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Abstract

The slow progress of diversification and the low value added of the main manufacturing exports, given the narrow based industrial structure, make Cambodia's foreign market vulnerable to external shocks and unable to contribute widely to the domestic economy. This paper, therefore, attempts to identify additional key export sectors by applying the Input-Output model. Results show that *Food-beverage-tobacco* and *Rubber-plastic* are the only two sectors with strong linkages both backward and forward, while *Hotel-restaurant* and *Agriculture* are backward-oriented and forward-oriented, respectively. The former two plus *Wood-paper* are able to induce higher income. *Agriculture* has high labor contents, yet the indirect employment of the sector is small, while the share of total net exports of *Textile* is not as high as it appears in actual share. The finding suggests that while the high linkage-oriented industries such as processed food and rubber have not been able to realize their full potential in exports, the largest current export industry, textile, is unlikely to contribute enough profit due to high import dependency and the lack of inter-industrial linkages. Limited interaction is found when net exports are dominated by a few commodities, and most sectors with relatively high linkages are not the net foreign exchange earners. This emphasizes that export potentials can be realized through not only diversification but also linkage creation. As a result, the study suggests four potential export sectors: Food-beverage-tobacco, Rubber-plastic, Hotel-restaurant, and Agriculture.

Keywords: Key Sectors, Input-Output Model, Backward-forward Linkages

1. Introduction

Cambodia's trade increased from 48 percent of GDP in 1993 to 140 percent in 2013, with exports accounting for 65 percent (US$7.28 bollion) and growing at 18 percent on average annually (WDI, 2015).[1] The garment industry and tourism are the current leading export sectors. This growth has been realized through a combination of targeted policy—tax incentives and quota increases for the garment sector—and horizontal policy—the tariff cuts, and the accession to ASEAN in 1999 and to the WTO in 2004 (World Bank, 2009). Nevertheless, export growth should be interpreted with caution as domestic technological benefits are limited. The important question is how much the export boom has

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contributed to domestic industry and vice versa. Boosting the domestic industrial connection and the value added content of export products may be a good option. For this reason, domestic development depends greatly on which goods the country exports.

Export of primary commodities has decreased from almost 80 percent of total exports in 1995 to less than 15 percent in 2012—one third of which is accounted for by food items including milled rice, beverages and tobacco—replaced by labor-intensive manufacturing exports (UNCTAD, 2014). The main products are garments (apparel and clothing accessories), footwear, and motor vehicles which are 66 percent, 8 percent, and 3 percent of total exports, respectively (Table A. 1).

Trade system of Cambodia depends significantly on how to expand; hence, identifying potential exports and increasing supply and competitiveness are the key elements. Three policy headings have been proposed: to ensure the vitality and competitiveness of existing exports, to develop export potential and diversify products and markets, and to encourage investment and improve investment facilitation for export (WTO Secretariat, 2011). Initial baskets of 19 potential products and services were identified following the Diagnostic Trade Integration Strategy (DTIS) in 2007 (Table A. 2) (MoC, 2007). Garment and footwear are still the top products in the list, followed by agricultural items. Improved market access due to favorable trade agreement with the EU, low labor costs together with a relatively encouraging business environment are the main competitiveness of Cambodia's export. However, low labor productivity and high trade facilitation costs remain critical, whereas a number of other constraints hinder exports progress, which will be discussed in the next sections. The paper proceeds with a brief review of existing literature in section 3, while section 4 introduces study objective, original contributions, and data. The methodology is described in section 5, followed by the discussion of the results in section 6. Section 7 concludes the paper.

2. Challenges to the Performance of Export Sectors

2.1. Slow Progress of Diversification

Five main products account for more than 60 percent, with articles of apparel alone sharing more than half, of total export in 2012, remaining unchanged from 2000, which indicates that diversification towards new products in the recent years has made slow progress (UNCTAD, 2014). The low-end garments and markets within the sector itself are mainly based on the advantages of quota assessment, while other factors such as creation of production chains seem to be ignored (World Bank, 2009). As a result, other sectors see little progress, the impacts of the main export on other factors such as employment, value added and linkages are thus limited. In addition, diversification index see no significant improvement. This index, ranging from 0 (more diversified) to 1 (less diversified), shows to which extent the country depends on specific products comparing to world export. In comparison, the export diversification index of Cambodia stood at 0.79 in 2012, similar to that of Laos (0.77), yet

higher than that of Thailand (0.40), Vietnam (0.52), and other countries in ASEAN, except Brunei and Myanmar, as shown in Table 1.[2]

Table 1 Export Diversification Index, ASEAN, 2000 and 2012

Country	Index Value	
	2000	2012
Brunei	0.81	0.84
Cambodia	0.83	0.79
Indonesia	0.49	0.55
Laos	0.74	0.77
Malaysia	0.51	0.46
Myanmar	0.79	0.82
Philippines	0.62	0.57
Singapore	0.46	0.50
Thailand	0.40	0.40
Viet Nam	0.57	0.52

Source: UNCTAD, 2014

2.2. Lack of Value Chains

The country is not able to retain value added in its main manufacturing as little of the value chain operates inside the country, where intermediate parts are imported and assembled into finished products which are then exported. Manufacture export capacity is one of the indicators commonly used to measure industrial performance as it shows the ability of countries to produce in a highly competitive environment and indicates the level of national manufacturing value added (MVA) (UNIDO, 2011). Hence, it is necessary to complement the export analysis with MVA. Cambodia has impressive growth in manufacturing exports, with an average annual rate of 15 percent from 2000 to 2009, which is relatively higher than that of Malaysia, Thailand and Indonesia, whereas MVA per capita in Cambodia also rose considerably due to the low based start of manufacturing export. However, the value remains among the lowest in the region. As shown in Table 2, Cambodia's per capita MVA in 2009 still lagged behind Vietnam's in 2005 and Indonesia's and the Philippines's in 2000, which means that Cambodia's MVA growth is not as impressive as it appears at first glance.

Table 2 Manufactured Exports and Value Added, Cambodia and Asia, 2000–2009

	Manufactured exports (US$ million)			Average annual growth rate	Manuf value added per capita (US$ constant 2000 prices)		
	2000	2005	2009	2000–09	2000	2005	2009
Malaysia	87,643	120,622	133,222	5%	1,265	1,412	1,390
Thailand	58,731	95,859	127,686	9%	680	895	1,004
China	228,407	722,628	1,155,517	20%	303	492	754
Indonesia	42,990	55,118	72,130	6%	216	258	295
Philippines	36,633	39,432	35,729	0%	221	247	258
Viet Nam	6,765	17,504	36,429	21%	73	118	171
Cambodia	1,090	2,093	3,276	15%	46	80	111
India	35,419	87,168	149,047	17%	63	80	99

Source: UNIDO, 2011

2.3. Underperformance in the Regional Market

In 2011, only 1.5 percent of Cambodia's exports went to ASEAN countries other than Thailand and Vietnam. Among all the members, Cambodia contributed only 0.26 percent of total exports to the regional market in the same year, an increase from 0.14 percent in 2005, comparing to 0.34 percent in 1997 before the accession into ASEAN (UNCTAD, 2012). Meanwhile, Cambodia has underperformed in relation to other partners in intra-regional markets—only 13 percent, against 49 percent on average (World Bank, 2009). This may reflect the inability of the export sectors in realizing potential gains from regional free trade agreement.

The comparison above shows that the competitiveness of Cambodia in the export market does not correspond to the performance of its industries. Favorable status of market access plays important role in promoting garment export; however, there are still open questions with regard to which sectors can also take part in the world market while at the same time contribute to domestic economic linkages.

