-FINANCED MIGRATION

Over the past two decades migration has continued to rise globally. It is becoming more skill-focused—as seen by the increased percentage of tertiary-educated workers seeking jobs in advanced Organisation for Economic Co-operation and Development (OECD) countries and non-OECD countries alike (Lowell and Findlay 2001, OECD and UNDESA 2013, Clemens 2013). Who is considered skilled or highly skilled makes a difference depending on the host government's definition. A widely adopted definition of a skilled migrant is a person who possesses a tertiary degree (OECD 2009, Green 2014). Highly skilled migrants also have "a university degree or extensive/equivalent experience in a given field" (Green 2014, Cerna 2010). In some countries, the highly skilled category is based on an earnings threshold or skilled occupation list (Cerna 2010, OECD 2009). Others are based on visa criteria.

There is a wide variety of definitions for highly skilled migrants across destinations (Green 2014). A "foreign highly skilled worker" in Taipei,China, for example, is any foreign national selected for their ability to participate in Taipei,China's labor market, based on the assignment of their special professional skill. The category is designed for specialized or technical work, business managers or executives, school teachers, supplementary school teachers, sports coaches and athletes, religious workers, artists and entertainers, contract performers, foreign students, and those from the PRC (Ke and Hsieh n.d.). Based on these examples, careworkers would not be considered highly skilled in Taipei,China. In Japan, the government defines highly skilled migrants based on its Highly Skilled Foreign Professional (HSFP) visa—"persons who fall into the current acceptance criteria for foreign nationals and who are recognized to have advanced abilities and skills." The HSFP visa has three subcategories—academic research, technical activities, and business management. The technical activities category targets engineers, information technology (IT) specialists, and specialists such as doctors and lawyers (Green 2014). By this definition, careworkers and nurses under IJEPA are not considered highly skilled foreign workers.

Indonesia's Ministry of Trade defines a skilled worker as one who has special skills or expertise, knowledge, or ability in their field. They could come from college/university or technical school or work experience.

Table 8.1   Number of Indonesian migrant workers placements by educational attainment

Education	2013		2014		2015	
	Number	%	Number	%	Number	%
Graduate	352	0.07	179	0.04	31	0.0001
Bachelor	6,340	1.24	3,956	0.92	4,685	0.57
Diploma	29,012	5.66	17,355	4.04	1,594	1.69
Senior High School	124,825	24.37	106,830	24.85	70,309	25.49
Junior High School	191,542	37.40	162,731	37.86	108,724	39.43
Elementary School	160,097	31.26	138,821	32.29	90,393	32.78
TOTAL	512,168	100.00	429,872	100.00	275,736	100.00

Source: BNP2TKI (2016a).

BNP2TKI (2016b) vaguely defines professional migrant workers as those with the competency and higher education to do their jobs. Indonesia Ministry of Trade's definition of skilled worker conforms to the OECD (2009) definition—a person who graduates from tertiary education with a "Diploma."[3] However, BNP2TKI data only record migrant worker placement according to final educational attainment rather than by major or occupation. Table 8.1 shows that the share of skilled migrant workers to total placements was roughly 6.97% in 2013, 5.00% in 2014, and 2.26% in 2015.

The data show a declining trend of Indonesian skilled migrant worker placements as well as total migrant worker placements during 2013–2015. This was likely due to the scarcity of skilled workers in Indonesia. According to a Ministry of Manpower (MOM) statement, Indonesia had 56 million skilled workers in 2017. Many of them prefer voluntary employment while they search for good jobs and high pay (Gloria 2017). Also, overall Indonesian migrant worker placements have decreased because of growing economic opportunities in several regencies—and tightened government protection. For example, economic opportunities increased in Majalengka and Sukabumi regencies in West Java due to a rise in regional minimum wages and job vacancies opened by new factories. The regional minimum wage in Sukabumi grew to IDR 1.969 million in 2015—above the estimated IDR 1.742 million cost of living—making it more attractive for job seekers, according to an officer at Sukabumi government's Office

of Manpower (Yolandha 2015, Suhendri 2014). In addition, to improve protection of Indonesia's Middle East migrants, in 2012 the government stopped deploying domestic helpers to Iraq, Iran, Kuwait, Lebanon, Saudi Arabia, and Libya, among others. The moratorium did not apply to those considered more skilled, such as careworkers and nurses, and to domestic helpers in the Asia and Pacific region because of better protection in places such as Taipei,China and Japan (Erdianto 2017, Huda 2017).

Some studies classify nurses as highly skilled and careworkers as skilled. For example, Stilwell et al. (2004) say that health workers—physicians, nurses, dentists, and pharmacists, among others—are generally assumed to have completed tertiary education and hold professional jobs, and are thus classified as highly skilled professionals. In Indonesia, a nurse is categorized as a health worker. Under Health Worker Law No. 36 of 2014, health workers must have knowledge and/or skills acquired through health-related education and have been assessed as qualified to undertake professional practice. Health workers must have at least a three-year professional education (Diploma III), except for medical workers (physicians, dentists, and medical specialists), who must have at least 3.5–4 years of higher education plus 1–2 years' professional training. Based on this definition, nurses are classified as skilled.

In countries like the United Kingdom, careworkers are categorized as skilled workers because tasks performed require specific skills and knowledge that must meet national "induction" standards backed by a certificate of competence (Gordolan and Lalani 2009). An Indonesian migrant careworker is considered skilled as they would have passed a competency test and been certified. The Ministry of Manpower (MOM) requires migrant careworkers to have competency-based training and pass a test to acquire a certificate of competence before migration (MOM 2015).[4] In 2007, MOM issued Indonesia's National Standard of Work Competency (*Standar Kompetensi Kerja Nasional Indonesia* [SKKNI]) covering careworkers.[5] The 2007 SKKNI divides careworkers into four subcategories— "Caretaker," "Caregiver," "Old Folk Care," and "Old Folk Consultant." They are differentiated by level of acquired competence certificate—Level II for Caretaker, Level III for Caregiver, Level IV for Old Folk Care, and Level V for Old Folk Consultant. According to the Ministry of Manpower and Transmigration, a caretaker is defined as a caregiver assistant, with 24 units of competency against a caregiver's 30 units (MOMT 2007a). Among the 50,545 Indonesian careworkers migrating in 2015, caretakers dominated placements with 44,941 persons—caregivers accounted for only 5,604. In this chapter, "careworker" means both careworker in Taipei,China (trained as a caretaker in Indonesia) and careworker in Japan (trained as a nurse in Indonesia). "Nurse" still means nurse under

IJEPA—as they were trained as nurses, obtained nurses' licenses, and had more than two years of prior work experience in Indonesia.

Under the ASEAN MRA on Nursing Service (ASEAN 2006), nurse refers to a national who has completed required professional training and holds a professional nursing qualification. They must be assessed as technically, ethically, and legally qualified to be a nurse and registered and/or licensed as a professional nurse by the source country's nursing regulatory authority. This definition does not apply to a technical nurse, such as those providing basic patient care under the supervision of a registered nurse or physician.[6]

As the regional and global healthcare market develops, health worker and careworker migration will continue to rise (Stilwell et al. 2004). Global spending on health increased over the past two decades to 9.92% of global gross domestic product (GDP) in 2014, up from about 8.50% in 1995. Health expenditures in East Asia and Pacific countries rose from 5.8% in 1995 to 6.9% in 2004 (World Bank n.d). Global spending on healthcare was expected to reach 15% of GDP in 2015, with Asia accounting for a significant portion of the increase. Health worker and careworker mobility out of ASEAN has increased due to Japan's Economic Partnership Agreements (EPAs) with Indonesia, the Philippines, and Viet Nam—with health as one of the priority sectors for accelerated integration in creating a single ASEAN market (Francisco 1999).

Recruiting and placing health workers and careworkers overseas has been a lucrative business. Workers are placed either through a government placement agency, private recruiting firm, or direct hiring by foreign hospitals (Fransisco n.d.). While many private recruitment agencies act in good faith in assisting migrant workers at each stage of the migration process, there are instances of unscrupulous private recruitment agencies overcharging service fees from prospective workers. For example, recruiters in the PRC sometimes charge nurses between $4,000 and $15,000 to migrate to Australia and the United Kingdom. Nurses from the Philippines migrating to Jordan typically pay double the Philippine government's allowed limit of one-month's salary (Aguinas 2013).

Migration costs—such as medical examinations, visa fees, and airfares, among others—can reach exploitative levels (IOM 2011). Potential migrant workers and their families who cannot pay migration costs often find themselves indebted to loan sharks or private recruitment agencies. Many studies on debt-financed migration analyze debt/labor contracts between intermediaries and migrants, the intermediaries themselves, and debt repayment mechanisms (Friebel and Guriev 2004). Many cases of debt-financed migration occur illegally through smugglers and other intermediaries who withhold migrant wages from businesses operated by these

intermediaries (Chin 1999, IOM 2000). Indeed, debt-financed migration also occurs during legal migration—such as with Indonesian careworkers in Taipei,China; Hong Kong, China; and Singapore. Given that workers generally decide to migrate expecting financial benefits to clearly outweigh costs (Aguinas 2011), governments need to improve workers' access to fair credit.

Generally, there are five ways governments try to limit migration costs: (i) licensing or registering recruitment agencies; (ii) determining allowable placement fees; (iii) requiring the use of standard contracts; (iv) setting minimum wages; and (v) offering subsidized loans. More effective are collaborative frameworks involving both host and source countries through bilateral agreements or MOUs (Aguinas 2011).

In Indonesia, the collaborative framework policy covering labor migration is Law No. 39 of 2004 on the Protection and Placement of Indonesian Migrant Workers. This law limits migrant worker placement to countries that have signed an MOU with Indonesia or to host countries with established labor laws or regulations protecting foreign workers. Indonesia's President Instruction No. 6 of 2006 on the Policy of Reformation concerning Indonesian Migrant Workers Placement and Protection System requires a bilateral agreement to improve worker protection leading to an MOU on labor cooperation (beritasore.com 2009). For the host country or territory, the bilateral agreement strengthens international cooperation on migration to ensure foreign workers effectively match labor demand with supply.

In general, Indonesia's MOUs contain clauses guaranteeing the protection and welfare of migrant workers—placement service procedures, work contracts, migrant worker passports, salaries, method of payment, weekly holidays, employer and recruitment agencies. In addition, MOUs regulate placement costs, worker health and safety, insurance, job training, and dispute settlement mechanisms (Zubaidah 2013).

As of 2013, Indonesia had signed 11 MOUs on labor cooperation with ten host governments—among them Malaysia; Japan; Taipei,China; United Arab Emirates (UAE); Qatar; Jordan; Lebanon; and Australia. Indonesia has since opened discussions on six MOUs with Kuwait, Brunei Darussalam, Germany, Thailand, the Republic of Korea, and Saudi Arabia (Zubaidah 2013). In general, the MOUs cover sectors where migrant workers are placed. In Malaysia, for example, they cover domestic workers and sectors such as construction, agriculture, and manufacturing; Japan covers manufacturing and healthcare; Taipei,China covers productive industries and social welfare industries; Hong Kong, China covers domestic workers; the Republic of Korea covers manufacturing, construction, agriculture, and fisheries; Saudi Arabia and Jordan cover

domestic workers; Lebanon covers construction; and Australia covers the hospitality sector (Rosidi 2013, Nugroho 2017, Zubaidah 2013, Hambali 2017, VIVAnews 2010, beritasore.com, Hukumonline).

3. CASE STUDY 1: INDONESIAN CAREWORKER MIGRATION TO TAIPEI,CHINA

Taipei,China began to accept foreign workers in 1989. A regular guest worker program for low-skilled workers began in 1992 via the Employment Service Act (Abella 2009), with careworkers from Indonesia, the Philippines, and Thailand joining. Careworkers are employed on a two-year contract with the work permit extendable annually for a maximum nine years (IETO 2016a). In December 2004, Indonesia and Taipei,China shifted to a bilateral agreement to manage worker migration. An MOU covering recruitment, placement, and worker protection was signed by Indonesia's Economic and Trade Office to Taipei,China (*Kantor Dagang Ekonomi Indonesia di Taipei,China* or IETO) and Taipei,China's Economic and Trade Office to Indonesia (TETO). The MOU can be revised every four years—the last revision was in 2011 (Pawestri 2012, Kabinawa 2013, Lan 2016). As of January 2017, the MOU was still being evaluated for further revision.

According to Taipei,China's Ministry of Labor (MOL 2016), Indonesians had the largest foreign worker population at end-March 2016—with 240,511 migrants, or 44% of total guest workers. They were split between social welfare (180,631 persons, up from 135,019 at end-2010) and productive industries (59,880 workers). Nearly all social welfare migrants (98%) are domestic careworkers, with 2,318 careworkers working in nursing institutions. Indonesians comprise 79% of social welfare migrants (MOL 2016).

Indonesia's Private Agency for Placement of Indonesian Migrant Workers (*Pelaksana Penempatan Tenaga Kerja Indonesia Swasta*, PPTKIS) recruits and places most careworkers in Taipei,China on a private-to-private basis. There are seven stages to the process (Figure 8.1).

First, PPTKIS and the Ministry of Manpower office at the regency/city level disseminate information on recruitment, register and select applicants, and arrange placement agreements and passport recommendations. Second, selected applicants take medical and psychological examinations in government-approved medical facilities. Third, applicants without a nursing degree undergo live-in job training provided by PPTKIS, take a competency test, and pay for migrant worker protection insurance. Fourth, those who received their certificate of competence apply for a passport
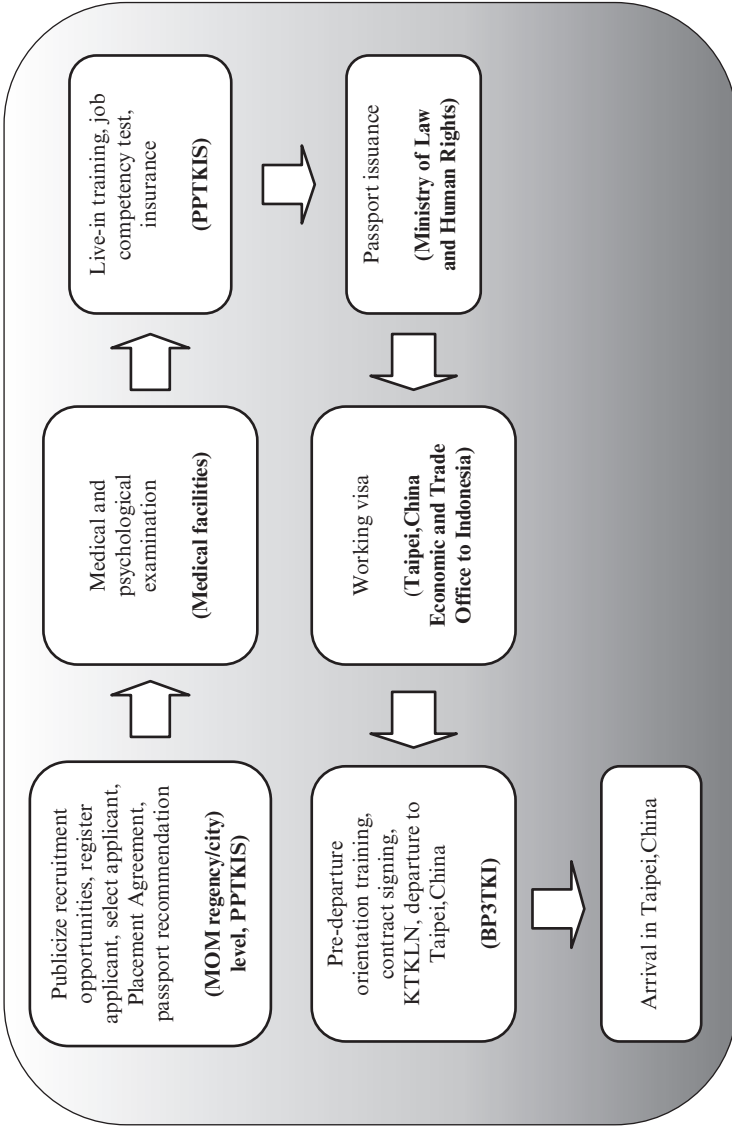
Source: Purba (2011), Manpower Office of West Kalimantan Province (2016).

Figure 8.1   Recruitment and placement service procedure of Indonesian careworkers in Taipei, China

from Indonesia's Ministry of Law and Human Rights. Fifth, they apply for a working visa from Taipei,China's TETO office. Sixth, approved applicants take Pre-Departure Orientation Training (*Pembekalan Akhir Pemberangkatan* [PAP]) at the BNP2TKI provincial office (*Balai Pelayanan Penempatan dan Perlindungan Tenaga Kerja Indonesia* [BP3TKI]). During this time, they also sign their work contract and apply for a Migrant Worker's Card (*Kartu Tenaga Kerja Luar Negeri* [KTKLN]). Finally, after arriving, the Taipei,China agency—the government-authorized institution or company that recruits and places foreign workers—arranges for the migrant careworker to meet their employers (Purba 2011, Manpower Office of West Kalimantan Province 2016).

A careworker applicant to Taipei,China must be a high school graduate or a graduate of a three-year nursing academy. Those with a high school degree must complete the (stage 3) live-in job training course and pass a competency test for a Level II careworker certificate of competence. The training curriculum follows Indonesia's 2007 National Standard of Work Competency (SKKNI) on "Sector of Individual Services for the Households Sub-Section Careworker." Of the 24 competency units required for domestic placement, 3 units are general competency, 15 units "substantive" competency, and 6 units "special" competency (MOMT 2007a). There are 454 hours of training (Lan 2016). The training generally starts with 15 hours on moral education, work ethics, sanitation, motivation, and discipline. Knowledge and skills for housekeeping takes 27 hours, cooking 24 hours, babysitting 27 hours, and elderly care 27 hours. Careworker applicants are also taught table manners and serving (27 hours), laundry and ironing (27 hours), and how to use modern appliances (27 hours). Language instruction takes the most time, including English (114 hours) and Mandarin (138 hours) (Lan 2016).

