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Assessing agricultural market integration of Cambodia within and beyond ASEAN

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ABSTRACT

In this paper, we address the question of the agricultural market integration of Cambodia within the Association of Southeast Asian Nations (ASEAN), and its other top trading partners. Focusing on agricultural trade, we use two indicators, namely, "Trade Potential" and "Competition Indices," to assess the nature and extent of the integration. More specifically, we identify the exports of Cambodia with high export potential and comparatively low competition in export markets. Higher trade potential with lower competition (value or volume) indicates an opportunity of higher returns for agricultural producers. In the case of Cambodia, "maize," and "starches" are identified as high-potential exports with lower intra-ASEAN competition. There is also scope for regional cooperation in traditional exports such as "rice," "manioc (cassava)," "molasses," and "pepper" between Cambodia and other Southeast Asian countries for which both the export potential and intra-ASEAN competition are high. Finally, to demonstrate the upward movement in the value chain, possibly due to quality upgradation, we present the dynamics of the unit values of Cambodia's agricultural exports.

Keywords: Market Integration, Competition Indices, Trade Potential, Unit Value, Cambodia, ASEAN

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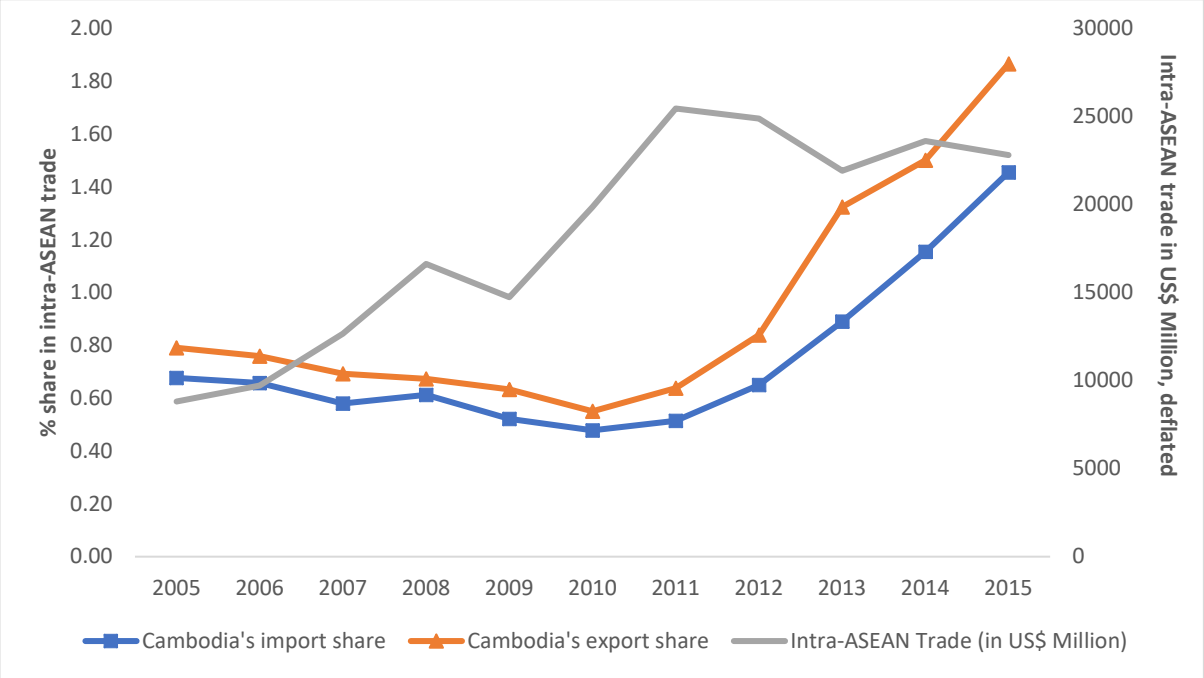
I. Introduction

In this paper, we focus on agricultural exports of Cambodia between 2005 and 2015.[1] We look at the changes in the exports on the intensive margins (changes in sales across existing trade relations) as well as on extensive margins (changes in the number of such trading relations [Baldwin 2009]). The analysis based on both margins is important as historically most cases of high growth in exports are characterized by trading at the extensive margins.

In assessing the dynamics of Cambodia's agricultural exports, we calculate the summary measures of export potential of various products in different markets. Along with the export potential of different agricultural products in the Association of Southeast Asian Nations (ASEAN) markets, we also calculate the indices of competition. Cambodia can consider exporting products with higher potential and lower competition within Southeast Asian (SEA) countries, which may spur Cambodia's growing exports' share in the intra-ASEAN agricultural trade (Figure 1).[2]

Figure 1. Cambodia's share in intra-ASEAN agricultural trade



Source: United Nations (2017).
Note: ASEAN = Association of Southeast Asian Nations.

ASEAN, a regional grouping of 10 SEA countries—Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam—implemented the ASEAN Free Trade Area (AFTA) in 2003. This agreement enabled intra-ASEAN trade (in general) and agricultural trade (in particular) to grow steadily during the

[1] Throughout the paper, the GDP deflator of the United States is used to deflate the export values. The base year for deflation is 2009.
[2] SEA countries include Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Malaysia, Myanmar, the Philippines, Singapore, Thailand, and Viet Nam. We do not include "East Timor" in the SEA countries. Therefore, we use the term "ASEAN countries" and "Southeast Asian countries"/ "SEA countries" interchangeably.

period under review (Figure 1). Further, the dynamics of intra-ASEAN agricultural trade show that after the food price crisis of 2007/2008, the intra-ASEAN agricultural trade increased sharply. Cambodia is particularly important from the point of view of the trade response to shocks during the food price crisis. Cambodia comprises a rare example where the food price crisis did not lead to trade restrictions and, during the crisis, trade remained free. In fact, Cambodia is considered to have benefited from the high world prices during the food price crisis.

Entering into regional agreements with ASEAN seems to have helped Cambodia in exporting more products to the SEA countries. However, these exports were mainly limited to Malaysia, Thailand, and Viet Nam (Table 1). Cambodia can further integrate with other ASEAN countries to diversify its exports where its export share is minimal.

Table 1. Percentage share of SEA countries in Cambodia's total agricultural exports to ASEAN

SEA countries	TE2007	TE2010	TE2015
Brunei		0.21	1.65
Indonesia	2.87		0.37
Lao PDR		1.30	0.22
Malaysia	18.36	14.13	50.08
Myanmar		0.19	0.05
Philippines	1.12	23.03	5.01
Singapore	1.96	2.12	8.03
Thailand	43.48	24.95	16.63
Viet Nam	32.95	42.88	19.84

Source: United Nations (2017).
Note: ASEAN = Association of Southeast Asian Nations; SEA = Southeast Asian countries; TE = Triennium ending average.

Barring rice, Cambodia's top exports have been dominated by intensive margins, that is, most of the top exports have been concentrated in a few markets. One major implication of the lack of diversification across products and trading partners is that it makes Cambodia vulnerable to shocks that are either driven by policy changes or other demand and supply shocks. For instance, any policy change leading to trade inhibition (say, rejection of agri-food-product imports by the European Union) can adversely affect Cambodia and its smallholder farmers with reduced export earnings. Cambodia may reduce this vulnerability by expanding exports at both the extensive as well as intensive margins.

The share of agricultural export in Cambodia's total exports has been increasing, unlike non-agricultural exports. It increased from 0.59 percent in triennium ending average (TE) 2007 to nearly 5 percent in TE2015.[3] However, this share is minuscule when compared to the share of "textiles and clothing," which dominates total exports, with 74 percent in TE2015. During the period under review, the agricultural exports of Cambodia grew at around 41 percent between TE2007 and TE2015 as compared to 7.77 percent of Cambodia's non-agricultural exports.

This concentrated growth performance of Cambodia's agricultural exports motivates us to highlight some potential products for the country by employing trade indicators such as

[3] Authors' calculations based on United Nations (2019). Triennium ending average (TE) means 3-years average. For instance, TE2015 refers to average from 2013 to 2015.

"Competition Indices" and "Trade Potential." These indicators underline the export potential of Cambodian agricultural products, as well as their competition level with ASEAN and non-ASEAN countries.[4] Products with higher trade potential and lower competition can help Cambodia diversify across products and partners. Cambodia and other ASEAN countries may also consider regional cooperation for some traditional export products such as "rice" and "maize," for which export potential and intra-ASEAN competition are both comparatively high.

We also present the export price of Cambodia's top exports (in terms of unit values) to examine quality differentiation across the destinations. The increase in prices, if any, would also capture the expansion in trade on the extensive margin as it indicates quality differentiation or exports of different varieties. Our analysis shows that export price (proxied by deflated unit value) is fluctuating for most of the top products. Inconsistent supply, lack of processing facilities, and volatility in international prices can be among several other factors which may explain the fluctuation in the price of a unit export of the top products (Ministry of Commerce 2014).

The rest of the paper is organized as follows: Section II presents the top exports and destinations of Cambodia. Section III describes the methodology of trade indicators used to measure the nature and extent of market integration. Section IV briefly describes the data used for the analysis. Sections V and VI present the results of the trade indicators. Section VII concludes and provides policy recommendations.

II. Important Products and Destinations

Cambodia's agricultural exports are highly concentrated across products. Exports are heavily dominated by "rice (HS 1006)" which accounts for 65 percent of the total agricultural exports (Table 2). After rice, cane or beet sugar (HS 1701), palm oil (HS 1511), manioc (cassava, HS 0714), and starches (HS 1108) are Cambodia's main exports, but cumulatively these products have only a modest share in the total exports as compared to rice.[5] These products are the top five agricultural exports of Cambodia and nearly account for 86 percent of the total exports. The other important exports include molasses (HS 1703), crustaceans, pepper (spices, HS 0904), maize, and frozen fish, which account for about 5 percent of the total exports. Products including ethyl alcohol (with higher alcoholic strength, HS 2207), ethyl alcohol (with lower alcoholic strength, HS 2208), and mineral water (HS 2202) are also among the top exports; however, we leave these out since our primary focus is on commodities that have a significant engagement of the smallholders.

[4] Since we are focusing on the agricultural exports of Cambodia, we will use the term "trade potential" and "export potential" interchangeably.

[5] We focus on agricultural exports of Cambodia, and use "total agricultural exports" interchangeably with "total exports."

Table 2. Top 10 agricultural products of Cambodia (based on decadal ranking)
Unit: Value (deflated) in million US$

Product code	Product description	Decadal exports value	Product share (%)	Agricultural rank	Export value (TE 2007)	Export value (TE 2015)	CAGR (%)
1006	Rice (HS 1006)	995.16	65.40	1	2.44	234.93	76.94
1701	Cane or beet sugar (HS 1701)	104.18	6.85	2	0.04	28.98	130.00
1511	Palm oil (HS 1511)	93.30	6.13	3	1.05	12.07	35.72
0714	Manioc (cassava, HS 0714)	65.99	4.34	4	0.22	17.96	73.05
1108	Starches; inulin (HS 1108)	44.68	2.94	5	3.50	6.10	7.18
1703	Molasses (HS 1703)	18.06	1.19	8		5.81	
0306	Crustaceans (HS 0306)	16.88	1.11	10	3.39	0.57	-20.05
0904	Pepper (spices, HS 0904)	14.94	0.98	11	0.05	3.86	73.41
1005	Maize (corn, HS 1005)	12.04	0.79	12	1.43	0.28	-18.40
0303	Frozen fish (HS 0303)	11.52	0.76	13	1.89	0.00	-64.70
n.a.	Others agricultural exports	144.90	9.51	n.a.	6.15	18.28	14.60
	Total agricultural exports	**1521.65**					

Source: United Nations (2017).
Note: 1) Compounded annual growth rate (CAGR) is calculated from TE 2007 to TE 2015. 2) The agricultural ranks 6, 7, and 9 correspond to the exports of ethyl alcohol (HS 2207), ethyl alcohol (HS 2208), and mineral and aerated waters (HS 2202), respectively. Their export shares (product shares) in total agricultural exports are 2.6, 1.3, and 1.1, respectively. 3) TE = Triennium ending average. 4) n.a. = not applicable. 5) The significant growth in Cambodian exports between TE 2007 and TE 2015 may be due to "no trade restriction during the food price crisis," and "the high growth rate of 10 percent in gross agricultural production during 2002 to 2012 (World Bank 2015)."

Compared to the case of products, in the case of destinations, the exports of Cambodia are well-diversified (Table 3). Among destinations, France is the main importer of Cambodian agricultural products, accounting for around 15 percent of Cambodia's total agricultural exports. After France, Malaysia, China, and Viet Nam, which are a part of ASEAN + 1, are the main destinations of Cambodian exports and together account for around 30 percent of the total exports. The top 10 destinations of Cambodian agricultural exports, most of which are European Union (EU) and SEA countries, account for nearly 71 percent of the total exports. This diversification in export markets, however, may be due to the large share of rice in the total exports, as rice is mostly exported to EU and SEA countries. Notably, excluding rice, the other top exports of Cambodia are highly concentrated in a few markets (Table 4).

Table 3. Top 10 destinations of Cambodian exports (based on decadal ranking)
Unit: Value (deflated) in million US$

Destination	Decadal exports value	Country share (%)	Country ranking
France	225.69	14.83	1
Malaysia	195.19	12.83	2
China	161.75	10.63	3
Viet Nam	99.32	6.53	4
Poland	96.32	6.33	5
Netherlands	95.53	6.28	6
Thailand	78.92	5.19	7
United Kingdom	61.57	4.05	8
Bulgaria	35.71	2.35	9
Belgium	30.51	2.00	10
Others	441.14	28.98	
Total agricultural exports	**1521.65**		

Source: United Nations (2017).

Table 4. Top destinations' share in the top agricultural exports of Cambodia in TE 2015

Serial No.	Agricultural rank	Products	Top destinations	Share of top destinations in total agricultural exports in TE 2015 (%)
1	1	Rice	France (A)	18.21
		(HS 1006)	Malaysia (B)	15.29
			China (C)	12.62
			Poland (D)	9.28
			Total (A+B+C+D)	**55.40**
			Others	44.60
2	2	Cane or beet sugar	Viet Nam (A)	37.69
		(HS 1701)	Bulgaria (B)	31.90
			United Kingdom (C)	19.67
			Total (A+B+C)	**89.26**
			Others	10.74
3	3	Palm oil	Malaysia (A)	56.89
		(HS 1511)	Switzerland (B)	28.55
			Republic of Korea (C)	8.42
			Total (A+B+C)	**93.86**
			Others	6.14
4	4	Manioc	China (A)	79.93
		(cassava, HS 0714)	Thailand (B)	19.37
			Total (A+B)	**99.30**
			Others	0.70
5	5	Starches; inulin	China (A)	45.72
		(HS 1108)	Thailand (B)	40.46
			Viet Nam (C)	4.33
			Total (A+B+C)	**90.51**
			Others	9.49
6	6	Molasses	Thailand (A)	68.89
		(HS 1703)	Viet Nam (B)	31.11
			Total (A+B)	**100.00**
7	7	Crustaceans	China *	76.29
		(HS 0306)	Viet Nam	18.05
			Thailand	3.13
			Total (A+B+C)	**97.47**
			Others	2.53
8	8	Pepper	Singapore (A)	81.62
		(spices, HS 0904)	France (B)	5.91
			Viet Nam (C)	2.82
			Total (A+B+C)	**90.35**
			Others	9.65
9	9	Maize	Other Asia, nes (A)	65.44
		(corn, HS 1005)	Thailand (B)	24.16
			Viet Nam (C)	9.61
			Total (A+B+C)	**99.21**
			Others	0.79
10	10	Frozen fish	Malaysia	100.00
		(HS 0303)		

Source: United Nations (2017).

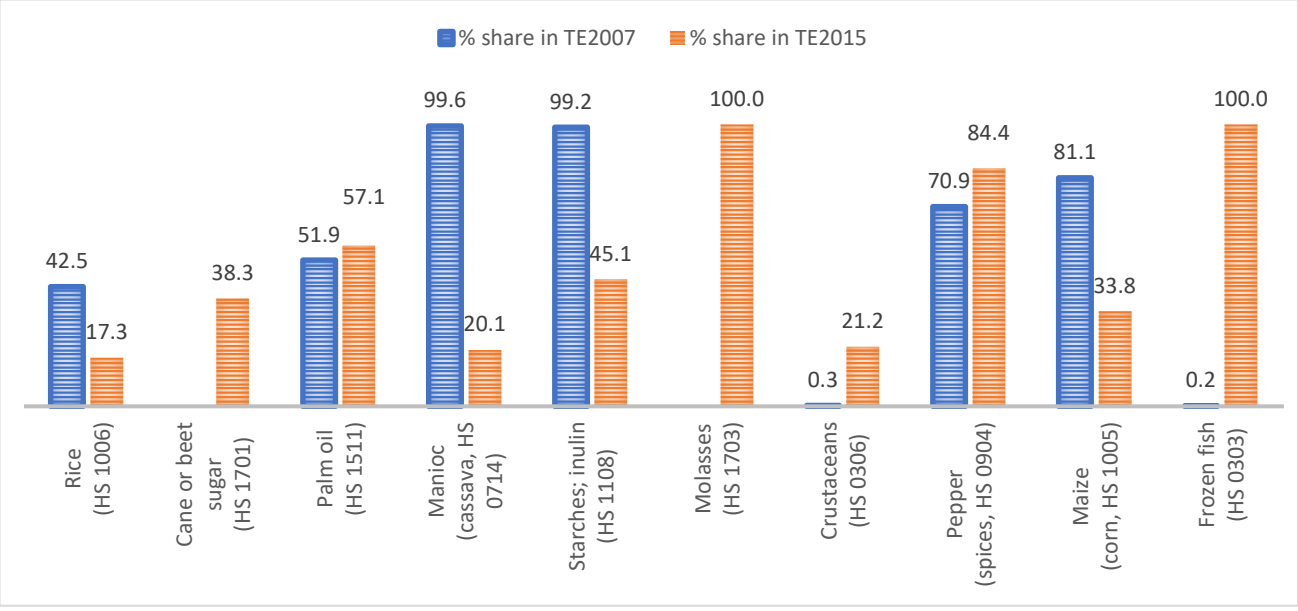
Note: 1) * China's share in crustaceans exports also includes the share of Hong Kong. 2) nes = not elsewhere specified. 3) TE = Triennium ending average.

Important destinations by products: The "Everything But Arms (EBA)" initiative of the EU and Generalised System of Preferences (GSP) scheme of many developed countries have helped Cambodia export agricultural commodities to countries such as France, Germany, the United Kingdom, and the United States (ERIA 2011). Under EBA, Cambodia has been granted a complete duty-free and quota-free treatment, which facilitates easier access to the European markets. This treatment, along with GSP, has resulted in significant growth in exports of commodities such as "rice," "cane sugar (HS 1701)," and "palm oil" (Table 2).

In the case of rice, Cambodia mainly exports to EU countries, and to Malaysia among the SEA countries (Annex A: Table A5.1). For cane sugar and palm oil, the majority of the exports are concentrated in a few countries. Cambodia mainly exports cane sugar to Viet Nam, Bulgaria, and the United Kingdom, and in the case of palm oil, it mainly exports to Malaysia, Switzerland, and the Republic of Korea (Table 4). Malaysia, being Cambodia's primary market for palm oil, imports only 1.37 percent of its total imports from Cambodia (Indonesia contributes around 91 percent to the overall imports of palm oil by Malaysia).[6] Similarly for India, which is the biggest importer of palm oil in the world, Cambodia contributes only 0.04 percent to India's total imports. This share is significantly low as compared to the shares of India's palm oil imports from Indonesia (71 percent) and Malaysia (27 percent)–the two biggest exporters of palm oil.[7]

Like palm oil and cane sugar, the remaining top exports of Cambodia are also concentrated, mainly to SEA countries. Between 2005 and 2015, Cambodia exported more cane sugar, palm oil, molasses, crustaceans, pepper, and frozen fish to ASEAN countries (Figure 2). The exports to these SEA countries, however, were mainly to Thailand and Viet Nam, indicating possibly that preferential treatment under AFTA played a modest role in expanding the agricultural exports of Cambodia (Table 4, and [Ministry of Commerce 2014]).

Figure 2. ASEAN countries' percentage share in top 10 agricultural exports of Cambodia



Source: United Nations (2017).
Note: ASEAN = Association of Southeast Asian Nations. 1) ASEAN countries' share in top 10 exports of Cambodia for TE2007 and TE2015 is shown in the figure. 2) TE = Triennium ending average.

[6] Authors' calculations based on United Nations (2019).
[7] In the case of India, decadal imports of palm oil are considered. Cambodia did not export palm oil to India in TE2015.

Between 2005 and 2015, Cambodia traded relatively more at intensive rather than extensive margins. Adjusting at product level and extensive margins, Cambodia exported only one new product: Molasses (HS 1703) which was mainly exported to Thailand and Viet Nam (Annex A: Table A5.6). At the intensive margin, it exported more of 5 existing products viz. "rice," "cane sugar," "palm oil," "manioc (cassava, HS 0714)," and "pepper." At the partner level, Cambodia's attempt to diversify across markets seems to have worked only for rice. Between 2005 and 2007, Cambodia exported rice to 19 markets, which increased to 78 markets between 2013 and 2015 (Annex A: Table A4 and Table A5.1). In the case of "cane sugar," "cassava," "starches," and "pepper," the number of markets Cambodia exports to also increased; however, it was unable to diversify the value of its exports (Annex A: Table A4, Table A5.2, A5.4, A5.5 and A5.8).

Importantly, during this period, Cambodia also witnessed a decline in the exports of "crustaceans," "maize," and "frozen fish." In the case of frozen fish, Cambodia exported to eight markets between 2005 and 2007, which fell to merely one market–Malaysia–between 2013 and 2015. Similarly, the total number of markets for exports of crustaceans fell from seven markets between 2005 and 2007 to five markets between 2013 and 2015. This decline in exports may be due to the strict regulations imposed by the United States and other European countries on fishery exports (Ministry of Commerce 2014). In the case of maize, the decline in Cambodia's exports may be due to different non-tariff measures (NTMs) imposed by Thailand, a major export destination for Cambodian maize (Hai 2017). A synopsis of the performance of these top agricultural exports is provided in Table 5.

Table 5. Growth rate of top 10 exports with changes in the number of markets between TE2007 and TE2015

		Exports to number of markets	
		Increase	**Decrease/No change**
Growth (% CAGR)	**Positive (Rising sector)**	Rice (HS 1006) *	Palm oil (HS 1511)
		Cane or beet sugar (HS 1701)	
		Manioc (cassava, HS 0714)	
		Starches; inulin (HS 1108)	
		Molasses (HS 1703)	
		Pepper (spices, HS 0904)	
	Negative (Waning sector)	Maize (corn, HS 1005)	Crustaceans (HS 0306)
			Frozen fish (HS 0303)

Source: United Nations (2017).

Note: 1) * Commodities with diversified exports to markets (by value). 2) Rising and waning commodities are defined as the commodities which have registered positive and negative growth, respectively, in their exports over the period. For this purpose, we calculated compounded annual growth rate (CAGR) from TE 2007 to TE 2015. 3) TE = Triennium ending average.

III. Methodology

We use two main indicators—"Trade Potential" and "Competition Indices"—to assess the export possibility and the level of competition which Cambodia faces in ASEAN countries and other top destinations. The rationale behind this characterization is that a higher trade potential with lower competition offers an opportunity for agricultural producers in Cambodia to benefit from exports.

A. Export Potential

Export potential is defined as either the country's global exports or the partner country's global imports, whichever is lower, minus the actual trade between the two countries. It considers exports and imports as the country's supply and demand potential, respectively. Export potential for a commodity in a year is given as follows:

$$\textit{Export potential for a year} = \textit{minimum (country's global exports, partner country's global imports)} - \textit{actual trade} \quad (1)$$

Note that this indicator estimates only the maximum possibility of trade between the two countries relative to the actual trade. It does not take into account the supply-side constraints that a country may face in producing and exporting a specific product (Division of Market Development [ITC] 2014).

B. Measures of Competition

To measure the competition between countries, we employ the Value-Based Index (VBI) and Count-Based Index (CBI) of competition for agricultural commodities (Mattoo, Mishra, and Subramanian 2017). In constructing these indices, we use the trade data at the HS 6-digit level of product disaggregation from UN Comtrade data (United Nations 2017).

More formally, the competition faced by Cambodia with respect to a competitor, c, in an importing country, j, for a product, g, can be measured by VBI, which is given as follows:

$$VB_g^{i,j} = \sum_{g'=1}^{G} \left(\frac{V_{g'}^{i,j}}{V_g^{i,j}} \right) s_{g'}^{c,j} \quad (2)$$

where i is Cambodia, g is an HS 4-digit product, g' is an HS 6-digit product, and G is the total number of HS 6-digit products in the 4-digit product (International Monetary Fund 2018). The first term (in parenthesis) on the right-hand side captures the relative importance of g' in the exports of Cambodia. This is measured as the value of HS 6-digit product g' exported by Cambodia to importing country, j, divided by the value of the corresponding HS 4-digit product, g, exported by Cambodia to importing country, j.

The second term, $s_{g'}^{c,j}$, captures the relative importance of a particular competitor, c, as a source of imports of HS 6-digit product, g', in importing country j. It is measured as the value of HS 6-digit product, g', exported by the competitor to importing country, j, divided by the total imports of HS 6-digit product, g', by the importing country, j. The product of the first and the second term obtained at the HS 6-digit level is then aggregated to obtain the VBI at the level of HS 4-digit product, g, and a competitor, c.

The VBI captures the intensive margin of competition since it is conditional on a competitor exporting the products that are also exported by Cambodia. A simpler and more intuitive measure of competition captures the extensive margin of competition: the numbers of products exported by a competitor that are also exported by Cambodia. This is the CBI of competition, which is given as follows:

$$CB_g^{i,j} = \frac{N_g^{ij,c}}{N_g^{i,j}} \quad (3)$$

$CB_g^{i,j}$ measures the number of HS 6-digit products, within an HS 4-digit product code g, that are exported by Cambodia and also by competitor c to destination j as a proportion of the total number of HS 6-digit products, within the same HS 4-digit product code g, exported by Cambodia to destination j.