3. Literature Reviews on Specification of export sectors

Export as a Factor of Production

Exports have been examined as an input of production since the amount of exports positively affects aggregate outputs (Ram, 1985; Tyler, 1981; Balassa, 1978). Tyler (1981) studied a cross-country analysis from 1960 to 1977 by including export as a factor of production and found a strong association between output growth and manufacturing exports in developing economies. However, by which channels exports contribute to growth is not explicitly identified in the model.

Reveal Comparative Advantage

Reveal comparative advantage (RCA) is commonly used as an indicator measuring export strength. Abidin (2000: 309) stated that: "the RCA measures the export share of commodity i from country j in the world market relative to its production share". For the case of Cambodia, traditional exports, comprising of textile fabrics, natural rubber latex, wood and vegetable materials have maintained RCA over 1990–2006, but their joint share fell and was replaced by garment cluster and non-traditional exports including nuts, castor oil seeds and plywood products (World Bank, 2009).

The application of RCA basically examines main exporting commodities to specify competitiveness. Notwithstanding, other sectors usually see little progress in output, productivity and efficiency when the attention is given only to those strong exporting sectors. Taipei, China, has experienced this problem (Tung, 2000). In addition, linkages across sectors are not taken into account in RCA model which can limit export potential of different industries. For instance, minimal industrial linkages are one of the crucial factors limiting export of Malaysia (Abidin, 2000). Therefore, it is of central importance that linkages between sectors should also be taken into consideration when examining exporting issues.

Sectotal Linkages

Sectoral linkage approach indicates the extent to which one industry is affected by the stimuli of another through structural interconnection, which can be investigated by using Input-Output framework (Hazari, 1970; Rasmussen, 1956). While such kind of models are wisely applied, the study on Cambodia's case have been few. Kobayashi et al. (2009) studied industrial structure of Cambodia and the role of agriculture by measuring gross output and value added of each sector. They found that garment industry played an important role in GDP and self-sufficiency, yet induced smaller domestic outcome, while agriculture and food sectors had a tendency to induce high and wide distribution of income. Nonetheless, different measures of the importance of exporting sectors were not specifically emphasized in their study.

4. Research Objective and Data

The study attempts to identify key sectors promising for exports using the Input-Output model through five approaches: backward and forward linkages, multiplier effects on income, labor intensity, foreign exchange earnings, and hypothetical extraction. Sectors with potential for exports should rank high in most, if not all, of the five indicators. To the best of the author's knowledge, this is the first study to combine the five approaches and, more importantly, to base on both the traditional Rasmussen's backward-forward linkages and the more current hypothetical extraction method. The normalization approach[3] for ranking given to each indicator at the end of the estimation is another contribution in the methodology. In addition, previous study on this topic in the case of Cambodia are mainly based on qualitative method (MoC, 2014; MoC, 2007; RGC, 2015; World Bank, 2009). The quantitative approach, therefore, would contribute to widen the discussion of the topic.

The 2011 input-output table used in the study consists of 18 sectors.[4] This table is derived from the Social Accounting Matrix (SAM) of Cambodia constructed by Heng et al. (2014). The database used in the estimation also contributes to the originality of the paper in the sense that the author has generated data of employment by sector from the National Institute of Statistics (NIS)' Cambodia Socio-Economic Survey (CSES, 2009) for consistency with the I-O table.

Table A. 4 shows the descriptive statistic of the structural feature of Cambodian economy. *Textile (TEXTILE)* accounts for 21 percent, the largest share, of domestic production, followed by *Agriculture (ARG)*, *Wholesale-retail trade and transportation (WTT)*, respectively. These three industries are also the top three contributing to highest value added. Top export belongs to *TEXTILE*, while the next are in services, particularly *Hotel-Restaurant* (*HR*) and T*rade-Transportation* (*WTT*). For the export and import intensity, defined as export and import share in domestic production, almost all (96 percent) of *TEXTILE* is exported, which reveals that foreign market plays a more vital role for this industry. Similarly, export intensity of *HR* is 71 percent

showing the importance of this exporting service in tourism. While AGR employs more than 60 percent of the labor force, it contributes to only 41 percent of income, representing that value added per worker is lower in this sector than in the service sectors. This can be explained by the higher share of low skilled-labors in the former and the high-skilled labors in the latter.

5. Methodology

Matrix Form

Intermediate goods plus final demand should be equivalent to total output. This can be written in matrix form as $\mathbf{x}=\mathbf{Ax}+\mathbf{f}$, where $\mathbf{A}$ is the input coefficient matrix representing the input per unit of total output of each industry,[5] $\mathbf{x}$ is the total output vector and $\mathbf{f}$ is final demand vector (Miller & Blair, 2009). The matrix form of the decomposition is derived as follows:

$$\mathbf{x}=(\mathbf{I}-\hat{\mathbf{M}})\mathbf{Ax}+(\mathbf{I}-\hat{\mathbf{M}})\mathbf{f}+\mathbf{e} \tag{1}$$

$$\mathbf{x}=[\mathbf{I}-(\mathbf{I}-\hat{\mathbf{M}})\mathbf{A}]^{-1}[(\mathbf{I}-\hat{\mathbf{M}})\mathbf{f}+\mathbf{e}] \tag{2}$$

where $\mathbf{x}=\begin{bmatrix} x_1 \\ \vdots \\ x_n \end{bmatrix}$; $\mathbf{f}=\begin{bmatrix} f_1 \\ \vdots \\ f_n \end{bmatrix}$; $\mathbf{e}=\begin{bmatrix} e_1 \\ \vdots \\ e_n \end{bmatrix}$; $\mathbf{I}=\begin{bmatrix} 1 & \cdots & 0 \\ \vdots & \ddots & \vdots \\ 0 & \cdots & 1 \end{bmatrix}$; $\mathbf{A}=\begin{bmatrix} a_{11} & \cdots & a_{1n} \\ \vdots & \ddots & \vdots \\ a_{n1} & \cdots & a_{nn} \end{bmatrix}$; $a_{ij}=\dfrac{x_{ij}}{x_j}$

$$\hat{\mathbf{M}}=\begin{bmatrix} m_1 & \cdots & o \\ \vdots & \ddots & \vdots \\ o & \cdots & m_n \end{bmatrix};\ m_i=\frac{m_j}{x_j+f_j};\ [\mathbf{I}-(\mathbf{I}-\hat{\mathbf{M}})\mathbf{A}]^{-1}=\begin{bmatrix} b_{11} & \cdots & b_{1n} \\ \vdots & \ddots & \vdots \\ b_{n1} & \cdots & b_{nn} \end{bmatrix}$$

5.1. Backward and Forward Linkages

Backward and forward linkages in the I-O framework can be measured based on the Leontief inverse matrix, $[\mathbf{I}-(\mathbf{I}-\hat{\mathbf{M}})\mathbf{A}]^{-1}$. b_{ij} denotes the elements of the Leontief inverse matrix. The backward linkages are the column sums of all of the b_{ij} elements, following Hazari & Kingma (1976) and Mujeri & Alauddin (1994),

$$\sum_{i=1}^{n} b_{ij}=b_{.j} \tag{3}$$

which indicates the direct and indirect input requirements for all sectors for a unit increase in final demand for the jth sector, while the forward linkages are the raw sums of the b_{ij} elements

$$\sum_{j=1}^{n} b_{ij}=b_{i.} \tag{4}$$

which indicates the output increase in the ith sector required to meet a unit increase in final demand for all sectors. The result of the two linkages provides information about which sectors produce

the highest direct and indirect effects, yet there is no information regarding whether there is a high interdependence among all sectors. As a result, linkage indices have to be defined.