To avoid financial exploitation and ease migration costs, Indonesia limits applicable fees. The Decision of Director of Overseas Employment in the Ministry of Manpower and Transmigration No.152/PPTK/VI/2009 covers placement costs of careworkers at nursing institutions. Decision No.153/PPTK/VI/2009 covers placement costs of Taipei,China domestic careworkers. Nursing and domestic careworkers have the same placement cost components, but placement cost standards are set differently (Table 8.2).

Although Indonesia sets a ceiling for placement costs, they are in fact significantly higher than minimum wage levels in many migrants' home region. For instance, in West Java—Indonesia's largest source of migrant workers—placement costs for careworkers to Taipei,China are roughly eight times the provincial minimum wage (Pikiran Rakyat 2015), or equal to the price of a new motorcycle. The cost of live-in job training—

Table 8.2   Placement cost components and standards of Indonesian careworkers in Taipei,China, 2016

Cost component	Domestic careworker		Careworker at nursing institution	
	IDR	$	IDR	$
1 Taipei,China working visa	727,000	55.22	727,000	55.22
2 Air ticket	2,850,000	216.47	2,850,000	216.47
3 Airport tax	150,000	11.39	150,000	11.39
4 Worker insurance	520,000	39.50	520,000	39.50
5 Medical examination	600,000	45.57	600,000	45.57
6 Passport	110,000	8.35	110,000	8.35
7 Competency test and certification	125,000	9.49	125,000	9.49
8 Domestic transport cost	100,000	7.60	100,000	7.60
9 Training, room and board	7,740,000	587.88	7,740,000	587.88
10 PPTKIS service fee	4,118,400	312.81	4,838,400	367.49
Total	*17,040,400*	*1,294.27*	*17,760,000*	*1,348.93*

Note: $ = IDR 13,166 on 17 March 2016.

Sources: BNP2TKI (2015h); BP2TKI (2015i).

paid by careworker applicants—is 45% of placement costs for domestic careworkers in Taipei,China and 43% for those in nursing institutions. PPTKIS also charges high service fees—about 24% for domestic careworkers and 27% for those in nursing institutions. Many need to borrow to cover costs, and become trapped in "debt-financed migration."

Indonesia launched a program in 2005 to offer more affordable loans, initially targeted at migrant domestic workers. It now covers careworkers as well, and is designed to eliminate financial barriers to worker migration (Poeloengan 2006). While the aim was to provide migrants affordable loans, the program actually adds to the cost through service and administration fees, among others, and interest rates charged from formal financial institutions (Table 8.3).[7] For nursing institution and domestic careworkers, placement loans in 2014 were equal to 12 times the average provincial West Java minimum wage (Pusdalisbang 2014). Comparing the debt payment structure of domestic careworkers with careworkers

Table 8.3   *Debt payment structures of Indonesian careworkers in Taipei,China, 2014*

Debt payment structure	Domestic careworker		Careworker at nursing institution	
	IDR	$	IDR	$
1. Principal loan (placement cost)	17,040,400	1,398.01	17,760,400	1,457.00
2. Service fee	0	0	0	0
3. Lending rate	2,837,227	232.77	3,285,674	269.60
4. Administration fee	1,150,000	94.35	1,200,000	98.45
Total debt	21,027,627	1,725.13	*22,246,074*	*1,825.00*

Note: $1 = IDR12,189 in 2014.

Sources: 2014 data for careworkers at institutional nursing was based on the Statement Letter of Placement Cost for Potential Indonesian Careworkers at Nursing Institution to Taipei,China from PT. Jangkar Global Groups (2014); 2014 data for domestic careworkers was based on Statement Letter of Placement Cost for Potential Indonesian Children Caretaker/ Careworker/Home-maid to Taipei,China, also from PT. Jangkar Global Groups (2014).

at nursing institutions in 2014 shows that the financial burden for careworkers in terms of high placement loan costs remains a hindrance to migration in Taipei,China.

A comparison of placement costs and salaries in host destination shows how they vary (Table 8.4). Among those listed, placement costs in Taipei,China and salaries in Japan are highest.

Although careworker placement costs to Taipei,China remain high, migration continues to rise (Figure 8.2). Careworkers account for 99.24%, with the rest domestic helpers. Productive industries accounted for just 59,261 persons in 2015 (MOL 2015). A primary reason for the continued growth is the higher salary compared with other jobs—like domestic workers, who earn more in host destinations like Singapore and the PRC plus Hong Kong, China (BNP2TKI 2015j). Beside salaries, skills or education qualifications for working in Taipei,China's social welfare industry better match Indonesian migrants, the majority having just a senior high school degree.

4.   CASE STUDY 2: INDONESIAN NURSE AND CAREWORKER MIGRATION TO JAPAN

In 1993, the Japanese government introduced the Technical Intern Training Program (TITP) to train unskilled workers from developing countries. It

Table 8.4 *Comparison of placement costs and salaries of Indonesian migrant workers in selected Asian host destinations, 2016*

Destination rank	Destination and occupation	Placement cost		Salary per month		
		IDR	$	Local currency	IDR	$
2.	*Taipei,China*					
	a. Domestic careworker	17,040,400	1.294,27	NTD17,000	6,834,000	519.06
	b. Careworker at nursing institution	17,760,000	1.348,93	NTD20,008	8,043,216	610.91
13.	*Japan*					
	a. Nurse	2,700,000	205,07	JPY120,000	14,013,600	1,064.38
	b. Careworker	2,700,000	205,07	JPY120,000	14,013,600	1,064.38
5.	People's Republic of China plus Hong Kong, China Domestic worker	14,530,000	1.103,60	HKD4,210	7,140,160	542.32
4.	Singapore Domestic worker	12,397,000	941,59	SGD550	5,297,050	402.33

Notes:
Destination rank corresponds to number of placements made.
Exchange rate as of 17 March 2016.

Source: BNP2TKI (2015j).
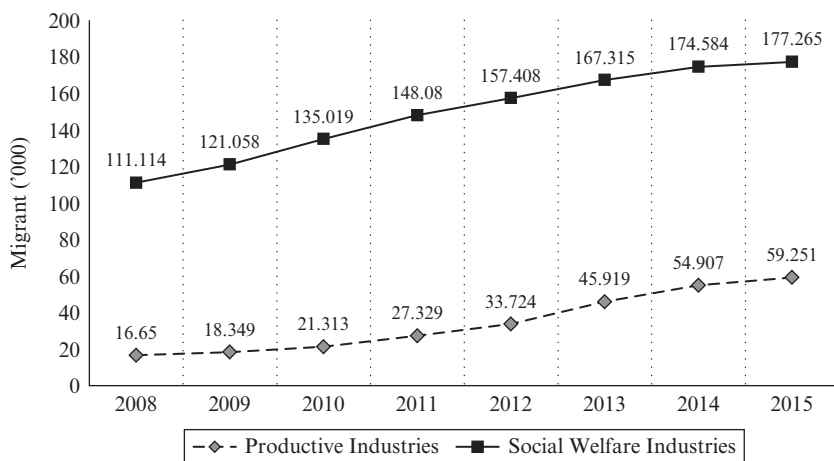
Figure 8.2   *Number of Indonesian migrant workers in Taipei,China social welfare and productive industries ('000)*

was originally designed to help developing countries acquire technical skills and advanced technology. TITP has since evolved into what appears to be more of a guest worker program for small and medium-sized companies to tap foreign unskilled labor. These low-skilled foreign workers are employed in Japanese companies as trainees or technical interns with valid three-year work permits (Wempi et al. 2008, Satoshi 2008).

The policy for accepting foreign workers promotes employment in "Professional or Technical Fields," aimed at strengthening Japan's international competitiveness. Those granted residence status should be engineers, specialists in humanities, international service, intra-company transferees, skilled labor, professors, investors, business managers, legal accountants, medical professionals (doctors, dentists, nurses, pharmacists), researchers, and investors. Meanwhile, foreign workers under economic partnership agreements (EPAs) fall under the public welfare system in the "Designated Activities" visa program (Horii 2014).

Japan's intake of foreign nurses and careworkers is specifically cited in its EPAs with Indonesia, the Philippines, and Viet Nam, among others. The Indonesian EPA includes an agreement on migrants, allowing them entry and temporary stay under several categories: business activities, professional services, and supplying services as nurses or certified careworkers. They require an individual contract with a public or private

organization, Indonesian investors in Japan, transferees from corporations in both countries, and short-term Indonesian business visitors (IJEPA 2007).[8]

IJEPA was signed in 2007, while the MOU on Placement and Admission of Indonesian Nurses and Careworkers was signed in 2008 by Indonesia's BNP2TKI and the Japan International Corporation of Welfare Services (JICWELS). JICWELS is a semi-governmental organization sanctioned by the Ministry of Health, Labor, and Welfare. The MOU was renewed in January 2010 (Ardiansyah 2016), but there were no immigration rules or visa categories to cover careworker migrants. Medical worker visas cover nurses. However, these visas are issued only to nurses who passed Japan's license examinations—which are conducted in Japan. As nurses and careworkers migrating through IJEPA do not have licenses, they are "exceptions" and are issued a "visa for specially designated work" (Carlos 2009, Horii 2014).

From 2008 to 2015, just 563 nurses and 1,020 careworkers were placed under IJEPA (BNP2TKI 2013, 2015f, 2016a). Indonesia had more migrant workers than Viet Nam and the Philippines during the period. However, Indonesian migrant workers under IJEPA are far below those enrolled in TITP (Table 8.5).[9] The drastic drop in Indonesian migrants matched the overall decline in Indonesian migrants—from 429,872 in 2014 to 275,736 in 2015. The official reason for the drop was cultural and religious differences between Indonesians and Japan (metrotvnews.com 2015).

Japan accepts Indonesian nurses and careworkers under IJEPA only on a government-to-government basis. Thus, private placement agencies are not

Table 8.5   Placements of Indonesian migrant workers to Japan, 2008–2015

Year	Indonesian migrant workers to Japan	Indonesian migrant workers placed under the Indonesia-Japan Economic Partnership Agreement		
		Nurse	Careworker	Total
2008	n.a	104	104	208
2009	n.a	173	189	362
2010	n.a	39	77	116
2011	1,508	47	58	105
2012	3,293	29	72	101
2013	3,746	48	108	156
2014	2,428	41	146	187
2015	468	82	266	278

Source: BNP2TKI (2015f).
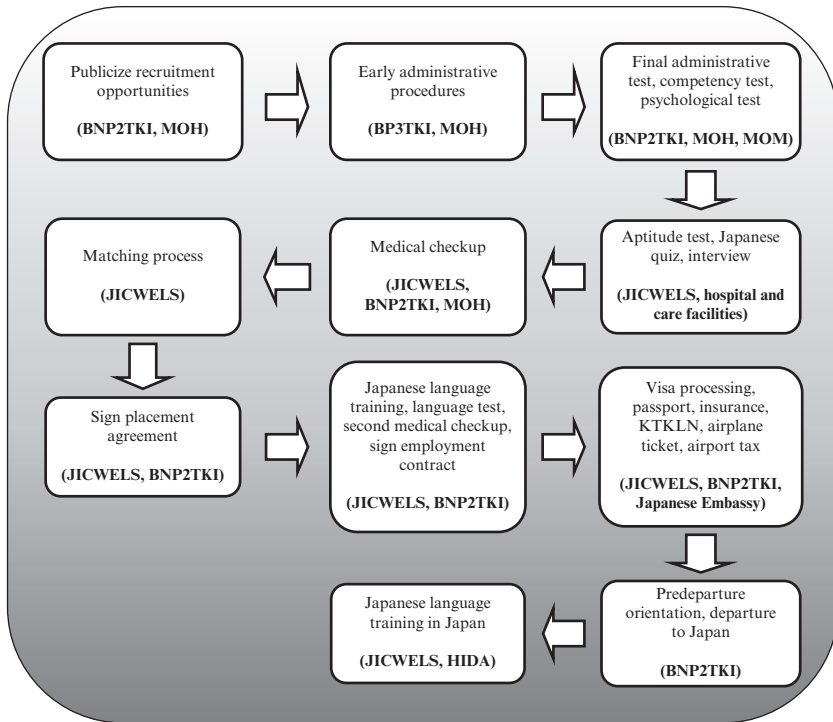
Source: BP3TKI Province of Yogyakarta Special Region (2013, 2014).

Figure 8.3 *Recruitment and placement procedure for Indonesian nurses and careworkers under the Indonesia-Japan Economic Partnership Agreement*

involved. BNP2TKI, the Ministry of Health and the Ministry of Manpower recruit and place migrants, while Japan's JICWELS acts as the host agency.

There are 11 stages involved in recruitment and placement under IJEPA (Figure 8.3). First, BNP2TKI and MOH disseminate information on recruitment. Second, BP3TKI (BNP2TKI provincial offices) and MOH make the first administrative selection. Third, the national BNP2TKI, MOH, and MOM make final administrative selections, conduct competency tests, and do psychological examinations. Results are sent to Japan's JICWELS. Fourth, JICWELS conducts an aptitude test, interview, and Japanese quiz for applicants. Interviewers assess an applicant's knowledge of Japan (for example, language and culture), why they would like to work there, and whether they possess the required skills. Then applicants are

interviewed by representatives of Japanese hospitals or care facilities (and sometimes by JICWELS staff on behalf of hospitals or care facilities). If needed, hospitals or care facilities can conduct interviews via online networks (such as Skype). Fifth, applicants undergo an initial medical checkup supervised by JICWELS and BNP2TKI at health facilities approved by the Ministry of Health in their region. Sixth, applicants are matched with potential employers (hospital or care facilities). They can select a maximum of 20 hospitals or care facilities listed on the JICWELS website. Seventh, once notified that they have been accepted by the employer—and agree with the offered salary, working hours, and work facilities—the applicant signs a placement agreement under the supervision of BNP2TKI and JICWELS. If the applicant does not agree with the salary, work hours, and facilities offered by the employer, they can repeat the matching step until they find the right match. Eighth, BNP2TKI and JICWELS conduct Japanese-language courses and tests, and the selected applicant undergoes a second medical checkup, supervised by BNP2TKI and JICWELS, to ensure they are really fit for working in Japan. Those who pass then sign the employment contract under BNP2TKI and JICWELS supervision. Ninth, BNP2TKI, JICWELS and the Japanese Embassy in Jakarta process working visas, passports, insurance, migrant worker identity cards (KTKLN), air tickets, and airport tax. Tenth, BNP2TKI holds pre-departure orientation before departure to Japan. Finally, JICWELS facilitates entry of migrants before they undergo more Japanese-language training in Japan's Human Resources and Industry Development Association (HIDA) and conduct on-the-job training (BP3TKI 2014a, 2014b, 2017; BNP2TKI 2015c).

The skill and education qualifications for careworkers to Japan under IJEPA differ from Taipei,China. IJEPA's Annex specifies that applicants must be university nursing graduates (Diploma III from an Indonesian academy of nursing) or graduates from another Indonesian academy or university (Diploma III or higher) and certified by the government as qualified careworkers.

However, even without a Diploma III, careworkers may apply to work in Japan if they have passed 32 units of careworker competency—namely 3 units of general competency, 27 units of substantive competency, and 2 units of special competency equivalent to 1,600 hours of study (Lan 2016, MOMT 2007a). Also, IJEPA allows applicants to apply as nurses if they are registered as a nurse or obtain an Indonesian nursing license and have worked as a nurse for at least two years (IJEPA 2007, Aoki 2010, JICA 2012).

Indonesian nurses and careworkers under IJEPA are treated as "nurse candidates" or "careworker candidates" respectively. Thus, those qualified

Table 8.6 *Placement cost components for Indonesian nurses and
            careworkers under the Indonesia-Japan Economic Partnership
            Agreement (IJEPA), 2016*

No.	Cost component	IDR	$
1.	Nurse competency test	250,000	18.99
2.	Psychological examination	250,000	18.99
3.	First medical checkup (MCU)	1,000,000	75.95
4.	Second medical checkup (MCU)	500,000	37.98
5.	Pre-and post-placement insurance	100,000	7.60
6.	Pre-departure orientation (3 days)	600,000	45.57
	Initial placement cost	2,700,000	205.07
	Refund of medical checkups	1,500,000	113.93
	Final placement cost	1,200,000	91.14

Note: $1 = IDR 13,166 as of 17 March 2016.

Source: BNP2TKI (2015c).

as certified careworkers (*Kaigofukushishi*) are given a temporary stay
for training—including Japanese language—and then an additional six
months under the supervision of a *Kaigofukushishi* at a caregiving facility.
Nurse candidates follow a similar procedure, though under the supervision
of a *Kangoshi* (certified nurse) (IJEPA 2007).

Placement costs for Indonesian nurses and careworkers under IJEPA
are relatively inexpensive (Table 8.6). The Indonesian government sets the
placement cost for a nurse and a careworker at IDR 2,700,000 ($205.07).
The Japanese government refunds the costs of the two medical checkups
for accepted applicants. This reduces placement costs to around IDR
1,200,000 ($91.14). In 2016, the final placement cost for a successful
candidate for nurse or careworker under IJEPA was 55% of the average
West Java minimum wage.

Under IJEPA, costs are relatively affordable as there are fewer cost com-
ponents. Also, with applicants holding degrees, there are no competency
training costs. As it is a government-to-government agreement, there are
also no agency fees. And the costs of pre-arrival Japanese-language train-
ing, air tickets, and airport tax are covered by the Japanese government
and employers.

Japan and Indonesia have worked together to lower placement costs. The
2010 MOU between BNP2TKI and JICWELS stipulates that JICWELS
will collect the initial costs from employers and transfer a $267 placement
cost and $15 of a migrant worker tax to BNP2TKI. The MOU also says the

Indonesian government will provide pre-departure orientation. Air tickets are paid for by the employer (BNP2TKI and JICWELS 2010). Employers also pay around JP¥21,000 per person annually to JICWELS as a management fee (Aoki 2010). Japan also funds preparatory Japanese-language training both in Indonesia and in Japan for nurses and careworkers (Japan Foundation 2015). Migration costs to Japan are thus shared more equitably between source and host governments and employers.

