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Economic Impacts of Skilled Labor Mobility within the ASEAN Economic Community

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Abstract

This paper investigates the potential impacts, on ASEAN member economies, of skilled labor mobility under the ASEAN Economic Community's (AEC) Mutual Recognition Arrangements (MRAs) on professional services. The MRAs allow ASEAN member countries to recognize each other's professional licensing or conformity assessments, thereby facilitating intra-ASEAN skilled labor mobility. So far, 8 MRAs on professional labor services have been agreed upon, namely: accounting, architecture, dentistry, engineering, medicine, nursing, surveying qualifications, and tourism professionals. As far as we are aware, no prior study has analyzed how freer flow of skilled professionals within ASEAN might impact each ASEAN-member economy, and how such impacts may reverberate to both regional and global economies. We fill this research gap and contribute to policy research in two ways. First, we take advantage of the GTAP Center's recently updated global bilateral migration and remittances (GMig2) data, with a 2011 base year, to find out the extent of bilateral skilled labor flows within the ASEAN region. Second, we use the GMig2 model—a variant of the GTAP model that explicitly accounts for bilateral labor flows and remittances—to quantify the potential economic effects of intra-ASEAN skilled labor mobility. Our simulation results suggest that GDP expands for ASEAN-member countries as skilled labor mobility not only addresses the shortages and surpluses of skilled labor within the region, but also spurs consumption on the back of higher remittances sent by migrant workers.

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1. Introduction

The Association of South East Asian Nations (ASEAN) has been actively pursuing trade integration efforts since the last two decades. In 1992, member countries signed the ASEAN Free Trade Agreement (AFTA) in order to increase intra-ASEAN trade and improve the region's competitiveness through the elimination of intra-ASEAN tariff[2] and non-tariff barriers by 2015. In 2015, the ASEAN Economic Community was launched, with the primary aim of creating a single market and production base which would allow for the free flow of goods, services investments, skilled labor and the freer movement of capital (ADB 2015).

The main objective of this paper is to understand and quantify the potential impacts on ASEAN member economies, of skilled labor mobility under the ASEAN Economic Community's (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, and how such impacts may reverberate to both regional and global economies. We fill this research gap and contribute to policy research by carrying out simulation-based analyses with the aid of the GMig2 data base and modeling framework. Both the GMig2 data and model (Walmsley *et al.* 2007) extend the widely-used GTAP data base and model—by explicitly accounting for bilateral migration and remittances flows.

We use the GMig2 model to analyze scenarios that help would shed light on two questions of particular interest to the ASEAN region, namely: (i) would intra-ASEAN skill mobility bring about economic benefits to each ASEAN member country and the ASEAN region as a whole? and (ii) would further economic gains be achieved if complementary policies that reduce wage differentials between migrants and permanent residents are also implemented?

This paper is organized as follows. Section 2 briefly describes the GMig2 data base and model. Section 3 analyzes the underlying GMig2 data base by focusing on each AEC member's economic structure, intra-ASEAN trade and intra-ASEAN skilled labor migration flows. Section 4 describes the three policy experiments and analyses the simulation results. Finally, Section 5 outlines the insights gleaned from the simulation results and our agenda for future work.

[2] Under the Common Effective Preferential Tariff (CEPT) scheme, Tariff elimination excludes products classified under: Temporary Exclusions, Sensitive Products and General Exclusions.

2. Methodology

Analyzing the potential impacts of skill 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. With this, we employ the GMig2 model (Walmsley *et al.* 2009)—a multi-sector and multi-country general equilibrium model that extends the widely-used GTAP modeling framework by explicitly accounting for bilateral labor flows and their consequent impacts on wages and migrants' remittances.

Like GTAP, the GMig2 model assumes constant returns to scale and consists of equations defining agents' behavior and optimizing decisions (e.g., profit and utility maximization, cost minimization), market clearing conditions, and identities that satisfy accounting constraints. Moreover, GMig2 includes equations that tracks bilateral labor movements and their associated flow-on effects to each country's labor force ($LF_{i,s}$) and population ($POP_{c,r}$) flows, as shown in Equations [1] and [2].

$$LF_{i,r} = \Sigma_c LF_{i,c,r} \quad [1]$$

$$POP_r = \Sigma_c POP_{c,r} \quad [2]$$

In GMig2, the *home* 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. Both equations [1] and [2] indicate that an increase in the number of migrant workers with skill *i* from home region *c* to host region *r* would result in a reduction in the labor force and population in the supplying region *c*, and a consequent increase in the labor force and population[3] in the host region *r*.

There are two methods by which skill mobility, within the AEC, can be analyzed with the aid of the GMig2 model. The first method is through an exogenous change in labor supply either via three possibilities: (i) change in the number of migrants from home region *c* to host region *r*; (ii) change in total labor supply in the host region *r*, to simulate a proportional increase in the stock of migrants coming from various home countries *c*, as observed in the initial data; and (iii)

[3] Note that the change in each region's population, as computed in Equation [2], may be more than the change labor force. This is because the GMig framework assumes that workers move with their families. In this paper, we assume that migrant workers do not move with their family due to the temporary nature of skill mobility within the AEC.

change in the total supply of labor to simulate a proportional outflow of migrants to their home country.

The second method, which we employ in this paper, models skill mobility within the AEC via an endogenous mechanism that allows migrant workers to move, from their home country *c* to host region *r*, based on real wage differences between their host ($RW_{i,c,r}$) and home countries ($RW_{i,c,c}$), as shown in Equation [3].

$$LF_{i,c,r} = A_{i,c,r} * [RW_{i,c,r} / RW_{i,c,c}]^{ESUBMIGi,c,r} \quad [3]$$

The degree with which migrants respond to real wage differences is governed by the supply elasticity parameter represented by ESUBMIG. Higher (lower) values assigned to the ESUBMIG parameter results in a greater (smaller) response of migrants to real wage differences. In the absence of econometric estimates, we set ESUBMIG for skilled labor to 1.0 which means that migrants have a unitary elasticity response to real wage differences between their home and host countries. The exogenous coefficient, $A_{i,c,r}$, shown in Equation [3] accounts for other factors in the migration decision (e.g., language and other restrictions) and is calibrated from the underlying GMig2 data base, which we explain next.

The GMig2 model we use in this paper is calibrated to the most recent GMig2 version 9.0 data with a 2011 base year, and can distinguish up to 57 sectors and 140 countries/regions in the world. Like the model, the GMig2 data also extends the standard GTAP data base by explicitly accounting for bilateral labor flows, migrant and non-migrant wages, as well as bilateral remittances. These are constructed from various data sources such as: (a) bilateral matrix of foreign-born population from Ozden *et al.* (2010); (b) labor force participation rates from the International Labor Organization (ILO); (c) labor skill shares from Docquier *et al.* (2010); and (d) data on GDP, population and bilateral remittances from the World Bank.

Given our focus on skill mobility and since this study is our maiden attempt to analyze skill mobility within the AEC, we aggregate the full GMig2 data base to 16 countries/regions, 2 labor types (classified into skilled and unskilled) and 8 broad sectors which include three services sub-sectors, namely: business services, public and health services, and other business services. These services sectors employ occupations—such as: accountants, architects, dentists, engineers, medical practitioners, nurses, surveyors, and tourism professionals—covered by the

AEC's Mutual Recognition Arrangements (MRAs). Table 1 shows that our aggregated GMig2 data distinguish all AEC members, except Myanmar which in the original GTAP/GMig2 data base is aggregated with the Rest of South East Asia (i.e., Myanmar and Timor Leste). With this, we now loosely define the rest of South East Asia, though include Timor Leste, as being part of AEC. It is important to note that the current GMig2 data base only distinguishes 2 labor types, namely: unskilled and skilled, with the latter category representing all skilled labor types over and above the 8 professional occupations covered by the MRA.