5.1.1. Linkage Indices

First, the average is given to the backward linkage $\frac{1}{n}b_{.j}$ ($j=1, ..., n$) and the forward linkage $\frac{1}{n}b_{i.}$ ($i=1, ..., n$), and the overall averages are

$$\frac{1}{n^2}\sum_{j=1}^{n}\sum_{i=1}^{n}b_{ij}=\frac{1}{n^2}\sum_{j=1}^{n}b_{.j}=\frac{1}{n^2}\sum_{i=1}^{n}b_{i.} \tag{5}$$

Next, the index of backward and forward linkages, which are termed "Index of Power of Dispersion" and "Index of Sensitivity of Dispersion", are determined respectively as follows (Rasmussen, 1956),

$$u_j=\frac{\frac{1}{n}b_{.j}}{\frac{1}{n^2}\sum_{j=1}^{n}b_{.j}} \tag{6}$$

$$u_i=\frac{\frac{1}{n}b_{i.}}{\frac{1}{n^2}\sum_{i=1}^{n}b_{i.}} \tag{7}$$

These indices can be used to answer which industries highly depend on others. If u_j is bigger than unity ($u_j>1$), the jth industry is highly interactive, and it is not if u_j is smaller than unity ($u_j<1$). u_j is termed "Index of Power of Dispersion" because it describes to which extent the effects are dispersed throughout the economy. Similarly, u_i is interpreted that if this index is bigger than one ($u_i>1$), the industry i will increase its output more than other industries. In other words, the term "Index of Sensitivity of Dispersion" explains how the expansion of other industries affects the ith industry.

5.1.2. Coefficients of Variation

The indices above are unweighted averages and they do not take into account the importance of individual sector. For example, if one industry has a high index of power of dispersion (u_j), it does not necessarily imply that most industries will be affected if that jth industry depends heavily on only a few industries and leaves the rest unchanged. Therefore, the coefficient of variation is needed for the measures of variability and structure of a certain industry.

$$v_j=\frac{\sqrt{\frac{1}{n-1}\sum_{i=1}^{n}\left(b_{ij}-\frac{1}{n}\sum_{i=1}^{n}b_{ij}\right)^2}}{\frac{1}{n^2}\sum_{i=1}^{n}b_{ij}} \qquad (j=1, ..., n) \tag{8}$$

$$v_i = \frac{\sqrt{\frac{1}{n-1}\sum_{ij=1}^{n}\left(b_{ij}-\frac{1}{n}\sum_{j=1}^{n}b_{ij}\right)^2}}{\frac{1}{n^2}\sum_{j=1}^{n}b_{ij}} \qquad (i=1, ..., n) \tag{9}$$

In the case of a relatively high value of v_j, the jth industry is dependent heavily on only a few industries, and a relatively low value of v_j indicates, the jth industry evenly draws on most of other industries; similarly, in the case of a relatively high value of v_i, the whole system draws one-sidedly on the ith industry.

5.2. Multiplier Effects

Income multipliers are used to determine which sectors generate higher income effects if the same amount of initial effect is given (Hara, 2008). ty_j denotes total income generated by industry j, so

$$y_j = \frac{ty_j}{x_j} \tag{10}$$

is the income per unit of output. The direct and indirect income distributed by each sector is derived,

$$\mathbf{Y} = (\hat{\mathbf{Y}})[\mathbf{I}-(\mathbf{I}-\hat{\mathbf{M}})\mathbf{A}]^{-1} \tag{11}$$

where $(\hat{\mathbf{Y}})$ is the diagonal matrix of income coefficient, and $[\mathbf{I}-(\mathbf{I}-\hat{\mathbf{M}})\mathbf{A}]^{-1}$ is the Leontief inverse matrix, hence $\mathbf{Y}$ is the matrix of direct and indirect income effects per unit of final demand. The column sum of $\mathbf{Y}$ $(\sum_{i=1}^{n} y_{ij}, j=1, ..., n)$ denotes the total income effects for the jth industry. To get the income multiplier, the total income effect is divided by the initial income,

$$y_j^m = \frac{\sum_{i=1}^{n} y_{ij}}{y_j} \tag{12}$$

Income multipliers y_j^m therefore can imply that the US$1 increase in final demand generates additional income of some amount of US$ for workers in one industry, plus another amount for workers in remaining industries.

The result provides guidance in policy decisions, for example, which sector should receive investment funds given limited resources if the target is to raise household income. Increasing final demand can be the initial attempts; nonetheless, domestic final demand may not be increased easily, at least in the short term, given the small market size of Cambodia, so the increase in foreign sales can be a potential target. Hence, the income multipliers are considered one of the main indicators to specify key export sectors that are likely to raise workers' income via export promotion.

5.3. Employment Intensity

tl_j denotes the total labor employed by the jth sector, so the direct labor requirements per unit of total output is

$$l_j = \frac{tl_j}{x_j} \tag{13}$$

This is pre-multiplied by total output requirements per unit of final demand and yields total (direct and indirect) labor effects

$$\mathbf{L} = (\hat{\mathbf{L}})\,[\mathbf{I} - (\mathbf{I} - \hat{\mathbf{M}})\mathbf{A}]^{-1} \tag{14}$$

where $(\hat{\mathbf{L}})$ is the diagonal matrix of labor coefficient, and $[\mathbf{I} - (\mathbf{I} - \hat{\mathbf{M}})\mathbf{A}]^{-1}$ is the Leontief inverse matrix, hence $\mathbf{L}$ is the matrix of total labor requirements per unit of final demand. The higher the labor content, the more potential of the sector to possess comparative advantage which, on the one hand, answers the question whether this particular sector produces labor-intensive products and should be relied on for export promotion, and on the other hand, helps with policy making to undertake investment to maximize employment generation in the highest labor requirement sectors.

5.4. Trade Balance

Exporting sectors do not necessarily realize net foreign exchange earnings because some sectors have to spend more on total imports than what they can earn from exports. The analysis of net earnings is possible within an I-O framework where the direct and indirect import requirements per unit of final demand (denoted by **TM**) can be derived from the multiplication of the diagonal matrix of total import coefficient, $(\hat{\mathbf{M}})$, and the Leontief inverse matrix

$$\mathbf{TM} = (\hat{\mathbf{M}})\,[\mathbf{I} - (\mathbf{I} - \hat{\mathbf{M}})\mathbf{A}]^{-1} \tag{15}$$

Net foreign exchange earnings of sector j are defined as the result of export (e_j) taking out the total import requirements

$$z_j = e_j - \sum_{i=1}^{n} tm_{ij} f_j \qquad (j = 1, ..., n) \tag{16}$$

If z_j is positive, the jth sector is the net exporter or winner of foreign exchange. The net earners should be considered as key exports as they will help secure foreign reserves and correct trade deficit, which has persisted for two decades in Cambodia. The result adds a leading guide for the policy making as to which sectors should be export-oriented.

5.5. Hypothetical Extraction

In addition to the linkage concept, the hypothetical extraction method (HEM) is a more recent alternative approach used to measure key sectors and was studied by Paelinck et al., (1965); Strassert,

(1968); and Meller & Marfán (1981) (cited in Temurshoev, 2010). HEM refers to the "shut down" of any sector in the I-O transaction and can be used to identify key industries through industries' "factor worth". Temurshoev (2010: 875) terms "factor" as any indicator, which might refer to economic, social, or environmental factor. To put it another way, HEM measures how the whole system (i. e. output, employment) is to be affected directly and indirectly if one industry is extracted.

Another purpose of using HEM in this study is basically to confirm whether the result of this latter method will correspond to that of the traditional method of the Rasmussen concept of linkages in the case of Cambodian economy. The method will provide additional outlook as to what sectors should be specified as key sectors, aimed at obtaining precise answers to achieve the study objective. To the best of the author's knowledge, no previous studies have combined these methods for comparison.