5. POLICIES TO REDUCE BARRIERS FOR INDONESIAN MIGRANT CAREWORKERS TO TAIPEI,CHINA AND IJEPA NURSES AND CAREWORKERS

There are obvious differences between Indonesian careworkers migrating to Taipei,China and IJEPA nurses and careworkers (Table 8.7). First, from the host territory's perspective, the main contrast is openness to migrant workers. Taipei,China uses what is in effect a guest worker program for low-skilled workers, while Japan uses the bilateral agreement IJEPA.

Second, in managing migration, IJEPA involves a government-to-government mechanism to recruit and place workers exclusively through government institutions. Migrants to Taipei,China use a private-to-private mechanism allowing private agencies to take the dominant role in recruitment and placement.

Third, from the source country's perspective, nonfinancial factors that determine who can migrate are skill and education qualifications. Careworkers going to Japan have stricter requirements: they must have (i) graduated with a nursing degree from an Indonesian university; (ii) obtained a Diploma III from an Indonesian nursing academy; or (iii) obtained a Diploma III or higher from another Indonesian academy or university and be certified careworkers. Indonesian careworkers migrating to Taipei,China have less rigorous requirements: they must have (i) obtained a senior high school education and be qualified as certified careworkers Level II; or (ii) obtained a Diploma III from an Indonesia nursing academy and qualify as certified careworkers Level III.

Fourth, there is a large gap between placement costs borne by nurses and careworkers under IJEPA and placement costs of Indonesian careworkers in Taipei,China. Placement costs for careworkers in Taipei,China are far higher than those under IJEPA. Indonesian careworkers migrating to Taipei,China must cover training costs and agency fees—large cost components not applicable under IJEPA. While IJEPA placement costs are shared by workers and host and source country governments, migrants

Table 8.7   Comparison of migrant careworkers to Taipei,China and IJEPA nurses and careworkers

	Taipei,China (Careworker)	Japan (Nurse and Careworker)
Migrant worker reception policy in host territory	Taipei,China's guest worker program	Economic Partnership Agreement (EPA)
Collaboration framework	Memorandum of Understanding	Bilateral EPA and Memorandum of Understanding
Migration mechanism	Private-to-private	Government-to-government
Education and skill qualifications	Careworker: Senior high school graduate and certified careworker Level II; or Diploma III from nursing academy and certified careworker Level III	Careworker: (i) Graduated in nursing from an Indonesian university; (ii) Diploma III from an Indonesian nursing academy; (iii) Diploma III or higher from another Indonesian academy or university and is a certified careworker Nurse: (i) qualified registered nurse or an Indonesian nursing license; (ii) Diploma III from an Indonesian nursing academy or graduated in nursing from an Indonesian university, with 2 years' work experience as a nurse
Placement costs	Paid by careworker	Shared by careworker/ nurse, source country government, host country government, employer
Placement cost financing system	Provided by Indonesian government	Not applicable

Table 8.7   (continued)

	Taipei,China (Careworker)	Japan (Nurse and Careworker)
Major barriers to mobility	Financial: high placement costs loan costs and fees Capacity: lower educational and skill requirements	Nonfinancial: language proficiency cultural differences ability to take Japanese certification examination

Source: Author's summary.

to Taipei,China must cover the costs themselves. Although Indonesia established a placement cost financing system for careworkers migrating to Taipei,China, the system adds loan costs to borrowers. For nurses and careworkers under IJEPA, Indonesia does not need a financing system as costs are far lower.

The main nonfinancial barrier in Japan is the language proficiency needed to pass the national certification examination to become a qualified nurse or careworker required for a skilled worker visa.

Indonesia is concentrating on three issues related to careworker migration to Taipei,China. The first two involve high placement costs and the weak financing system. The third is low careworker qualifications (BNP2TKI 2014, 2015a). For Indonesian nurses and careworkers under IJEPA, both countries are addressing: the low pass rate of certification examinations among Indonesian nurse and careworker candidates; Japanese employer costs in accepting nurse and careworker candidates; differences in job descriptions; and workers unwilling to extend their contracts for various reasons.

5.1   Lowering Placement Costs and Improving Financing System

For careworkers migrating to Taipei,China, Indonesia plans to reduce placement cost limits and private agency fees (such as PPTKIS). It also plans to subsidize passport and medical/psychological examination costs. It is encouraging more state-owned banks—which subsidize "People's Business Credit" (*Kredit Usaha Rakyat* [KUR]) for migrant applicants—to join the migrant financing system to broaden access to affordable loans. As of 2015, 13 financial institutions participate in the migrant worker loan program (BNP2TKI 2015g). Interest rates under KUR fell from 22% in 2014 to 12% in 2015, and further declined to 9% in 2016 (BNP2TKI 2015f, Amianti

and Wiryani 2016a, Himawan and Hapsari 2016). However, further reductions are naturally constrained by Central Bank lending rates, high inflation, the high cost of bank funds and overheads, and market concentration in domestic banking (Amianti and Wiryani 2016b, Amianti 2016, Nuryakin 2016). The Head of BNP2TKI released regulation No. 22 of 2015 that said prospective migrant workers who are financially capable would not be obliged to join the government-backed loan program (BNP2TKI 2015e).

5.2   Increasing Careworker Qualifications for Migrant Workers to Taipei,China

Nearly all (97%) Indonesian migrant workers to Taipei,China in 2015 had senior high school degrees or lower (BNP2TKI 2016a). The Indonesian National Qualification Framework (*Kerangka Kualifikasi Nasional Indonesia* [KKNI]) has been working since 2005 to boost domestic worker and caretaker skills through training or work experience leading to formal certification (Government Regulation No. 8 of 2012).

Despite these policies, challenges remain. The first is low educational attainment (MOMT 2007b), as most certified migrants are Level II or equivalent (careworker assistant). The second is to upgrade the PPTKIS to better train potential careworkers. One study found that some PPTKIS do not follow SKKNI careworker requirements (Agustina 2013). Third, the 2015 SKKNI covering domestic workers lacks standard training and curricula for careworkers, leaving applicants with uneven skill levels.

5.3   Reducing Cultural Barriers for IJEPA Nurses and Careworkers

Since the first batch of IJEPA's nurses and careworkers arrived in Japan in 2008, four basic problems have been identified. The first is language, as candidates must pass national language tests before receiving professional qualification and certification, required to extend employment contracts (Shun 2012, Lan 2016). Table 8.8 shows that, during 2010–2014, just 254 Indonesian nurse and careworker candidates passed the national examination written in Japanese *kanji*—20% of the 1,235 IJEPA workers (BNP2TKI 2015b). Japan has taken several steps to overcome this problem. In 2010 it agreed to extend the time for nurse and careworker candidates who arrive in 2008–2009 by one year. It also offered several months' free language training in Indonesia; and since 2012 Japanese-language training was extended to six months (Japan Foundation 2015). JICWELS also distributes Japanese-language textbooks and provides e-learning at all hospitals with nurse candidates.

The second issue is the greater cultural barrier facing careworkers

Table 8.8   Number of Indonesian nurse and careworker candidates who passed Japan's language examination, 2010–2014

Year	Nurse	Careworker	Total
2010	2	0	2
2011	15	0	15
2012	34	35	69
2013	20	86	106
2014	16	46	62
Total	87	167	254

Source: BNP2TKI (2015b).

than nurse candidates. To be eligible to take the national certification examination, careworker candidates must have three years' on-the-job training in Japanese care facilities. They have one chance to pass the annual national certification examination during the last year of their four-year contract. Indonesian nurse candidates have a better chance to pass the national certification examination. Nurse candidates can take the national certification examination three times during their three-year contract (Aoki 2010, Rosyati 2017). If they fail, they return to Indonesia once their contract expires (BNP2TKI 2015b).

During 2008–2013, 273 nurses and 173 careworkers under IJEPA returned home. Since 2011, BNP2TKI and the Japanese Embassy have held annual job fairs for returnees to find work in Japanese companies or hospitals in Indonesia. Some 27 Japanese companies and seven hospitals were involved in the 2011 job fair—22 Japanese companies participated in the 2015 job fair (Pikiran Rakyat 2011, BNP2TKI 2015d).

The third issue is the drop since 2010 in the number of hospitals and care facilities accepting Indonesian nurse and careworker candidates. The decline is linked to training costs and cost-of-living allowances for nurse and careworker candidates. Japanese hospitals and care facilities pay initial costs—including a portion of the six-month language training, candidate living expenses, and JICWELS management fees. Also, in many cases Japanese hospital care facility staff must help nurse and careworker candidates study for the national certification examination. Japanese public health facilities already suffer from manpower shortages. Since 2010, the government has offered subsidies to hospitals accepting one or more nurse candidates and care facilities accepting careworker candidates (Aoki 2010).

The fourth issue is the gap between the nurse and careworker candidates' expectations and the reality on the ground. Nurse or careworker candidates frequently leave their jobs even if they speak Japanese fluently and pass the

national certification examination. One reason is that Indonesian nurse candidates are often treated by hospitals as "nurses' assistants" (Noriyuki 2012). For those trained as nurses in Indonesia, they are generally assigned as careworkers rather than nurses.

Another factor is that careworker jobs differ in Japan and Indonesia. In Japan, careworkers mainly tend to patients' hygiene needs as part and parcel of the holistic approach to care, while in Indonesia that work is normally done by family members or personal helpers (Lan 2016, Noriyuki 2012). In the future, Japan intends to ask candidates before they enter into employment contracts whether they will continue working once they pass the national examination.

6. CONCLUSION

Indonesian health workers and careworkers have played an important role in regional healthcare, helping fill the demand for skilled workers in countries and territories with aging populations. This chapter adds to existing studies on the mobility of Indonesian careworkers to Taipei,China and migration under IJEPA. Comparing Indonesian careworkers to Taipei,China and nurse and careworker candidates to Japan, there are several lessons that may be useful when examining skilled worker mobility as the ASEAN Economic Community (AEC) evolves. ASEAN members can learn from studying host policies on accepting migrant workers and from source country policies on managing labor migration—such as the effectiveness of bilateral agreements, specific recruitment and placement mechanisms and procedures, and setting cost standards and financing systems. Source countries can enhance migrant worker qualifications by providing national competency standards through training and certification. IJEPA's cost distribution structure between source and host governments and employers is a case in point, although overcoming language barriers and smoothing cultural differences require greater attention.

This chapter has several limitations in terms of scarce, accurate data. The secondary data used can be helpful in describing migrant worker trends, reception policies, migration mechanisms, or government recruitment and placement services. But it lacks detailed descriptions of migrant worker experience during pre-departure and placement periods. Also needed is an assessment of what Indonesian careworkers experience in their workplaces in Taipei,China—including cultural and/or language barriers. Also, the chapter does not follow Indonesian nurses and careworkers who passed Japan's national examination and extended their job contracts.

For the AEC, further research on ASEAN members' reception policies,

migration mechanisms, and placement services across migrant occupations would be useful. Standardizing placement costs and providing financing systems for skilled workers, potential barriers to the mobility of skilled workers, and ASEAN's Qualification Reference Framework and national qualifications framework are also needed.

NOTES

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1. Most Indonesian "careworkers" are "caretakers", not "caregivers." Caregivers are more skilled than careworkers. Yet, Indonesian careworkers in Japan are more skilled than Indonesian careworkers in Taipei,China because they attend a three-year nursing school before placement. But in Japan they are treated as careworker candidates, meaning they are less skilled than Japanese careworkers.
2. BNP2TKI is an Indonesian government institution at the ministerial level that implements policies on the placement and protection of Indonesian overseas workers. It was established under President Regulation No. 81 of 2006.
3. In Indonesia, "Diploma" is defined as completion of one, two, or three years' professional education after completing senior high school education—as defined by Government of Indonesia No. 60 of 1999 on Higher Education.
4. *Kementerian Tenaga Kerja* (Ministry of Manpower [MOM]). Prior to 2014 the ministry's name was *Kementerian Tenaga Kerja dan Transmigrasi* (Ministry of Manpower and Transmigrastion [MOMT]).
5. *Standar Kompetensi Kerja Nasional Indonesia* (SKKNI) is promulgated by a Decision of the Ministry of Manpower and Transmigration (MOMT) Number 249 of 2007.
6. See https://study.com/what_is_a_nurse_technician.html.
7. Loan costs equal borrowing rate (cost of funds) plus administration fee (cost of loan processing) plus installment payment service fee.
8. Indonesia-Japan Economic Partnership Agreement, Annex 10 referred to in Chapter 7 Specific Commitments for the Movement of Natural Persons.
9. Romdiati (2003), citing the Japan International Training Cooperation Organization (JITCO 2002, https://www.jitco.or.jp), says that the number of TITP Indonesian workers in Japan increased from 1,438 trainees in 1995 to 5,972 in 1998 and 5,817 in 2001. Unfortunately, current figures are unavailable. For instance, BNP2TKI, although established in 2006, does not produce statistics or receive statistics from the Ministry of Manpower and Transmigration.

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9. Will ASEAN mutual recognition arrangements induce skilled workers to move? A case study of the engineering labor market in Thailand

Sasiwimon Warunsiri Paweenawat and Jessica Vechbanyongratana

1. INTRODUCTION

One of the main features of the ASEAN Economic Community (AEC) is the free movement of skilled workers in eight employment categories under the mutual recognition arrangement (MRA). The agreement should lower migration costs, leading to increased movement of skilled workers across ASEAN countries. In particular, the agreement removes some entry barriers through common licensing and easier access to work visas. Since 2015, registered ASEAN professionals have migrated to work in other ASEAN countries. But it remains to be seen whether the agreement significantly affects job decisions of skilled labor. This chapter examines Thailand's market for engineers—one of the MRA professional classes—and discusses the potential movement of Thai engineers based on the costs and benefits. It also looks at the potential attractiveness of the Thai market for engineers from other ASEAN countries.

The ASEAN MRA on engineering services was the first MRA signed and has been in force since 2005. However, only in 2013 did all ASEAN members fully join. The ASEAN Chartered Professional Engineer Coordinating Committee (ACPECC) is the central professional organization that recognizes engineering qualifications in the region. It allows registered engineers to work in other ASEAN countries immediately after registering as a Registered Foreign Professional Engineer (RFPE) in the host country. However, the number of registered engineers remains very low.

Table 9.1   Current registered engineers on the ACPE database

Country	Number of Registered Engineers
Brunei Darussalam	8
Cambodia	30
Indonesia	847
Lao People's Democratic Republic	12
Malaysia	284
Myanmar	239
Philippines	205
Singapore	252
Thailand	158
Viet Nam	196
Total Engineers	2,231

Note: ACPE = ASEAN Chartered Professional Engineer.

Source: ASEAN Chartered Professional Engineer Coordinating Committee (ACPECC) (as of December 2016).

As of December 2016, only 2,231 engineers had registered as an ASEAN Chartered Professional Engineer (ACPE), with just 158 from Thailand (Table 9.1). One study found that Thai engineers compared well against those from other ASEAN countries (University of the Thai Chamber of Commerce 2012). So why have so few Thai engineers registered as ASEAN engineers if they are leaders in the region?

From the demand side, Thailand is often assumed to have a shortage of workers in science, technology, engineering, and mathematics—the "STEM" fields. However, a recent paper by Paweenawat and Vechbanyongratana (2015) on the returns to STEM education and employment in Thailand finds there is no shortage of STEM degree holders. Rather, only 29% of STEM graduates have STEM-related jobs. They receive higher returns in non-STEM occupations.

From the supply side, the market for engineers and possible impact of the ASEAN MRA come into play. Paweenawat and Vechbanyongratana indicate there is a large mismatch in this portion of the labor market. Engineering graduates largely do not work as engineers due to factors such as the lack of appropriate jobs and low returns on education compared with non-engineering fields like finance, for example. These need to be better understood.

This chapter thus asks whether Thai engineers would take advantage of opening regional skilled labor markets given current labor market conditions for engineers in Thailand. It addresses the supply side of the

market by investigating the number of Thai postsecondary engineering graduates currently in or expected to join the labor market. It then assesses how close engineering graduates match jobs commensurate with their qualifications in Thailand—and the relative wage returns they can expect for both engineering degrees and engineering occupations in Thailand. The chapter briefly discusses Thailand's current demand for engineering graduates. Finally, it discusses the potential impact of regional integration on the engineering labor market.

The study first utilizes a probit regression to assess the probability that workers trained as engineers find formal employment in a largely informal labor market. An augmented Mincer wage regression is then used to analyze wage returns to engineering degrees and occupations. The analysis finds a 5% higher probability of engineering graduates finding formal employment compared with business and social science graduates assumed to have similar analytical skills. Furthermore, the rate of return to engineering degrees/jobs is high compared with other degree/job fields. Given the empirical results and good labor market conditions for engineers in Thailand, one would expect limited movement of Thai engineers into other ASEAN countries. Yet Thailand may be attractive for engineers from other ASEAN countries. Thus, we suggest the Thai government should better prepare its engineers and create incentives for them to work overseas.

The chapter is organized as follows. Section 2 reviews studies relating to the decision to migrate for employment and the wage returns to higher education. Section 3 introduces the methodology and data used to estimate the probabilities of Thai engineers engaging in formal employment and relative wage returns to engineering education and occupations. Sections 4 and 5 present the results and conclusions, respectively.

2.   LITERATURE REVIEW

2.1   The Decision to Migrate for Employment

Economists generally analyze the decision to migrate based on a cost–benefit framework. Sjaastad (1962) stated that a person will compare the current value of the expected return and the cost of migration. Bauer et al. (2005) clearly outline the potential costs and benefits of migrating abroad for employment, summarized as follows:

- Benefits
  - Monetary
  - Increased labor earnings in new job

- Non-monetary
  - o Attractive climate
  - o Good work environment
- Costs
  - o Monetary
    - ■ Travel expenses
    - ■ Employment search costs
  - o Non-monetary
    - ■ Forgone earnings at home
    - ■ Psychological costs arising from the loss of a familiar environment and confrontation with another culture.

According to Bodker et al. (2013, p. 5), more successful workers in the labor market generally have higher direct and indirect costs. This means that the benefits need to be relatively high for skilled workers to overcome the inherent costs of migration. In fact, Borjas (1987) suggests that high-skilled workers tend to migrate to countries where skill prices are relatively high.