Table 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	BRN	3	Processed food	PFD
4	Cambodia	KHM	4	Textile and clothing	TEX
5	Indonesia	IND	5	Other manufacturing	MNF
6	Laos	LAO	6	Business services	OBS
7	Malaysia	MYS	7	Public and health services	OSG
8	Philippines	PHL	8	Other services	SER
9	Singapore	SIN			
10	Thailand	THA			
11	Vietnam	VNM			
12	Rest of South East Asia (including Myanmar)	XSE			
13	South Asia	XSA			
14	North America	NAM			
15	European Union 27	EU			
16	Rest of the World	ROW			

Source: Aggregation of the GTAP/GMig2 version 9 data base

3. Benchmark data

In this section, we present and analyze the underlying structure found in our aggregated GMig2 data base. Given the focus of this paper, we pay particular attention to each AEC member's economic structure, intra-ASEAN trade and intra-ASEAN skilled labor migration flows.

Table 2 shows the Gross Domestic Product (GDP) from both expenditure- and income-side for the year 2011. Global GDP amounted to $US71 trillion, with North America and Europe accounting for a combined share of 50%. All South East Asian economies contributed $US2 trillion or roughly 3.1% of global GDP. Indonesia has the highest GDP among AEC member

countries with $US845 billion, followed by Thailand and Singapore with $345 and $274 billion, respectively.

Table 2 Gross Domestic Product (in $US billions, 2011)

	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	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
Laos	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
Vietnam	108.2	42.4	9.3	97.1	-121.5	135.5
Rest of South East 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

	Unskilled Labor	Skilled Labor	Gross Capital	Indirect Taxes	Depre-ciation	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	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
Laos	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
Vietnam	34.4	16.1	31.5	31.0	22.6	135.5
Rest of South East 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

Source: Calculations based on GTAP/GMig version 9 data base

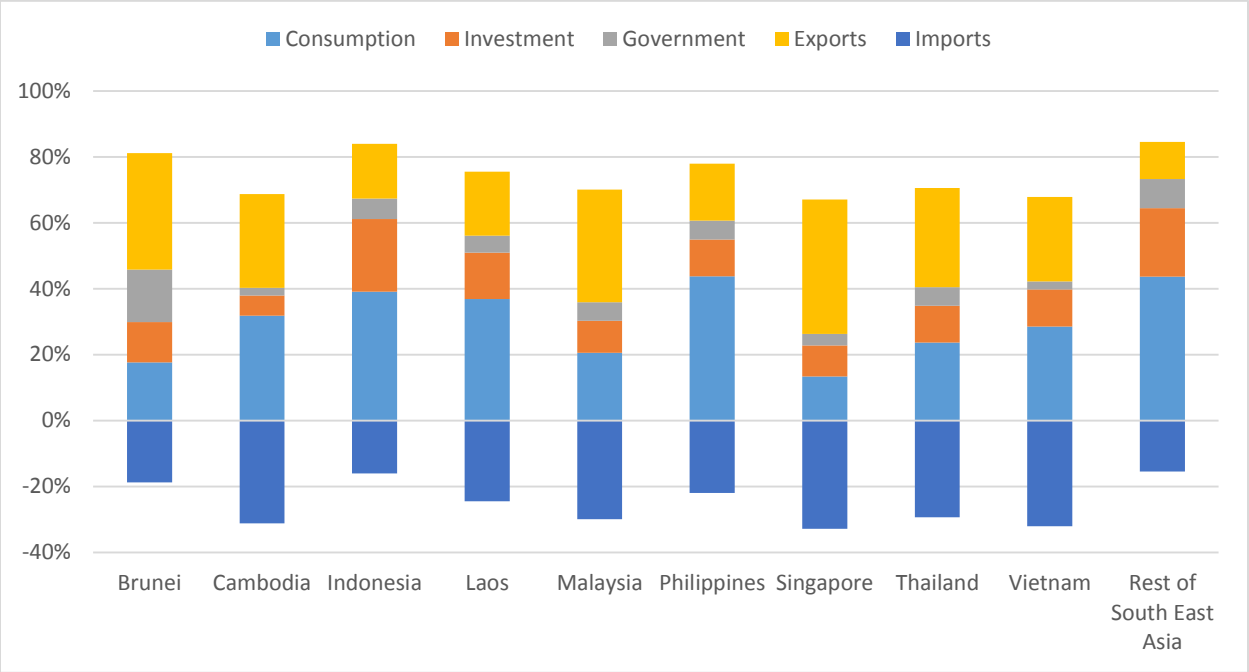
Figure 1 and Figure 2 decompose the components that make up GDP for each South East Asian economy. Figure 1 shows that the GDP of Indonesia, Laos, Philippines and Rest of South East Asia are mainly anchored on consumption, while the GDP of both Brunei and Singapore are mainly driven by exports. From the income-side, Figure 2 shows that income from unskilled labor accounts for a significant share of GDP for most South East Asian economies, with the exception of Singapore for which the share of skilled labor income roughly equals that of capital. Much of Brunei's income-side GDP comes from capital and indirect taxes, with the latter mostly in the form of oil royalties.

The total exports and imports for each South East Asian country are shown in Figure 3. Total trade (exports and imports) is the highest in Singapore, followed by Thailand, Malaysia and Indonesia. We also see that in 2011, these four countries along with Brunei record a trade surplus whereas Cambodia, Laos, Philippines, Vietnam and the Rest of South East Asia record a trade deficit.

Figure 4 shows the weighted average tariff rates faced and imposed by each South East Asian economy relative to their trading partners. The blue bars show the average tariff rates faced by each country's exports, while the orange bars show the average tariff rates imposed on each country's imports. Exports from South East Asia face an average tariff of less than 6%. On the other hand, the region generally imposes an average import tariff of less than 6%. Exceptions are imports by Cambodia and Laos which on average are levied at 11% and 8%, respectively.