Using the same final demand vector (**f**), the model is originated from the matrix of equation (2)

$$\mathbf{x}(-\boldsymbol{j})=[\mathbf{I}-(\mathbf{I}-\hat{\mathbf{M}})\mathbf{A}(-\boldsymbol{j})]^{-1}[(\mathbf{I}-\hat{\mathbf{M}})\mathbf{f}+\mathbf{e}] \tag{17}$$

The difference between the total outputs before and after the extraction is

$$\Delta\mathbf{x}=\mathbf{x}-\mathbf{x}(-\boldsymbol{j}) \tag{18}$$

6. Result and Discussion

Table 3 presents the backward and forward linkages obtained from the technological coefficient, equation (3) and (4). On average, the direct and indirect effect of the total linkages for Cambodia's economy is 1.27. For the backward linkages, *FBT (Food Beverage Tobacco)* stands at 1.62, which is the highest rank among all of the sectors. This figure indicates that if final demand for this sector increases by US$1 million, total outputs of all sectors will increase by US$1.62 million. The second highest linkage is *Hotel-Restaurant*, followed by *Rubber-Plastic* with backward linkages of 1.54 and 1.49, respectively. *Electricity-Gas-Water* and *Wood-Paper* are among others with moderate linkages, while *MOTORT* and *TEXTILE* have the fewest linkages, slightly higher than 1.00. The increase in final demand for these two sectors will not have significant impacts on the economy.

AGR ranks modestly for backward linkages but appears to be first for forward ones. Agriculture, covers paddy, livestock, crop and related activities—important in providing input for food production—and forestry, such as silviculture, logging, gathering of non-wood forest products, and support services to forestry. The figure shows that there is a high dependency of other industries on *AGR*.

Power of Dispersion and Sensitivity of Dispersion

The result of the index of power of dispersion (u_j) and sensitivity of dispersion (u_i), together with the variation of coefficients (v_j, v_i) in parenthesis, is presented in Table 4. Six sectors have strong backward linkages. Among them, *FBT* has the strongest linkages with u_j as high as 1.27, and v_j as

small as 2.94, followed by *HR*, and *RP*. On the other hand, *OTHMNU*, *TEXTILE* and *MOTORT* have the weakest backward linkages. Although *FBT* ranks first for u_j, its v_j ranks second after *HR*, indicating that the stimuli of *FBT* have the highest impacts, but the distribution towards all sectors can be less even than that of the stimuli by *HR*. For the forward linkage indices, u_i reaches its highest level at 1.47 for *AGR*, followed by a total of seven other sectors with strong forward linkages. The lowest u_i goes to *HR*. It should be noticed that this sector has relatively strong backward linkages but weak forward linkages. The increase in final demand for this sector would result in relatively high impacts on other sectors, but not vice versa. For instance, the higher demand for hotel and restaurant services would lead to an increased demand for food (either raw agricultural or processed food), transportation and trade, specifically due to tourism services, and other business services. However, the increased demand for those does not necessarily lead to an increase of *HR* output.

Table 3 Backward-Forward Linkages of Cambodian Economy by Sector, 2011

	Industry	Backward Linkages	Rank	Forward Linkages	Rank
1	AGR	1.22	12	1.88	1
2	FISH	1.25	8	1.41	5
3	MINQ	1.16	15	1.12	13
4	FBT	1.62	1	1.28	8
5	TEXTILE	1.10	17	1.06	17
6	WP	1.31	5	1.15	12
7	RP	1.49	3	1.63	2
8	METAL	1.22	13	1.19	11
9	FMETAL	1.23	10	1.41	4
10	MOTORT	1.08	18	1.07	15
11	OTHMNU	1.12	16	1.39	6
12	EGW	1.38	4	1.20	10
13	CON	1.23	11	1.10	14
14	WTT	1.25	7	1.29	7
15	HR	1.54	2	1.04	18
16	PFR	1.24	9	1.46	3
17	AEH	1.30	6	1.06	16
18	OTHSER	1.19	14	1.20	9
	Average	1.27		1.27	

Source: Author's calculation, based on the I-O table

Figure 1 is divided into four quadrants and locates different sectors according to the level of both u_j and u_i. *RP* and *FBT*—located in the upper-right part (part 1)—have strong linkages both backward and forward, while six sectors (*Mining, Textile, Metal, Motor, Construction, and Other services*)—in the lower-left part (part 4)—are weak in both of the linkages, and the remaining sectors are either backward-oriented (part 2) or forward-oriented (part 3).

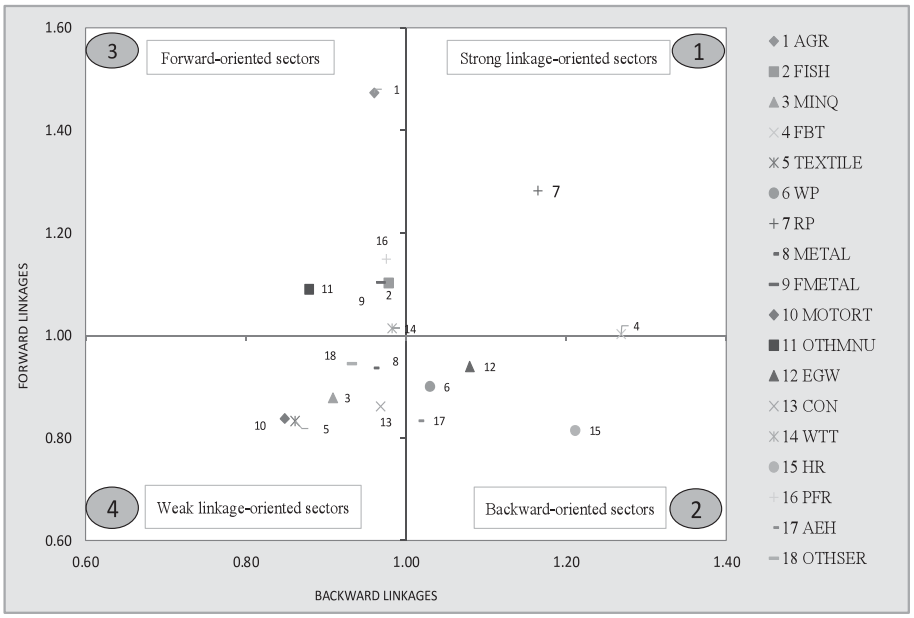
For part 1, *FBT* is among the strongest linkages, as it covers the manufacturing, processing and preserving of food items which require inputs from various sectors, especially from agriculture. Cambodia is endowed with various types of aquatic life and rice fields for growing crops and raising livestock, which explains the strong backward linkages of food sectors together with the strong forward linkages of agriculture. Processed food exports remain low but the value has increased almost four-fold from US$16 million in 2007 to US$60 million in 2011 (MoC, 2014). Main exports in this category are unmanufactured tobacco/cigarettes, crude palm oil and cane sugar. Other processed food produced locally includes dried fish and meat, frozen shrimp and fish, sugar, dried packaged fruits,

Table 4 Index of Power and Sensitivity of Dispersion

	Sector	Backward Linkages Index Uj (Vj)			Sector	Forward Linkages Index Ui (Vi)	
4	FBT	1.27	(2.94)	1	AGR	1.47	(2.70)
15	HR	1.21	(2.73)	7	RP	1.28	(3.44)
7	RP	1.17	(3.80)	16	PFR	1.15	(3.09)
12	EGW	1.08	(3.33)	9	FMETAL	1.10	(3.28)
6	WP	1.03	(3.42)	2	FISH	1.10	(3.46)
17	AEH	1.02	(3.36)	11	OTHMNU	1.09	(3.12)
14	WTT	0.98	(3.47)	14	WTT	1.01	(3.35)
2	FISH	0.98	(3.90)	4	FBT	1.00	(3.68)
16	PFR	0.98	(3.67)	18	OTHSER	0.95	(3.65)
9	FMETAL	0.97	(3.77)	12	EGW	0.94	(3.85)
13	CON	0.97	(3.50)	8	METAL	0.94	(3.81)
1	AGR	0.96	(4.13)	6	WP	0.90	(3.93)
8	METAL	0.96	(3.72)	3	MINQ	0.88	(3.92)
18	OTHSER	0.93	(3.69)	13	CON	0.86	(3.95)
3	MINQ	0.91	(3.79)	10	MOTORT	0.84	(4.01)
11	OTHMNU	0.88	(3.93)	17	AEH	0.83	(4.14)
5	TEXTILE	0.86	(4.01)	5	TEXTILE	0.83	(4.16)
10	MOTORT	0.85	(3.96)	15	HR	0.82	(4.10)

Source: Author's calculation

Figure 1 Linkage-Oriented Classification



Source: Author's calculation

cookies, noodles, ready-made canned food, and cassava preparation, whereas beverages includes spirits and non-alcoholic drinks, rice/palm wine, beer, soybean juice, and other canned fruit juice.