In the importing country market, an increase in the value of CBI signifies that Cambodia is competing with other exporters over more disaggregated products within a product group. On the other side, a rise in the value of VBI indicates that Cambodia faces more competition with the commodity's dominant exporter, as measured by the export value. Here, it should be noted that the value of VBI and CBI lies between 0 and 1, where 0 indicates no competition.

IV. Data

We perform the analysis on 4–digit level data (H1 Nomenclature) downloaded from UN Comtrade (United Nations 2017). Generally, agricultural trade data includes chapters related to Animal and Animal Products (HS 01 – 05), Vegetable Products (HS 06-15) and Foodstuffs (HS 16-24). We exclude products from Residues and Wastes Food Industries (HS 23) and Tobacco Products (HS 24) in our analysis.

V. Trade Indicators

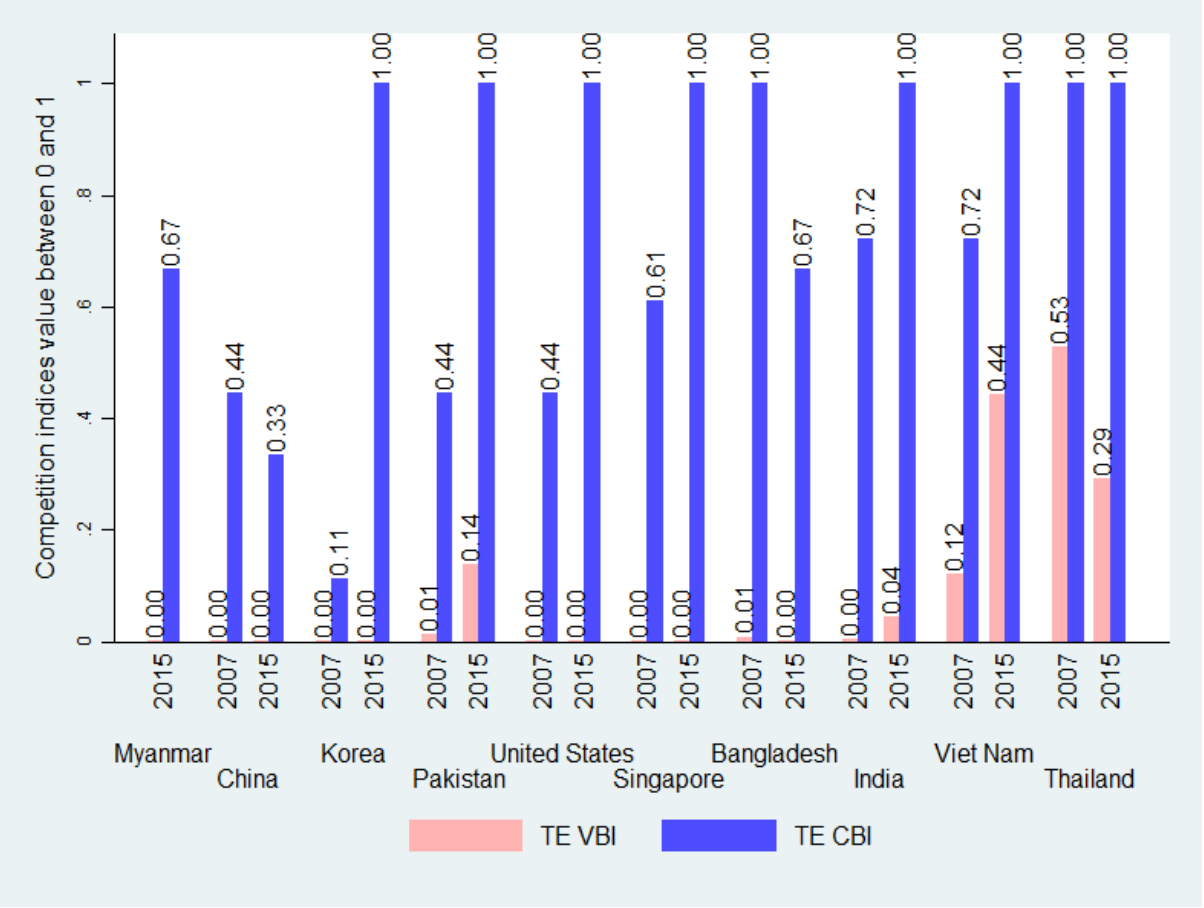
A. Competition Indices of Cambodia

In this section, we assess the degree of competition and identify major competitors for Cambodian top exports in the ASEAN markets. This helps us to identify commodities for which Cambodia competes with non-ASEAN countries. Here, we highlight the following:

i. The trend of average competition, which Cambodia faces in the ASEAN markets; and
ii. The major competitors for top 10 Cambodian exports in the ASEAN and other markets

As discussed above, Malaysia, Singapore, Thailand and Viet Nam are the main destinations of Cambodian exports among ASEAN countries. For "rice," "palm oil," and "frozen fish," Malaysia is an important market because it accounts for nearly 15, 57, and 100 percent, respectively, of the total exports (Annex A: Table A5.1, A5.3, and A5.10, respectively). In Malaysia, Cambodia mainly competes with Viet Nam and Thailand for rice, Indonesia and Thailand for palm oil, and China, Viet Nam and Indonesia for frozen fish (Figure 3, Annex A: Figure A.1 and A.2, respectively). In the case of rice, an increase in CBI with Viet Nam from 0.72 in TE2007 to 1.00 in TE2015 means that the overlap of the number of exports within the 4-digit "rice" group has increased between Viet Nam and Cambodia. On the other hand, an increase in VBI (which captures the competition with the dominant exporters in the importing market) means that the competition of Cambodia with the dominant exporter, Viet Nam, has increased in the Malaysian rice market. The reverse holds in the case of VBI with Thailand.

Figure 3. Cambodia's competition with other exporters of rice in Malaysia

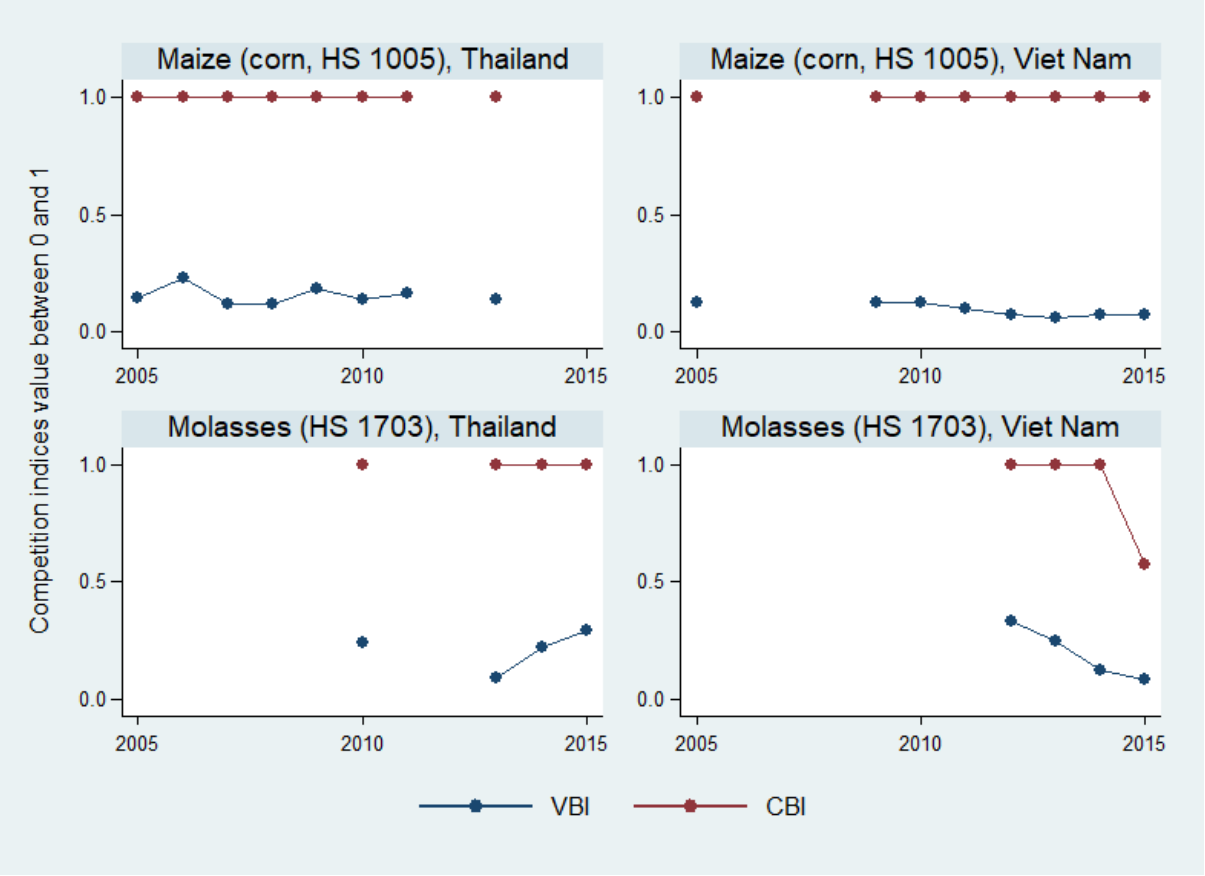


Source: United Nations (2017).
Note: 1) Triennium ending average (TE) is calculated for VBI and CBI. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) Value of competition indices = 0 means no competition.

In the case of pepper, Singapore is the main destination of Cambodia as it accounts for nearly 82 percent of the total exports (Annex A: Table A5.8). Here, Cambodia mainly competes with Viet Nam, Indonesia, and India (Annex A: Figure A.3).

Thailand and Viet Nam are the main destinations of Cambodian molasses and maize. In the case of molasses, the average CBI was constant between 2010 and 2014; however, the average VBI was falling for Viet Nam and increasing for Thailand (Figure 4: second row). In Thailand, Cambodia exited the molasses market after 2010 and entered again with increasing VBI. This means that the competition with the dominant exporters of molasses is rising for Cambodia in the Thailand market. In the case of Viet Nam, the VBI for molasses is falling, which reflects an opportunity for Cambodia to export more molasses to Viet Nam. Like molasses, the average CBI was constant for maize; however, the average VBI was fluctuating, and remained low in Thailand and Viet Nam.

Figure 4. Cambodia's competition in Thailand and Viet Nam markets for maize and molasses



Source: United Nations (2017).
Note: 1) Average competition indices across countries are considered. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) Value of competition indices = 0 means no competition.

Beyond Southeast Asia, regional trade partners such as China, India, and Korea are important to Cambodia. For these countries, we have also calculated and drawn the competition indices; however, for brevity, we provide only the summary of the average competition and major competitors of Cambodia in Tables 6a and 6b.[8]

[8] The competition indices figures can be produced for all the top 10 products of Cambodia for ASEAN markets on demand.

Table 6a. Trends in Cambodia's average competition in ASEAN + 3 markets

Products	Competition index	Malaysia	Singapore	Thailand	Viet Nam	China	Korea	India
Rice (HS 1006)	CBI	= (from 2009)	±			±		
	VBI	= (from 2012)	=			±		
Cane or beet sugar (HS 1701)	CBI				**	**		
	VBI				**	**		
Palm oil (HS 1511)	CBI	=					+	=
	VBI	+ (from 2011)					+	+
Manioc (cassava, HS 0714)	CBI			=		=		
	VBI			− (from 2010)		±		
Starches; inulin (HS 1108)	CBI			**	=	=		
	VBI			**	+	+		
Molasses (HS 1703)	CBI			=	=			
	VBI			+	−			
Crustaceans (HS 0306)	CBI			−	=	±		
	VBI			±	=	±		
Pepper (spices, HS 0904)	CBI		=		=		**	
	VBI		=		−		**	
Maize (corn, HS 1005)	CBI			=	=			
	VBI			±	=			
Frozen fish (HS 0303)	CBI	=						
	VBI	=						

Source: United Nations (2017).

Note: ASEAN = Association of Southeast Asian Nations. 1) VBI = Value-Based Index; CBI = Count-Based Index. 2) "±" means competition is fluctuating, "+" means competition is rising, "–" means competition is falling, and "=" means competition is constant. 3) Fluctuating means that there was no clear pattern whether competition was increasing or decreasing throughout the period under review. 4) Average competition indices across countries are considered. 5) ASEAN + 3 countries with more than 1 percent share in Cambodian exports (triennium ending average [TE] 2015) are considered. 6) ** Not enough data to analyze the trend.

Table 6b. Top three competitors of Cambodia in ASEAN + 3 markets

Products	Malaysia	Singapore	Thailand	Viet Nam	China	Korea	India
Rice (HS 1006)	Viet Nam	Thailand			Viet Nam		
	Thailand	Viet Nam			Thailand		
	Pakistan	India			Pakistan		
Cane or beet sugar (HS 1701)				Thailand	Brazil		
				Korea	Viet Nam		
				Lao PDR	Thailand		
Palm oil (HS 1511)	Indonesia					Malaysia	Indonesia
	Thailand					Indonesia	Malaysia
	Philippines					Ecuador	Thailand
Manioc (cassava, HS 0714)			Lao PDR		Thailand		
			Sri Lanka		Viet Nam		
			China		Indonesia		
Starches; inulin (HS 1108)			United States	Lao PDR	Viet Nam		
			Japan	Thailand	Thailand		
				Indonesia	Germany		
Molasses (HS 1703)			Lao PDR	Indonesia			
			Indonesia	Ukraine			
			United States	Egypt			
Crustaceans (HS 0306)			United States	Ecuador	Canada		
			Malaysia	India	Unites States		
			Canada	Malaysia	Indonesia		
Pepper (spices, HS 0904)		Viet Nam		Indonesia		Viet Nam	
		Indonesia		Brazil, India		Malaysia	
		India		Singapore and Malaysia*		Indonesia	
Maize (corn, HS 1005)			Lao PDR	Brazil			
			Brazil	India			
			South Africa	Argentina			
Frozen fish (HS 0303)	China						
	Viet Nam						
	Indonesia						

Source: United Nations (2017).

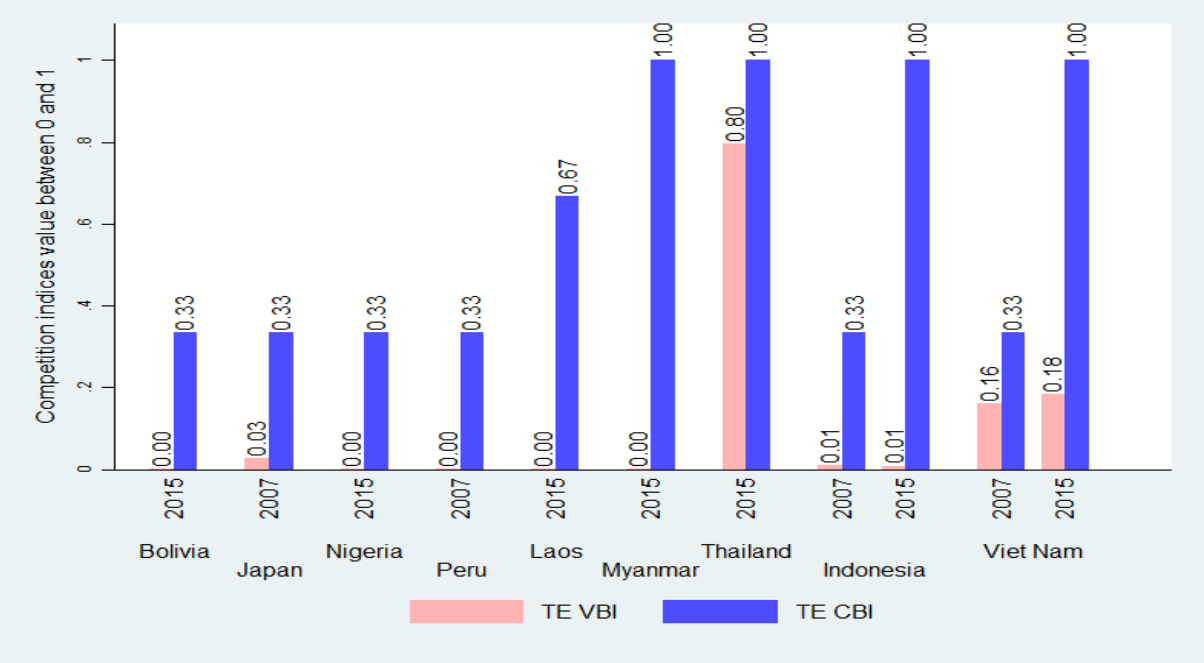
Note: ASEAN = Association of Southeast Asian Nations. 1) Competitors are listed in the order of rank based on the value of the Value-Based Index (triennium ending average [TE] 2015). If the value of Value-Based Index (VBI) is the same among competitors, then Count-Based Index (CBI) value in TE2015 is considered. 2) ASEAN + 3 countries with more than 1 percent share in Cambodian exports (TE 2015) are considered. 3) *Value of competition indices were the same for Brazil, India, Singapore and Malaysia in the case of pepper (spices, HS 0904).

From these tables, we observe that exporting more maize to Viet Nam, and starches to Thailand, may benefit Cambodia as its main competitors are non-ASEAN countries and further integration within ASEAN can provide a competitive edge to Cambodia over non-ASEAN competitors. Commodities in which Cambodia's competition is falling and/or constant are as follows:

i. Rice exports to Malaysia
ii. Manioc (cassava, HS 0714) exports to Thailand
iii. Molasses exports to Viet Nam
iv. Pepper exports to Singapore and Viet Nam
v. Crustaceans exports to Viet Nam
vi. Frozen fish exports to Malaysia

However, for these exports, Cambodia faces competition from other ASEAN countries. For example, China imports nearly 80 and 70 percent of manioc (cassava, HS 0714) and crustaceans, respectively, in TE2015, from Cambodia (Annex A: Tables A5.4 and A5.7). Cambodia mainly competes with Thailand, Viet Nam, and Indonesia for manioc (cassava, HS0714), and Canada, the United States, and Indonesia for crustaceans (Figure 5 and Annex A: Figure A. 4, respectively). One of the main reasons for this high intra-ASEAN competition may be due to the lack of agro-processing facilities in Cambodia, because of which Cambodia exports low-value unprocessed crops such as "cassava" and "maize" to neighbouring countries, where the crops are then processed and re-exported to common destinations (Ministry of Commerce 2014). Therefore, integrating smallholders and traders with the regional supply chains in ASEAN may help Cambodia in obtaining higher returns for its exports. These supply chains with direct linkages to smallholders and traders will likely benefit the region and will allow Cambodia to realise its true export potential.

Figure 5. Cambodia's competition with other exporters of manioc (cassava, HS 0714) in China



Source: United Nations (2017).
Note: 1) Triennium ending average (TE) is calculated for VBI and CBI. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) Value of competition indices = 0 means no competition.

B. Trade Potential of Cambodia

In this section, we present the "export potential" of Cambodia to highlight the possibility of trade between Cambodia and its top destinations. We also present the export potential for top Cambodian commodities with SEA countries; however, for brevity, we highlight only their overall trends in Table 7.[9]

Table 7. Trends of Cambodia's export potential with SEA countries (in million US$)

Products	Brunei	Indonesia	Lao PDR	Malaysia	Myanmar	Philippines	Singapore	Thailand	Viet Nam
Rice (HS 1006)	+	+	+	+	±	+	+	+	+
Cane or beet sugar (HS 1701) *	+	±	+	±	±	±	±	±	±
Palm oil (HS 1511) *	±	−	±	−	−	−	−	−	−
Manioc (cassava, HS 0714)	+	±	±	+	±	±	+	+	+
Starches; inulin (HS 1108)	±	±	+	±	+	±	±	±	±
Molasses (HS 1703)	±	+	±	+	+	+	+	+	±
Crustaceans (HS 0306)	±	−	±	−	±	±	−	−	−
Pepper (spices, HS 0904) **	+	+	+	+	+	+	±	+	+
Maize (corn, HS 1005)	±	±	±	±	±	±	±	±	±
Frozen fish (HS 0303)	−	−	±	−	±	−	−	−	−

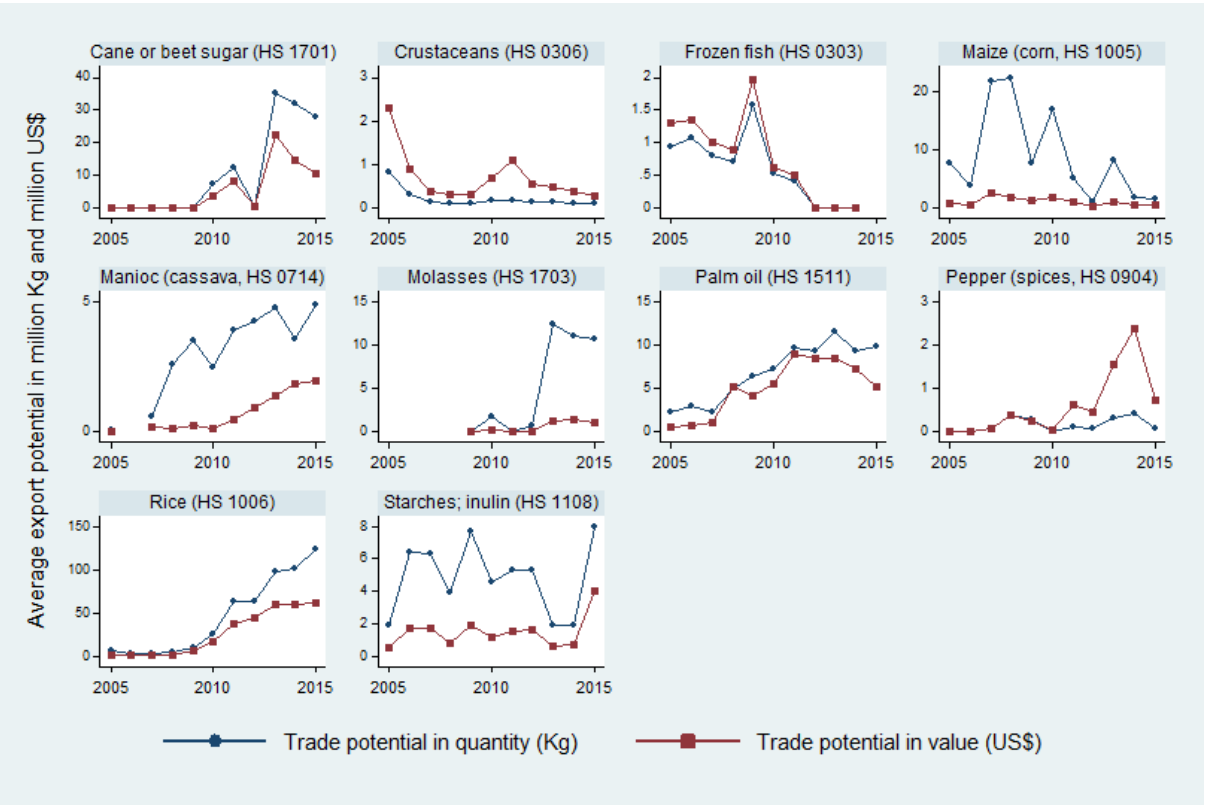
Source: United Nations (2017).

Note: SEA = Southeast Asian countries. 1) "±" means export potential is fluctuating, "+" means export potential is rising, and "–" means export potential is falling. 2) Fluctuating means that there was no clear pattern whether export potential was increasing or decreasing throughout the period under review. 3) *Export potential after year 2011. 4) **Export potential until year 2014.

Out of the top 10 Cambodian agricultural exports, the exports of "rice," "manioc (cassava, HS 0714)," and "pepper" have witnessed significant growth from the year 2009/2010 (Figure 6). From TE2007 to TE2015, their exports have grown around 77, 73 and 73 percent, respectively (Annex A: Table A1). In the case of rice, the EU's EBA program has potentially benefited Cambodian rice exports with a 30 to 40 percent tariff advantage over Viet Nam and Thailand in EU markets (World Bank 2018). Between 2009 and 2011, EU made few technical changes in the program, which also favoured the Cambodian rice exports, resulting in the increase in export potential with the EU countries (Figure 7 [UNCTAD 2015]). Cambodia also established quality standards to gain international recognition and the confidence of global buyers for its rice exports (International Finance Corporation 2015).