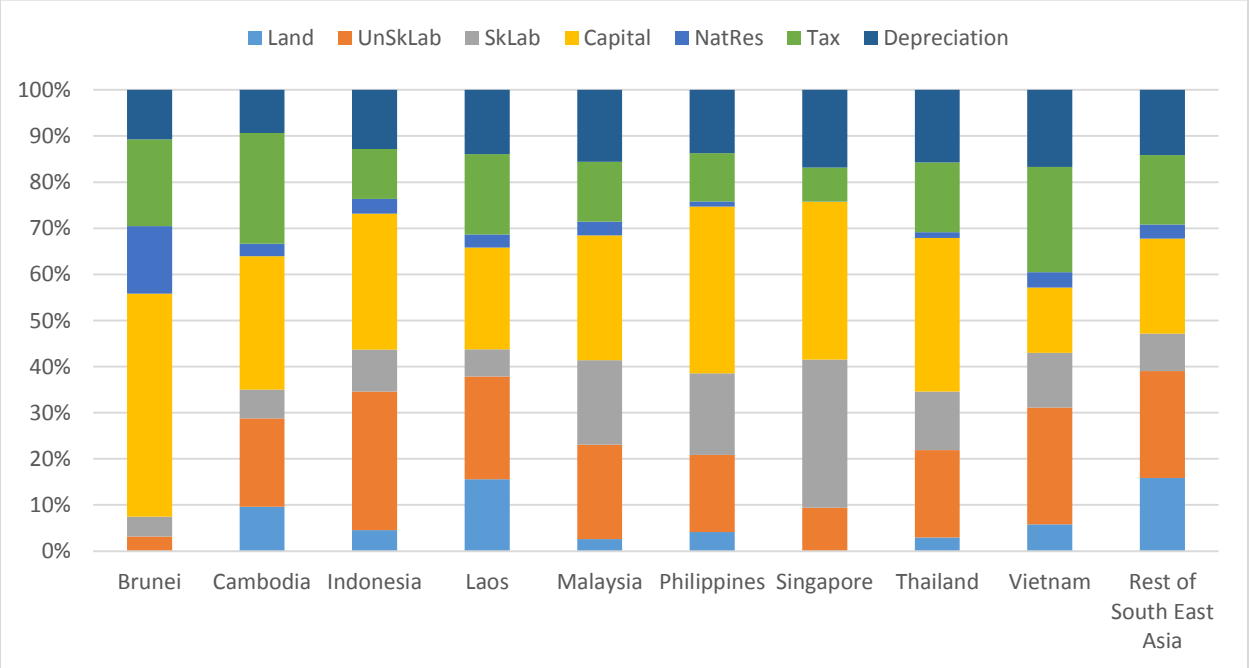
Table 3 presents the bilateral trade flows for each South East Asian economy for the year 2011. In this table, the row headings show the exporting countries, while the column headings show the importing countries—consequently, the row entries in Table 3 show the value of exports while column entries show the value of imports. For example, Singapore's total exports to Malaysia in 2011 is valued at $US31.6 billion. Calculations from Table 3 suggests that South East Asian countries accounted for 5.8% of global imports and 6.1% of global exports, while intra-ASEAN trade only accounted for 1.2% of total global trade flows.

Figure 1 Gross Domestic Product, Expenditure-side (in % share, 2011)



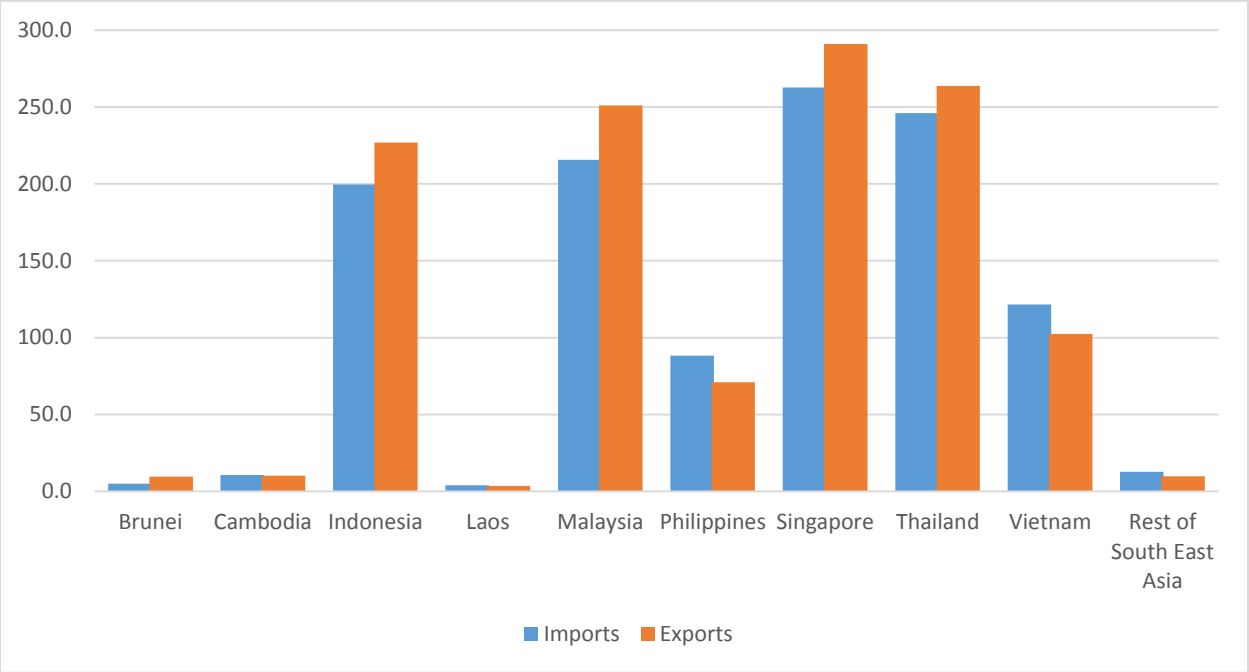
Source: Calculations based on GTAP/GMig version 9 data base

Figure 2 Gross Domestic Product, Income-side (in % share, 2011)



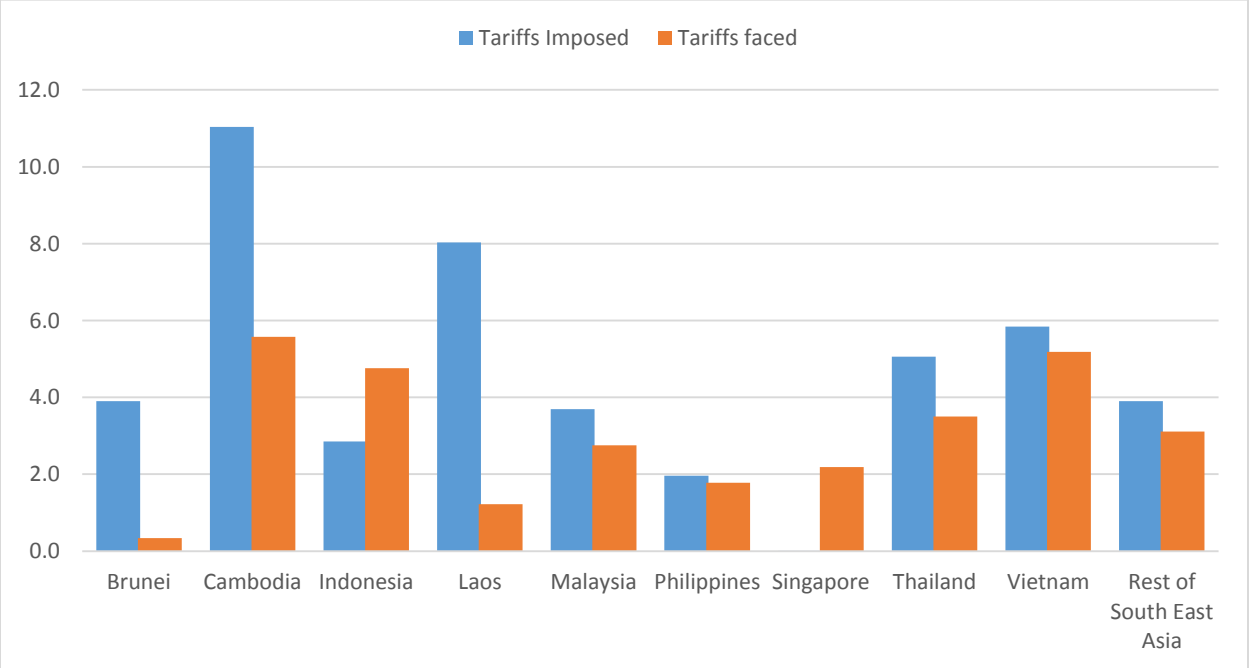
Source: Calculations based on GTAP/GMig version 9 data base