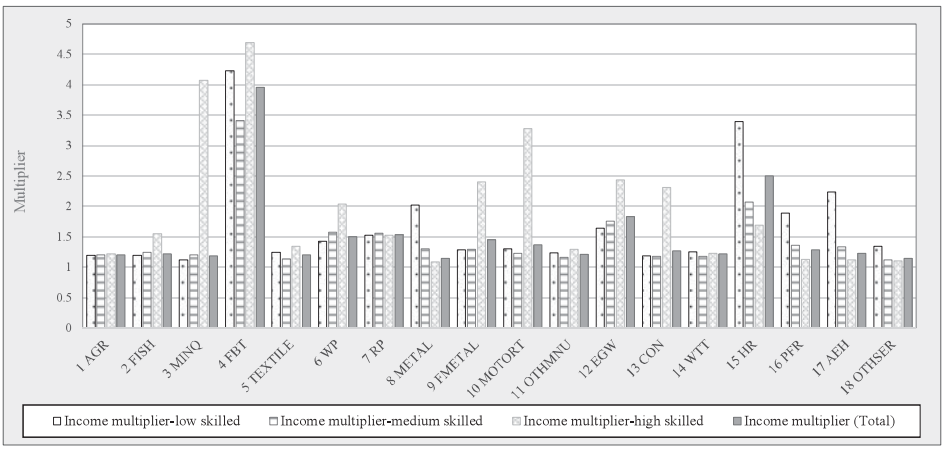
Rubber plantations have increased significantly from 2009 and covered 328,771ha in 2013, which comprised of 17 percent of Rubber Estates (former state-owned enterprises), 41 percent of economic land concessions and another 42 percent of household rubber plantations (MAFF, 2015). The sector yielded 85,244 tons of dry rubber production with the export of 86,052 tons in 2013, both increased more than 100% from 2009. Although production is small scale, it is a long term streamlining agro-industrial sector, as it is basically non-heavy and low-tech manufacturing with inputs and workers that can be supplied locally. For instance, starting from planting, to harvesting, tapping, and processing, the work can be done at the sites. This explains one of the reasons for the high linkages of this sector.

For part 2, *HR* is highly backward oriented, which is explained by the necessary intermediate inputs from agriculture and processed food. Moreover, this industry, as the main part of the tourism sector, connects strongly to transportation services and trade. When there is an increase in tourist arrivals, the demand for *HR* will increase, which will also lead to increase demand for other related services including telecommunications and financial and insurance systems. These interactions also give the reason for the strong forward-orientation of other sectors: *AGR, FISH, WTT* and *PFR*, in part 3. In addition, *PFR* links forward to both public and private sectors, specifically in the recent-high growth economy of Cambodia. The connection is clear: the more technological and financial services needed for investment and business activities, the more outputs will be added by the *PFR* sector as it plays an important role in mobilizing capital and, thus, boosting investment.

Multiplier Effects on Income

The estimation categorizes labor into three skill groups: low skill, medium skill and high skill. In agriculture and industry, a significant proportion of the income is received by low-skilled labors, while high-skilled labors take the lead in services. The multiplier of income is first calculated for each sector by the three skill groups separately, and later by labor as a whole, shown in Figure 2. Corresponding to the results of the linkage indices, *Food-Beverage-Tobacco* has the highest income multiplier for all the skill groups. To be precise, a unity increase of final demand for this sector would generate 4.23, 3.41, and 4.71 income multiplier to the low-skilled, medium-skilled and high-skilled, respectively, and a 3.96 income multiplier for the total group. In other words, labors will receive 3.96 times the income per unit of output higher than the initial level. Meanwhile, when other industrial sectors, except *Metal*, contribute to low-skilled multiplier at a level of less than two, service sectors contribute relatively higher. *Hotel-Restaurant* contributes up to 3.39. In contrast, the high-skilled worker income multipliers are on average higher in industry than that in service. This phenomenon happens because the former employs a lower proportion of high-skilled labors, which means that the number of labors and hence the income share is low for this group. Large changes will show up even when there is a small increase; as a result, the multipliers will stand high compared to that for the low-skilled group.

Figure 2 Multiplier Effects on Income by Sectors



Source: Author

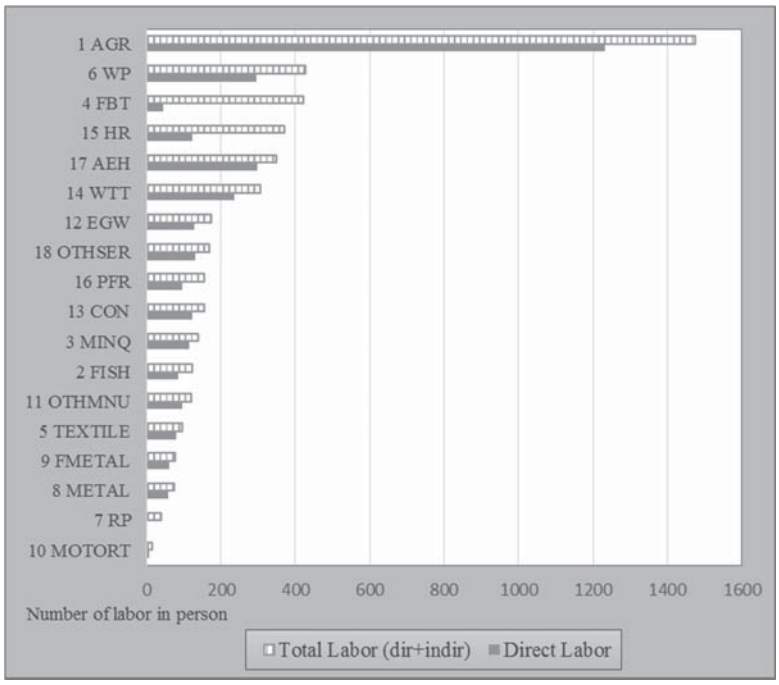
Mathematically, when the denominator y_j, of equation (12) is too small for high-skilled income, y_j^m for this group would be large.

There are not many changes in the trend of the income multipliers of the whole group from that of the low-skilled. Income multipliers of all the exporters rank from 3.96 to 1.14. FBT is the highest contributor mainly because of two reasons: 1) the linkages between this sector and the rest are notably high (highest index of power of dispersion), and 2) the initial income level in this sector is small, while the indirect changes are relatively large, which mathematically results in the substantial level of multiplier. A similar result was also suggested by Kobayashi et al. (2009) that food sector has the highest value added multiplier among all industrial sectors. The direct effects on income of AGR are rather high in comparison to industrial sectors, explained by agriculture's large portion of income share, yet the indirect effects from this sector are moderate. From the results, FBT, WP and RP of merchandise, and HR service are able to induce higher domestic income than the other sectors. Their growth is expected to distribute higher income to broad groups including low-skilled workers. Thus, it is preferable to put forward these sectors as potential areas for stimulation in order to gain larger profits for future domestic investment.