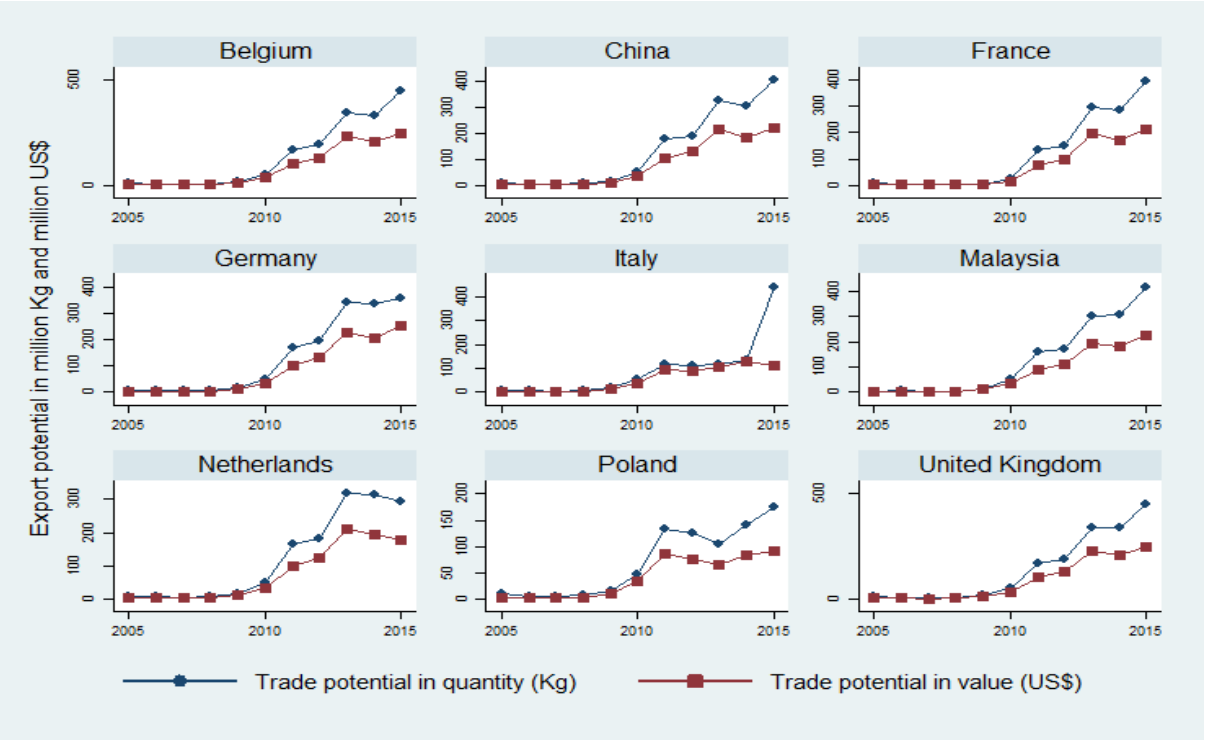
[9] The figures showing detailed export potential trends in ASEAN countries are presented in Annex A, Figure A.5.

Figure 6. Average export potential of top 10 Cambodian agricultural commodities



Source: United Nations (2017).
Note: 1) Average export potential was determined across partner countries. 2) Kg = Kilograms.

Figure 7. Cambodia's export potential with top destinations in rice



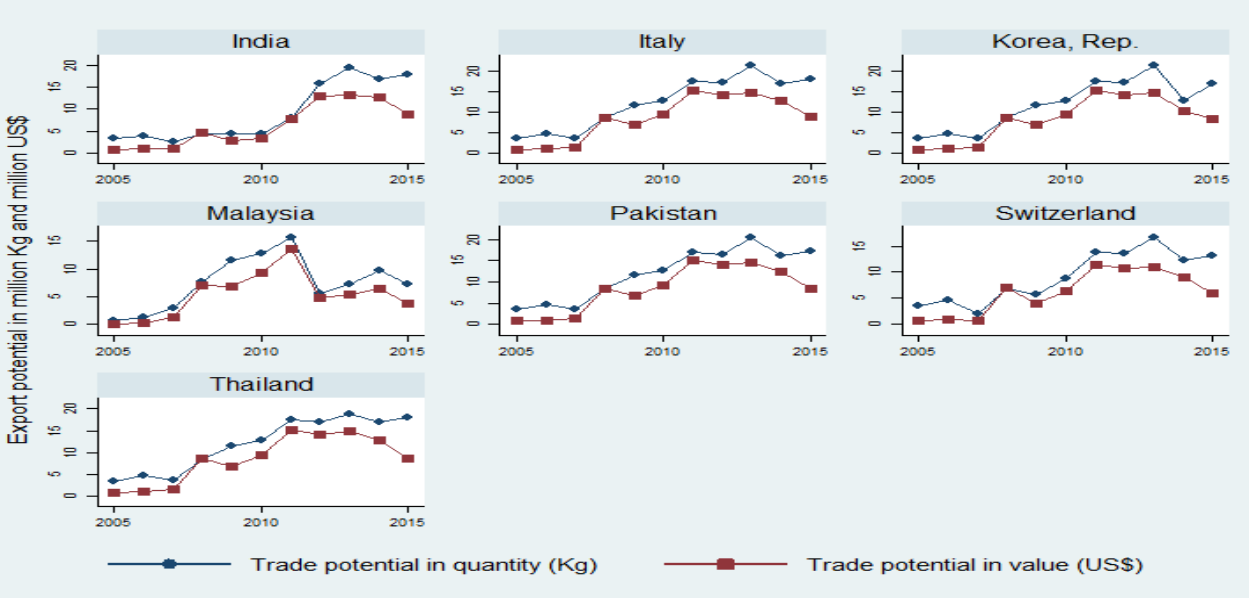
Source: United Nations (2017).
Note: Top destinations based on TE2015 exports; Kg = Kilograms; TE = Triennium ending average.

Between 2005 and 2015, we observed a widening gap between the export potential in quantity and value for the top destinations. This gap reflects Cambodia's limited capacity to move up the value chain and earn more from a unit export of rice (Figure 7). This may be due to the lack of processing capacity, weak formal export arrangements, and limited ability to meet international sanitary and phytosanitary standards (SPS) (FAO 2014). Cambodia may overcome these barriers if it invests to develop new processing units and supports exporters in analysing market trends which may facilitate them in enhancing their competitiveness in the foreign markets (International Finance Corporation 2015).

Like rice, the exports of "manioc (cassava, HS 0714)," "pepper," and "palm oil" have benefited from the duty-free quota-free (DFQF) program of the destination countries, including Switzerland, China, India, the Republic of Korea, and Japan. Cambodia also has free trade agreements (FTA) with some of these countries, which provide preferential treatment to Cambodia's exports. In the case of manioc (cassava, HS 0714), China signed a memorandum of understanding (MOU) with Cambodia which led to a significant increase in its exports. However, low-quality cassava plantings, limited processing facilities, and poor post-harvest handling may explain the widening gap between the export potential in quantity and value (Ministry of Commerce 2014). To enter into the high-value markets, Cambodia may invest more in processing facilities and research and development (R&D) to support high-quality cassava production. It may also ensure a consistent supply quantity and improve its capability to meet SPS requirements in the foreign markets.

In the case of pepper, the geographical indication (GI) status given to "Kampot Pepper" by the European community in 2009 and the increase in pepper production area has contributed to the growth of Cambodia's pepper exports (Lak 2018).[10] Taking necessary measures to obtain GI status for other varieties of pepper such as "memot pepper" may help Cambodia to realise its export potential with top destinations. In the case of palm oil, the exports and exports potential have increased for the top destinations throughout the period (Figure 8); however, the divergence between the potential in quantity and value may be due to the fall in the global prices of palm oil (Vernaillen 2013).

Figure 8. Cambodia's export potential with top destinations in palm oil

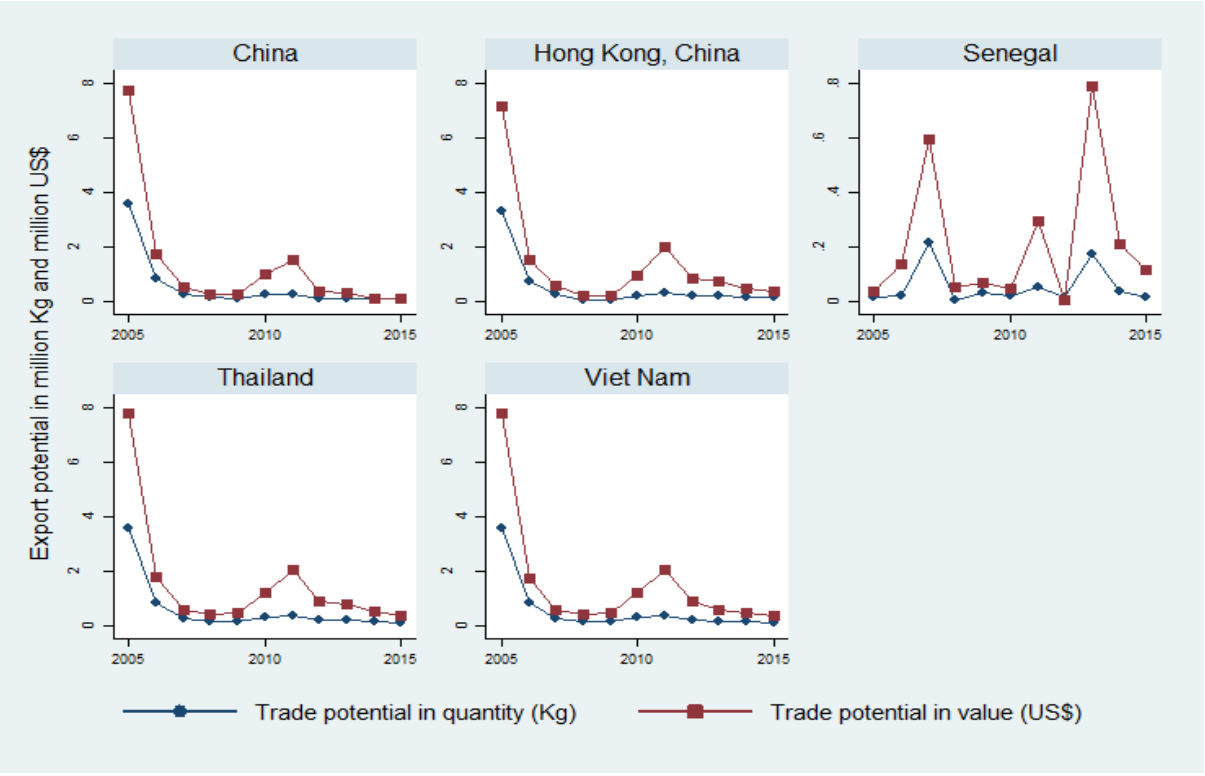


Source: United Nations (2017).
Note: Top destinations based on TE2015 exports; Korea, Rep. = Republic of Korea, Kg = Kilograms, TE = Triennium ending average.

[10] A geographical indication (GI) is a sign used on products that have a specific geographical origin and possess qualities or a reputation that are due to that origin (WIPO 2019).

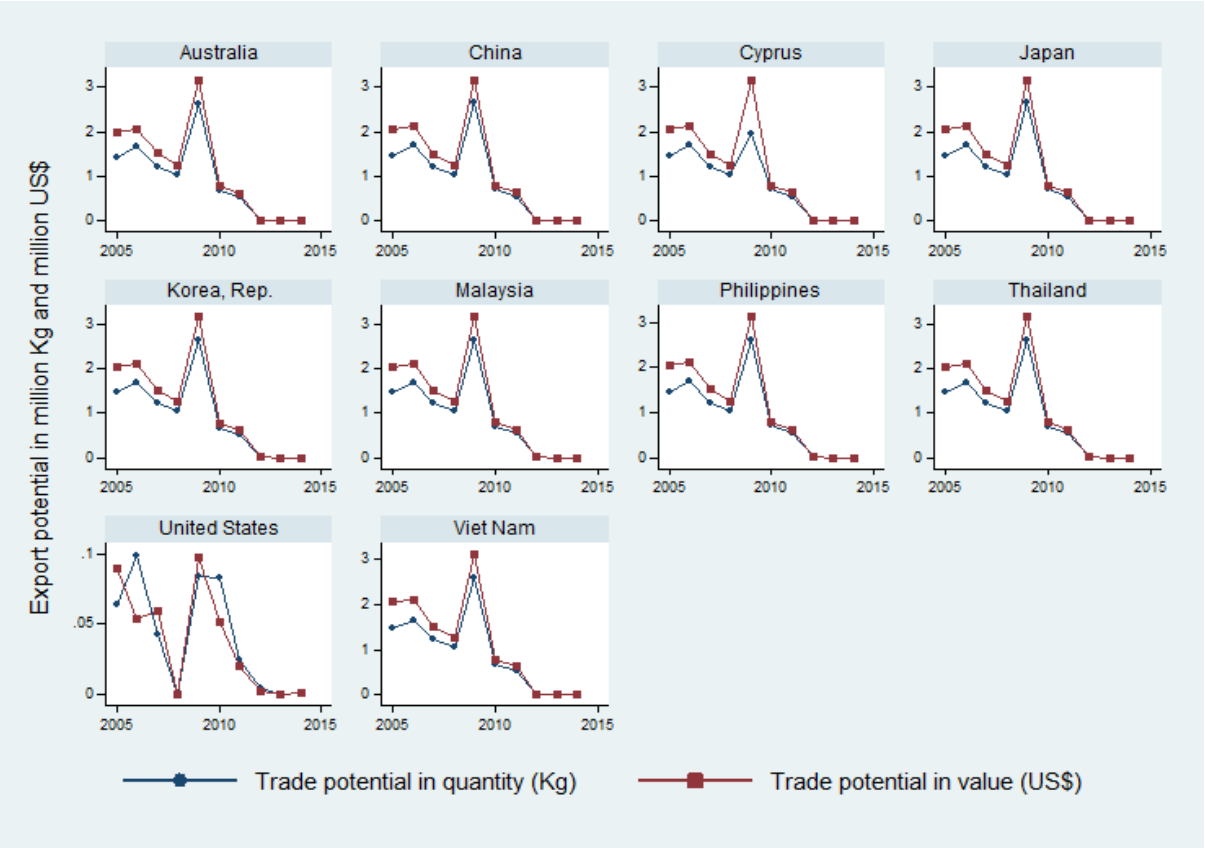
During the period under review, the exports of Cambodian fishery products fell because of stringent SPS and complex regulatory regimes in the top destination markets (Ministry of Commerce 2014). For instance, EU disallowed duty-free access to fisheries exports until Cambodia establishes a competent authority which is approved by EU. Moreover, an inconsistent domestic supply and an export tax on seafood have constrained the growth of a modern processing and export sector in the country. These factors may have adversely affected the crustaceans and frozen fish's export potential for the top destinations as well as for SEA countries (Figure 9, Figure 10, Annex A: Figure A.5g and Figure A.5j, respectively).

Figure 9. Cambodia's export potential with top destinations in crustaceans



Source: United Nations (2017).
Note: Top destinations based on TE2015 exports; Kg = Kilograms, TE = Triennium ending average.

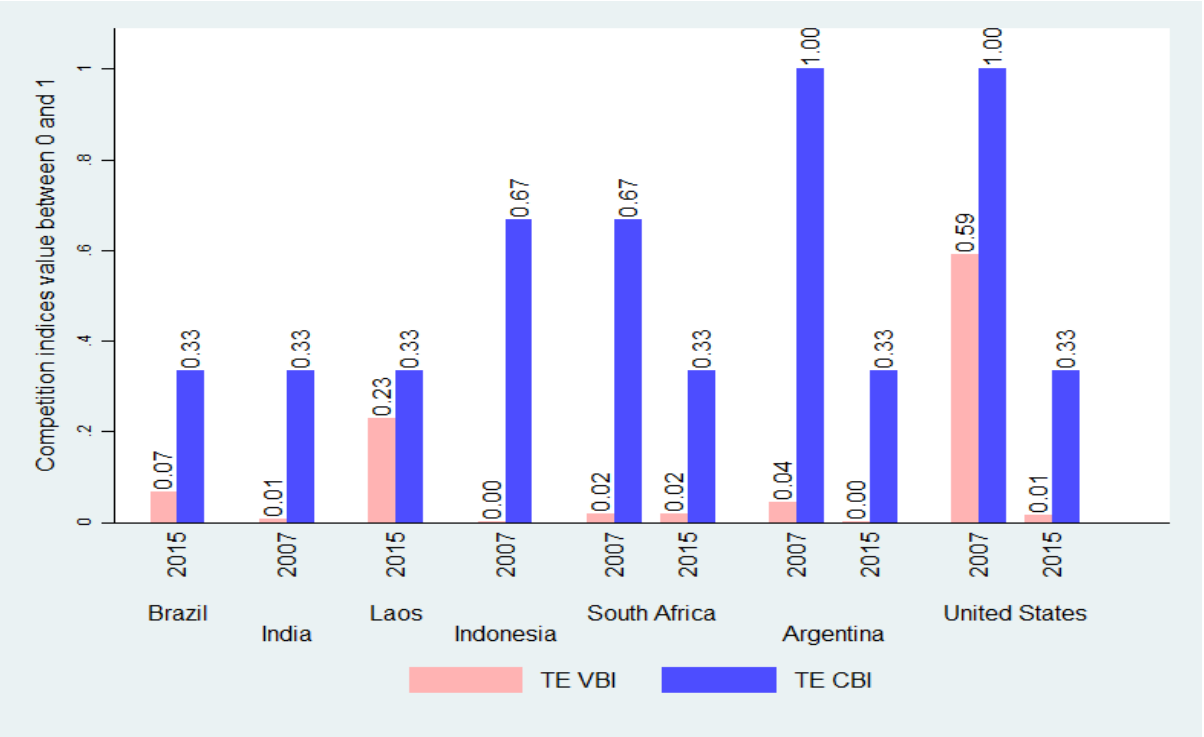
Figure 10. Cambodia's export potential with top destinations in frozen fish



Source: United Nations (2017).
Note: Top destinations based on decadal exports as Malaysia is the only country importing frozen fish from Cambodia in TE2015; Kg = Kilograms, Korea, Rep. = Republic of Korea; TE = Triennium ending average.

Like crustaceans and frozen fish, the exports and export potential of maize have not grown, particularly in SEA markets (Annex A: figure A.5i). This may be due to growing competition from South American countries such as Brazil and Argentina, whose maize's prices have fallen and become competitive in the main markets such as Thailand and Viet Nam (Figures 11 and 12; (Vo 2017)). Another reason for the fall in maize exports and export potential can be the stringent NTMs in Thailand, a major importer of Cambodian maize (Hai 2017).

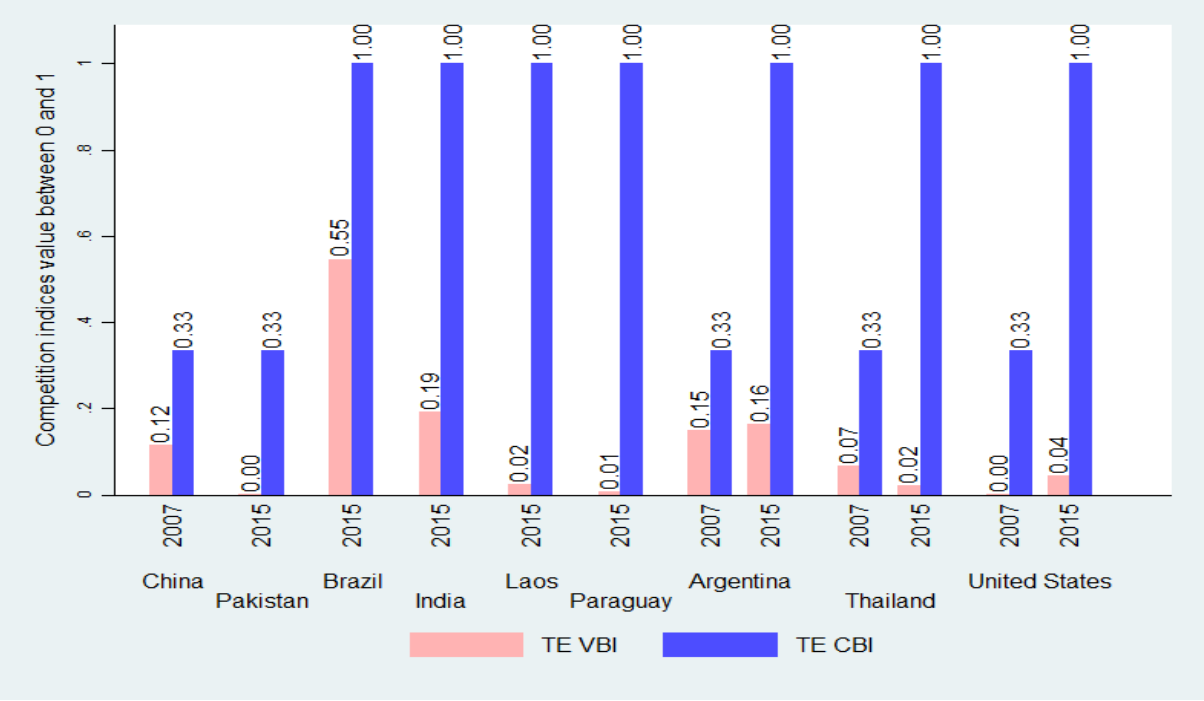
Figure 11. Cambodia's competition with other exporters of maize (corn, HS 1005) in Thailand



Source: United Nations (2017).

Note: 1) Triennium ending average (TE) is calculated for VBI and CBI. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) Value of competition indices = 0 means no competition.

Figure 12. Cambodia's competition with other exporters of maize (corn, HS 1005) in Viet Nam



Source: United Nations (2017).

Note: 1) Triennium ending average (TE) is calculated for VBI and CBI. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) Value of competition indices = 0 means no competition.

Finally, we list the products and ASEAN markets which Cambodia can consider exporting and diversifying. For these products and markets, Cambodia's export potential fluctuated throughout the period; however, Cambodia's competition with non-ASEAN countries either fell or remained constant. Further integration with ASEAN countries and lowering competition may help Cambodia in gaining market share for these exports. These products and markets are as follows:

1. Exports of "starches; inulin (HS 1108)" to Thailand
2. Exports of "maize (corn, HS 1005)" to Viet Nam

For other exports such as "rice," "manioc (cassava, HS 0714)," "molasses," and "pepper," Cambodia's competition is also falling, fluctuating, or both in the ASEAN markets; however, its competition is with other ASEAN countries. As the ASEAN Economic Community (AEC) is becoming a reality, Cambodia, along with other ASEAN countries, may benefit if they can integrate into the regional supply chains of these products and export to other common destinations.

VI. Quality Differentiation in Agricultural Exports of Cambodia

Recent literature suggests that firms earn different levels of income across different markets for the same product they export (Manova and Zhang 2012). This reflects quality variation in the same product exported by firms to different markets. In this relation, we calculate the deflated unit value of exports in each market to provide an idea about the quality differentiation and scope of moving up the value chains.

We derive deflated unit value to proxy the export price of a commodity by dividing the export value (deflated) by total quantity. Export price derived for 4-digit product is given as:

$$UV_g^{ijt} = \frac{Export\ Value_g^{ijt}}{Total\ Quantity_g^{ijt}} \quad (4)$$

where i is Cambodia, j is the destination country, and UV_g^{ijt} is the export price of Cambodia in country j in time t for product g. Export prices are calculated to draw broad conclusions regarding the quality of the products exported to different and common destinations by Cambodia.

Note that unit values are computed at an aggregate level and can differ from the firm level export prices. While calculating average prices, we identified and removed outliers by classifying them into two groups: i) Reporter, Product, and Time; and ii) Reporter, Product, and Partner. Before we explore the trends in the unit values of Cambodia's top exports to top destinations, we provide an outline of trends in the unit values of agricultural exports to SEA countries in Table 8.

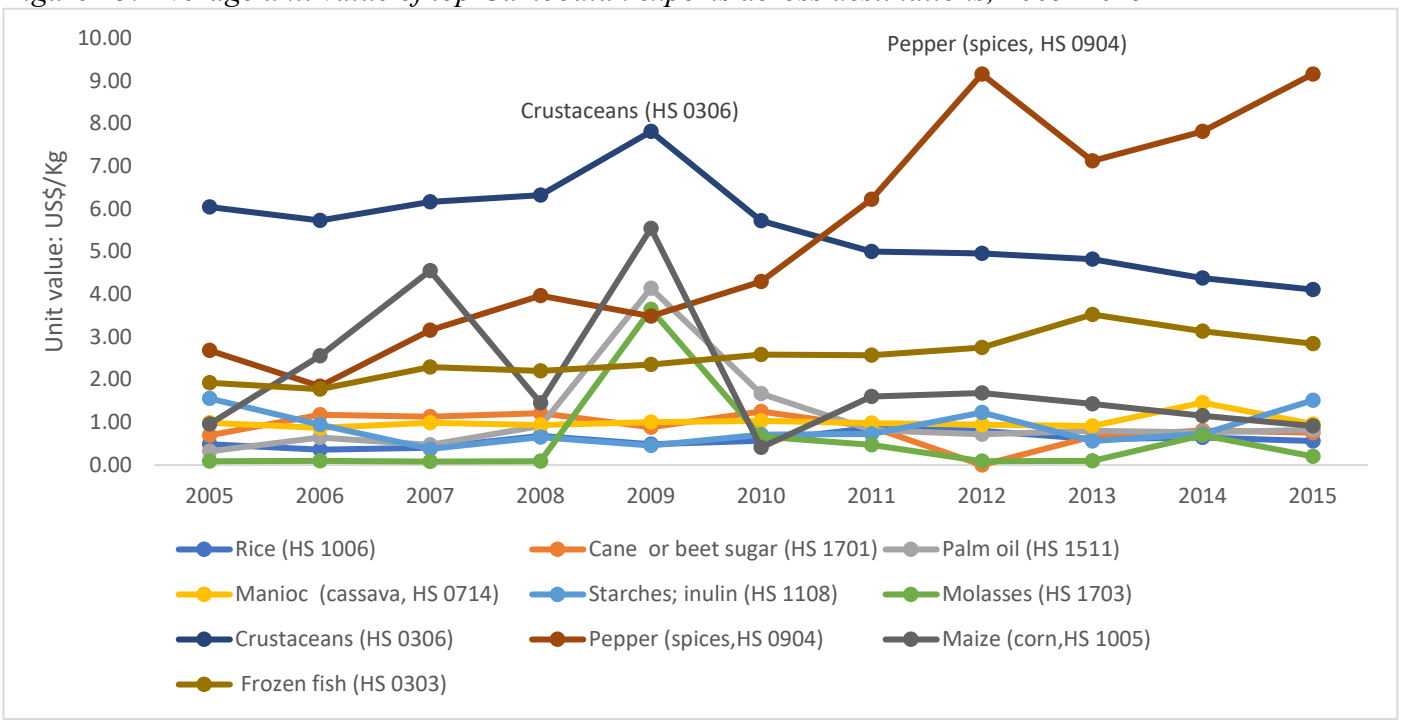
Table 8. Trends in the unit value of Cambodia's top commodities exports to SEA countries

Products	Brunei	Indonesia	Malaysia	Philippines	Singapore	Thailand	Viet Nam
Rice (HS 1006)	±	±	−	±	−	±	±
Cane or beet sugar (HS 1701)		−					−
Palm oil (HS 1511)		−			+	±	−
Manioc (cassava, HS 0714)						±	±
Starches; inulin (HS 1108)		−	±	±		±	±
Molasses (HS 1703)						±	±
Crustaceans (HS 0306)						−	±
Pepper (spices, HS 0904)			±		±	−	±
Maize (HS 1005)						±	±
Frozen fish (HS 0303)			−				−

Source: United Nations (2017).
Note: SEA = Southeast Asian countries. 1) "±" means export potential is fluctuating, "+" means export potential is rising, and "–" means export potential is falling. 2) Fluctuating means that there was no clear pattern whether export potential was increasing or decreasing throughout the period under review. 3) Data for Lao PDR and Myanmar was not available.