Figure 3 Total Exports and Imports (in $ billion, 2011)



Source: Calculations based on GTAP/GMig version 9 data base

Figure 4 Tariffs faced and imports (in %, 2011)



Source: Calculations based on GTAP/GMig version 9 data base

Table 3 Global Trade (in $ billions, 2011)

Exporter \ Importer	Brunei	Cambodia	Indonesia	Laos	Malaysia	Philippines	Singapore	Thailand	Vietnam	Rest of South East Asia	Sub-total Intra-ASEAN Exports	Add: ASEAN Exports to Rest of the World	Total (Global) Exports
Brunei	0.0	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	0.0	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	0.1	0.3	0.0	0.0	11.7	3.8	7.9	7.2	2.4	0.3	33.7	193.3	227
Laos	0.0	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	0.7	0.3	7.6	0.0	0.0	3.2	20.9	11.5	3.8	0.6	48.8	202.5	251.0
Philippines	0.0	0.0	0.9	0.0	1.4	0.0	3.4	2.3	0.8	0.0	8.8	62.2	71.0
Singapore	0.5	0.3	26.1	0.0	31.6	4.6	0.0	11.0	5.3	0.5	79.9	211.2	291.0
Thailand	0.2	2.7	11.4	2.4	14.1	4.6	7.1	0.0	7.3	2.6	52.5	211.1	263.7
Vietnam	0.0	1.7	2.5	0.2	2.4	1.6	2.4	2.1	0.0	0.1	12.9	89.5	102.4
Rest of South East Asia	0.0	0.0	0.1	0.0	0.3	0.0	0.1	3.4	0.1	0.0	4.0	5.8	19.7
Sub-total: 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 Rest of the World	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 (Global) Imports	5.0	10.7	199.6	4.0	215.6	88.1	262.7	246.0	121.5	12.6		18,988.2	

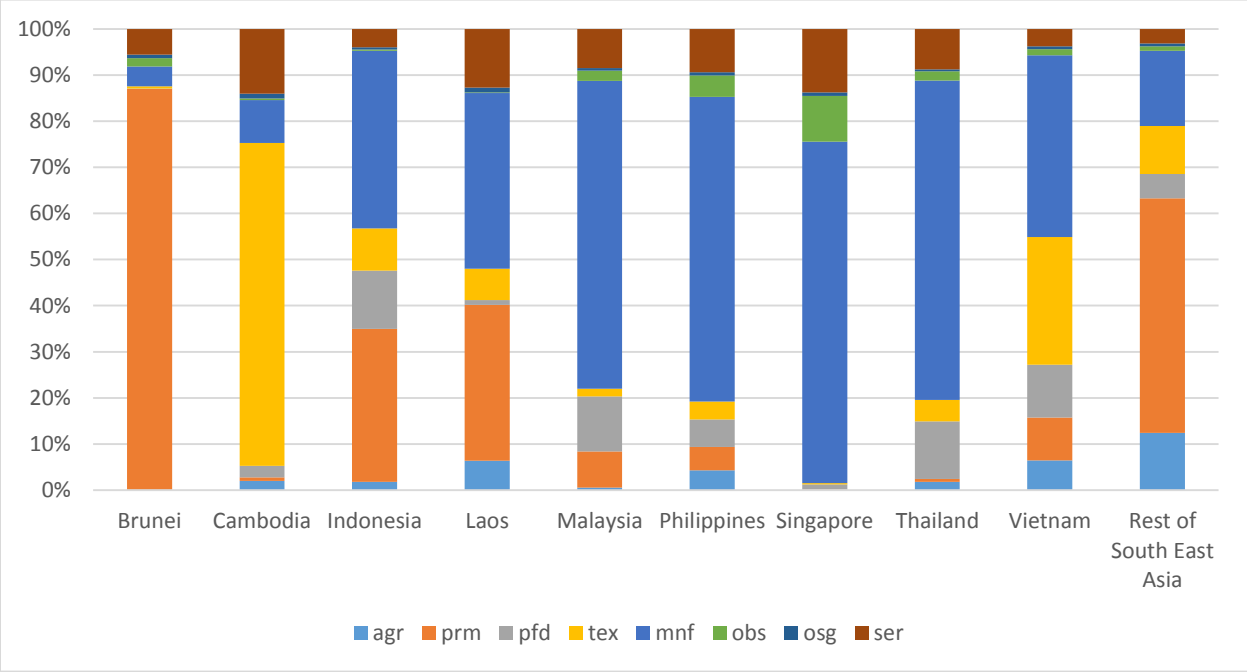
Source: Calculations based on GTAP/GMig version 9 data base

Figure 5 shows that South East Asian economies are highly specialized with Brunei, Laos and the Rest of South East Asia mainly exporting primary commodities (i.e., oil and mining), while Malaysia, 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 between 5% in Indonesia and 24% in Singapore.Figure 6 decomposes the share of each imported commodity to total imports for each South East Asian economy. The region mainly imports manufactured goods, with textiles accounting for 27% and 12% of total imports of Cambodia and Vietnam, respectively. The share of services to total imports varies, ranging between 5% in Laos and 24% in Singapore.

Table 4 shows the bilateral skilled labor flows (in thousands of people) within ASEAN. In this table, the row headings identify the home countries, while the column headings define the host countries. For example, there are 74,500 skilled migrants from Malaysia who are working in Singapore. Table 4 shows that there are 172 thousand intra-ASEAN skilled migrants, of which roughly 54% are working in Singapore. Other major skilled migrant destinations are Thailand, Malaysia and Cambodia, respectively accounting for 14%, 11% and 10% of total intra-ASEAN skilled labor migration flows. The shaded cells in Table 4 indicate significant bilateral labor migration flows which we explore more in Figure 7 below.