Employment Intensity

The data of employment by sector is not provided in the I-O table; this data, thus, is generated separately from the household survey (CSES, 2009) as it records each person's occupation classified according to the International Standard Industrial Classification (ISIC Rev. 4). The data of employment by occupation and age are aggregated to correspond to the sectors of the I-O table. Figure 3 presents the employment intensity per unit of final demand, based on equation (14). Direct labor refers to the number of labors directly employed in one industry to produce one unit of output, while total labor refers to the number of labors directly and indirectly required in and out of the industry itself if there is

Figure 3 Labor Intensities (per M.US$ of Final Demand)



Source: Author

an increase in final demand for that particular industry.

Agriculture has the top rank due to abundance of labor in this rural sector, yet there is only a minor difference between the number of direct and total labor demand—1,233 and 1,474, respectively—suggesting that only 19 percent of the labor demand occurs out of the sector. A similar case happens in *Wood-Paper* industry. In contrast, the next two sectors—*Food-Beverage-Tobacco* and *Hotel-Restaurant*—provide high indirect employment due to the flow-on effects. For instance, the increase in one unit of output of *FBT* requires only 43 workers, while 873 percent of this amount is generated throughout the remaining sectors. *MINQ, FISH, TEXTILE* and *OTHMNU* have moderate direct labor intensity but are listed among the least in total units due to the low interconnection in labor generation.

Countries targeting employment maximization should consider mobilizing more resources to sectors where labor intensities are higher since the rapid growth of productivity and employment requirement per unit of investment in those sectors is viable (Parikh 1979). Moreover, Cambodia, as a labor-abundant country with a relatively low cost of labor, finds this characteristic an advantage for international competition. Therefore, investment planning in exports should obviously be devoted to the sectors with high labor intensities, where employment maximization and export promotion can both be achieved.

Labor requirement is also related to the import structure of each sector as, in general, a sector

with relatively high imports will not generate high employment. As shown in the results, the sectors with the least labor requirements, such as *FMETAL, TEXTILE and OTHMNU*, have the sectoral import size of 12, 31, and 33 percent of total imports, respectively. In contrast, *AGR* imports less than one percent of total values. In this case, certain industries may never be able to expand owing to the lack of sufficiently large demand for domestic products. Both the market expansion and labor productivity can be improved, nevertheless, through trade and domestic specialization. Perikh (1979) pointed out that relative price and productivity increase are the two crucial elements when projecting results from a policy point of view. First, competitiveness in relative price increases demand for the products and makes the sector more attractive regardless of productivity level. Second, although the productivity varies across sectors, the lower one has potential to grow over time due to technological absorption. The two factors can be the reasons that high labor content sectors need to be promoted with a close link to external economies.

Foreign Exchange Earnings

Only four sectors of merchandise—one from agriculture and three from manufacturing—and four services are the net exporters (Table 5). *Hotel-Restaurant*, with strong backward linkages, contributes to 67 percent of total net exports even though its share in actual exports is only 14 percent. It should be pointed out that although *TEXTILE* is the main exporter covering more than 60 percent of actual total exports, this sector, owing to the large import size, shares only six percent in total net exports—a ten-fold drop comparing to its share in actual exports. This shows the inefficiency of this sector not only in linkages, but also in foreign currency earnings. This is because the garment industry needs to import large amounts of fabric material, causing currency leakage, which is also consistent with previous study (Kobayashi et al., 2009). As a result, the current largest export sector of Cambodia is unlikely to contribute enough profit to foster potential future sectors.

Table 5 Net Exporting and Net Importing Sectors

Net Exporting Sectors					Net Importing Sectors				
	Sector	Net Exports (US$ Million)	Percentage Share in Actual Exports	Percentage Share in Net Exports		Sector	Net Exports (US$ Million)	Percentage Share in Actual Imports	Percentage Share in Net Imports
15	HR	886.55	13.75%	66.71%	4	FBT	−357.95	6.25%	39.43%
18	OTHSER	213.62	3.83%	16.07%	13	CON	−202.40	0.91%	22.29%
14	WTT	100.05	8.36%	7.53%	9	FMETAL	−108.22	12.47%	11.92%
5	TEXTILE	84.03	67.04%	6.32%	17	AEH	−107.44	0.46%	11.83%
16	PFR	17.81	2.38%	1.34%	11	OTHMNU	−41.30	33.01%	4.55%
6	WP	15.62	0.88%	1.18%	10	MOTORT	−33.79	3.85%	3.72%
8	METAL	7.80	0.35%	0.59%	2	FISH	−24.63	0.01%	2.71%
1	AGR	3.44	1.10%	0.26%	12	EGW	−20.86	0.22%	2.30%
					3	MINQ	−10.49	0.64%	1.16%
					7	RP	−0.75	1.70%	0.08%

Source: Author

The result reveals the lack of self-sufficiency of manufactured goods, as only a few can manage to produce with low import contents. In addition, the high concentration on a few sectors reflects Cambodia's current trade pattern. It should also be recalled that *Wood-Paper* and *Hotel-Restaurant* are the only sectors with positive net exports which have strong backward linkages, while other sectors such as *Food-Beverage-Tobacco* and *Rubber-Plastic* are in the net importing category. This highlights the high dependency on imports and the neglect of linkages. This may also happen due to the great final demand and/or the very high import coefficients of those sectors (equations 15) (Hazari & Kingma, 1976; Mujeri & Alauddin, 1994). This requires a policy of generating adequate linkages; otherwise, the achievement of external economy needed to accelerate a sustainable pace of development would be difficult.

Hypothetical Extraction

The abolishment of *TEXTILE* would result in the highest impacts as the total outputs would decrease by 22 percent of the total outputs before extraction (Table 6). It should be noted that the hypothetical extraction in the study attempts to estimate only the effects on aggregate outputs, while impacts on other socio-economic factors are not examined. This may underestimate the real total impacts; therefore, interpretation of the result should be done with caution. Second and third sectors are T*rade-Transportation* and *Agriculture*, which are the sectors with relatively high forward linkages and considerably high shares in total outputs. In addition, *FBT* ranks moderately high, while *METAL* and *MOTORT* rank low in this exercise, which is quite consistent with the linkage indices; as a result, the shutdown of the latter two sectors would be less consequential. *MINQ* ranks at the bottom since this sector does not have any noticeable interconnection, as it has been neither an active producer nor exporter. Manufacturing sectors, other than *TEXTILE* and *FBT*, have modest impacts, at 2.5 percent on average. It can be concluded that *Agriculture*, *Textile* and *Food-Beverage-*

Table 6 Hypothetical Extraction Effect on Outputs

	Sector	Change in Total Output (Δx) (US$ Million)	Percentage Change in Total Output		Sector	Change in Total Output (Δx) (US$ Million)	Percentage Change in Total Output
5	TEXTILE	5,354.12	22.03%	18	OTHSER	1,059.58	4.36%
14	WTT	4,517.62	18.59%	11	OTHMNU	502.59	2.07%
1	AGR	4,003.35	16.47%	9	FMETAL	434.15	1.79%
15	HR	2,154.82	8.87%	12	EGW	308.56	1.27%
4	FBT	2,050.35	8.44%	7	RP	291.38	1.20%
16	PFR	2,030.06	8.35%	6	WP	224.33	0.92%
13	CON	2,000.78	8.23%	10	MOTORT	168.94	0.70%
2	FISH	1,469.67	6.05%	8	METAL	111.51	0.46%
17	AEH	1,459.39	6.00%	3	MINQ	93.27	0.38%

Source: Author

Tobacco goods, and T*rade-Transport* and *Hotel-Restaurant* services have the highest impacts if they are eliminated.

