Export Orientation and Economic Growth:
Implications for Cambodia's Potential Industries

by

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Abbreviations

ADB	Asian Development Bank
AVEs	Ad Valorem Equivalents
ASEAN	Association of South East Asia Nations
BL	Backward Linkage
CGE	Computable General Equilibrium
CES	Constant Elasticity of Substitution
CET	Constant Elasticity of Transformation
CSES	Cambodia Socio-Economic Survey
DTIS	Diagnostic Trade Integration Study
EP	Export Promotion
EPZs	Export Processing Zones
FDI	Foreign Direct Investment
FL	Forward Linkage
F.O.B	Freight On Board
FTA	Free Trade Agreement
GDP	Gross Domestic Product
GSP	Generalized Special Program
GTAP	Global Trade Analysis Project
HEM	Hypothetical Extraction Method
IMF	International Monetary Fund
I–O	Input-Output
IS	Import Substitution
MFA	Multi-Fiber Agreement
MFNs	Most Favor Nations
MOC	Ministry Of Commerce
NBC	National Bank of Cambodia
NIEs	Newly Industrialized Economies
OECD	Organization of Economic Cooperation and Development
PEP	Partnership for Economic Policy Networks
R&D	Research and Development
RCA	Revealed Comparative Advantage
SAM	Social Accounting Matrix
SEZs	Special Economic Zones
SPS	Sanitary and Phyto-Sanitary
TBT	Technical Barriers to Trade
Trade SWAps	Trade Sector-Wide Approaches
WDI	World Development Indicators
WTO	World Trade Organization

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Chapter 1: Introduction

1.1. Background of the Study

A strong force of economic integration has emerged during recent decades and brought along not only physical and financial capital but also technological upgrading for economic acceleration. The concepts of trade policy have changed over time since the 1950s, and now trade policy has become one of the main concerns for development. Trade was once centered on import substitution policy, in which domestic production was encouraged and protected to replace imports to satisfy domestic demand with incentives provided to the so-called infant industries—newly established industries with the high potential to grow (Todaro & Smith, 2009). This initiative was seen as the road to industrialization. However, another point of view suggests export promotion policy for developing countries to stimulate growth. Lessons from remarkably high growth countries, especially the first tier of newly industrialized economies (NIEs), including South Korea, Hong Kong, Taiwan and Singapore, and later the second tier NIEs, namely Malaysia, Philippines, Thailand, and Indonesia, give strong evidence of successful export-led growth (Weiss, 2005). This strategy has also been merged into the growth policy of some other developing countries in Asia and other regions.

Similarly, Cambodia has incorporated trade into growth policy. During the early 1990s, Cambodia attained political stability, transformed from a centrally-planned to a free-market economy, and carried out several institutional and economic reforms, including in trade and export. Trade liberalization has been one of the main driving forces for the country's strong economic performance. Cambodia's trade increased from 48 percent of GDP in 1993 to 140 percent in 2013, more than half of which is accounted for by exports growing at 18 percent on average annually (WDI, 2015). Notably, the garment industry and tourism are the leading export sectors over the last decade (World Bank, 2009). This growth has been realized through a combination of targeted policy—tax incentives and quota increases for the garment sector—and horizontal policy such as tariff cuts and the accession to ASEAN in 1999 and the WTO in

2004. Other factors such as general macroeconomic stability and the security environment also play central roles in this achievement.

Before further discussion of Cambodia's export performance, some keywords should be defined for a better understanding. According to Todaro and Smith (2009, p. 822), exports are the value of all goods—merchandise—and non-factor services—freight, insurance, travel and others (excluding factor services such as investment receipts and remittances)—sold to the rest of the world, whereas merchandise exports, valued f.o.b (freight on board), refer to "all international changes in ownership of merchandise passing across borders" from exporting to importing partners. Export promotion, on the other hand, is defined as "governmental efforts to expand the volume of a country's exports through incentive and other means in order to generate more foreign exchange and improve the current account of its balance of payment" (Todaro and Smith, 2009, p. 822). Questions emerge as to which products a country should export, what impacts they would bring, and what factors make exports boom. Trade theories, as well as empirical studies, strive to answer the questions, yet how to adopt and succeed in promoting export performance is largely dependent on each economy's characteristics and circumstances; therefore, a comprehensive study related to the issues is needed for each economy.

1.2. Problem Statements

Along with rapid growth, Cambodia's exports face a number of challenges, a few of which cannot be overlooked and for which immediate actions are needed. First, diversification toward new goods and services has made slow progress, while manufacturing production chains have remained low. Although the tourism sector has stayed strong, the garment industry has slowed down, especially during the late 2000s, thus merchandise trade which depends highly on the garment sector has been vulnerable. Because of these facts, additional strategic sectors with export potential and export improvement techniques need to be identified. The low-end garments and exporting markets within the garment sector itself are mainly based on the

advantages of quota assessment; for example, the US and EU market are the main exporting partners due to the increased access through the quota system under the Everything-But-Arms initiative, while intermediates are mostly imported and assembled into finished products. Other sectors, both exporting and non-exporting, have been left unaffected, and the economic linkages for growth seem to be ignored (World Bank, 2009). As a result, the impacts of exports on other factors such as the employment and the creation of value chains are limited.

Second, the trade deficit has persisted over two decades. The current account deficit peaked at ten percent of GDP in 2012, and the trade deficit has remained around eight percent of GDP since 2005, showing that moderate exports are not enough to cover the loss of foreign exchange because of higher imports (IMF, 2012; WDI, 2012). The deficit is currently financed by foreign direct investment and official loans. Although it is projected that the deficit will narrow in the medium term along with saving-investment and higher export growth, the possibility and sustainability of deficit reduction is being questioned due to the unidentified determinants of export growth and improved competitiveness. Shown in Table 1.1, in comparison with other ASEAN members, the level of trade openness of Cambodia, the trade-GDP ratio, is at 1.28 on average from 2005 to 2010, which is similar to that of Thailand and

Table 1.1: Trade Performance, ASEAN, 1995-2011

	Trade Dependency (Trade-GDP ratio)			Trade Balance (percentage of GDP)			Export share to ASEAN
Country	**1995**	**2000**	**2011**	**1995**	**2000**	**2011**	**2011**
Brunei	1.16	1.03	1.10	3.89	31.54	52.15	0.51%
Cambodia	0.78	1.12	1.14	-15.40	-11.92	-5.42	0.26%
Indonesia	0.54	0.71	0.51	-1.33	10.52	1.41	13.61%
Lao PDR	0.61	0.74	0.82	-14.11	-14.12	-6.21	0.39%
Malaysia	1.92	2.20	1.67	-3.93	19.21	15.90	18.04%
Myanmar	0.03	0.01	..	-3.93	19.21	15.90	1.49%
Philippines	0.81	1.05	0.67	-7.82	-1.99	-5.00	2.78%
Singapore	3.49	3.72	3.91	16.76	12.85	26.67	41.06%
Thailand	0.90	1.25	1.49	-6.74	8.63	4.54	17.47%
Vietnam	0.75	1.13	1.78	-9.10	-2.46	-4.22	4.40%
							100.00%

Source: World Development Indicators, 2012; Unctad, 2012 “International Trade in Goods and Services”

relatively higher than that of Indonesia and the Philippines, yet the trade deficit of Cambodia is relatively large compared to those countries.

Third, Cambodia's exports to the regional market have remained low. In 2011, for instance, Cambodia's exports to ASEAN accounted for 0.26 percent, the smallest share, of the total exports from all of the ten countries into the region (Untactad, 2012, WDI, 2013). Meanwhile, Cambodia has underperformed in relation to others regional 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 to realize the potential gain from regional free trade while much more could be done for better performance. Last, a number of cross-cutting business environment constraints related to trade facilitation hinder the growth of both exports and other sectors although export potential exists. The limitations include the cost and time of customs, standards, and logistics, together with the investment environment and trade barriers across borders. Although the government has been working to address the problems, without specific efforts dealing with the most crucial factors affecting exports, the outcome is doubtful.

1.3. Research Objectives and Questions

Aspiring to address some of the challenges, the dissertation attempts to achieve three objectives:

Objective 1: To specify Cambodia's key sectors which are promising for exports and for industrial connection.

- Which export sectors contribute to the highest inter-sectoral linkages in the domestic economy?
- Which export sectors can be competitive in terms of labor intensity and which sectors are net foreign exchange earners?

Objective 2: To measure the potential impacts of the promising sectors—agriculture and agro-industry (following the findings from objective 1)—on economic growth and employment, and to examine policy options for export promotion.

- What are the impacts of quantity and price changes of the potential export sectors on the economy in terms of growth, employment and household welfare?
- Which policy measures can be carried out for the promotion of export orientation in the potential industries?

Objective 3: To quantify the impacts of trade facilitation on economic and export structures.

- To what extent does the improvement of trade facilitation impact trade and the economic structures of Cambodia?
- How does every export sector respond to trade facilitation?

1.4. Research Methodology

For first objective, the study applied the Input-Output framework, which is widely used for inter-industrial policy studies, among others. In adopting this model, the study reveals the sectoral features of the economy and utilizes Cambodia input-output table, comprising 22 sectors, derived from the 2011 Cambodia Social Accounting Matrix (SAM) (Heng et al., 2014). The data on employment by sector is generated from the Cambodia Socio-Economic Survey (CSES 2009). The specification of key sectors is based on five approaches:

- Backward and forward linkages: a key sector should have high backward and forward linkages with the rest of the economy so that it contributes more favorably to the increase of outputs.
- Multiplier effect on income: one sector should generate high direct and indirect income since the prime purpose of export growth is poverty elevation and better income distribution.
- Labor intensity: a key sector requires high labor intensity for export competitiveness as well as for employment generation appropriate to the labor-intensive characteristic of Cambodia.
- Foreign exchange earnings: a key exporter should earn more foreign currency than the amount spent on intermediate imports.

- Hypothetical extraction: the elimination of a sector will impact the whole economic system. The stronger a sector impacts, the higher the level of its importance.

Sectors to be identified as promising for export should fall into most, if not all, of the five criteria above. In other words, the key export sectors should have high linkages, generate the highest total income multiplier, require the highest labor contents in production, earn net foreign exchange, and cause a significant loss if they closed down.

The second objective examines what is going to happen if the country promotes export orientation in the potential sectors provided by the findings from the first objective. The study aims to move from the econometric approach, which has commonly been used to capture export and growth relationships, to a Computable General Equilibrium (CGE) approach by applying the standard model created by Partnership for Economic Policy Networks (PEP) with the data from 2011 SAM and the Socio-Economic Survey (CSES 2009). The analysis, as the objective suggests, focuses on the impacts of the selected export sectors and the impacts of domestic policies that are plausible to promote export orientation in those sectors through a series of counterfactual simulations outlined below:

- External shocks: quantity and terms of trade shocks
- Internal shocks: changes in labor productivity and capital demand
- Domestic policy: changes in subsidies and tariffs

The third objective incorporates a trade facilitation framework into the CGE model by adding a new dataset, variables, and equations of time costs to export and import. The advantage of integrating time costs into the model is to demonstrate further the impacts on economic welfare, and the general equilibrium impacts on production and trade linkages of reducing time delays in the importation and exportation of goods. Initially, the data source of time costs which have been converted to per day ad valorem equivalents (AVEs) of time to export and import is collected from the GTAP database. The per-day AVEs to time in trade are multiplied by the number of days to complete export and import procedures. The study performs simulation

analysis to examine to what extent an improvement of trade facilitation affects trade and the diversification structure of Cambodia, and to distinguish how the effects of trade facilitation and trade liberalization differ.

1.5. Contributions of the Study

Each objective contributes partly to the originality of the study. Objective one uses the I-O table which derived from the SAM; however, since there is no employment data corresponding to the I-O table, the current study has generated employment by sector from the National Institute of Statistic's (NIS) Cambodia Socio-Economic Survey for the analysis. For the methodology, to the best of my knowledge, this is the first study to combine the five approaches to analyze potential sectors and, more importantly, to be based on both the traditional Rasmussen's linkages and the more current hypothetical extraction method. The normalization approach for the ranking given to each indicator at the end of the estimation is another contribution to the literature.

To make it fit with the study purpose, objective two makes some modifications to the data and the conventional model. First, the household account is reclassified into six new categories, distinguished by area and living standard level: Phnom Penh poor and non-poor, other urban poor and non-poor, and rural poor and non-poor. Both the income and expenditure (characterized by sector and skill level) of each group are generated from the CSES (2009) dataset. This new household account contributes to the originality of the data applied in the study. Second, standard CGE models usually determine a fixed supply of factors (labor and capital) while wages/rental rates adjust to clear the market to achieve full employment equilibrium. Nevertheless, to capture the labor market characteristic of Cambodia, this study assumes an unemployment labor market, by introducing an unemployment variable while keeping labor supply exogenous and wage endogenous.

The last objective, which incorporates a trade facilitation framework into the conventional CGE model, is the first attempt to utilize this PEP model in combination with the

data of tariff equivalents of time to trade database to measure the effects of trade facilitation in Cambodia. Existing studies have explained Cambodia's trade flows and competitiveness as well as suggested that the country's trade is highly concentrated in a few products and that diversification is needed. However, few have focused on suggesting strategic sectors; even those that have were mainly based on qualitative approaches rather than quantitative ones. This dissertation, therefore, contributes to the empirical literature within the topic of export orientation and economic growth, particularly for the case of Cambodia, which can be further developed for similar impact studies of economic and development subjects.

1.6. Structure of the Thesis

The dissertation comprises seven chapters, structured as sketched in Figure 1.1. Chapter one introduces the background of export-led growth. The current export pattern of Cambodia is briefly discussed, followed by the research problems explaining why the current challenges should be addressed and why the study should be carried out. The chapter lists research objectives and methodologies to be used to achieve each objective. The possible contributions of the current study are also provided.

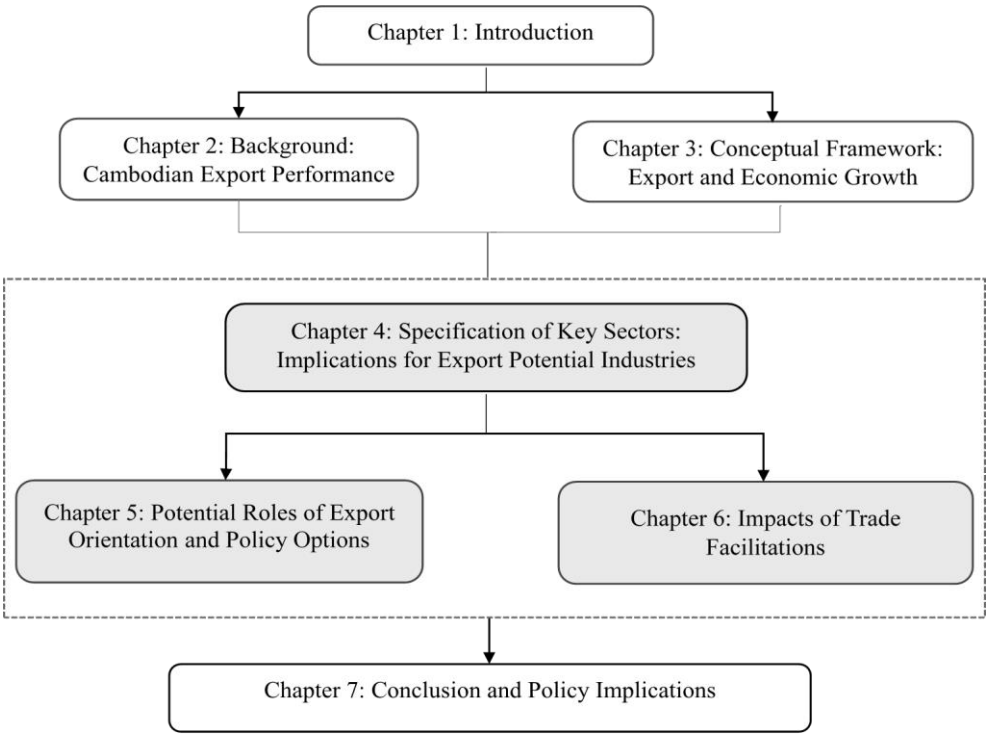
Chapter two illustrates trade in more detail, specifically the export performance of Cambodia, and how it has been revolutionized over the last decades. This chapter is crucial to reveal historical activities of the economy in the areas of trade and export, as well as the failures and successes the country has experienced. The final part of this section will provide insights about policies implemented by the government, how effective the implementation has been, and the remaining challenges.

Chapter three reviews the conceptual framework related to trade in general and exports in particular, which covers the trade theories, the roles of exports in economic development, focusing on three aspects: why a country exports, what to export and what factors affect exports. The chapter also summarizes different methodologies previous studies have used for the same or similar objective of identifying potential sectors and factors effecting export expansion.

Chapter four, five and six are the analytical parts of the dissertation. Each chapter discusses the three objectives, respectively. The three chapters follow a similar structure: the introduction of the topic and objective, the problems and remaining challenges of the topic in question, the methodology and data, the empirical estimation and discussion of the results, and concluding remarks. In addition, a section of Asia experience in export-led growth is added to the last part of Chapter six. The first part of the section shows export performance of some high export growth countries, and the second part discusses policy reforms for export promotion in South East and South Asia, with a closer look at Malaysia experience. The last part of the same section demonstrates trade facilitation and infrastructure performance of Cambodia in comparison with other countries.

The last chapter concludes the whole dissertation with the summary of main findings and policy recommendations for Cambodia. Limitations and possible extensions for further studies are also provided in the last part of the chapter.

Figure 1.1: Structure of the dissertation



Source: Author

Chapter 2: Background: Cambodia's Trade, Export Performance and Policy

2.1. Economic and Trade Performance

Cambodia began the process of liberalization toward privatization and a free-market economy in the late 1980s with gradual price liberalization. Starting from the full formation of the Royal Government of Cambodia in 1993 after the Paris Peace Accord, the country began a broad range of actions in policy development and implementation in various sectors aimed at achieving high growth and sustainable development. Trade openness began following trade reforms, including the reduction of trade barriers and deregulation of export and import procedure. Since then, Cambodia has integrated export expansion into development policy. Going through both the difficult domestic history and the global experience of development, Cambodia is one of the few countries to have achieved sustained rapid growth, seven percent on average for 15 years, and its growth performance ranked seventh in the world for the period of 1998-2008 (NIS, 2014; World Bank, 2009). Income per capita has been increasing, more than doubling from1999, at 6.5 percent on average which is a significant achievement compared to the past 50 years of development across countries (NIS, 2014; World Bank, 2009). Despite the strong commitment, the progress in trade performance remains slow, and more efforts are needed to achieve the long-term goals.

2.1.1. Main Economic Performance

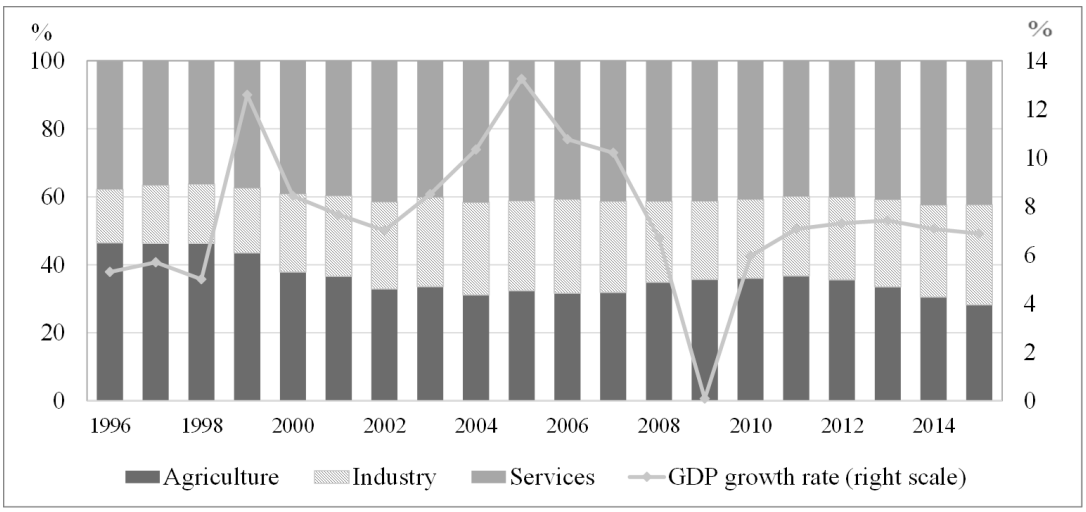
Total GDP has grown continuously from US$3.9billion in 1995 to US$9.9 billion (constant 2000 USD) in 2014, with an average growth rate of 5.7 percent annually (NIS, 2014). Despite the high growth, Cambodia, being reclassified from a low to a lower-middle income country by the World Bank in 2016, has faced some major downturns, in particular during the mid 1990s, when Cambodia encountered internal political instability, followed by the Asian financial crisis in 1997. The growth rate in the subsequent years fluctuated, but peaked at 13.2 percent in 2005 as the result of industrialization, investment and the significant increase in exports of textiles under the Multi-Fiber Agreement (MFA) quota provision of the United States

(US) and the European Union (EU) markets. The growth rate dropped by 10 percent from 2007 to 2009 as the consequence of the global economic crisis since overall growth had been highly dependent on the garment industry and tourism. The impact of the crisis reduced consumption and investment as well as exports. For instance, the decline in tourist visits, a slowdown in the construction sector, and a sharp decrease in garment exports affected the rapid GDP growth. Merchandise exports dropped by almost 20 percent in 2009, mainly because of the lower number of exports of the garment industry to the US and the EU markets; meanwhile, a sharp decrease of 27 percent in foreign investment combined with the slow growth of tourism receipts resulted in the almost no growth of real GDP (0.1%) in that year (NIS, 2011). The growth rate, however, started to rebound one year later, as reported by the National Institute of Statistics (2011). The construction sector began to recover in 2010 due to the return of large investment projects, and the tourism growth rate rose by 16 percent from the previous year. The growth trend was reestablished at the rate of seven percent in 2011.

2.1.1.1. Economic Performance by Sector

Cambodia has shifted from an agricultural-oriented economy to an industrial-oriented one, while the service sector has remained a major contribution, as shown in Figure 2.1. Agriculture contributed 28 percent to GDP in 2015, an almost 20 percent decline from the mid-

Figure 2.1: Share of Sectors in Economy and GDP Growth Rate



Source: ADB, 2016 “Key Indicators for Asia and the Pacific”

90s, while the share of industry and services increased to 29 and 42 percent respectively in 2015 (ADB, 2016). Among these, growth has been mainly driven by four sectors: garment, construction, tourism and agriculture.

Although the economic structure shifted and the share of the value added dropped, the agricultural sector remains one of the main sources of employment and income generation for the majority of the population, especially those living in rural areas. The report of World Bank (2009) indicated a 4.4 percent average growth rate of this sector over the past ten years, slightly more than that of Vietnam and Lao PDR (4.0 and 3.9 percent). The gain of land resource and productivity at approximately two percent per year has played a role in the growth of the sector. Industry, growing at an average of 16 percent per annum from 1998 to 2007, is the fastest growth sector and contributes to 3.4 points of growth annually (WDI, 2012; World Bank, 2009). This has led to employment growth, creating almost 100,000 new jobs each year, yet the labor productivity growth is stable. Textiles, wearing apparel and footwear rose dramatically from 5.7 to 58 percent from 1993 and 2010 respectively, accounting for the largest share of the total industrial sector, followed by the construction sub-sector—driven by some major projects like satellite city construction, tourism development sites, real estate construction, and public works such as roads, bridges, irrigation systems and hydro-power plants. The service sector has contributed a significant portion to the economy and ranks first in GDP share since 2000. However, this area has not yet extended to the technological and financial sectors. Instead, the main component of services includes trading, which remains one of the vital service subsectors along with the combination of tourism—hotels and restaurants—transport and communication, real estate and business. Employment absorption of this industry is also similar to that of the industrial sector but with a higher level of labor productivity growth, six percent per year from 1998 to 2007 (World Bank, 2009).

2.1.1.2. Macroeconomic Policy and Development Affecting Trade

a. Fiscal Policy, Inflation and Exchange Rate

From the late 1990s, after the Asian economic crisis and internal political instability, the inflation rate remained below five percent due largely to internal stability and the favorable external environment which generated a high demand for exports and official and private capital inflows, as well as to the contractionary policy intervention of the National Bank of Cambodia (NBC) (Keo, 2002). The inflation rate, however, fluctuated during 2008 and 2009, impacted by the global financial crisis. Consumer prices increased; food, electricity and gas prices doubled with the decrease of demand for some commodities during the economic downturn. After 2009, the inflation rate has remained stable and moderate, between four and five percent.

As a dollarized economy, Cambodia has appropriately managed policy mix, relying mainly on fiscal policy in recent years while monetary policy allowed the expansion of the financial sector. The local currency—Cambodian Riels (R)—represents only a small part of cash in circulation, mostly in small transactions and in the interior of the country, while a large share of assets and currency holdings are dominated in US dollars (IMF, 2012). Since 1993, Cambodia has followed a managed floating exchange rate regime (Keo, 2002). The official exchange rate of Riel against USD fluctuated at around 2,600 riel/USD until 1997, but depreciated around 27 percent after the Asian financial crisis and reached 3,800 riel/USD on average from 1998 to 2000. Over the last ten years, the riel-dollar exchange rates have remained stable, fluctuating mostly between 3,840 and 4,150 from 2000. Fiscal policy and monetary policy have been used by the government and NBC to stabilize the exchange rate market. However, Keo (2002) observed that monetary policy might not have been an effective tool due to the high level of dollarization in the market; in contrast, dollarization has been an instrument to lower the macroeconomic risks in the Cambodian economy and has helped stabilize the currency value even in times of rising inflation.

b. Fiscal Balance

Fiscal space remains a challenging task for the Public Financial Management Reform Program (PFMRP) although there is progress in increasing revenue and current spending has

been kept under control. Domestic revenue rose from 6.5 to 10 percent of GDP from 2003 to 2008 due to tax policy and administration reforms, including the establishment of a Large Taxpayer Department (LTD) and automated customs clearance (IMF, 2012). Even with signs of improvement, revenue has stayed low, and foreign-financed capital spending has been larger than budgeted, making the overall fiscal balance deteriorate. IMF (2012) reported the slow growth rate of revenue collection, which stayed lower than 0.5 percentage point of GDP in 2011, yet tax collection had a rise of almost one percentage point of GDP one year later. Weak tax administration can be one of the causes of the low tax-to-GDP ratio in Cambodia compared to the regional standard. Besides domestic taxes, government revenue growth slows down due to the Free Trade Area implementation causing trade taxes in total revenue to decline. As a result, greater revenue mobilization is needed to be self-sustaining. For this purpose, an integrated approach should focus on improving revenue administration, implementing fair and efficient tax policies, and strengthening governance. In addition, measures should be taken to prioritize policy actions to generate additional revenue, to be implemented at low cost, and to create strong positive externalities.

c. Foreign Direct Investment (FDI)

The establishment of Special Economic Zones (SEZs) is a tool to absorb private investment. The annual average investment rose from 15 to 21 percent of GDP from 1997 to 2007, generating an average of 2.4 points of growth per annum (World Bank, 2009). Although it is a major achievement, investment remains low compared to some high growth developing countries, and the contribution of physical capital accumulation to growth has been limited. FDI has played a crucial role in the process of industrialization in Cambodia since FDI does not only increase capital accumulation to finance trade deficits and international reserves but also brings along new technology. Moreover, most of FDIs are from large firms which absorb more labor force than that of domestic enterprises. Investment and industrial policy attracted FDI first in the construction and tourism industries in 1993, and a large number later in the

garment sector from 1996 after the bilateral agreement with the US had been signed (WTO Secretariat, 2011a). FDIs are from various countries, including China, Hong Kong, the Republic of South Korea, the US, Russia, and some ASEAN members. FDI-implemented projects peaked in 2007, amounting to US$867 million, but decreased thereafter, as shown in Table 2.1, with the total stock accounting for approximately 50 percent of total GDP (WTO Secretariat, 2011a). The garment industry represents the largest FDI in manufacturing, and investors from China received approximately 90 percent of investment approvals from 2005 to 2010. FDI has also started to diversify to other exports, especially those labor-intensive products such as footwear, wood products, and toys, and has made a significant contribution to employment.

Table 2.1: Foreign Direct Investment (in US$ million)

	2004	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**
FDI (implemented)	131	381	483	867	815	530	553
Approved projects (fixed assets)	201	589	2,390	1,382	7,169	2,229	2,496
FDI stock	2,090	2,471	2,954	3,821	4,637	5,167	5,720

Source: WTO Secretariat, 2011a

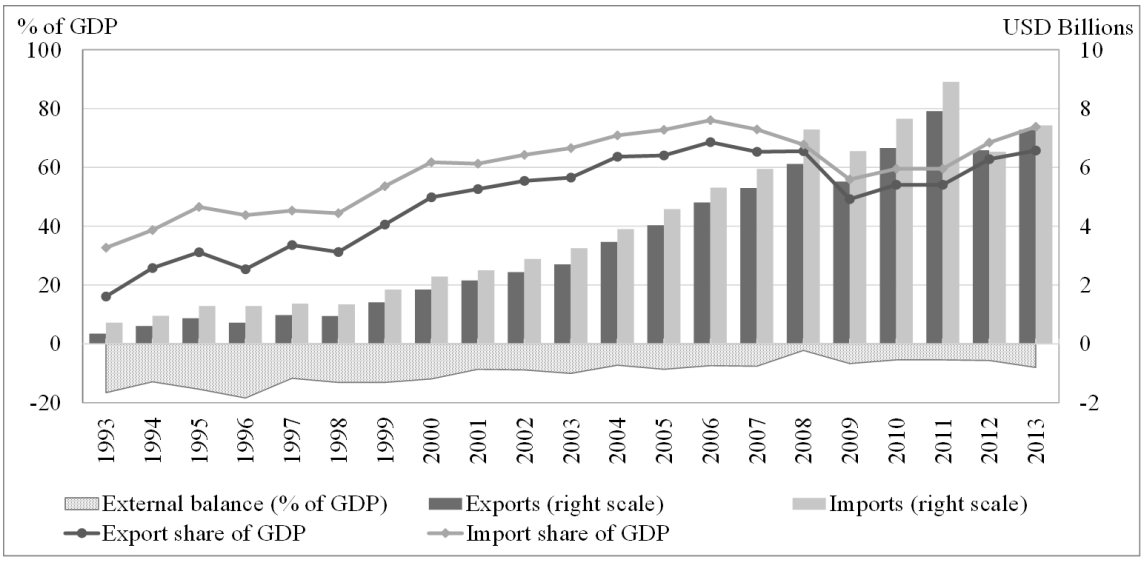
2.1.2.Trade Performance

Trade has been playing an important role as one of the main sources of income for the Cambodian economy. From the early 1990s to the late 2000s, trade share in the economy kept moving upward. Figure 2.2 illustrates that both export and import values, as well as export and import shares in GDP, have been moving along the same line and been competing for a positive move. However, the import figure has always been higher than that of the export, resulting in a trade deficit over the last two decades. Notwithstanding, the trade deficit has declined over the years (WDI, 2015).

The accession to ASEAN in 1999 was a major opening for Cambodian goods and services in international markets. Export and import volume has increased due to regional and sub-region free trade agreements and accelerated after 2005 with accession to the World Trade Organization (WTO), which safeguards the access to the US and the EU market as major trade

partners. Nonetheless, exports were severely hit in 2007-08 during the global economic crisis, demonstrating that Cambodia's exports are highly vulnerable to external shocks. These two components began to move upward again in 2010 and have recovered to the levels before the crisis, and they are forecast to move forward positively.

Figure 2.2: Trade Balance, Export and Import Figure



Source: World Development Indicators, 2015

2.1.2.1. Merchandise Trade

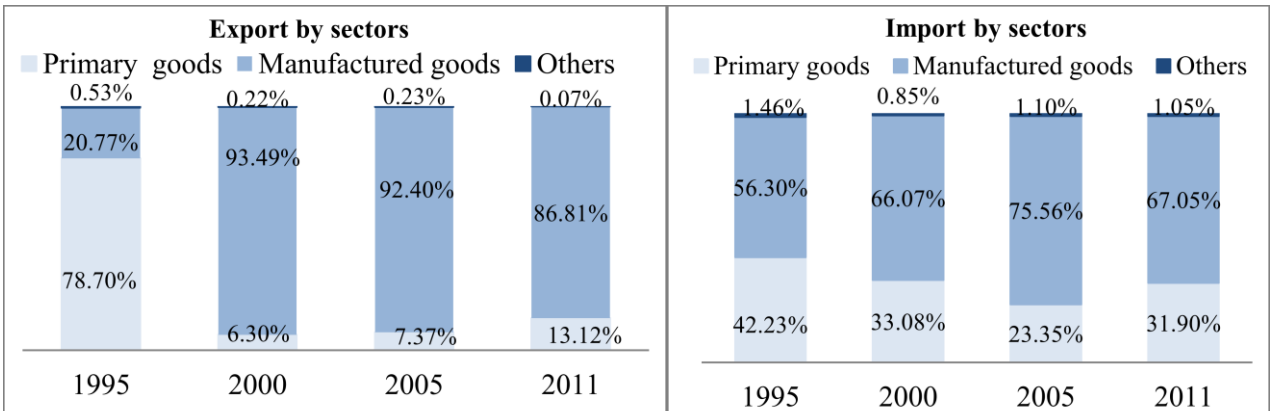
a. Export Profile

Exports by Sector: Exports of primary goods accounted for two-thirds of total exports during the beginning of the opening up period but declined and were replaced by exports of manufactured goods in the late 2000s due to the process of industrialization, movement of capital goods and technology, and the encouragement of investment in manufacturing. In 2011, manufactured goods made up 86.8 percent of total exports, while primary goods accounted for only 13.1 percent (UNCTAD, 2012). (Table A.1 in Appendix lists the merchandise exports by group of products from 2005 to 2010).

Export Commodities: Table 2.2 presents export and import commodities and partners. Apparel and clothing accessories are the main commodities exported, accounting for 54% of

the total exports in 2010 (Unctad, 2011), followed by miscellaneous manufactured articles, such as plastic, toys, stationery supplies, works of art, and jewelry, which share a total of 32% of total exports. Other exported goods include footwear, machinery specialized for particular industries, such as agricultural machinery, power generating equipment, and office machines. Cambodia also exports crude rubber, cork and wood (Table 2.2).

Figure 2.3: Export and Import by Sector



Source: Unctad, 2012 "International Trade in Goods and Services"

b. Import Profile

Imports by Sector: Manufacturing imports, including capital goods, are necessary for industrialization, but the figure is still high, which shows a relatively high dependency on imported intermediate goods for domestic production. The share of manufactured goods in total imports has remained quite steady during the last 15 years, comprising 67 percent in 2011, while there is a drop in primary imports reflecting less dependency on this item (Figure 2.3).

Import Commodities: Imports of manufactured goods include items such as iron and steel, rubber, metal and nonmetallic items. Machinery and transportation equipment combined with commodities and transactions are the next major import products. The rest include mineral fuels, lubricants and related materials, chemicals, and other products as detailed in Table 2.2.