The European Union (EU)—the classic model of regional economic and monetary integration—holds several lessons, as free labor mobility within the EU is one of its main pillars. Bonin et al. (2008) found from their survey that the movement of workers within the EU15, EU12, and EU27 has been driven by two main factors—jobs and family. Manpower (2008) particularly focused on the movement of high-skilled workers within the EU, finding that higher compensation is the most significant factor leading to movement within this group.

Kahanec (2012) found that even though the EU worked toward establishing MRAs for professional qualifications—to ease high-skilled labor migration within the EU—the mobility rate remained relatively low compared with other single currency areas such as Australia, Canada, the Russian Federation, and the United States. Interestingly, he found that MRAs facilitated recognition of professional credentials, but their implementation was difficult. Barriers to EU labor mobility included taxation, social security and health insurance problems, as well as difficulties in the work itself. Furthermore, Eurofound (2014) said that language was also a major impediment for intra-EU mobility. Based on the 2010 Eurobarometer survey on geographical and labor market mobility by the European Commission (2010), more than half of the respondents mentioned that language differences were considered a barrier to intra-EU migration. Together these barriers could explain the low rates of EU skilled worker mobility compared with other regions.

A study by Sugiyarto and Agunias (2014, p. 4) asserts that the "AEC

does not guarantee or seek full labor mobility even among the highly skilled, it only facilitates this movement"—weaker than labor agreements in the EU and the Caribbean Community (CARICOM). The EU allows free labor movement at all skill levels, while CARICOM provides high-skilled workers with free entry visas within the region. As a result, ASEAN's intention of free movement is "less ambitious" by comparison (Sugiyarto and Agunias 2014, p. 4).

United Nations (2013) says that 70% of total ASEAN migrants come from other ASEAN countries. The vast majority of intra-ASEAN migrants (87%) are low-skilled workers (Orbeta 2013)—leaving the migration flow between high- and low-skilled workers extremely unbalanced. There are only eight MRAs—covering accounting, engineering, nursing, architecture, medicine, dentistry, tourism, and surveying—or about 1.5% of the ASEAN workforce (Johnson 2015). As MRAs are highly selective by design—and 97% migrate between just three countries (Thailand, Malaysia, and Singapore) (Migration Policy Institute 2013)—it is not surprising that Sugiyarto and Agunias (2014, p. 8) conclude that "[t]he progress on realizing ASEAN's vision has in general been very slow and uneven, despite the stated deadline of 2015." Furthermore, they determine that, based on the results of studies in other regions in the world, most successful MRAs are just part of broader mobility and economic cooperation strategies.

2.2 Wage Returns to Higher Education

As this chapter focuses on skilled workers' decision to migrate, the returns to higher education—especially for particular degrees—is important. Berger (1988) was the first to investigate the relationship between predicted future earnings and a student's choice of major. Several studies since have estimated the returns to university degrees with various results. For example, even though some show that STEM graduates on average earn more than non-STEM graduates (O'Leary and Sloane 2005; Webber 2014b), others find there is no wage premium for science graduates (Walker and Zhu 2010). Despite the mixed results, a recent study by Webber (2014a) concludes that, in general, returns to education for highly educated workers differ by type of university degree.

Aside from the degree earned, the occupation chosen after graduation is a key factor in determining earnings. Chevalier (2012) finds that STEM occupations—not degrees—determine wage returns in the United Kingdom. Other studies explored how matching degrees with occupation can determine earnings. For example, Borghans and De Grip (2000) find a positive wage return for those working in occupations that match their

degrees, while Hoekstra (2009) indicates there is a wage penalty for those who do not match. In addition, Kinsler and Pavan (2015) show that STEM graduates earn a 30% wage premium if they work in an occupation that matches their major.

Labor market returns for those with engineering degrees have been studied. Fan and Zhang (2015) found the rate of return in engineering is highest or relatively high compared with other degrees. This is consistent with other studies (Thomas 2000) that found workers who graduated with engineering majors received the highest initial salaries compared with those majoring in other fields. Based on the American Community Survey (2009–2010) data, Arcidiacono et al. (2014, p. 1) also found that engineering graduates receive higher earnings than humanities graduates. Similarly, Black et al. (2003) note that, while workers with economics degrees have higher earnings relative to other majors, their earnings remain below those of engineering graduates.

Most studies investigate returns to engineering education and occupations in advanced economies. In one of the few studies that consider labor market returns to engineering degrees in emerging economies, Bourne and Dass (2003) found that the rate of return to engineering degrees was highest among all degrees in Caribbean countries. The most closely related study on Thailand is by Paweenawat and Vechbanyongratana (2015), which estimates private returns to STEM education. The results show that occupational choice largely determines wages, not the degree earned. By analyzing returns to engineering education and occupations in Thailand, this chapter provides the relevant context in which to discuss the potential impact of ASEAN MRAs.

3.   DATA AND METHODOLOGY

Descriptive and econometric approaches are used to create a holistic picture of Thailand's current market for engineers. Existing market surveys and studies help assess the current supply and demand for engineers in Thailand. Then a supply-side analysis is conducted using data from the 2007–2009 Thai Labor Force Surveys (LFS)—compiled by the National Statistical Office of Thailand, Statistical Forecasting Bureau. Each quarterly LFS represents data compiled from interviews with the household head or other member. Each survey covers 70,000–200,000 people or 0.1–0.5% of the population. The estimation uses the 3rd quarter survey because the sample size is relatively larger and complete compared with surveys from other quarters—due to the effect of seasonal agricultural migrants. LFS surveys are used to estimate the number of postsecondary

engineering degree holders in Thailand and the number of people engaged in engineering professions. The data are also used to determine how closely engineering degree holders match with their employment, the probability of engaging in formal employment, and the wage returns to engineers relative to non-engineers.

The sample includes full-time workers (more than 30 hours a week) between 16 and 59 years old at the time of the survey with a four-year university degree or higher. The full sample contains 49,021 observations, of which 35,072 were wage earners.

Work status falls under seven main categories—(i) employers, (ii) self-employed without employees, (iii) unpaid family workers, (iv) government employees, (v) government enterprise employees, (vi) private employees, and (vii) members of cooperatives. Although the relationship between degree type and formal employment is important, there is no LFS variable directly indicating formal employment. As a proxy, a dummy variable for formal employment is used that includes employers and government, government enterprise, and private firm employees. The other categories are considered informally employed.

The LFS classifies occupations according to the International Standard Classification of Occupations 1988 (ISCO-88) codes. A worker is classified as working in engineering as defined by the Occupational Information Network's (O*NET) STEM classification system.[1] O*NET uses the Standard Occupational Classification (SOC), thus the SOC codes were converted using the United States Bureau of Labor Statistics' crosswalk with ISCO-08 (2008 update to ISCO-88), then converted again using the ISCO-08/ISCO-88 crosswalk. Most occupations classified as engineering jobs are obvious. A worker is also classified as having an engineering degree if their degree field is code 52 according to the International Standard Classification of Education (ISCED) (Table 9.2).

The summary statistics are also stratified by degree type. Employees with engineering degrees differ from the rest of the sample in several important ways. For example, employees with engineering degrees earn on average THB3,438 more per month than employees without engineering credentials. Also, fewer engineers pursue graduate-level education, possibly because the return on undergraduate degrees is relatively high in Thailand. Women comprise only 7% of engineering graduates, whereas they represent 62% of employees with bachelor degrees. Finally, workers with engineering credentials are more likely to be in Bangkok and central Thailand, where most engineering work is located.

Paweenawat and Vechbanyongratana (2015) showed that career matching for engineering graduates is much higher than for other science and

Table 9.2   Summary statistics

Variable	Total	Non-Engineering Degree	Engineering Degree	t-statistic/ z-statistic
Formal Employment	0.762	0.761	0.765	−0.42
Indicator	(0.426)	(0.426)	(0.424)	. . .
Real monthly income	17,850.25	17,712.29	21,150.62	−8.76***
(USD1 = THB35.23 as	(14,447.82)	(14,327.05)	(16,754.83)	. . .
of 10 May 2016)				
MA/PhD Degree Indicator	0.104	0.105	0.086	2.72***
	(0.305)	(0.306)	(0.281)	
Engineering Degree	0.043	. . .	. . .	. . .
	(0.203)	. . .	. . .	. . .
Engineering Occupation	0.046	0.034	0.330	−63.38***
	(0.210)	(0.180)	(0.470)	
Female Indicator	0.596	0.620	0.069	17.19***
	(0.491)	(0.485)	(0.254)	
Age	38.304	38.467	34.669	50.45***
	(9.959)	(9.986)	(8.582)	
Married Indicator	0.602	0.603	0.571	3.02***
	(0.489)	(0.489)	(0.495)	
Urban Indicator	0.544	0.544	0.541	0.28
	(0.498)	(0.498)	(0.498)	
Public Employee Indicator	0.484	0.494	0.268	20.35***
	(0.500)	(0.500)	(0.443)	
Bangkok Metropolitan Area	0.120	0.116	0.206	−12.38***
	(0.325)	(0.320)	(0.404)	
Central Region	0.307	0.302	0.409	−10.39***
	(0.461)	(0.459)	(0.492)	
Northern Region	0.194	0.197	0.124	8.33***
	(0.395)	(0.398)	(0.329)	
Northeastern Region	0.223	0.226	0.153	7.88***
	(0.416)	(0.418)	(0.360)	
Southern Region	0.156	0.158	0.109	6.18***
	(0.363)	(0.365)	(0.311)	
Observations	49,021	46,911	2,110	

Note: USD = United States dollar, THB = Thai baht.

Source: Authors' calculations.

Table 9.3 *Cross-tabulations of engineering degree, engineering job, and formal sector employment matching for postsecondary degree holders*

Panel A

	Non-Engineering Degree	Engineering Degree	Total
Non-Engineering Job	45,338	1,414	46,752
Engineering Job	1,573	696	2,269
Total	46,911	2,110	49,021

Panel B

	Informal Employment	Formal Employment	Total
Non-Engineering Degree	11,190	35,721	46,911
Engineering Degree	495	1,615	2,110
Total	11,685	37,336	49,021

Panel C

	Informal Employment	Formal Employment	Total
Non-Engineering Occupation	11,649	35,103	46,752
Engineering Occupation	36	2,233	2,269
Total	11,685	37,336	49,021

Source: Paweenawat and Vechbanyongratana (2015) and authors' calculations.

technology fields. A cross tabulation can be done matching engineering degrees, engineering jobs, and formality (Table 9.3).

Panel A indicates that about 31% of postsecondary engineering graduates match with engineering jobs, well above the 17% match rate for those with degrees in other STEM fields (Paweenawat and Vechbanyongratana 2015). Although about two-thirds of the workforce is informal, less than a quarter of postsecondary engineering graduates and 2% of postsecondary degree holders in engineering occupations are informally employed (see Table 9.3, panels B and C). Overall, it appears that the formal Thai economy can absorb trained engineers in the formal market relatively easily—with labor protection and benefits.

The econometric study analyzes two aspects of Thailand's labor market for engineers. The first is the probability that an engineer or engineering graduate will work in the formal economy. The second looks at wage returns to engineering occupations and degrees relative to non-engineering

occupations and degrees. The analysis also considers whether female engineers experience different rates of formality and wage levels than male engineers. This helps shed light on whether an engineer has an advantage or disadvantage compared with other occupations and degrees in finding formal employment with protection and benefits. Furthermore, the empirical analysis determines an engineer's relative earning power vis-à-vis non-engineers.

3.1   Probit Regressions

The first analysis uses a probit regression to model the sorting of engineering graduates relative to non-engineering graduates into Thailand's formal and informal economies. Approximately one-third of the labor force is formally employed—formality is generally defined as being covered by one of the government social security systems (Schmitt et al. 2013). Formality affords the worker a set of employment protections, including worker compensation, unemployment insurance, pension, and maternity benefits, among others. As mentioned, the LFS does not directly classify workers as formal or informal. Rather, workers are classified as employers, employees, or non-employees.[2] Here "employees" and "employers" are considered working in the formal sector and "non-employees" as informal workers. While this classification can be problematic—as some private firms practice social evasion—private firms are for the most part in compliance with social security laws. Thus most private firm workers with postsecondary credentials are formal sector workers. Employers are also included in the formal economy as it is assumed those in a position to hire others can also afford public or private insurance protection. Of the 49,021 observations on postsecondary graduates, 76% are classified employees or employers, and thus assumed to work in the formal sector. The variable "formal employment" is a binary outcome variable, where it takes on the value of "1" if the graduate works as an employee or employer and "0" otherwise.

The probit model is

$$\Pr(Y=1\,|\,X) = f\left(\begin{array}{l} \textit{engineering degree, female, female * engineering degree,} \\ \textit{MA/PHD, age, urban, married, region} \end{array}\right)$$

$$(9.1)$$

Controls exist for engineering degree, gender (female), an interaction between female worker and engineering degree, master's or doctorate (MA/PHD) degree completed, age, urban, married, and region. The probability of engineering graduates sorting into the formal sector

relative to non-engineering graduates is then estimated. The first probit estimation compares the probability of engineering graduates entering the formal sector compared with other degree holders. The sample is then split into two groups: engineering graduates (ISCED 52) and social science and business graduates (ISCED 31 social sciences and 34 business). The results of the second probit estimation compares the probability of being formally employed between engineering graduates and social science and business graduates—assumed to have similar analytical skills/ability as engineering graduates based on Blundell et al. (2000). Finally, only engineering graduates are examined (probit 3) to determine the factors that lead some engineers to find employment in the informal sector.

3.2 Augmented Mincerian Regressions

The second part of the analysis utilizes an augmented Mincer wage regression to explore the returns to engineering education and engineering employment in the formal labor market relative to non-engineering degrees and occupations in Thailand. Postsecondary degrees in the formal labor market (35,072 observations report wages and are classified as employees) are estimated using the following augmented Mincerian equation:

$$\ln w_i = \beta_0 + \beta_1 MA/PHD_i + Deg_i\phi + X_i\gamma + \varepsilon_i \qquad (9.2)$$

where $\ln w_i$ is natural logarithm of real monthly wages, MA/PHD equals 1 if the respondent holds an MA or PhD degree, Deg_i is a vector of dummy variables indicating the postsecondary degree earned (engineering is the base category), and ε_i is an error term. Vector X_i controls for the other factors that can influence wages—including age, age squared, gender, residence (urban/rural), marital status (married/non-married), region (Bangkok, Central, North, Northeast, South), public sector employment, and survey year (2007–2009). A second specification concentrates on the returns to engineering degrees and engineering jobs by adding the dummy variable, ED_i, which equals 1 if the individual has an engineering degree, and EJ_i, which equals 1 if the individual has an engineering job. Thus, β_1 and β_2 are the returns to a postsecondary engineering degree and to an engineering job, respectively. To test for the additional returns to matching in the labor market (an engineering degree holder is engaged in an engineering job), the interaction term $(ED_i * EJ_i)$ is added in the regression equation. Thus, β_3 captures the additional wage return to engineers who match the labor market. ED_i and EJ_i also interact with *female_i* to determine if female engineers have different labor market returns than male engineers.

$$\ln w_i = \beta_0 + \beta_1\, ED_i + \beta_2\, EJ_i + \beta_3\, (ED_i * EJ_i) + \beta_4\, female_i +$$

$$\beta_5\, (female_i * ED_i) + \beta_6\, (female_i * EJ_i) + \beta_7\, (female_i * ED_i * EJ_i) +$$

$$\beta_8\, MA/PHD + X_i\gamma + \varepsilon i \qquad (9.3)$$

For this specification, the returns are first compared with engineering degrees and engineering jobs with non-engineering graduates (entire sample). Then, the returns to business/social science graduates are compared with engineering graduates. Finally, only engineering graduates are analyzed to determine the role matching plays on wages.

It is well recognized that the coefficient on schooling variables in Mincerean regressions suffers from systematic bias due to unobserved ability (Card 1999). This problem is compounded as it is likely that individuals self-select into engineering degrees and occupations because they are high-ability individuals who can cope with course materials. For example, Leslie (2003) finds that high-ability students systematically select science and technology degrees. Although there are no current studies on the correlation between student ability and acceptance into engineering degree programs, it is widely believed engineering programs are some of the most competitive programs for admission in Thailand. Initially, this apparent bias might seem problematic. However, accurately estimating the relative returns to engineering degrees is less interesting than the overall position engineering graduates hold in wage distribution. If their position based on level of education, degree pursued, and unobserved ability is favorable compared with non-engineers, this can influence a decision to migrate (or not) for employment.

4. RESULTS AND DISCUSSION

4.1 Relative Probability of Engineering Graduates Being Formally Employed

The probit regressions provide details on the relative probability engineering graduates are formally employed compared with workers with other postsecondary qualifications. The probit uses three different stratifications (Table 9.4). The first compares the relative probability of engineering graduates to non-engineering graduates being employed in the formal sector. The second limits the analysis to engineering degree holders and business/social science degree holders. The idea here is to look at the labor market outcomes of engineering graduates compared with a group of graduates with similar academic strengths (analytical skills) to see if one group has a

Table 9.4   *Probability of engaging in formal employment (probit regressions)*

Variables	(1)	(2)	(3)
	Entire Sample	Selected Postsecondary Degrees	Engineering Degrees Only
	Dependent Variable: Employee		
Engineering Degree	0.018*	0.051***	
	(0.010)	(0.011)	
Female Indicator	−0.005	−0.031***	−0.037
	(0.004)	(0.007)	(0.039)
Female X Engineering Degree	−0.030	−0.028	
	(0.038)	(0.043)	
MA/PhD Degree Indicator	0.134***	0.132***	0.118***
	(0.005)	(0.009)	(0.028)
Age	0.003***	0.001***	0.003**
	(0.000)	(0.000)	(0.001)
Urban Indicator	−0.021***	−0.026***	−0.014
	(0.004)	(0.006)	(0.018)
Married Indicator	0.006	−0.014**	0.054**
	(0.004)	(0.007)	(0.022)
Central Region	−0.029***	−0.092***	−0.086***
	(0.007)	(0.011)	(0.028)
Northern Region	−0.032***	−0.125***	−0.202***
	(0.007)	(0.012)	(0.042)
Northeastern Region	0.012*	−0.092***	−0.205***
	(0.007)	(0.012)	(0.039)
Southern Region	−0.026***	−0.130***	−0.207***
	(0.008)	(0.013)	(0.044)
Observations	49,021	21,241	2,110

Note: MA = master's degree, PHD = doctorate.