Normalization Values and Ranking

Since each sector has its rank for each indicator, key sectors should be picked carefully. To provide the final ranking, the study applies the normalization scoring approach:

$$s=\frac{z_i-\min(z)}{\max(z)-\min(z)} \qquad (0<=s_i<=1,\ i=1,\ ...,\ 18)$$

where z represents each indicator and z_i is the value of sector i for indicator z. The normalization value (s) gives the score to each sector in each different indicator. Finally, the study estimates the First Principle Component to rank the sectors as shown in Table 7, where *FBT, HR, AGR, RP and EGW* are the top five sector.

7. Conclusion and Implications

This study analyzed potential export sectors by applying the I-O framework, utilizing five indicators. The study finds that *Agriculture* generates high employment, and *Food-Beverage-Tobacco* has strong linkages, generates the largest total income multiplier and requires relatively high

Table 7 Sectoral Normalization Scores and Ranks

	Sector	BL	FL	Income Multiplier	Labor Content	Net Foreign Exchange	HEM	Principle Component	Rank
1	AGR	0.27	1.00	0.02	1.00	0.29	0.74	2.15	3
2	FISH	0.31	0.44	0.03	0.07	0.27	0.26	−0.42	10
3	MINQ	0.14	0.10	0.01	0.08	0.28	0.00	−1.33	17
4	FBT	1.00	0.28	1.00	0.28	0.00	0.37	3.52	1
5	TEXTILE	0.03	0.03	0.02	0.05	0.36	1.00	−0.89	14
6	WP	0.43	0.13	0.13	0.28	0.30	0.02	0.02	7
7	RP	0.75	0.71	0.14	0.02	0.29	0.04	0.81	4
8	METAL	0.27	0.18	0.00	0.04	0.29	0.00	−1.06	15
9	FMETAL	0.29	0.44	0.11	0.04	0.20	0.06	−0.52	11
10	MOTORT	0.00	0.03	0.08	0.00	0.26	0.01	−1.70	18
11	OTHMNU	0.07	0.42	0.02	0.07	0.25	0.08	−1.13	16
12	EGW	0.55	0.19	0.24	0.11	0.27	0.04	0.27	5
13	CON	0.28	0.07	0.04	0.10	0.12	0.36	−0.76	12
14	WTT	0.32	0.30	0.03	0.20	0.37	0.84	0.20	6
15	HR	0.86	0.00	0.48	0.24	1.00	0.39	2.22	2
16	PFR	0.30	0.51	0.05	0.10	0.30	0.37	−0.17	8
17	AEH	0.40	0.03	0.03	0.23	0.20	0.26	−0.34	9
18	OTHSER	0.20	0.20	0.00	0.10	0.46	0.18	− 0.86	13

Source: Author

labor intensity. *Textile* would contribute to the highest impact on total outputs, yet possesses weak linkages. *Wood-Paper* and *Rubber-Plastic* are moderately important in most indicators. *Trade-Transportation* ranks high in the last two indicators, whereas *Hotel-Restaurant* is the top foreign exchange earner and is important in a few other indicators.

The findings suggest that high import dependency with the absence of technical inter-industry linkages is a cause of concern for the export-orientation process of Cambodia. While the strong linkage-oriented industries, such as food and rubber, have not been able to realize their full potential in exports, the largest current industry (textile) is unlikely to contribute enough profit to foster future growth due to the lack of inter-industrial linkages. This limited interaction is evident when net exports are dominated by a few commodities and when most sectors with relatively high linkages in both income and labor intensity are neither the net earners of foreign exchange nor the main contributors to outputs. This underscores that the potential of export can be realized through the requirements of not only diversification, but also linkage creation between sectors. This finding is consistent with previous study by Kobayashi et al (2009) who found that agriculture, food sector, and hotels-restaurants are able to induce wide distribution to domestic income while garment cannot secure long term distribution. After the discussion of the sectoral pattern, the study suggests that attention should be given to the following four key sectors with export potential: *Agriculture, Food-Beverage-Tobacco, Rubber-Plastic*, and *Hotel-Restaurant*, which, by and large, is in line with the trade development policy of the government toward export diversification.

The government also recognizes the importance of the above sectors while more attention should be needed. For one thing, agriculture products: fishery, livestock and crops are among the 19 potential products in DTIS 2007. In addition, values of agro-food export has increased gradually, accounting for 5 percent of total export in 2011 (MoC, 2014). Main export items are tobacco, cane sugar and palm oil. The Industrial Development Plan (RGC, 2015) also targets an increase of processed agricultural exports from eight percent of total exports in 2015 to 12 percent in 2025. With agriculture-endowment and significant changes underway global demand for ready-made food products in Asia, Cambodia has an opportunity to expand its agro-food industry. However, the number of items exported has been limited, while rice and beer are the only two products listed in the DTIS, Cambodia should be able to enlarge further its exporting items of this sector. For instance, processed meat and fruit, frozen fish and shrimp, wine, and non-alcoholic drink have been able to enter the world market but still at an initial stage which require improvement. Despite its potential, the processed food industry—other than the rice sector—has received little strategic attention, with the lack of domestic investment along the value chain. Also, national business association specific to this industry has yet existed in Cambodia (MoC, 2014). Moreover, the industry is characterized by SMEs with emerging larger firms both heavily focus on domestic demand, while breaking into international market has just been starting, whereas the lack of compliance with quality standard of Sanitary and Phyto-Sanitary (SPS) measures is

a key constraint. With the challenges, encouraging investment and value addition, and improving the quality standards should be a priority.

Rubber plantation has increased during the recent years, with 86,052 tons of exports in 2013, almost all of which are in the form of natural rubber (MAFF, 2105; MoC, 2014).[6] 87 percent of formal natural rubber exports in 2007 went to Vietnam which has suitable facility to process and re-export. Over the past five years, however, this figure has declined to 58 percent as exports to other markets (China and Malaysia) has grown due to significant investment efforts and expansion of the production capacity (MoC, 2014). However, the remaining challenges are the difficulties of meeting international standards.

The increased investment and exports of hotel-restaurant services largely attribute to the strong tourism sector. International tourist arrivals increased from 2 million in 2007 to 4.5 million in 2014 with 68 percent of hotel occupancy (MoT, 2015). As of 2009, 60 percent of hotel rooms and guesthouses were located in Siem Reap, while they are more limited at the coastal area, and are harder to access in other areas of the country (MoC, 2014). Despite the low-cost of the services, issues around the quality of food hygiene and sanitation persist. In addition, inadequate transport and tourism infrastructure also adversely affects hotel-restaurant outputs. Leakage of revenue due to imported inputs including agro-food product—estimated to be around 25 percent—is also putting pressure to the contribution of this sector.

Having identified the strategic export sectors, several implications can be proposed. First, the country should encourage production and investment of the targeted sectors, especially the food and rubber-processing industries. This can be done through special incentives to establish factories, and provision of subsidized infrastructure, such as parts of export-processing zones or special economic zones. Second, increasing the supply chains of domestic agro-industrial production is required through the establishment of a contracting system between agriculture and manufacturing and the formation of business associations. Investment in clearing and storage houses is vital to link potential investors with local partners/farmers via contract farming (demand-supply contract). In addition, the establishment of geographical clusters of local business around large/foreign firms should be encouraged, and local content requirements should be strictly imposed to increase local processing and value added of rubber exports. Third, agro-industrial SMEs should be encouraged to be involved in export activities. Most domestic firms, such as food-processing, small holding rubber plantations, and hotels-restaurants are SMEs which base their operation mainly on local intermediates. Involving them in export activities, thus, will benefit localization. Some necessary supports, such as access to subsidized credit and duty-free measures, should be provided. Last, to achieve the objectives of export promotion, the country should seek for quality guarantee for the four proposed industries and provide training and technical know-how to improve compliance with international quality standards.