2.1.2.2. Service Trade

The services account has remained in surplus, growing from US$290 million in 2004 to

Table 2.2: Export and Import Commodities and Partners (share in total exports), 2010

Export Commodity	2010	Export Partners	2010	Import Commodity	2010	Import Partners	2010
Apparel and clothing accessories	54.40%	USA	34.10%	Manufactured goods	33.10%	China	21.63%
Miscellaneous manufactured articles	32.40%	Hong Kong	24.80%	Machinery and transport equipment	16.65%	Thailand	21.40%
Footwear	3.20%	Singapore	7.70%	Commodities and transactions, n.e.s.	13.54%	Singapore	17.92%
Machinery specialized for particular industries	2.50%	Canada	4.90%	Mineral fuels, lubricants and related materials	12.67%	Vietnam	14.37%
Road vehicles (parts/accessories)	1.90%	Netherlands	4.20%	Food and live animals	6.64%	Hong Kong	7.12%
Crude rubber	1.50%	United Kingdom	4.20%	Miscellaneous manufactured articles	5.84%	South Korea	3.74%
Cereals and cereal preparations	0.70%	Thailand	2.70%	Chemicals and related products, n.e.s.	5.73%	Indonesia	2.50%
Cork and wood	0.70%	Germany	2.00%	Beverage and tobacco	4.18%	Malaysia	2.30%
Textile yarn, fabric, made-up articles and related products	0.30%	Spain	1.80%	Crude mineral, inedible, except fuels	1.05%	Japan	1.96%
Other transport equipment	0.30%	Vietnam	1.70%	Animal and vegetable oils, fats and waxes	0.60%	United States	1.79%

Source: UN Comtrade, 2012, "Trade Statistics"

US$663 million in 2010, accounting for six percent of GDP, due mainly to the growth of the tourism sector (WTO Secretariat, 2011a). Cambodia's exceptional cultural heritage, natural endowment, and its location in a dynamic region, together with some key policies, contribute to the rapid growth of tourism. After experiencing a contraction in 2009 due to a slowdown in global travel, the sector has recovered in the near term. Other services, such as trade-related services, transportation, insurance and freight, have positive prospects to contribute to the growth of service receipts.

2.2. Trade Policy Framework and Development

2.2.3. General policy orientation

Openness and integration are viewed as essential strategies for growth and poverty reduction, as they were included in the Rectangular Strategy Phase II of the government,

emphasizing the strategies for growth, employment, equity, and efficiency. They were also the basis of the National Strategic Development Plan of Cambodia, updated for 2015-2025, based mainly on international trade and investment.

The trade system of Cambodia depends significantly on the ability to expand, which is under critical consideration. Hence, identifying potential exports and increasing supply and competitiveness are the key elements of trade and development objectives of this country. Three policy headings are proposed (WTO Secretariat, 2011b):

- policies to ensure the vitality and competitiveness of existing exports
- policies to develop export potential and diversify export products and export markets
- policies to encourage investment and investment facilitation for exports

2.2.4. Main Trade and Related Laws

Legal and regulatory reforms have been undertaken, specifically during and after the process of international integration, to provide a better trade climate and bring trade regimes, business, and investment into line with international norms. Necessary laws and their implementation and enforcement, together with legislation and other administrative steps, are needed to achieve the goals of the reforms. Trade and some trade-related laws are listed in Table 2.3, some of which are in place for implementation and some are in draft for approval. For the trade area, a customs law was enacted in 2007 followed by laws on trade remedies, rule of origin, and standards—created to develop standard and product conformity assessments. In the subsequence years, a law on tourism, a law on insolvency, and sub-decree establishing a national commercial arbitrary body was promulgated.

2.2.5. Trade Facilitation

2.2.5.1. Business environment

Various business registration processes have been simplified along with the upgrade of investment promotion and trade facilitation. For instance, a Single Window model has been implemented to reduce the cost and time required for document processing, and an arbitration

center is being set up to deal with commercial disputes. The enhanced transparency, simplification, and accountability realized from the reforms will, on the one hand, help exports benefit from a faster process and build trust for investors, and, on the other hand, fight against

Table 2.3: Trade-related law on WTO access legal agenda

Area	Law/regulation	Area	Law/regulation
Trade	Customs Law	**Investment**	Amendment to the Investment Law and related sub-decrees
	MEF Regulation 387	**Competition**	Law on Competition
	Sub-decree 209	**Business framework**	Law on Commercial Court
	MoH Regulation 1031		Law on Judicial Organization
	Law on Trade Remedies		Law on Insolvency
	Law on Rules of Origin		Law on Commercial Contracts
	SEZ law		Law on Commercial Agency
	Law on Standards		Law on Commercial Arbitration
	MAFF Regulation 589		Civil Code, Civil Procedural Code, Criminal Code and Criminal Procedural Code
	Anukret 15 on Plant Quarantine		Law on Anti-Corruption
	Anukret 16 on Control of animal Hygiene and Animal Products		Law on Commercial Enterprises
	Inter-ministerial Prakas 868 on food safety		Law on Concessions
	Law on e-commerce	**Services**	Law on Telecommunications
IPRs	Sub-decree implementing the Law Concerning Marks, Trade Names and Acts of Unfair Competition		Amendment to the Labour Law
	Law on Geographical Indications		Draft amendment to the Law on Land Management and Urbanization
	Law on Integrated Circuits and Layout Designs		Amendment of the Law on Bar
	Law on Trade Secrets and Undisclosed Information		Law on Tourism
	Law on Seed Management and Plant Breeder Rights		Prakas on minimum standards in hotels
	Regulation on IP Border Measures		Law on Maritime Transport
	Law on Patents		Law on Insurance and Reinsurance
	Law on Copyright and Related Rights		Law on Financial Leasing
	Prakas on Trade Mark Agent		Law on Civil Aviation
	Sub-decrees on the establishment of a national Committee for IPRs (NCIPR) and sub-committees on enforcement and education		
	Draft compulsory licensing law/regulation for public health		

Source: WTO Secretariate, 2011b

corruption, reduce risk to investment, and the cost of doing business. Further progress is required. The World Bank (2009) recommends that some priorities in this area should include:

- further facilitation, in the area of business and trade, with more transparent processes and computerization
- regulatory simplification and clarification by reviewing the licensing agreement and reducing uncertainty in the tax area
- effective dispute resolution through an existing Labor Arbitration Council and other alternative mechanisms
- industrial relation facilitation and improvement of incentives for labor productivity gains
- further facilitation of regional integration through trade and investment policy improvement which include trade facilitation across ASEAN countries, facilitate transit and cross-border trade, and rationalize rules of origin.

2.2.5.2. Cross-border Trade

Some crucial measures of cross-border trade facilitation include: (1) the establishment of the Single Administrative Document (SAD) in 2006 as the replacement for 45 documents previously required at the border; (2) the introduction and operation of the computerization of customs clearance through ASYCUDA at border checkpoints from 2009, which has significantly reduced the time of customs declarations for more than 90% of import and export clearance, and is being developed to cover transit trade and to allow direct online data entry; (3) the introduction of risk management along with the ASYCUDA, resulting in the reduction of the physical inspections of the import and export containers (WTO Secretariat, 2011a). Besides, the development of Single Window and the implementation of the safe framework standard are among the lists of immediate plans.

2.2.5.3. Strengthening industrial policy

The role of industrial policy, as a part of development policy, has been recognized as a necessary instrument to address market failure because industrial policy aimed at strategic

collaboration and coordination between public and private sector will be an effective approach to link this policy to exports as a key "market-based test of performance" (World Bank, 2009). A number of industrial policies are already in place in many sectors which have received targeted supports such as quota negotiations for garments, "Open Skies" and infrastructure policy for tourism, and Special Economic Zones (SEZs) for assembly factories. Other existing industrial policy instruments are reviewed in Table 2.4.

Table 2.4: A Few Existing Industrial Policy Instruments

Instruments	Objectives/Notes
Export quotas for labor standards	Trade preferences granted by US in exchange for higher labor standards (monitored by BFC)
Tax holidays	Generous tax holidays for a range of sectors
Exemption of import duties and VAT for imported inputs used for manufactured exports	Ditto, but targeted at exporters
Investment promotion	Unit in Council for the Development of Cambodia in charge of investment servicing ("one stop shop") and investment promotion. Investment promotion activities are almost inexistent
Export promotion	Trade Promotion department in Ministry of Commerce, in charge of promoting new exports
Special Economic Zones	Provide a bundle of infrastructure, land, and tax exemptions in special zones
Export Market Access Fund (EMAF)	Provide matching grants to exporters undertaking a market access study
Government-Private Sector Forum	Identify and address constraints through public- private dialog
Value Chain interventions	Interventions financed by donors to support various parts of (usually) agribusinesses' value chains (the assessment would vary with the specific interventions)
Economic Land Concessions	Provide state land to investors

Source: World Bank, 2009

A finding reveals that most of the instruments seem to lack accountability, coordination, and incentives, or appear to be poorly targeted (World Bank, 2009). Outside of the garment sector, little progress has been achieved, particularly in investment and export promotions, land management and SEZs. Hence, it is important to make existing policy instruments more transparent and accountable to maximize their impacts. The World Bank (2009) suggested some priorities: (1) streamline of institutional responsibility and standards involving the division of

labor; (2) linkage between potential investors and local partners; (3) integration of value chains in agriculture through institutional models; (4) coordination in the tourism sector; (5) exploration in the area of training and coordination mechanisms; (6) measurement of growth at the intensive margin (i.e. growth within existing sectors); and (7) development of information and technology for a better coordination capability and productivity improvement.

2.2.6. Trade Development

Integration Framework: To integrate more efficiently and turn trade into a source of development, Cambodia, with the support of multilateral agencies and a number of development partners, adopted the Trade Integration Strategy in 2000 which described a comprehensive reform to improve the business environment, to create conditions helpful for exporters, to strengthen supply capacity, and to improve competitiveness (MoC, 2007). The Diagnostic Trade Integration Study 2002 (DTIS) has been implemented from this perspective. Trade and investment facilitation, intellectual property rights, Sanitary and Phyto-Sanitary (SPS) measures, technical barriers to trade, and the development of sectors are some actions identified in the first DTIS. To follow up the program, the Ministry of Commerce (MOC) launched the TRADE (Trade Related Assistance for Development and Equity) project in 2005 focusing on updating DTIS 2002 and on developing a Human Development Impact Assessment of Trade (HDIA) which frames the country's ability to turn trade development into poverty reduction and sustainable human development (MoC, 2007).

Aid for Trade and Trade Sector-Wide Approaches (Trade SWAps): Trade SWAps is a localized system providing a shared vision for the trade sector in a consultative and coherent way, which was launched during the implementation of the DTIS. It is the approach attached to Aid for Trade aimed at increasing trade effectiveness in line with the principles of ownership, alignment, harmonization, management for results, and mutual accountability. According to the MOC (2012), Trade SWAps' vision states that:

In the next ten years, the Royal Government of Cambodia will be increasing value for its integrity, for its capacity to articulate and implement trade policy and strategies in consultation with all trade stakeholders and for its ability to enforce trade regulations aiming at strengthening competitiveness in existing export industries and at promoting export diversification.

The expansion of the private sector is also included with the improvement of foreign and domestic trade by strengthening effective backward linkages in the economy. For the above objectives and vision, Trade SWAps, with the benefit maximization of Aid for Trade, is clustered around three pillars:

- Legal reform and cross-cutting issues for trade development (trade facilitation, technical barriers to trade)
- Product and service sector export development
- Capacity building for trade development

2.3. International and Regional Trading integration

2.3.1. The Association of Southeast Asian Nations (ASEAN)

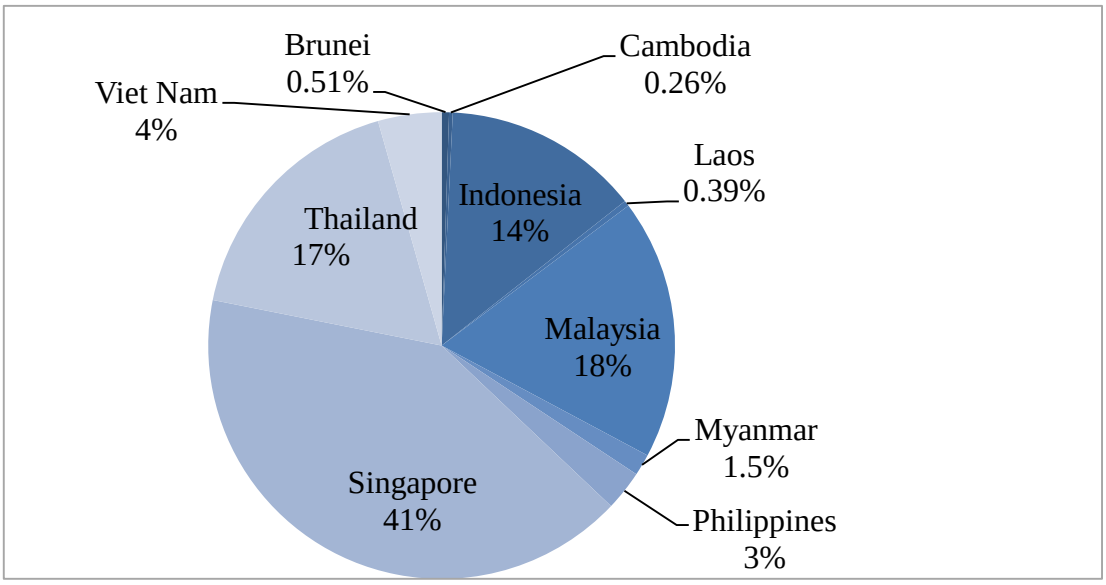
The membership of Cambodia in ASEAN, which started in 1999, is the starting point of international integration and provides some opportunities for this country to strengthen trade development. For one thing, ASEAN can be the role model to accelerate national and transnational reforms. The ASEAN single window is a case of reform and is applied in Cambodia to connect the trade-related one-stop window. Furthermore, ASEAN can provide the opportunity to outsource functions as partnership. For instance, provided that the basic SPS management system is not in place for the time being, this function could be instead monitored by ASEAN. As a result of the ASEAN membership, Cambodia's trade and trade regime are affected through trade liberalization, harmonization of trade-related procedures, and development of trade relations with ASEAN dialogue partners.

For the case of trade liberalization, Cambodia has agreed upon the schedule of reducing tariffs among the ASEAN trade partners. Different tariff lines on the inclusion list have been

eliminated accordingly as scheduled in 2008, 2010 and 2015, except for a 7% of tariff line which is expected to be removed by 2018 (WTO Secretariat, 2011a). The reduction of the tariff has resulted in the expansion of both exports and imports with the regional partners. The annual average rate increased by 37% and 35% for exports and imports respectively between Cambodia and ASEAN partners compared to 14% and 25% with the rest of the world from 2006 to 2008 (WTO Secretariat, 2011a). Notwithstanding, despite the increasing rate, the export value to ASEAN is still low, as it accounts for only 7% of the total export of Cambodia. Figure 2.4 shows that among all of the members, Cambodia shares only 0.26 percent in total exports to ASEAN.

Liberalization of trade in services is also established under the ASEAN Framework Agreement on Services including the commitment to market access and national treatment of some specific sectors. Common mutual for post-clearance customs audit and customs valuation are among the topics of ASEAN's harmonization policies, also covering the enforcement of intellectual property rights. In addition, the membership connects Cambodia with the region through a number of methods, including visa recognition, international highway plans,

Figure 2.4: Share in Total Exports to ASEAN by Members



Source: Unctad, 2012 "International Trade in Goods and Services"

infrastructure efforts and labor movement policies which would be useful for trade development and labor migration.

Cambodia has also been following Free Trade Agreements (FTAs) between ASEAN and its dialog partners, including China, India, Japan, South Korea, and Australia/New Zealand. The schedule of tariff reduction has also been set following the FTAs. Besides, Cambodia has joined Greater Mekong Sub-region (GMS) group and the Cambodia - Lao PDR - Vietnam (CLV) discussions and intra-regional trade, but has not achieved much, particularly with regard to intra-regional trade. Some data of intra-regional trade is displayed in Table 2.5.

2.3.2. The World Trade Organization (WTO)

Cambodia gained accession to the WTO in 2004, following specific commitments and precise plans for implementation of related legislation and enforcement mechanisms. Chea and Sok (2005) asserted that protecting the garment industry after the removal of export quotas at the end of 2004 under the MFA was a primary objective of Cambodia to become a member of the WTO since this industry had become significant and needed to be sustained. Moreover, membership was expected to provide the opportunity for Cambodia to force both economic policy and legal reforms. For one thing, Cambodia's exports are subject to internationally agreed rules, such as most favored nations (MFNs) and national treatment. For instance, negotiation for tariff binding has been carried out which resulted in Cambodia in average final tariff bound rates of 28.1% for agricultural and 17.7% for non-agricultural products, with no export subsidies (WTO Secretariat, 2011b). Implementation of WTO agreements in areas such as SPS, technical barriers to trade (TBT), TRIPs and customs valuation is to be undertaken during the transition periods. Apart from this, numerous trade-related laws and legal reforms have been accelerated to ensure compliance with WTO regulations, which create a more transparent business environment and improve Cambodia's position as an international investment destination. It can be seen that one of the main benefits of membership is the improvement of governance and credibility. Besides the benefits, however, challenges ahead

are foreseen. Due to limited production capacity and resource mobilization, the expansion of exports is not guaranteed. As a result, the production base needs to be improved so that the country can realize full gains of exports to the world market, especially those of the WTO members; meanwhile, both industries and agriculture also need to be more competitive. The removal of trade constraints and the involvement of the private sector, farmers and civil society in trade are also needed along with a strong political will.

2.3.3. Other Trading Relations

Cambodia has signed trade agreements under the Generalized System of Preferences (GSP) operated by developed countries, applying for the exemption and reduction of import tariffs on many products that fulfill the requirements, such as rules of origin. For instance, under the Everything-But-Arms initiation (EBA), as part of the GSP, Cambodia received in February 2001 quota-free access to the European market. Also, a Trade and Investment Framework Agreement (TIFA) was signed between Cambodia and the United States in 2006 aimed at greater trade and investment in both countries (WTO Secretariat, 2011a, 2011b). Additional preferences of other countries are also entitled for duty-free status based on product quality.

Table 2.5: Cambodia and Intra-Regional Trade

	1998				**2007**				**1998-2007 annual growth**	
	Total export (US$ b)	% to Asia (*)	% Regional exports	% Intra-reg exports	Total export (US$ b)	% to Asia (*)	% Regional exports	% Intra-reg exports	Total exports	Intra-reg exports
Cambodia	0.9	52.9	0.1	0.1	4.1	13.1	0.1	0.0	17.8	0.8
China	183.7	49.0	13.9	15.9	1218.1	38.0	32.4	25.0	23.4	19.9
Hong Kong, China	173.7	48.9	13.1	15.0	344.7	63.2	9.2	11.8	7.9	11.0
Indonesia	48.9	54.1	3.7	4.7	114.1	59.2	3.0	3.7	9.9	11.0
Japan	388.0	33.7	29.4	23.0	714.3	46.9	19.0	18.1	7.0	11.0
Korea, Dem. Rep.	0.9	35.9	0.1	0.1	1.6	41.0	0.0	0.0	6.9	8.6
Korea, Rep.	132.8	40.7	10.0	9.5	371.4	48.2	9.9	9.7	12.1	14.2
Lao PDR	0.4	48.4	0.0	0.0	1.3	63.1	0.0	0.0	15.2	18.6
Malaysia	73.5	48.3	5.6	6.3	176.2	54.6	4.7	5.2	10.2	11.7
Mongolia	0.3	47.6	0.0	0.0	1.7	74.2	0.0	0.1	19.2	25.2
Myanmar	1.1	35.2	0.1	0.1	4.8	67.0	0.1	0.2	17.2	25.9
Papua New Guinea	2.4	27.4	0.2	0.1	7.4	20.7	0.2	0.1	13.6	10.1
Philippines	29.5	40.6	2.2	2.1	50.5	60.8	1.3	1.7	6.1	11.0
Singapore	109.9	48.8	8.3	9.5	299.2	63.2	8.0	10.2	11.8	15.0
Taiwan, China	110.8	43.7	8.4	8.5	244.1	65.7	6.5	8.7	9.2	14.2
Thailand	55.4	43.2	4.2	4.2	152.5	52.9	4.1	4.4	11.9	14.4
Vietnam	9.3	55.8	0.7	0.9	48.6	41.6	1.3	1.1	20.1	16.3
Total Asia (*)	**1,322**	**42.9**	**100.0**	**100.0**	**3,754**	**49.2**	**100.0**	**100.0**	**12.3**	**14.0**

Source: World Bank, 2009

2.4. Export Strategy

2.4.1. Assessment of Competitiveness and Constraints

Cambodia is endowed with relative abundance of land—more than 0.25 ha of land per capita—and labor, with some 250,000 new entrants every year, which suggests the potential role of land-intensive and labor-intensive production having comparative advantage (World Bank, 2009). However, the number of laborers equipped with education and skills remains low compared to other countries which have achieved the same level of development. In addition, a number of constraints hinder Cambodia's exports. For one thing, the country relies mostly on a few main sectors for exports. For another thing, infrastructure is underdeveloped, contributing to high costs and low service quality. For instance, there is a lack of adequate road networks, highways, ports and rail services, electricity and telecommunication, while most of the available services are concentrated in urban areas.

Policy and the institutional environment facing firms have become a considerable topic, pointing to following issues (MOC, 2006):

- low productivity due to excessive regulation and weak institutions; some key factors include corruption, weak property rights, informal practices and costly regulations
- high cost of trade and ineffective trade facilitation processes, including difficulties trading across borders
- lack of transparency due to weak governance of public-private partnership and concession
- limited capacity for law enforcement and credible judicial system.

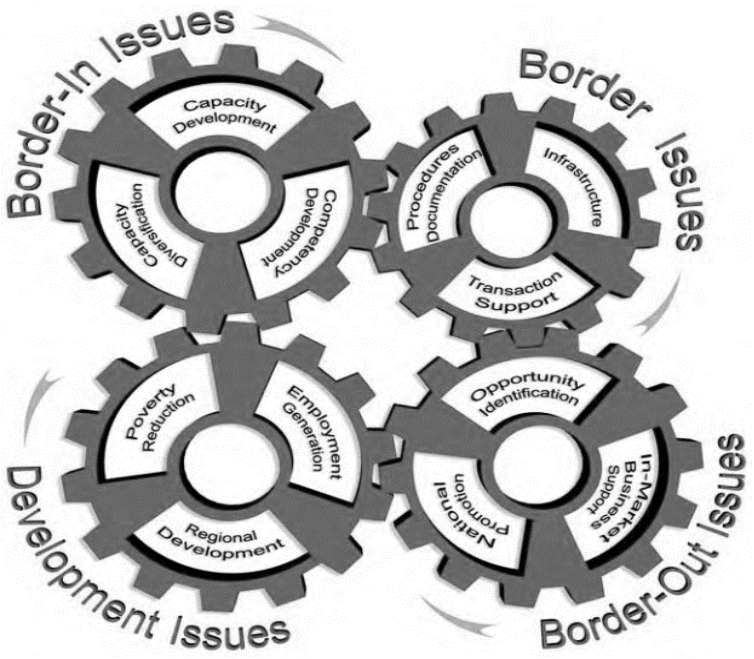
2.4.2. Dealing with Constraints

Following the National Export Strategy, the MOC (2006) has committed to ensuring competitiveness and strengthening governance. Some actions include: (1) promoting market infrastructure and deregulation; (2) reducing transaction costs and improving efficiency of trade facilitation; (3) enhancing the rule of law and institutions; (4) promoting small and medium-sized enterprises, and; (5) enhancing access to information and to markets. To achieve this,

investment climate and customs reforms together with policy on private participation have to be undertaken.

To stimulate the development of export sector, the *4-Gears-model* has been adopted, emphasizing four main pillars as shown in Figure 2.5. The first one is the "**Border-In**" approach, concentrating on supply-side matters, productivity and capacity, quality, technology development, and marketing competencies. Second, the "**Border**" approach covers operational matters targeting development and facilitation of trade and a business environment for international competitiveness. Third, "**Border-Out**" focuses on demand-side matters by providing market support and identifying commercial opportunities abroad, promoting export-oriented FDI and technology transfer. The last one is the "**Development**" approach concerning socioeconomic impacts such as poverty reduction, rural and gender development, and employment generation.

Figure 2.5: National Export Strategy 4-Gears



Source: MOC, 2006

2.4.3. Export Diversification

a. Export Product Diversification

Initial baskets of 19 potential export products and services (in *List1* and *List 2*, Table 2.7) have been identified following the finalization of DTIS in 2007 (MoC, 2007). The identification of the export potentials is based mainly on the product's current competitiveness level, the market access condition, or the impact on poverty reduction. For the viable assessment purpose, four indexes have been developed, three are classified as export potential and one is classified as human development. Table 2.6 describes the export product assessment index and attractive market identification index, while Table 2.7 lists the ranking given to indicators of each index of particular potential product and service.

b. Export Market Diversification

In line with the new products, attractive market analysis has been carried out for the possibility to expand new products to the existing markets (new product-old destination) as well as to assess new markets (new product-new destination). The US (mostly for garment sector),

Table 2.6: Assessment of exports for the 19 products and services

Export Products Assessment Index	Attractive Market Identification Index
1. Export performance: measures current exports of the given product (based on the value in 2005)	1. Strength of the demand measured by the growth of import in a particular market and the growth of a given product demanded in the world market
2. World market: measures demand condition of importing countries based on a composite indicator of growth of world demand and access to world markets due to tariff	2. Size of import markets measured by their share in world import
3. Domestic supply capacity: measures supply including product quality, productivity, production cost and efficiency of supporting industries based on the result of a survey of more than 150 firms	3. Openness level of import markets measured by tariffs applied for a given product from particular countries
4. Human development: measures the impacts of the given sector (based on the estimate of 2005-2006) on the economy with regards to combination of some dimensions include employment and income generation, poverty reduction, rural development, environmental sustainability, and sector linkages—developed through a literature review, and discussion and interview with experts and firms.	4. Preferential access to import markets measured by tariff differential for Cambodia and its major competitors.

Source: Ministry of Commerce, 2007

France, Germany, the United Kingdom, Canada, Japan, South Korea (mostly for tourism), China PRC, Singapore, Thailand and Vietnam are the current main export destinations. Some of those markets, particularly European countries and Japan, and new destinations including Italy and Spain are among the attractive markets for the 19 export potentials identified. Other partners include Australia, Turkey, and Kazakhstan, as well as Taiwan and Hong Kong for East Asian market; Singapore, Indonesia, Malaysia, and Thailand for Southeast Asia; Saudi Arabia and the United Arab Emirates for the Gulf countries (MoC, 2007). The expanded markets have been

Table 2.7: Positioning Levels of the 19 Products and Services

	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)	H (4.1)	360,000	H
Footwear	156,513	H (4.1)	M (3.1)	H (3.5)	H (3.6)	4,500	M
Cassava	13,000	L (1.2)	H (5.0)	H (3.5)	H (3.5)	4,000	L
Rubber	9,095	L (1.2)	H (3.9)	H (4.5)	H (3.2)	40,000	M
Fishery	100,000	M (3.0)	M (2.7)	H (3.5)	M (3.1)	260,000	M-H
Rice	200,000	H (5.0)	L (1.2)	M (3.0)	M (3.1)	2,940,000	M-H
Soybeans	34,000	L (1.7)	H (3.4)	M (3.0)	M (2.7)	16,500	L-M
Cashew nuts	50,000	L (2.0)	M (2.7)	M (3.0)	L (2.6)	12,000	M
Silk	4,000	L (1.1)	M (2.7)	L (2.3)	L (2.0)	20,500	M-H
Livestock	19,000	L (1.4)	M (3.1)	L (1.3)	L (1.9)	400,000	M
Corn	25,000	L (1.5)	L (1.2)	L (2.5)	L (1.7)	12,500	L-M
Beer	975	L (1.0)	M (2.8)	L (1.0)	L (1.6)	3,000	L
List 2							
Fruits and vegetables	269	L (1.0)	H (3.2)	M	M	..	M-H
Wood products	5,547	L (1.1)	M (2.9)	M	M	..	M
Light manufacturing	3,336	L (1.1)	H (3.3)	M	M	..	M
Tourism	..	H	H	M	H	..	H
Labour services	..	M	H	M	M	..	M
Web-based services	..	L	H	L	L	..	L
Transport services	..	L	M	L	L	..	L

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 ("Trade Related Assistance for Development and Equity")

specified based on the index of Attractive Market assessment which was developed in DTIS 2007 (MoC, 2007).

Although the potential export products and markets have been specified, a number of shared challenges are reported. High production and infrastructure costs, low productivity and competitiveness are the major constraints for export diversification. Other factors continuing to hinder success include limited value added due to high dependency on imports of raw materials and intermediate inputs, limited product differentiation and quality, limited access to technology, R&D capacity, difficulties in meeting the quality standards of foreign markets and time delivery requirements, and, equally if not more important, the limited quality of legal and institutional frameworks for export development (MoC, 2007; World Bank, 2009; WTO Secretariat, 2011b).

2.5. Export Policies by Sector

2.5.4. Agriculture

Exports of agricultural products account for only eight percent of total exports (WTO Secretariat, 2011a). Nevertheless, the figure can be underestimated because most of the agricultural exports are unofficial and in a non-processed state. Table 2.8 shows domestic support was granted for agricultural products in 2007 and 2008. Over half of the total support took the form of payments for relief from natural disasters. Other main measures receiving support are advisory services and pest and disease control (WTO Secretariat, 2011a).

Rice: The Ministry of Agriculture, Forestry and Fishery (MAFF) reported that the milled rice supply had increased gradually from 2000 as a result of paddy rice production, at a 9% annual growth rate over the past decade (WTO Secretariat, 2011a). Apart from domestic consumption, a large amount of rice surplus is available for export. Yet there is a huge difference between the quantities of officially recorded exports by the Customs Department and those of the exact exports due to two main reasons: informal exports of unprocessed paddy rice and smuggling along borders.

Table 2.8: Domestic Support Measure for Agriculture, 2007-2008

Measure	Description of measure	Monetary value of measure (million Riels)	
		2007	2008
Research	Research activities on agricultural productivity, land diversification, plant and animal health, in accordance with Annex 2, para. 2(a) of the Agreement on Agriculture	183	288
Pest and disease control	Expenditures on plant protection and animal quarantine, in accordance with Annex 2, para. 2(b) of the Agreement on Agriculture	1,052	1,406
Training services	Training for farmers and local communities on crop productivity, small-scale agri-processing and contract farming, in accordance with Annex 2, para. 2(c) of the Agreement on Agriculture	943	1,150
Extension and advisory services	Extension and advisory services, including transfer of information and results of research to farmer cooperatives and farmers, in accordance with Annex 2, para. 2(d) of the Agreement on Agriculture	1,370	1,342
Inspection services	Expenditures on inspection services relating to animal health, in accordance with Annex 2, para. 2(e) of the Agreement on Agriculture	157	92
Marketing and promotion services	Marketing and promotion services, including market information and market development, in accordance with Annex 2, para. 2(f) of the Agreement on Agriculture	Nil	Nil
Infrastructural services	Infrastructural services including rehabilitation and maintenance of small-scale irrigation schemes, in accordance with Annex 2, para. 2(g) of the Agreement on Agriculture	Nil	Nil
Payments for relief from natural disasters	Expenditure for relief from natural disaster on the provision of agricultural inputs, equipment and pest and disease control to agricultural production, in accordance with Annex 2, para. 8 of the Agreement on Agriculture	4,920	5,722
Total		**8,625**	**10,000**

Note: Measures exempt from the reduction commitment-Green Box
Exchange rate: 2007, US$1 = 4,058 Riels; 2008, US$1 = 4,003 Riels.
Source: WTO Secretariat (2011b, p. 70)

In order to improve trading in the rice sector, the Royal Government of Cambodia has a vision to transform the country to be a major milled rice exporter and has set the year 2015 as the target year to: (1) achieve a paddy rice surplus of more than four million tons; (2) achieve [formal] exports of milled rice of at least one million tons, and; (3) ensure the international recognition of Cambodian rice (RGC, 2010). Productivity enhancement and commercialization are important, and it is estimated that the potential milled rice available for export (2.9 million tonnes) will be much larger than targeted. To achieve the above vision, the strategies are implemented based on two important approaches (RGC, 2010):

- Short-term and immediate strategy: increasing productivity and promoting formal export of milled rice by:
    - Promoting additional investment in and expansion of irrigation facilities, promoting the better use and lowering the cost of inputs and appropriate technologies, and providing micro credit to rice producers
    - Encouraging private sector participation in investment
    - Coordinating rice export activity through streamlining procedures and transport facilitation
- Medium- and long-term strategy: enhancing rice export competitiveness by promoting production technology, exploring market opportunities, and improving physical infrastructure.

Rubber: Rubber has been one of the key crops, which increased from 19,715 tons in 2008 to 42,250 tons in 2010, of which around 70 percent was exported with an estimated value of US$89.1 million (WTO Secretariat, 2011a). Some challenges of this sector include high input and utility costs, lack of standard certification of exports, limited finance and cash flow among producers and processors, relatively low yield, high transportation costs, excessive paperwork required for exports, unofficial trading fees and low customs clearance efficiency (WTO Secretariat, 2011a). The General Directorate of Rubber has been established to prepare and implement policies and strategic programs to ensure development of this sector.

Forestry and Fishery: Wood production does not make a significant contribution to national revenue. The Forest Administration, the main government agency, monitors and implements forestry policy, including the reform process and legal framework of the forest sector. Fisheries and livestock are among the main sources of livelihood of the rural people, but their contribution to GDP has decreased from more than 15 percent during the 1990s to about 7.6% in 2010, with annual exports around 35,000 tons that year (WTO Secretariat, 2011a). Market expansion of this sector would provide a better opportunity, and should be needed, to increase fishery exports.

2.5.5. Industry

Industry covers manufacturing, consisting of mostly small and medium enterprises with approximately 370,000 registered and unregistered in 2010 (WTO Secretariat, 2011a). The current largest industrial sector is garments.

Garments: This sector generated 15 percent of GDP and 69 percent of total exports in 2008 and employed 320,000 labors in the formal sector, and is the country leading export sector with a volume growth rate of an average of 11 percent per annum from 2005 to 2008 (WTO Secretariat, 2011a). After being granted MFN in 1996 and benefiting from the development of MFA, Cambodia's garment industry started to develop remarkably and attracted foreign investors taking advantage of Cambodia's quota-free status and EBA initiative. Since then, exports have grown rapidly. Table 2.9 presets some statistical data of the performance of this sector. Export values increased significantly from 2004; nevertheless, the global slowdown in 2008 negatively impacted Cambodia's garment exports in the subsequent year. The performance of the garment exports is mainly dependent on the structural change of the market access, with the US and the EU as the main partners, and the low costs of labor. However, a number of features that hamper the competitiveness in comparison to neighboring countries are low labor productivity, high costs and unreliable supply of electricity, less developed infrastructure, and high transportation and trade costs.

Table 2.9: Garment Sector, 2004-2010

	2004	2005	2006	2007	2008	2009	2010
Exports (US$ million)	1,958	2,167	2,626	2,840	2,942	2,388	2,994
U.S. share of exports (%)	64	71	72	70	67	62	60
EU share of exports (%)	29	22	22	22	22	24	23
Factories in operation	219	247	290	292	284	243	262
Employees ('000)	270	284	334	353	325	282	319

Source: WTO Secretariat (2011a, p.77)

2.5.6. Services

Tourism: Tourism has played an important role in foreign exchange earnings, as well as in contribution to GDP and employment, and has attracted a high portion of foreign capital investment. Particularly, as shown in Table 3.10, this sector has been bringing in over USD1.7 billion per year and generated employment for approximately 300,000 people directly and indirectly. The "Open Skies" policy was initiated in 1997, for which direct flight from overseas to Siem Reap, located in the famous tourist region, was permitted. The beach town of Sihanouk Ville is also another popular resort among tourists and it has recently expanded with an airport in the southern part to accommodate aircrafts and developed with many resort projects by international and local developers. The country's ample forested areas are also to be opened to ecotourism.

Table 2.10: Tourism Sector

	1995	2000	2002	2003	2004	2005	2006	2007	2008	2009	2010
Visitor arrivals ('000)	220	466	787	701	1,055	1,422	1,700	2,015	2,125	2,162	2,508
Annual % change	24.3	26.8	30.0	-10.9	50.5	34.7	19.6	18.5	5.5	1.7	16
Tourism receipts (million US$)	100	228	379	347	578	832	1,049	1,400	1,595	1,561	1,786
Average length of stay (days)	8.0	5.5	5.8	5.5	6.3	6.3	6.5	6.5	6.6	6.5	6.45

Source: WTO Secretariat (2011a, p. 81)

Regulatory uncertainty and the lack of responsibility sharing are the key constraints for the growth of this sector. The legal framework, aimed at reducing business risk, together with the 2009 Tourism Law and the establishment of the Tourism Marketing Promotion Board, is expected to address these issues. Promoting private sector participation can be an important tool. For faster growth of the sector, the assurance of quality, standards, licensing, management and monitoring, as well as environmental protection, investment and incentives, ecotourism, food hygiene and sanitation, and tourist security are priority areas.