Table 8 shows that the trends in the unit value of almost all the top exports of Cambodia are either fluctuating or falling in the ASEAN markets. Among the top commodities, the unit value of pepper and crustaceans is higher; however, the unit value of crustaceans has been falling since 2009 (Figure 13).

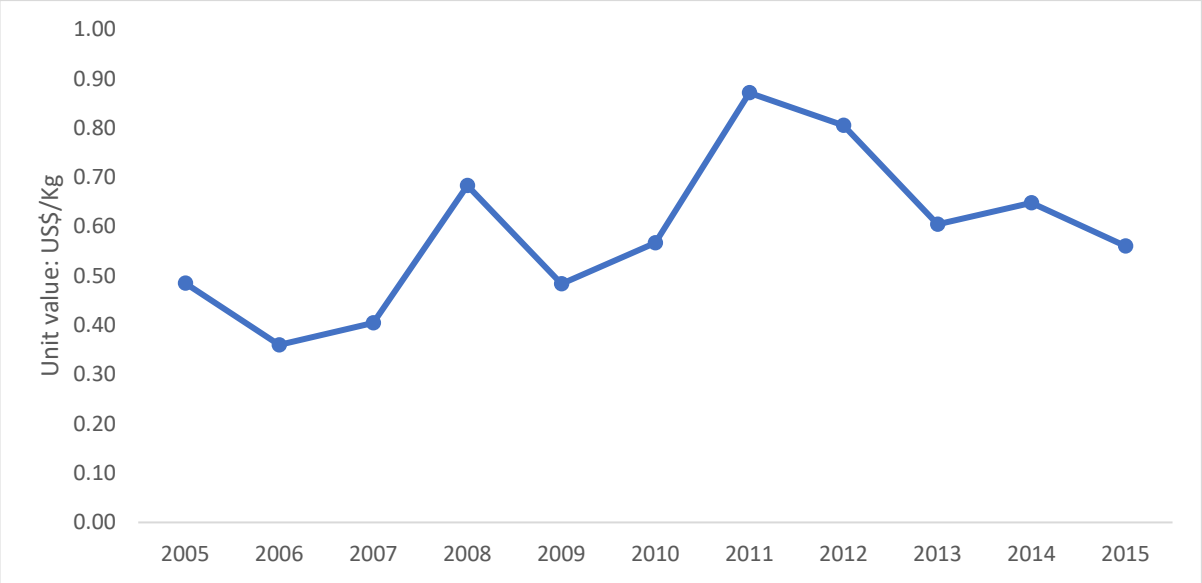
Figure 13: Average unit value of top Cambodian exports across destinations, 2005–2015



Source: United Nations (2017).
Note: Kg = Kilograms.

Similar to crustaceans, the unit value of rice, which covers around 70 percent of the agricultural production in Cambodia, has been declining since 2011 (Figure 14). In ASEAN + 3, Malaysia and China are the major importers of Cambodian rice. In these markets, Cambodia realises the mean unit value of US$0.63/kilograms (Kg) and US$0.67/Kg, respectively; however, the unit value is declining in both the markets (Annex A: Figures 6a and 6b). The EBA program of the EU, and the policy support from the Cambodian government, have enabled the exports of fragrant rice varieties to the EU markets, where the mean unit value realization is greater than US$0.5/Kg (Annex A: Figure 6b).

Figure 14: Average unit value of Cambodian rice across destinations, 2005-2015



Source: United Nations (2017).
Note: Kg = Kilograms.

In the case of cane or beet sugar, the major destinations of Cambodia are: Viet Nam, Bulgaria, and the United Kingdom, and the unit-value realizations from these countries are US$1.00/Kg, US$0.55/Kg and US$0.59/Kg, respectively (Annex A: Table A5.2, Figure 7b). The unit values of cane or beet sugar exports are declining in Bulgaria and Viet Nam and increasing in the United Kingdom after 2010 (Annex A: Figure A.7a). Malaysia, which accounts for around 1 percent of the total exports of cane or beet sugar, have expressed highest unit value among all the destinations (US$1.87/Kg). Even though the export data is for only two years for Malaysia, the unit value is significantly higher than in other markets.

Palm oil from Cambodia has found major markets in Malaysia, Switzerland, the Republic of Korea, India, and Pakistan (Annex A: Table A5.3). Mong Reththy Investment Cambodia Oil Palm Co., Ltd. (MRICOP) is actively investing in oil palm plantations in Cambodia and exporting mainly crude palm oil to these countries. Some companies from Malaysia, Thailand, and China also invest in Cambodia's oil palm plantation under an Economic Land Concession (ELC) agreement (Forest Peoples Programme 2011). The mean unit value of palm oil exports is highest in Switzerland (US$0.77/Kg), followed by Thailand (US$0.66/Kg), India (US$0.62/Kg) and Italy (US$0.60/Kg) (Annex A: Figure 8b). Although the unit value is high in Switzerland, it has been fluctuating since 2010 whereas the unit value realisation is increasing in markets like India (Annex A: Figure 8a).

SEA countries are potential markets for Cambodia; however, the unit value realisations for Cambodia's exports are low in these countries. For example, manioc (cassava, HS 0714) is the second major commodity after rice, which is mainly produced by the smallholders in Cambodia, serving as a key source of dietary energy and a potential raw material for industrial starch production (Wenjun et al. 2016). Thailand and Viet Nam have a higher share in the Cambodian exports of cassava among SEA countries (Annex A: Table A6.4), and the mean unit value realization from these countries is less than US$0.30/Kg (Annex A: figure 9b). Similarly, for China, which constitutes around 80 percent of Cambodia's total exports of cassava, the mean unit value realisation is US$0.32/Kg. The Cambodian cassava exporters are encountering difficulties in China such as inability to meet SPS requirements, insufficient cassava quality, and bottlenecks in transportation, which may explain the lower unit-value realisation from China (Ministry of Commerce 2014). Another reason for low unit-value realisation can be the export of unprocessed cassava to these markets, and hence, there is a need for value addition in the form of the processing of cassava to starch, ethanol, etc. to harness export potential (Ministry of Commerce 2014).

The Cambodian pepper (spices; HS 0904) exports are mainly concentrated to Singapore, France and Viet Nam (Annex A: Table A5.8). Unlike other commodities, the pepper fetches a high premium in ASEAN markets with a mean unit value realisation of around US$5.0 to US$7.5/Kg (Annex A: Figure 12b). The Cambodian pepper variety "Kampot Pepper," which is known for strong pungency, also having geographical indication, gets a premium in the overseas markets. The mean unit value of exports from New Zealand, Switzerland, Australia, Germany, and France is higher, even though their import share is lower as compared to the ASEAN countries. This provides an opportunity for Cambodia to concentrate its exports to developed economies to earn a higher price for its pepper.

Major destinations for Cambodian maize are regional markets such as Thailand and Viet Nam, where maize is mainly used as animal feed. Thailand impose numerous NTMs on feed maize. These NTMs inevitably limit exporters' capacity to trade freely, even under the framework of the ASEAN Free Trade Agreement (UNESCAP 2017). In recent years, Viet Nam has become an important destination for Cambodian maize with a mean unit value realization of US$0.23/Kg (Annex A: Table A6.9, Figure 13b).

The fisheries sector, which includes both marine and inland fish, is an important food source in Cambodia. The majority of the fish produced are consumed domestically, and fish contributes around 70 to 75 percent of the protein in the national diet (Thomas et al. 2013). The low volume of fish exports, and the lack of government support for industrial fisheries, leads to volatile exports to the main destination markets (UNCTAD 2017). In the case of crustaceans, China is an important destination accounting for around 70 percent of total exports with the mean unit value realisation of US$4.22/Kg (Annex A: Table A5.7 and Figure 14b). The crustaceans' exports to ASEAN markets such as Thailand and Viet Nam receive comparatively low unit values of US$1.98/Kg and US$1.70/Kg, respectively, indicating the importance of further integration with the ASEAN countries.

Overall, Cambodia has the potential to realise a higher unit value for its export commodities, including cane or beet sugar, pepper, and crustaceans. Intensifying the integration process with

ASEAN and other regional trade partners will further enable Cambodia to export more of these products and receive higher prices for a unit export.

VII. Conclusions and Policy Implication

This analysis of Cambodia's market integration within ASEAN and beyond highlights the issue of the limited diversification of Cambodia's exports across products and markets. Such limited diversification has a major implication for risk mitigation in international markets. During the period under review, we observed that Cambodia exported to new markets and tried to adjust at the extensive margin; however, the country was unable to diversify its exports in terms of value. Cambodia also faces the challenges related to infrastructure, poor domestic supply, and financial constraints which limit its capacity to move up the value chains (Ministry of Commerce 2014).

Considering these issues, challenges, and our analysis, we propose the following policy recommendations:

1. "Competition Indices" and "Trade Potential" used in the analysis highlight potential products which can be the starting point for Cambodia to diversify its exports. These potential products are "maize (corn, HS 1005)," and "starches; inulin (HS 1108)," in which Cambodia's potentials for export are high and the intra-ASEAN competition is low.

   High export potential also exists for the traditional commodities such as "rice," "manioc (cassava, HS 0714)," "molasses," and "pepper;" however, for these exports, Cambodia faces high intra-ASEAN competition. As the AEC is becoming a reality, and with additional tariff reductions under the ASEAN Free Trade Agreement, Cambodia may explore opportunities to integrate with regional chains of production to reduce its competition and may also take advantage of easier access to larger markets in the region (Ministry of Commerce 2014).
2. Cambodia may also learn and adopt policies from the experience of Viet Nam. Following the introduction of "Doi Moi" reforms and Integrated Pest Management, Viet Nam witnessed a significant increase in total rice production and yield (JICA 2013). These reforms included the following:
   a. Dismantling the collective system and promoting family farming
   b. Abolishing administered prices
   c. Devaluing the exchange rate and exposing the agriculture sector to international prices

   Today, along with rice, Viet Nam is one of the largest exporters of coffee, cashew, and black pepper. In 1990, however, Viet Nam did not produce either coffee, cashew, or black pepper. Viet Nam increased the production and exports of these commodities by providing subsidies including value-added tax exemptions and marketing related assistance (Arita and Dyck 2014).
3. Market integration is an effective way of linking Cambodia's smallholders to ASEAN agricultural markets. It provides an opportunity to export more of its potential products and realise higher prices from ASEAN markets. Intensifying integration will ease the access to ASEAN markets, which will further facilitate increasing the unit value of exports of "cane or beet sugar," "pepper," and "crustaceans" in some of the ASEAN markets.

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Annexure A

Table A1. Top 10 agricultural products of Cambodia (based on decadal ranking)

Unit: Value (deflated) in million US$

Product code	Product description	Decadal exports	Product share (%)	Agricultural rank	Export value (TE 2007)	Export value (TE 2015)	CAGR (%)
1006	Rice (HS 1006)	995.16	65.40	1	2.44	234.93	76.94
1701	Cane or beet sugar (HS 1701)	104.18	6.85	2	0.04	28.98	130.00
1511	Palm oil (HS 1511)	93.30	6.13	3	1.05	12.07	35.72
0714	Manioc (cassava, HS 0714)	65.99	4.34	4	0.22	17.96	73.05
1108	Starches; inulin (HS 1108)	44.68	2.94	5	3.50	6.10	7.18
1703	Molasses (HS 1703)	18.06	1.19	8		5.81	
0306	Crustaceans (HS 0306)	16.88	1.11	10	3.39	0.57	-20.05
0904	Pepper (spices, HS 0904)	14.94	0.98	11	0.05	3.86	73.41
1005	Maize (corn, HS 1005)	12.04	0.79	12	1.43	0.28	-18.40
0303	Frozen fish (HS 0303)	11.52	0.76	13	1.89	0.00	-64.70
n.a.	Others agricultural exports	144.90	9.51	n.a.	6.15	18.28	14.60
	Total agricultural exports	**1521.65**					

Source: United Nations (2017).

Note: 1) Compounded annual growth rate (CAGR) is calculated from TE 2007 to TE 2015. 2) The agricultural ranks 6, 7, and 9 correspond to the exports of ethyl alcohol (HS 2207), ethyl alcohol (HS 2208), and mineral and aerated waters (HS 2202), respectively. Their export shares (product shares) in total agricultural exports are 2.6, 1.3, and 1.1, respectively. 3) TE = Triennium ending average. 4) n.a. = not applicable. 5) The significant growth in Cambodian exports between TE 2007 and TE 2015 may be due to "no trade restriction during the food price crisis," and "the high growth rate of 10 percent in gross agricultural production during 2002 to 2012 (World Bank 2015)."

Table A2. Top 10 destinations of Cambodia (based on decadal ranking)

Unit: Value (deflated) in million US$

Destinations	Decadal exports value	Country share (%)	Country ranking
France	225.69	14.83	1
Malaysia	195.19	12.83	2
China	161.75	10.63	3
Viet Nam	99.32	6.53	4
Poland	96.32	6.33	5
Netherlands	95.53	6.28	6
Thailand	78.92	5.19	7
United Kingdom	61.57	4.05	8
Bulgaria	35.71	2.35	9
Belgium	30.51	2.00	10
Total agricultural exports	**1521.65**		

Source: United Nations (2017).

Table A3. 1. Cambodia's decadal exports of rice (HS 1006) to markets

Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
France	1	223.21	22.43
Malaysia	2	146.02	14.67
Poland	3	96.21	9.67
China	4	94.94	9.54
Netherlands	5	79.38	7.98
Belgium	6	30.24	3.04
Germany	7	29.84	3.00
United Kingdom	8	27.31	2.74
Russian Federation	9	27.10	2.72
Italy	10	26.84	2.70
Total exports		**995.16**	

Source: United Nations (2017).

Table A3. 2. Cambodia's decadal exports of cane or beet sugar (HS 1701) to markets

Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
United Kingdom	1	33.74	32.38
Viet Nam	2	32.77	31.45
Bulgaria	3	27.91	26.79
Greece	4	2.85	2.73
Italy	5	2.32	2.23
China	6	1.63	1.56
Spain	7	1.29	1.23
Malaysia	8	0.55	0.53
Romania	9	0.34	0.33
Czech Republic	10	0.27	0.26
Total exports		**104.18**	

Source: United Nations (2017).

Table A3. 3. Cambodia's decadal exports of palm oil (HS 1511) to markets

Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
Malaysia	1	34.52	37.00
Switzerland	2	25.30	27.11
India	3	24.74	26.52
Korea, Rep.	4	3.05	3.27
Viet Nam	5	2.39	2.56
Pakistan	6	1.11	1.18
Swaziland	7	0.99	1.06
Japan	8	0.57	0.61
New Zealand	9	0.34	0.37
Singapore	10	0.13	0.14
Total exports		**93.30**	

Source: United Nations (2017).

Note: Korea, Rep. = Republic of Korea.

Table A3. 4. Cambodia's decadal exports of manioc (cassava, HS 0714) to markets

Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
China	1	47.42	71.86
Thailand	2	17.64	26.73
Viet Nam	3	0.90	1.36
Korea, Rep.	4	0.02	0.03
France	5	0.01	0.01
Hong Kong, China	6	0	0
Slovak Republic	7	0	0
Total exports		**65.99**	

Source: United Nations (2017).

Note: Korea, Rep. = Republic of Korea.

Table A3. 5. Cambodia's decadal exports of starches; inulin (HS 1108) to markets
Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
Viet Nam	1	23.17	51.86
China	2	9.88	22.11
Thailand	3	7.57	16.94
Malaysia	4	1.49	3.33
Indonesia	5	0.87	1.95
Italy	6	0.74	1.66
United States	7	0.21	0.46
France	8	0.16	0.35
Saudi Arabia	9	0.13	0.29
Philippines	10	0.13	0.29
Total exports		**44.68**	

Source: United Nations (2017).

Table A3. 6. Cambodia's decadal exports of molasses (HS 1703) to markets
Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
Thailand	1	12.55	69.47
Viet Nam	2	5.48	30.34
Japan	3	0.03	0.15
Australia	4	0.01	0.04
Total exports		**18.06**	

Source: United Nations (2017).

Table A3. 7. Cambodia's decadal exports of crustaceans (HS 0306) to markets
Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
United States	1	8.49	50.26
China	2	3.02	17.90
Japan	3	2.16	12.80
Hong Kong, China	4	1.81	10.72
Ethiopia	5	0.54	3.19
Korea, Rep.	6	0.40	2.39
Viet Nam	7	0.36	2.14
Thailand	8	0.06	0.34
Senegal	9	0.04	0.25
United Kingdom	10	0	0.02
Total exports		**16.88**	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea.

Table A3. 8. Cambodia's decadal exports of pepper (spices, HS 0904) to markets
Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
Singapore	1	10.29	68.88
Viet Nam	2	1.78	11.92
Thailand	3	1.22	8.16
France	4	0.92	6.18
Korea, Rep.	5	0.16	1.06
Germany	6	0.15	1.02
Netherlands	7	0.13	0.87
Japan	8	0.08	0.52
Switzerland	9	0.06	0.37
United States	10	0.04	0.28
Total exports		**14.94**	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea.

Table A3. 9. Cambodia's decadal exports of maize (corn, HS 1005) to markets
Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
Thailand	1	8.73	72.52
Viet Nam	2	3.20	26.62
Hong Kong, China	3	0.06	0.49
Korea, Rep.	4	0.02	0.21
Bangladesh	5	0.02	0.16
Total exports		**12.04**	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea.

Table A3. 10. Cambodia's decadal exports of frozen fish (HS 0303) to markets
Unit: Value (deflated) in million US$

Destinations	Rank	Export value	Destination's share in product exports (%)
United States	1	11.14	96.74
Australia	2	0.16	1.42
Viet Nam	3	0.07	0.63
Philippines	4	0.05	0.44
China	5	0.04	0.31
Cyprus	6	0.02	0.21
Korea, Rep.	7	0.02	0.20
Japan	8	0	0.02
Thailand	9	0	0.02
Malaysia	10	0	0.01
Total exports		**11.52**	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea.

Table A4. Cambodia exports to number of markets

Product	No. of destinations from 2005 to 2007	No. of destinations from 2013 to 2015
Rice (HS 1006)	19	78
Cane or beet sugar (HS 1701)	2	16
Palm oil (HS 1511)	7	7
Manioc (cassava, HS 0714)	4	5
Starches; inulin (HS 1108)	7	15
Molasses (HS 1703)		2
Crustaceans (HS 0306)	7	5
Pepper (spices, HS 0904)	6	11
Maize (corn, HS 1005)	2	3
Frozen fish (HS 0303)	8	1

Source: United Nations (2017).

Table A5. 1. Cambodia's exports of rice (HS 1006) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
France	1	18.21	25.11
Malaysia	2	15.29	40.25
China	3	12.62	0
Poland	4	9.28	0.09
Netherlands	5	8.66	7.47
Germany	6	3.45	0.16
Belgium	7	3.30	1.59
Italy	8	3.07	2.43
United Kingdom	9	2.89	
Gabon	10	2.78	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A5. 2. Cambodia's exports of cane or beet sugar (HS 1701) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
Viet Nam	1	37.69	
Bulgaria	2	31.90	
United Kingdom	3	19.67	
Greece	4	3.09	
Italy	5	2.67	
China	6	1.87	
Spain	7	1.44	
Malaysia	8	0.63	
Romania	9	0.40	
Czech Republic	10	0.31	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A5. 3. Cambodia's exports of palm oil (HS 1511) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
Malaysia	1	56.89	47.76
Switzerland	2	28.55	20.39
Korea, Rep.	3	8.42	
India	4	3.87	23.06
Pakistan	5	2.05	
Thailand	6	0.20	
Italy	7	0.02	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea; TE = Triennium ending average.

Table A5. 4. Cambodia's exports of manioc (cassava, HS 0714) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
China	1	79.93	0.27
Thailand	2	19.37	20.25
Viet Nam	3	0.68	79.33
France	4	0.02	
Slovak Republic	5	0	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A5. 5. Cambodia's exports of starches; inulin (HS 1108) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
China	1	45.72	0.75
Thailand	2	40.46	
Viet Nam	3	4.33	79.57
Italy	4	3.95	
United States	5	1.10	
France	6	0.79	
Korea, Rep.	7	0.50	0.02
India	8	0.42	
Malaysia	9	0.30	10.09
Lithuania	10	0.07	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea; TE = Triennium ending average.

Table A5. 6. Cambodia's exports of molasses (HS 1703) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
Thailand	1	68.89	
Viet Nam	2	31.11	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A5. 7. Cambodia's exports of crustaceans (HS 0306) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
China	1	70.12	1.81
Viet Nam	2	18.05	0.34
Hong Kong, China	3	6.17	8.65
Thailand	4	3.13	
Senegal	5	2.53	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A5. 8. Cambodia's exports of pepper (spices, HS 0904) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
Singapore	1	81.62	
France	2	5.91	1.21
Viet Nam	3	2.82	
Korea, Rep.	4	1.15	
Netherlands	5	1.06	
Germany	6	1.06	
Switzerland	7	0.36	
Japan	8	0.31	4.93
Australia	9	0.13	
New Zealand	10	0.05	

Source: United Nations (2017).
Note: Korea, Rep. = Republic of Korea; TE = Triennium ending average.

Table A5. 9. Cambodia's exports of maize (corn, HS 1005) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
Thailand	1	24.16	81.06
Viet Nam	2	9.61	0.08
Bangladesh	3	0.79	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A5. 10. Cambodia's exports of frozen fish (HS 0303) to markets

Destinations	Rank TE2015	% share in exports TE2015	% share in exports TE2007
Malaysia	1	100	

Source: United Nations (2017).
Note: TE = Triennium ending average.

Table A6. 1. Cambodia's exports of rice (HS 1006) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Malaysia	40.25	1	15.29	2
Singapore	0.61	10	1.34	15
Brunei			0.63	21
Indonesia	1.46	7	0.04	48
Philippines				
Thailand	0.13	15		
Viet Nam	0.03	18		
Total exports	**42.48**		**17.3**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 2. Cambodia's exports of cane or beet sugar (HS 1701) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Viet Nam			37.69	1
Malaysia			0.63	8
Total exports			**38.32**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 3. Cambodia's exports of palm oil (HS 1511) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Malaysia	47.76	1	56.89	1
Thailand			0.2	6
Singapore	4.14	4		
Viet Nam				
Total exports	**51.9**		**57.09**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 4. Cambodia's exports of manioc (cassava, HS 0714) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Thailand	20.25	2	19.37	2
Viet Nam	79.33	1	0.68	3
Total exports	**99.58**		**20.05**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 5. Cambodia's exports of starches; inulin (HS 1108) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Thailand			40.46	2
Viet Nam	79.57	1	4.33	3
Malaysia	10.09	2	0.3	9
Indonesia	8.3	3		
Philippines	1.22	4		
Total exports	**99.18**		**45.09**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 6. Cambodia's exports of molasses (HS 1703) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Thailand			68.89	1
Viet Nam			31.11	2
Total exports			**100**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 7. Cambodia's exports of crustaceans (HS 0306) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Viet Nam	0.34	6	18.05	2
Thailand			3.13	4
Indonesia	0	7		
Total exports	**0.34**		**21.18**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 8. Cambodia's exports of pepper (spices, HS 0904) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Singapore			81.62	1
Viet Nam			2.82	3
Malaysia				
Thailand	70.9	1		
Total exports	**70.9**		**84.44**	

Source: United Nations (2017).
Note: SEA = Southeast Asian countries; TE = Triennium ending average.

Table A6. 9. Cambodia's exports of maize (corn, HS 1005) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Thailand	81.06	1	24.16	1
Viet Nam	0.08	2	9.61	2
Total exports	**81.14**		**33.77**	

Source: United Nations (2017).
Note: SEA = Southeast Asia countries; TE = Triennium ending average.

Table A6. 10 Cambodia's exports of frozen fish (HS 0303) to SEA countries

Destinations	% share in exports TE2007	Rank TE2007	% share in exports TE2015	Rank TE2015
Malaysia			100	1
Indonesia	0	7		
Philippines				
Thailand	0.03	6		
Viet Nam	0.16	5		
Total exports	**0.19**		**100**	

Source: United Nations (2017).
Note: SEA = Southeast Asia countries; TE = Triennium ending average.