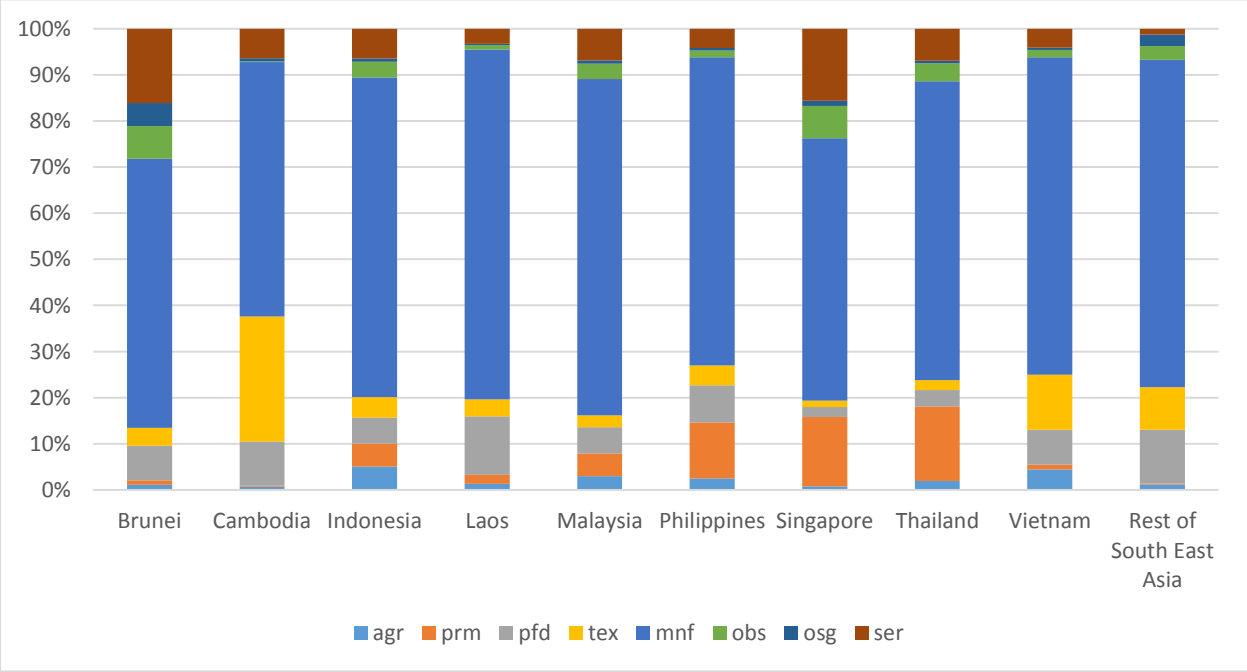
Table 5 shows the share of skilled migrants in each host country's total labor force. We see that on average, skilled migrants only account for 11.2% of the ASEAN region's total skilled labor force. Brunei has the highest skilled migrant as a share of its labor force with 11.5%, followed by Singapore and Cambodia with 9.5% and 7.7%, whereas the rest of South East Asia has negligible skilled migrant share to its total labor force. Figure 7 presents the composition of skilled migrants by host country, which were derived from the skilled migration flows shown in Table 4. Figure 7 indicates that intra-ASEAN skilled labor migration is mainly concentrated in a few corridors, namely: (a) Malaysia to Brunei and Malaysia to Singapore; (b) Thailand to Cambodia and Vietnam to Cambodia; (c) Philippines to Indonesia and Vietnam to Indonesia; (d) Vietnam and Thailand to Laos; (e) Singapore and Indonesia to Malaysia; (f) Indonesia, Malaysia and Vietnam to the Philippines; (g) Rest of South East Asia to Thailand; (h) Indonesia, Malaysia and Philippines to Vietnam; (i) Indonesia, Malaysia and Thailand to the Rest of South East Asia

Figure 5 Exports by commodity (in % share)



Source: Calculations based on GTAP/GMig version 9 data base

Figure 6 Imports by commodity (in % share)



Source: Calculations based on GTAP/GMig version 9 data base

Table 4 Skilled Migrant by home and host countries (in thousands, 2011)

Home \ Host	Brunei	Cambodia	Indonesia	Laos	Malaysia	Philippines	Singapore	Thailand	Vietnam	Rest of South East Asia	Total
Brunei		0.01	0.01	0.00	0.66	0.10	0.14	0.43	0.02	0.00	1.38
Cambodia	0.00		0.00	0.00	0.01	0.14	0.08	1.74	0.00	0.02	2.01
Indonesia	0.25	0.03		0.01	5.59	1.85	9.34	0.15	1.26	0.11	18.60
Laos	0.00	0.00	0.00		0.01	0.15	0.01	1.99	0.00	0.02	2.17
Malaysia	4.41	0.20	0.36	0.00		0.91	74.50	0.45	0.86	0.12	81.82
Philippines	0.92	0.11	0.77	0.01	2.94		4.00	0.49	0.41	0.01	9.65
Singapore	0.00	0.10	0.10	0.00	7.34	0.25		0.19	0.17	0.03	8.19
Thailand	0.71	8.45	0.22	0.34	1.15	0.44	2.83		0.24	0.04	14.43
Vietnam	0.00	7.87	0.67	1.20	1.04	1.31	1.04	1.99		0.00	15.12
Rest of South East Asia	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

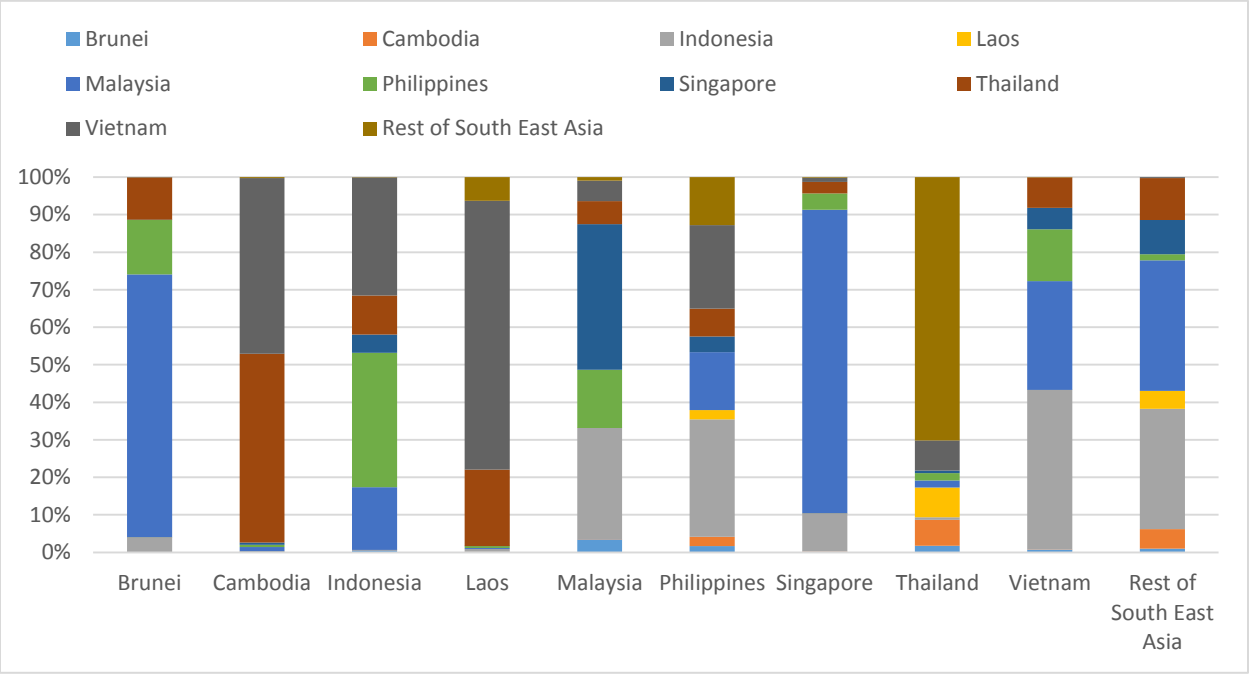
Source: Calculations based on GTAP/GMig version 9 data base

Table 5 Skilled migrant from r in s, as a share of labor Force in s (in %)

Home \ Host	Brunei	Cambodia	Indonesia	Laos	Malaysia	Philippines	Singapore	Thailand	Vietnam	Rest of South East Asia	Regional Average
Brunei		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Cambodia	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1
Indonesia	0.5	0.0		0.0	0.2	0.0	1.0	0.0	0.0	0.0	1.2
Laos	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.1
Malaysia	8.0	0.1	0.0	0.0		0.0	7.7	0.0	0.0	0.0	5.3
Philippines	1.7	0.0	0.0	0.0	0.1		0.4	0.0	0.0	0.0	0.6
Singapore	0.0	0.0	0.0	0.0	0.3	0.0		0.0	0.0	0.0	0.5
Thailand	1.3	3.9	0.0	0.2	0.0	0.0	0.3		0.0	0.0	0.9
Vietnam	0.0	3.6	0.0	0.7	0.0	0.0	0.1	0.0		0.0	1.0
Rest of South East Asia	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

Source: Calculations based on GTAP/GMig version 9 data base

Figure 7 Composition of Skilled migrant by host country (in %)



Source: Calculations based on GTAP/GMig version 9 data base

4. Simulation results

We now use the GMig2 model to help us analyze the potential economic impacts of skill mobility within the AEC. We simulate three scenarios:

1. AFTA: Complete removal of intra-ASEAN tariffs to understand the economic impacts associated with the ASEAN Free Trade Area agreement alone. This scenario does not allow for skill mobility within the AEC.
2. AFTA-SKILL: AFTA scenario coupled with endogenous labor mobility. This scenario simulates the policy of allowing skilled migrants to move within the AEC based on real wage differences between their home and host countries.
3. AFTA-WAGE: AFTA- SKILL together with a 5% improvement in the initial ratio of migrants' wages relative to permanent residents. This scenario simulates an AEC-wide policy to improve migrants' working conditions.