Source: Authors' calculations.

relative advantage of finding formal employment. The final specification limits the analysis to engineering graduates. The results here will point to individual characteristics correlated with securing formal employment.

Overall, only 24% of postsecondary degree holders are informally employed, compared with two-thirds of the overall labor force. The regression results indicate that engineering graduates have a modest 2%

advantage over others with postsecondary degrees of being formally employed after controlling for education level, region of residence, and personal characteristics for the entire sample. However, in the second specification, engineering graduates have a 5% higher probability of finding formal employment. In general, women have about the same or slightly lower probability of being employed in the formal sector as men. The interaction term between female and engineering degree, however, indicates that female engineering graduates do not have any additional disadvantage or advantage compared with male engineering graduates. Thus, it appears that both male and female engineering graduates have approximately the same or higher probability of working in the formal sector as other skilled workers. Although the proportion of skilled workers who work informally is relatively small compared with the overall labor market, the fact remains that nearly a quarter of engineering graduates are informally employed. It is difficult to ascertain whether this is by choice or due to lack of opportunity.

The third specification results suggest that education level and region of residence matter to engineers. In particular, MA and PhD holders are 12% more likely to be formally employed than bachelor degree holders. Also, those who live in the Bangkok metropolitan area—where the majority of skilled jobs are located—are more likely to be formally employed.

Although Thailand's labor market is largely informal, 23% of engineering degree holders and only around 2% of those who hold engineering occupations are informally employed. Relative to other skilled workers with university credentials, engineers have approximately the same or slightly better probability of being formally employed. Within engineers, those with high educational attainment (MA or PhD) and those who live in Bangkok have higher probabilities of formal employment. With engineers largely enjoying formal employment opportunities in Thailand, it is unlikely that Thai engineers would seek employment abroad for formal employment or to gain employment protections.

4.2   Relative Wage Returns to Engineering Degrees and Occupations

The next part of the analysis looks at the relative wage returns of engineering graduates and practitioners and their position in Thailand's wage distribution for skilled workers (Table 9.5). The first specification looks at the relative returns of engineering graduates to graduates in other fields. The second also looks at returns to engineering employment and matching. The third limits the sample to compare relative returns of engineering graduates with graduates in business and social sciences, assumed to have similar unobserved skills. Finally, the sample is limited

Table 9.5   Returns to engineering degrees and occupations in Thailand

Variables	(1)	(2)	(3)	(4)
	Entire Sample	Entire Sample	Selected Postsecondary Degrees	Engineering Degrees Only
	Dependent Variable: Log Real Monthly Wages			
Education	−0.269***			
	(0.013)			
Humanities and Fine Arts	−0.267***			
	(0.016)			
Social Sciences, Business, and Law	−0.276***			
	(0.012)			
Science	−0.209***			
	(0.015)			
Agriculture	−0.238***			
	(0.019)			
Health and Social Services	−0.031**			
	(0.014)			
Services	−0.298***			
	(0.022)			
Manufacturing	−0.167***			
	(0.030)			
Architecture	−0.102***			
	(0.023)			
Engineering Degree		0.059***	0.065***	
		(0.017)	(0.019)	
Engineering Job		0.118***	0.098***	0.305***
		(0.014)	(0.029)	(0.027)
Female Indicator		−0.038***	−0.076***	0.064
		(0.005)	(0.009)	(0.064)
Engineering Degree Matched with Engineering Job		0.243***	0.246***	
		(0.028)	(0.039)	
Female X Engineering Degree		0.097*	0.125**	
		(0.058)	(0.063)	
Female X Engineering Occupation		−0.051*	−0.075	−0.003
		(0.026)	(0.049)	(0.102)
Female X Eng. Degree X Eng. Occupation		0.022	0.022	
		(0.095)	(0.111)	
MA/PhD Degree Indicator	0.324***	0.314***	0.434***	0.270***
	(0.007)	(0.007)	(0.012)	(0.043)
Age	0.039***	0.041***	0.039***	0.094***
	(0.002)	(0.002)	(0.004)	(0.013)

Table 9.5   (continued)

Variables	(1)	(2)	(3)	(4)
	Entire Sample	Entire Sample	Selected Postsecondary Degrees	Engineering Degrees Only
	Dependent Variable: Log Real Monthly Wages			
Age^2	0.000	−0.000	0.000	−0.001***
	(0.000)	(0.000)	(0.000)	(0.000)
Urban Indicator	0.033***	0.043***	0.045***	−0.003
	(0.007)	(0.008)	(0.013)	(0.042)
Married Indicator	0.060***	0.054***	0.064***	0.033
	(0.005)	(0.005)	(0.009)	(0.033)
Public Employee Indicator	0.007	0.044***	−0.062***	−0.208***
	(0.006)	(0.006)	(0.009)	(0.030)
Central Region	−0.294***	−0.294***	−0.251***	−0.280***
	(0.008)	(0.008)	(0.012)	(0.034)
Northern Region	−0.406***	−0.400***	−0.408***	−0.442***
	(0.009)	(0.009)	(0.014)	(0.048)
Northeastern Region	−0.390***	−0.390***	−0.395***	−0.505***
	(0.009)	(0.009)	(0.014)	(0.047)
Southern Region	−0.408***	−0.403***	−0.404***	−0.405***
	(0.009)	(0.009)	(0.015)	(0.054)
Year 2008	0.003	0.011	−0.004	−0.090*
	(0.008)	(0.008)	(0.015)	(0.046)
Year 2009	−0.028***	−0.028***	−0.054***	−0.071**
	(0.006)	(0.006)	(0.010)	(0.031)
Constant	8.485***	8.223***	8.283***	7.444***
	(0.042)	(0.041)	(0.073)	(0.241)
Observations	35,066	35,066	13,705	1,407
R-squared	0.539	0.532	0.507	0.531

Notes:
Standard errors in parentheses.
*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.
MA = master's degree, PHD = doctorate.

Source: Authors' calculations.

to engineers, looking at the returns to advanced degrees and job market matching.

The first specification indicates that those who hold postsecondary engineering degrees do relatively well in the labor market compared with those holding other postsecondary degrees. In fact, on average, engineering

degree holders earn more than any other type of degree holder, with the exception of those in health and services, which includes doctors. Specification 2 shows that on average there is a 6% wage premium for engineering graduates compared with others. Furthermore, wages for engineers are 12% above those in other occupations. Engineer graduates working as engineers can expect an additional 24% wage premium. Thus, the overall premium for men with engineering degrees employed in engineering is 42% compared with male graduates in other fields working as non-engineers. After taking into account interactions between female, engineering degree, and engineering occupation variables, women can expect to earn 45% more than men with degrees and jobs outside engineering—indicating that women on average earn relatively high salaries in Thailand when matching their engineering degree with an engineering occupation.

Following Webber (2014b), the returns to engineering degrees are compared with business and social science degrees to minimize the ability bias. The results are similar to specification 2. Both male and female engineering graduates matched with engineering jobs can expect an average 42% higher wage than business and social science graduates. It is clear that, relative to those who finish other postsecondary degrees, engineering graduates on average earn significantly more in Thailand (Figures 9.1 and 9.2).

The final specification focuses only on engineering graduates and the impact of job-matching on wages. Engineering graduates with engineering jobs earn 31% more than engineering graduates working elsewhere. In addition, those with advanced engineering degrees (MA/PhD) can expect to earn on average an additional 27% over those with only a bachelor's degree. Female and male engineers also appear to have similar wage
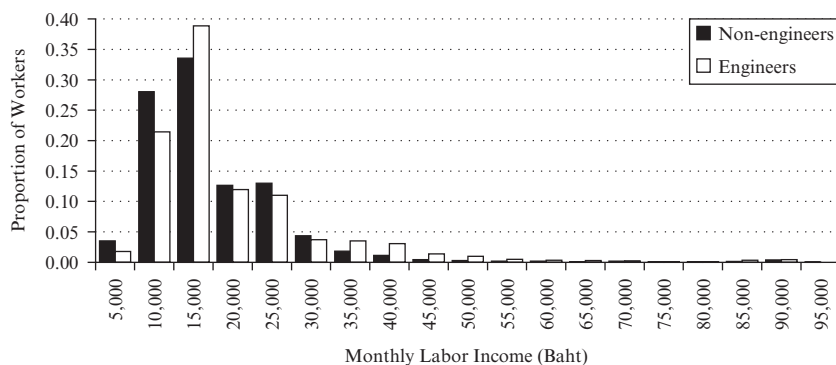
Source: Authors' calculations.

Figure 9.1   Distribution of real monthly wages by engineering occupation
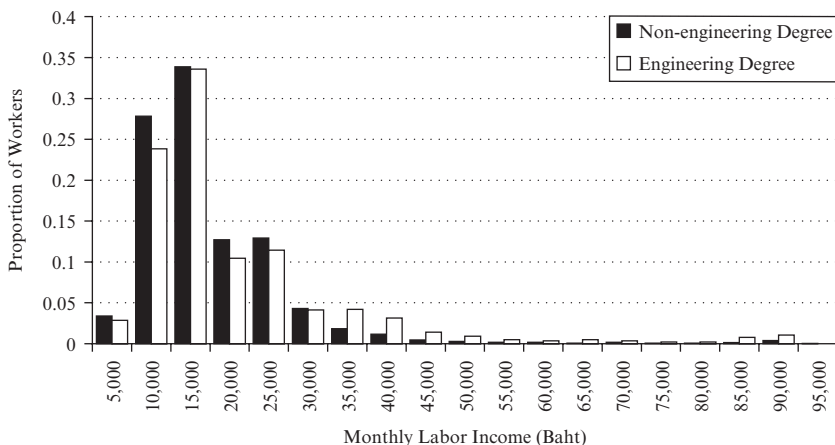
Source:　Authors' calculations.

Figure 9.2　Distribution of real monthly wages by engineering degree

returns matching engineering occupations. In sum, the rate of return to engineering degrees/jobs is relatively high, especially for those matching engineering degrees with engineering work.

5.　DISCUSSION

As of December 2016, 158 Thai engineers were Registered Foreign Professional Engineers (RFPEs) under the ASEAN MRA. Why so few? The framework of migration costs and benefits for skilled workers might hold an answer. Migration costs can be direct or indirect. Direct costs include travel and any other monetary outlays needed to migrate (job search and visa processing, among others). Non-monetary costs can include the psychological cost of leaving social networks (including family) and difficulties in a new environment. Furthermore, based on the survey of ASEAN employers on skills and competitiveness by the ILO (2014, p. 27), language plays a major role.

The ASEAN MRA essentially reduces migration costs in two ways. First, it reduces potential monetary costs of gaining country-specific professional certifications. And, second, it should in theory overcome non-monetary costs associated with obtaining permission to work abroad, especially where there is limited scope for foreign professionals to work in engineering. The question is whether these reductions in direct and

indirect costs of migration offset costs enough so the benefits of migration outweigh its costs.

In Thailand, one potentially important non-monetary cost is the psychological cost of leaving family. According to Knodel et al. (2015, p. 10), it is quite common for adult children to stay with their parents in extended family units—instrumental in old-age support. Although co-residence fell from 77% in 1986 to 55% in 2014, the number remains significant. This could create a significant non-monetary barrier to migration among those with tight family obligations. Also, from the family perspective, skilled-labor mobility is a sensitive topic compared with low-skill workers. Access to foreign labor markets for other family members, particularly spouses, could be a major barrier in deciding to work abroad (Kahanec 2012).

There are two monetary considerations. First is an engineer's higher wages vis-à-vis the rest of Thailand's labor market. Second is the differential in pay between what engineers can earn at home and what they can expect abroad. On the first, the empirical investigation of LFS data strongly suggests engineering graduates can expect to find formal employment, have a good chance of matching their education and occupation compared with other fields, and have higher relative wage returns than those with other postsecondary degrees. As to the second, the average wages for Thailand's engineers are above other ASEAN countries, with the exception of Malaysia and Singapore (Figure 9.3).

Interestingly, even though average wages in Singapore are well above those in other ASEAN countries, the MRA may not attract engineers from Thailand, as Singapore already had mechanisms in place that allow engineers from nearby countries to legally enter and work in the country. In fact, according to Fukunaga (2015), prior to the MRA engineers could already apply to legally work in Brunei Darussalam, Cambodia, Malaysia, Singapore, the Philippines, and Thailand.

And according to the ASEAN engineering MRA, engineers working in other ASEAN countries have to practice under the supervision of a qualified engineer in the host country. This makes procuring a position more difficult and discourages work overseas. Also, there are no supporting government policies—such as tax or financial incentives—to encourage Thailand's engineers to work abroad, as opposed to engineers in Singapore and Malaysia. United Nations (2014, p.188) states that "due to the structure of the Thai economy, it is unlikely that Thailand would take substantial steps to encourage the out-migration of skilled professionals to other [ASEAN Member States], given the strong demand for such skills in Thailand and potential risk of brain drain."

There does not appear to be any impetus for Thailand's engineers to use
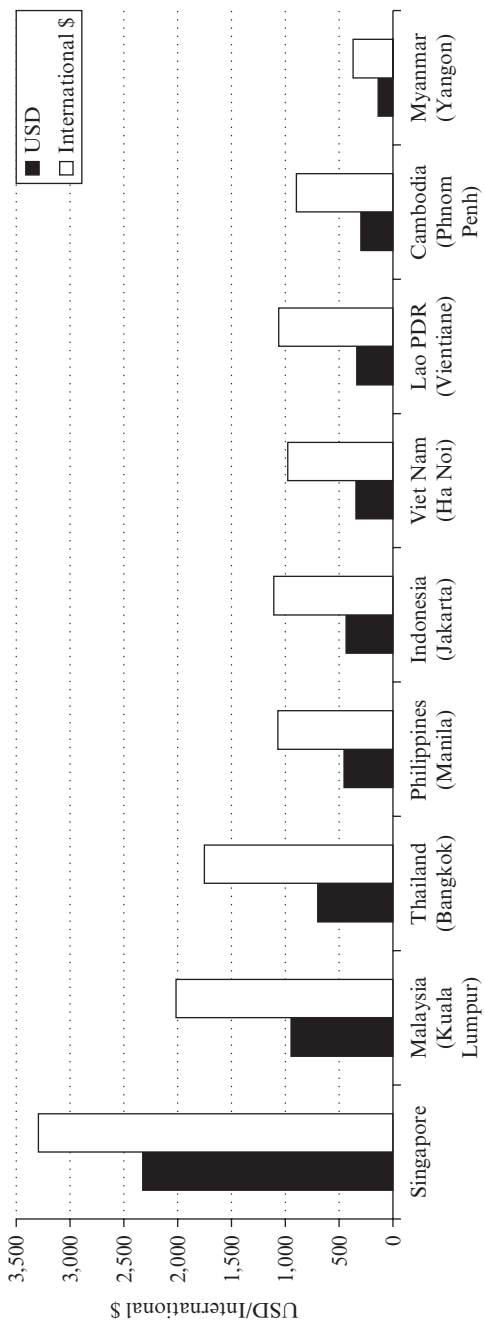
Note: ASEAN = Association of Southeast Asian Nations.

Source: Salaries from JETRO (2013); official exchange rate and purchasing power parity conversion factors from World Bank (2016a and 2016b).

Figure 9.3   Monthly base salaries for mid-level engineers in ASEAN, 2012

the MRA to work as engineers in other ASEAN countries. However, it is possible that engineers from other ASEAN countries may want to move and work in Thailand's engineering market, possibly increasing competition in Thailand's engineering labor market.

A recent survey by Adecco (2015) found engineering most in demand in Thailand in 2014—indicating a supply shortage of engineers in Thailand. Manpower (2014) found that increased foreign direct investment (FDI) in manufacturing as a result of the AEC led to an increase in demand for engineers in Thailand, especially in the automobile industry. Thus, demand for engineers has been growing as the automobile sector expands—which should continue as the government moves to make the country an automobile manufacturing hub.

The relatively high returns to engineering degrees/occupations in Thailand and the relatively high salaries compared with other ASEAN countries—combined with the reduced costs of migration due to the MRA—could be attractive to engineers in the region. And Thailand's labor market is relatively woman-friendly, as demonstrated by the empirical results—another potential factor that could attract ASEAN engineers to Thailand.

Thailand is already recognized as a major recipient country for ASEAN migration (Wickramasekera 2002). Its relatively open economy has already attracted a large number of skilled and professional workers globally, with an estimated 100,000 high-skilled foreign workers with work permits in 2010 (Huguet et al. 2012, p.2). According to official statistics from the Department of Employment, Office of Foreign Workers Administration, and the Immigration Bureau, in 2012 the estimated number of foreign professional, skilled, and semi-skilled workers was 89,829, of which 83,419 were foreigners with work permits and 6,410 diplomats and officials. Given this openness and attractiveness, the Thai Ministry of Labor (2015) expects that ASEAN MRA implementation will challenge Thai workers through greater competition from skilled workers from other ASEAN countries. The Ministry of Labor (2015) emphasizes that Thailand's workers need to adjust to the new labor realities and improve their skills, especially their English-language proficiency and proficiency in information technology (IT). However, the government has not issued any significant new regulations or policies related to the eight MRAs (United Nations 2014). The extensive use of Thai in the workplace is a difficult barrier for ASEAN engineers, as was found in the EU (Eurofound 2014). Thus, the effectiveness of ASEAN MRAs in attracting greater labor inflows remains to be seen.