Figure A.1. Cambodia's competition with other exporters of palm oil in Malaysia

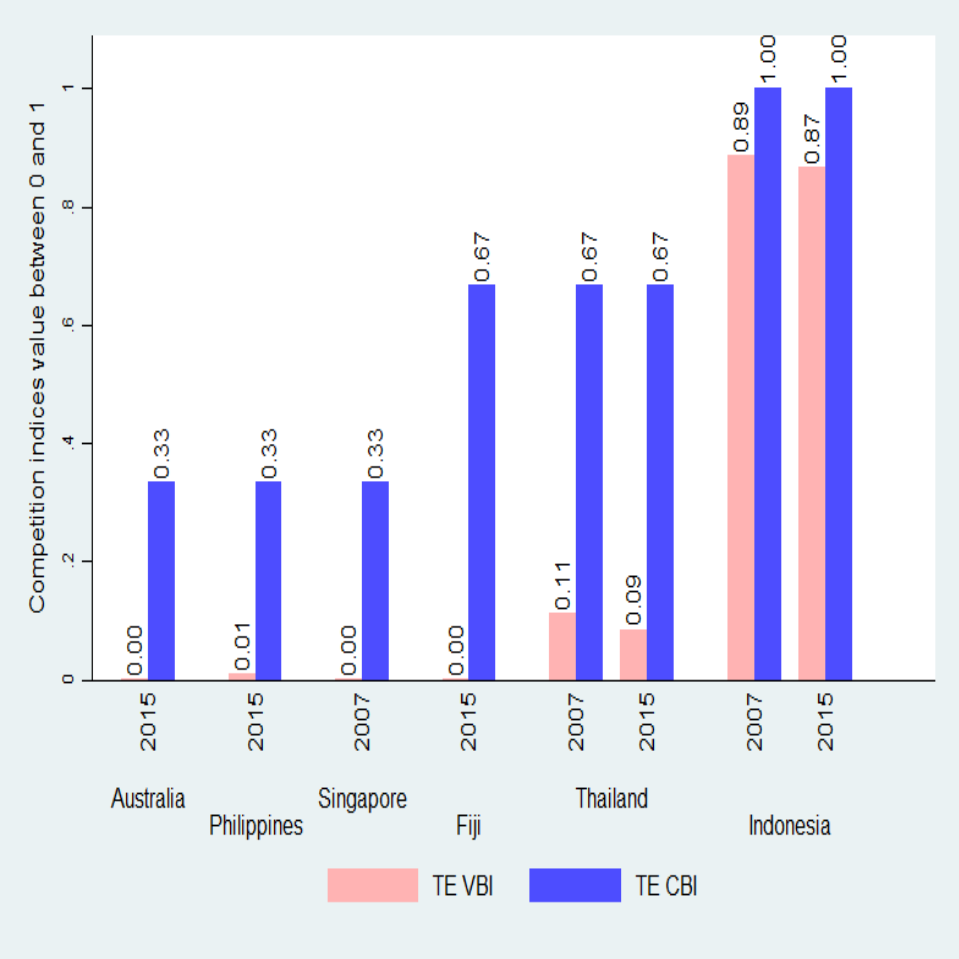
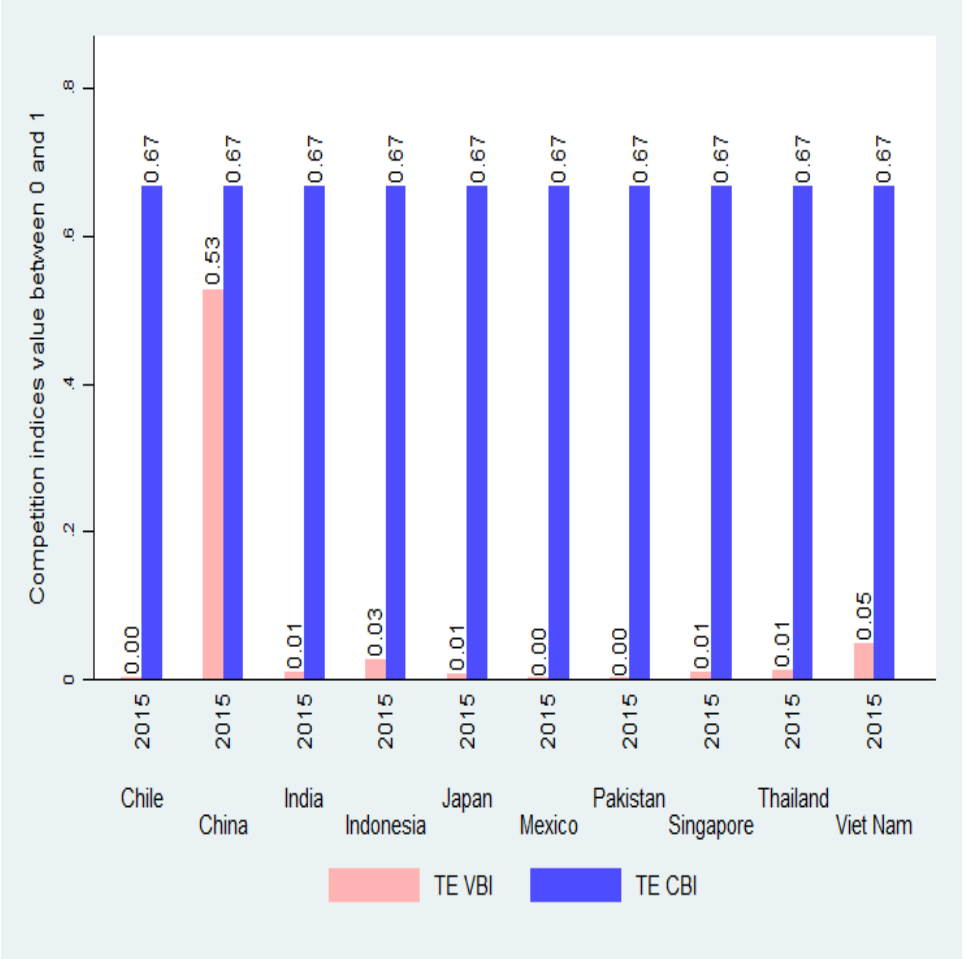


Figure A.2. Cambodia's competition with other exporters of frozen fish in Malaysia



Source: United Nations (2017).

Note: 1) Triennium ending average (TE) is calculated for VBI and CBI. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) Value of competition indices = 0 means no competition.

Figure A.3. Cambodia's competition with other exporters of pepper in Singapore

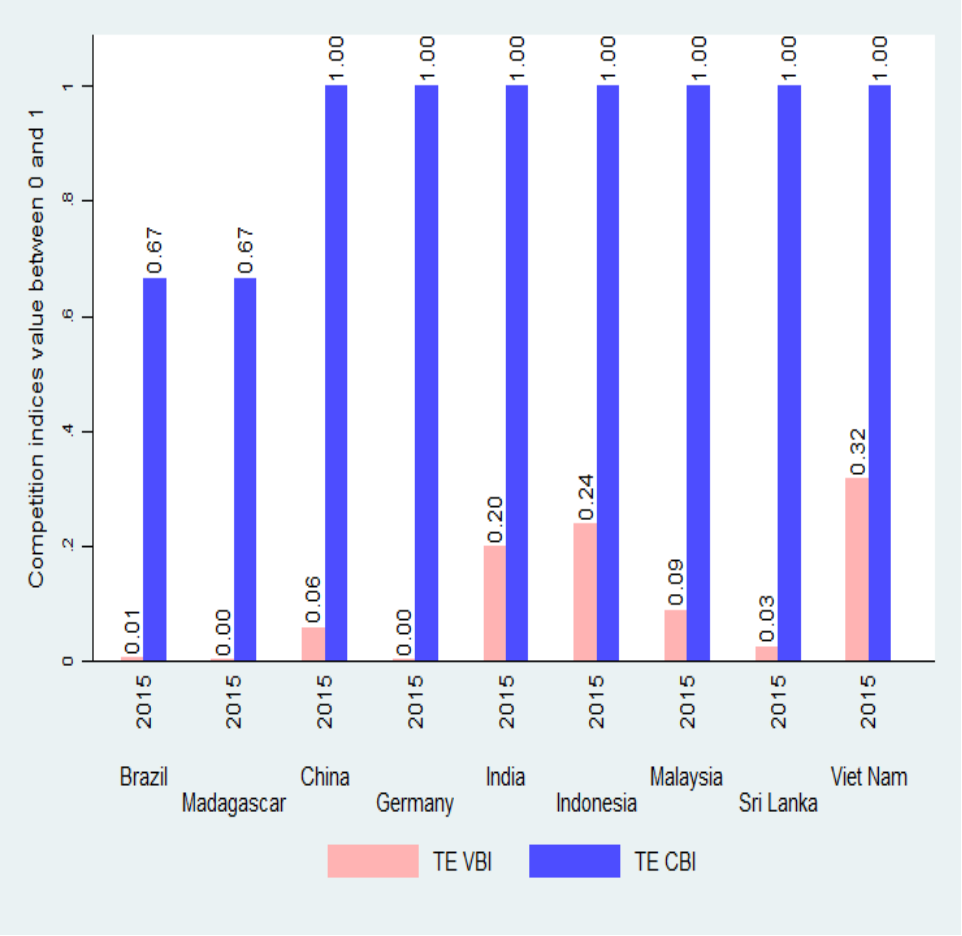
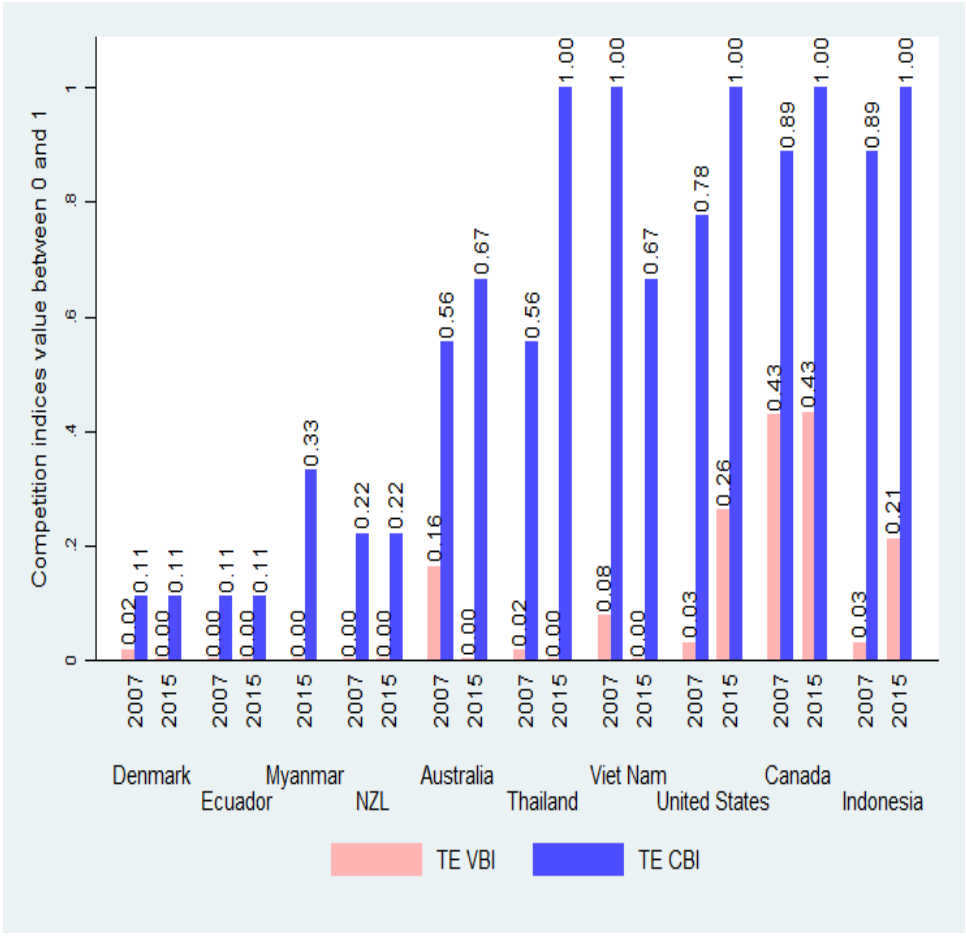


Figure A.4. Cambodia's competition with other exporters of crustaceans in China



Source: United Nations (2017).

Note: 1) Triennium ending average (TE) is calculated for VBI and CBI. 2) VBI stands for Value-Based Index and CBI stands for Count-Based Index. 3) NZL in figure A.4 stands for New Zealand. 4) Value of competition indices = 0 means no competition.

Figure A.5 Cambodia's export potential with ASEAN countries in top commodities

Figure A.5a Export potential in rice (HS 1006)

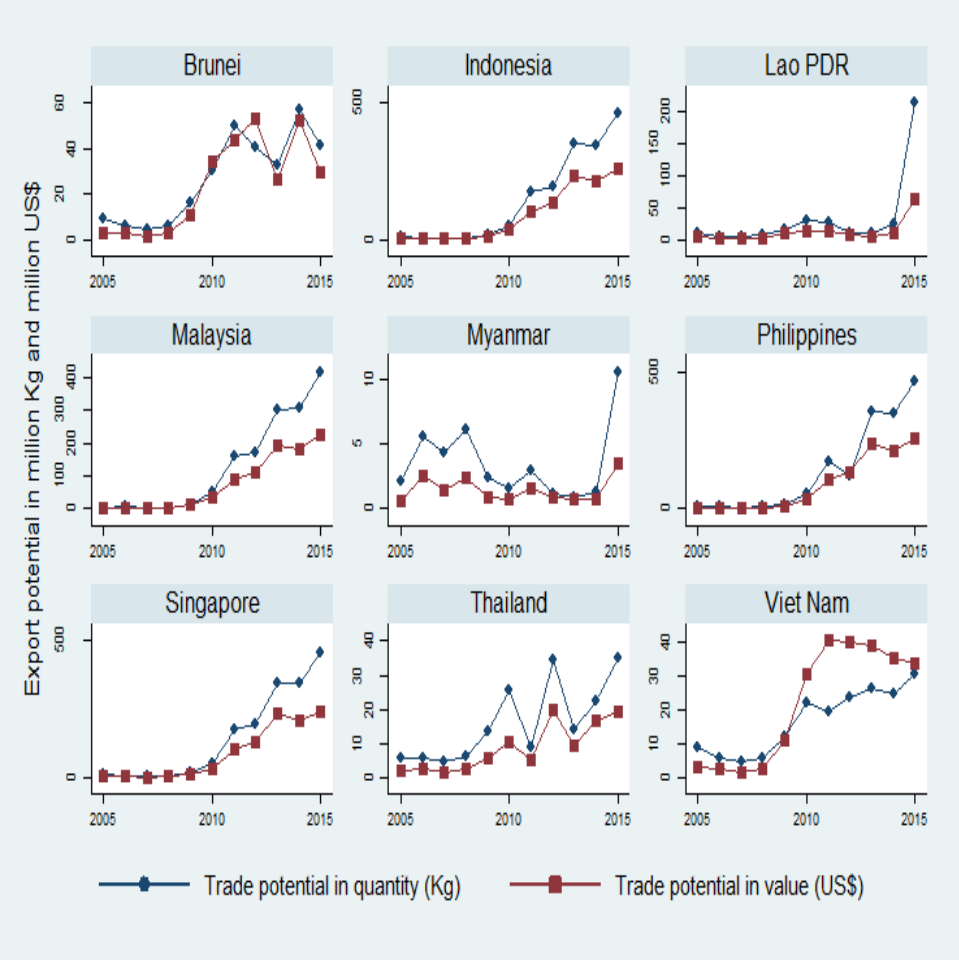
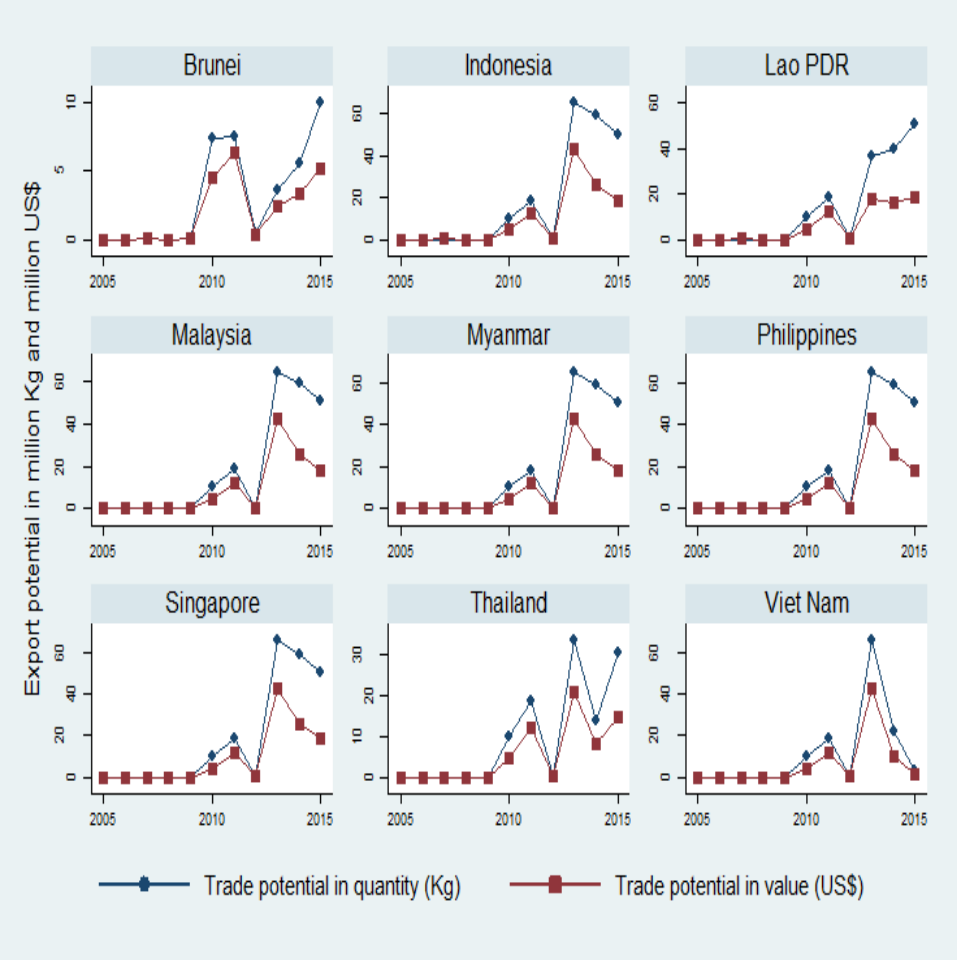


Figure A.5b Export potential in cane or beet sugar (HS 1701)



Source: United Nations (2017).
Note: ASEAN = Association of Southeast Asian Nations; Kg = Kilograms.

Figure A.5c Export potential in palm oil (HS 1511)

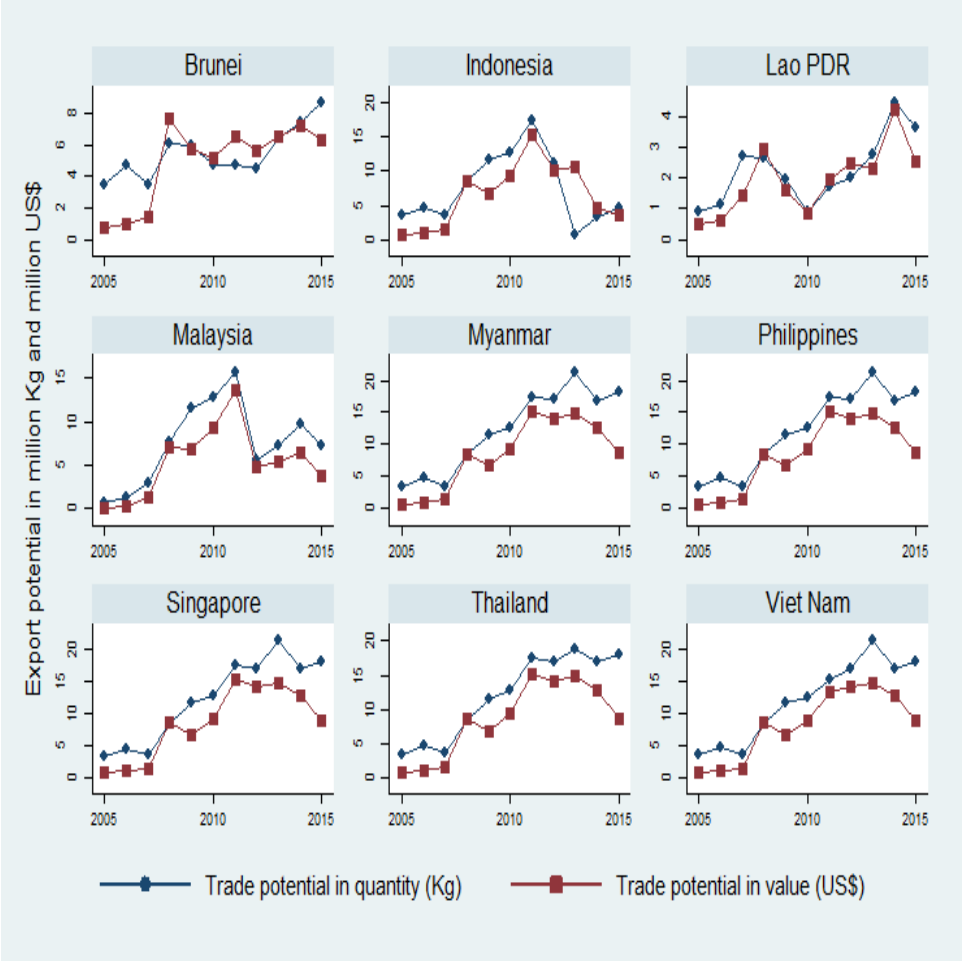
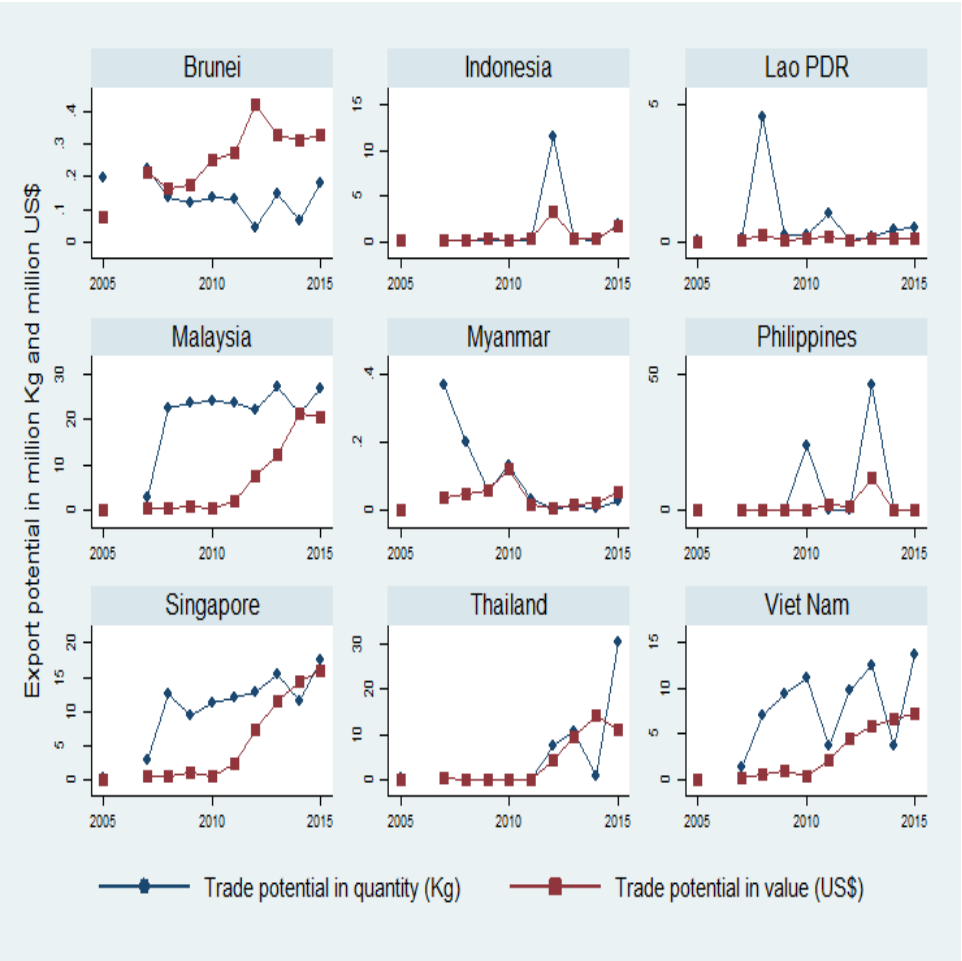


Figure A.5d Export potential in manioc (cassava, HS 0714)



Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.5e Export potential in starches; inulin (HS 1108)