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

Table 6 shows the GDP impacts of our three policy scenarios. The first column of Table 6 shows that, tariff eliminations due to AFTA, generally results in GDP gains for AEC member economies. Exceptions are Laos and Rest of South East Asia which have marginal GDP contractions of -0.14% and -0.01% respectively, due to higher imports. Among all AEC members, Brunei gains the most with 0.19% followed by Malaysia, Vietnam and Cambodia with 0.16%, 0.15% and 0.12% expansion in GDP, respectively. Other AEC member countries show GDP expansions of less than 0.1%.

Note that the GDP gains, under AFTA, are quite small. This is because of two reasons. First, successive tariff reductions under the Common Effective Preferential Tariff (CEPT) since the last decade resulted in current ASEAN tariffs being already low and close to optimal (Figure 4). Second, total intra-ASEAN trade is quite small relative to global trade, and AEC members trade more extensively with countries outside the region (see Table 3 for initial bilateral trade flows). The GDP impacts for countries outside the AEC are negligible suggesting that tariff elimination in the AEC does not appear to cause trade diversion effects: this is also driven by the two reasons we have pointed out above.

Table 6 Effects on Gross Domestic Product (% change from base)

	AFTA	AFTA-SKILL	AFTA-Wage
Australia and New Zealand	0.00	0.00	0.00
Rest of East Asia	0.00	0.00	0.00
Brunei	0.19	0.20	0.81
Cambodia	0.12	0.18	0.61
Indonesia	0.02	0.02	0.50
Laos	-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
Vietnam	0.15	0.15	0.85
Rest of South East Asia	-0.01	-0.01	0.50
Rest of South Asia	0.00	0.00	0.00
North America	0.00	0.00	0.00
European Union	0.00	0.00	0.00
Rest of the World	0.00	0.00	0.00

Source: Simulation results

To better understand the GDP impacts for each AEC economy, we present in Table 7 the percentage changes in each aggregate that makes up GDP from the expenditure-side. The AFTA results, shown in the upper panel of Table 7 suggest that tariff elimination within the AEC brings about higher exports and imports for all member economies. Exports increases for all countries, except for Vietnam. This is because Vietnam's aggregate exports price index increases more than any other AEC member economy (see Table 8), thereby resulting in falling foreign demand for Vietnam's exports. A comparison of the percentage changes in exports and imports show that imports grow more than exports for all AEC members. This is driven by higher demand for investment goods and higher demand for imported intermediate inputs needed to support exports expansion. Note that the significant growth in both the quantity of exports and imports for Cambodia, Laos and the Rest of South East Asia should be taken with caution, as these countries have relatively small trade flows in our initial data.

The upper panel of Table 7 also shows that tariff elimination under AFTA results in higher investment demand for all AEC member countries, as imported capital goods become cheaper due to tariff elimination. Investment increases the most in Vietnam followed by Thailand, Malaysia, Brunei and Singapore, while the Philippines and Rest of South East Asia show low investment growth rates. Again, the higher investment growth for Cambodia and Laos should be taken with caution due to their low investment flows in our initial data.

We now discuss the changes in household consumption alongside changes in government demand and investments as movements in these three aggregates are driven by our standard GTAP closure rules and regional household specification. In general, household consumption increases for all AEC economies, except for Cambodia, Laos and the Rest of South East Asia. Household and government consumption fall in Cambodia because, as shown in Table 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/invest and at the same time reduce their private consumption. The higher government price index also leads to a fall in government consumption. For Laos, consumption goes down because the reduction in the investment price index outweighs the reduction in CPI thereby encouraging investments, while government consumption rises due to falling government price index. Higher government price index also results in reduced government consumption in Indonesia and Thailand.

Table 7 Real GDP (Expenditure-side, % change from base)

	Consumption	Investment	Government	Exports	Imports	GDP
Scenario: AFTA						
Brunei	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
Laos	-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
Vietnam	1.29	8.84	0.03	-1.74	2.71	0.15
Rest of South East Asia	-0.02	0.33	-0.02	1.89	1.72	-0.01
Scenario: AFTA-SKL						
Brunei	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
Laos	-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
Vietnam	1.29	8.84	0.03	-1.74	2.72	0.15
Rest of South East Asia	-0.02	0.33	-0.02	1.89	1.73	-0.01
Scenario: AFTA-WAGE						
Brunei	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
Laos	-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
Vietnam	1.97	10.21	0.16	-1.37	3.42	0.85
Rest of South East Asia	0.32	0.42	0.37	2.44	2.07	0.50

Source: Simulations results

Table 8 GDP price indices (Expenditure-side, % change from base)

	Consumption	Investment	Government	Exports	Imports	GDP price index
Scenario: AFTA						
Brunei	-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
Laos	-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
Vietnam	1.09	1.07	2.31	1.14	0.02	2.15
Rest of South East Asia	-0.28	-0.20	-0.17	-0.09	0.04	-0.28
Scenario: AFTA-SKILL						
Brunei	-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
Laos	-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
Vietnam	1.09	1.07	2.31	1.14	0.02	2.15
Rest of South East Asia	-0.28	-0.20	-0.17	-0.09	0.03	-0.28
Scenario: AFTA-WAGE						
Brunei	-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
Laos	-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
Vietnam	1.03	0.97	1.39	1.10	0.02	1.98
Rest of South East Asia	-0.37	-0.32	-1.89	-0.10	0.03	-0.60

Source: Simulations results

The second column of Table 6 shows the GDP impacts of our second simulation, AFTA-SKILL, which combines AFTA with skilled labor mobility within the AEC. Recall that in this simulation, we allow migrants to respond to real wage differences between their home and host countries. The results show that the GDP changes are similar with that of the AFTA scenario because of limited skilled migration within the region (Table 9: 1.08 or 1,080 people). This is because of two reasons. First, we assumed that skilled migrants only have a unitary elasticity (i.e., ESUBMIG=1), thereby tempering their response to relative wage differences between their home and host countries. Second, the small increase in skilled migrant movements is linked to our benchmark data which shows limited intra-ASEAN skilled migration (Table 4) at the base.