6.   CONCLUSIONS

This chapter explored the labor market for engineers in Thailand. Three main aspects were analyzed. First, an evaluation of the demand–supply situation found that Thailand's engineering graduates match relatively well with engineering occupations. Also, the demand for engineers is high, making jobs readily available for new entrants. Second, while two-thirds of Thailand's workforce is in the informal economy, the results show that 23% of engineering degree holders and only 2% of those in engineering occupations are informally employed. Third, the rate of return to engineering degrees/jobs is relatively high compared with other degree/job fields in Thailand's skilled worker market. This is especially true for engineering graduates matched with engineering jobs, earning on average 42% more than non-engineering graduates in non-engineering jobs. In general, the analysis shows that engineers have as good as or better career prospects within Thailand in terms of formal employment and wages compared with other highly educated workers. The empirical exercise also shows that women engineers can expect similar opportunities and returns in the formal sector as their male engineering counterparts.

In terms of the costs and benefits of international labor migration, it is clear from JETRO (2013) that the monthly salaries for mid-level engineers in Thailand are higher than most other ASEAN countries (see Figure 9.3). From a non-monetary standpoint, the psychological costs of leaving family in Thailand are high, especially given extended family units and the cultural expectation to provide support to the elderly. Thus, it is unlikely many Thai engineers would use the MRA to seek employment in another ASEAN country. These results are consistent with the findings in a recent study by Fukunaga (2015, p.17), which indicate that one of the main challenges for MRA implementation is the lack of incentives to work overseas; and that the supply and demand in each member's labor market remains the main factor driving MRA implementation.

Given Thailand's attractive work environment—relatively high wages for the region and high demand for engineers—and modest savings in time and money due to the MRA, it is possible engineers from other ASEAN countries will consider engineering jobs in Thailand. This could mean Thai workers should upgrade their skills to survive in a more competitive environment. Thus, the Thai government and higher education institutions should consider how to prepare local engineers for a more competitive market.

Finally, if the government wants Thailand's engineers to use the MRA, it should consider providing information related to the laws and regulations in each ASEAN country as well as the benefits engineers can expect

working overseas. According to the Center for International Trade Studies, University of the Thai Chamber of Commerce (2012), only 10% of Thailand's engineers were aware of the benefits of free labor mobility. The government could develop a strategy to prepare for greater high-skilled labor mobility and create opportunities for engineers to work overseas. But the MRA lowers migration costs only slightly. And the high local demand for engineers, the attractive wages relative to other skilled workers, and the socio-cultural conditions that place great importance on family linkages will likely outweigh any MRA benefits.

While this chapter analyzes the state of Thailand's labor market for engineers and likely MRA impact, it has its limitations. First, it is an *ex ante* evaluation—as the full effect of the MRAs have yet to be felt. Follow-up studies could evaluate the *ex post* impact of the MRA on Thailand's engineering market. Also, due to data constraints, it was not possible to directly study the engineering labor markets in other ASEAN countries. As the AEC moves forward with legal arrangements to improve the free flow of labor, more comprehensive studies in each member country are needed to better understand the costs and benefits of these arrangements across ASEAN.

NOTES

1. http://www.onetonline.org/.
2. Employees and employers include private firm employees, government employees, government enterprise employees, and employers. Non-employees include own-account workers, unpaid family workers, and members of cooperatives. The majority of non-employees are own-account workers.

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10. Skill flows and the Fourth Industrial Revolution: future questions and directions for the ASEAN Economic Community

Anna Fink and Elisabetta Gentile*

1. INTRODUCTION

In 1969, the independent calculations and communications required to guide the National Aeronautics and Space Administration's (NASA's) Apollo 11 mission were performed by mainframe computers that cost $3.5 million each and were the size of a car. Today, even the simplest Wi-Fi router is more powerful, much smaller, and at the same time much, much cheaper than the technology that put the first man on the moon. Although this process of technological upgrading spanned over 50 years, a major shift occurred at the turn of the 21st century, with the convergence of a wide range of breakthroughs—not just digital (e.g., artificial intelligence), but also physical (e.g., new materials) and biological (e.g., bio-engineering). Economist Klaus Schwab, who coined the term "Fourth Industrial Revolution (4IR)" to refer to this ongoing process, says the accelerating pace of change, breadth, and depth of these technologies is "fundamentally changing the way we live, work, and relate to one another" (Schwab 2016).

The emergence of these disruptive technologies, especially in the digital sphere, could be a boon for the ASEAN Economic Community (AEC). According to the Master Plan on ASEAN Connectivity 2025, digital technologies—particularly mobile internet, big data, cloud technology, the internet of things, the automation of knowledge work, and the Social-Mobile-Analytics-Cloud (SMAC)—could potentially unleash up to $625 billion by 2030 (8% of ASEAN's projected gross domestic product [GDP]) through increased efficiency, new products and services, and digital public goods (ASEAN 2016). The Master Plan goes on to identify education, e-commerce, payments solutions, and cloud-based technologies as areas

where ASEAN could be at the forefront of change, as opposed to simply utilizing existing technologies.

However, new technologies also present new challenges. ASEAN members are already experiencing shortages of skilled labor, and current trends indicate that by 2025 more than half the high-skilled jobs in Cambodia, Indonesia, the Lao People's Democratic Republic, the Philippines, Thailand, and Viet Nam—some 25.6 million jobs—could be filled by workers without sufficient qualifications (ILO and ADB 2014). Therefore, disruption to the labor market is one of the major challenges the AEC will have to tackle regionally (WEF and ADB 2017).

As discussed in Chapter 2, skill flows can help alleviate skill gaps by creating better matches between employers and employees and enabling the transfer of know-how across borders. It is no surprise, then, that the Master Plan reaffirms ASEAN's commitment to facilitate the mobility of skilled labor and university students.

Combined with ASEAN's continuing demographic transition and structural transformation, the 4IR is also changing the way we think about skilled workers. The AEC concluded regional arrangements for the mutual recognition of professional qualifications in tourism and six regulated occupations: accounting, architecture, dentistry, engineering, medicine, and nursing (ADB 2017b). Most of these professions require higher education and/or on-the-job training. However, technical-vocational profiles must also play an important role in the 4IR, as they possess the practical, hands-on skills aligned with the demands of the labor market. The commitment in the Master Plan to strengthen skills mobility "by establishing high-quality qualification framework in critical vocational occupations" (ASEAN 2016) is an encouraging first step toward thinking of skilled workers as those whose profiles are in high demand, rather than workers who are above a certain "skill threshold." The Global Commission on International Migration suggests using the term "essential workers" instead of defining workers as high- or low-skilled (GCIM 2005).

It is still a matter of debate how the technologies of the 4IR will affect skill flows. Some predict that ease of access to information will result in increased mobility of skilled workers; others claim that digital technologies will usher in the era of "virtual migration" (Aneesh 2006), in which work crosses national boundaries through online capital, labor, and information flows.

In this chapter, we seek to add to ongoing debates on how the 4IR will affect ASEAN in the context of skill flows and labor mobility. We do this by reviewing some of the literature on the impact of the 4IR on skilled employment, and then focus on its implications for skill flows—both digital and physical—within the region. We go on to consider how 4IR

technologies can support and further our understanding of physical skilled labor mobility. We conclude with a summary of some of the areas for further research and policy issues for ASEAN to consider.

Although the role of skills mobility in this new economy will likely vary by occupation, we believe that it remains of strategic importance to support growth and inclusiveness in the region. Furthermore, skilled workers increasingly "have mentalities and connections that are much more global in nature than those of their predecessors" (Baldwin 2016), which means that if ASEAN fails to create an environment conducive to skill flows, skilled workers will simply go elsewhere.

2. THE FOURTH INDUSTRIAL REVOLUTION AND SKILLED EMPLOYMENT

Attempts to quantify the impact of 4IR technologies on employment build on the labor economics literature on the task content of employment (Autor et al. 2003; Autor and Dorn 2013). Instead of categorizing jobs as high-, middle- or low-skilled based on factors like occupation or level of educational achievement, this literature looks at the task content of a specific occupation. An occupation is *routine* if it involves tasks performed regularly and easily standardized, and *nonroutine* if it requires problem-solving and complex communications. Routine and nonroutine occupations can be further categorized as cognitive or manual. As mentioned in Section 1, the relationship of routine and nonroutine with high-, middle-, and low-skilled work is complicated (and shifting). But, largely, nonroutine cognitive tasks (carried out by researchers, teachers, and managers) are considered high-skilled, whereas routine manual work (cashiers and assembly line workers) are considered low-skilled.

Frey and Osborne (2017) link data from the O*NET database, which contains survey-based information on the task content of each occupation with 2010 employment and wage data from the United States (US) Bureau of Labor Statistics (BLS) to predict the probability of automating 70 occupations. They find that 47% of total US-based employment is at high risk of automation, with office and administrative support, sales, and other mostly middle-skilled service occupations taking the biggest hit.

Using the methodology from Frey and Osborne (2017), Chang and Huynh (2016) study the impact of technologies on employment in Cambodia, Indonesia, the Philippines, Thailand, and Viet Nam, and conclude that up to 56% of all employment in these countries is at risk of displacement due to technology over the next decade or two. Occupations at high risk are largely routine tasks that can increasingly

be automated—for example, as carried out by sewing machine operators, shop and sales persons, food service personnel, and office clerks. Industry experts also estimated that 47% of business process outsourcing (BPO) workers in the Philippines are focused on process-driven tasks that will be challenged by increasingly sophisticated voice and text/image recognition (AfDB et al. 2018). The characteristics of essential workers in the 4IR will therefore be determined less by level of training, knowledge, and the expertise required to do the job, and more about whether humans hold a comparative advantage over machines in doing the work. Based on current and expected technological advancements, this will mean workers with skills in communications, problem solving, empathy, moral values, and complicated manual dexterity will have the advantage.

The methodology in Frey and Osborne (2017) and Chang and Huynh (2016)—which we call an "occupation-based approach"—has several shortcomings. First, automation does not target entire occupations, but specific tasks within an occupation. Second, the automation of one or more tasks in an occupation may be technically but not economically feasible. For example, while it may technically be possible to automate the production of clothes, sewbots remain expensive compared to the average apparel and footwear wages in Asia (ADB 2018).[1] Third, even if it is both technically and economically feasible to automate one or more tasks, workers can adapt to the new division of labor by switching tasks. Furthermore, 4IR technologies, as with past technologies, could be complementary to workers, enabling them to increase productivity, leading to higher wages within sectors and productivity spillovers to other industries. This can support general economic and employment growth. Finally, by using Frey and Osborne's data on the probability of automation in the US, Chang and Huynh assume that the task contents for each occupation are similar across countries. These shortcomings suggest the occupation-based approach by Frey and Osborne may seriously overestimate the risk of automation for entire occupations.

Arntz et al. (2016) take a "task-based approach" to estimate the susceptibility of employment to automation for 21 Organisation for Economic Co-operation and Development (OECD) countries. They use individual survey data from the Programme for the International Assessment of Adult Competencies (PIAAC), which provides a list of tasks people actually perform at their workplace. They find that only 9% of jobs in the US are at high risk of automation, compared with the 47% estimated by Frey and Osborne.

This task-based approach has some of the same faults as the occupation-based approach: it is still based on technical feasibility rather than actual adoption of new technologies, and it does not consider whether workers

adapt to the new division of labor. Furthermore, it only analyzes existing occupations when new technologies tend to create new jobs (Stewart et al. 2015). Nonetheless, these are limitations that would be difficult to overcome by any study.

Unfortunately, the task-based approach in Arntz et al. cannot be replicated for ASEAN countries because detailed survey-based data with task content of occupations are unavailable for developing Asia. However, compared to Chang and Huynh, we can hypothesize that it would yield a lower number of jobs at high risk of automation. Thus, fears of the jobs lost from 4IR technologies in the Asia and Pacific region may be over-stated. Task-based approaches show that the technical automation of jobs may be lower than feared under occupation-based approaches—and these estimates do not consider economic feasibility and potential productivity gains.

An additional reason why the impact of 4IR technologies in developing Asia may not be as severe is that the region continues to undergo structural transformation—a movement of employment from agriculture to industry and services. Developing Asia has created 30 million non-agricultural jobs annually over the past 25 years (ADB 2018), partly due to structural transformation as well as technology-driven improvements in productivity.

Another key driver of employment in the region has been participation in global value chains (GVCs). In 2016, Asia's GVC participation was 61.1% (ADB 2017a), second only to the European Union (EU). Factories located across Asian economies form a regional production network in which parts and components are produced and then assembled into a final product, which is then shipped largely to advanced economies.[2] This high level of integration means that technology adoption and location of production are not independent decisions, and therefore technological advances along the supply chain can result in the elimination or relocation of jobs.[3]

GVCs were born out of unbundling production processes across national borders (Baldwin 2016). The "first unbundling" was prompted by falling transportation costs and marked the end of the necessity to make goods in the same place as the consumer; falling communication and coordination costs led to a "second unbundling," which ended the need for manufacturing stages to be performed near one another. Right now, a "third unbundling" is underway in which individual jobs, processes, and services are being optimized with the aid of digital technology. The latest unbundling is affecting every sector of the economy, including the professions—previously considered impervious to automation by virtue of their hard-earned expertise. Indeed, the fragmentation of expertise into a series of streamlined processes is already underway. Some of these processes will still require traditional professional input, but others

are being standardized and performed by technology or outsourced to individuals who do not need to be locally licensed (Susskind and Susskind 2015).

A forecasting exercise to predict how 4IR technologies will affect the structure of GVCs in developing Asia—and therefore employment—would require heavy assumptions, with the results quite sensitive to those assumptions. The next best thing is to focus on a recent period during which a great deal of technological upgrading occurred across the region and infer potential future trends.

Bertulfo et al. (2019) combine multiregional input-output tables with employment data from labor force surveys to examine the relationship between technology and jobs along supply chains in 12 economies in developing Asia,[4] covering 35 sectors from 2005 to 2015. They decompose the overall change in employment during the decade—an 11% increase—into technology, task relocation (i.e., offshoring), consumer demand, and consumer preferences. They find that, holding all other factors constant, technology improvements within GVCs would have been associated with a 46% decrease in employment for the 12 countries during 2005–2015. At the same time, increased demand for goods and services from within the domestic economy would have resulted in an 80% increase in employment, holding all other factors constant. As the outlook for ASEAN economic growth is robust, the share of middle- and upper-income classes projected to rise from 48.3% in 2010 to 78.6% in 2030, and the value of the consumer market to expand by a factor of four—from $1,098 billion to $4,425 billion (Kobayashi et al. 2017)—we can confidently state that, in the near future, and even in the face of technological change, the rise of this new middle class and its demand for goods and services will generate increased employment.

Nevertheless, even as overall employment grows, the distribution of that employment will shift and be hard to predict. Bertulfo et al. go on to look at the change in the share of nonroutine cognitive, nonroutine manual, routine cognitive, and routine manual occupations (i.e., employment composition) associated with improved technology within a GVC. In manufacturing, the share of nonroutine cognitive occupations unequivocally increases, whereas the share of all other categories decreases. Because the services sectors in the 12 developing Asian countries have different compositions, the results for services paint a mixed picture. For example, the Philippines, Thailand, and Viet Nam see an increase in the share of nonroutine manual occupations, whereas Indonesia sees an increase in the share of nonroutine cognitive and routine manual occupations. Overall, the analysis in Bertulfo et al. suggests that even if the increase in labor demand associated with rising demand for goods and services

in the domestic market more than offsets the decrease in labor demand associated with technology, the quality and distribution of jobs should be of greater interest than the total number of jobs, as the impact of job loss on individual livelihoods will still be significant. Due to the rapid growth in developing economies, inequality *between* countries in the region is falling. But at the same time inequality *within* countries is rising, as jobs are created in urban areas with high concentrations of skilled workers, with other areas experiencing job loss or displacement (McKenzie 2017).

National inequality can impact long-term growth by undermining social cohesion. In the case of skill flows, anxiety over inequalities can set public attitudes against immigration. The International Labour Organization Four-Country Study on Public Attitudes to Migrant Workers (ILO 2011) surveyed people in Malaysia, Singapore, the Republic of Korea, and Thailand. It found that 88% of respondents in Singapore, 79% in the Republic of Korea, 76% in Malaysia, and 55% in Thailand agreed there is a need for migrant workers to fill certain labor market niches.[5] Yet, at the same time, about 80% of respondents in Malaysia, Singapore, and Thailand felt that government policies to admit migrant workers should be more restrictive. And it is not always the case that skilled workers are more welcome than low-skilled workers (Tunon and Baruah 2012). During the 2011 general election in Singapore, "foreign talent"—professionals with well-paying jobs—was a hot-button issue. An interesting finding for the three ASEAN members in the study is that respondents were less likely to agree with reducing the number of skilled workers from other ASEAN countries (17% in Singapore, 18% in Thailand, and 29% in Malaysia).

Another aspect of the third unbundling is growing ability to work remotely, either through digital technologies (e-mail, videoconference) or more advanced technological developments such as telepresence and telerobotics, which allow workers to physically perform tasks in a place other than their true location. This is the "spatial unfixing of work" (Graham et al. 2017), giving rise to the "gig economy" and the "human cloud." Online platforms have increased the ability of employers to outsource tasks to independent workers ("microwork" and "elancing"), with major implications for skill flows, as we discuss next.

3.   IMPLICATIONS FOR SKILL FLOWS

It is undeniable that the digitization of information through 4IR technology is playing a major role in the global growth of skilled migration.[6] It allows both workers and employers to overcome information asymmetries associated with cross-country job searches. Therefore, "competition for

high-income jobs has become global and the caliber of competitors has never been higher" (McKenzie 2017). In this global labor market, skilled workers are willing to move from country to country for opportunities to advance their skills, or simply to use them more effectively, a phenomenon known as "transit migration." For example, nearly 14% of those with tertiary education who migrated to the US during 2001–2012 lived in a country other than their birthplace prior to their arrival (Artuc and Ozden 2018). High-income OECD countries are particularly important transit stops for immigrants due to their proximity to more attractive labor markets possibly less accessible via direct migration.