Chapter 3: Conceptual Framework: Exports and Economic Development

3.1. Why Export?

3.1.1. Export Promotion vs Import Substitution

The traditional trade approaches of export promotion and import substitution have been the subjects of lively debate in development literature since the 1950s (Todaro & Smith, 2009). The protectionists, who favor import substitution (IS), believed that an inward-looking strategy encourages appropriate use of resources through the restriction of trade, which will result in greater self-reliance. In contrast, the free traders, who advocate export promotion (EP), argue that an outward-looking strategy enhances not only free trade but also movement of capital, enterprises and labor, as well as opening a wide range for communication systems. Although the former approach remains strong in development discourse, an emerging consensus in favor of the latter has been witnessed among many developing and certain developed economies from the late 1970s (Todaro & Smith, 2009). A number of countries, such as Brazil, Chile, Turkey and Thailand, have switched from the IS strategy to the EP strategy. Given the successful experience of the early EP-adopting economies of Hong Kong, Singapore, Taiwan, South Korea and some others in Asia, EP promotes growth efficiency through the substitution of outside markets for small domestic markets and reduces distorting price and cost effects of protectionism. While trade development strategies are set by each country, the division between the IS and EP can be less pronounced when the government promotes export expansion while at the same time adopting protectionism that favors potential and/or infant industries. Although the gains from EP may be limited in the first step of adoption, the economic returns of this policy tend to gain momentum (Todaro & Smith, 2009).

Further evidence of the benefits of EP can be revealed by the tremendous roles of exports, one of which is the relationship between exports and economic growth. An empirical study by Balassa (1978) revealed a favorable relationship between exports and growth of gross national product and manufacturing outputs, given the direct and indirect effects of exports

through the contribution of domestic and foreign capital and labor. His cross-country analysis strongly suggests that outward orientation leads to better growth performance than inward policies since export orientation improves resource allocation with greater capacity utilization, promotes economies of scale in the areas where countries have comparative advantage, absorbs technological improvement to promote competition as a long term continuing effect, and at the same time contributes to employment generation as a one-for-all gain (Balassa, 1978). In addition, in the countries where marginal saving ratios are higher than average, the growth rate will be relatively and permanently higher under EP in comparison to IS. Later studies have also included trade policy in empirical investigation to compare the impact of export expansion. Trade policy was once divided into four groups: moderately and strongly outward, and moderately and strongly inward. Amirkhalkhali & Dar (1995) and McNab & Moore (1998) came to a similar conclusion that the level of economic openness did matter. In comparison, for the sample of developing countries, strong outward policy has the highest positive impact on average annual GDP growth (over three percent), followed by the moderately outward policy (over 1.6 percent GDP growth) (McNab & Moore, 1998).

3.1.2. Export Expansion and Economic Performance (Export-Led Growth Evidence)

3.1.2.1. Exports as a factor of production

The roles of exports have been examined and well-documented in various studies, demonstrating their relationship with economic performance. Tyler (1981) extended the work of Balassa and studied a cross-country analysis of 55 developing economies from 1960 to 1977 by including exports as a factor of production and found a strong association between the growth of outputs and manufacturing exports, reflecting the importance of export-related economic policies. One might argue that the model (GNP = f (K+L+E))[1] that includes exports as a factor of production might not be perfect and there might be causality effects[2]; however,

[1] GNP: Gross National Production, K: capital, L: labor, E: export (Based on Cobb-Douglas production function)

[2] Exports induce growth and growth induces exports

the model has been supported for various reasons. For one thing, it is reasonable to state that exports are the input of the production because the amount of exports positively affects aggregate outputs from a given amount of capital and labor since exports increase production efficiency and technological improvement as the result of better resource allocation and better specialization (Balassa, 1978; Ram, 1985). In this sense, exports may raise the productivity of capital and labor, specifically through technological transfer. In addition, the increase in exports helps reduce the problem of foreign resource constraint, thus improving trade balance (Ram, 1985). It is useful to note that the model is used as a production relation but not the national account identity since they have different formats for total output (Ram, 1985).

Ram (1985) suggested that during the early period (the 1960s), the significant impacts of exports on growth were witnessed more in middle-income countries than in low-income countries, but the difference was less distinguishable in the later period (the 1970s). Other researchers (Jung & Marshall, 1985; Yaghmaian, 1994) have claimed that export-reducing growth and growth-reducing exports are plausible and that the effects of exports on economic performance is generally dependent on the initial level of development and structural change, which means that unless countries have achieved some level of development prior to becoming outward-looking, the possibility of benefitting from exports is limited. Notwithstanding, Moschos (1989) rejected the above idea and concluded there is a positive relationship between these two variables for both low- and high-income economies and is stronger in the low income group.

It is not exceptional that the effects of exports on growth can be determined partly by the economic structure and characteristic of individual country as well as causality effects. For example, those who have not prepared themselves for openness or who have no available resources to absorb capital and technological transfer might not find exports beneficial in the first place. For another example, a country can face adverse effects from exports if it depends too much on the increase in a specific sector while other sectors or non-exporting sectors face

diminishing returns and finally disappear. Nevertheless, a number of countries adopting export-orientation strategy have experienced successful export-led growth.

3.1.2.2. Externalities and Export-Led Growth

Export expansion brings more than the direct effects themselves. The indirect effects, as mentioned, include the externalities that capture the huge increase in trade share and factor productivity, and the strong association between productivity and externalities through various components: capital accumulation, factor allocation effects from low to high productivity sectors, effects from exporting light and heavy manufacturing goods, and effects from importing capital goods (Melo & Robinson, 1992). Three interesting approaches are included in literature by Melo and Robinson (1992).

The first approach is Marshallian externalities, based on Luca (1988) and Romer (1986), introducing the form of human capital accumulation, or complementarities between human and physical capital as the result of externalities in such a way that they lead to increasing returns to scale at the economy-wide level in general, and maintain constant returns to scale at a firm level in particular. The second approach discusses how disembodied knowledge is obtained. Exports are considered a driving force to explain the creation of new knowledge and technology endogenously driven by investment in R&D that responds to market incentive, and by adoption of foreign technology. The third approach incorporates the demand spillovers between sectors as an important externality. For instance, once the domestic industry engages in export activities, a wide range of technology is required and the acquisition will spill over across industries. Also, the demand for improvement of infrastructure, where intervention is essential especially to more efficient direct investment, can create an environment in which all firms can capture the benefits.

3.1.2.3. Export and Trade: Income Distribution and Convergence

For the discussion of the full benefits of exports, an understanding of basic concept of trade liberalization is useful because export expansion depends greatly on the level of trade

liberalization. A simple notion of openness is that trade allows people to have more access to varieties of products outside their frontier at world market prices. Empirical studies have come to the consensus that the income of countries that trade with each other converges intensely, and that the convergence can be achieved regardless of the initial level of development and skills (Rassekh, 2004). This can be noted more among groups of countries that are trade partners. For instance, the investigation of 19 OECD countries during the period of 1950 to 1985 pointed out that trade and exports contributed to income convergence among these countries (Rassekh, 1992, cited in Rassekh, 2004).

Exports and market integration do not only contribute to convergence across countries, but also to income distribution within a country. According to the Stolpher-Samuelson theorem, income redistribution is obtained even without taking into account the effect of economic growth because market expansion redistributes income from abundant to scarce cohorts within the economy. Evidence suggested that income inequality—measured by the Gini coefficient—and poverty in an individual country has reduced significantly between the 1980s to the early 2000s as the result of international market transactions and globalization (Bhall, 2002, cited in Rassekh, 2004).

Nevertheless, some studies have failed to provide unambiguous support to the above findings. It is argued that there is no significant link between trade and convergence, while free trade may instead reduce the investment ratio and thus lower the growth rate or leave it unaffected instead (Slaugter, 2001, and Bhagwati, 2002, cited in Rassekh, 2004). These opposing views may be correct in the sense that freer trade does not necessarily mean higher volume of trade or higher volume of exports, especially for a country that enjoys the influx of imports due to lower trade barriers but has limited capability to improve its exports. For exports to contribute to income distribution and convergence, the link to externalities is crucial. Since some trade-offs might appear, coordination can play a vital role in maximizing export activities and thus achieve redistribution (Melo & Robinson, 1992).

It can be concluded from the above discussion of the existing literature that a country should enhance export expansion and favor export promotion policies for the reason that the benefits of exports largely outweigh the disadvantages. Exports directly contribute to economic growth, and especially play significant roles, directly and indirectly, in allowing countries to capture the positive externalities in industrial development and income redistribution. However, the promotion strategy should be planned and implemented with precautions for the possible leakages between exports and imports.

3.2. What to Export

3.2.1. Exports and International Trade in Theory

Due to diverse resources, abilities and preferences in producing and consuming different goods, individuals or countries find it beneficial to produce and export what they have in surplus in exchange for what is not available in their domestic markets. As discussed in the previous section, there is a general consensus that it is profitable to do so owing to the central roles of exports. However, questions have arisen as to what determines which goods are produced and exported, and why countries produce and export different goods. To answer these questions, the theory and practice associated with export and trade should be reviewed. Classical trade theory gives weight to the concept of relative cost of production and price differences, dating back to the Absolute Advantage of Adam Smith and Comparative Advantage of David Ricardo (Todaro & Smith, 2009). The former focuses on the ability of a country to produce something more efficiently than another country; thus, a country should produce only the goods in which it is most efficient and trade for the goods in which it is not. For example, Japan can produce manufactured goods, such as automobiles, relatively cheaply, and can export these to Cambodia, where agricultural goods, such as rice, can be produced at a lower relative cost and be imported to Japan in exchange for automobiles.

The latter, however, suggests that a country should export products that it can produce more efficiently than other products, meaning that even though the country may have an

absolute advantage in two commodities, it is better to specialize in one commodity in which its comparative cost advantage lies. This principle, hence, gains momentum as it gives rise to specialization and beneficial trade even for countries with less absolute advantage.

This theory was later modified by the Factor Endowment theory, or neoclassical trade theory, by Eli Hecksher and Bertil Ohlin, who, instead, took into account not only the cost of labor, but also other production factors such as capital and land (Todaro & Smith, 2009). The theory is based mainly on two main propositions: different products require different levels of production factors; and countries are endowed with different factors of production. Regardless of the initial factor prices and production location, the factors will be used in different proportions because more capital is required for certain products while more labor is required for others. For example, manufactured goods are generally made with more machines per worker than agricultural goods, which require a greater number of workers per unit of capital. Countries with an abundance of labor tend to have cheaper labor costs and thus have an advantage to produce labor-intensive products less expensively than countries with scarce labor. The resource endowment theory assumes that countries with less capital and more labor, as is the case in developing countries, should produce and export labor-intensive products, particularly primary products, and import capital-intensive goods. In contrast, capital-abundant countries, developed countries, should be specialized in capital-intensive manufacturing since they have relatively cost and price advantage in producing these types of commodities. In short, according to the Hecksher-Ohlin factor endowment model, countries should produce and export goods that require abundant (and thus cheaper) resources or factors, and import those goods which required factors in short supply.

Several views can be drawn from the classical and neoclassical theory. First, it enables countries access to consumption not only outside their production frontier but also at lower world market prices. Second, specialization rewards the exporting countries with better utilization of resources, and once the abundant resource is intensively used, higher economic

return is predicted, leading to the increase of labor wage rate in developing countries (Todaro & Smith, 2009). For this, international real wage and capital cost will move toward equalization, reducing disparities between trading partners. Nevertheless, the assumptions of two countries and two production factors, and perfect competition embedded in the theory, have been unrealistic. On the one hand, despite the resource endowment, labor and capital can be mobilized across sectors and nations; meanwhile, technology is neither identical nor freely available. On the other hand, market and competition are not always perfect because of price and information distortion or monopoly market control. All sectors cannot always ensure trade balance and constant returns to scale. More importantly, the suggestion that developing countries should produce and export agricultural goods has received remarkable criticism.

Commodity terms of trade—the ratio between the price of a unit of export and the price of a unit of import—explains the argument. The Prebisch-Singer thesis states that terms of trade of developing countries have fallen and will continue to fall because the export price of primary products is low in relation to the import price of manufactured products from developed countries (Todaro & Smith, 2009). This argument is based on a combination of low income and price elasticity of demand for primary products. These two phenomena contribute to the instability of export earnings and the less predictable rate of economic growth in developing nations, diverging further from the rich nations. Therefore, the Prebisch-Singer thesis suggests that developing countries should reduce their high dependency on agricultural exports and shift to manufacturing industries for a more favorable export growth and terms of trade.

New trade theory, linking trade to output growth, associated with the Endogenous Growth model of Romer and Lucas, is extended from the exogenous growth model and emphasizes the important role of human capital and learning effects that can be obtained through investment in R&D, leading to improved innovation and skills (Rassekh, 2004). Learning-by-doing saves cost and maximizes profit. In this sense, even if the resources are limited and are fully employed, output growth can be realized through the accumulative factors

of human capital and technology, and thus increase productivity. Hence, production and exports should be directed toward and involved in R&D and skill improvement. This can be obtained depending partly on the significance of government intervention and strategic trade policy. However, the issue might be subjective and hardly observable but cannot be overlooked.

By discussing trade theory starting from the classical and neoclassical framework, the Prebisch-Singer thesis, to the new trade theory, some clues to the above question as to what determines which goods to export should have been obtained. Over time, each model has been modified due to its limitations and for more favorable applicability. It is advantageous, therefore, to pose the same question in practice and to see how the theory is applied.

3.2.2. Identifying Exports in Practice

3.2.2.1. The Leontief Paradox

The examinations of labor efficiency in explaining trade between the United States and the United Kingdom during the 1940s and 1950s, suggesting that labor cost—and labor productivity—of the US exceeded the level of the UK so that US firms should have had export advantage in manufacturing sectors while the UK exported labor-intensive products to the US, supported the classical approaches (Markusen et al., 1995). Conversely, the discovery by Leontief that the capital-labor ratio of imports was 23 percent higher than that of exports in the US in 1947 surprised the world of economics (Markusen et al., 1995). The term Leontief paradox is, thus, given to this unexpected outcome, which is contradictory to Heckscher-Ohlin theorem. Markusen et al. (1995) mentioned that the Leontief paradox was not an isolated event, as other studies seemed to prove similar results.

3.2.2.2. Revealed Comparative Advantage

Revealed comparative advantage (RCA), pioneered by Balassa, is a popular tool and commonly used as an indicator of comparative advantage, measuring the export strength of a country. Abidin (2000) stated that: “the RCA measures the export share of commodity i from country j in the world market relative to its production share. An RCA value of more than unity

indicates that the country has captured more export share than that of production, and thus it has a comparative advantage." (p. 309). The case of Malaysia, for example, shows that this country had a comparative advantage in natural resource-based production in the early 1970s, while capital-intensive products took over by the mid-1980s (Abidin, 2000). Similarly, Taiwan identified labor-intensive sectors as the key for export-led growth after adopting export promotion policies in the late 1950s, expanding quickly until the 1970s (Tung, 2000). The structural change, however, shifted key exports of this economy to sectors with high capital intensity from the 1990s. In the case of Cambodia, traditional exports, consisting of textile fabrics, natural rubber latex, wood and vegetable materials have maintained RCA over the period 1990-2006, but their joint share fell and was replaced by garments and non-traditional exports, including nuts, castor oil seeds and plywood products (World Bank, 2009).

Net export performance ratio, a model based on RCA, has been applied to identify which industries exhibit positive net exports. In the study of Thailand's export strength from 1979 to 1996, Warr (2000) applied this method and found that although machines, transport and equipment exports have contributed considerably to gross exports, this industry has been dependent largely on imports and thus faced negative balance in all periods. Instead, food and live animals from the primary sector and miscellaneous manufactured articles are the ones with positive net export performance ratio.

The application of RCA basically examines commodities that have been exported to identify products with high competitiveness. Notwithstanding, constraints appear because non-exporting sectors usually see little progress in contribution to outputs, productivity and efficiency when the attention is given only to those exporting sectors. Taiwan has experienced this problem (Tung, 2000). In addition, linkages across sectors are not taken into account in the RCA model, which can limit the export potential of different industries. For example, minimal linkages between industries are one of the important factors limiting the exports of Malaysia

(Abidin, 2000). Therefore, it is of central importance that linkages between sectors should also be taken into consideration when examining export issues.

3.2.2.3. Export and Sectoral Linkages

Other pieces of research have moved away from RCA to the sectoral linkage approach by examining how export sectors and the whole economic system are interconnected. The concept indicates the extent to which one industry is affected by the stimuli of another industry through structural linkages, namely backward and forward linkages, which are defined by Hirschman as follow (Hazari & Kingma, 1976):

> The backward linkage effects refer to the input-provision, derive demand, i.e. every non primary economic activity, will induce attempts to supply through domestic production the inputs needed in that activity. The forward linkage effects refer to the output-utilization, i.e. every activity that does not by its nature cater to final demands, will induce attempts to utilize its outputs as inputs in some new activities (p 362).

The analysis of such linkages is of great importance to studying the role of each sector, both exporting and non-exporting, in inducing growth (Mujeri & Alauddin, 1994). Such interaction can be examined by using an input-output framework[3] (Hazari & Kingma, 1976; Mujeri & Alauddin, 1994; Rasmussen, 1956). The impacts of trade and linkages provide insights into the role of the export sector in expanding necessary stimuli which, in turn, have favorable impacts on the expansion of other sectors. This model can go further to analyze the effect on income and employment, on factor intensity, and other assorted economic factors. Through these analyses, one can identify which industries should be promising for exports with potential to grow and with significant impacts on the domestic economy. The combination of these issues is of significance in developing countries such as Cambodia. While such models are widely applied, studies of Cambodia have been few. Kobayashi et al. (2009) studied the industrial structure of Cambodia and the role of agriculture by measuring the gross output and

[3] More details of the input-output framework are discussed in Chapter 4.

value added of each sector. They found that the 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.

3.3. What Makes Exports Grow

Even if countries understand the important roles of exports and adopt outward-looking strategies, and even if the countries have identified their potential export sectors, not every country succeeds in improving its export performance. It is, therefore, useful to examine why export performance varies across countries and how it can be improved.

3.3.1. Export Supply Determinants

Income elasticity of demand and price elasticity of demand are some common measures of the demand side affecting export performance of individual countries. In contrast, export supply has taken into account domestic factors such as domestic production, consumption and price elasticity of supply. According to Majeed et al. (2006) (based on the argument of Funke and Holly, 1992), previous approaches that emphasized demand factors have been rather unsuccessful in explaining export performance in the long term trends, while supply side factors strongly influence export behavior. Theoretically, production capacity and price determine quantity supply. This also holds for exports.

Empirical studies have relied on estimation of export supply equations, incorporating supply conditions and relative price between export goods and domestic goods. When the relative price increases, export production becomes more profitable and the supply of exports will rise. Havrila and Gunawardana (2006) studied the export supply of the Australian textile industry, suggesting that export supply of textiles was positively and significantly related to relative price. Atique, Ahmad, and Zaman (2003) examined the supply and demand for the exports of Pakistan, using the polynomial distributed lag (PDL) approach. In the supply model, domestic production, relative price (the unit value of export to domestic price), and wage rate

were included in the estimation. Their result gave strong support to the importance of domestic production capacity, whereas wage rate had cumulative effects and less elasticity although it was insignificant in the short run, while relative price did not appear important. They pointed out that institutions (economic and political) did matter, and that policies for greater utilization of productive capacity were needed. The significance of production capacity or production size is also found under cross country analysis, particularly of developing countries. Athukorala and Sen (1998) and Jongwanich and Magtibay-Ramos (2009) studied the patterns of processed food exports of developing countries in different periods, and found that economic size was positively significant in explaining the structural change of the export of food manufacturing.

3.3.2. Policies affecting export performance

Policies can be divided into *direct* and *indirect* polices. Although the distinction between the two is arbitrary, it is useful to assess them separately to study successful export performance (Krueger, 2000).

3.3.2.1. Direct Policy

Direct policies are important for export-oriented strategy as they impact the resource allocation between the production of tradable and non-tradable goods. Exchange rate is known to be one of the important direct policies influencing exports. Nominal exchange rate determines the cost of imports and the price of exports in domestic currency per unit of foreign currency (Krueger, 2000). Real exchange rate is more important in defining the relative price. The depreciation of the real exchange rate, relatively more expensive traded goods in relation to non-traded goods, shows that traded goods are more profitable in export markets than in domestic markets. In the case of Turkey, for example, the econometric analysis discovered that the policy allowing real depreciation of exchange rate contributed by far the most to the export boom (Arslan & van Wijnbergen, 1993). This may not always hold. The link between real exchange rate and export performance appeared weaker in some recent studies due to the flexibility of export behavior in response to the market and due to the diversification towards

specialization within global industries, rather than relying on price (Jongwanich, 2010; Jongwanich & Magtibay-Ramos, 2009). Nonetheless, it cannot be denied that a sustainable exchange rate is necessary to ensure export growth because exchange rate volatility negatively affects exports and discourages investment (Kabir Hassan & Tufte, 1998).

Trade regime defines ease of export as well as import of capital goods to use in the production of tradable goods. Although a unique measure of trade openness has not been identified, several approaches have been applied. Yanikkaya (2003) measured trade openness by (1) total trade volume and (2) trade restrictions such as tariff and export tax as barriers to trade. Sachs et al. (1995) based their measurement on specific policy criteria such as tariffs, black market exchange rate, economic system and state monopoly. Studying the impact of trade regime based on these criteria, Athukorala and Sen (1998) found positive and significant impact of the openness of exports in the food industry. Jongwanich and Magtibay-Ramos (2009) considered total trade volume as the proxy of trade regime and also suggested a similar result. Conversely, trade restriction is found positive in relation to economic growth in the study by Yanikkaya (2003). However, this, as he mentioned, happened under some conditions restricted to developing countries, in which potential sectors were protected. Krueger (2000), on the other hand, argued that even countries favoring a "half-and-half" strategy—the strategy that encourages export orientation while protecting some import-competing industries—would find it hard to achieve successful growth in practice because the difficulty of imports occurs under protectionism, including the imports of intermediate and capital goods in the production of the export sector, which will consequently hinder the production procedure.

Recent studies have included FDI as an indicator for export growth (Jongwanich, 2010; Jongwanich & Magtibay-Ramos, 2009; Majeed et al., 2006). FDI inflow to developing countries has been observed as export-oriented and, in general, is a driving force for technology transfer, capital movement, and skills improvement as it develops industrial competence (Abidin, 2000). FDI in Malaysia, for instance, has helped build and greatly expand some new

economic sectors since the 1980s (Abidin, 2000). Similarly, the estimates by Jongwanich (2010) revealed that FDI had increased in importance in determining exports in some East and Southeast Asian economies. Nonetheless, the impact of FDI varies across countries. The empirical result of Jongwanich and Ramos (2009) exhibited a positive relationship between FDI and exports, but the coefficients appeared insignificant, suggesting that the great influence of FDI on exports was not evident in all regions.

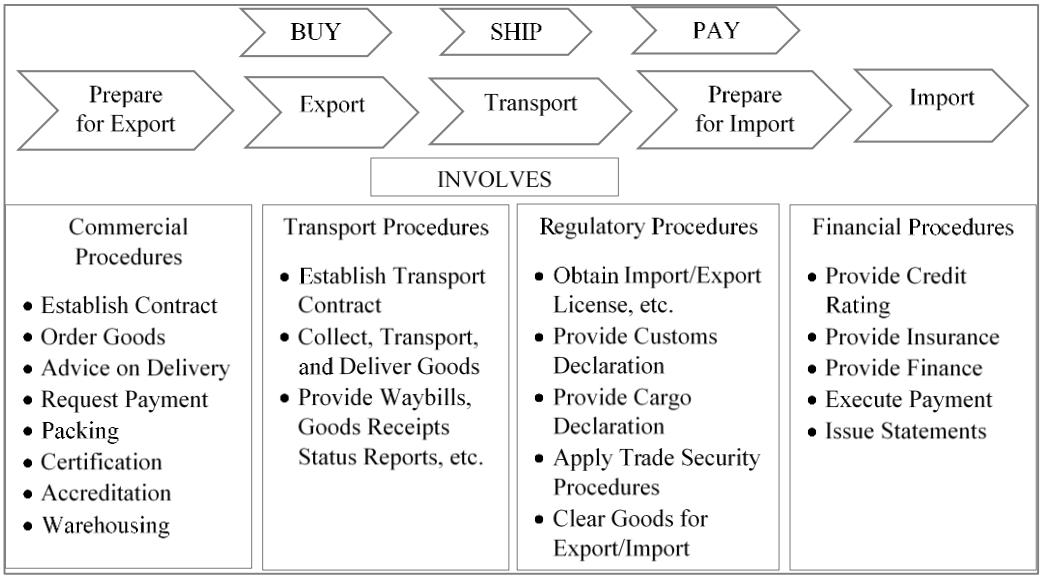
3.3.2.2. Indirect Policy

Indirect policies, or supporting policies, are conducive to overall economic performance; hence, the effectiveness of direct policies can be limited without the indirect supports (Krueger, 2000). Adequate infrastructure, for example, represents an essential part of the satisfactory growth of exports. Failure to expand infrastructure limits the potential gains from outward promotion and can impose serious constraints on the attainable export growth rate. A number of types of infrastructure and services are closely linked to trade and need to be considered as part of a comprehensive approach to export facilitation. Some main subsectors of trade-related infrastructure and services are (ADB & ESCAP, 2009; Krueger, 2000):

- Transport: such as internal road networks, port and international transport links. Inefficient transport services lead to longer delivery time, costly inventory accumulation, and reducing export volume.
- Logistic: such as freight forwarders and distributors. Efficient logistic providers allow cost and time minimization in the connection between exporters and importers.
- Telecommunication: such as telephone and internet lines. Reliable communication services make it possible for exporters to communicate and obtain information quickly and relatively cheaply.
- Electricity: electricity service greatly affects transaction cost of investment and production.

Another policy necessary to ensure smooth procedure of trade is trade facilitation, which refers to the efficient and transparent implementation of rules and regulations related to trade, and can be defined as the measures affecting the movement of goods along the international supply chain, in a broader sense, and as the system of customs procedures and documents, in a narrow sense (ADB & ESCAP, 2009). The scope of its general definition is displayed in Figure 3.1 which lays down the transaction of trade from "Buy", from trading partners, to "Ship", preparing to export, export, transport, preparing to import and importing, to "Pay", to the sellers. Such procedures can sometimes be major impediments to produce and export, which arise in response to the need of governments to monitor. As a result, one of the main objectives of export facilitation is to minimize cost and, more importantly, to simplify, harmonize and standardize the process of exports.

Figure 3.1: Buy-Ship-Pay Model (Process in Trade transaction)



Source: ADB&ESCAP, 2009, p.4

Trading across borders incurred in getting goods from producers in one country to consumers in another. While trade regime is important in making this process viable, the country cannot fully reap the gains from trade if barriers at borders are not minimized. Barriers encountered at borders, those other than the marginal cost of production, delay export activities and consequently reduce volume of exports. The barriers may include cost and document

required to export and import, and can also be broken down into policy barriers, legal and regulatory costs, information and security barriers, and barriers associated with the use of different currencies. A clear understanding of trading across borders and how it can be deal with will help promote deeper trade integration. Trade costs, for example, encountered by exporters differ across countries, starting from getting information to transferring out the goods and getting receipt of formal payment, depending on efficiency level of traders, and specifically on trading environment of the particular countries. More time and reflect institutional bottlenecks such as regulatory and logistic procedures resulting in more expensive export transaction.

In addition, the consensus over business environment has generally included the macroeconomic aspect such as economic stability, inflation, and exchange rate. However, a more specific measure of business regulatory aspect is of concern particularly in the area of regulatory agenda which might be difficult to observe. The survey of *Doing Business* by International Finance Cooperation has included various topics concerning the business regulatory environment ranging from *starting a business, dealing with construction permits, registering property, getting credit, protecting investors, paying taxes, trading across borders, enforcing contractions, getting electricity*, to *resolving insolvency*. Business environment demonstrates how markets function and how business profitability can be ensured. Particularly, better business environment reduces market failures and enhances industrialization process with sufficient public services and enforceable rules and regulation (Khondoker & Kalirajan, 2012). Nevertheless, these have often been limited in developing economies making business procedures starting from opening a new business to licensing and contract enforcement a challenging task. For instance, too many document requirements, power outage, delay in custom clearance and getting telephone connections are serious problems in expanding growth of industries. In contrast, better business regulation reduces time and operation costs barred by

investors making the processes faster. Starting business represents procedure and flexibility of opening a business in one country.

Jongwanich and Ramos (2009) include some policy variables such as infrastructure, represented by road networks, and business facilitation, represented by domestic credit for the private sector, in their empirical model. Majeed et al. (2006) also included those factors of policies as expected to affect developing countries' exports. Their variables are: communication services (telephone and television) as proxies for infrastructure, and national savings, official development assistance and indirect taxes as proxies for investment and trade facilitation, all statistically significant. On the other hand, in the empirical investigation of labor-intensive exports and their determinants, Ninkovic (2009) and Khondoker and Kalirajan (2012) found that, besides resource endowment, infrastructure (road networks, electricity consumption per capita) and the business regulatory environment (days required to start a new business) are very important, and strongly suggested that the vital roles of the above factors were applicable to almost all of the export products and not limited to labor-intensive ones.

In conclusion, the review of the previous studies gives insights into the numerous determinants of export performance in different countries, and possibly in different sectors. A general consensus gives weight to the central roles of production capacity and trade regime, while exchange rate or relative price is somewhat unpredictable in explaining export supply due to the structural change of exports in global markets and industries. The importance of the production capacity variable indicates that to maintain a country's competitiveness, policy emphasis should be shifted towards strengthening supply-side factors including the improvement in business investment climates (Jongwanich, 2010). In the context of exports, FDI appears ambiguous, depending greatly on specific countries and sector orientation. Variables of great interest should go toward indirect policies, which have little been examined in empirical investigation, when examining the promotion of export performance.

Chapter 4: Specification of Key Sectors: Implications for Export Potential Industries

4.1. 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 billion) and growing at 18 percent on average annually (WDI, 2015)[4]. 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—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 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. More importantly, 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.

Exports of primary commodities have 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 account for 66 percent, 8 percent, and 3 percent of total exports, respectively, as shown in Table 4.1. The country depends highly on the imports of industrial goods for domestic production, which usually happen as a start of industrialization.

[4] The trade deficit has persisted over two decades. The figure slightly decreased from 11 percent of GDP in 2000 to 8 percent in 2013.

Table 4.1: Export and Import by Categories, share in total values (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
Crude rubber	14.53	1.93	3.91			
Agriculture and 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			
Low tech/Labor-intensive/ Resourece based	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: including crude/agricultural materials and mineral fuels, 2: including exports of second-hand vehicles
Source: Unctad, 2014 "International Trade in Goods and Services"

However, the imports of consumption goods surge due to the increasing income of urban residence and higher demand for luxurious goods, which put additional pressure on trade deficit.

The 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 objectives 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 exports (WTO Secretariat, 2011a). Initial baskets of 19 potential products and services were identified following the Diagnostic Trade Integration Strategy (DTIS) in 2007 (MoC, 2007). Garment and footwear are still the top products in the list, followed by agricultural items. Improved market access due to a favorable trade agreement with the EU and low labor costs, together with a relatively encouraging business environment, are the main competitive elements of Cambodia's exports. However, low labor productivity and high trade facilitation costs remain critical, whereas a number of other constraints hinder export progress, which will be discussed in the following section. The

chapter proceeds with a brief review of existing literature in section 3, while section 4 introduces the study objectives, 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 chapter.

4.2. Challenges to the Performance of Export Sectors

4.2.1. Slow Progress of Diversification

Five main products—apparel, footwear, crude rubber, bicycle, and vegetable and fruit—account for more than 70 percent of total exports in 2012, with articles of apparel alone sharing more than half, remaining unchanged from 2000, which indicates that diversification towards new products in 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, and the impacts of the main exports on other factors such as employment, value added and linkages are thus limited. In addition, the diversification index notes no significant improvement. This index, ranging from 0 (more diversified) to 1 (less diversified), shows to what extent the country depends on specific products comparing to world exports. 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

Table 4.2: Export Diversification Index, ASEAN, 2000 and 2012

Country	Index Value	
	2000	2012
Brunei Darussalam	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 “Trade Indicators”

(0.40), Vietnam (0.52), and other countries in ASEAN, except Brunei and Myanmar, as shown in Table 4.2[5].

4.2.2. 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 start base of manufacturing production. However, the value remains among the lowest in the region. As shown in Table 4.3, Cambodia's per capita MVA in 2009 still lagged behind Vietnam's in 2005 and Indonesia's and the Philippines's in 2000, which implies that Cambodia's MVA growth should be not as impressive as it appears at first glance.

Table 4.3: 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

[5] The 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).

4.2.3. 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, compared 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 to realize potential gains from the 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 an important role in promoting garment exports; 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.

4.3. Research Objective and Data

The chapter attempts to fulfill the first objective of the dissertation which is 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 export should rank high in most, if not all, of the five indicators. To the best of my knowledge, this is the first study to combine the five approaches and, more importantly, to be based on both the traditional Rasmussen's backward-forward linkages and the more current hypothetical extraction method. The normalization approach[6] for ranking given to each indicator at the end of the estimation is another contribution to the literature. In addition, previous studies on this topic in the case of

[6] The normalization approach is discussed at the last part of section 6, under the subsection "Normalization Values and Ranking".

Cambodia are mainly based on the 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, as given in Table 4.4. This table is derived and aggregated 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 study in the sense that since there is no employment data corresponding to the I-O table, the current study has generated data on employment by sector from the National Institute of Statistics (NIS)' Cambodia Socio-Economic Survey (CSES, 2009) for consistency.

Table 4.4: 18 Sectors of the Cambodia's I-O Table, 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	

Source: Heng et al., 2014

Table 4.4 lists the names with the descriptions of the 18 sectors, of which two belong to agriculture, 11 to industry, and five to service, whereas Table 4.5 shows the descriptive statistic of the structural features of the Cambodian economy. *Textile (TEXTILE)* accounts for 21 percent, the largest share, of domestic production, followed by *Agriculture (ARG)* and *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 *Trade-Transportation* (*WTT*).

Table 4.5 also lists 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 the foreign market plays a more vital role for this industry. Similarly, the export intensity of *HR* is 71 percent with imports of less than one percent, showing the importance of this exporting service in tourism. In contrast, high import penetration is observed in four industries—*Other*

Table 4.5: Structural Feature, 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

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

manufacturing (572%), *Fabricated metal-office-computing machine* (255%), *Motor vehicle-other transport equipment* (191%) and *Metal* (119%). These figures demonstrate that domestic supply of these industries are far behind the level to cover self-sufficiency.

Finally, while *AGR* employs more than 60 percent of the total labor force, it contributes to only 41 percent of income, illustrating 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 labor in the former and high-skilled labor in the latter.

4.4. Methodology

Introduction to the Input-Output Application

An analytical framework of the input-output model was developed by Professor Wassily Leontief in the late 1930s, with the publication of the 1919 and 1929 I-O tables of the United States. This resulted in his being awarded the Nobel Prize in Economic Science in 1973 in recognition of the application of I-O frameworks to economic problems (Miller & Blair, 2009). Basically, I-O frameworks are used for inter-industry analysis, which is the analysis of the interdependence or interrelationship among industries in one region or one economy.