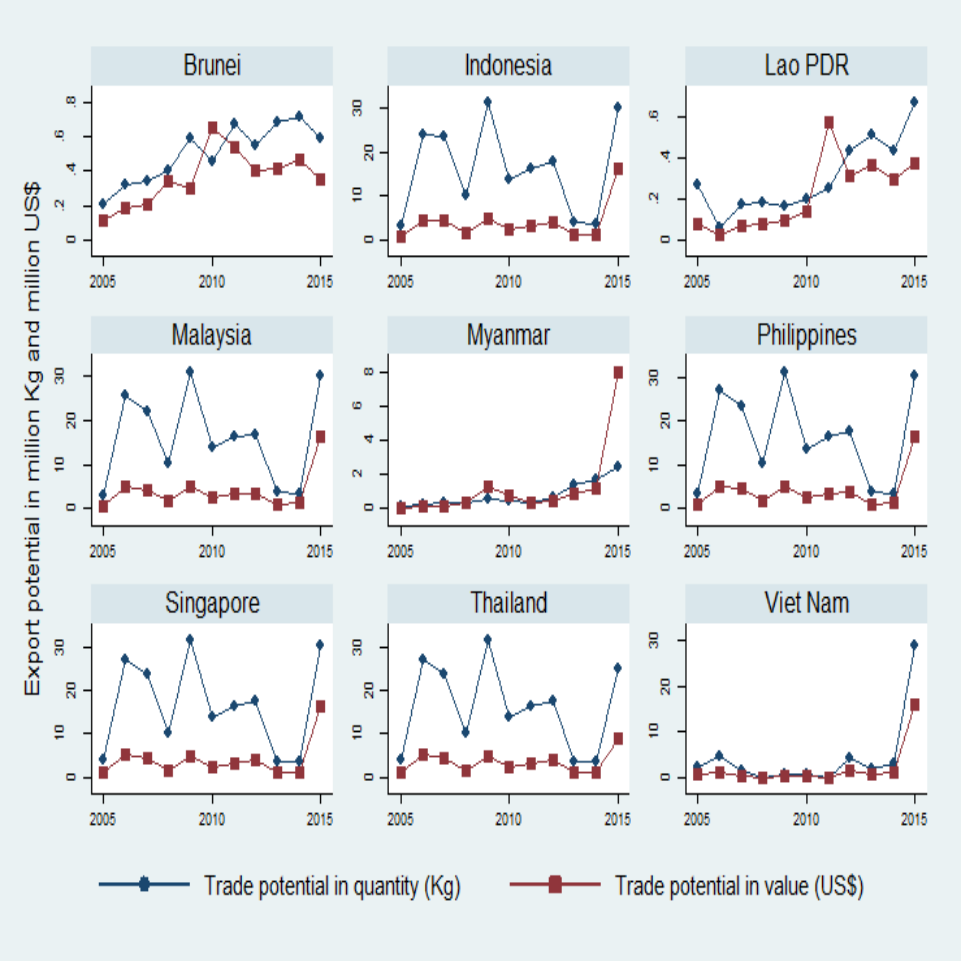
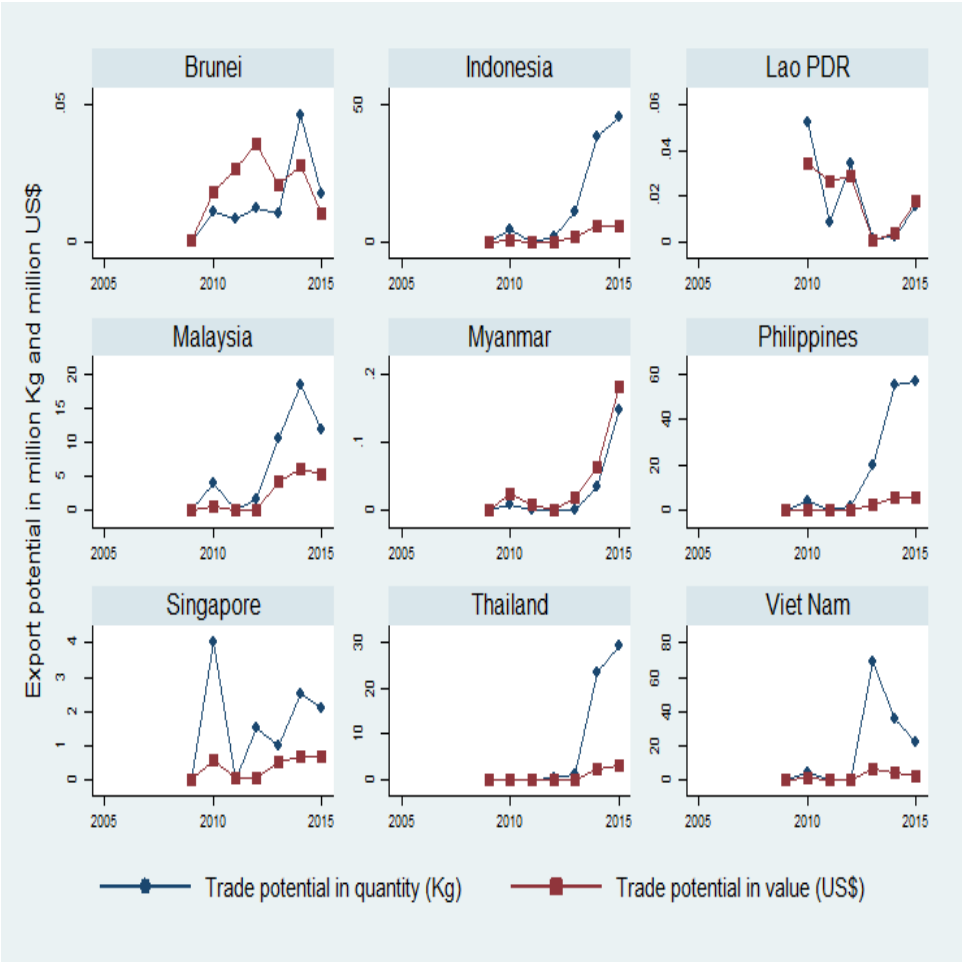


Figure A.5f Export potential in molasses (HS 1703)



Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.5g Export potential in crustaceans (HS 0306)

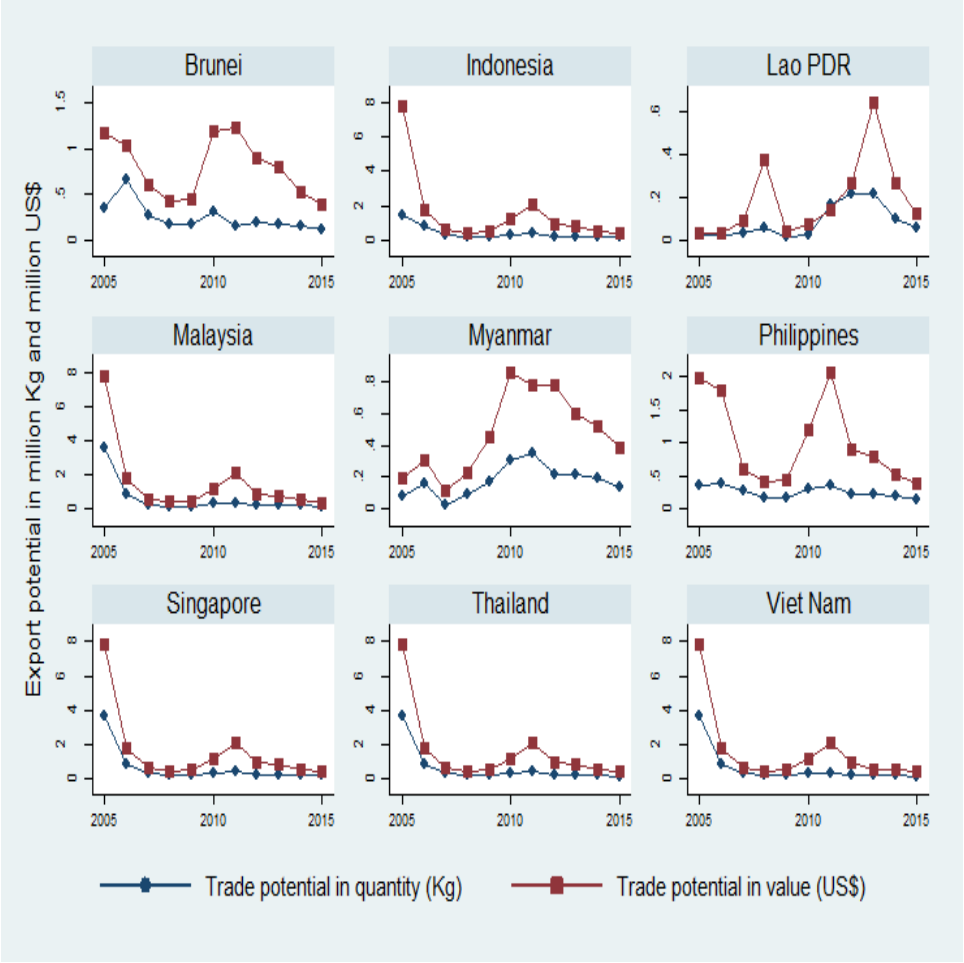
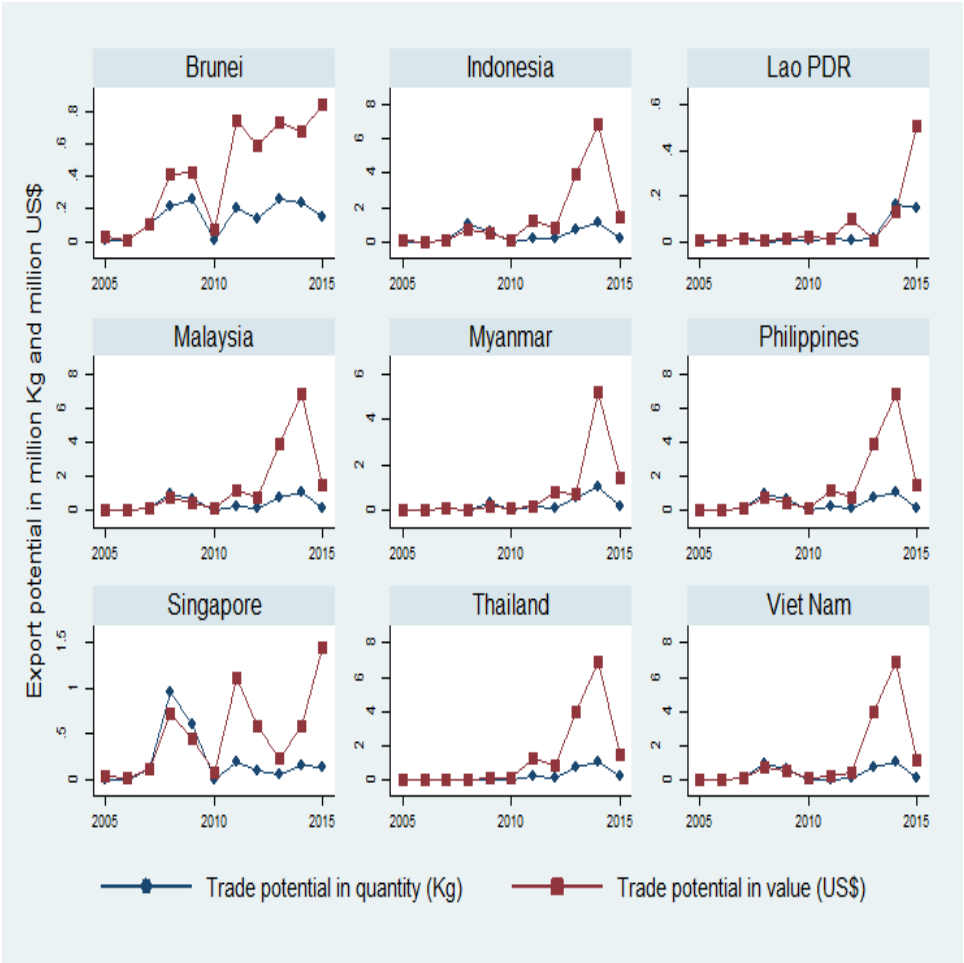


Figure A.5h Export potential in pepper (spices, HS 0904)



Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.5i Export potential in maize (corn, HS 1005)

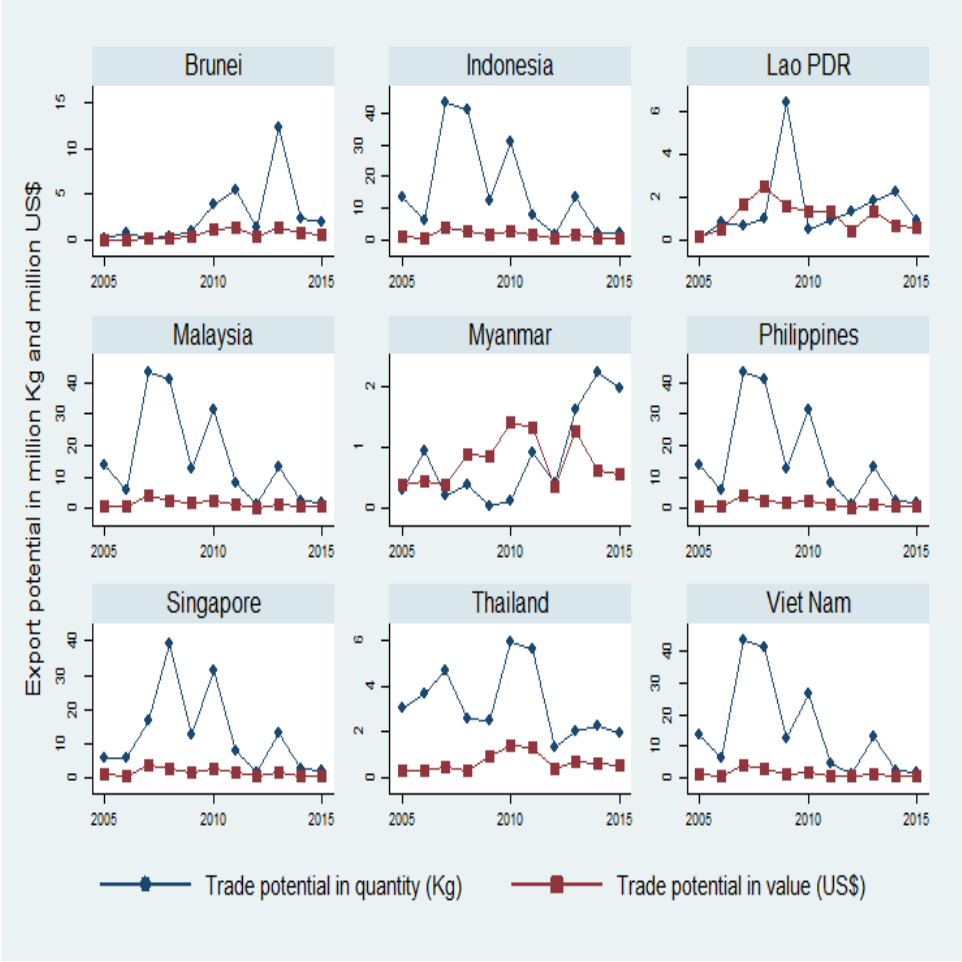
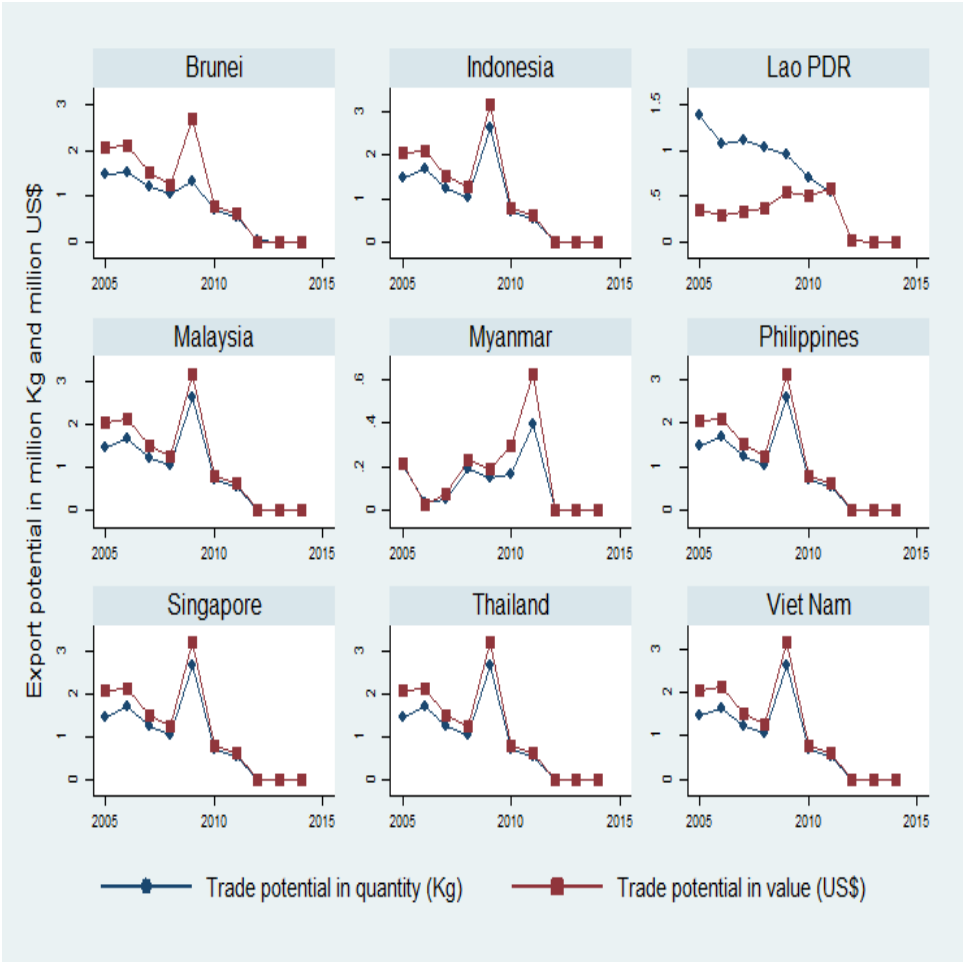
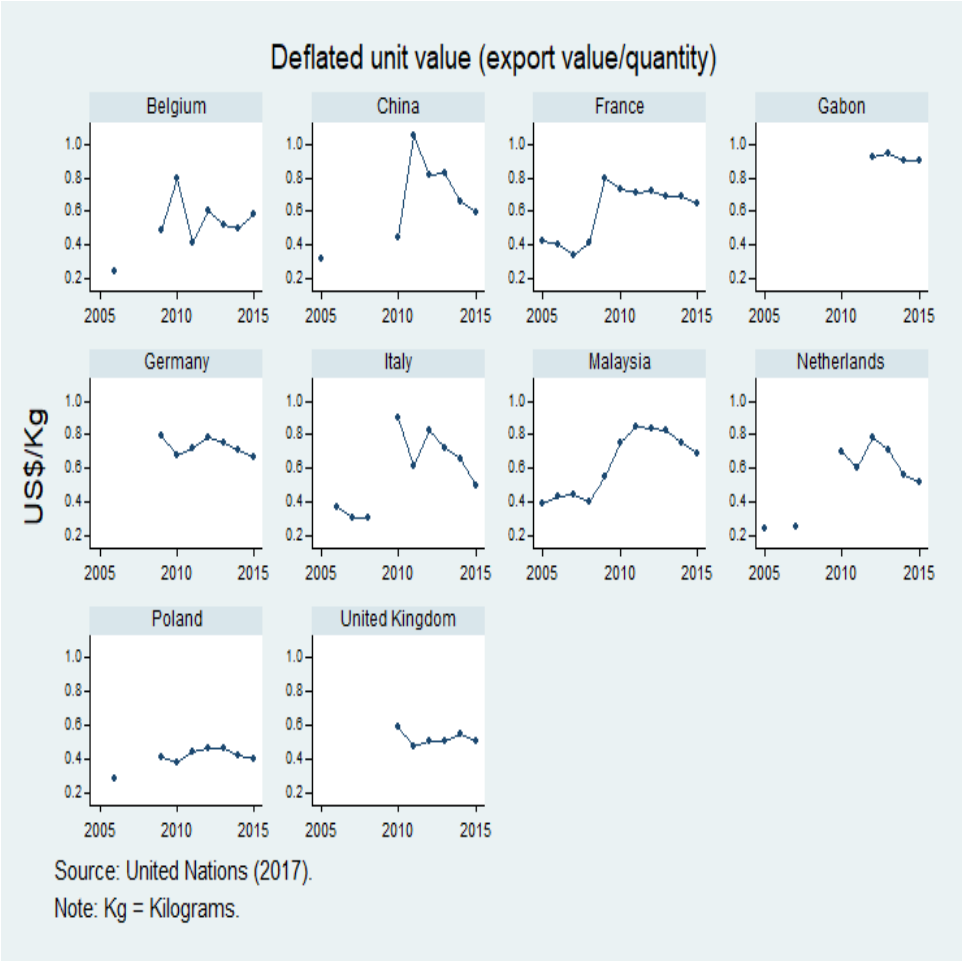


Figure A.5j Export potential in frozen fish (HS 0303)



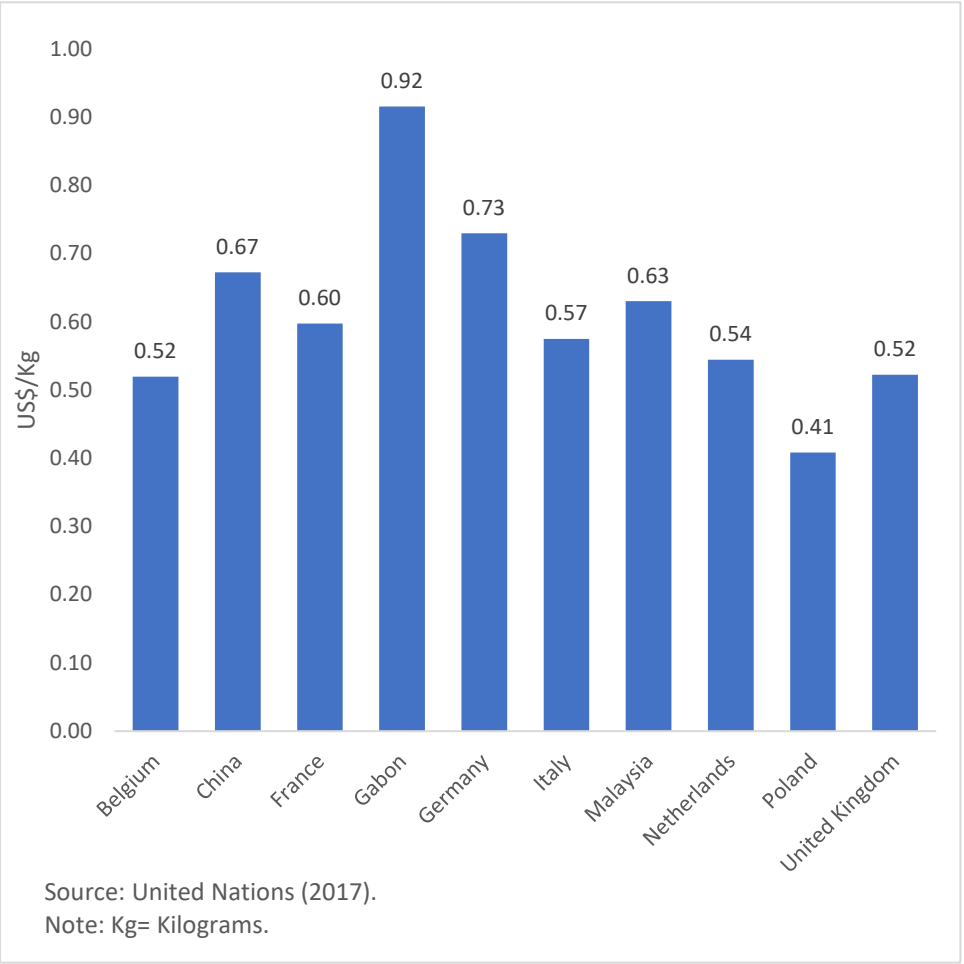
Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.6a): Trend of unit value of Cambodian rice (HS 1006) in top destinations



Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.6b): Mean unit value of Cambodian rice (HS 1006) in top destinations, 2005–2015



Source: United Nations (2017).
Note: Kg= Kilograms.