Another pattern has emerged over recent decades—facilitated by the modern transport and communication that keep families and communities connected (even over great geographical distances). It is one of increasingly temporary and circular-skilled migration.[7] The OECD estimates that in 2016, roughly 4.2 million workers migrated to or around OECD countries on temporary migration programs—an 11% increase from 2015—as opposed to fewer than 500,000 permanent migrants (OECD 2018). Through circular migration, migrants get "the best of both worlds"—the purchasing power of their high-income country wages is even higher in their lower-income countries of origin.

Although temporary migration *per se* is not a new phenomenon, it has become a salient feature of the 4IR because the third unbundling requires a growing supply of workers who not only possess specialized skills, but are also flexible enough to respond to the needs of a fast-changing labor market. Employers increasingly value diversity, especially those with a markedly international profile—such as multinational corporations, financial institutions, and multilateral organizations. For these employers, rotation in overseas postings is often a prerequisite for career advancement. What was once the prerogative of a few technical, seasonal, creative, or scientific professions has become a pervasive reality that clashes with the myth "that many erstwhile temporary and circular migrants intend to—and eventually do—become permanent settlers at the destination" (Hugo 2013).

Bijwaard and Wahba (2014) use an extremely comprehensive dataset to study the effect of a migrant's earnings on the duration of their migration experience. Their unique administrative data from the Netherlands contains detailed monthly information on all immigrants from developing countries who have entered the country between 1999 and 2007, allowing them to construct a full labor market and migration history. Their model explicitly accounts for the fact that income is endogenous—that individuals who are more talented, educated, experienced, and bold, among others, tend to earn higher wages—and for economic conditions in the country

of origin. They find that return intensities are U-shaped with respect to income, which means that low- and high-income groups are more likely to return, with the likelihood being the highest for low-income migrants. This is consistent with successful high-income migrants leaving once they have reached their savings or human capital accumulation targets, and low-income migrants returning for failing to do so.

Of interest is the fact that, "while high-skilled workers are more likely to re-migrate as a group, those at the very highest skill levels are less likely to do so" (Kerr et al. 2016). Data from the Survey of Earned Doctorates shows that in 2005–2015, the fraction of US doctorate recipients with temporary visas from the top 10 countries of origin who intended to stay in the US was high (except for Thailand at 28%). Approximately 9 out of 10 US doctorate recipients from Iran, India, and the People's Republic of China (PRC) intended to stay in the US, and the remaining top countries had "stay rates" ranging from 50% to 65% (NSF 2017). The incidence of return migration for foreign research scientists in the US is small, especially in STEM fields, and decreases sharply with age. This suggests international mobility decisions are mostly determined early in a career (Gaulé 2014). Women are even less likely to return (NSF 2017; Gaulé 2014).

Studies that focus on the microeconomic determinants of migration suggest that income may not be the most important determinant of deciding to return for highly skilled individuals. Gibson and McKenzie (2009) conducted a comprehensive survey of individuals who graduated high school between 1976 and 2004 and who were the highest achieving students in three Pacific countries at different levels of development: Tonga, Papua New Guinea, and New Zealand. The probability of migrating is very high for this population, and so is the probability of return migration. They find that the decision to migrate is most strongly associated with preference variables—such as risk aversion, patience, and subjects studied in secondary school—and not strongly linked with economic variables such as income or labor market conditions. The decision to return is also most strongly associated with preferences, with family and lifestyle reasons stronger predictors of return than the extent of the income gains from migrating.

Finally, the decision to return is also dependent in large measure on regulatory hurdles placed on the path to family reunification, permanent residence, and citizenship. As discussed in Chapter 2, several OECD countries already have points-based immigration systems that favor exceptionally skilled individuals. These policies, aimed at protecting job opportunities for native workers by limiting physical migration, may have the unintended consequence of encouraging technology-enabled fragmentation and outsourcing of professional services (Mattoo and Mishra 2009).

Perhaps the truly momentous change brought by the 4IR is the spatial unfixing of work, which effectively allows the migration of work without the migration of the worker (Hamel 2009). We tend to think of this practice as outsourcing, subcontracting, or simply trade. Instead, we should consider it virtual migration—and an alternative form of labor supply—for at least three reasons (Aneesh 2006). First, outsourcing companies rarely specialize in tradable products, and, if they do, tradable products tend to be a small fraction of sales: their product is skilled work. For example, companies in the Philippines that supply medical claim processing services to insurance providers in the US are mainly supplying health professional work; or companies in India that offer development and management of digital platforms are essentially supplying professional IT work. Second, unlike other regular imports, there are no tariff or non-tariff barriers to online labor flows, and no mechanisms to monitor the massive volumes of information flowing across national borders every minute of every day. Finally, the tasks that tend to be outsourced are relatively standardized and relatively less dependent on local culture, language, and experience. So there is no difference between a given task performed onsite by a physical migrant and the same task performed offsite by a virtual migrant.

The traditional BPO model—in which operations and responsibilities are contracted to a third-party service provider—was aided by the spread of digital connectivity in the early 1990s and made it possible for destinations like India and the Philippines to capture large amounts of outsourced work. Today, as ever more people in low-income countries connect to the internet, a different type of outsourcing has emerged: digital labor platforms that allow business processes to be outsourced to the human cloud without the mediation of formal BPO organizations (see Section 4). "In this context, workers can transcend some of the constraints of their local labor markets, and tasks such as translations, transcriptions, lead generation, marketing, and personal assistance can now all, in theory, be done by workers from anywhere for clients based anywhere" (Graham et al. 2017). These online workers are therefore self-employed and are likely to hold a "portfolio" of jobs.

The advantage of virtual migration for employers is that it allows them to bypass the burdensome regulatory requirements to bring foreign workers into a country, as well as restrictions on their numbers. Before the 2008/09 global financial crisis and the subsequent eurozone crisis—when widespread unemployment brought increased public scrutiny on large companies' outsourcing practices—employers who resorted to virtual migration could also avoid the charge of "preferring immigrants to citizens" in employment and job creation, because virtual migration was conflated with trade in services.

Governments see the potential of the gig economy and the human cloud for offering work to low-income sections of their populations. Digital Malaysia emphasizes the importance of microwork and elancing for sustaining income (MDeC 2013). The gig economy is often espoused as particularly good for caregivers, retirees, students, and others who need flexible schedules—essentially creating more demand for workers who previously might not have worked. The question remains, however: is the theory in line with reality? Evidence from the UK suggests that this can be a boon for workers in high demand; but for others who engage in the gig economy due to a lack of other options, it can make already disempowered populations increasingly vulnerable (Balaram and Stephens 2018).

The Online Labour Index (OLI), started in 2016, tracks projects posted on the five largest English-language online work platforms[8]—representing 60–70% of the market by traffic—to measure how online labor platforms are used across countries over time. The Index considers only fully digital transactions (i.e., buyers and sellers of the labor or services must be matched digitally, payments must be conducted digitally, and the results of the work must be delivered digitally).

The data used to compute the OLI is collected by periodically "crawling" the list of vacancies available on each of the sample platforms.[9] For each crawl, the status of each vacancy is monitored and saved: whether open, in progress, or completed. Comparing changes in status allows them to calculate the number of new and filled vacancies between two crawls. The main shortcoming of this approach is that they do not observe vacancies that were posted and completed between two crawls, which means that the OLI is likely to underestimate the total number of projects the five platforms handle. In addition, since the OLI only considers English-language platforms, the market shares of non-English-speaking countries are likely to be underrepresented in the figures.

Panel A of Figure 10.1 shows the top five employer countries. The US has by far the largest market share with 41% of posted vacancies. The UK follows with 8.5%, then Australia and Canada, both at 7%. India's fifth place with a 6% market share is not surprising considering that the country has a large IT sector that generates domestic demand for online workers, as well as a healthy international labor market intermediation services industry spanning over two decades. The "body shoppers" described by Aneesh (2006) have simply extended their domain to the human cloud: they win projects and, in turn, subcontract them to the human cloud acting as project managers.[10]

Panel B of Figure 10.1 breaks down the vacancies into six categories: (i) creative and multimedia; (ii) clerical and data entry; (iii) sales and marketing support (mostly related to online advertising); (iv) software development

A. Market share by country

B. Occupation shares by country

- Software development and technology
- Creative and multimedia
- Writing and translation
- Sales and marketing support
- Clerical and data entry
- Professional services
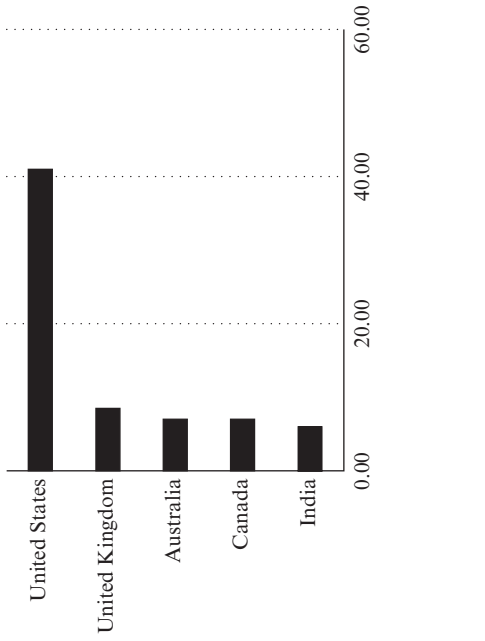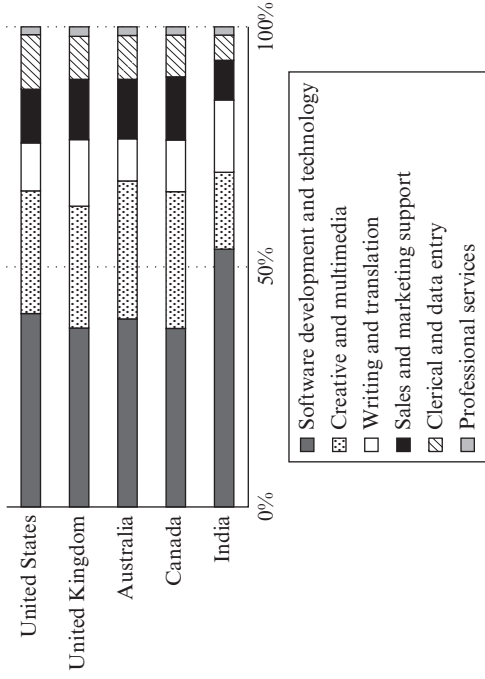
Note: 2016–2018 estimates based on five websites representing approximately 60–70% of the market by traffic.

Source: Online Labour Index, https://livedataoxford.shinyapps.io/OnlineLabourIndex/.

Figure 10.1   Top five employers of online labor

and technology; (v) writing and translation; and (vi) professional services (e.g., business consulting and legal services). Figure 10.1 shows that the distribution of posted vacancies over the six categories is relatively similar across the five countries, except for India, where a substantially higher share of vacancies is in software development and technology.

The OLI also compiles statistics on online workers for four online work platforms.[11] Panel A of Figure 10.2 shows that four out of the top five worker supplier countries are in Asia. Indian workers get 26% of posted vacancies, followed by workers in Bangladesh, Pakistan, the US, and the Philippines with 19%, 14%, 7%, and 6%, respectively. Overall, 71% of posted vacancies on the remaining four platforms go to workers from Asia. Panel B shows that the distribution of occupations over the six categories varies across worker countries. In India, almost half of the occupations are in software development and technology; the Philippines have the highest share of creative and multimedia occupations (39%), followed by clerical and data entry (18%). Bangladesh has the highest share of sales and marketing support occupations (39%), followed by 26% in creative and multimedia occupations. The US has the highest share of writing and translation occupations, whereas workers from Pakistan seem to deal prevalently in creative and multimedia occupations (34%), followed by software development and technology (31%).

Because the OLI focuses on the five largest English-language online work platforms, it provides some clues on which countries have the highest demand for online labor and which countries are the largest suppliers. Interestingly, the patterns of virtual migration appear to mimic the patterns of physical migration described in Chapter 1—virtual migrants from Asia have the highest market share and supply their labor mostly to OECD countries (with the US in first place).

Our discussion of the OLI is also useful to understand the challenges of tracking virtual migration, and how ill-suited conventional labor market statistics and economic indicators are to measuring work transacted online (McKenzie 2017). This is the main reason why the impact of virtual migration on native workers, as well as physical migrants, is not yet fully understood.

We can theorize virtual migration to affect the domestic economy the same way as physical migration (see Chapter 2). The *displacement effect* is the direct effect of outsourcing one or more production tasks or hiring immigrants to perform them onsite on reducing demand for native workers who perform the same tasks. The *productivity effect*, on the other hand, derives from the efficiency gains from outsourcing one or more tasks or hiring migrant labor onsite, which increases demand for native workers, either for the same tasks or complementary tasks.

A. By country

B. Occupation shares by country
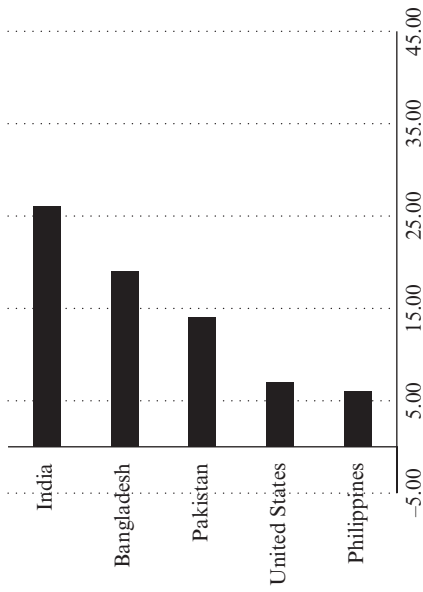
■ Software development and technology
⊞ Creative and multimedia
☐ Sales and marketing support
■ Writing and translation
▨ Professional services
▨ Clerical and data entry
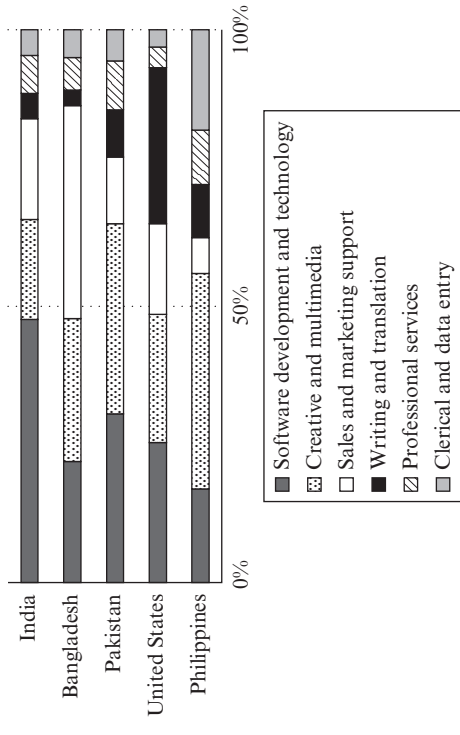
Note: 2017–2018 estimates based on four websites representing at least 40% of the global market for platform-based online work.

Source: Online Labour Index Worker Supplement, https://livedataoxford.shinyapps.io/1490198815-8pmoe2dwg9r7n6d/.

Figure 10.2   Top five suppliers of online labor

To our knowledge, no study has rigorously analyzed the impact of virtual migration on both physical migration and native employment. Ottaviano et al. (2013) come closest by using data on the US manufacturing sector—subdivided into 58 industries from 2000 to 2007—to study the simultaneous patterns of substitutability between native, immigrant, and offshore workers. However, "offshore workers" in this study are employees working abroad in foreign affiliates of US parent companies, which may only partially overlap with virtual migrants. They find that easier offshoring reduces the employment shares of both native and immigrant workers, whereas easier immigration reduces the employment share of offshore workers only—which suggests a displacement effect between offshore and migrant workers. However, when they look at employment levels, they do not find any significant effects of easier offshoring on the employment levels of either migrant or native workers, while easier immigration has a positive and mildly significant impact on natives. This suggests the presence of a strong productivity effect associated with both immigration and offshoring.

When they rank worker tasks by complexity,[12] easier offshoring raises the average complexity of native tasks, whereas easier immigration has no effect. The authors suggest that it is because "immigrants are relatively specialized in low complexity tasks, natives in high complexity tasks, and offshore workers in medium complexity tasks" (Ottaviano et al. 2013, p. 1926), and therefore immigrants do not compete directly with natives, whereas offshore workers generate some competition with both immigrants and natives.

Although it presents useful insights, the paper by Ottaviano et al. focuses on employees of foreign affiliates of US manufacturing firms, and therefore we do not know to what extent it captures the virtual migration phenomenon. The study is constrained by the limited data on services and the production function approach at the core of the analysis, which is much better understood within the context of manufacturing than services.

While evidence shows that physical skill flows are increasing (Chapter 1; Kerr et al. 2016), it is easy to envision that, with digitization and high-speed connectivity combined with lengthy and complicated procedures for work visas, virtual migration will continue to grow. Provisions in new "mega free trade agreements"—such as the Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP) and the currently negotiated Regional Comprehensive Economic Partnership (RCEP)—will likely further support this trend. The CPTPP includes a chapter on trade in services which opens service and investment sectors to competition for members' firms without restrictions. While domestic qualification restrictions will still apply—but not to government services—it still provides a

strong commitment to ensuring barriers to trade in services are minimized. Equally, it explicitly includes some liberalization measures to enable digital trade.

Based on the discussion so far, there is reason to believe that it is unlikely that virtual migration will replace physical migration of skilled workers in the near future, especially at the top of the skill distribution. Kremer's O-ring production function, discussed in Chapter 2, explains why the most highly skilled must work with each other and have access to specialized services and high-quality equipment to maximize productivity. Telepresence and telerobotics are not yet perfect substitutes for face-to-face interaction, and skeptics wonder if they ever will be: it is human nature, after all, to seek real connections. Equally, despite the spatial unfixing of work, talent clusters will still occur due to economies of agglomeration—achieving a critical mass of similar businesses or services in one location can create sufficient scale to attract complementary specialized inputs and service providers (McKenzie 2017).