Notes

1 Trade deficit has persisted over two decades. The figure has slightly decreased from 11 percent of GDP in 2000 to 8 percent in 2013.

2 Diversification index is calculated in UNCTADStat by measuring the absolute deviation of the trade structure of a country from world structure. A value closer to 1 indicates greater divergence from the world pattern (UNCTAD, 2014).

3 Normalization approach is discussed at the last part of section 6, under the subsection "Normalization Values and Ranking".

4 The description of each sector is given in Appendix, Table A. 3.

5 The term "industry" and "sector" are used interchangeably from this section.

6 The figure may be underestimated due to significant quantities of natural rubber exported informally across borders (MoC, 2014).

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Appendix

Table A.1 Export and Import by Categories, Share in Total Value (1995–2012)

	Export (share in total)			Import (share in total)		
	1995	2005	2012	1995	2005	2012
Primary commodities[1]	74.71	4.95	9.79	18.41	13.21	22.28
Food items	3.99	2.42	4.90	23.83	10.14	12.91
Milled rice	0.69	0.09	1.48			
Beverage Tobacco	0.07	0.49	0.50			
Manufactured products						
Low tech/Labor-intensive/	19.62	84.39	79.35	24.57	48.51	37.72
Garment	16.72	79.22	66.32			
Footwear	0.56	3.70	8.16			
Bicycle/Motor-vehicle[2]	0.27	0.07	3.41			
Medium tech	0.38	0.41	1.53	14.82	13.38	15.36
High tech	0.77	7.64	4.46	16.91	13.41	11.25

Note: [1] excludes food items, [2] includes exports of second hand vehicles
Source: Unctad, 2014

Table A.2 Positioning Levels of the 19 Products and Servicers

	Export potential					Human development	
	Estimated export in 2005 ($ 1,000)	1. Export performance	2. World markets	3. Domestic supply condition	Export potential assessment (average 3 indices)	Estimated employment	4. Human development assessment
List 1							
Garments	2,610,766	H (5.0)	H (3.5)	H (3.8)	High (4.1)	360,000	High
Footwear	156,513	H (4.1)	M (3.1)	H (3.5)	High (3.6)	4,500	Medium
Cassava	13,000	L (1.2)	H (5.0)	H (3.5)	High (3.5)	4,000	Low
Rubber	9,095	L (1.2)	H (3.9)	H (4.5)	High (3.2)	40,000	Medium
Fishery	100,000	M (3.0)	M (2.7)	H (3.5)	Medium (3.1)	260,000	Medium-High
Rice	200,000	H (5.0)	L (1.2)	M (3.0)	Medium (3.1)	2,940,000	Medium-High
Soybeans	34,000	L (1.7)	H (3.4)	M (3.0)	Medium (2.7)	16,500	Low-Medium
Cashew nuts	50,000	L (2.0)	M (2.7)	M (3.0)	Low (2.6)	12,000	Medium
Silk	4,000	L (1.1)	M (2.7)	L (2.3)	Low (2.0)	20,500	Medium-High
Livestock	19,000	L (1.4)	M (3.1)	L (1.3)	Low (1.9)	400,000	Medium
Corn	25,000	L (1.5)	L (1.2)	L (2.5)	Low (1.7)	12,500	Low-Medium
Beer	975	L (1.0)	M (2.8)	L (1.0)	Low (1.6)	3,000	Low
List 2							
Fruits and vegetables	269	L (1.0)	H (3.2)	Medium	Medium	..	Medium-High
Wood products	5,547	L (1.1)	M (2.9)	Medium	Medium	..	Medium
Light manufacturing	3,336	L (1.1)	H (3.3)	Medium	Medium	..	Medium
Tourism	..	High	High	Medium	High	..	High
Labour services	..	Medium	High	Medium	Medium	..	Medium
Web-based services	..	Low	High	Low	Low	..	Low
Transport services	..	Low	Medium	Low	Low	..	Low

Note: *List 1=Currently-Exported Products, List 2=Services and Non-Exported Products*
Indexes range from 1 (lowest ranking) to 5 (highest ranking). Product sectors rank "high" with an index of more than 3.1, medium with an index between 2.7 and 3.1, or low with an index of less than 2.7. "n.a"=not applicable. The composite indexes for livestock and beer do not take into account domestic supply conditions and socio-economic impact due to lack of comparable data.
Source: MoC, 2007

Table A.3 18 Sectors in the I-O Table of Cambodia, 2011

Number	Sector	Description	
1	AGR	Agriculture, Hunting, Forestry, and Related Service Activities	Agriculture
2	FISH	Fishing, Aquaculture, and Service Activities Incidental to Fishing	
3	MINQ	Mining and Quarrying	Industry
4	FBT	Manufacture of Food Products, Beverages, and Tobacco	
5	TEXTILE	Manufacture of Textiles, Wearing Apparel, and Footwear	
6	WP	Manufacturing of Wood, Wood Products, Paper, and Paper Products	
7	RP	Manufacture of Rubber and Plastic Products	
8	METAL	Manufacture of Basic Metals	
9	FMETAL	Manufacture of Fabricated Metal Products; and Office and Computing Machinery	
10	MOTORT	Manufacture of Motor Vehicles and Other Transport Equipment	
11	OTHMNU	Other Manufacturing	
12	EGW	Electricity, Gas, and Water Supply	
13	CON	Construction	
14	WTT	Wholesale, Retail Trade, and Transport Service	Service
15	HR	Hotels and Restaurants	
16	PFR	Post and telecommunications, Financial intermediation and insurance, Real estate, renting and business services	
17	AEH	Public administration and defense, Education, Health and social work	
18	OTHSER	Other Community Service Activities	

Table A.4 Structural Feature of Cambodian Economy, 2011

	Sector	Production	Value added	Export	Import	Export intensity	Import intensity	Employment	Labor income
1	AGR	16.05	23.42	1.10	0.65	2.05	1.33	64.45	41.13
2	FISH	5.59	7.34	0.04	0.01	0.23	0.03	1.53	6.73
3	MINQ	0.34	0.45	0.00	0.62	0.15	59.88	0.13	0.23
4	FBT	5.81	3.66	0.41	6.10	2.09	34.68	0.82	1.90
5	TEXTILE	20.89	13.36	67.04	31.34	95.98	49.58	5.42	6.22
6	WP	0.75	0.65	0.88	1.90	35.12	83.68	0.72	0.56
7	RP	1.08	0.57	0.08	1.65	2.33	50.56	0.01	0.73
8	METAL	0.40	0.30	0.35	1.45	25.91	118.53	0.08	0.41
9	FMETAL	1.59	1.34	0.53	12.31	10.01	255.33	0.32	0.53
10	MOTORT	0.65	1.02	0.15	3.76	7.09	190.97	0.02	0.09
11	OTHMNU	1.92	2.15	1.03	33.27	16.08	571.88	0.61	0.88
12	EGW	1.01	0.48	0.00	0.22	0.00	7.34	0.42	0.30
13	CON	6.85	6.30	0.05	0.93	0.22	4.50	2.76	4.34
14	WTT	15.36	15.62	8.36	3.27	16.28	7.04	11.82	18.03
15	HR	5.77	4.18	13.75	0.03	71.26	0.19	2.32	2.81
16	PFR	7.29	8.94	2.38	1.67	9.76	7.59	2.28	5.48
17	AEH	4.82	5.14	0.00	0.47	0.00	3.24	4.68	5.06
18	OTHSER	3.83	5.09	3.83	0.33	29.92	2.84	1.62	4.58
	Total	100.00	100.00	100.00	100.00			100.00	100.00

Note: Full description of the sectors is given in Table A.3

Source: 2011 SAM, Employment data is obtained from CSES, 2009