Table 4.6 illustrates a basic sample of I-O table, which is principally the matrix of columns and rows divided into three quadrants (Parikh, 1979). The first is the intermediate quadrant which is comprised of all of the industries in an economy (the first to the nth industry), such as agriculture, manufacturing and service, providing the whole picture of supply and demand of intermediate products with transaction flows across these various industries. The column of the table is the input flows showing that a given industry requires intermediate inputs (x_{ij}) from other industries to produce its output (x_i), while the row is the output flows that one particular industry sells its final outputs to other industries (as their intermediate inputs). Within this transaction, industries are interdependent on each other in the process of production. The second quadrant is final demand (f_i), including household consumption, government expenditure, investment (fixed capital formation), and exports, together working as the demand

for the final products distributed by all of the industries. The third is the primary input quadrant. Primary inputs consist of value added (v_i)—wage, tax, return to capital, operating surplus—and import, which show the amount of each component required, in addition to intermediate inputs, by each industry. In some cases, there is another quadrant that demonstrates the direct link of various primary inputs to the final demand (Valadkhani, 2003).

Table 4.6: Basic Transaction I-O Table

	Industry 1	Industry n	Final Demand	Total output
Industry 1	x_{11}	x_{1n}	f_1	x_1
Industry n	x_{n1}	x_{nn}	f_n	x_n
Gross Value Added	v_1	v_n		
Total Output	x_1	x_n		

Source: Miller & Blair, 2009

The transaction of I-O from the above table follows:

- Income-expense balance (looking through the column of the table):

Intermediate goods + Primary goods (Value added) = Total outputs

$$x_{ij} + v_i = x_i \ (i = 1, \dots, n)$$

- supply-Demand balance (looking through the row of the table):

Intermediate goods + Final demand = Total outputs

$$x_{ij} + f_i = x_i \ (j = 1, \dots, n)$$

Putting them together,

Intermediate goods + Value added = Intermediate goods + Final demand

Value added = Final demand

The value added is the income part of the economy that should be equal to the final demand as the consumption part of the same economy. That application implies consistently to the national account identity stated GDP (Y) of an economy (looking at the consumption part) is the combination of household consumption (C), government expenditure (G), private investment (I), and net foreign final demand (export (E) adjusted with import (M)) as appears in the equation: Y = C + G + I + (E – M).

The I-O frameworks can be applied to various economic analysis such as economic impact studies, income and employment generation, cost-benefit analysis, price-quantity relationships, and backward-forward measures within and across regions, all of which are useful in policy measure and planning. The direct effects on any factors, say income or employment, can be easily estimated; nonetheless, the indirect effects are not simply observed unless the Leontief technique and the linkages are taken into account (Valadkhani, 2003). However, it should also be noted that analysis with I-O application is not without limitations. Traditionally, I-O modeling assumes that there are no supply constraints, production of every industry is subject to constant return to scales, the commodity input structure is fixed, output is a linear function of demand, and there is only homogeneous sector output (Hara, 2008). These assumptions can be unrealistic and quite restrictive.

Matrix Form

Intermediate goods plus final demand should be equivalent to total output. This can be written in matrix form as **x** = **Ax** + **f**, where **A** is the input coefficient matrix representing the input per unit of total output of each industry[7], **x** is the total output vector and **f** is final demand vector (Miller & Blair, 2009). The study applies an endogenous import model; therefore, import is used in domestic final demand (**f**) but not in export (**e**). The matrix form of the decomposition is derived as follows:

$$\mathbf{x} = \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\mathbf{x} + \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{f} + \mathbf{e} \tag{4-1}$$

$$\mathbf{x} = \left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1}\left[\left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{f} + \mathbf{e}\right] \tag{4-2}$$

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

7. The term “industry” and “sector” are used interchangeably from this section.

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

4.4.1. Backward and Forward Linkages

Backward and forward linkages in the I-O framework can be measured based on the Leontief inverse matrix, $\left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1}$. 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):

$$\sum_{i=1}^{n} b_{ij} = b_{.j} \tag{4-3}$$

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

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

which indicates the output increase in the *i*th sector required to meet a unit increase in final demand for all sectors. The results of the two linkages provide 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.

4.4.1.1. 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

$$\frac{1}{n^2} \sum_{j=1}^{n} \sum_{i=1}^{n} b_{ij} = \frac{1}{n^2} \sum_{j=1}^{n} b_{.j} = \frac{1}{n^2} \sum_{i=1}^{n} b_{i.} \tag{4-5}$$

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):

$$u_j = \frac{\frac{1}{n} b_{.j}}{\frac{1}{n^2} \sum_{j=1}^{n} b_{.j}} \tag{4-6}$$

$$u_i = \frac{\frac{1}{n} b_{i.}}{\frac{1}{n^2} \sum_{i=1}^{n} b_{i.}} \tag{4-7}$$

These indices can be used to answer which industries highly depend on others. If u_j is bigger than unity (u_j >1), the *j*th 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 as if this index is bigger than one (u_i>1), then 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 *i*th industry.

4.4.1.2. Coefficients of Variation

The indices above are unweighted averages and they do not take into account the importance of individual sectors. 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 *j*th 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.

$$v_j = \frac{\sqrt{\frac{1}{n-1} \sum_{i=1}^{n} \left(b_{ij} - \frac{1}{n} \sum_{i=1}^{n} b_{ij} \right)^2}}{\frac{1}{n} \sum_{i=1}^{n} b_{ij}} \quad (j = 1, ..., n) \tag{4-8}$$

$$v_i = \frac{\sqrt{\frac{1}{n-1}\sum_{j=1}^{n}\left(b_{ij} - \frac{1}{n}\sum_{j=1}^{n} b_{ij}\right)^2}}{\frac{1}{n}\sum_{j=1}^{n} b_{ij}} \quad (i = 1, ..., n) \tag{4-9}$$

In the case of a relatively high value of v_j, the jth industry is heavily dependent 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.

4.4.2. 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

$$y_j = \frac{ty_j}{x_j} \tag{4-10}$$

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

$$\mathbf{Y} = \left(\hat{\mathbf{Y}}\right)\left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1} \tag{4-11}$$

where $\left(\hat{\mathbf{Y}}\right)$ is the diagonal matrix of income coefficient, and $\left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1}$ 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

$$y_j^m = \frac{\sum_{i=1}^{n} y_{ij}}{y_j} \tag{4-12}$$

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 labor income. Increasing final demand can be the initial attempts; nonetheless, domestic final demand may not be easily increased, at least in the short term, given the small market size of Cambodia, so the increase in foreign sales can be a potential target to expand the markets. Hence, the income multipliers are considered one of the main indicators to specify key export sectors that are likely to raise workers' incomes via export promotion.

4.4.3. Employment Intensity

According to the factor endowment theory of Heckscher-Ohlin, a country should produce and export products which require more of the factor in which the country is endowed, either capital or labor (Todaro & Smith, 2009). Most of least developed countries are found to be with scarce capital but excessive labor supply which can be beneficial from the countries to be more competitive in labor intensive products. Similarly, Cambodia is recognized as a labor-intensive country with a relatively low cost of labor (World Bank, 2009). There is, therefore, a significant concern about how the country could benefit from this endowment, as well as how employment could be created to cope with the increasing labor supply. Recent experience from newly industrialized economies such as South Korea, Malaysia and Indonesia has shown increasing concern toward export promotion in labor-intensive industries during the first stage of an export boom (Weiss, 2005). The question, however, arises as to which industries possess the most competitiveness for exports while at the same time contributing to employment generation.

Employment intensity analysis of foreign trade is applied to answer the above question. Following Parikh (1979), labor content per unit of final demand can be calculated on the basis

of I-O model using the input coefficients and data of employment in each industry. tl_j denotes the total labor employed by the *j*th sector, so the direct labor requirements per unit of total output is

$$l_j = \frac{tl_j}{x_j} \tag{4-13}$$

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

$$\mathbf{L} = \left(\hat{\mathbf{L}}\right)\left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1} \tag{4-14}$$

where $\left(\hat{\mathbf{L}}\right)$ is the diagonal matrix of labor coefficient, and $\left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1}$ is the Leontief inverse matrix, hence **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 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, densely populated, industries.

4.4.4. Trade Balance

Trade balance is normally examined in terms of gross export values, which does not take into account both direct and indirect imports and, therefore, does not reflect net earnings of each industry. 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, $\left(\hat{\mathbf{M}}\right)$, and the Leontief inverse matrix

$$\mathbf{TM} = \left(\hat{\mathbf{M}}\right)\left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}\right]^{-1} \tag{4-15}$$

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

$$z_j = e_j - \sum_{i=1}^{n} tm_{ij} f_j \qquad (j=1, ..., n) \tag{4-16}$$

If z_j is positive, the *j*th 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 the trade deficit, which has persisted for two decades in Cambodia. The result is a valuable guide for policy making as to which sectors should be export oriented.

4.4.5. 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) uses "factor" for any indicator, which might refer to economic, social, or environmental factors. To put it another way, HEM measures how the whole system (i.e. output, employment) is affected directly and indirectly if one industry is extracted. If an industry is well connected with other sectors, with high and broad linkage distribution, the shut-down of this industry will severely affect other sectors in terms of output as well as other factors through the reduction of supply of inputs to and demand for outputs from other industries. Even if the same amount of the reduced inputs can be replaced by homogenous imported inputs, the effects are beyond the direct factor loss

itself due to the inter-sectoral relationship. In contrast, if the industry has few linkages with other sectors, the loss of that industry will be less consequential.

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 the 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 objectives. To the best of my knowledge, no previous studies have combined these methods for comparison.

The differences between the total outputs before and after the extraction tell how important each sector is in the economy. The elimination of sector j means that this sector no longer produces outputs and no longer requires intermediate inputs from other remaining sectors. Technically speaking, the row and column of input coefficient matrix (**A**) of sector j become zero, and the new matrix is denoted **A(-j)**. However, due to the reasons that (1) the technological production of the other sectors (i ≠ j) remains the same, (2) the deletion of both the row and column of j in **A(-j)** covers all the total linkages in which backward and forward linkages are not divided, and (3) this total extraction might be too excessive for the economy; it is assumed that the same amount of the required outputs formerly produced by sector j can be imported so as to provide necessary inputs to other sectors (Miller & Blair, 2009; Temurshoev, 2010). Using the same final demand vector (**f**), the model is generated from the matrix of equation (4-2)

$$\mathbf{x}(-j) = \left[\mathbf{I} - \left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{A}(-j)\right]^{-1}\left[\left(\mathbf{I} - \hat{\mathbf{M}}\right)\mathbf{f} + \mathbf{e}\right] \tag{4-17}$$

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

$$\Delta\mathbf{x} = \mathbf{x} - \mathbf{x}(-j) \tag{4-18}$$

The reduction of outputs can be explained as the dependence of sector j on itself (i = j) and, more importantly, on the remaining sectors (i ≠ j). For the former case, two reduction processes of sector j's contribution are found: (1) reduction in its own final demand and (2) in

sector i's final demand. For the latter case, two other important processes of the effect are also revealed. First, sector j does not require any more contribution from sector i to produce final demand; second, sector j does not produce any more input to sector i and, in turn, inputs from sector i are not required (as it was in reverse before the omission of j) (Temurshoev, 2010). The objective here is to find the sector with the highest reduction in outputs, which is the maximum $\Delta\mathbf{x}$.

4.5. Result and Discussion

Table 4.7 presents the backward and forward linkages obtained from the technological coefficient, equation (4-3) and (4-4). 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

Table 4.7: Backward-Forward Linkages of the 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

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, covering 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

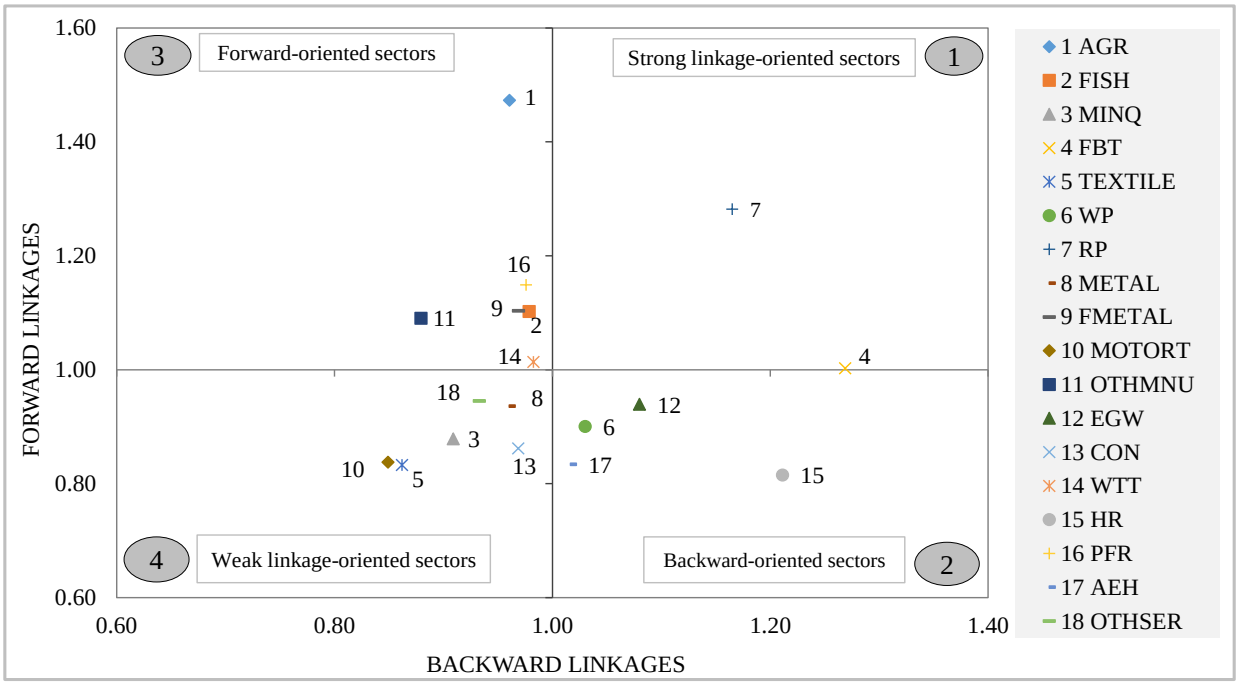
The result of the index of power of dispersion (u_j) and sensitivity of dispersion (u_i), together with the variation of coefficients (v_j, v_i) in parenthesis, is presented in Table 4.8. Six sectors have strong backward linkages. Among them, *FBT* has the strongest linkages with u_j as high as 1.27, 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 them does not necessarily lead to an increase of *HR* output.

Figure 4.1 is divided into four quadrants and locates different sectors according to the level of both u_j and u_i. Part 1—in the upper right part of the Figure—locate strong linkage-

Table 4.8: 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)

Figure 4.1: Linkage-Oriented Classification



Source: Author's calculation (Table 4.7, Figure 4.1)

oriented sectors. *RP* and *FBT* are the only two sectors in this part, showing that these two sectors have strong linkages both backward and forward, while six sectors (*Mining, Textile, Metal, Motor, Construction, and Other services*) located in part 4—in the lower-left part—are weak in both of the linkages. 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). The 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, 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.

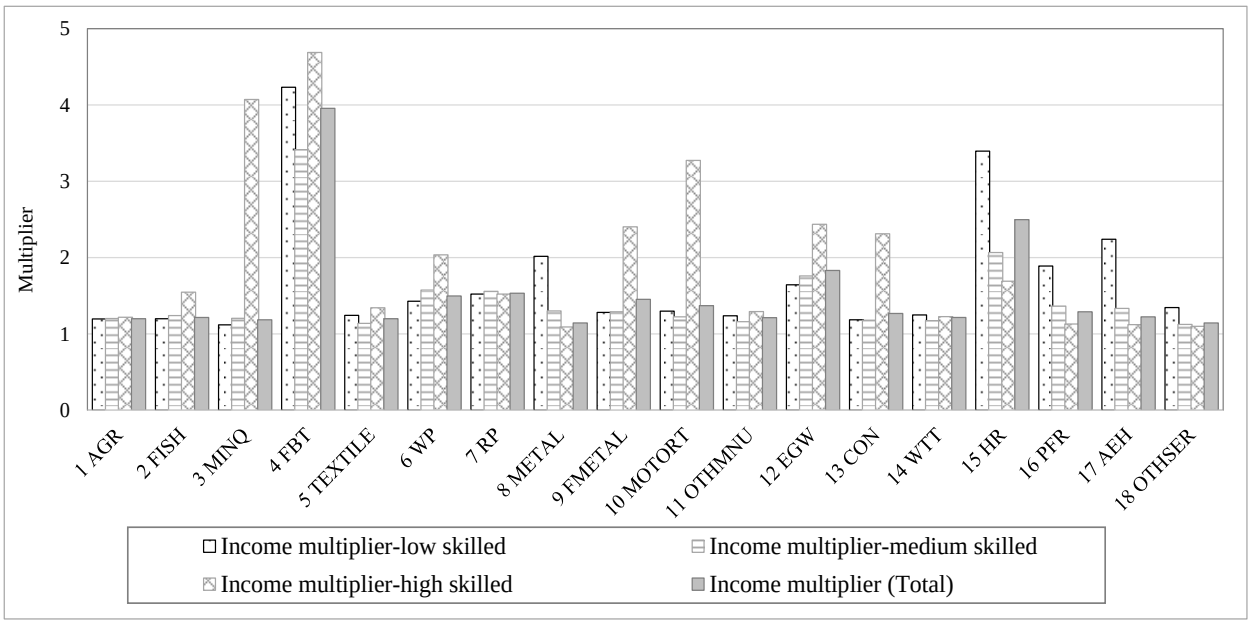
Rubber plantations have increased significantly from 2009 and covered 328,771ha in 2013, comprised of Rubber Estates (former state-owned enterprises, 17 percent), economic land concessions (41 percent), and household rubber plantations (42 percent) (MAFF, 2015). The sector yielded 85,244 tons of dry rubber production with exports of 86,052 tons in 2013, both increases of 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 increased 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-

Figure 4.2: Multiplier Effects on Income by Sectors



Source: Author

skilled labor, while high-skilled labor takes 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, as shown in Figure 4.2. 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, labor 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 the 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 services. This phenomenon happens because the former employs a lower proportion of high-skilled workers, which means that the number of laborers 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 those of the low-skilled group. Mathematically, when the denominator $y_{j,}$ of equation (4-12) 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 for 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 a substantial level of multiplier. Kobayashi et al. (2009) also suggested that the 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

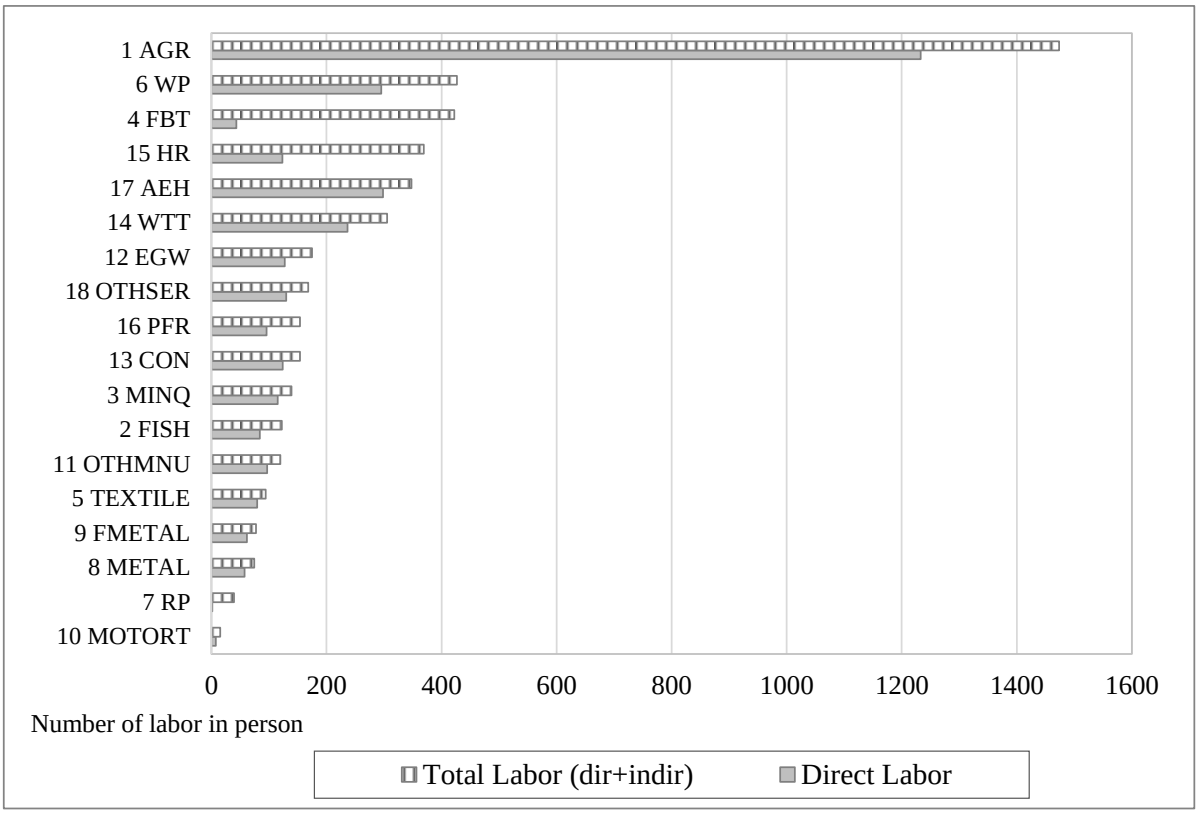
The data of employment by sector is not provided in the I-O table; this data, thus, is generated separately from the household survey (CSES, 2009) as it records each person's occupation classified according to the International Standard Industrial Classification (ISIC Rev. 4). The data of employment by occupation and age are aggregated to correspond to the sectors of the I-O table. Figure 4.3 presents the employment intensity per unit of final demand, based on equation (4-14). Direct labor refers to the number of workers directly employed in one industry to produce one unit of output, while total labor refers to the number of laborers directly and indirectly required in and out of the industry itself if there is an increase in final demand for that particular industry.

Agriculture has the top rank due to the 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 comes from 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.

The level of labor contents seems to be related closely to labor productivity, which can be defined as labor requirement per one unit of final demand (Parikh, 1979). The sectors with high labor contents are considered as having low labor productivity and vice versa, which gives the point of view that, as suggested by Parikh (1979), countries with low unemployment rate

should undertake investment in low labor contents, or high productivity, sectors, while 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. On the other hand, aiming at increasing employment, foreign final demand for those sectors plays an important role, particularly in small domestic markets like that of Cambodia. Hence, exprt promotion should be oriented to above mentioned sectors with high labor intensities. Moreover, Cambodia, as a labor-abundant country with a relatively low cost of labor, finds this characteristic an advantage for international competition. Promoting labor-intensive products, for which advanced technologies are not much required, the production in Cambodia can be less expensive and highly competitive. Therefore, investment planning in exports should obviously

Figure 4.3: Labor Intensities (per M.US$ of Final Demand)



Source: Author

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 imports. 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. Parikh (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 because the lack of domestic final demand for the labor-intensive products makes the expansion of those sectors unsuccessful.

Foreign Exchange Earnings

Only four sectors of merchandise—one from agriculture and three from manufacturing—and four services are net exporters (Table 4.9). *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. In addition, the contribution of services such as WTT, PFR, OTHSER to net exports are relatively high compared to manufacturing sectors. 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 compared 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 and other inputs, causing currency leakage, which is also consistent with previous research (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 4.9: Net Exporting and Net Importing Sectors

Net Earners of Foreign Exchange					Net Losers of Foreign Exchange				
	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 negative net exporting 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 impacts on total output resulting from the extraction of each exporter are ranked in order from the largest to the smallest in Table 4.10. 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. 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. The second and third sectors are *Trade-Transportation* and *Agricultur*e, 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 for the loss of aggregate outputs. *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-Tobacco* goods, and *Trade-Transport* and *Hotel-Restaurant* services have the highest impacts if they are eliminated.

Table 4.10: Hypothetical Extraction Effect on Outputs

Sector	Change in Total Output (△x) (US$ Million)	Percentage Change in Total Output	Sector	Change in Total Output (△x) (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

Normalization Values and Ranking

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

$$s = \frac{z_i - \min(z)}{\max(z) - \min(z)} \qquad (0 <= s_i <= 1,\ i = 1,\ldots, 18) \qquad (4\text{-}19)$$

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 listed in Table 4.11, where *FBT, HR, AGR, RP and EGW* are the top five sectors.

Table 4.11: 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

4.6. Concluding Remarks

This chapter 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 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 (textiles) 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 the previous study by Kobayashi et al (2009) who found that agriculture, the food sector, and hotels-restaurants are able to induce wide distribution to domestic income while the garment cannot secure long-term distribution. After the discussion of the sectoral pattern, this current study suggests that attention should be given to the following four key sectors for export promotion: *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 though more attention is needed. For one thing, agriculture products, such as fishery, livestock and crops, are among the 19 potential products in DTIS 2007. In addition, the value of agro-food exports has increased gradually, accounting for five percent of total exports in 2011 (MoC, 2014). The main export items are tobacco, cane sugar and palm oil. The Industrial Development Plan (RGC, 2015) also targets an increase in processed agricultural exports from eight percent of total exports in 2015 to 12 percent in 2025. With agriculture endowment and significant changes underway in 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 export items in this sector. For instance, processed meat and fruit, frozen fish and shrimp, wine, and non-alcoholic drinks have been able to enter the world market but are still at an initial stage and require improvement. Despite its potential, the processed food industry—other than the rice sector—has received little strategic attention, with a lack of domestic investment along the value chain. Also, a national business association specific to this industry does not yet exist in Cambodia (MoC, 2014). Moreover, the industry is characterized by SMEs with emerging larger firms, both heavily focused on domestic demand, while entry into the international market is just starting, whereas the lack of compliance with quality standards of Sanitary and Phyto-Sanitary (SPS) measures is a key constraint. For these challenges, encouraging investment and value addition and improving quality standards should be priorities.

Rubber cultivation 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[8] (MAFF, 2105; MoC, 2014). 87 percent of formal natural rubber exports in 2007 went to Vietnam, which has suitable facilities

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

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) have grown due to significant investment efforts and expansion of production capacity (MoC, 2014). However, the remaining challenges are the difficulties of meeting international standards.

The increase in investment and exports of hotel-restaurant services is largely due 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 in 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 products—estimated to be around 25 percent—is also limiting 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 businesses 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 quality guarantees for the four proposed sectors and provide training and technical know-how to improve compliance with international quality standards.

Chapter 5: Potential Roles of Export Orientation and Policy Options for Cambodia's Agriculture and Agro-industry

5.1. Introduction

Emphasis has been given to export-led growth as a driving force for development, as exports play crucial roles in generating income and employment in the domestic economy, as well as in bringing investment, technical upgrades, and industrialization. In this context, the success which is highly associated with the performance of exporting sectors is essential to ensuring long-term growth. Various studies have measured the impacts of exports as well as factors affecting the performance of exports. From the point of view of demand, world prices and demand of trading partners are supposed to determine a country's exports (Atique et al., 2003; Jongwanich, 2010). From the supply side framework, on the other hand, production capacity and domestic policies are necessary to explain the phenomenon. However, given different characteristics of specific economies, the size of impacts and the effectiveness of policies depend greatly on which sectors the countries rely on for export.

The slow progress of diversification and low value-added content of the current exports of Cambodia makes the country vulnerable to shocks and unable to widely contribute to the domestic economy. For instance, five products (apparel and clothing accessories, footwear, bicycle, crude rubber, and vegetable and fruit) account for more than 70 percent of exports, with articles of apparel alone more than half of total exports in 2012, remaining unchanged from 2000, indicating that diversification towards new products in recent years has made slow progress (UNCTAD, 2014). Moreover, the country is not able to retain value added in its main manufacturing—garments, footwear, and bicycles—as little of the value chains operate inside the country, where intermediate parts are imported and assembled into finished products which are then exported. Despite an impressive growth of manufacturing exports, at an average annual rate of 15 percent from 2000-2009, Cambodia's manufacturing value added per capital

remained among the lowest in the region and lagged behind its neighbors such as Vietnam, Thailand and Indonesia (UNIDO, 2011).

Following the results from the previous chapter, which specifies agriculture, food-beverage-tobacco, rubber industry, and hotel-restaurant as sectors with high export potential, this chapter further analyzes the impacts of those sectors. However, only the merchandise exports will be taken into account in the analysis. Given the narrow based industrial structure, this country has been depending greatly on intermediate textile imports while ignoring the possible benefits of the agricultural endowment to create the connection between agriculture and the industrial sector. Hang Chuon (2011) stated that economic growth during the last decade has centered on a few urban-based sectors such as tourism and construction in addition to garment, while creating more opportunities for trading, investment and private sector development for urban rather than rural areas. This differentiated growth performance, as a consequence, has widened the income and inequality gaps between the two regions (Hang Chuon, 2011). For better income distribution, a previous study suggested that Cambodia should give more attention to promoting exports of agro-related industries, particularly food manufacturing (Kobayashi et al., 2009). Consistently, agriculture, food and the rubber industry have been found as highly linkage oriented, able to induce high multiplier on income, and possess high labor contents, while the garment industry is unlikely to contribute profits due to the lack of inter-industrial linkages (Chhuor, 2016). The government has also recognized the importance of these sectors and has set in the Industrial Development Plan 2015-2025 the goal

Table 5.1: Targeted share of export sectors (% of total exports)

Sector	1998	2008	2013	2015	2020	2025
Processed agricultural products	10%	10%	7.90%	8%	10%	12%
Manufacturing						
- Garment and Footwear	80%	70%	77%	60%	55%	50%
- Non-garment and footwear	0.10%	0.50%	1%	5%	10%	15%

Source: Industrial Development Plan 2015-2025 (Royal Government of Cambodia, 2015)

to increase agro-industrial exports, as listed in Table 5.1 (RGC, 2015). However, there is a lack of impact studies and more critical policies regarding those sectors. Potential export sectors have been identified, yet their expected impacts on the economy are ambiguous.

This study, therefore, attempts to assess the impacts on economic factors including growth, employment, and household welfare and to seek for plausible promotion policies for three selected main sectors: the food-beverage-tobacco industry, the rubber industry, and agriculture, which are deemed promising for the export-orientated structure of Cambodia. A standard Computable General Equilibrium (CGE) framework is applied to quantify the economic effects, specifically on growth, investment, sectoral output and employment, government and labor income, household welfare, and their interactions. Section 2 discusses the current performance, potential and remaining challenges of the three selected export sectors, while section 3 briefly reviews previous literature. An introduction to the CGE model characteristics and the SAM data applied in the study are given in section 4. Section 5 describes simulation designs, followed by the discussion of the simulation results, and the last section concludes the chapter.

5.2. Economic and Export Performance of Agriculture, Food and the Rubber Industry

Cambodia has enjoyed a high growth rate of about seven percent on average during the last decade, with the garment industry, construction, tourism and agriculture acting as the main driving forces. The share of agriculture output in GDP fell from 44 percent in 1995 to 23 percent in 2014, replaced by industry, which doubled to 31 percent, while the share of services has remained relatively stable during the period (NIS, 2015). Despite the decreasing share in GDP, agriculture and agro-related activities have played significant roles in contributing to the employment and livelihood of more than 70 percent of the total population, to poverty reduction in rural areas, to food security, and to equitable economic growth (Hang Chuon, 2011). Agro-industry—food and rubber, in this study—share a similar characteristic to agricultural products in that they are based on agricultural intermediates, except that the former should undergo some

degree of preserving, processing, or packaging before distributing to final domestic and foreign markets, and thus are categorized as industrial products, according to the Ministry of Industry (NIS, 2015).

5.2.1. Agriculture

Agricultural production, a pro-poor sector, has experienced exceptional growth driven by crop production, mainly paddy rice. Although the value added share in GDP has decreased, agriculture maintained an average of five percent growth until 2010 and 2.3 percent during the next four years, as shown in Table 5.2. Previously domestic-oriented, agricultural production was exported, after the civil war and during the start of the market economy in the late 1980s, due to a surplus of production—mostly paddy rice, corn, soybeans, cassava, and cashews. Statistic in Table 5.3 shows that exports of agricultural products were US$35 million in 2014, with 26 percent growth on average from 2000 (UN Comtrade, 2016). Nevertheless, the figure can be underestimated due to informal exports crossing the borders to Thailand and Vietnam, which have the capacity to process and re-export to third countries (MoC, 2014).

Table 5.2: Agriculture value added and contribution to GDP by categories (1995-2014)

	Average Value Added Growth				**Share in GDP**					**Share in Agriculture**				
	1995-2000	**2001-2005**	**2006-2010**	**2011-2014**	**1995**	**2000**	**2005**	**2010**	**2014**	**1995**	**2000**	**2005**	**2010**	**2014**
Agriculture	3.3	4.9	5.1	2.3	44.4	35.7	29.4	27.3	22.7					
Crops	4.7	6.0	10.8	2.6	16.3	15.6	15.0	14.7	12.3	36.7	43.7	50.9	53.8	54.4
Livestock & Poultry	2.5	3.0	4.6	0.3	7.7	5.5	4.5	4.1	3.1	17.4	15.5	15.4	15.0	13.9
Fisheries	3.1	2.4	3.9	3.8	13.2	10.7	7.7	6.8	6.0	29.8	30.0	26.3	24.8	26.3
Forestry & Logging	-1.8	-3.0	2.1	-1.7	7.1	3.5	2.2	1.7	1.2	16.1	9.7	7.4	6.3	5.4

Source: National Institute of Statistics, 2015 “National Account”

Paddy Rice: rice crops are the main agricultural production and continue to contribute about 10 percent of total real growth during 2010-2012. Dry seasonal rice production increased from 18.5 percent in 2003 to 23.3 percent in 2012 due to more access to irrigation systems. Rice

crops depend up to 80 percent on expanding cultivated areas, while only 20 percent on yield. Yet, expansion of cultivated areas has decreased and is getting difficult due to land constraints. The rice surplus was estimated at 4.7 million tons in 2012, most of which was exported unprocessed and unrecorded given weak capacity and financing in milling (World Bank, 2013).

Livestock: Livestock business is common among rural families and local markets, and thus constitutes one main source of income for the poor in many ways, especially as a form of savings which can be readily turned into cash in case of emergency. Export of livestock, including cattle, buffalos, pigs, and poultry, is expected to provide considerable opportunities, expanding into regional markets and meeting increasing demand, particularly for cattle, in the Middle East, in addition to limited exports to Malaysia (Ear, 2005). However, within the global trade, where animal disease has been strictly controlled, meeting health standards is crucial, which can be achieved by developing veterinary services and access to veterinary medicines. Ear (2005) suggested that despite a relatively open trade condition for livestock, the cattle sector needs to develop as a significant exporter through a well-managed organization, a realization of competitive prices for local demand for animal feed, and enhancement of the availability and improvement of veterinary services, medicines, and vaccines.

Table 5.3: Agriculture export by categories (2000-2014)

Product Categories	2000	2005	2010	2014
Total Agriculture Exports (US$, Thousand)	5,270	6,659	7,662	35,441
Share in Total Exports (%)	0.38	0.22	0.14	0.33
Share in Agri. Exports by Categories (%)				
Crops	5.23	28.93	38.44	6.30
Pepper and other spices	0.01	0.73	1.45	21.13
Live animals	0.92	0.16	1.28	0.18
Fisheries	75.45	15.43	10.83	1.70
Forestry and logging	0.00	0.95	7.92	0.02
Vegetables and fruit	0.90	2.87	5.88	65.96
Oil-seeds and oleaginous fruits	10.60	38.88	29.27	3.65
Other animal and vegetable materials	6.89	12.05	4.94	1.06
Total	100.00	100.00	100.00	100.00

Source: UN Comtrade, 2016, compiled by Author

Fisheries: The fishery is also one of the main sources of livelihood of rural people although the contribution of the sector to GDP has decreased from more than 13 percent during the 1990s to about six percent in 2014, with annual exports of around 35,000 tons (NIS, 2015; WTO Secretariat, 2011). Market expansion of this sector would provide better opportunities, so increasing fishery and livestock exports is necessary.