In fact, the entire debate may be superseded by a more integrated mix of virtual and physical transitory and circular migration in the future. It is not uncommon for large contracts that could be technically fulfilled entirely through virtual migration to have a physical component. Let us consider, for example, the development of a new digital platform. Perhaps the overseas client is not aware of all available options or is not sure what the structure of the platform should be. The IT firm will send a team to the client location to determine the client's needs, assist during the test phase, and finally train users to maximize the impact of the new tool. In capacity-building and training activities, human interaction often helps motivate and energize the learners.

The previous sections looked at the potential impact of the 4IR on high skill flows in the region. It showed that physical migration is becoming increasingly temporary, in the form of either circular or transit migration. Furthermore, it discussed how technology is fueling the growth of virtual migration and the reasons why the potential policy implications of online work are not yet fully understood. One thing that is clear is that it is likely increasing numbers of high-skilled workers will move for work. Given the skills gap in the region (highlighted in the introduction), it is important that ASEAN countries take action to support this mobility. Section 4 moves on to consider how the 4IR can be used to reduce barriers to labor mobility, contributing to more effective and equitable regional labor markets.

4. HOW CAN 4IR TECHNOLOGIES SUPPORT PHYSICAL SKILLED-LABOR MOBILITY?

The barriers to physical labor mobility are complex and multifaceted, ranging from restrictive employment regulations to access to affordable housing, to linguistic and cultural differences. Some barriers result in lower numbers of workers relocating, and some result in worker movement going unrecorded and unregulated. While certainly no panacea, 4IR technologies can help reduce some of the challenges related to asymmetric information between host countries and potential mobile skilled workers. 4IR technologies can support more informed policy making, access to tools for reskilling, and greater access to financial and social services.

First, 4IR technologies can support more informed labor market policy making. Online talent platforms such as LinkedIn or JobStreet.com provide information on what jobs are available, the skills required, career pathways, and worker retention. Partnerships between online platforms and government, combined with artificial intelligence (AI) and machine learning, could provide richer analysis of the labor market, leading to more targeted and timely labor market policies.

Talent platforms also promise to overcome the lack of information on job opportunities outside of immediate worker networks. LinkedIn is a global platform with more than 500 million users. McKinsey Global Institute (MGI 2015) estimates that online platforms may add up to $805 billion to global GDP annually by 2025, by reducing the time people spend looking for jobs and by enabling matches that might not have otherwise happened. Whether these platforms are in fact leading to increased physical worker mobility remains, however, a relatively unexplored area.[13]

Second, the 4IR will require massive reskilling and retraining, either within existing occupations or to move into new occupations. "There are few precedents in which societies have successfully retrained such large numbers of people" (MGI 2017). 4IR technologies can help meet this challenge. Online courses and massive open online courses (MOOCs) can help workers gain specific skills on their own regardless of location and at low cost. They provide training at scale, and are particularly suitable for workers in full- or part-time jobs—which make MOOCs critical to meeting the challenge of reskilling the existing workforce. For example, at Coursera, an online learning platform, half of the students are from developing countries, with about 60–70% employed but preparing for better jobs (MGI 2017). Digital learning appears to be particularly relevant for Asia, which is the second-largest e-learning market globally. Many traditional education providers are also expanding their reach through online mechanisms (for example, ChinaEdu, Korea National

Open University, and Open University Malaysia). This is particularly true for online English-language training (Adkins 2016).[14]

Nevertheless, platform effectiveness is not assured. Analysis of online courses offered by Harvard and the Massachusetts Institute of Technology (MIT) found that only 30% of those intending to earn a certificate did actually do so, with the subsequent impact on their career outcomes unknown (Chuang and Ho 2016). Head (2017) warns against losing sight of the fact that technology is a tool rather than a solution.

New modalities will inevitably emerge to meet this need. For example, Gnowbe, a micro-learning app for mobile phones, promotes its ability to "activate personalized learning" through a combination of bite-sized learning modules, peer-to-peer knowledge sharing, multimedia content, and use of gamification principles.[15] Greater use of digital technologies in education can also help provide more targeted and individualized teaching for students. Integration of digital technologies in teaching methods can not only increase IT skills but also support more peer-to-peer and self-directed approaches (Sarvi and Pillay 2017), which foster problem-solving and interpersonal skills, anticipated to be in increasing demand in the future.

Some blockchain applications may be particularly useful for supporting circular or transitory migration. Blockchain technology can, for example, increase the security and portability of academic credentials. Schemes are proliferating that provide instantly verifiable certificates, carried by individuals for life. In combination with digital training platforms, these would provide a secure and quick means of tracking qualifications of professionals moving within ASEAN, potentially alleviating some of the bureaucratic burden behind implementing mutual recognition agreements (MRAs).

Innovative financial service companies that use digital and 4IR technologies (FinTech) are changing how financial services are provided. For mobile workers, it can decrease the cost and increase the ease of receiving and making payments, sending remittances, and accessing other services such as loans and insurance.

In 2016, $7.8 billion was estimated to have been remitted by ASEAN workers to ASEAN destinations (see Chapter 1). These were largely cash transfers conducted through banks or money transfer agents (e.g., Western Union). Lack of competition means transfer fees in Southeast Asia are high—an estimated 7.1% (the UN's Sustainable Development Goals hope to reduce this globally to below 3%). Peer-to-peer networks such as Transferwise offer much lower rates. Equally, the use of cryptocurrencies, although currently small, could become a faster and cheaper mechanism for making remittances. In the Philippines, cryptocurrency startups based on blockchain technology, such as Coins.ph and Toast, are growing fast. Coins.ph has more than 1 million users with a network of 22,000 domestic

disbursement and collection locations (UOB 2017). Mainstream Bitcoin adoption is also surging, as Filipinos increasingly use it for remittance payments—mainly due to the inefficiency of the local banking system. The Bangko Sentral ng Pilipinas estimates that over \$6 million in remittances to the Philippines is being sent monthly in Bitcoin (Alegado 2017). Crowdsourcing for loans[16] and the use of social data points[17] for meeting know-your-customer requirements also offer mechanisms for people without bank accounts to receive and make payments.

Social protection services, particularly healthcare and worker compensation for foreign workers, vary across ASEAN. For instance, foreign workers in Thailand can access the public healthcare system at similar costs as citizens; but not so in Singapore (Asher and Zen 2015). Emerging economies that do not yet have well-established social protection schemes can design more appropriate and flexible systems. Flexible and transferable social protection schemes are important as they reduce barriers to labor mobility and facilitate circular or transitory migration. Campbell (2018) argues that "protected mobility' is essential when dealing with labor mobility in the 4IR.

Digital identities (eIDs) linked with blockchain technology provide a means of decreasing the cost of providing essential services and social welfare more flexibly. Blockchains offer a way to handle complex systems linked to individuals with greater data security. This could make them suitable for managing a harmonized social protection scheme transferable (or at least coordinated) within and across ASEAN.

While not without its critics, the Aadhaar ID system in India shows the potential of eID systems for providing not only social welfare payments but financial services, training, insurance, and private business services as well (e.g., mobile phone credit top-up). Estonia launched an "e-residency" scheme to allow people from overseas to tap into certain aspects of their national eID system, including greater ease in establishing online businesses. The use of eIDs for cross-border movement is growing in financial services to help decrease "onboarding" costs for new customers.[18] These approaches could be extended to create mobile eIDs that both ease challenges in accessing finance and allow workers to contribute and receive payments from social welfare schemes and many other aspects of public services.

5. FUTURE DIRECTIONS AND QUESTIONS FOR ASEAN

While change is hard to predict, particularly in the 4IR, this chapter argues that if past trends on growth and employment in ASEAN remain relevant,

then continued economic growth and prosperity will compensate for the displacement effects of 4IR technologies on jobs—leading to an overall growth in employment. Nevertheless, even if employment grows overall, some occupations will be hit hard, affecting worker livelihoods. This could contribute to rising national inequality, social discontent, and political backlash against migration. Combined with an existing and growing skills mismatch within the region, this adds to the urgency for ASEAN to address skills mobility as critical.

As barriers to communication continue to decline across the world, and the 4IR requires greater worker flexibility, two key trends emerge. First is a clear pattern of return and circular migration, as well as transit migration, for skilled workers. Return migration is consistent with successful migrants leaving once they have reached their savings or human capital accumulation targets; transit migration stems from skilled workers' willingness to move from country to country for opportunities to advance their skills. The second key trend is that the workers of the 4IR are more likely to be self-employed and hold a portfolio of jobs. Combined, these two trends mean that work visa policies and procedures must be reformed. The process of obtaining a visa cannot take longer than the stay itself; and if workers are self-employed and working for multiple employers, their visas cannot be tied to a single employer or make it difficult to transfer to a different employer. Currently, ASEAN citizens find it easier to emigrate outside the region; and it may well be that workers who are not ASEAN citizens find it easier than ASEAN citizens to obtain a work visa in the region. ASEAN needs a preferential work-based immigration system for its member citizens.

Another issue associated with increasingly temporary migration and increasingly self-employed workers is eligibility for social security benefits—especially as it pertains to self-employed individuals—which varies widely across countries. Furthermore, benefit portability is also problematic, as migrant workers may lose access in their home countries before qualifying for benefits in their host countries.

There is tremendous potential for regional coordination, using 4IR technologies such as blockchains. ASEAN could support student circulation and create an evidence base to support MRAs for professionals by providing portable academic credentials and effective credit swapping mechanisms across ASEAN universities. Similarly, a regional eID could provide a basis for more expedient work visa procedures, as well as cost-efficient and secure access to social protection and services to mobile and transitory skilled workers.

While research shows that skilled worker migration is increasingly temporary and transitory, it also shows that highly skilled individuals,

while perhaps more mobile at the beginning of their career, are less likely to return. Indeed, the highly specialized nature of their skills, which makes them deployable only in a few settings, combined with the high recognition that they receive in their host countries, explains this divergence.

That is why we believe skills mobility remains strategically important to support ASEAN growth and inclusiveness. Skilled workers—and the highly skilled in particular—need an enabling environment to make the most efficient use of their skills. While technologies such as telerobotics and telepresence are increasingly sophisticated, they do not yet perfectly substitute face-to-face interaction. Equally, the economies of agglomeration will continue to provide benefits to talent clustering. Therefore, governments must support talent clusters through place-based strategies centered on university research centers, science parks, and other enablers of business growth (Berriman and Hawksworth 2017). This place-based approach also involves extending the latest digital infrastructure beyond major urban centers to overcome the digital divide and increase opportunities for rural populations. Finally, place-based policies also involve creating a better regional infrastructure to reduce the costs of the flow of services, goods, and people (Duranton and Venables 2018).

Enabled by the spatial unfixing of work, virtual migration is also on the rise, and it has evolved from the traditional BPO model, in which operations and responsibilities are contracted to a third-party service provider, to digital platforms that allow tasks to be subcontracted directly to the human cloud. Our analysis based on the OLI, albeit limited to the largest English-language online work platforms, suggests that the patterns of virtual migration mimic the patterns of physical migration—virtual migrants from Asia hold the highest market share and supply labor mostly to OECD countries (with the US highest).

The impact of online work and associated virtual migration on physical migration and native workers is not yet fully understood. Initial research in the US suggests there may be some displacement effects between offshore workers, skilled migrants, and native workers, but that productivity gains compensate in terms of employment growth. Further research is required to better understand this interaction, not only in ASEAN but in the rest of the world as well. This is particularly pertinent in the context of ongoing trade in services liberalization under mega trade agreements like the CPTPP and the RCEP.

While physical migration is heavily regulated and taxed, virtual migration is commonly considered outsourcing, subcontracting, or trade in services, and largely unregulated and undetected. Existing tax laws were developed in a world of physical goods and in-person services. But for online labor, even the location of the worker is difficult to determine—it

could be the IP address of the worker, the location of the server of the digital platform that connects the worker to the employer, or the location where the virtual migrant supplies labor (e.g., a Filipino worker works for a US customer from the Philippines through the mediation of a digital platform with servers located in Ireland).

The stated purpose of heavy barriers to physical skill flows is to protect employment opportunities for local workers; but in practice they are likely to tilt the scale in favor of virtual migration whenever it is technologically and culturally feasible. Therefore, we argue that barriers to physical migration should be reduced, making physical and virtual migration subject to the same labor regime as much as possible. This would increase oversight of standards, increase the taxation base, and help protect worker rights.

To understand and quantify the impact of 4IR technologies on jobs in ASEAN, as well as the interaction of physical and virtual skill flows with native workers, ASEAN must both strengthen its capacity in collecting labor market statistics and harmonize those statistics across the region. That would include developing an ASEAN-wide platform to track the stock and flow of skilled workers (including vocational workers), and using surveys harmonized with the OECD's Programme for the International Assessment of Adult Competencies (PIAAC) to enable analysis of the task content of occupations and how it evolves.

However, the new economy of the 4IR is largely undetected by conventional labor market statistics and economic indicators. AI and machine learning have "the potential to use a wealth of data, frequently crowd-sourced or publicly available, to look for data patterns and correlations that [. . .] could help illuminate successful approaches to anticipating migration flows, harnessing skills, and better understanding the power of remittances" (Eldridge et al. 2017).

Equally outside conventional labor market statistics—although representing the majority of intra-ASEAN migrants—are the undocumented workers in construction, agriculture and fisheries, and domestic services. The fact that they work the so-called "3D" jobs—dirty, dangerous, and demeaning—does not necessarily mean they are low skilled. The lack of recognition of their qualifications, combined with a lack of opportunities in their home countries, may force many into occupations they are over-qualified for, contributing to brain waste (see Chapter 2). Furthermore, as megatrends like rapid urbanization and population aging transform ASEAN's labor force, workers like caregivers and bricklayers will be more and more essential to the region.

A more inclusive MRA that includes vocational occupations—combined with a preferential work-based immigration system for ASEAN citizens and mobile eIDs tied to a host of services—would go far toward address-

ing the concerns of host countries, while at the same time protecting the rights of migrant workers and harnessing their full potential. As migrants increasingly use social media to acquire information on opportunities and tap into support networks, AI can be a game-changer in detecting triggers and patterns of undocumented migration to devise adequate policy responses.

ASEAN wants to be at the forefront of change and embrace new technologies. It has also demonstrated its commitment to promoting skilled-labor mobility within the AEC. It is time for ASEAN members to bring this vision to life and bring the 4IR future inexorably closer.

NOTES

*   We thank Rana Hasan and Jayant Menon for peer reviewing the chapter, and Mia Kim Veloso for excellent research assistance.
1.   A sewbot is a fully automated garment-producing machine.
2.   This is the so-called "Factory Asia" model.
3.   Technological advances could trigger "reshoring"—the reintroduction of previously offshored manufacturing to a country—if the offshore location loses its cost advantage. Reshoring (or onshoring) is the reverse process of offshoring, where manufacturing is moved to another country where operating costs are lower.
4.   The ASEAN members included in this analysis are Indonesia, Malaysia, the Philippines, Thailand, and Viet Nam; the other economies are Bangladesh, India, the People's Republic of China (PRC), the Republic of Korea, Mongolia, Sri Lanka, and Taipei,China.
5.   Thailand's lower number is surprising considering that the country not only had a very low unemployment rate, but was also experiencing labor shortages in key economic sectors. Furthermore, Thailand's aging population and rising education levels also means that fewer people are available for routine manual occupations.
6.   Digitization is the process of converting information into a digital (i.e., computer-readable) format in which the information is organized into bits.
7.   "Circular migration refers to repeated migration experiences between an origin and destination involving more than one migration and return" (Hugo 2013). It is "based on a continuing, long-term, and fluid relationship among countries that occupy what is now increasingly recognized as a single economic space" (Agunias and Newland 2007).
8.   The five platforms are Freelancer, Guru, Mturk, PeoplePerHour, and Upwork.
9.   A web crawler, or simply crawler, is a program that systematically browses the internet, typically for the purpose of web indexing. A crawler can be instructed to archive a list of websites, in which case it copies and saves the information in repositories that can be viewed, read, and navigated as they were on the live web but preserved as "snapshots."
10.   "Body shoppers" are firms that specialize in finding talent on demand for overseas clients. The recruited worker, for example a software developer, is deployed at the overseas client's premises on a temporary basis, but the entire time they are employed by the local body shopper, not the overseas client. This is different from headhunters, who find workers that match the profile requested by the customer for a fee.
11.   The four platforms are Fiverr, Freelancer, Guru, and PeoplePerHour.
12.   The authors "consider the complexity of a task to be increasing in the intensity of use of communication and cognitive skills and decreasing in the manual content of the task" (Ottaviano et al. 2013, p. 1926).
13.   Most studies on the impact of online job platforms look at career mobility and use the data to review movement of flows, but the impact of the platform itself is hard to ascertain.

14. The highest growth rate (in terms of the value of sales) for digital English-language learning globally is Myanmar, with a 60% growth rate predicted between 2015 and 2020. The Lao PDR, Cambodia, Malaysia, and Indonesia also have projected growth rates well above 30%.
15. This refers to learning reminders, notifications by short message service (SMS), and e-mail and trigger-based e-mails and reminders.
16. Consider CrowdCredit, Crowdo, CreditEase.
17. Social data points include information not typically part of a credit record, i.e., connections on Facebook, mobile phone behavioral data.
18. Meaning the verification process when opening a new account.

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SKILLED LABOR MOBILITY AND MIGRATION

Regional integration plays an important role in the advance of economic and social development across many parts of the world. Generating growth and expanding markets, it boosts productivity through the exchange of ideas, technologies, and human resources. This book explores the key vision of the Association of Southeast Asian Nations (ASEAN): fostering the free flow of goods, services, investment, and skilled labor in order to establish a globally competitive region with a single market and production base.

Bringing together contributions from renowned scholars in their respective fields, this book takes stock of the trends and patterns of skilled labor migration in the ASEAN, examining the existing literature and adding to it with unique insights drawn from original case studies and policy simulations. Identifying the challenges posed by recent significant changes, this book also looks to the future, to identify potential policy responses. The contributions dispel a common assumption that skill mobility is a zero-sum game, and instead contend that it can be mutually beneficial for both sides.

With rigorous quantitative analysis, this book will be a useful tool for both policy practitioners and policymakers as well as for researchers and students of international development, economics, and Asian studies.

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