Nevertheless, we see in the second column of Table 6 that GDP expands a bit more for Cambodia (0.12% vs. 0.18%) as migrants addresses the shortage of skilled labor, hence increasing their labor force. Brunei and Singapore also experience higher GDP as a result of employing more skilled migrants from other ASEAN countries. As shown in the last row of Table 9, the higher GDP for these three countries are anchored on higher skilled labor intake. In terms of sources, skilled migrants to Cambodia come from Thailand and Vietnam, while Singapore taken in additional skilled workers from Malaysia and the Philippines. On the other hand, Malaysia registers a GDP contraction because of a reduction in labor force—i.e., net skilled migrant outflow (Table 9: -0.11 or -1,100 net migrants).

The middle panel of Table 7 shows the percentage changes in each aggregate that makes up GDP from the expenditure-side under the AFTA-SKILL scenario. In general, the magnitude of results is similar with those obtained under the AFTA scenario. An exception is Malaysia which shows marginally lower household consumption changes as well as marginally higher exports and imports changes under AFTA-SKILL than in the AFTA scenario. These differences are driven by changes in Malaysia's current account balance (CAB) which we now explain. The net migrant outflow in Malaysia (i.e., higher outflow of skilled Malaysian workers and lower inflow of migrants from the AEC) leads to higher worker remittances that causes Malaysia's CAB to improve (**Error! Not a valid bookmark self-reference.** shows that the current account balance (CAB) deteriorates more than the trade balance (TB) for Cambodia, Laos, Singapore and Vietnam, thereby resulting in real exchange rate depreciation that make their exports (Table 8: Exports prices under AFTA-WAGE vs. AFTA-SKILL scenario) relatively cheaper. On the other

hand, higher net remittances leads to slight improvement in CAB relative to TB for Brunei, Indonesia, Malaysia, Philippines, Thailand, and the Rest of South East Asia thereby resulting in a lower real exchange rate depreciation under AFTA-WAGE when compared with the AFTA-SKILL scenario. Exports still significantly expand for these countries as their slightly lower real exchange rate depreciation also brings about slightly cheaper imported inputs (again, compared with AFTA-SKILL) that translate to lower exports price indices under the AFTA-WAGE scenario (Table 8).

Table 11). This CAB surplus forces Malaysia's real exchange rate to depreciate less in AFTA-SKILL when compared with the AFTA scenario, resulting in relatively cheaper imports and hence, higher demand for imports. Exports slightly expand as Malaysia's exports price index rises less under AFTA-SKILL (Table 8: 0.19% vs. 0.20% in AFTA scenario), due to cheaper cost of imported intermediate inputs. Similarly, investments increase as imported capital goods become relatively cheaper

The third column of Table 6 shows the GDP impacts of our third simulation—called AFTA-WAGE—which combines AFTA-SKILL with a 5% improvement in the initial ratio of migrants' wages relative to permanent residents in the host country. We see that GDP expansions are higher when compared with the first two scenarios. Among AEC members, Singapore gains the most with 1.6% GDP expansion followed by Malaysia and Philippines with at least 1% GDP gains. All other AEC member countries register GDP gains ranging between 0.5% and 0.8%. Laos and the Rest of South East Asia likewise register GDP gains in this scenario, as oppose to GDP contractions in our first two scenarios.

The GDP expansions for Brunei, Cambodia, and Singapore are again anchored on skilled labor intake (Table 10). Although other AEC countries—namely: Indonesia, Laos, Malaysia, Philippines, Thailand, Vietnam and Rest of South East Asia—experience a net outflow of migrants (Table 10), their GDP still increase as a result of higher exports sales and greater household consumption (Table 7) associated with higher remittances. Indeed, the lower panel of Table 7 shows that the percentage changes in each aggregate that makes up GDP from the expenditure-side are all higher under the AFTA-WAGE scenario, when compared with the AFTA-SKILL scenario. A detailed examination Table 7 reveals that consumption, exports and

imports increase more under AFTA-WAGE scenario when compared with our first two scenarios; real investment only increase slightly under AFTA-WAGE. Essentially, all these changes are influenced by changes in the current account balance which we now explain. Note that the net migrant intake under AFTA-WAGE is lower for all countries, except Singapore, when compared with AFTA-SKILL scenario. This is because the 5% improvement in the initial ratio of migrants' wages relative to permanent residents in the host country, results in reduced demand for skilled migrants as they become relatively more expensive.

Table 9 Skilled Migrant by home and host countries (in thousands, difference relative to base): AFTA-SKILL scenario

Home \ Host	Brunei	Cambodia	Indonesia	Laos	Malaysia	Philippines	Singapore	Thailand	Vietnam	Rest of South East Asia	Total Outflow
Brunei	-	0.00	0.00	0.00	-0.01	0.00	0.00	0.00	0.00	0.00	-0.01
Cambodia	0.00	-	0.00	0.00	0.00	-0.01	-0.01	-0.10	0.00	0.00	-0.11
Indonesia	0.00	0.00	-	0.00	0.04	0.00	0.07	0.00	0.03	0.00	0.14
Laos	0.00	0.00	0.00	-	0.00	0.00	0.00	-0.01	0.00	0.00	-0.02
Malaysia	0.04	0.01	0.00	0.00	-	-0.01	0.07	0.00	0.02	0.00	0.13
Philippines	0.01	0.01	0.00	0.00	0.02	-	0.02	0.00	0.01	0.00	0.07
Singapore	0.00	0.01	0.00	0.00	-0.01	0.00	-	0.00	0.00	0.00	0.00
Thailand	0.01	0.51	0.00	0.00	0.00	0.00	0.00	-	0.00	0.00	0.51
Vietnam	0.00	0.34	-0.02	-0.01	-0.02	-0.03	-0.02	-0.03	-	0.00	0.21
Rest of South East Asia	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	

Source: Simulations results

Table 10 Skilled Migrant by home and host countries (in thousands, difference relative to base): AFTA-WAGE scenario

Home \ Host	Brunei	Cambodia	Indonesia	Laos	Malaysia	Philippines	Singapore	Thailand	Vietnam	Rest of South East Asia	Total Outflow
Brunei		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	-0.01
Cambodia	0.00	-	0.00	0.00	0.00	-0.01	0.00	-0.10	0.00	0.00	-0.11
Indonesia	0.00	0.00	-	0.00	0.06	0.01	0.20	0.00	0.03	0.00	0.31
Laos	0.00	0.00	0.00		0.00	0.00	0.00	0.00	0.00	0.00	0.00
Malaysia	0.02	0.01	0.00	0.00	-	-0.01	0.72	0.00	0.01	0.00	0.76
Philippines	0.01	0.01	0.00	0.00	0.02	-	0.06	0.00	0.01	0.00	0.11
Singapore	0.00	0.01	0.00	0.00	-0.07	0.00	-	0.00	0.00	0.00	-0.07
Thailand	0.00	0.50	0.00	0.00	0.00	0.00	0.02	-	0.00	0.00	0.52
Vietnam	0.00	0.34	-0.02	-0.02	-0.02	-0.03	-0.01	-0.03	-	0.00	0.22
Rest of South East Asia	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	

Source: Simulations results

Error! Not a valid bookmark self-reference. shows that the current account balance (CAB) deteriorates more than the trade balance (TB) for Cambodia, Laos, Singapore and Vietnam, thereby resulting in real exchange rate depreciation that make their exports (Table 8: Exports prices under AFTA-WAGE vs. AFTA-SKILL scenario) relatively cheaper. On the other hand, higher net remittances leads to slight improvement in CAB relative to TB for Brunei, Indonesia, Malaysia, Philippines, Thailand, and the Rest of South East Asia thereby resulting in a lower real exchange rate depreciation under AFTA-WAGE when compared with the AFTA-SKILL scenario. Exports still significantly expand for these countries as their slightly lower real exchange rate depreciation also brings about slightly cheaper imported inputs (again, compared with AFTA-SKILL) that translate to lower exports price indices under the AFTA-WAGE scenario (Table 8).