Domestic support was granted for agricultural products at Riel 8.62 billion and Riel 10 billion (approximate exchange rate US$1=Riel4,000) in 2007 and 2008, respectively. Over half of the total support took the form of natural disaster relief and the remaining went to pest and disease control, extension and advisory services, training services, research, and inspection services (WTO Secretariat, 2011a). CTIS (MoC, 2014) has acknowledged that to enhance the benefits of current agricultural products, aiming at increased flow of agricultural exports through formal channels, priorities should be given to two avenues: undertaking some degree of processing inside the country, and increasing direct export to final markets. These will require mechanisms to execute the government's strategy effectively. Reduction of informal domestic payments during transport and export procedures of the products should also be deemed vital. Moreover, although increasing in value, agriculture has experienced slower growth in the last few years, explained by depressed agricultural commodity prices and slow yield improvements after 2013 (World Bank, 2015). Rice production and yield in the wet season decreased by 2.5 percent and three percent respectively in 2014 from the previous year. While production growth has depended to a large extent on cultivated area expansion, current land constraints have become a concern. Agricultural output growth should from now on depend on yield improvements rather than land expansion.

5.2.2. Processed food

The sector achieved five percent growth on average from 2005 and had a nine-percent share in total manufacturing output in 2014, as shown in Table 5.4. Exports remain low, but the values have increased four-fold from US$76 million in 2010 to US$326 million in 2014,

accounting for three percent of total exports (UN Comtrade, 2016). Table 5.5 lists the share of the main export items, which are milled rice, tobacco, sugar preparation, and animal and vegetable oil. The milled rice surplus has increased gradually from 2000 as a result of paddy production, at a nine percent annual growth rate (WTO, 2011). Milled rice exports, which achieve a 28 percent increase year-on-year reaching 185 thousand metric tons during the first six months of 2013, have benefited from the Everything-But-Arms initiative of the EU, the main export partner (World Band, 2013). There is a difference between the quantities of officially recorded exports by the Custom Department, however, and the exact figures due to informal exports of unprocessed paddy rice and smuggling along the borders. To improve the trade of the rice sector, the government in 2010 set the year 2015 as the target year to achieve formal exports of milled rice of at least one million tons and to ensure the international recognition of Cambodian rice (RGC, 2010). Productivity enhancement and commercialization are essential tools to achieve this target, whereas public and private financing has moved to agriculture and agriculture processing activities. Unfortunately, total milled rice exports at the end of 2015 were almost 50 percent behind the target, which could be explained by the limited milling and financing capacity.

Table 5.4: Manufacturing value added and contribution to GDP by sector (1995-2014)

	Average Value Added Growth				**Share in GDP**					**Share in Manufacturing**				
	1995-2000	**2001-2005**	**2006-2010**	**2011-2014**	**1995**	**2000**	**2005**	**2010**	**2014**	**1995**	**2000**	**2005**	**2010**	**2014**
Manufacturing	21.0	13.9	8.7	9.9	8.9	15.9	19.6	20.5	22.5					
Food, Beverages & Tobacco	2.0	1.7	5.3	5.8	4.2	3.2	2.2	2.1	2.0	46.8	19.9	11.3	10.1	8.7
Textile,Wearing Apparel & Footwear	59.7	20.1	8.4	11.0	1.3	9.2	14.6	15.4	17.6	14.9	57.5	74.7	75.5	78.2
Wood, Paper & Publishing	5.2	-5.8	5.5	4.4	1.1	0.9	0.4	0.4	0.4	12.9	5.9	2.1	1.9	1.6
Manufacture of Rubber	25.3	-5.5	8.3	11.0	0.3	0.5	0.2	0.3	0.3	2.8	3.1	1.2	1.2	1.3
Other Manufacturing	9.2	8.7	8.7	7.0	2.0	2.2	2.1	2.3	2.3	22.7	13.6	10.7	11.2	10.2

Source: National Institute of Statistics, 2015 “National Account”

Table 5.5: Food-Beverage-Tobacco export by categories (2000-2014)

Product Categories	2000	2005	2010	2014
Total Agro-Food Exports (US$, Thousand)	8,482	22,130	76,201	326,908
Share in Total Exports (%)	0.61	0.73	1.36	3.06
Share in Agro-Food Exports by Categories (%)				
Meat and meat preparations	0.01	0.81	0.03	0.02
Diary products	31.84	0.04	0.00	0.00
Fish products	23.80	41.14	2.64	0.04
Cereal preparations (exclude Rice)	0.43	0.26	0.26	0.07
Rice (milled, husked)	10.30	13.45	45.60	70.80
Vegetables and fruit	3.46	4.34	0.80	0.35
Sugars and Sugar preparations	0.00	0.05	6.75	10.66
Coffee, tea, cocoa, spices	0.00	0.01	0.00	0.00
Animal and vegetable oils and fats	0.00	3.48	13.17	4.94
Other animal and vegetable materials	0.13	0.00	0.00	0.07
Other food items	0.65	4.27	10.72	5.17
Beverage	3.85	3.69	4.86	2.48
Tobacco	25.51	28.44	15.18	5.39
Total	100.00	100.00	100.00	100.00

Source: UN Comtrade, 2016, compiled by Author

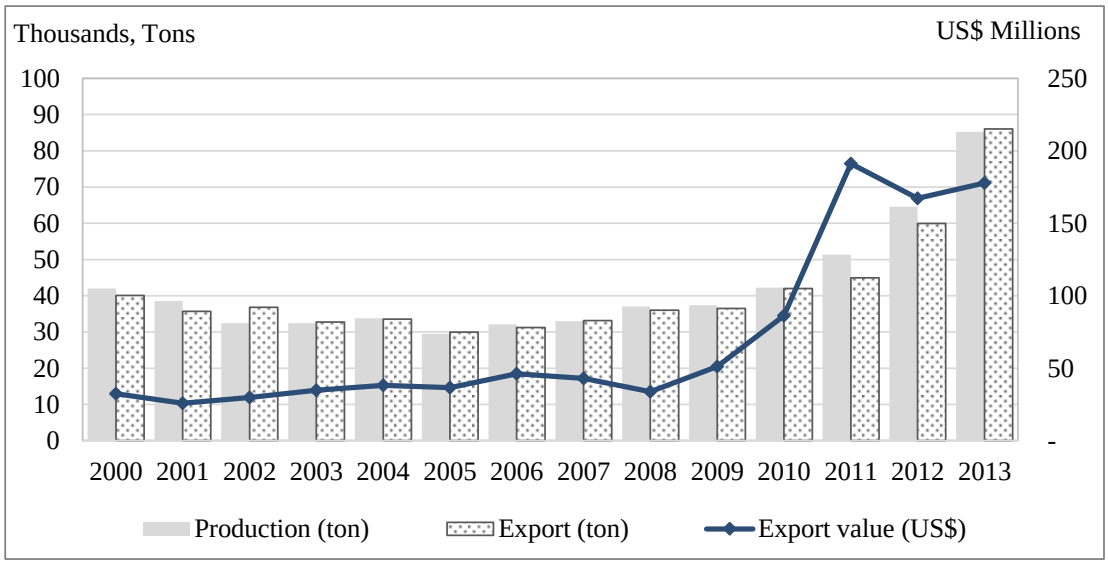
The industrial development plan of the government of Cambodia also targets an increase of agro-industrial exports from eight percent in 2015 to 12 percent in 2025 (RGC, 2015). The opportunity of Cambodia to expand its processed food exports is viable given the increasing demand for perishable food products in the world market, particularly in Asia where traditional agricultural production has decreased in recent years. Cambodia should enlarge its export items in this sectors because the agro-food industry—other than the milled rice sector—has received little strategic attention, with the lack of domestic investment along the value chain. Moreover, the industry is characterized by SMEs with emerging large firms both depend extensively on domestic demand, while at an early stage breaking into the international market, whereas the lack of compliance with quality standard of SPS and other measures is a key constraint. With the challenges, encouraging investment and value addition, and improving the quality standards should be a priority.

5.2.3. Rubber

Rubber plantation has soared significantly from 2007 and covered 328,771ha in 2013,

comprising rubber estates (former state-owned enterprises), economic land concession, and household rubber plantation (MAFF, 2015). Figure 5.1 illustrates that the sector yielded 85,244 tons of dry rubber, with 86,052 tons of exports in 2013. Cambodia is a rubber exporting country—almost all of the production are exported, and most of total exports are in the form of natural rubber[9] (MAFF, 2015, MoC, 2014). For example, 87 percent of formal natural rubber exports in 2007 went to Vietnam which has suitable facility to process and re-export. However, the figure has declined to 58 percent as exports to other markets, notably China and Malaysia, have grown over the past five years due to significant investment efforts and expansion of the production capacity. Notwithstanding, the remaining challenges, not different from that of other agro-industrial products, are the difficulties in meeting international standards. Some other constraints include high input and utility costs, limited finance and cash flow among producers and processors, relatively low yield, excessive paperwork required for export, and low custom clearance efficiency (WTO, 2011). The General Directorate of Rubber has been established to prepare and implement policies and strategic programs to ensure development of this sector.

Figure 5.1: Rubber production and export (2000-2014)



Source: Ministry of Agriculture, Forestry and Fishery, 2014 and UN Comtrade, 2016

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

5.3. Literature Reviews

The roles of exports have been examined using different measures, such as the treatment of exports as a factor of production in econometric models, the qualitative discussion, and the Computable General Equilibrium (CGE) model (Ram, 1985; Tyler, 1981; Balassa, 1978; Ganuza et al., 2005). The reviews of the potential impacts of sectoral export from previous studies, therefore, should be divided into two parts: the non-CGE model (both qualitative and empirical studies) and the CGE models. For the former, Tyler (1981) studied a cross-country analysis from 1960 to 1977 by including exports as a factor input and found a strong association between output growth and manufacturing exports in developing economies.

5.3.1. Non-CGE Models

In Cambodia's case, a number of qualitative studies, on the one hand, proposed the potential growth of agriculture and food sectors, following the efforts by the public and private sectors, and the expected significant contributions of these sectors to growth and poverty reduction. DTIS (MOC, 2007) suggested a list of 19 potential exports according to a number of indicators based on their previous performance, one of which was their contributions to human development[10]. The report indicated that garments and footwear rank high and medium, respectively, in human development assessment, while most agricultural products rank from low to medium. Nonetheless, the indicator could not quantify the prospective impacts of those sectors. A firm-level survey, on the other hand, was conducted with 164 sample garment companies to observe the roles of this export industry (Yamagata, 2006). The results confirmed that the industry has contributed substantially to poverty reduction through job creation because entry-level workers receive wages far above the poverty line, female workers predominate in the main category jobs, and barriers to employment and promotion up to certain levels are not high in terms of experience and education. The study, however, suggested that despite the fast

[10] The summarized table of the indicators and rankings are given in Chapter 2, Table 2.7.

development led by labor-intensive industry, the government has lacked a strong industrial promotion policy.

For the empirical literature, Chan and Oum (2011) studied the impacts of garment and textile trade preferences on livelihoods in Cambodia by applying the Input-Output model. Similar to the above study, they found that the garment industry has contributed to above nine percent on average of GDP growth between 1998 and 2008 and has helped reduce poverty due to large-scale employment of rural labor. However, the paper concluded that despite its expansion, the industry has not contributed to improving labor productivity and was not likely to be sustainable in the medium to long term due to the severe competition with other garment exporting countries. Similarly, applying the model of the Input-Output framework, but not focusing on only the garment sector, Kobayashi et al. (2009) studied the industrial structure of Cambodia as a whole and the role of agriculture by estimating sectoral gross output and value added. They found that agriculture and the food sector had a tendency to induce high and wide distribution of income. Nevertheless, the focus on export impacts of those sectors was not emphasized in their study.

5.3.2. CGE Models

Different measures can examine the impacts of exports on growth and other economic factors as discussed in the above literature; however, what channels the contribution may go through are not explicitly identified. General equilibrium approach, therefore, has been introduced as an alternative method for country-focus studies since this approach is able to capture the full effects on both macro- and micro-levels—changes at the economy-wide level to resulting impacts on distribution of income (Ganuza et al., 2005). Existing research utilizing the CGE model centers on the impacts of export orientation in general and on specific export sectors in particular. For instance, studies of different Latin American countries—Costa Rica, Bolivia, and Cuba—have been carried out to observe the impacts of export promotion on growth and poverty, using the CGE model (Ferriol et al., 2006; Jiménez, 2007; Sánchez &

Sauma, 2006). The analysis of each country examined macroeconomic performance along with export performance, how economic reform effects export and vice versa, by dividing export products into different principal groups, in which both macroeconomic effects and policy alternatives are explored through counterfactual analysis. Some of the common simulations of the former effects include the changes in terms of trade and export demand quantity, and of the latter include more open trade policies following trade reforms.

The study of Costa Rica by Sánchez and Sauma (2006), for example, showed that the deceleration of growth in recent years is related to the fall in exports and that the growth during the previous decade is explained mainly by the increase in exports, especially non-traditional trade; however, the results of the simulations revealed that the impacts, including the performance of exports, of current economic processes on poverty reduction and income distribution are ambiguous (reduced poverty but also increased inequality). Meanwhile, Cuba's case captured the supply side by taking into account the government's active role in macroeconomic management, and revealed that economic activity is more constrained by supply than demand (Ferriol et al., 2006). Therefore, the need to increase supply, either quantity or efficiency, is important to realize full benefits from the increase in demand.

Other studies took into account the impact of specific sectors. Banse et al. (2007) assessed the impact of FDI, measured by technology/productivity growth, on food industry in the European Union (divided into old and new member states), applying a regional CGE model. The food industrial harmonization and technological change simulations resulted in a limited impact on macroeconomic factors as a whole, yet produced a favorable impacts on agri-food development, in general, such as increase in production and trade, and an improved productivity and market integration of this sector, and on agriculture income in particular. In a broader sense in modeling the development process of (1) agriculture, (2) agriculture-development-led industrialization (ADLI), and (3) primary sector export-oriented strategy of the Mozambican economy, Tarp and Tarp (2004) ran experiments to see how productivity and marketing margin

impacted the three strategies. The result suggested that agricultural development benefited both agricultural and non-agricultural households, but did not reduce poverty of the rural poor, while more income/welfare reached the rural poor in the ADLI scenario. The last strategy, on the other hand, achieved pro-equity with limited impacts on the economy in the short to medium term since the exports of the primary sector are a minority.

Kobayashi et al. (2008) studied the economic structure and poverty reduction of Cambodia based on the CGE model and analyzed the causes of household income gap. They suggested that the difference in growth rate between the fishery and service sectors is one cause of the income conflict among groups, while agricultural and food exports induce growth with better income distribution. Meanwhile, their simulation results also revealed that for a more efficient pro-poor growth in Cambodia, preferential treatment for food manufacturing and textiles (categorized as light industries) is preferable. While the study discussed the economic structure as a whole, export structure and promotion policy of strategic export sectors were not emphasized in their experiments.

With a limited number of empirical sectoral export impact studies, most of which take into account the garment sector, the focus on agriculture, food and the rubber sector has been rare despite the recognition of their potential distribution. To fill this gap, the current study aims at analyzing the export potential roles of these three sectors: food and rubber as agro-industrial sectors and agriculture by employing the CGE model, taking into consideration the impacts on growth, employment, production and household welfare.

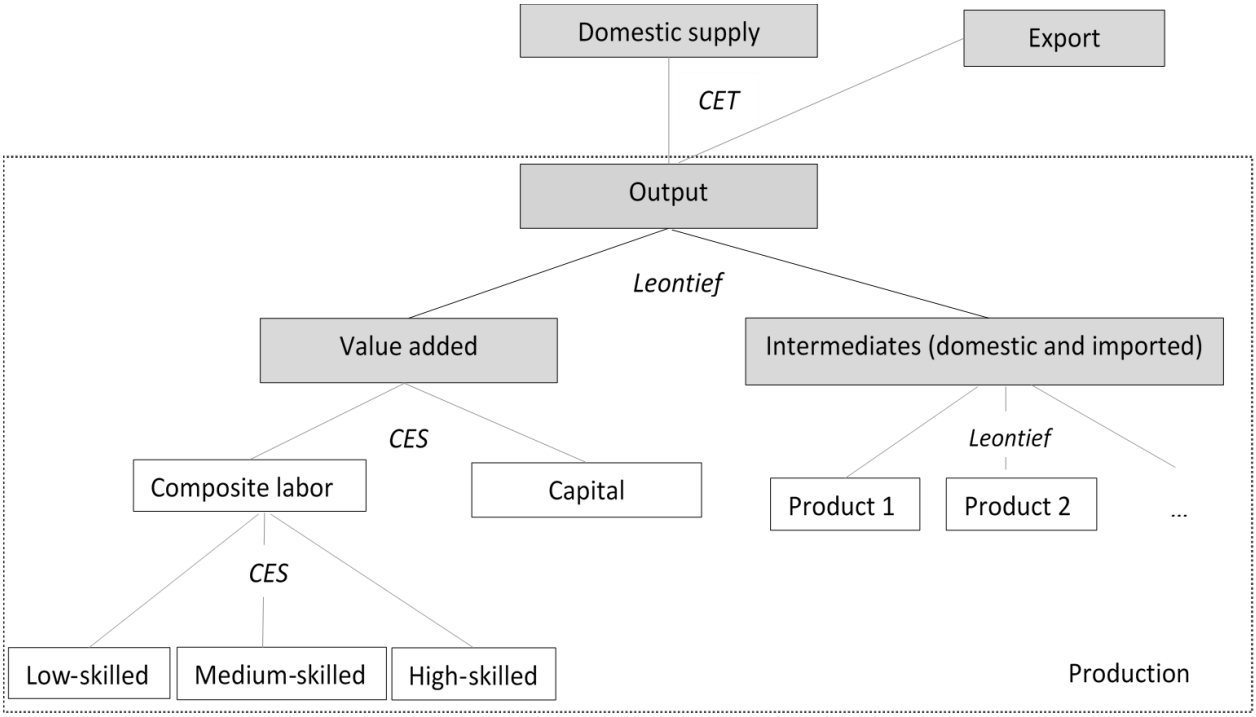
5.4. Methodology and Data

5.4.1. Basic Characteristics of the CGE model

CGE models are used extensively in policy analysis as they capture linkages at different levels, including sectoral levels of production structure and trade, factor levels of employment of labor and capital, household levels of income and consumption, as well as economy-wide changes or shocks (Hosoe, Gasawa, & Hashimoto, 2010; Vos, 2007). Producers and consumers

(households, government, and firms) interact through product and factor markets, buying and selling goods and services. The CGE model applied in the study is based on the standard one-country one-period 1-1 model of the PEP (Partnership for Economic Policy Networks), developed by Decaluwe et al. (2013). The model captures the production and market activities through a specific nested structure sketched in Figure 5.2.

Figure 5.2: Nested Structure of Production Framework



Source: Adopted from PEP 1.1, 2013

Production

At the top level of output, production technology follows Leontief production function between different intermediates and between intermediate and production factors. Each industry combines value added and intermediate inputs in fixed shares, strictly complementary, without substitutability, following Leontief production function. At the second level, value added bundle consists of composite labor and capital, which are imperfect substitutable, following Constant Elasticity of Substitution (CES) specification as in the equation below,

$$VA_j = B_j^{VA}\left[\beta_j^{VA} LDC_j^{-\rho_j^{VA}} + \left(1-\beta_j^{VA}\right) KDC_j^{-\rho_j^{VA}}\right]^{-\frac{1}{\rho_j^{VA}}} \tag{5-1}$$

where j represents each industry, VA is value added, LDC and KDC are demand for composite labor and capital, B^{VA}, β^{VA},and ρ^{VA} are scale, share and elasticity parameter of CES value added.

Composite labor also follows CES function. Producers are assumed to operate in a competitive environment, so they follow profit maximization function subject to production technology which describes how industries use inputs to produce aggregate outputs. Firms will employ labor and capital to the point where the value marginal product of each is equal to its price (wage rate for labor and rental rate for capital). Such function is described by the demand for labor relative to the demand for capital. Similarly, given imperfect substitutability between different types of labor, the firms minimizes labor costs by choosing their labor composition in response to relative wage rates[11]. For the intermediate input side, intermediate consumption is made up of domestic and imported goods and services and assumed to be perfectly complementary, following Leontief production specification.

Supplies of Products and International Trade

The supplies of production outputs are distributed into domestic and foreign markets through Constant Elasticity of Transformation (CET) function (tradable goods). First, producers decide the amount of output among different products based on revenue maximization hypothesis, given product prices. Second, the output is shared out among markets, either domestic or export, again to maximize sale revenues, in response to demand in each market and taxes imposed, as in equation (5-2),

$$XS_{j,i} = B_{j,i}^{X}\left[\beta_{j,i}^{X} EX_{j,i}^{\rho_{j,i}^{X}} + \left(1-\beta_{j,i}^{X}\right) DS_{j,i}^{\rho_{j,i}^{X}}\right]^{\frac{1}{\rho_{j,i}^{X}}} \tag{5-2}$$

[11] The same behavior is also applied to composite capital if there are different categories of capital (land, machinery, etc.). However, there is only one type of capital in this study.

where XS is industry *j* production of commodity *i*, DS is supply of commodity *i* to the domestic market, EX is export supply to foreign market, B^X, β^X,and ρ^X are scale, share and elasticity parameter of CET between export and local sales.

Trade-focused CGE specifies export supply as CET function, as it assumes that although industries can reorganize production to change the proportion of goods between export and domestic sales (DS), the products for different markets are not perfectly transformable, and thus the CET function describes how the proportion can be adjusted based on price changes (export price, PE and local price, PL) of commodity *i*, as depicted in the export supply equation (5-3) ($EX_{j,i}$). As for the export demand (equation (5-4): EXD_i), the model adopts the small-country hypothesis which infers that world export and import prices are exogenous. In spite of this, the model assumes that producers cannot always sell as much as they want on the world market; instead, domestic producers can increase their share of the world market only by offering a f.o.b price (PE_i^{FOB}) that is advantageous relative to the world export price (PWX_i). To what extend the share can be increased depends on the degree of substitutability of the specific product (price elasticity of export demand σ_i^{XD}). Export supply and export demand are depicted in equations below.

$$EX_{j,i} = \left[\frac{1-\beta_{j,i}^{X}}{\beta_{j,i}^{X}} \frac{PE_i}{PL_i} \right]^{\sigma_{j,i}^{X}} DS_{j,i} \tag{5-3}$$

$$EXD_i = EXD_i^{O} \left[\frac{ePWX_i}{PE_i^{FOB}} \right]^{\sigma_i^{XD}} \tag{5-4}$$

The model also assumes imperfect substitutability between imported and domestically-produced goods, differentiated by origins, which specifies import demand following Armington function (Ducaluwe et al., 2013; Ganuza et al., 2005). In other words, the imperfect substitutability between import demand (shown in the equation (5-5), IM_i) and demand for domestic goods (DD_i) is represented by CES (σ_i^M). The PEP model assumes the price elasticity

of import supply is infinite at the going world price, implying by the exogenous world import price.

$$IM_i = \left[\frac{\beta_i^M}{1-\beta_i^M} \frac{PD_i}{PM_i} \right]^{\sigma_i^M} DD_i \tag{5-5}$$

Income and Savings

Household income, $YH_h = YHl_h + YHK_h + YHTR_h$, comes from labor income (YHl_h) and capital income (YHK_h), as factor payment, and transfers from other agents ($YHTR_h$). After paying taxes, transferring to government, and savings, disposable income is entirely dedicated as consumption. Household savings are a linear function of disposable income, and consumption demand follows a linear expenditure system for utility maximization subject to income.

Government income is described by YG = TDHT+TPRODN+TPRCTS+YGK+YGTR. Government collects taxes as a source of revenues, such as income taxes (TDHT), production taxes (TPRODN), and taxes on products, imports and exports (TPRCTS), provided that the PEP-1-1 model takes into account a variety of tax instruments. In addition, government receives transfers from other agents (YGTR) and remuneration of capital (YGK). Similar to household savings, income taxes are considered as a linear function of total income. The model also distinguishes tax rates by industry and by type of labor and capital. On the other hand, government expenditures consist of transfer payments to other agents and current expenditure on goods and services. The difference between its revenues and it expenditures is the current government budget, which can be surplus or deficit (positive or negative savings).

Rest of the world: The rest of the world, the last agent in the model[12], receives income from import payment, capital income, and transfers from domestic agents, while making foreign spending to the domestic economy through the values of exports and transfers to domestic

[12] Business is another agent in the PEP-1-1 model, but it is not characterized in the current study.

agents. The amount of rest of the world savings is the difference between foreign receipts and spending, which are exactly equal to the current account balance of domestic economy but of opposite sign (SROW = -CAB).

Transfers: Household transfers to government are usually treated as contributions to social programs so they are treated in the same way as income taxes. Meanwhile, transfers from household to non-government agents are proportional to disposable income. It should be noted that transfers are not explicitly associated with a specific form of economic behavior in CGE model due to the lack of precise information of the transactions, so they should be treated in the most neutral way possible to prevent them influencing economic activities.

Demand

Demand consists of intermediate demand, household consumption, investment demand, public sector demand, and demand as transport and trade margins, all of which cover domestic and imported goods and services.

Household consumption ($C_{i.h}$) is determined by utility maximization subject to income, which is specified by

$$PC_i C_{i,h} = PC_i C_{i,h}^{MIN} + \gamma_{i,h}^{LES}\left(CTH_h - \sum_{ij} PC_{ij} C_{ij,h}^{MIN}\right) \qquad (5\text{-}6)$$

This type of demand follows a Linear Expenditure System (Stone-Geary Utility functions) which assumes a minimum level of consumption of each commodity ($C_{i,h}^{MIN}$) (can be zero for some commodities), given marginal share ($\gamma_{i,h}^{LES}$) of each commodity in consumption budget (CTH_h). Since this assumption imposes neither zero cross-price elasticity nor unit income-elasticity for all goods, it offers a flexibility of substitution in response to relative price changes.

Demand for investment includes gross fixed capital formation (GFCF) and inventory changes. The former is always positive and endogenous in this PEP model, while the latter can

be either positive or negative in the SAM and is usually treated as exogenous in CGE models. Total investment expenditure is characterized by savings-investment equilibrium, with savings endogenous. GFCF equals to the difference between total investment expenditure and the cost of inventory changes, and is distributed in fixed shares among commodities, given by cobb-Douglas production function. Therefore, the investment demand for each commodity is negatively associated to its purchaser price.

Government consumption on goods and services follows the same hypothesis in the way that, given current expenditure budget, quantity demand for each commodity is distributed in fixed shares and varies inversely related to its price.

Margin rates are applied to the volume of domestic production and imports which require transport and trade services. The amount determines margin services required to move and distribute commodities to the market. Finally, in addition to the final demand, goods and services are used as intermediate inputs in the production. Intermediate demand for each commodity is the sum of industry demands.

Price

Price of production: In principle, the price of an aggregate is a weighted sum of the prices of its components, in which the weights are determined by equating the value of the aggregate to the sum of the values of its components, given the quantity of the aggregate. The weight assigned the price of each component is the ratio of its volume to the volume of the aggregate. In Leontief case (fixed-proportion aggregate), the weights do not change in response to relative price changes while they do in other cases, depending on the elasticity of substitutability and transformation. The unit cost of an industry's output is therefore a weighted sum of the value added prices and aggregate intermediate prices, as described by

$$PP_j = \frac{PVA_j VA_j + PCI_j CI_j}{XST_j} \tag{5-7}$$

The value accounting identity is therefore

$$PP_j\, XST_j = PVA_j\, VA_j + PCI_j\, CI_j. \tag{5-8}$$

The prices of other aggregates follows the same principle. For instance, the aggregate intermediate price is a combination of the commodity prices of the industry's intermediate, and value added price is a combination of the prices of composite labor and capital used in the production.

Price of international trade: Since exporting industries can sell their outputs in both international and domestic market, the price of their aggregate production is a weighted sun of the price obtained in each market. The weights change in relation to variation in relative price, following CET function. The basic price ($P_{j,i}$) received by industry j is a weighted sum of its basic price on the domestic market and on the export market, while the FOB price, include margins ($tmrg^X_{ij,i}$) and export taxes ($ttix_i$), paid by purchasers on the export market is different from the price obtained by producers. The basic price and the FOB price are given by the following equations:

$$P_{j,i} = \frac{PE_i EX_{j,i} + PL_i DS_{j,i}}{XS_{j,i}} \tag{5-9}$$

$$PE_i^{FOB} = \left(PE_i + \sum_{ij} PC_{ij} tmrg^X_{ij,i} \right)\left(1 + ttix_i\right) \tag{5-10}$$

On the domestic market, the price of the composite commodities is a weighted sum of the price paid for domestically produced goods and imported goods. The former is the sum of the price obtained by producers, indirect taxes and margins, whereas the latter is the world price in terms of the local currency, combined with import taxes and duties, indirect taxes and margins.

Gross domestic product (GDP)

There are four types of GDP in the model.

1. $GDP^{BP} = \sum_j PVA_j VA_j + TIPT$: (5-11)

   GDP at basic price is equal to payments made to value added and taxes on production other than taxes on labor and capital already included in factor costs.

2. $GDP^{MP} = GDP^{BP} + TPRCTS$: (5-12)

   GDP at market price is equal to GDP at basic price plus amount of taxes in products and imports.

3. $GDP^{FD} = \sum_i PC_i [\sum_h C_{i,h} + CG_i + INV_i + VSTK_i] + \sum_i PE_i^{FOB} EXD_i - e \sum_i PWM_i IM_i$: (5-13)

   GDP at market price from the final demand perspective is the total of net final demand expenditure, which include household consumption, government expenditure, investment demand, and the value of net exports.

4. $GDP^{IB} \sum_{l,j} W_l LD_{l,j} + \sum_{k,j} R_{k,j} KD_{k,,j} + TPRODN + TPRCTS$: (5-14)

   GDP at market price from the income perspective is the total income of labor and capital, plus taxes on production and taxes on products and imports.

5.4.2. Basic characteristics of the SAM

The social accounting matrix (SAM) presents the system of national accounts of an economy at a particular period and summarizes the structure of both internal and external connections and the roles of different actors: industry, household, government and rest of the world (Burfisher, 2011; Vos, 2007). Each entry traces the circular flow of income and payments of all economic activities, including production, factor inputs, institutions and commodity demand, and international trade. Since the income-expenditure accounts of each agent of corresponding row and column must balance—the total income from all sources must be equal to the total expenditure—SAM must balance exactly and, thus, must be a square matrix. Although SAMs are commonly built for specific counties, they may be applied at different levels: regions, countries, and the world.

With a few modifications, the study uses the Cambodian aggregated SAM, adopted from Heng et al. (2014) published in the Partnership for Economic Policy Research Network (PEP). The SAM were built following the structure of ADB's Supply-Use Table and based on various sources of survey data, including the National Account, Government Budget, Customs Tariff, Balance of Payment, and Household Survey. The structure of Cambodia's Macro SAM is shown in Table 5.6. The final balanced SAM follows the format of SAM sample of PEP to fit with the GAMS code of PEP 1-1 model. The number of activities, factor inputs, agents and household types of the final SAM applied in the current study are listed below:

- Production: 16 activities, 22 commodities[13], with the description in Table 5.7
- Factors: one type of capital, three types of labor: low-skilled, medium-skilled, and igh-skilled
- Agents: three types of agents: government, household, rest of the world
- Households: six categories (according to living areas and living standard levels): Other urban poor (UP), Other urban non-poor (UNP), Rural poor (RP), Rural non-poor (RNP), Phnom Penh poor (PPP), Phnom Penh non-poor (PPNP)[14]

Table 5.6: Cambodia's Macro SAM, 2011 (Million USD)

	activity	commodiy	f-labor	f-capital	household	gov	row	tax-vat	tax-excise	tax-imp	tax-exp	tax-direct	sav-inv	dstk	total
activity		23,511													23,511
commodity	11,551				9,767	1,479	7,432						2,191	181	32,602
f-labor	4,548						5								4,553
f-capital	7,411						7								7,418
household			4,424	6,813		132	215								11,583
gov				19			440	494	291	255	18	365			1,882
row		8,033	130	586	30	32									8,811
tax-vat		494													494
tax-excise		291													291
tax-imp		255													255
tax-exp		18													18
tax-direct					365										365
sav-inv					1,422	239	712								2,372
dstk													181		181
total	23,511	32,602	4,553	7,418	11,583	1,882	8,811	494	291	255	18	365	2,372	181	

Source: Heng et al. (2014)

[13] Some industries produce more than one commodities

[14] Phnom Penh is Cambodia's capital city, which has quite different characteristics from other urban areas.

Table 5.7: Industries and Commodities in the Cambodia's SAM, 2011

No.		Activities	No.		Commodities
1	AGR	Agriculture	1	AGR	Agriculture
2	FBT	Manufacture of Food Products, Beverages, and Tobacco	2	FBT	Food, Beverages, and Tobacco
3	TEXTILE	Manufacture of Textiles, Wearing Apparel, and Footwear	3	TEXTILE	Clothing and Wearing Apparel; and Leather and Leather Products
4	WP	Manufacture of Wood, Wood Products, Paper, and Paper Products	4	WP	Products of Wood, Paper, and Paper Products
5	RP	Manufacture of Rubber and Plastic Products	5	RP	Rubber and Plastics Products
6	METAL	Manufacture of Basic Metals	6	METAL	Basic Metals
7	FMETAL	Manufacture of Fabricated Metal Products; and Office and Computing Machinery	7	FMETAL	Fabricated Metal Products, Except Machinery and Equipment
			8	MACHINE	General and Special Purpose Machinery
			9	OFFICE	Office, Accounting, and Computing Machinery
8	MOTORT	Manufacture of Motor Vehicles and Other Transport Equipment	10	TRANS	Transport Equipment
9	OTHMNU	Other Manufacturing	11	OTHMNU	Other Manufacturing
			12	CHEM	Basic Chemicals and Other Chemicals
			13	FURN	Furniture and Other Transportable Goods, n.e.c.
10	MEGW	Mining and Quarrying, Electricity, Gas, and Water Supply	14	MEGW	Coal and Lignite, Peat, Crude Petroleum and Natural Gas; Other Minerals; Electricity, Gas and Water
11	CON	Construction	15	CON	Construction Services
12	WTT	Wholesale,Retail Trade, and Transport Service	16	WTT	Wholesale,Retail Trade, and Transport Service
13	HR	Hotels and Restaurants	17	HR	Lodging, Food, and Beverage Serving Services
14	FBUS	Financial Intermediation-Insurance, Real Estate-Business Services, Post and Telecommmunication	18	FBUS	Financial Intermediation and Insurance; Real Estate and Business Services; Post and Telecommmunication
15	AEH	Public Administration and Defense, Education, Health and Social Work	19	ADM	Public Administration and Compulsory Social Security Services
			20	EDU	Education Services
			21	HEALTH	Health and Social Services
16	OTHSER	Other Community Service Activities	22	OTHSER	Other Services, n.e.c.

Source: Heng et al., 2014, Aggregated by Author

5.4.3. Economic structural features in the base scenario

Table 5.8 shows the basic structural features of the Cambodian economy, including share of production, domestic demand, international trade by commodity level, and value added and factor inputs by industry level, at the base scenario of the SAM, 2011. Agriculture and textiles account for the highest share in production, at 22 and 21 percent respectively, followed by construction (CON) and food-beverage-tobacco (FBT) in the industrial sectors, while wholesales-retail trade and transportation (WTT) has the highest output share (15 percent) among service sectors, followed by finance-business (FBUS) and hotel-restaurant (HR). Machinery, office and transport equipment share the smallest production output. Agriculture, WTT, CON, FBUS and FBT are also the top sectors sharing the highest domestic demand for commodities produced locally, which also means they are less dependent on import requirements to satisfy domestic demand. The figures, however, infer that any changes

occurring in these sectors would induce high impacts on total domestic production. The table also shows export and import share in total values. Textiles alone account for 67 percent of total exports, given the advantage of duty-free access to the EU and US markets. The next main export sectors are in services, particularly hotel-restaurant and WTT. On the other hand, Cambodia imports a significant amount of textiles and chemicals for both intermediate and consumer goods, whereas high imports of other manufacturing (OTHMNU) are mainly consumer goods such as electrical equipment and household appliances. The three sectors together share 62 percent of total imports.