Figure A.7a): Trend of unit value of Cambodian cane or beet sugar (HS 1701) in top destinations

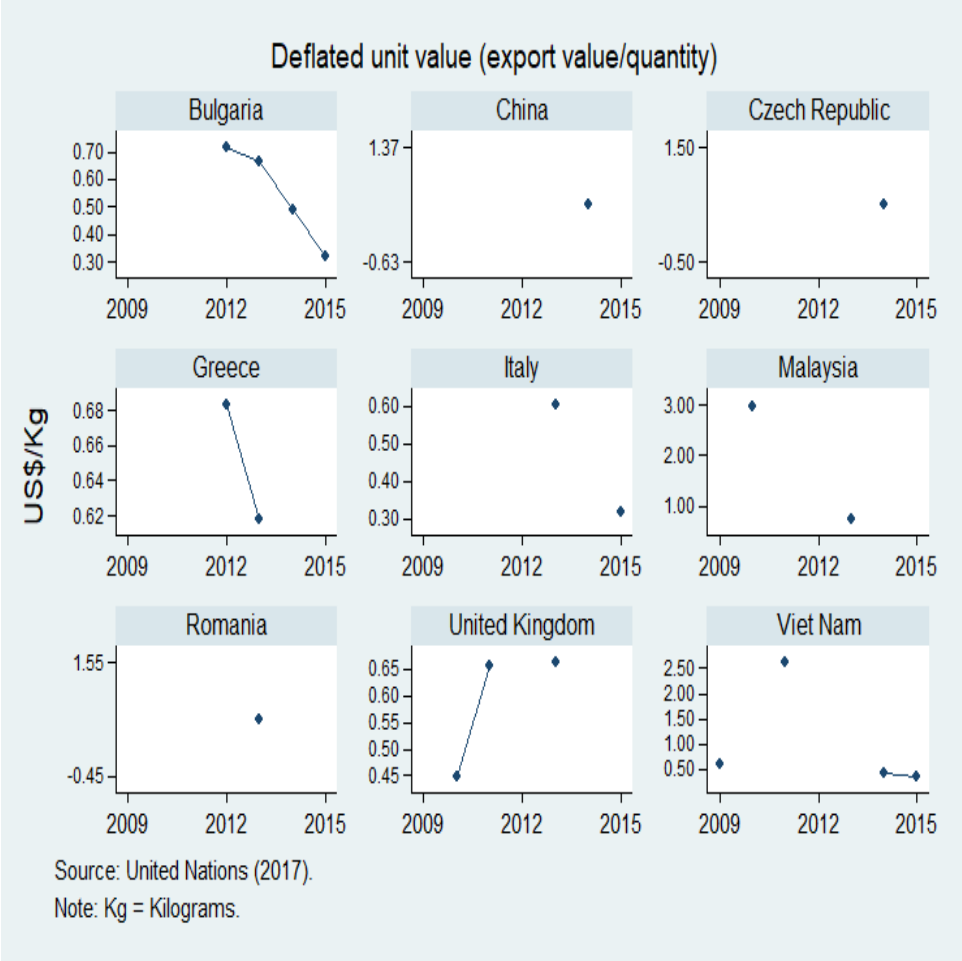


Figure A.7b): Mean unit value of Cambodian cane or beet sugar (HS 1701) in top destinations, 2005–2015

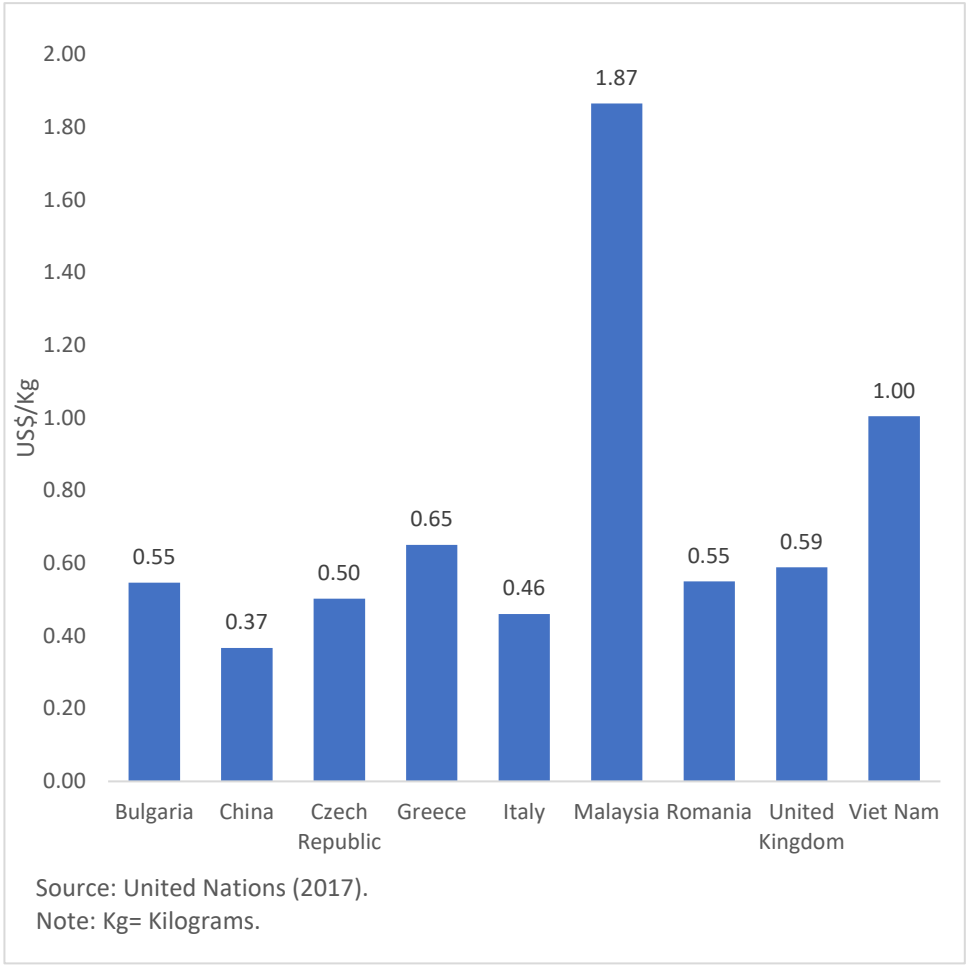
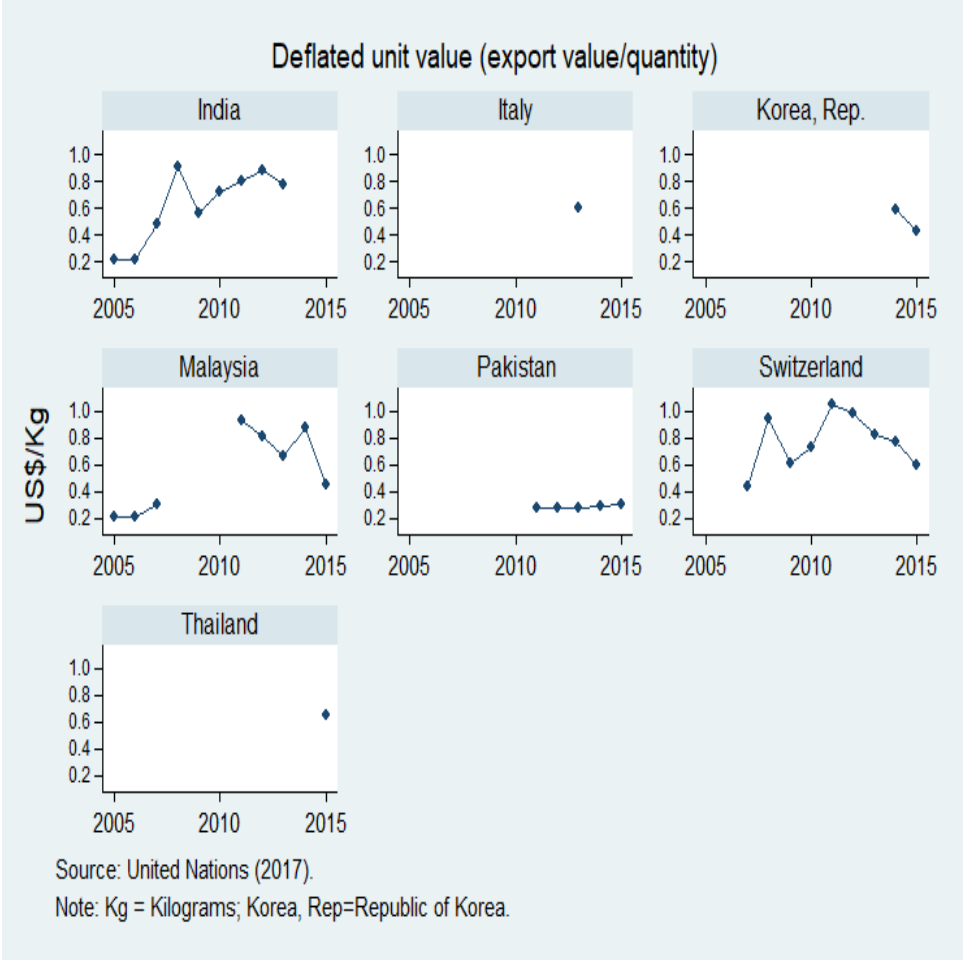


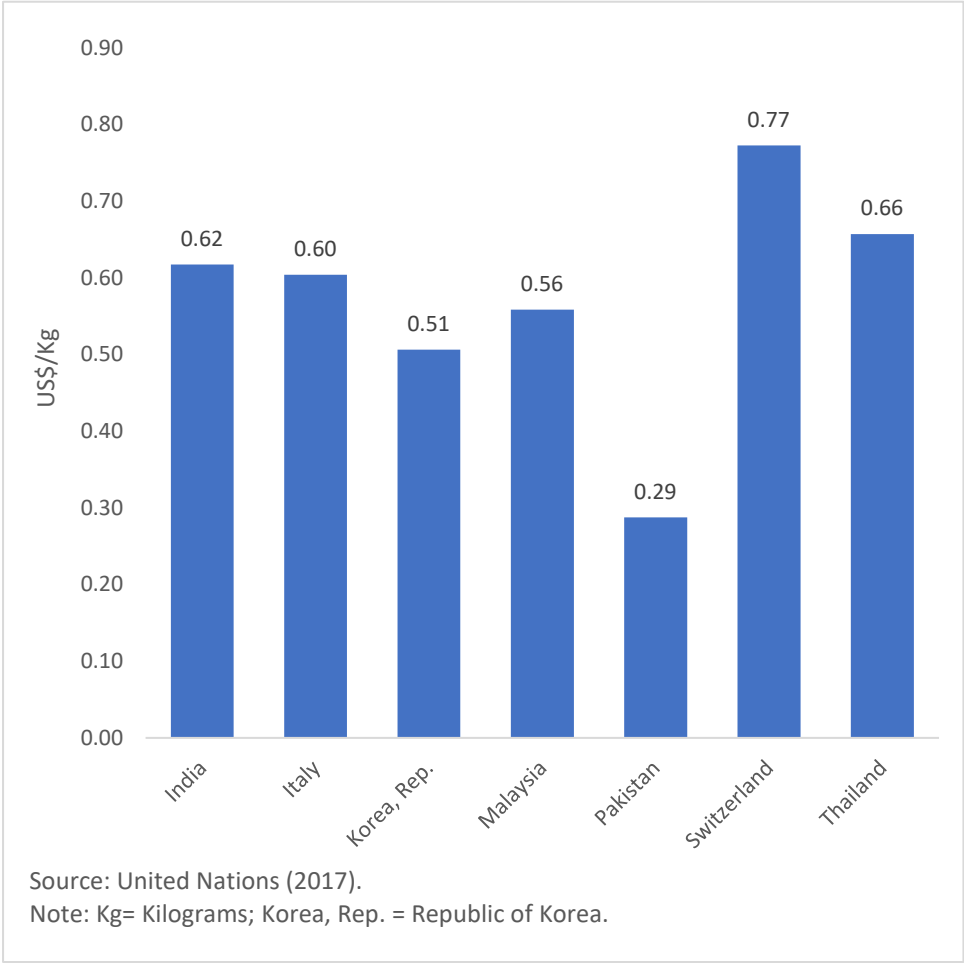
Figure A.8a): Trend of unit value of Cambodian palm oil (HS 1511) in top destinations



Source: United Nations (2017).

Note: Kg = Kilograms; Korea, Rep=Republic of Korea.

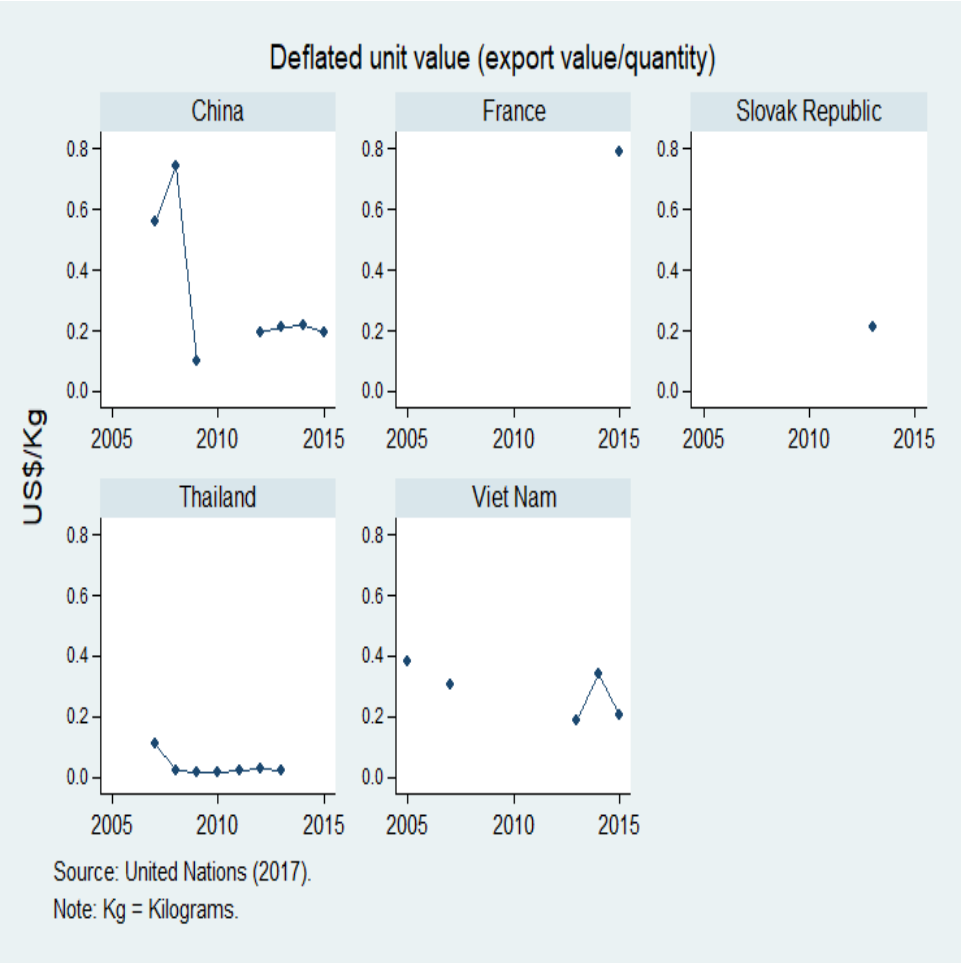
Figure A.8b): Mean unit value of Cambodian palm oil (HS 1511) in top destinations, 2005–2015



Source: United Nations (2017).

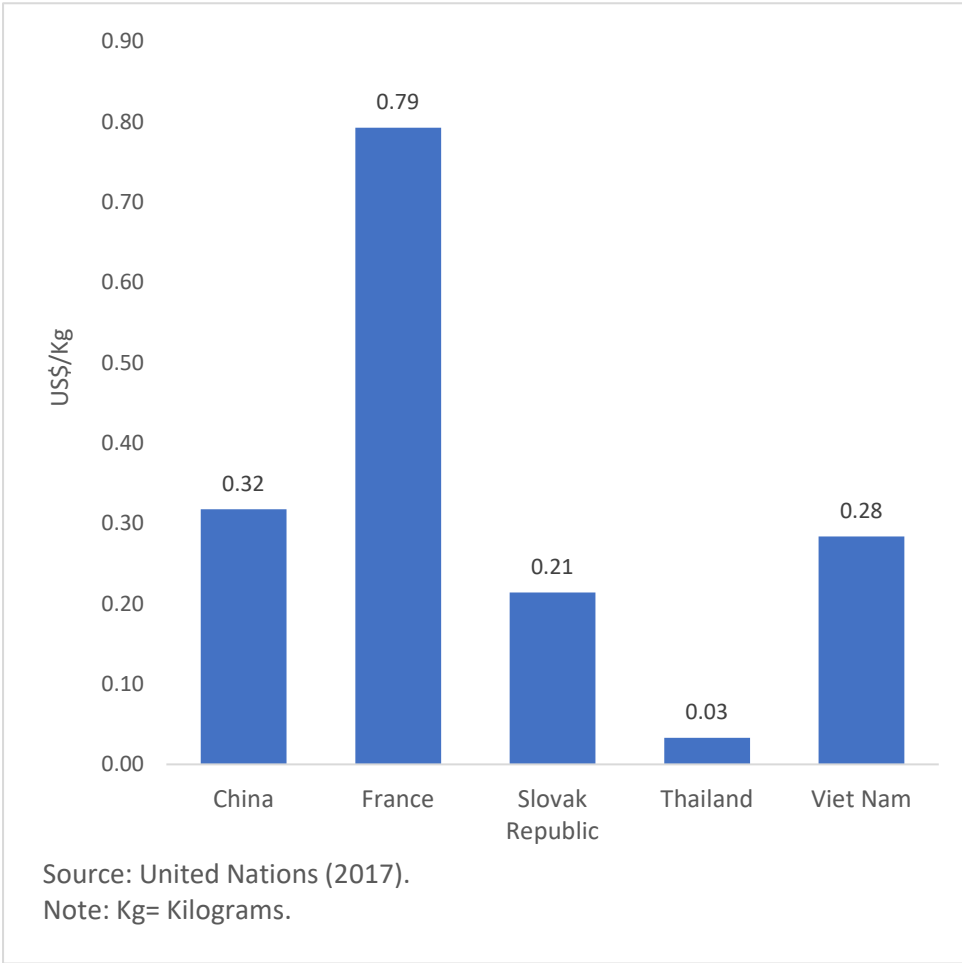
Note: Kg= Kilograms; Korea, Rep. = Republic of Korea.

Figure A.9a): Trend of unit value of Cambodian manioc (cassava, HS 0714) in top destinations



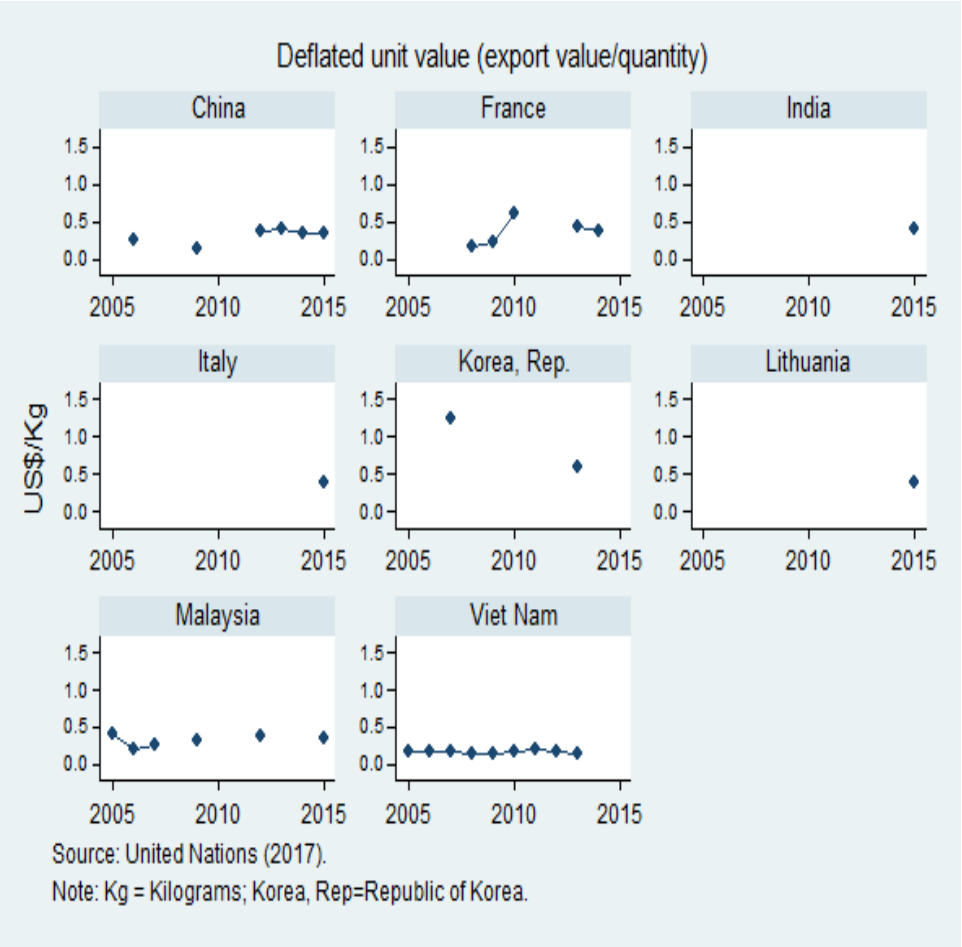
Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.9b): Mean unit value of Cambodian manioc (cassava, HS 0714) in top destinations, 2005-2015



Source: United Nations (2017).
Note: Kg= Kilograms.

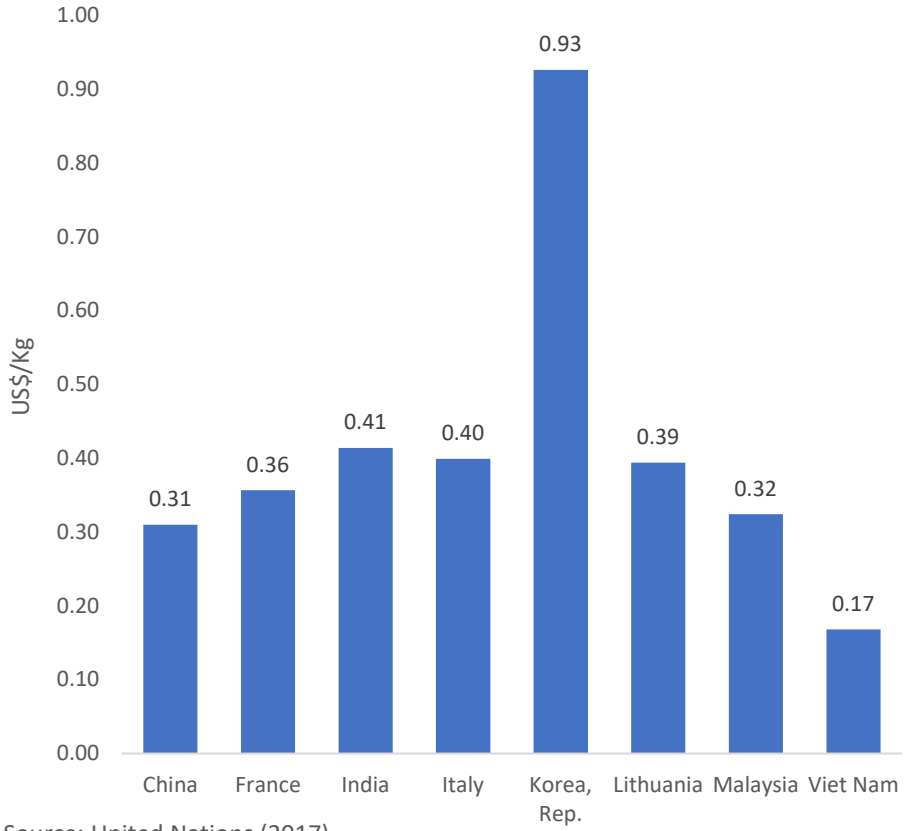
Figure A.10a): Trend of unit value of Cambodian starches; inulin (HS 1108) in top destinations



Source: United Nations (2017).

Note: Kg = Kilograms; Korea, Rep=Republic of Korea.

Figure A.10b): Mean unit value of Cambodian starches; inulin (HS 1108) in top destinations, 2005–2015



Source: United Nations (2017).

Note: Kg= Kilograms; Korea, Rep. = Republic of Korea.

Figure A.11a): Trend of unit value of Cambodian molasses (HS 1703) in top destinations

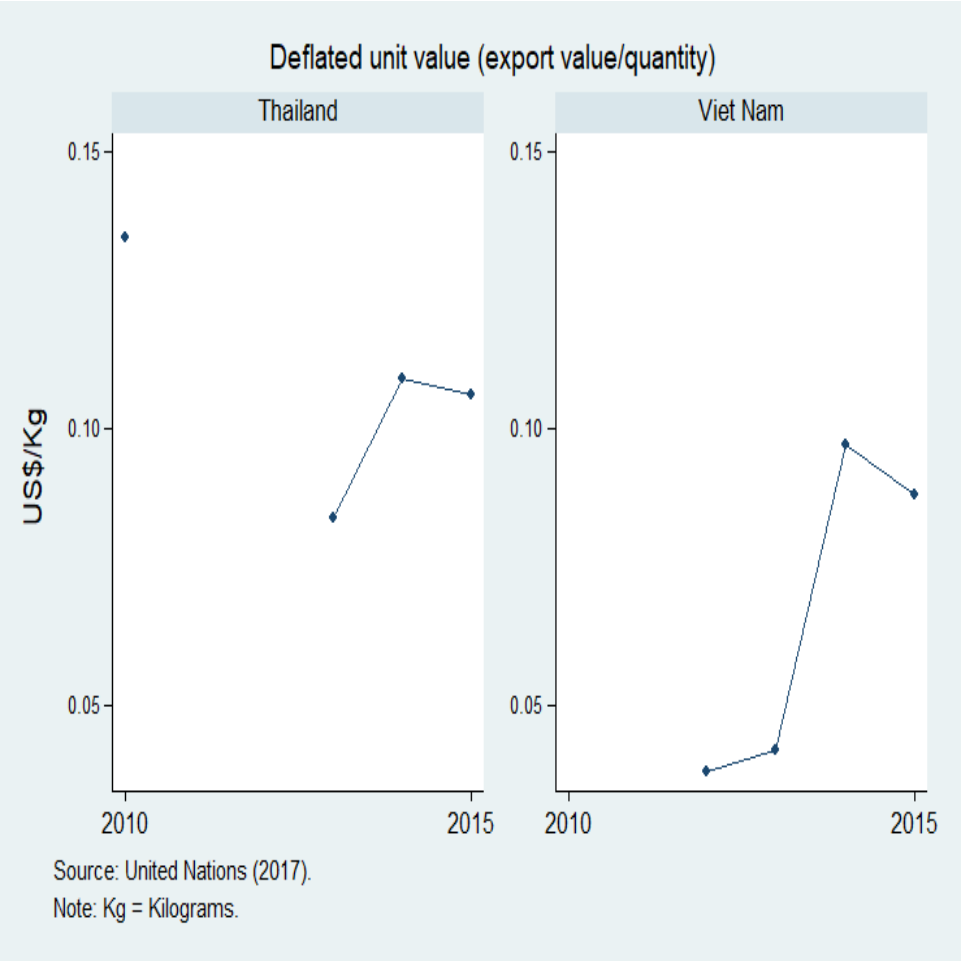


Figure A.11b): Mean unit value of Cambodian molasses (HS 1703) in top destinations, 2005–2015