Table 11 Change in trade and current account balance (in $US million)

	Trade Balance			Current Account Balance			Net Remittances		
	AFTA	AFTA-SKILL	AFTA-WAGE	AFTA	AFTA-SKILL	AFTA-WAGE	AFTA	AFTA-SKILL	AFTA-WAGE
Brunei	-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
Laos	-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
Vietnam	-3921	-3922	-4467	-3925	-3926	-4469	-4	-4	-2
Rest of South East Asia	-57	-57	-50	-56	-56	-47	1	1	3

Source: Simulation results

5. Insights and further work

In this paper, we have analyzed the potential economic implications of freer flow of skilled labor within the ASEAN region with the aid of the GMig2 data base and model. We have also filled a research gap by shedding light on how skilled labor mobility within the AEC might impact each ASEAN economy, and how such impacts may reverberate to both regional and global economies.

Our analysis of benchmark GMig2 data indicates that skilled migrants only account for 13% of the roughly 1.5 million intra-ASEAN migrants, and that intra-ASEAN migrants only account for a small share of the ASEAN region'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 similarity of culture, thereby limiting bilateral labor movements to a few countries.

Our simulation results suggest that GDP gains from tariff elimination under the AFTA agreement are quite small. This is because past tariff reductions under the Common Effective Preferential Tariff (CEPT) resulted in current ASEAN tariffs being already low and also because intra-ASEAN trade is still quite small relative to global trade with AEC members trading more extensively with countries outside the region. Nonetheless, we find that, AFTA coupled with a policy that allows for freer flow of skilled labor and a 5% improvement in the initial ratio of migrants' wages relative to permanent residents in the host country, would result in GDP gains for AEC economies. The GDP gains from the income-side are anchored on higher supply of skilled labor, while the GDP gains from the expenditure-side are driven by higher investments and exports as imported intermediate inputs become cheaper as well as higher consumption on the back of higher remittances sent by migrant workers.

Note that this study is our initial attempt to analyze the potential impacts of skilled labor mobility under the ASEAN Economic Communities' (AEC) Mutual Recognition Arrangements (MRAs) on professional services. So far, the MRAs facilitate a freer flow of 8 professional labor categories—such as: accountants, architects, dentists, engineers, medical practitioners, nurses, surveyors, and tourism professionals—within the AEC. An important caveat of our analysis is that the GDP gains under our two skilled mobility scenarios are likely overestimated. This is because the GMig2 data we have used in this study, only distinguish two labor types, namely: unskilled and skilled workers, with the latter category representing all skilled labor types over and above the 8 occupations covered by the 8 MRAs. Therefore, further data work is needed to disaggregate the 8 MRA occupations from the current homogeneous skilled labor category in the GMig2 data base and model. Doing this would pave the way for an improved understanding of the potential economic impacts of freer flow of skilled labor within the AEC.

6. References

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7. Appendix: Concordance

Table 12 Sectoral Concordance

No.	Original Sector	Aggregated Sector	No.	Original Sector	Aggregated Sector
1	pdr	agr	30	lum	mnf
2	wht	agr	31	ppp	mnf
3	gro	agr	32	p_c	mnf
4	v_f	agr	33	crp	mnf
5	osd	agr	34	nmm	mnf
6	c_b	agr	35	i_s	mnf
7	pfb	agr	36	nfm	mnf
8	ocr	agr	37	fmp	mnf
9	ctl	agr	38	mvh	mnf
10	oap	agr	39	otn	mnf
11	rmk	agr	40	ele	mnf
12	wol	agr	41	ome	mnf
13	frs	prm	42	omf	mnf
14	fsh	prm	43	ely	ser
15	coa	prm	44	gdt	ser
16	oil	prm	45	wtr	ser
17	gas	prm	46	cns	ser
18	omn	prm	47	trd	ser
19	cmt	pfd	48	otp	ser
20	omt	pfd	49	wtp	ser
21	vol	pfd	50	atp	ser
22	mil	pfd	51	cmn	ser
23	pcr	pfd	52	ofi	ser
24	sgr	pfd	53	isr	ser
25	ofd	pfd	54	obs	obs
26	b_t	pfd	55	ros	ser
27	tex	tex	56	osg	osg
28	wap	tex	57	dwe	ser
29	lea	tex			

Source: Aggregation of the GTAP/GMig2 version 9 data base

Table 13 Regional Concordance

No.	Original Region	Aggregated Region	No.	Original Sector	Aggregated Region	No.	Original Sector	Aggregated Region
1	aus	anz	51	pri	row	101	kwt	row
2	nzl	anz	52	tto	row	102	omn	row
3	xoc	row	53	xcb	row	103	qat	row
4	chn	xea	54	aut	EU	104	sau	row
5	hkg	xea	55	bel	EU	105	tur	row
6	jpn	xea	56	cyp	EU	106	are	row
7	kor	xea	57	cze	EU	107	xws	row
8	mng	xea	58	dnk	EU	108	egy	row
9	twn	xea	59	est	EU	109	mar	row
10	xea	xea	60	fin	EU	110	tun	row
11	brn	brn	61	fra	EU	111	xnf	row
12	khm	khm	62	deu	EU	112	ben	row
13	idn	idn	63	grc	EU	113	bfa	row
14	lao	lao	64	hun	EU	114	cmr	row
15	mys	mys	65	irl	EU	115	civ	row
16	phl	phl	66	ita	EU	116	gha	row
17	sgp	sgp	67	lva	EU	117	gin	row
18	tha	tha	68	ltu	EU	118	nga	row
19	vnm	vnm	69	lux	EU	119	sen	row
20	xse	xse	70	mlt	EU	120	tgo	row
21	bgd	xsa	71	nld	EU	121	xwf	row
22	ind	xsa	72	pol	EU	122	xcf	row
23	npl	xsa	73	prt	EU	123	xac	row
24	pak	xsa	74	svk	EU	124	eth	row
25	lka	xsa	75	svn	EU	125	ken	row
26	xsa	xsa	76	esp	EU	126	mdg	row
27	can	nam	77	swe	EU	127	mwi	row
28	usa	nam	78	gbr	EU	128	mus	row
29	mex	nam	79	che	row	129	moz	row
30	xna	nam	80	nor	row	130	rwa	row
31	arg	row	81	xef	row	131	tza	row
32	bol	row	82	alb	row	132	uga	row
33	bra	row	83	bgr	EU	133	zmb	row
34	chl	row	84	blr	row	134	zwe	row
35	col	row	85	hrv	row	135	xec	row
36	ecu	row	86	rou	EU	136	bwa	row
37	pry	row	87	rus	row	137	nam	row
38	per	row	88	ukr	row	138	zaf	row
39	ury	row	89	xee	row	139	xsc	row
40	ven	row	90	xer	row	140	xtw	row
41	xsm	row	91	kaz	row			
42	cri	row	92	kgz	row			
43	gtm	row	93	xsu	row			
44	hnd	row	94	arm	row			
45	nic	row	95	aze	row			
46	pan	row	96	geo	row			
47	slv	row	97	bhr	row			
48	xca	row	98	irn	row			
49	dom	row	99	isr	row			
50	jam	row	100	jor	row			

Source: Aggregation of the GTAP/GMig2 version 9 data base