For the export and import intensity, defined by export share in total production and import share in total composite demand, textiles and office and machinery have high shares in both export and import intensity, which reveals that these commodities are highly export oriented, and that the foreign market plays a greater role for these industries while the domestic market is mostly satisfied by imported goods. For these sectors, domestically produced goods for domestic consumption are far behind the level to cover self-sufficiency. In contrast, hotel-

Table 5.8: Structural feature of Cambodian economy at base scenario, 2011

Commodities	Production	Domestic Demand for Local Products	Export	Import	Export Intensity	Import Intensity
1 AGR	22.31	31.82	1.02	0.65	1.42	1.01
2 FBT	5.29	7.47	0.41	6.10	2.38	28.75
3 TEXTILE	20.94	0.30	67.15	31.34	99.00	98.08
4 WP	0.74	0.67	0.88	1.90	37.02	58.35
5 RP	1.07	1.53	0.05	1.65	1.44	34.84
6 METAL	0.39	0.40	0.35	1.45	27.94	63.95
7 FMETAL	1.23	1.76	0.05	1.78	1.27	33.38
8 MACHIN	0.04	0.01	0.09	4.47	73.70	99.35
9 OFFICE	0.12	0.00	0.39	6.06	99.58	99.98
10 TRANS	0.18	0.19	0.15	3.76	27.04	90.90
11 OTHMNU	0.64	0.88	0.08	23.96	4.06	93.06
12 CHEM	0.18	0.23	0.06	7.12	10.14	93.78
13 FURN	0.47	0.29	0.89	2.19	58.24	79.12
14 MEGW	1.36	1.96	0.00	0.85	0.04	17.62
15 CON	7.06	10.19	0.05	0.93	0.22	4.32
16 WTT	15.61	18.84	8.37	3.27	16.56	7.90
17 HR	5.97	2.48	13.78	0.03	71.27	0.65
18 FBUS	7.49	9.78	2.38	1.67	9.81	7.80
19 ADM	2.22	3.21	-	0.16	-	2.43
20 EDU	1.64	2.38	-	0.19	-	3.87
21 HEALTH	1.11	1.60	-	0.12	-	3.46
22 OTHSER	3.95	4.00	3.83	0.33	29.97	3.91
Total	100.00	100.00	100.00	100.00		

Indusries	VA	Total Labor	Labor by Skills LSK	MSK	HSK	Capital
1 AGR	32.71	47.86	65.72	29.08	5.20	16.15
2 FBT	2.49	1.90	57.97	36.67	5.36	3.14
3 TEXTILE	12.96	6.22	35.62	53.49	10.89	20.32
4 WP	0.61	0.56	68.21	26.71	5.08	0.67
5 RP	0.51	0.73	49.01	31.63	19.36	0.28
6 METAL	0.26	0.41	3.09	11.42	85.49	0.09
7 FMETAL	0.92	0.53	43.92	41.05	15.04	1.35
8 MOTOR	0.11	0.09	40.20	54.10	5.71	0.14
9 OTHMNU	0.92	0.88	35.55	47.19	17.26	0.97
10 MEGW	0.91	0.53	52.60	36.82	10.58	1.32
11 CON	6.68	4.34	47.07	45.46	7.47	9.24
12 WTT	16.13	18.03	42.32	39.52	18.16	14.06
13 HR	4.45	2.81	38.26	41.54	20.20	6.25
14 FBUS	9.46	5.48	13.00	25.59	61.41	13.81
15 AEH	5.46	5.06	4.95	22.10	72.95	5.90
16 OTHSER	5.42	4.58	14.12	39.71	46.17	6.33
Total	100.00	100.00				100.00

Source: SAM, 2011

restaurant has the export intensity of 71 percent, showing the importance of this service, especially in the tourism sector, yet with less dependence on imports for domestic consumption. It should be noted that food-beverage-tobacco, rubber, and agriculture account for a small share in both exports in total values as well as exports in production.

Finally, the shares of employment in total labor force vary widely between sectors, ranging from the highest in Agriculture (48%), WTT (18%) and Textiles (6%), to the lowest in MOTORT (0.1%) and METAL (0.4%). Each of the remaining industrial sectors, except CON and FBT, employs less than one percent of total labor, while the rest of services share an average of four percent, reflecting that employment is highly concentrated in a few manufacturing sectors and not widely spread throughout the economy. Having a look at the division of labor by skill would show a clearer industrial employment pattern. Most of the industrial sectors are low-skilled intensive, which can be common in low-income countries, while most service sectors, except HR and WTT, employ a larger share of high-skilled labor. However, those services are still at a low level in their contribution to both production and exports.

5.4.4. Household income and expenditure estimations

To make it fit with the purpose of the analysis, the study modifies the household account, which was previously categorized by 24 provinces, into six new categories according to urbanization and living standard level, by generating the data of both income and expenditure of each group from the Cambodia Socio-Economic Survey dataset (CSES, 2009). This new household account contributes to the originality of the SAM applied in this study. The households receive income from different sources: labor income, capital income, government transfers, and transfers from rest of the world, each of which can be generated from the household survey (CSES, 2009). Nonetheless, the estimation needs to be done through a number of processes.

First, labor income is categorized by sectors and skill levels, of which years of educational attainment is assumed to determine skill levels: low-skilled (up to grade 5),

medium-skilled (grades 6 to 10), and high-skilled (grade 11 and above). Second, labor income should take into account both formal employees and self-employed workers in both primary and secondary occupations because it is common that one person may have more than one jobs at a time (one full-time and one part-time job) due to the low wage level in Cambodia; however, the household survey records only the wage of employees and only the wage of their primary jobs. To avoid underestimation of labor income, average earnings per hour of employees by sectors and by skill level is calculated, and it is assumed that the self-employed, as well as all workers taking secondary jobs, receive the same average wage as employees' primary job in the same sectors. The total income of all the groups of workers can then be calculated by multiplying the average wage by the working hours per week/year.

Third, this income data is differentiated by living areas (Phnom Penh, other urban, and rural) and by living standard level (poor and non-poor), identified based on daily expenditure following the poverty line definition by the Ministry of Planning (NIS, 2013). The same differentiation is also applied to other sources of household income—capital and transfers.

Table 5.9: Estimation of Household income in the SAM

From SAM		**LSK**	**MSK**	**HSK**	**Capital**	**Government**	**RoW**	**Total**
	Household income	2982.04	2067.17	1064.65	5110.85	132.06	226.72	11583.48
From CSES								
	Shares of income by sources							
	othurban poor	0.02	0.02	0.02	0.00	0.00	0.01	0.02
	othurban non_poor	0.06	0.13	0.17	0.29	0.21	0.22	0.10
	othrural poor	0.22	0.11	0.02	0.00	0.09	0.07	0.15
	othrural non_poor	0.66	0.61	0.30	0.32	0.49	0.43	0.59
	pp poor	0.01	0.02	0.02	0.02	0.01	0.01	0.01
	pp non_poor	0.04	0.13	0.47	0.36	0.20	0.27	0.13
	Total	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**	**1.00**
Incorporate into SAM								
	Income by sources							
	othurban poor	46.99	36.15	19.06	0.00	0.63	2.89	105.72
	othurban non_poor	172.47	259.18	183.78	1488.80	28.23	48.81	2181.27
	othrural poor	645.77	225.85	19.43	18.94	11.29	14.75	936.03
	othrural non_poor	1969.70	1253.79	315.37	1633.34	64.78	97.44	5334.41
	pp poor	19.56	32.35	23.91	112.38	0.66	1.44	190.30
	pp non_poor	127.55	259.85	503.11	1857.39	26.47	61.40	2835.75
	Total	**2982.04**	**2067.17**	**1064.65**	**5110.85**	**132.06**	**226.72**	**11583.48**

Source: Author's calculation based on CSES 2009 and SAM 2011

Finally, shares of each category of the income sources are incorporated into the SAM by utilizing the original table serving as control totals, as shown in Table 5.9.

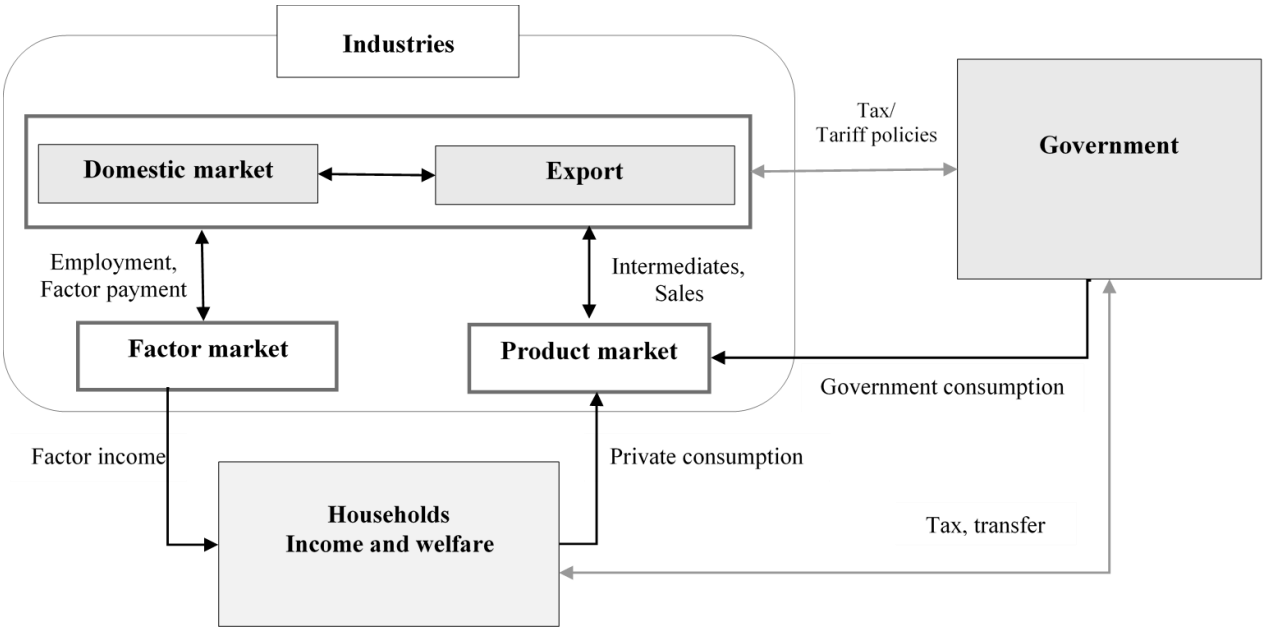
The estimation is also done for the household expenditure on different items: commodities, direct taxes, transfers to rest of the world, and saving/investment. The former three are generated from recorded household spending on food and non-food consumptions, in which the commodities are mapped using the corresponding table of ISIC rev.4 (applied in the CSES) with the CPC rev.1.1 (applied in the SAM), while saving account is a residual between income and expenditure.

5.5. Export Orientation and its impacts: simulations and analysis

5.5.1. Analytical Framework

The analysis follows the framework summarized in Figure 5.3. At the industry level, the move toward export orientation is captured through the connection between foreign market (export and import) and domestic commodity market, both links to the factor market through industrial activities. Industries consume intermediate and factor inputs, while prices determine

Figure 5.3: Conceptual Framework of the Study



Source: Author's creation, based on Ganuza et al. (2005)

how much production is needed. The change in production causes a change in demand for those inputs. Industries pay factor costs to labor and capital in the factor market. At the household level, households receive income from factor payment and consume commodities in the product market, showing the interconnection between industries and households.

Another important account is the government, which interacts with others through various transactions. For instance, the government receives taxes from and provides transfer payments to households, and also spends on consumption and investment. In addition, the government may operate some complementary policies in the factor market, such as the change in wage policy and initiative of a special training scheme to increase productivity. More importantly, the government is expected to play a vital role to promote the export orientation of selected industries through various preferential policy measures, including tax/subsidy and tariff implementation. The transactions will finally determine impacts on supplies and demand of every actor in the economy as well as economic and household welfare.

Welfare is represented by minimum expenditure to maximize utility. The study measures household welfare through the Equivalent Variation (EV) in percentage of initial income which estimates the differences between household minimum consumption budget and total consumption budget available after each simulation. A higher EV represents a larger remaining budget and, thus, a higher welfare.

Typical CGE models, as well as the standard PEP model, usually determine a fixed supply of factors (capital and labor) while wages/rental rates adjust to clear the market with full employment to achieve demand-supply equilibrium. However, to be more realistic and for the short-run framework, the model can specify unemployment cases which are common in developing countries (Burfisher, 2011; Vos, 2007). For instance, Sanchez and Sauma (2005) assumed that there could be unemployment in various labor market segments in the Costa Rica general equilibrium framework while fixing real wage and allowing labor supply to clear the labor market. Therefore, to capture the labor market characteristic of Cambodia's economy, the

study assumes an unemployment labor market by introducing an unemployment variable while keeping labor supply exogenous and wage endogenous, instead of assuming unlimited labor supply. Following the theoretical framework of wage curve by Blanchflower & Oswald (1994), a relationship between the wage rate and local unemployment rate can be described by:

$$W_l = a_l U_l^{\phi_l} \tag{5-15}$$

where:

W_l is wage rate of type l labor

U_l is unemployment rate of type l labor

a_l is a coefficient between unemployment rate and wage rate of type l labor

ϕ_l is the elasticity of unemployment and wage rate of type l labor

This assumption implies that unemployment can vary within the limit in response to changes in labor demand. This modification in the model contributes to the originality of the current study.

5.5.2. Macro Closure

For the model to project the economic outcomes, the study determines a set of macro closures, with some modifications to the conventional model, as follows.

- Capital is immobile across sector, which means that capital is sector-specific and in full employment
- Labor is assumed mobile across sectors. Labor in the economy is not fully employment, there is unemployment in each category of labor. Labor supply is exogenous.
- The saving rate is fixed and saving adjusts to ensure macroeconomic equilibrium (saving-investment driven)
- World export price and world import price are exogenous (small country hypothesis)
- Current account balance is exogenous
- Public expenditure and transfer payment are fixed

- Nominal exchange rate acts as a numeraire.

5.5.3. Simulation Designs

To capture the full impacts of export sectors, the study performs a series of simulations divided into three main exercises: external shocks, internal shocks, and domestic policies, each with a set of scenario, summarized in Table 5.10. Since the study focuses on three potential export sectors, the simulations will take into account mainly the changes that occur in those sectors: food-beverage-tobacco and rubber (both as industrial agro-manufacturing) and agriculture. The first exercise focuses on the changes in world trade pattern, including two sets of scenarios—world export demand and terms of trade shocks—each of which covers two simulations. Scenario 1 assumes a US$10 million increase in export demand for food and rubber products (simulation 1A), and for agricultural commodities (simulation 1B). This assumption

Table 5.10: Simulation designs

Scenarios		Simulation designs	
External Shocks	1. World demand shocks	1A.	US$10 million increase in world export demand for Agro-manufacturing products
		1B.	US$10 million increase in world export demand for Agriculture
	2. Terms of trade shocks	2A.	10% reduction in world price of Textile exports
		2B.	10% reduction in world price of Agro-manufacturing exports
Internal Shocks	3. Productivity shocks	3A.	10% increase in labor productivity of all skills of all sectors
		3B.	10% increase in low-skilled and medium-skilled labor productivity of selected sectors: Agro-industry and Agriculture
	4. Change in Capital stocks	4A.	10% decrease in capital stocks of Textile
		4B.	10% increase in capital stock of Agro-industry and Agriculture
Domestic Policies	5. Production and export promotion policies	5A.	US$5 million increase in production subsidies on Agro-industry and Agriculture
		5B.	US$5 million increase in export subsidies on Agro-industry and Agriculture
	6. Protection policies	6A.	50% increase in tariff on Agro-industry and Agriculture
		6B.	6A + 5% decrease in indirect tax
		6C.	6A + 5B

owes to the prediction that world demand for these products is going to increase, specifically for the ready-made processed food in Asia with a growing population and more households graduating to middle-income groups. Also, more developing countries are moving up to medium and high technological industrial production while reducing their supply dependence on agriculture and agro-processing products (food and rubber). The integration expansion in the ASEAN Economic Community and recent cooperation with China as export partner would also enable Cambodia to increase the export of those products.

Scenario 2 assumes a deterioration in the terms of trade, particularly the decrease in the export price of textiles in simulation 2A, which reflects the current trade pattern of Cambodia with high export dependency on the garment sector. World export price of garment products is assumed to decline due to the increase of global competitiveness within the industry resulting from lower labor costs in other major garment exporting countries such as Bangladesh and Myanmar. This simulation, therefore, would reveal the impacts on the domestic economy while Cambodia is expected to depend highly on garment exports in the next several years. Simulation 2B, on the other hand, assumes a lower world export price of food and rubber to assess the impacts of the price shocks should the country achieve its diversification toward agro-processing exports. The decrease in price could happen due to the price fluctuation of the primary agricultural inputs, particularly during the harvesting period and production surplus season, the change in other input prices such as the decrease in world fuel price which lower the cost of energy consumption and transportation.

The third set of scenarios assumes upward movement of labor productivity across-the-board in all the sectors (simulation 3A) and the same movement but only of low-skilled and medium-skilled labor in the selected sectors (simulation 3B)[15]. The increase in labor productivity is needed to increase supply efficiency in response to demand changes. These simulations also compare skill intensity between trade and non-trade sectors. Skill intensity

[15] Scenario 3 assumes labor market equilibrium (labor supply equals to labor demand).

refers to which types of labor (low-skilled, medium-skilled or high-skilled) are more in demand proportionately in the production of different goods. The demand may rise or fall as a result of the simulations depending on the types of labor that are more important in the targeted sectors. Are agriculture, the food industry and rubber production more skill intensive? This question can be addressed by examining what happens to labor demand when there is supply disturbance, following the first set of scenario. In addition, capital used in production can also reveal economic structure changes. The decrease capital endowment in the current large export sector, textiles (simulation 4A), replaced by an increase in capital demand in food, rubber manufacture and agriculture (simulation 4B) is also tested in scenario 4 to reveal what happens if capital becomes more efficient and is diversified toward the targeted sectors.

The last exercise discusses alternative export promotion policies that can be initiated by the government. The promotion policies considered in the study are divided into three parts: production subsidies, export subsidies and tariffs. Production subsidies (simulation 5A) can be seen as a significant incentive for the targeted sectors to attract both local and foreign investment, which can be provided in the form of tax exemption on value added, or on the import of capital used as production input. While the food and rubber industries are covered largely by SMEs and small-farm holders, it is important to attract larger firms and FDI to bring along new technology, which does not only boost innovation and skill improvement through spillover effects but also increase higher levels of processing before exporting to reduce unprocessed or informal exports. Moreover, the lack of quality standards requires Cambodia to invite FDIs that are more capable of complying with those criteria. Next, the increase of export subsidies on the three targeted sectors (simulation 5B) is deemed crucial to have more direct impacts on promoting exports. A more aggressive policy can also be carried out by combining production and export subsidies.

Scenario 6, on the other hand, covers the protectionism which imposes a higher import tariffs on products to protect potential industries. Although this policy would not directly

generate increased exports, it is seen as a road toward industrialization to encourage domestic production under incentives provided to the so-called infant industries—newly established industries with the high potential to grow—through protection against imports (Todaro & Smith, 2009). The three selected sectors might not be new in the Cambodian production chain, yet food and rubber are still at a stage where production and competitiveness levels are low and highly vulnerable to domestic demand changes, whereas agriculture faces the challenges of the lower price of imported produce which critically demotivate farmers and investors. For these reasons, the three sectors, to some extent, deserve protection policy. Only with protectionism do local producers have the incentive to upgrade production, whereas more investments can be encouraged. The increased tariff is expected to increase the government budget with the expenses of household consumption due to the increase in price. Therefore, simulation 6B assumes an increase in tariff with a decrease in indirect tax to compensate for the fall in private consumption. A more direct policy in simulation 6C is to combine a higher tariffs with export subsidies which, on one hand, encourage local production for export rather than for the domestic market, and, on the other hand, would not diminish the government budget.

5.5.4. Results and Discussion

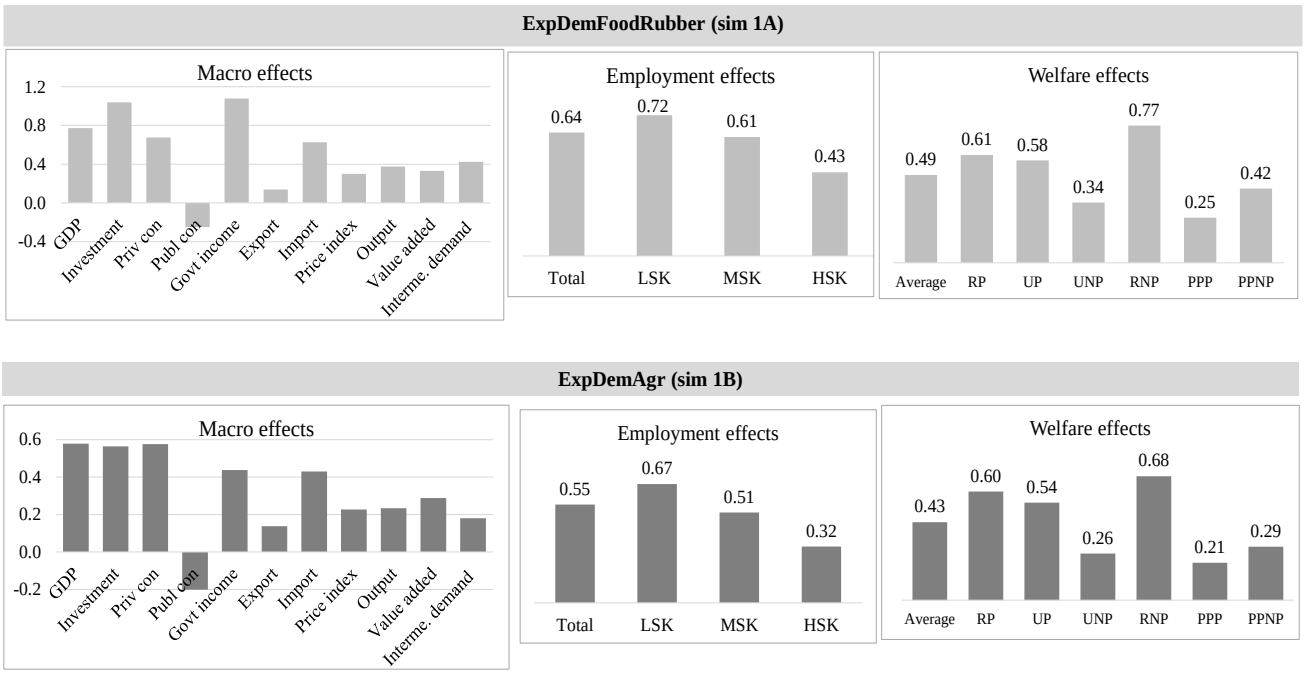
The results from the three exercises are expected to point out the roles of the promising sectors and the economic policy measures that can be feasible to promote export orientation. Favorable impacts of the potential sectors on the domestic economy and employment as a result of diversification and efficiency are desirable; however, this should not be achieved with the high expense of household income and welfare. The interpretation of the results, therefore, focuses on the following measures: 1) macro effects, which include real GDP and investment, government income and consumption; 2) sectoral and employment effects, particularly exports, imports, outputs, value added and labor demand (by sector and by skill group); and 3) household effects, which may cover household consumption, income, and welfare.

5.5.4.1. Impacts of External Trade Patterns

Demand Shocks

The increase in export demand in the first scenario would result in an increase in GDP, total investment, total exports, and production. Illustrated in Figure 5.4, the increase in food and rubber exports (sim 1A) induce higher, albeit small, impacts on most of the variables compared to the rise in agriculture exports (sim 1B) although they follow similar trends. Real GDP would rise by US$101 million and total investment by US$38 million in simulation 1A as opposed to US$76 million and US$22 million respectively in simulation 1B, whereas aggregate output is one-half higher in the former compared to the latter simulation. Government income and savings see enormous progress, which can be explained by the increase in revenue from tax and tariff as a result of higher export supply and import demand, with bigger impacts on imports, in both exercises. Public consumption, in contrast, faces negative impacts due to a rise in the price index, with higher impacts in simulation 1A. However, the increase in price does not adversely affect private consumption; instead, it surges by 0.67 and 0.58 percent in the two exercises respectively, whereas household welfare is better off, with the highest impact on

Figure 5.4: Simulation results of Export demand shocks (% change from base data)



Source: Author's estimation

rural households, due to the significant increase in household income, especially the income from labor as a result of wage increase. Also, income propensity to agriculture and food product consumption can be higher among rural groups than their urban/city peers.

Higher production to meet the increase in exports requires more labor, leading to an increase in employment by 0.64 percent in sim 1A and 0.55 percent in sim 1B, with positive impacts on all of the skill groups, yet low-skilled labor sees higher demand due to the low-skill intensity in agriculture and agro-related industry. It should be noted that the increase in labor demand does not happen only in the simulated industries but also in almost all other industries due to the flow-on effect of production. This effect means that the three targeted industries highly connect to the rest of the economy in indirect labor demand. Another purpose of carrying out the simulations in set 1 is to assess the level of linkages of export sectors with the rest of the economy. The results suggest that the linkage between agriculture exports and the remaining industries is, in fact, lower than those of agro-manufacturing. 0.18 percent of intermediate demand is needed to achieve US$10 million agriculture export acceleration, while the same amount of export increase in food and rubber products would consume an additional 0.42 percent of intermediate input.

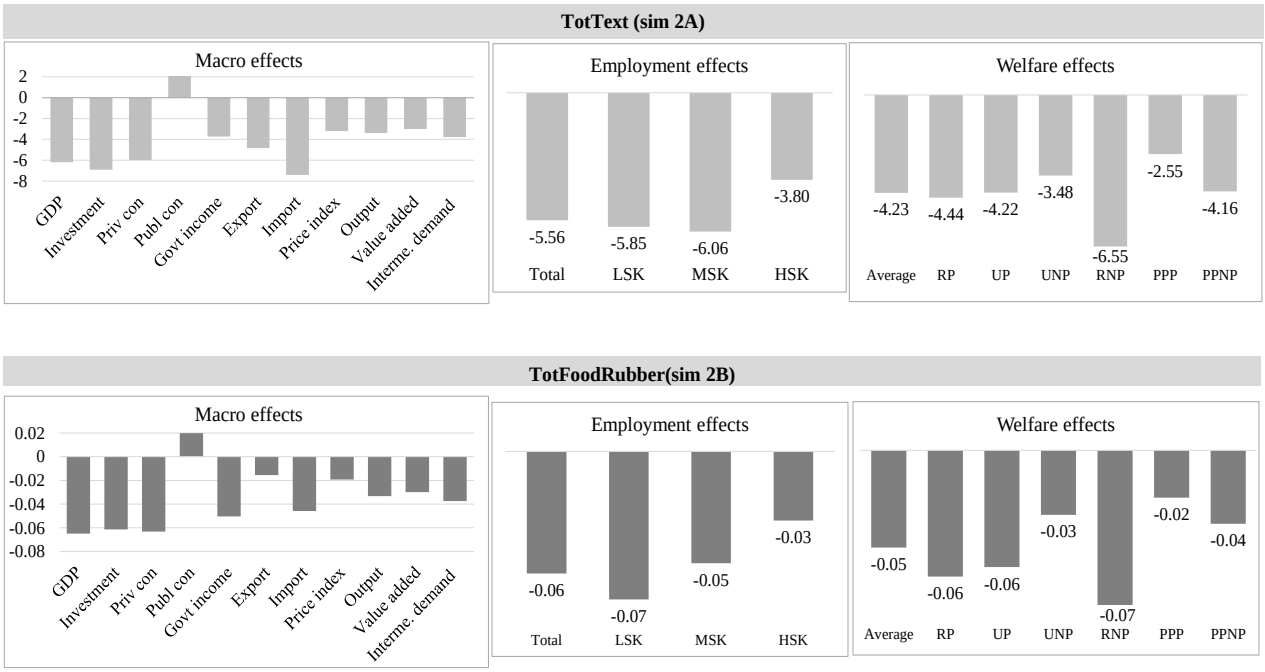
Terms of Trade Shocks

Unsurprisingly, the model projects negative impacts as a consequence of deterioration in the terms of trade, with more severe impacts caused by the lower export price of textiles in sim 2A than that of the lower export price of food and rubber industrial goods in sim 2B. GDP and total investment drop by six percent and seven percent in the former against a 0.06 percent fall in the latter, which can be explained by the relatively smaller share of the food and rubber sectors in the economy. The lower price of textiles in the external market reduces domestic aggregate output and value added by about 3.00 percent, with the most impact (8.00 percent decline) on the textile industry itself, as opposed to a less than 0.05 percent decline in both variables if there is a decrease in world price of food and rubber products. Total export reduction

in both simulations, with the latter seeing the smaller impact, suggests that effects of the export price decrement of agro-industry would not be as severe as that of the garment industry, given the lower share of agro-industry in exports.

World price shocks would induce producers to switch their export supplies to domestic sales following constant elasticity of transformation, which in turn results in a fall in domestic price; thus, domestic goods become more competitive than imported goods. Import demand decline leads to a reduction in government income from taxation. Regardless of a larger fall in price index in sim 2A, households are not in any way better off due to a large drop in wage and income, since a significant number of workers would lose their jobs, especially the low-skilled and medium-skilled who were previously employed in the garment sector. To be precise, the labor force in textiles will decrease by almost 30 percent when there is an export price shock within the textile industry (sim 2A). However, the effects would be less than one percent when there is an export price shock in both agro-food and the rubber industry at the same time (sim 2B).

Figure 5.5: Simulation results of terms of trade shocks (% change from base)



Source: Author

It can be seen from the results that the effects of the fall in textile export price alone, all other prices constant, would be more consequential than those of the declining agro-product prices, shown in Figure 5.5. This result reflects the high concentration on garment exports of Cambodia's current trade pattern, in which the external price shock is extremely vulnerable for the domestic economy. As an experience, garment exports, which accounted for 77 percent of total exports in 2008, dropped by 20 percent, whereas total exports declined by four percent from 2008 to 2009 as a result of the global financial crisis, compared to a 13 percent growth on average three years earlier (UNCTAD, 2014). This consequence points out the impacts of one short-term external shock due to the high dependency on garments as the main export sector, as well as due to relatively higher price elasticity of demand for these products. The possible diversification toward non-traditional food manufacturing and rubber processing exports suggests that the terms of trade shocks would be less consequential.

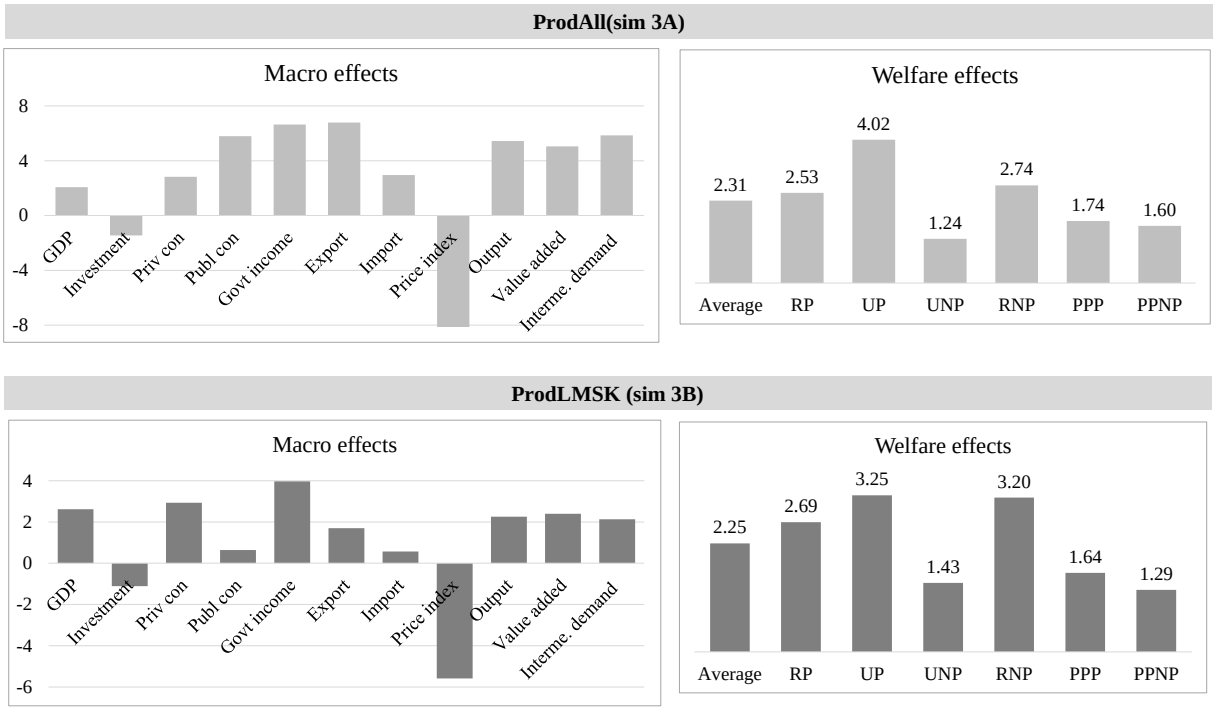
5.5.4.2. Impacts of Internal Shocks

Changes in Labor Productivity

Productivity shock measures inter-industry and employment linkages and examines how exports and imports react—which sectors are likely to lead to output and employment generation—and whether the impacts will favor labor-intensive sectors (Ha & Swales, 2012). In particular, the productivity scenario in the study attempts to measure linkage between the targeted export sectors and employment, and their skill-type intensity (Figure 5.6). The increase in labor productivity, needed to increase production efficiency, is beneficial in general, and strongly positive for GDP, income, and trade in particular, with the growth of exports higher than the growth of imports. The results of both sim 3A and 3B share a similar tendency, but with different impact sizes. Total exports surge more significantly in sim 3A. Nonetheless, it is interesting to note that at the sectoral level, the changes in agriculture and food exports in both simulations do not diverge, with both accelerate within the range of 12.40 and 11.10 percent for agriculture and 10.91 and 9.08 percent for food industrial products. It can be inferred that

these two sectors are more low- and medium-skilled intensive as the similar effects would happen with the increase in productivity of either all the skill groups or only the specified low- and medium-skilled groups. This finding is consistent with the results from the earlier scenarios which also show that the targeted sectors are low-skilled and medium-skilled intensive, proving that those two groups are important in trade sectors.

Figure 5.6: Simulation results of productivity shocks (% change from base)



Source: Author

The rise in outputs would significantly lower consumer prices and raise consumption of both public and household agents. Higher labor productivity is accompanied by the surge in real wages, of which high-skilled labor sees the largest impact at 8.14 percent compared to 4.35 and 0.57 for the medium- and low-skilled in sim 3A, and 5.32, 3.03, and 1.02 percent for the three skilled groups in sim 3B. A few reasons can explain these different changes in real wages. For one thing, wages of low-skilled labor are relatively less rigid to adjust to the labor market given a more flexible movement of this group between sectors as they are more likely to be employed within the informal job-contract system. Also, as opposed to their counterparts, those

low-skilled workers are more easily substituted with capital, which is also the reason why rates of return on capital in the real term increase in both simulations.

The primary purpose of running these two simulations is to compare how the growth in labor productivity across-the-board differs from that for only low-skilled and medium-skilled labor in the three potential sectors. Although the impacts are more marginal in the former simulation, the latter happens to generate higher impacts on a few main indicators. For instance, real GDP improves by US$269 million in the former, but US$340 million in the latter simulation. Similar effects can be seen at the household level, where household consumption soars by 2.82 and household income by 2.50 percent in sim 3A, versus 2.93 and 2.78 percent for the same variables in sim 3B (Figure 5.6). These suggest that households would benefit more if the productivity attainment focuses more on the specified low- and medium-skilled groups in the specified sectors rather than otherwise on unspecific targets. A more positive result could happen if the improvement in labor productivity is combined with an increase in export demand for the potential sectors. Interestingly, household welfare variations in both simulations intertwine, with more influence on other-urban-poor and rural groups, implying that scaling up productivity can be a valuable tool if the target is to raise the welfare of the rural and urban-poor households. It is worth noting that the estimated labor productivity in reality grew by 5.1 percent as an annual average during 2005-2013 (APO, 2015). This figure needs to be significantly increased in order for the economy to capture the benefits that the productivity generates.