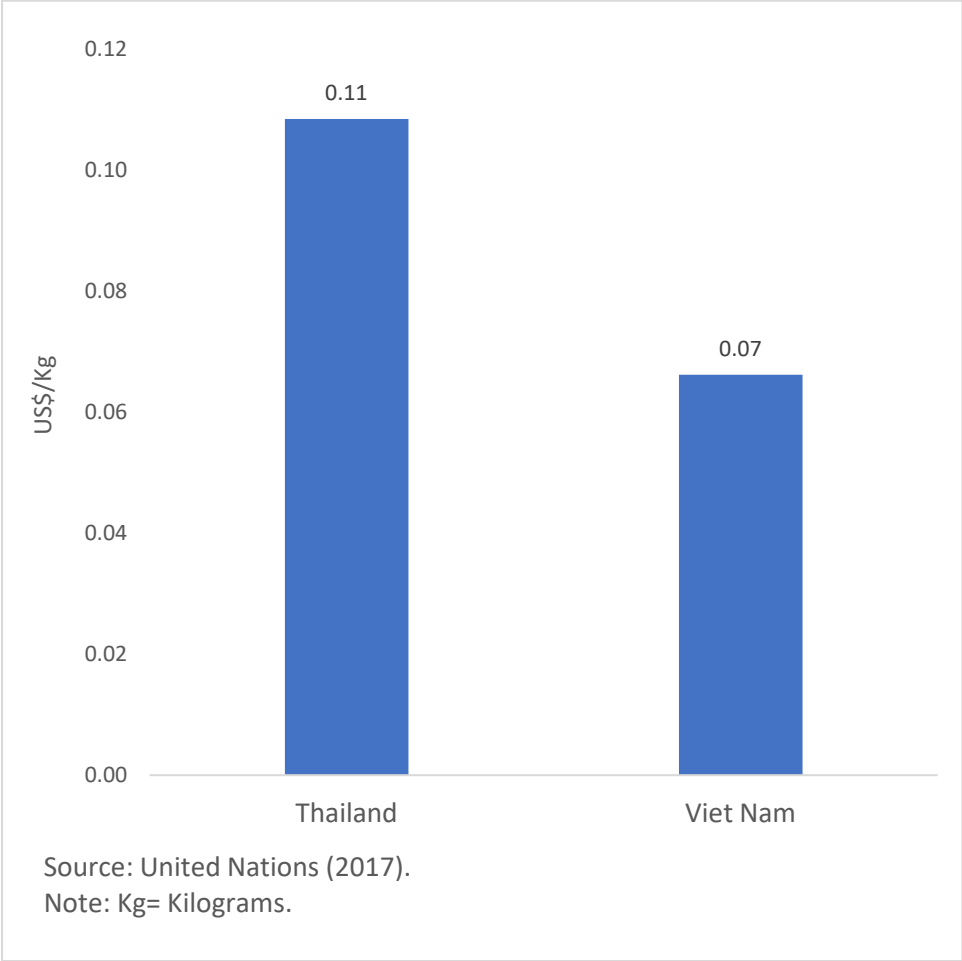
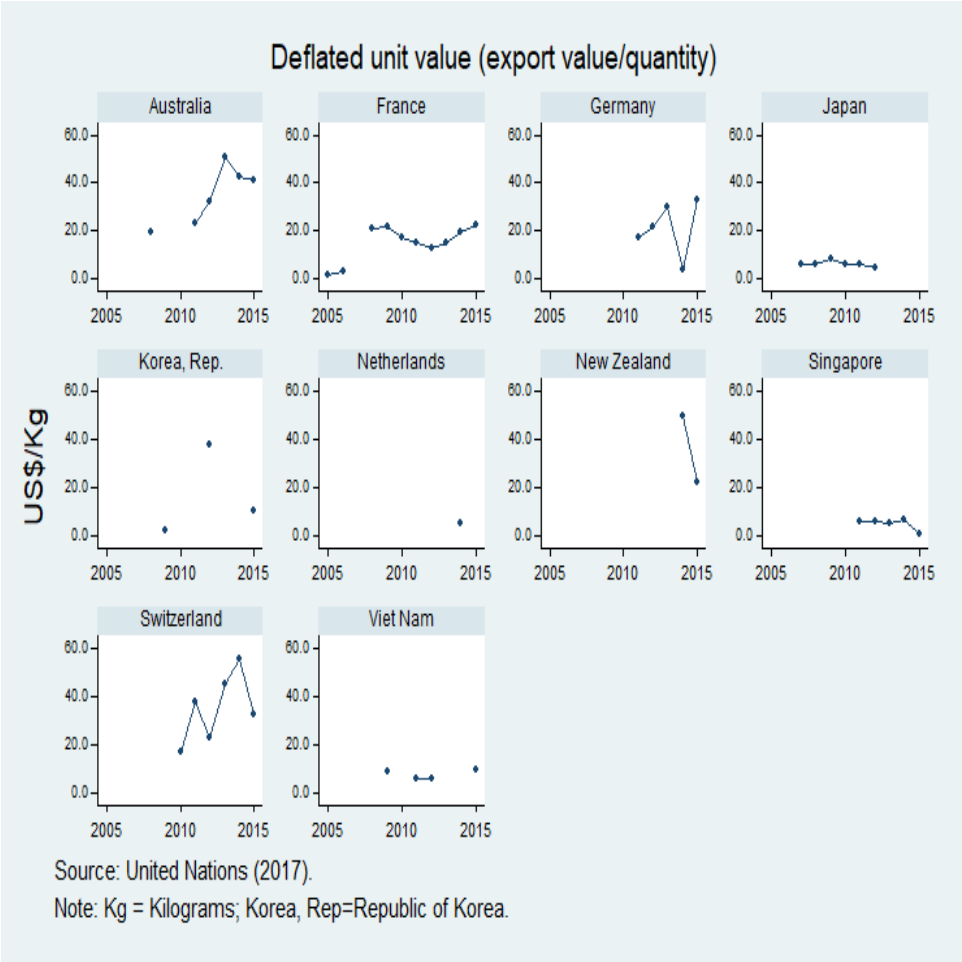


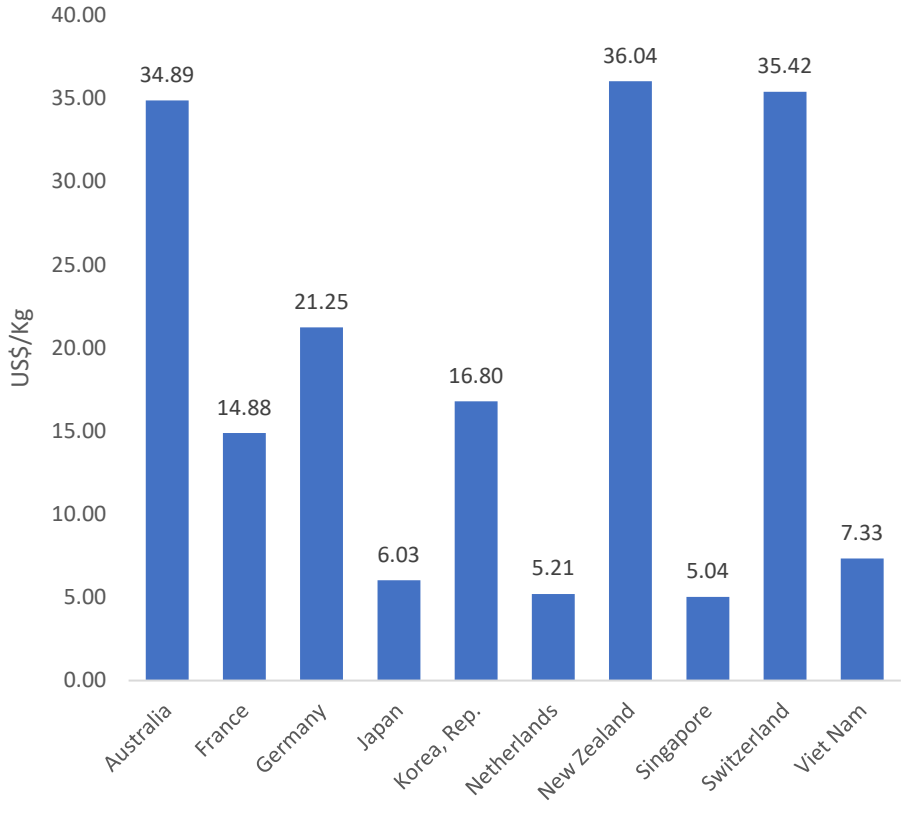
Figure A.12a): Trend of unit value of Cambodian pepper (spices; HS 0904) in top destinations



Source: United Nations (2017).

Note: Kg = Kilograms; Korea, Rep=Republic of Korea.

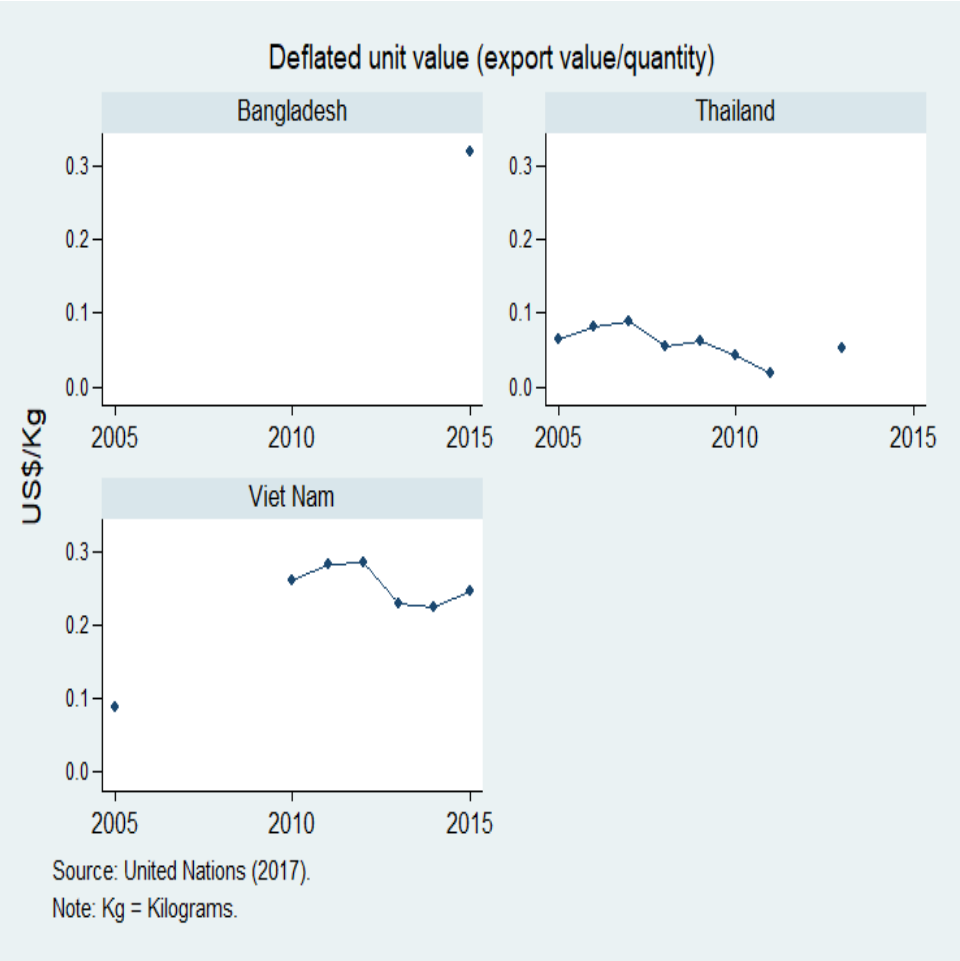
Figure A.12b): Mean unit value of Cambodian pepper (spices; HS 0904) in top destinations, 2005–2015



Source: United Nations (2017).

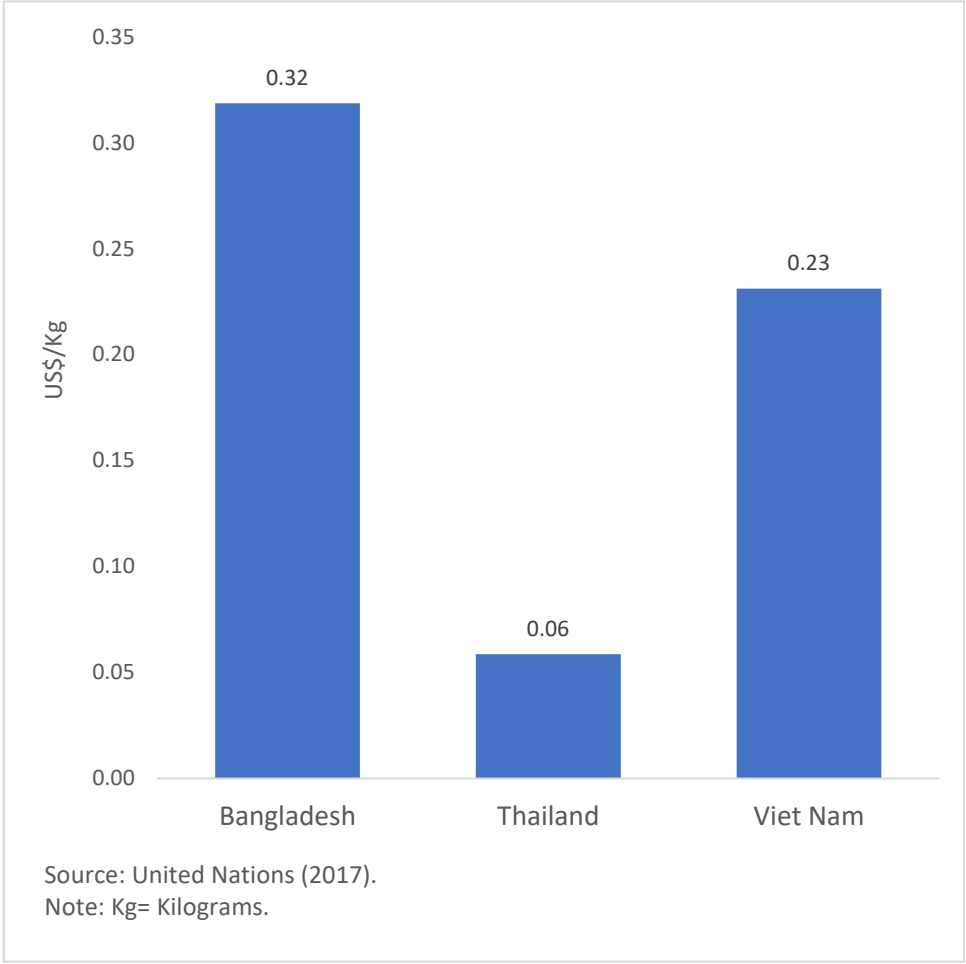
Note: Kg= Kilograms; Korea, Rep. = Republic of Korea.

Figure A.13a): Trend of unit value of Cambodian maize (corn, HS 1005) in top destinations



Source: United Nations (2017).
Note: Kg = Kilograms.

Figure A.13b): Mean unit value of Cambodian maize (corn, HS 1005) in top destinations, 2005–2015



Source: United Nations (2017).
Note: Kg= Kilograms.

Figure A.14a): Trend of unit value of Cambodian crustaceans (HS 0306) in top destinations

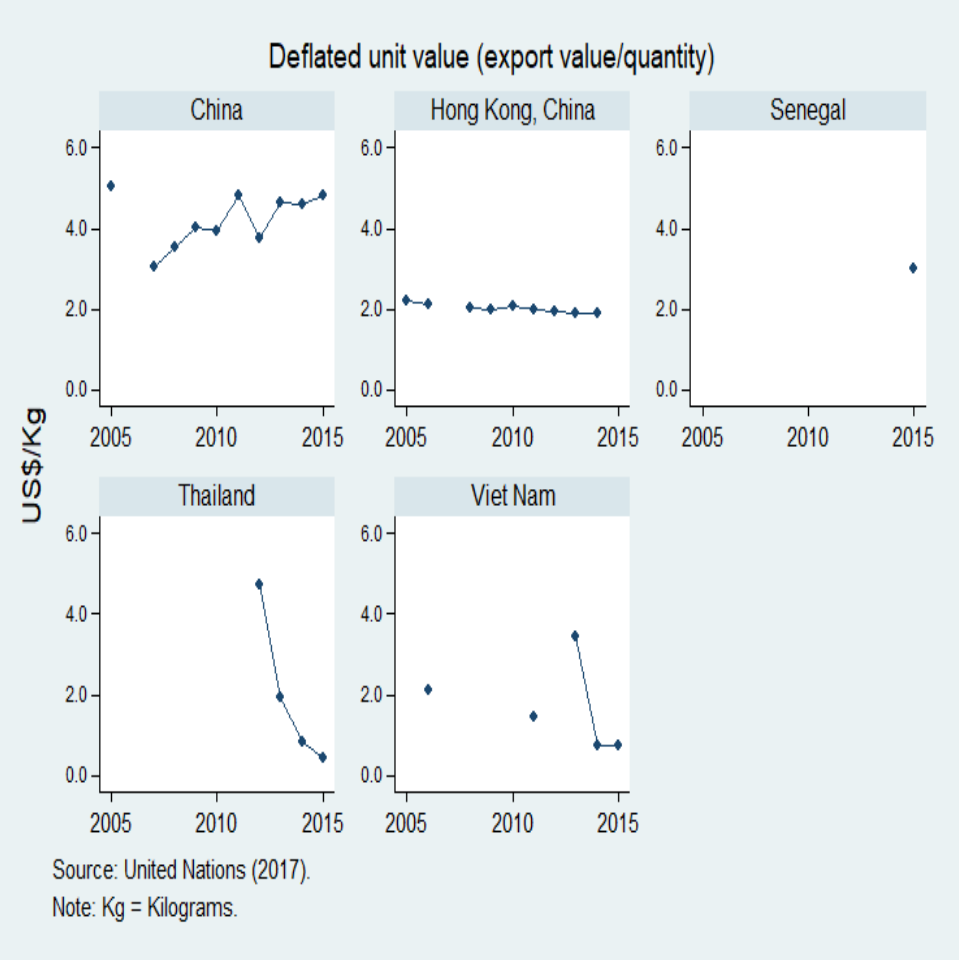


Figure A.14b): Mean unit value of Cambodian crustaceans (HS 0306) in top destinations, 2005–2015

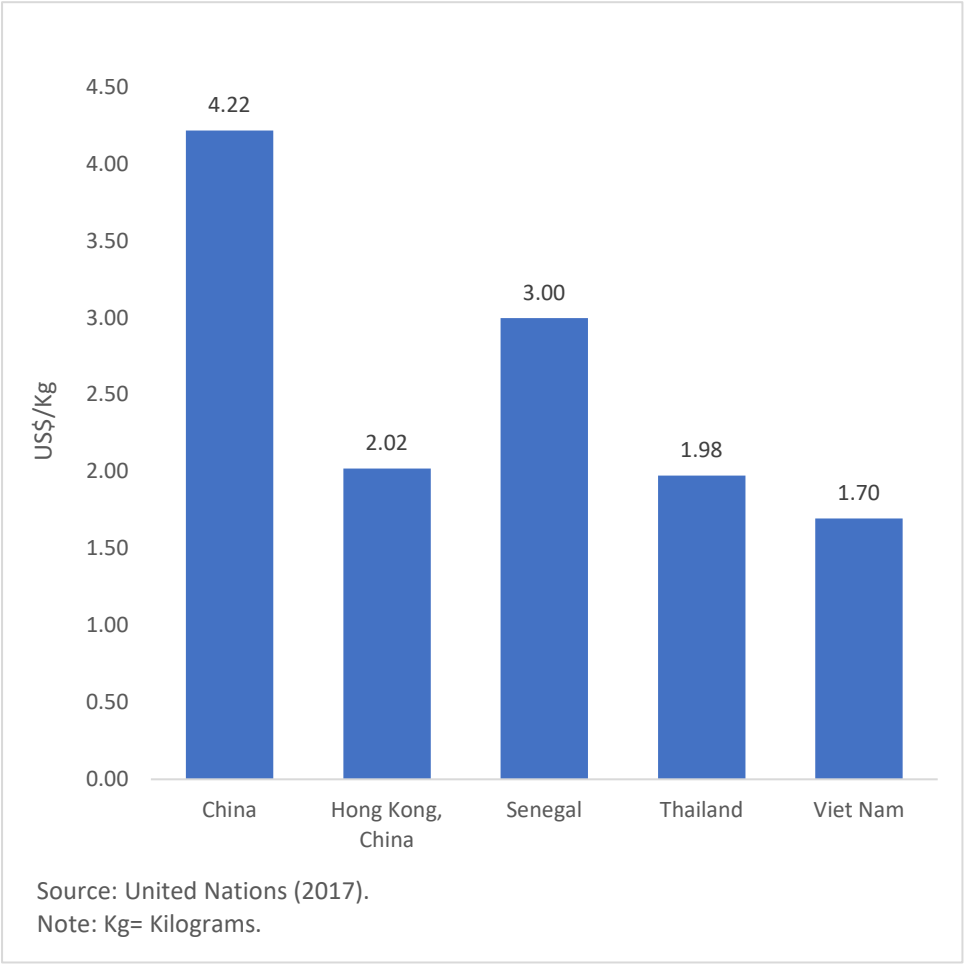


Figure A.15a): Trend of unit value of Cambodian frozen fish (HS 0303) in top destinations

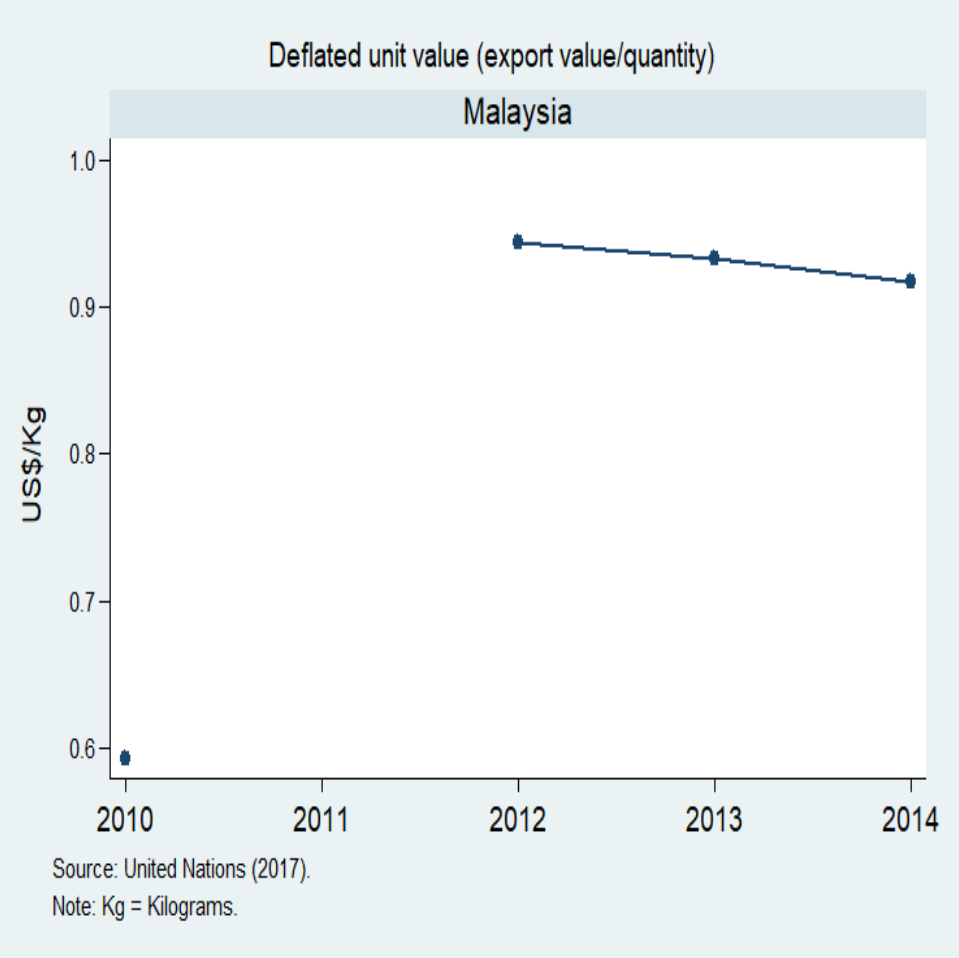
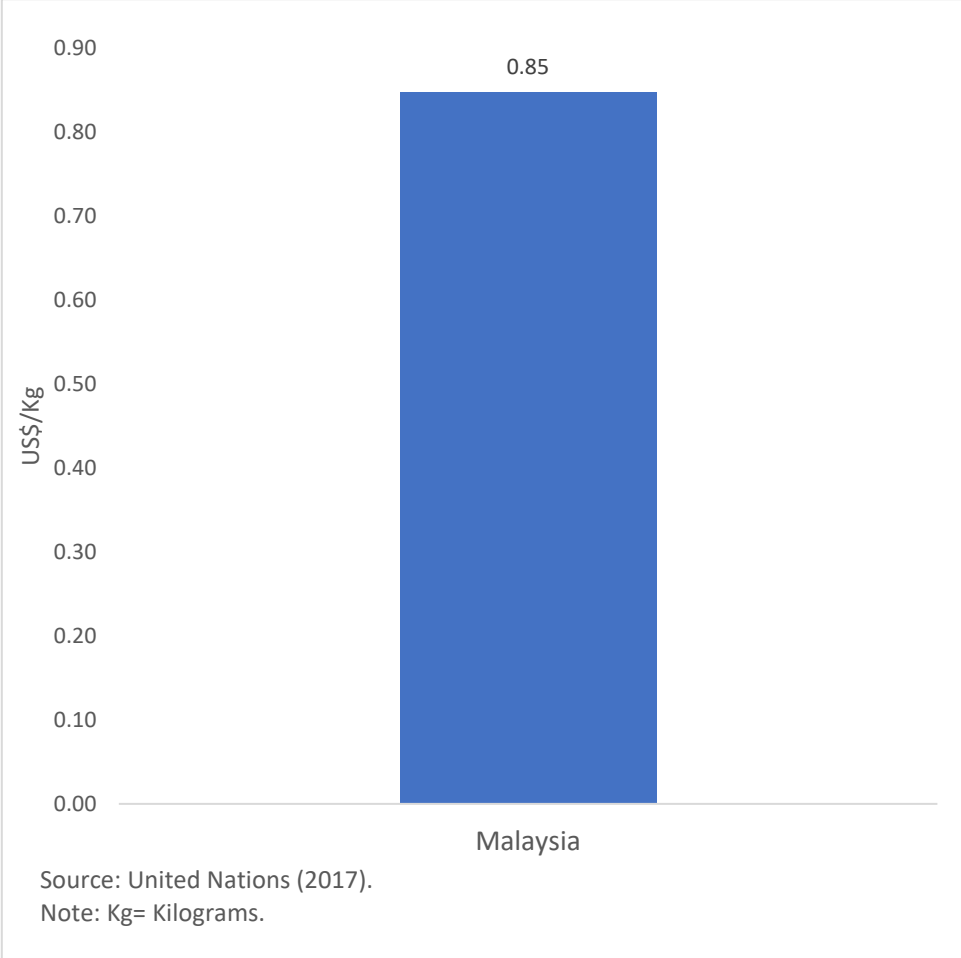


Figure A.15b): Mean unit value of Cambodian frozen fish (HS 0303) in top destinations, 2005–2015



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