Changes in Capital Efficiency

Scenario 4 forecasts structural changes as a result of capital usage modification in production. A reduction of capital stock in textiles (sim 4A), assumed as a shrinking industry due to lower competitiveness in the world market as well as the need for diversification toward other exporting sectors, generates an increase in real GDP, private consumption and labor income as a result of improved wage rates, particularly for low- and medium-skilled labor, due

to an increase in labor demand (0.55 percent) to substitute for the drop-off in capital. However, exports and aggregate outputs fall. It is expected that in the long run, with the full adjustment of factors, the impacts on exports and output would be less intense. For this reason, this exercise also hypothesizes progress in capital stock in food and rubber industrial manufacturing and agriculture (simulation 4B), assuming a more intensive and/or more efficient consumption of capital in the promising sectors. The results mirror those of the previous simulation, with an increase in aggregate outputs and value added (0.51 percent) leading to more demand for intermediate inputs, and higher exports particularly in the three sectors, which accelerate by 3.49, 1.37 and 1.95 percent for food, rubber, and agriculture, respectively. Real GDP soars by 0.63 percent, which is about twice as much as in the previous simulation. Government income and consumption also see positive changes, which can be explained by the increase in revenue from taxes as a result of higher production, exports, and consumption.

Nevertheless, labor demand in the three sectors declines, especially for the low-skilled group due to the substitution effects of capital employment; yet the fall of labor demand in total is smaller than that in the three sectors on average because some workers can move to other sectors, whereas real wages surge. Both simulations induce upward movement in both household consumption and welfare, which illustrates that a combination of these two simulations together as a long-run assumption (movement of capital between sectors) would generate more favorable impacts at the household level.

5.5.4.3. Impacts of Domestic Policies

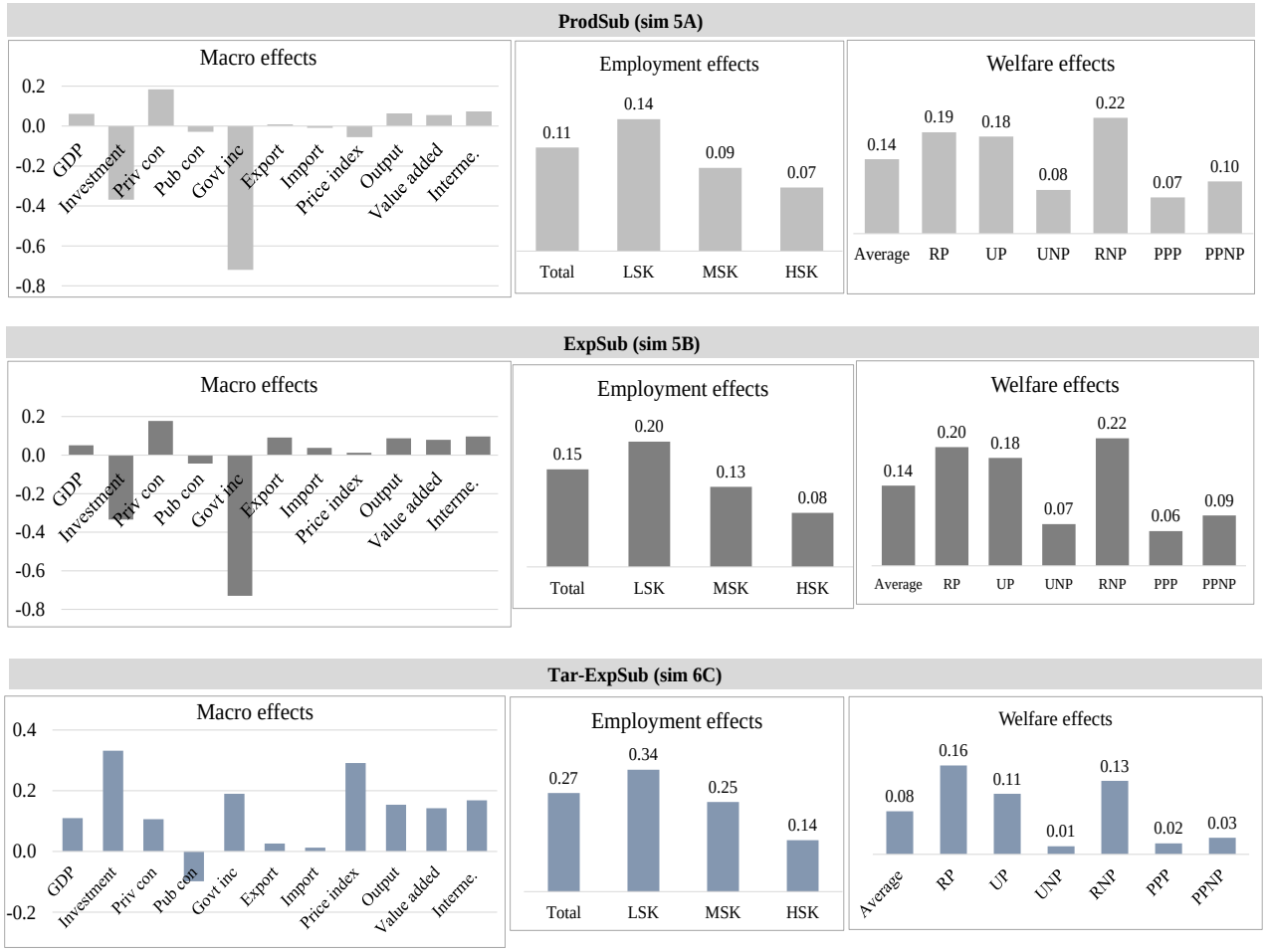
Subsidizing Policies

In the domestic policy shocks, four sets of scenarios are simulated. The first two assume the increase in production subsidies (sim 5A) and export subsidies (sim 5B) which would diminish government income, government savings, and investment due to the larger expense on subsidies, yet would be beneficial for the economy, in particular for total exports, production outputs, sectoral value added and GDP. Sim 5B seems to have higher, albeit small, impacts than

that of the sim 5A, in which most variables move in the same direction, except price index and imports, which have reversing trends in the two simulations, as illustrated in Figure 5.7. The contrasting change of price, however, does not induce noticeable difference on private consumption as the latter increases by almost 0.20 percent in both exercises.

Production subsidies give incentives for producers to increase their outputs, and thus price falls and demand for domestic goods surges to replace demand for imported goods. Export subsidies, on the other hand, make exports more profitable than domestic sales. Both production and exports soar at a larger scale, with a slight increase in domestic price, suggesting that export expansion via subsidies can be achieved without deteriorating domestic supply. In addition, both production and export subsidy initiatives require more labor to keep up with production

Figure 5.7: Simulation results of subsidy and tariff policies (% change from base)



Source: Author

level, leading to an increase in wage rate and labor income, coupled with positive changes in private consumption, generating better welfare for all household groups, with rural areas seeing the greatest impacts because they can benefit from decreased price of food and agricultural goods, which account for a high share of rural spending.

Protectionism and Subsidizing Policies

The protectionist policy, on the other hand, would generate adverse effects on price and consumption structure; however, this policy has been considered as an effective tool to encourage domestic production. Simulation 6A imposes an increase in import tariffs on the three selected sectors. GDP and total investment increase by 0.06 and 0.67 percent, while trade decreases, with a larger decline in exports, which can be explained by an appreciation of the real exchange rate. This experiment benefits most government income and savings, as about US$20 million would be added to each account, resulting from higher tariff revenues. However, import demand falls, given the higher price of imported products, replaced by higher demand for domestically produced goods, while accelerating prices, which in turn leads to a fall in both real public and private consumption and household welfare as a consequence.

To compensate for the diminishing consumption, sim 6B combines the previous simulation with a five percent decline in indirect tax. Under this experiment, government income drops slightly in exchange for a better livelihood of labor and households, including the increase in employment, income, consumption and welfare as a whole. For further analysis, simulation 6C combines simulation 6A (tariff increase) with simulation 5B (export subsidies), as revenues from tariffs can be generated to provide export subsidies without diminishing the government budget. As Figure 5.7 shows, investment improves at a larger level, whereas trade flow rises, with exports on a larger scale; labor income and employment see positive changes, particularly in the case of low-skilled labor. Most of the macro variables, particularly GDP and investment, and sectoral variables such as exports, aggregate output, value added and quantity demand are improving at a higher level than those in sim 6B. Importantly, government savings

and income increase greatly in this exercise, while they fall in the previous two. This can be explained by the amount of government revenues which remain high even after being distributed to subsidies. It can be concluded from the outcome of these scenarios that the combination of tariffs and indirect tax policy produces satisfactory results to protect local producers against imports as well as to maximize consumption and welfare, yet the impacts on sectoral industries and employment are relatively smaller than the combination of tariffs and export subsidizing policy. The latter policy, moreover, does not only generate a better outcome for macro and sectoral effects but also keeps the household consumption and welfare at a positive level, albeit slightly smaller than that of the previous simulation.

It should be noted that currently there has been an enormous volume of agricultural imports from neighboring countries, particularly Vietnam, into the Cambodian market even though this country is endowed with agricultural resources. It is reported that the imported products are lower in price, making domestic products less competitive regardless of the quality, which has discouraged local producers, especially small-scale holders, and thus affected their income. Similarly, the food industry seems to face a similar challenge, with the lower prices of imported ready-made food in comparison to products from local small or medium enterprises with lower technology and productivity. The imposition of tariffs, which can also be combined with subsidies, to protect local producers and to encourage more investment before achieving export increase, therefore, can be one of the efective measures to overcome the challenges.

Table 5.11 summarizes the results of all the simulations, divided into three parts. The first one illustrates the effects on macro economy; the second one shows the effects on factor inputs including employment, wage rates and capital remuneration; and the last one lists the effects on household welfare and consumption pattern, labor income and savings by different types of household.

Table 5.11: Simulation results (% deviation from base values)

Macro Effects

	Demand shock		Terms of trade shock			Productivity		Capital change		Subsidy		Tariff		
	1A	**1B**	**2A**	**2B**	**2C**	**3A**	**3B**	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**	**6C**
Real GDP (market price)	1.92	0.58	-6.19	-6.89	-3.44	1.36	2.20	0.36	0.63	0.06	0.05	0.06	0.03	0.11
Investment	2.65	0.56	-6.91	-6.96	-3.47	-1.19	-0.90	0.01	-0.15	-0.37	-0.33	0.66	-0.24	0.33
Public consumption	-0.64	-0.20	2.16	2.18	1.02	5.08	0.23	-0.19	0.13	-0.03	-0.04	-0.05	-0.02	-0.10
Government income	2.77	0.44	-3.73	-4.10	-1.07	5.06	3.10	-0.68	0.71	-0.72	-0.73	0.92	-0.94	0.19
Government savings	27.38	4.99	-51.36	-50.33	-16.81	-4.30	-4.57	-3.69	-1.81	-6.19	-5.83	9.20	-6.95	3.39
Private consumption	1.67	0.58	-5.98	-6.64	-3.46	2.19	2.57	0.51	0.48	0.18	0.18	-0.07	0.17	0.11
Household income	1.67	0.57	-6.12	-6.82	-3.57	1.98	2.47	0.51	0.53	0.18	0.17	-0.08	0.18	0.09
Household savings	1.48	0.46	-6.25	-6.96	-3.63	2.08	2.95	0.41	0.99	0.15	0.12	-0.09	0.16	0.03
Export	0.28	0.14	-4.83	-4.93	-2.73	5.20	0.85	-3.99	0.29	0.01	0.09	-0.07	0.07	0.03
Import	1.59	0.43	-7.41	-8.04	-3.87	2.28	0.19	-1.87	0.06	-0.01	0.04	-0.03	0.01	0.01
Consumption price index	0.78	0.23	-3.20	-2.60	-1.25	-6.61	-4.44	0.28	-1.17	-0.06	0.01	0.28	0.11	0.29
Aggregate output	0.93	0.23	-3.39	-3.41	-1.72	4.03	1.46	-1.20	0.51	0.06	0.09	0.07	0.11	0.15
Value added	0.82	0.29	-3.01	-3.06	-1.51	3.66	1.61	-0.71	0.51	0.06	0.08	0.06	0.10	0.14
Composite quantity demand	1.27	0.32	-4.31	-4.52	-2.14	3.07	1.21	-0.59	0.42	0.05	0.06	0.07	0.09	0.14
Domestic demand for local commodities	1.12	0.27	-2.76	-2.73	-1.27	3.50	1.74	0.04	0.60	0.09	0.08	0.13	0.13	0.20
Intermediate demand	1.05	0.18	-3.78	-3.75	-1.93	4.41	1.34	-1.69	0.51	0.07	0.10	0.07	0.13	0.17

Factor Effects

		Demand shock		Terms of trade shock			Productivity		Capital change		Subsidy		Tariff		
		1A	**1B**	**2A**	**2B**	**2C**	**3A**	**3B**	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**	**6C**
Employment	Total	1.57	0.55	-5.56	-5.66	-2.83	-2.55	-1.47	0.55	-0.74	0.11	0.15	0.12	0.19	0.27
	LSK	1.79	0.67	-5.85	-5.94	-2.98	-3.80	-2.15	0.55	-1.04	0.14	0.20	0.14	0.21	0.34
	MSK	1.52	0.51	-6.06	-6.15	-3.05	-1.97	-1.16	0.68	-0.63	0.09	0.13	0.12	0.18	0.25
	HSK	1.07	0.32	-3.80	-3.92	-2.02	-0.20	-0.19	0.31	-0.14	0.07	0.08	0.06	0.15	0.14
Real Wage	LSK	0.34	0.18	0.09	-0.58	-0.43	4.83	3.36	0.05	0.56	0.14	0.11	-0.19	0.02	-0.09
	MSK	0.44	0.17	-0.76	-1.43	-0.90	5.56	3.75	0.25	0.70	0.12	0.08	-0.18	0.03	-0.10
	HSK	0.46	0.13	-0.35	-1.07	-0.78	6.85	4.44	0.06	1.03	0.13	0.08	-0.21	0.05	-0.13
Capital rate of return		3.06	0.47	-4.93	-5.52	-2.85	2.38	3.56	0.72	-0.56	0.28	0.30	0.00	0.30	0.29

Household Effects

		Demand shock		Terms of trade shock			Productivity		Capital change		Subsidy		Tariff		
		1A	**1B**	**2A**	**2B**	**2C**	**3A**	**3B**	**4A**	**4B**	**5A**	**5B**	**6A**	**6B**	**6C**
Welfare effects (% of initial income)	Average	1.22	0.43	-4.23	-4.73	-2.46	1.82	1.97	0.38	0.32	0.14	0.14	-0.06	0.12	0.08
	RP	1.50	0.60	-4.44	-4.93	-2.60	2.05	2.41	0.48	0.02	0.19	0.20	-0.04	0.14	0.16
	UP	1.43	0.54	-4.22	-4.79	-2.55	3.17	2.77	0.48	0.20	0.18	0.18	-0.07	0.12	0.11
	UNP	0.84	0.26	-3.48	-3.89	-2.00	0.94	1.25	0.24	0.46	0.08	0.07	-0.06	0.08	0.01
	RNP	1.91	0.68	-6.55	-7.30	-3.83	2.15	2.86	0.60	0.41	0.22	0.22	-0.08	0.21	0.13
	PPP	0.63	0.21	-2.55	-2.84	-1.42	1.32	1.40	0.19	0.38	0.07	0.06	-0.04	0.06	0.02
	PPNP	1.04	0.29	-4.16	-4.61	-2.37	1.29	1.10	0.30	0.47	0.10	0.09	-0.05	0.12	0.03
Consumption by household		1.67	0.58	-5.98	-6.64	-3.46	2.19	2.57	0.51	0.48	0.18	0.18	-0.07	0.17	0.11
	RP	1.96	0.79	-5.81	-6.43	-3.38	2.92	3.36	0.63	0.04	0.25	0.26	-0.04	0.18	0.22
	UP	1.80	0.68	-5.34	-6.03	-3.19	4.22	3.68	0.61	0.26	0.23	0.23	-0.08	0.15	0.15
	UNP	1.45	0.45	-6.02	-6.70	-3.44	1.80	2.29	0.42	0.81	0.14	0.12	-0.09	0.14	0.03
	RNP	1.80	0.65	-6.17	-6.85	-3.59	2.26	2.88	0.57	0.40	0.21	0.20	-0.07	0.19	0.13
	PPP	1.41	0.47	-5.76	-6.38	-3.19	3.17	3.31	0.43	0.88	0.15	0.13	-0.08	0.13	0.05
	PPNP	1.38	0.39	-5.56	-6.14	-3.15	1.88	1.56	0.40	0.64	0.13	0.11	-0.07	0.16	0.04
Labor income of household		1.98	0.72	-5.82	-6.56	-3.46	2.74	2.16	0.67	-0.06	0.24	0.25	-0.07	0.22	0.17
	RP	2.08	0.80	-5.98	-6.71	-3.51	1.64	1.57	0.68	-0.32	0.25	0.28	-0.06	0.22	0.22
	UP	1.97	0.71	-5.82	-6.56	-3.46	2.86	2.22	0.67	-0.03	0.24	0.24	-0.07	0.22	0.17
	UNP	1.89	0.66	-5.70	-6.45	-3.43	3.68	2.66	0.67	0.16	0.22	0.22	-0.09	0.21	0.14
	RNP	2.03	0.75	-5.98	-6.71	-3.52	2.29	1.92	0.70	-0.17	0.24	0.26	-0.06	0.22	0.19
	PPP	1.88	0.65	-5.68	-6.43	-3.42	3.80	2.72	0.67	0.18	0.22	0.22	-0.09	0.21	0.13
	PPNP	1.75	0.57	-5.14	-5.91	-3.20	4.89	3.30	0.57	0.45	0.21	0.20	-0.11	0.21	0.09
Savings by household		1.48	0.46	-6.25	-6.96	-3.63	2.08	2.95	0.41	0.99	0.15	0.12	-0.09	0.16	0.03
	RP	2.01	0.77	-5.84	-6.54	-3.42	1.58	1.55	0.65	-0.28	0.25	0.27	-0.06	0.22	0.21
	UP	1.90	0.69	-5.62	-6.34	-3.35	2.76	2.14	0.65	-0.03	0.23	0.24	-0.07	0.21	0.16
	UNP	1.51	0.48	-6.32	-7.02	-3.66	1.86	2.80	0.43	0.92	0.15	0.13	-0.09	0.16	0.04
	RNP	1.78	0.63	-6.08	-6.78	-3.54	1.89	2.19	0.57	0.28	0.20	0.20	-0.07	0.19	0.13
	PPP	1.59	0.51	-6.34	-7.06	-3.69	2.22	2.86	0.47	0.83	0.16	0.15	-0.09	0.17	0.06
	PPNP	1.48	0.46	-6.14	-6.85	-3.58	2.32	3.01	0.41	0.98	0.15	0.13	-0.10	0.16	0.03

Source: Author's estimation

5.5.4.4. Sensitivity Analysis

The study performs sensitivity tests to check the robustness of the results as the CGE model features usually depend on some assumptions. Table 5.12 shows the comparison for demand shock of agro-exports (simulation 1A) and terms of trade shock of textiles (simulation 2A) in response to the 20 percent changes of Armington elasticity (CES) and constant elasticity of transformation between export and domestic sales. The results differ but keep the same magnitude in trends and signs, which confirms that the estimations of the study are robust to the changes in both elasticity parameters. Notwithstanding, the terms of trade shock appears to be less robust to changing Armington elasticity.

Table 5.12: Sensitivity Analysis for Armington and Export Elasticity (result in % changes)

	Demand shock (sim 1A)				**Terms of trade shock (sim 2A)**			
	Armington Elasticity		Export Elasticity		Armington Elasticity		Export Elasticity	
	20% increase	20% decrease	20% increase	20% decrease	20% increase	20% decrease	20% increase	20% decrease
GDP	-0.01	0.01	-0.11	0.18	0.10	-0.11	0.02	-0.02
Total Investment	-0.01	0.01	-0.15	0.25	0.11	-0.12	0.06	-0.08
Public consumption	0.00	-0.01	0.03	-0.05	-0.07	0.07	-0.03	0.04
Private Consumptio	-0.01	0.01	-0.10	0.16	0.10	-0.11	0.02	-0.02
Export	0.00	0.00	0.00	0.00	-0.03	0.03	0.08	-0.09
Import	0.00	0.00	-0.08	0.13	-0.02	0.02	0.03	-0.04
Household Welfare	0.00	0.01	-0.07	0.11	0.08	-0.08	0.01	-0.02
RP	0.00	0.01	-0.09	0.14	0.10	-0.11	0.03	-0.03
UP	0.00	0.01	-0.08	0.13	0.10	-0.10	0.02	-0.03
UNP	0.00	0.00	-0.05	0.08	0.05	-0.05	0.00	0.00
RNP	-0.01	0.01	-0.11	0.18	0.12	-0.14	0.03	-0.03
PPP	0.00	0.00	-0.04	0.06	0.04	-0.04	0.01	-0.01
PPNP	0.00	0.00	-0.06	0.10	0.05	-0.06	0.00	0.00

Source: Author's calculation

5.6. Concluding Remarks

The study shows the roles of the selected sectors—food-beverage-tobacco, rubber, and agriculture—in stimulating export orientation through external trade movement as well as internal intervention. The impacts of the potential sectors in response to export demand expansion bring positive economic growth and employment at the macro level, broadens production diversification at the sectoral level, and improves welfare at the household level,

particularly the rural poor. The simulation results also point out that the contribution and inter-connection of agro-manufacturing sectors are larger than that of agriculture. Therefore, priority should be given to creating production chains from agriculture to processed food and processed rubber, rather than exporting unprocessed raw agricultural products.

This target is also in line with the government's aims to undertake some degree of processing inside the country before exporting and to increase the total share of processed agricultural exports set in the Industrial Development Plan 2015-2025 (MoC, 2014; RGC, 2015). Milled rice export policy initiated by the government in 2010, for example, has been an important road map for a significant improvement in this sector, although the targeted export volume was not achieved by the timeline. Besides milled rice, however, there is a lack of critical and strategic attention to promoting other industrial food processing regardless of viable increasing export opportunities in recent years.

A more critical policy toward this sector is required not only to create the value chains from agriculture endowment, but also to reduce too much concentration on garment exports to minimize the high vulnerability resulting from possible changes in world price and in current pattern of competitiveness within the garment sector. These findings are also consistent with previous studies which suggested that agriculture and the food industry contribute better to domestic income while garment cannot secure long-term distribution and competition (Chan & Oum, 2011; Kobayashi et al., 2009; Kobayashi et at., 2008).

The analysis also reveals that the exporting sectors are low skilled and medium skilled-intensive, reflecting the higher increase in demand for those two groups of laborers to keep up with the growth in production and export supplies. Therefore, the impacts on factor market and labor income could be larger if the efforts toward export orientation are coupled with the initiative to increase labor productivity of those two groups. This can be done through higher investment in education and vocational training according to workers' educational attainment in different sectors, provision of necessary skills within agro-manufacturing industries and

agriculture, and encouragement of hands-on experience exchange between local and foreign specialists.

In addition, for the economy to expand the benefits that the productivity of labor and capital generate, the market needs an enabling environment for more efficient utilization of capital within the targeted sectors in the short term, and freer movement of capital endowment in the medium term. Also, technological innovations facilitated through more investment and preferential treatment are favorable for export structural change.

Finally, the policy simulations find that the influences of the agriculture sector and agro-industry would be greater if combined with export promotion initiatives. The study finds that several policy measures, particularly the provision of export subsidies or a combination of subsidizing and protectionist policies, would work as practical tools to promote the export orientation of these sectors and bring favorable impacts on both growth and employment. The subsidizing initiative can be done through various forms including infrastructure subsidies, tax exemption on production or imported inputs for export production, and promotional and market access supports.

Chapter 6: The Impacts of Trade Facilitation on Economic and Export Structures

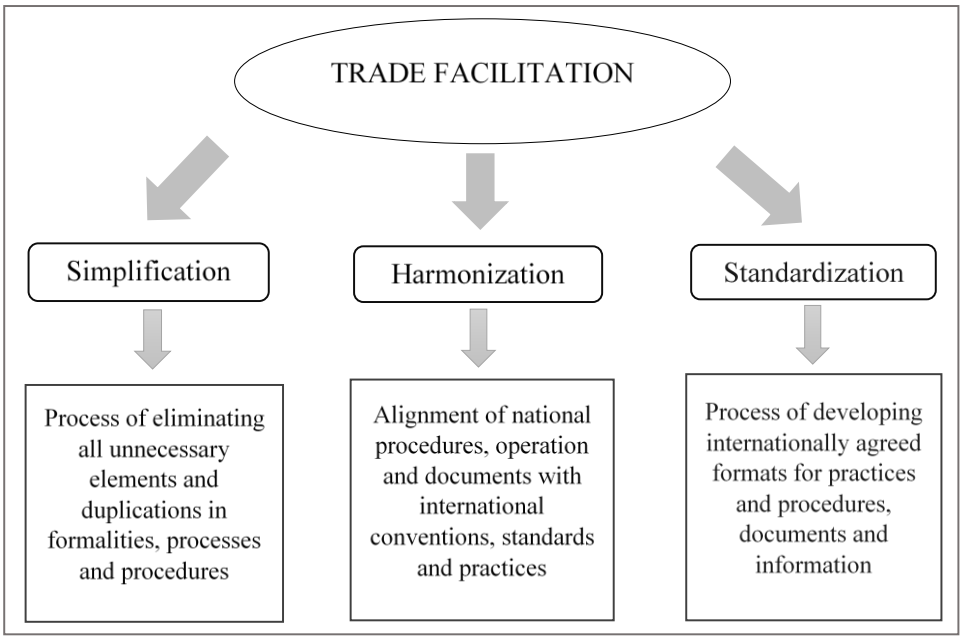
6.1. Introduction

Tariff barriers, once a huge obstacle to trade, experienced a remarkable fall recently while trade facilitation barriers remain high and impede trade between countries. Trade facilitation has also been one of the most prominent topics in the current round of WTO negotiations to improve global trade, which has not been shared by developing and developed countries at the same pace even after the general decline in tariff rates (Minor & Tsigas, 2008). This impediment to trade, therefore, becomes more apparent and need to be addressed.

While Wilson, Mass and Otsuki (2005) argued that there is no standard definition of trade facilitation in public policy discourse, various dimensions of this term have been captured in different works. In a broader sense, the WTO defines trade facilitation as the removal of obstacles to the movement of goods across borders[16], whereas ADB-ESCAP (2009) refers this term as the efficient and transparent implementation of rules and regulations related to trade, the measures that affect movement of goods along international supply chains, and the system of customs procedures and documents, which, in short, are to simplify, harmonize and standardize the trade process across borders, as depicted in Figure 6.1. World Customs Organization referred trade facilitation to the avoidance of unnecessary trade restrictiveness new transaction costs and institutional costs, which can be achieved by applying new technology and improving the quality of controls in an internationally harmonized manner (Zaki, 2009). Similarly, for a modern definition, existing studies have also included administration barriers and physical and service infrastructure when discussing trade facilitation issues (Brooks, 2009; Zaki, 2014). These move the focus of trade simplification efforts from the border to inside the borders of domestic institutional measures, aimed at making

[16] This definition is given in the WTO glossary at https://www.wto.org/english/thewto_e/glossary_e/glossary_e.htm, accessed: November 2016.

Figure 6.1: Simplification, Harmonization and Standardization in Trade Facilitation



Source: ADB&ESCAP, 2009

international trade easier by eliminating administrative delays, increasing commercialization and technologies in trade.

In a study of Asia's trade, Brooks (2009) argued that market-driven integrations, including large trade and export-oriented FDI, responded not only to outward policies and international production networks but also to trade facility development where producers have increasing access to efficient export related facilities of which cost reduction has become relatively more important than direct policy barriers. Brooks characterized these types of non-tariff constraints to trade as "hard" and "soft" barriers. The former is commonly referred to physical infrastructure obstacles dealing with various measures such as transportation and communication, while the latter focuses on the institutional and regulatory environment. Services given by the improvement of infrastructure facilitates the production and distribution process, lowering transaction margins and narrowing the price gap between suppliers and consumers. Looking at the supply side factor, the reduction in transaction costs is an essential element for the improvement of economies of scale, leading to a rise in potential for production

and sales in domestic markets and stimulating linkages across industries on one hand, and expanding the scope of supply to international markets, on the other hand.

In this sense, according to Brooks (2009) and Minor & Tsigas (2008), trade transaction costs can be divided into (1) direct costs that are charged for each cross-border procedure such as customs fees, port handlings fees, and informal payments, and (2) indirect costs which may include three other dimensions: time costs in trade—time required to complete shipment procedures; risks—increased losses and insurance costs due to high risk of damaged cargo when infrastructure quality is poor; and lack of access—high opportunity costs due to lack of access to transport and communication services. Trade facilitation, therefore, has come to determine whether a country is likely to export and, if so, at what levels.

Numerous studies have suggested that the indirect costs from time delays across the border are strongly associated with trade volumes and that the time costs are more likely to have a larger impact on trade than the direct costs, especially for developing countries (Djankov, Freund, & Pham, 2010; Minor & Tsigas, 2008). As for the case of Cambodia where trade has been highly liberalized following the WTO negotiations, trade procedure across borders remains a significant factor hindering export expansion. Hummels (2001) demonstrated that time costs to trade vary significantly across countries and commodities, and that the effects of time delays depend primarily on the export basket that the countries trade. He also suggested that time costs in trade of most developing countries, as well as Cambodia, are higher than tariffs. However, despite the recognition, limited work has explicitly examined through which channels this relationship occurs and how time costs affect Cambodia's trade and economy.

This current study therefore attempts to measure to what extent improvement of trade facilitation affects the trade and economic structure of Cambodia by using the CGE model, in which trade facilitation is represented by tariff equivalent of time costs to exports and imports. Existing studies with such empirical method for the case of Cambodia are limited; hence the current study should contribute to the existing literature discussing trade facilitation issue in

Cambodia and to the conventional CGE framework of the PEP (Partnership for Economic Policy Research Networks) adopted for the analysis. The next section of this chapter briefly reviews existing literature. Section three introduces methodologies and data utilized in the study, followed by the discussion of simulation results in section 4. The last section concludes the chapter.

6.2. Literature reviews

Non-CGE models

In addition to descriptive studies on the importance of trade facilitation, gravity model is a common approach to modelling bilateral trade flows through the relationship between trade and geography, where adding tariffs and trade facilitation indicators and some other additional factors are possible (Wilson, Mann&Otsuki, 2005[17]). Earlier work use gravity models to examine border effects or border related costs that take into account non-tariff barriers such as quantitative restrictions, technical barriers and SPS measures (Feenstra, 2002; McCallum, 1995). Another group of empirical studies characterize one aspect of non-official trade facilitation barriers separately such as the effects of infrastructure, governance, internet or trading time (Djankov et al., 2010; Hummels, 2001). Subsequently, a number of studies have incorporated several aspects of trade facilitation into the models.

Wilson, Mann, & Otsuki (2003) analyzed relationship between trade in APEC region (APEC) and trade facilitation using four categories: port efficiency, regulatory environment, customs environment, and e-business infrastructure. They found that the first two categories play more significant role in trade flows and that once APEC member with below-average indicators improve to the average level for all members, intra-APEC trade would increase by 21 percent, half of which is derived from enhancement of port efficiency. They later built on the previous methodology and categories and extended the model to a larger sample of countries

[17] Basic structure of gravity equation: Y = b+ £bZ +Ɛ, where Y is value of trade flows, and Z corresponds to gravity variables (such as GDP, GDP per capita, tariff, trade facilitation indicators).

for a global perspective and suggested that improvement of global trade facilitation capacity in the four indicators to the world average would raise world trade by US$377 billion, with exports higher than imports in most regions. Since gains from trade simplification reform could be substantial, policy measures to strengthen administrative and legal procedures are required even without costly projects (Wilson, Mann&Otsuki, 2005).

Time and document to import and export and internet are included as trade facilitation facets by Zaki (2009) on the sectoral level trade to assess sensitivity of each product. He noticed that time to import and document to export have negative relationship with trade, yet the impacts are more pronounced for trade between developed and developing countries than between developed ones. In addition, the findings, which are also similar to that by Hummels (2001) who studied the impacts of trading time, conclude that trading goods response differently to trade facilitation: perishable, seasonal and high-value added products response more to import time while hard industries do more to export documents. In short, there is a general consensus that indirect transaction costs associated with trade facilitation have a significant effect on trade. Meanwhile, gravity models have become an essential tool and widely employed mainly because of their simple data requirement such as the trade data and some trade cost proxies and because they could consistently provide evidence of positive impacts of improved trade facilitation on trade volumes (Minor&Tsigas, 2008; Hummels et al., 2007).

CGE Models

Despite their consistency, the gravity models face a number of limitations. For one thing, the models leave out the heterogeneity problem, empirically, and heterogeneity of traded goods in quality by origin and price differentials, theoretically (Wilson, Mann&Otsuki, 2005). For the other thing, the econometric framework fail to specify channels by which trade facilitation affect trade and to explicitly reveal insight of causation since they do not account for the economic linkages between sectors and the restriction of resources such as labor and capital (Minor&Tsigas, 2008). Last, the models usually link costs of trade simplification

indicators including waiting time, document and infrastructure without revealing the costs in monetary units (Hummels et al., 2007).

To address the weaknesses, Minor and Tsigas (2008) suggested that a combination of econometric and CGE model is more likely to be a useful method for border trade studies since the latter captures the causal linkages of country and sector-specific based on detailed accounting system. Moreover, incorporating trade facilitation into CGE framework can further demonstrate the impacts not only on trade volume but also on a wide range of other economic indicators such as investment, production, as well as factor and household welfare. Hertel, Walmsley & Itakura (2001) studied the impacts of Japan and Singapore free trade agreement and trade related issues covering technical standard, e-commerce regulations and customs procedure using GTAP model and found that the FTA increases bilateral trade and investment flows, with customs automization playing the most crucial role. Minor and Tsigas (2008) adopted the model yet presented border simplification using time costs to trade with available data econometrically estimated by Hummels (2001). On the other hand, Zaki (2010, 2014) measured the costs of trade facilitation with gravity model and integrated the results into MIRAGE CGE framework to assess the impacts on economic variables.

The new tool to studying the impacts of trade facilitation shed light for new studies to reveal more concrete evidence of trade facilitation effects. Despite the existing literature, the incorporation of the trade facilitation into CGE models, in general, are limited, and on the case of Cambodia, specifically, are even rare.

6.3. Methodology and Data

The CGE model is appropriate to explore trade facilitation because any changes generated by trade facilitation measures affect not only trade but also all economic activities, including production, employment, and welfare. To assess the impacts of trade facilitation, this study uses the CGE model adopted from the standard one-country one-period model of the PEP, developed by Ducaluwe et al. (2013), and determines a set of macro closure as follows:

- Capital is sector-specific, and in full employment
- Labor is mobile across sectors, labor supply is exogenous, and unemployment exists
- The saving rate is fixed and saving adjusts to ensure macroeconomic equilibrium
- World export price and world import price are exogenous (small country hypothesis)
- Current account balance is exogenous
- Public expenditure and transfer payment is fixed
- Nominal exchange rate acts as numeraire

The detailed structure of the model is the same as the one given in Chapter 5 of this dissertation. However, the standard PEP model is modified to take into account the trade facilitation framework.

6.3.1. Incorporating trade facilitation in the CGE model

To capture the impacts of trade facilitation, time delays in trade across the border are introduced as ad valorem imposed on export price and import price, following (Chahir Zaki, 2010). The data of the ad valorem equivalents (AVEs) of time to export and import is adopted from the GTAP database (for which the calculation is detailed in the data section below). The AVEs of time are comparable to ad valorem tariffs and represent a shift in the export or import demand curve in response to price changes (Minor, 2013). These new variables of time costs enter the model as tariff equivalents which increase export price and import price that should decline when trade is facilitated.

For the export price, export taxes and tariff equivalents of time (entering the model as converted tax rate) increase the f.o.b prices of export commodities, given by:

$$PEfob_i = PE_i (1 + ttix_i + ttcx_i) \quad (6\text{-}1)$$

$$TCX_i = ttcx_i \, PE_i \, EX_i \quad (6\text{-}2)$$

Where

$PEfob_i$: F.o.b price of exported commodity i

PE_i: Price received for exported commodity i (excluding export taxes)

$ttix_i$: Export tax rate on exported commodity i

$ttcx_i$: Tariff equivalents of time cost to export of commodity i

TCX_i: Receipts of tariff equivalents of time on exported commodity i

EX_i: Quantity of product i exported

For the import price, similarly, tariff barriers and the tariff equivalents of time make domestic import prices higher than world price:

$$PM_i = e\ PWM_i\ (1 + ttim_i + ttcm_i)\ (1 + ttic_i) \quad (6\text{-}3)$$

$$TCM_i = ttcm_i\ e\ PWM_i\ IM_i \quad (6\text{-}4)$$

Where

PM_i: Price of imported product i (including all taxes and tariffs)

PWM_i: World price of imported product i (expressed in foreign currency)

e: Exchange rate; price of foreign currency in terms of local currency

$ttim_i$: Rate of taxes and duties on imports of commodity i

$ttcm_i$: Tariff equivalents of time cost to import of commodity i

$ttic_i$: Tax rate on commodity i (indirect tax)

TCM_i: Receipts of tariff equivalents of time on imported commodity i

IM_i: Quantity of product i imported

Total revenues generated from the tariff equivalents of time delays in the trading procedure are assumed to be captured by customs agents who work for the border agencies. The model creates a new agent called “inefficiency customs agent” who receives revenues from the total time receipts and spends those revenues on consumption of commodity i. Since this is an extra income, all of the revenues are spent on consumption. Zaki (2010) assumed new income is only generated by revenue from the import side while treating the revenues from the export side as an investment transfer for trade balance. However, this study treats the receipts

from time barriers of both export and import sides as the income of inefficiency agent since they are both captured by the domestic customs agents as a form of extra cost attached to processing trade procedures or documentation. The new equations of income and consumption of the inefficiency agent entering the model are given by

$$Y_{cus} = \Sigma_i TCX_i + \Sigma_i TCM_i \quad (6\text{-}5)$$

$$C_{i,cus} = \gamma_{i,cus} Y_{cus} / PC_i \quad (6\text{-}6)$$

Where

Y_{cus}: Income of the inefficient customs agent

$C_{i,cus}$: Consumption of commodity i by the inefficient customs agent

$\gamma_{i,cus}$: Marginal share of commodity i in inefficient agent consumption budget

PC_i: Purchaser price of composite commodity i

6.3.2. Data

6.3.2.1. The SAM structure

With a few modifications, the study uses the 2011 Cambodian aggregated SAM, adopted from Heng et al. (2014). The number of activities, production factors, agents and household types of the SAM applied in the current study are listed below:[18]

- Production: 16 industries, 22 commodities
- Factors: one type of capital, three types of labor: low skilled, medium skilled, and high skilled
- Agents: government, household, rest of the world
- Households: six categories (according to living areas and living standard levels): Phnom Penh poor (PPP), Phnom Penh non-poor (PPNP), other urban poor (UP), other urban non-poor (UNP), rural poor (RP), rural non-poor (RNP).

[18] List of industries and commodities, and economic structural features at the base scenario can be found in Chapter 5, section 5.3.

6.3.2.2. Tariff equivalents for time barriers

The study adopts the data from the GTAP database which records per day equivalents of waiting time to export and import (Hummels & Schaur, 2013; Minor, 2013). To prepare this database, Minor (2013) built on the estimation by Hummels (2001) and Hummel et al. (2007) and mapped the commodity-specific values of the time costs onto the global database to aggregate the particular values to the sectors and the country pairs in the GTAP. The original estimation of time costs in trade is summarized as follow. To quantify the tariff equivalents of time in trade, Hummels et al. (2007) used a three-step method:

(1) Estimating the value of one day saved in transit by product, which is termed "the per-day value of time saving";

(2) Calculating the per-day value of time saving by country according to the commodities that the country trades or might later trade;

(3) Calculating tariff equivalents of time to export and import through the combination of the per-day value of time savings of each country with its number of days required for trading across borders, based on the data from Doing Business.

For the first step, Hummels (2001) and Hummels et al. (2007) estimated the value of time in trade through econometric calculation of willingness of exporters/importers and purchasers to pay for higher cost air shipping to avoid an additional day of ocean shipping, which has a longer delivery time. While firms benefit from time saving in product transit, measured in days, they face higher freight price for more timely delivery, measured in terms of the price of the traded products. Since there are differences in the units of these two components, time measured in days has to be converted into tariff equivalents. To make this conversion, Hummels (2001) relies on the assumption that higher prices reduce consumption. The price elasticity of demand—the decrease in demand in response to a one percent increase in price—can represent the value that consumers tie to getting goods in a faster way, referring to the benefit of time saving. The estimated price elasticity of demand is combined with the benefit

measured in days to calculate the "Ad valorem equivalents (AVEs)" of time saving to export and import by product basis, at the HS4 level of over 600 commodities. The data for the estimation comes from two sources: (1) the U.S. merchandise monthly import database 1991-2005, by transportation mode, by product, by exporter, and by entry point into the U.S.; and (2) the database of shipping times between ports around the world.

For the second step, the values of time savings for each country are calculated for the values of time average of the trade basket of each country. The current exports and imports for each country and the exports and imports of the region in which the country is located are the two alternative weighting schemes to provide estimates for exports and imports. Their findings suggest that the estimation of the per-day values of time savings differ significantly by both product and country. For instance, road vehicles have a time sensitivity of two percent ad-valorem, which can be explained that each day the goods are saved from shipping time lowers the price of the goods by two percent. While vegetables and fruit exhibit 0.9 percent of per-day ad-valorem to trade time, bulk products such as fertilizer and crude oil are not time sensitive. Consistently, the Middle East and North African countries are likely to have the lowest per-day ad valorem, attributed to the crude oil and natural resource-intensive goods in the export basket of those regions compared to the higher value-added manufacturing exports in the OECD countries which possess the highest per-day tariff equivalents (shown in Table 6.1).

For the last step, Hummels et al. (2007) obtained the final objective of the AVEs equivalents of the total export and import time delays for each country by multiplying the per-

Table 6.1: Per-day tariff equivalents, by region

Region	Imports	Exports
High income: OECD	0.8	1.0
East Asia and Pacific	0.8	0.7
Europe and Central Asia	0.9	0.7
Latin America and Caribbean	0.9	0.8
Middle East & North Africa	1.00	0.4
Sub-Saharan Africa	0.9	0.9
South Asia	1.5	0.6

Source: Hummels et al., 2007

day time values by the number of days recorded in Trading Across Borders data of the Doing Business. The number of days required for the export and import procedure is divided into three elements: inland transport, port and terminal handling, and customs administration. The methods take into account activities or delays in delivery times differing from the baseline; however, it should be noted that the data does not include time to complete documentation since exporters and importers may begin documentation processes beforehand while production is underway and can continue while the goods are on route to market (Hummels et al., 2007, Minor, 2008).

6.3.2.3. Tariff equivalents of export and import times of Cambodia

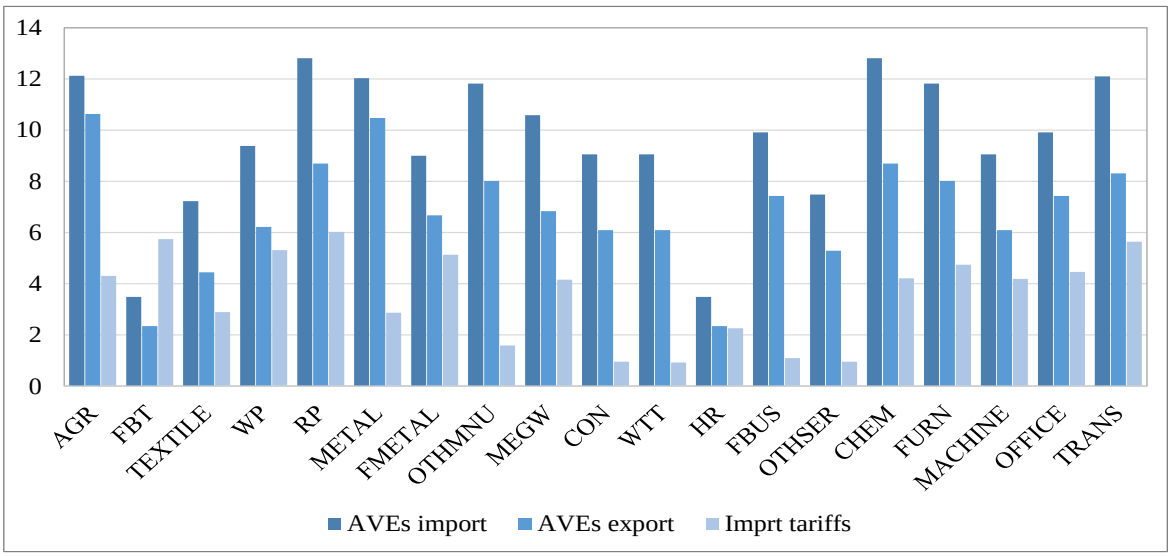
Since the more updated version of the numbers of days in trade is available, this study calculates the AVEs of time delays in exports and imports by multiplying the per-day ad valorem with the number of days of both export and import. The number of days to trade are weighted by trade flows—time to export is weighted by export values, and time to import is weighted by import values (Minor, 2013). As shown in Table 6.2, total times are eight days for export and 11 days for import procedures. Figure 6.2 presents the tariff equivalents by product, compared to import tax rates. The table shows that the tariff equivalents of time to trade, which are the hidden barriers, are in fact higher than the applied tariffs for almost all of the products in Cambodia, reflecting that removing the time cost barriers is crucial and likely to have a more favorable impact on the economy.

Table 6.2: Export and Import times in days, Cambodia, 2012

Export		Import	
Customs administration	3	Customs administration	3
Ports handling	3	Ports handling	5
Inland transport	2	Inland transport	3
Total	8	Total	11

Source: Doing Business, GTAP

Figure 6.2: AVEs of time to export, AVEs of time to import, and Import tariffs (in percentage)



Source: Prepared by author, using SAM for tariffs and GTAP for AVEs to export and import

6.4. Simulation Results and Discussion

6.4.1. Simulation design

The study performs a series of simulations to assess the impacts of trade facilitation on the economy and to determine which sectors gain most from it. The first simulation halves the time to export and import across borders for all the products as a result of improvement of the trading procedure. The second simulation proposes a 50 percent reduction in tariff rates across the board as a cause of trade liberalization. These two exercises distinguish between the two effects and how the dimensions of the effects differ. The last simulation, on the other hand, combines the reduction of time in trade and an increase in investment in transportation and

Table 6.3: Simulation designs for trade facilitation

Scenarios	Simulation designs
Trade facilitation	1. Decrease time delays of export and import by 50% (TF)
Trade liberalization	2. Decrease import tariffs of all sectors by 50% (TLB)
TF and investment on public services	3. Sim 1 + increase investment expenditure on transportation and administration + increase value added productivity (TF-INV)

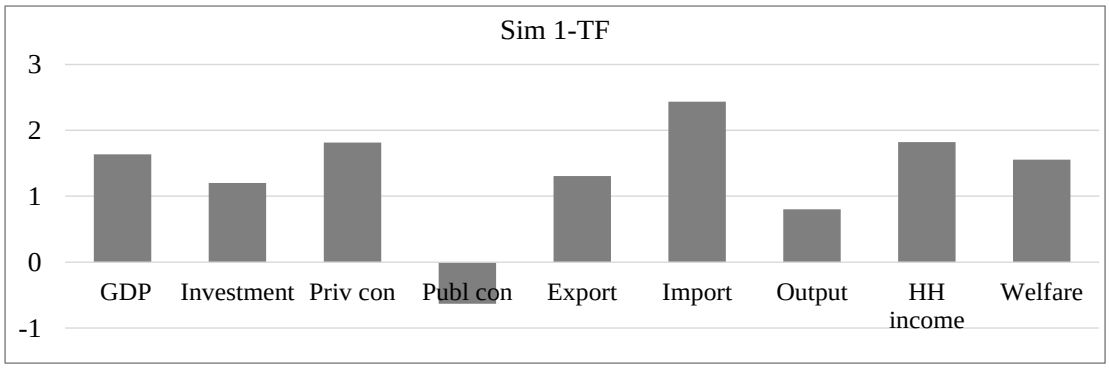
administration, considered as a cost to achieve the improvement of trade facilitation, and coupled with an increase in total factor productivity, assumed as a technical progress along with investment demand.

6.4.2. Effects on Macro Economy

Figure 6.3, 6.4 and 6.5 summarized the simulation results showing the effects on macro economy of the three simulations respectively. For the first simulations, the reduction in time delays in both export and import procedures induces positive impacts on the economy in general as a result of an improvement in the terms of trade. GDP rises by 1.63 percent as investment and private consumption soar by 1.20 and 1.82 percent respectively, as depicted in Figure 6.3. The changes can be explained by two effects: exports and imports. For the export side, the reduction in time, and thus the AVEs, saves producers' exporting costs since F.O.B export prices become cheaper, making export more beneficial (the world price is constant), resulting in an acceleration in total exports by 1.30 percent. For the import side, similarly, the decrease in tariff equivalents of time lessens prices of imported goods, and hence total imports rise by 2.43 percent. Terms of trade improve considerably when lengthy customs barriers to trade are eased with the reduction in transaction costs. Trade facilitation, therefore, reduces trade prices with imported goods become cheaper on average relative to exported goods.

The results of the second simulation show that cutting tariffs by the same proportion yields lower gains for most of the macro indicators. This can be primarily explained by a more

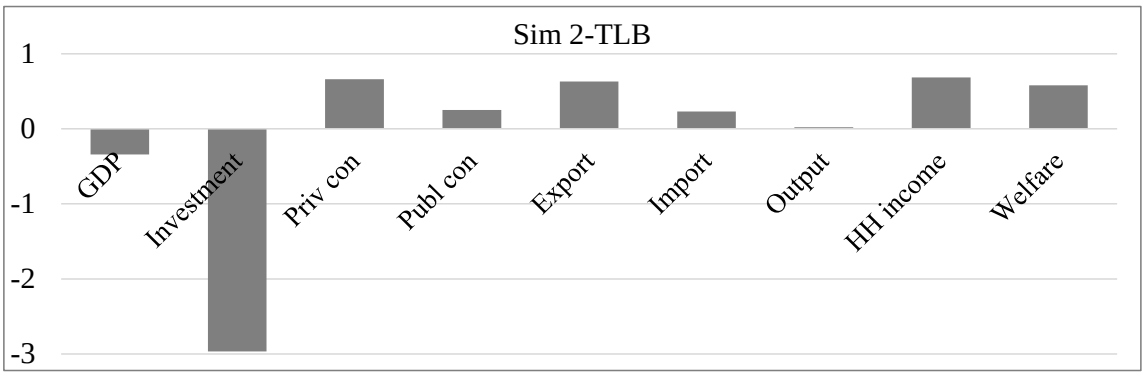
Figure 6.3: Macro effects of simulation 1: Trade facilitation (% changes from base values)



Source: Author's estimation

modest fall in trade price in simulation two than that in simulation one since tariffs are on average lower than time costs. For example, F.O.B export prices diminish on average by 0.15 percent in the former against 0.63 percent in the latter. GDP (at market price) sees a slight drop, whereas investment falls marginally by almost three percent due to the major fall in government income and savings as a result of the significant foregone tariff revenues.

Figure 6.4: Macro effects of simulation 2: Trade liberalization



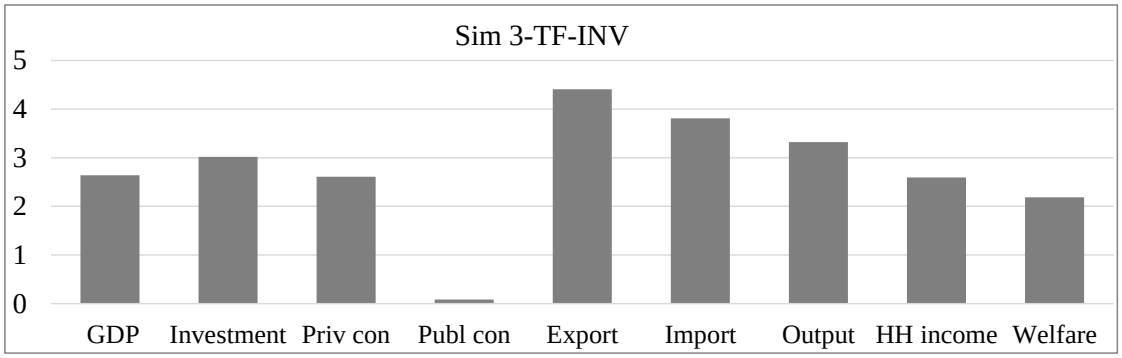
Source: Author

However, trade liberalization favors domestic consumption as import price and consumer price decline. The fall in prices causes exports to surge as producers find sales in the local market less beneficial. That can be the reason why total exports accelerate higher than total imports. These findings are also consistent with the previous study by Zaki (2014), who revealed that in both the short and the long run, the welfare gains from trade liberalization are lower than those of trade facilitation. He also suggested that "while welfare gains emerging from trade liberalization are explained by a more efficient allocation of resources, those arising from trade facilitation are primarily the result of a reduction in deadweight loss: changes in terms of trade are far more important as a source of welfare gain in trade facilitation than trade liberalization" (Zaki, 2014, p 121). That is the reason to suggest that when trade liberalization is pursued with trade facilitation simultaneously, economic welfare gains are more significant.

The last simulation, which combines the reduction in trade time with an increase in investment as a cost to improve trade facilitation quality, favors the economy at a larger scale.

The costs of higher investment is a sort of income redistribution done by the government as it involves projects of improving transport infrastructure, upgrading customs clearance procedures such as through computerization, and increasing wages for the public customs agents, although these aspects are not directly taken into account in the simulation. Hence they are favorable for the economy and should not be treated as an actual cost perspective (Chahir Zaki, 2010). GDP gains US$ 343million, increasing from 1.63 percent without investment to 2.64 percent with the investment to finance trade facilitation, whereas consumption surge substantially. Trade also improves, with exports larger than imports. It is worthwhile to note that the projects are financed without cutting the public budget because the rise in imports and exports increases tariff revenues following the trade simplification measure, which boosts government income and enables it to fund investment in public services. In contrast, such projects would not be possible without putting pressure on either government income or saving in the case of trade liberalization as tariff revenues fall and thus government income falls by 6.72 percent.

Figure 6.5: Macro effects of simulation 3: Trade facilitation and investment



Source: Author

6.4.3. Effects on Sectoral Trade

While removing time cost barriers improves total exports, it does not benefit all of the sectors equally. Table 6.4 shows that agriculture, office equipment, machinery and metal products see the largest export rise in simulation one, suggesting that these products are more sensitive to trading time. This can be given by the higher willingness to pay by producers or

purchasers for these products to be distributed to the markets in a timely fashion to avoid quality/price depreciation. Such results answer the trade facilitation literature which has shown that perishable goods such as agriculture products and food, seasonal/fashion products such as garments, and high value-added products are highly associated with transaction time (Hummels et at., 2007, Minor&Tsigas, 2008, Zaki, 2014). Conversely, those studies found that bulk products such as fertilizer, crude oil and natural resource-intensive goods are not time sensitive to trade. This conclusion supports the result of the current study that rubber, which is highly protected, does not benefit from lowering trading time barriers for export and import, showing that trade facilitation alone does not seem to have an impact on rubber industry. Yet, this particular industry will be significantly affected by the combination of removing time costs and

Table 6.4: Effects on exports and export prices by sector (% changes from base)

	Exports			Export Prices		
Commodity	**sim1-TF**	**sim2-TLB**	**sim3-TF-INV**	**sim1-TF**	**sim2-TLB**	**sim3-TF-INV**
Total	1.30	0.63	4.41			
AGR	2.99	0.25	6.81	3.01	-0.12	1.15
FBT	0.74	0.43	3.87	0.79	-0.21	-0.74
TEXTILE	1.49	0.78	4.36	1.42	-0.39	0.02
WP	1.14	0.40	4.95	2.43	-0.20	0.56
RP	-0.35	0.49	2.79	2.69	-0.24	1.10
METAL	1.63	-0.58	3.89	4.14	0.29	2.99
FMETAL	1.42	-0.19	4.25	2.50	0.10	1.10
MACHINE	1.91	0.89	5.26	1.99	-0.44	0.35
OFFICE	3.11	1.30	6.58	2.01	-0.64	0.33
TRANS	1.10	0.67	4.38	3.42	-0.34	1.78
OTHMNU	-0.14	0.27	3.31	3.92	-0.13	2.17
CHEM	0.28	0.04	3.54	4.02	-0.02	2.37
FURN	1.56	0.36	4.86	3.05	-0.18	1.42
MEGW	1.59	0.29	4.50	2.50	-0.14	1.05
CON	1.45	-0.89	3.80	2.21	0.45	1.05
WTT	1.16	0.32	4.37	2.36	-0.16	0.78
HR	0.30	0.39	4.13	1.01	-0.19	-0.86
FBUS	1.55	0.18	5.28	2.79	-0.09	0.95
OTHSER	1.23	0.20	4.93	1.95	-0.10	0.14

Note: Export prices are prices received for export commodities, excluding export tax and AVEs
Source: Author's estimation

Table 6.5: Effects on imports and import prices by sector (% changes from base)

	Imports			Import Prices		
Commodity	**sim1-TF**	**sim2-TLB**	**sim3-TF-INV**	**sim1-TF**	**sim2-TLB**	**sim3-TF-INV**
Total	2.43	0.23	3.81			
AGR	10.27	2.54	8.20	-5.21	-1.85	-5.21
FBT	4.46	2.84	3.24	-1.59	-2.63	-1.59
TEXTILE	1.90	0.95	4.87	-3.28	-1.31	-3.28
WP	3.01	0.85	4.37	-4.09	-2.32	-4.09
RP	4.78	1.26	6.33	-5.39	-2.53	-5.39
METAL	2.55	-2.49	2.78	-5.24	-1.25	-5.24
FMETAL	4.87	-2.35	4.04	-3.94	-2.25	-3.94
MACHINE	1.71	-2.69	1.98	-4.00	-1.85	-4.00
OFFICE	2.34	-1.70	2.80	-4.33	-1.95	-4.33
TRANS	2.35	0.89	3.13	-5.14	-2.39	-5.14
OTHMNU	1.20	-0.09	3.14	-5.21	-0.70	-5.21
CHEM	1.82	0.24	2.98	-5.47	-1.80	-5.47
FURN	2.44	0.99	3.30	-5.07	-2.04	-5.07
MEGW	6.83	1.08	6.10	-4.61	-1.81	-4.61
CON	7.05	-6.41	1.46	-4.11	-0.43	-4.11
WTT	5.47	-0.06	4.09	-4.12	-0.42	-4.12
HR	5.00	1.17	1.43	-1.65	-1.07	-1.65
FBUS	7.74	0.38	5.45	-4.46	-0.49	-4.46
ADM	-0.33	0.78	9.08	-	-0.48	-
EDU	1.49	0.06	0.78	-	-	-
HEALTH	1.60	0.04	0.93	-	-	-
OTHSER	6.91	0.57	4.49	-3.45	-0.44	-3.45

Note: The AVEs for ADM, EDU and HEALTH are not available, neither the tariffs for ADU and HEALTH
Source: Author's calculation

increasing public investment (simulation 3). Despite the differences by sector, trade facilitation, in general, has greater impacts on exports as well as export prices than trade liberalization does for most of the sectors.

Unsurprisingly, trade facilitation also reduces import prices (Table 6.5), as trade transactions at the borders become less time consuming, hence consumption of the imported goods increases, with agricultural imports increasing by 10 percent, followed by construction and services such as finance and business. The results suggest that the removal of trading time barriers leads to an improvement in the terms of trade (export price change in relation to change

in import price). Generally, sectoral trade increases more substantially as a result of reducing AVEs than those of reducing tariffs because Cambodia's trade has already been highly liberalized, while non-tariff/administrative barriers and trade costs are quite basic.

The findings also reveal that Cambodia would experience a remarkable diversification of exports and production directed toward those products that are sensitive to trading time following trade facilitation reforms. Those sectors with higher exports need to increase their production level more than others. For instance, besides textiles, which are the current major export, office equipment increases its exports and output by about three percent, machinery by 1.90 and 1.13 percent, agriculture by almost three and 1.72 percent, and agro-food by 0.74 and 1.04 percent for export and production, respectively. As mentioned earlier, perishable (food) and short market life (high value added) products respond more significantly to barriers associated with trade simplification. On the other hand, these types of constraints are treated as a part of fixed costs of exports. Lowering these fixed costs—perceived as primary determinants of firm entry—thus expand the range of commodities that the country can export as more firms would be able to enter into international markets (Dennis & Shepherd, 2011). Dennis and Shepherd (2011) found that product diversity gains of the order of three to four percent once there is a 10 percent reduction in the costs of exporting and transport.

These benefits turn even more pronounced when the improvement of trade facilitation is financed by the investment in transportation and administration (simulation 3), as the exports of all the sectors improve more than double compared to simulation 1. In addition, rubber exports would increase by almost three percent, indicating that for this industry to be able to reap the benefits, trade facilitation should be coupled with the initiation of other policies. A similar phenomenon is applied for the output levels of all the sectors where the effects are more positive in the last simulation.

6.4.4. Effects on Production Factors

While the importing sectors decrease their production, the exporting sectors require a higher level of production as aggregated output soars, meaning that there would be more demand for production factors. It should be noted that the model assumes that supply of the production factors is exogenous and that capital is fully employed, while there is unemployment in the Cambodian labor market. Table 6.6 presents the changes in labor employment and the returns to wages and capital remunerations. Once trade is facilitated, total employment increases by 1.67 percent, with greater impacts on low-skilled and medium-skilled labor since exporting sectors with higher production are more low-skill and medium-skill intensive. In contrast, medium skill wage progresses more than low skill wage since the former is less rigid and the medium-skilled workers are more likely to move quicker across sectors to where the premium is higher. Larger production also demands more capital. In accordance with the CES function of capital and labor characterized in the model, more capital is required to substitute labor for dealing with the progress in wages. Since capital is immobile across industries, higher demand for capital means higher rental rates.

Table 6.6: Effects on production factors (% change)

Factor Effects		**sim1-TF**	**sim2-TLB**	**sim3-TF-INV**
Employment	Total	1.67	0.04	0.69
	LSK	1.90	0.02	0.71
	MSK	1.68	0.00	0.61
	HSK	1.03	0.18	2.00
Real wage	LSK	0.26	0.69	1.94
	MSK	0.42	0.68	1.99
	HSK	0.26	0.88	2.46
Return on capital		0.47	0.19	1.62

Source: Author

As for the second simulation, real wages increase in relation to the high proportion of the decrease in price, yet employment increases minimally at 0.04 percent in total. This is reasonable, because as domestic product becomes more expensive relative to imported goods, consumption for locally produced goods diminishes and so does production output. The modest

increase in labor is, however, only required for the production for foreign market supplies, as producers tend to export more when external sales become more beneficial in relation to domestic revenues.

The combination of trade facilitation and investment in the last simulation produces a more substantial improvement in the returns to both labor and capital, yet the employment changes are moderate, except for among the high-skilled. This is because, on one hand, when there is a higher demand for production as a result of investment and technical progress, capital becomes more in demand and more efficient to substitute for low and medium-skilled workers; nevertheless, capital is less likely to be substitutable with the high-skilled group as the latter is needed to operate the highly-technical function of machinery. On the other hand, as industry opens up to foreign markets as a result of trade facilitation, more firms become more productive to keep up with the competition and will, therefore, hire more skilled labor at the expense of higher premium. The results infer that trade facilitation produces greater gains for the production factors when combined with the increase in investment in the trade-related public sector—transportation and administration.

6.4.5. Effects on Household income and welfare

Real household disposable income would increase by 1.82 percent on average as a result of trade simplification, with the rural poor and non-poor groups and the urban poor receiving the highest effects thanks to the rise in labor income as employment and wages increase. The decline in import prices due to the extraction of time costs encourages private consumption of all the household groups—Phnom Penh, urban and rural. Therefore, as listed in Table 6.7, welfare effects for households rise by 1.55 percent of total income in the first scenario, with the highest effects on the rural non-poor families (as percentage of initial income). The magnitudes of the effects are lower in the free trade scenario. For instance, welfare increases by 0.58 percent, whereas both consumption and real income increase by about 0.70 percent due

primarily to the decrease in both domestic and import price. Labor income increased less than the first simulation by half given the modest changes in labor demand.

The results of the last scenario, however, generate the highest impacts compared to the previous two. Welfare grows by 2.20 percent on average, whereas real household income and consumption progress considerably in response to the higher labor demand and wage rates, improved productivity along with the increase in investment in public sectors, and the lower consumer price index, which is cut by about 1.50 percent.

Table 6.7: The Effects on household welfare

Welfare Effects		**sim1-TF**	**sim2-TLB**	**sim3-TF-INV**
(% of total income)		1.55	0.58	2.19
	RP	1.50	0.45	1.99
	RNP	2.01	0.76	2.63
	UP	1.41	0.47	2.20
	UNP	0.98	0.37	1.48
	PPP	0.72	0.24	1.26
	PPNP	1.21	0.48	2.03

Source: Author's estimation

6.5. Asia Experience in Export-led Growth

6.5.1. Export Performance

Several developing Asian economies have performed well in essential function of growth and export expansion. Some remarkable changes have been seen in four Southeast Asian countries (the ASEAN-4)—Malaysia, Indonesia, Philippines and Thailand—followed by the People's Republic of China (PRC) while other Asian economies, including those of South Asia, are the later followers on this path (Das, 2000). Table 6.8 shows that exports from Eastern and Southern Asia grew faster on average than world exports from 1995 to 2011. World exports rose about 3.5 times while Eastern and Southern Asian exports grew almost 6-fold over the period (Unctad, 2012).

A closer look at various countries can be interesting. The ASEAN-4 economies have achieved a high export growth rate since early 1990s, and from 1995 to 2011, during which period, the export volume grew about 4 times for Indonesia and Thailand and 3 times for Malaysia and the Philippines. China, with exports soared 13-fold over the period, was among the fastest export growth countries, followed by India, in the sub-region. The low-base effect can be seen in these economies as they began their exports from a very low level. For example, at the time of adopting the open door policy in 1979, China's exports were only US$12.6 billion, grew from US$6.4 billion in 1975 (Das, 2000). Although there was a reduction in import demand from developed economies during the early 1980s due to the global recession, export figures for China picked up to US$148.8 billion in 1995 and continued to increase sharply afterward. This remarkable achievement in two decades reflected a change in both economic structure and macroeconomic management (Das, 2000).

Starting from 2000, food exports started at a similar point as or even lower than that of textile in the ASEAN-4, but the figure surpassed textile export in the last 2000s in all the four countries. This changes could have been caused by the diversification into agro-industry and by the movement of textile production to lower labor cost economies such as China, with textile the major exports. This can be a lesson for the latecomers, such as Cambodia, in the region to follow given the competition challenges by the lower labor costs of other major textile exporters such as Vietnam, Laos, India and Pakistan.

Table 6.8: East and South Asia Exports, 1995-2011 (US$ billion)

Year	World	East and South Asia	Indonesia	Malaysia	Philippines	Thailand	China	India
1995	5,121.1	628.6	45.4	73.8	17.4	56.4	148.8	31.7
2000	6,367.0	869.1	62.1	98.2	38.1	68.8	249.2	42.4
2005	10,447.3	1,726.4	85.7	141.6	41.3	110.1	762.0	100.4
2010	15,221.1	3,098.7	157.8	198.8	51.5	195.3	1,577.8	220.4
2011	18,237.2	3,721.0	203.5	227.0	48.0	228.8	1,898.4	301.5

Source: Unctad, 2012 "International Trade in Goods and Services"

6.5.2. Trade Policy Reform

South East Asia

Trade liberalization in most of the South East Asian countries began in the early 1980s (Santos-Paulino, 2002; Weiss, 2005). Indonesia undertook the movement from import substitution industrialization to export promotion policy during that period, carrying the promotion of non-traditional exports, reinforcing domestic and foreign investment and financial markets; and later enhancing exchange rate policy to support and improve competitiveness of Indonesia's exporters. Similarly in Malaysia, the liberal exchange rate system was maintained, together with the relatively low average tariff and quantitative restrictions. The Philippines once abandoned trade liberalization due to macroeconomic problems in 1983 but reestablished the policy in 1986 (Santos-Paulino, 2002). With inward liberalization and tariff reforms as moderate, gradual and steady, outward-looking strategies with investment law reforms and bias against FDI removal remarkably increased FDI and export activities in the Philippines although the advantages of the trade regime were not fully realized.

Thailand carried import substitution strategy during the 1970s. Incentives were provided to semi-manufacturing and manufacturing exports, including tinned fish, dried and preserved fruit and vegetables. The development of agro-processing industries were firstly carried by

Table 6.9: Timing shift in trade policy, some East Asia economies

Indonesia	1948-66 Economic nationalism; nationalization of Dutch	1967-73 Some trade liberalization	1974-81 Oil and commodity boom	1986-onwards Gradual trade liberalization and export promotion
Malaysia	1950-70 Natural resource based exports	1971-85 Import substitution and export promotion through EPZs	1986-onwards Gradual trade liberalization and export promotion	
Thailand	1955-70 Natural resource based exports	1971-80 Import substitution	1980- onwards Trade liberalization and export promotion	

Source: Weiss, 2005, p.4

domestic firms which established large vertically integrated agri-business groups that combined all stages of production and different sectors including financial enterprises, transportation and marketing (Reinhardt, 2000). Multinational firms, sometimes in the form of joint ventures with the public sector, were deemed to play a vital role in the support and provision of marketing networks and technologies. Thailand economy gradually moved to outward-oriented strategies by promoting private sector development and attracting inflows of FDI during the 1980s. This could have been done mainly by the attempt to depreciate domestic currency against US dollar due to the adoption of a more flexible exchange rate regime during the period.

Malaysia has been recognized as an export-led growth economy for the period 1965-1996, with strong evidence during 1965-1980 (Khalafalla & Webb, 2001). The country's development path is similar to the development experience of a successful economy, which "… grows because the initial development from export industry lead to a widening of the export base and growth in the size of the domestic market" (North, 1961, p.6). Hence, learning from Malaysia's experience would be worthy for Cambodia. According to Khalafalla and Webb (2001) and Reinhardt (2000), Malaysia has undergone a noticeable structural changes, which can be divided into three periods.

The first one dated back to before the 1980s when export growth was observed following trade promotion initiatives. After getting independence in 1957, the economy depended heavily on the so-called twin pillars of rubber and tin which accounted for almost 75% of total export earnings, whereas exports shared about half of national income, while manufacturing sector accounted for less than 10% of national output, employed only 10% of labor force. During the 1960s, the country pursued import substitution policy, in which the industrial import substitution and tariffs were attractive to foreign investment. The government promoted the expansion of resource based sector mainly rubber and palm oil production, while at the same time promoting the improvement of manufacturing sector, first toward domestic market, and then toward export market. From the early 1970s, while maintaining protectionism,

the country began to promote manufacturing exports, shifting gradually toward outward-oriented strategy as a way to move to industrialization.

The success of the policy shift during the 1970s resulted in a change of the commodity composition during the last 20 years with the emergence of manufacturing exports, palm oil and petroleum products, against the decline in relative importance of natural rubber and tin. Semi-manufacturing and manufacturing exports grew more rapidly compared to overall exports. In 1971 the New Economic Policy was launched to achieve two objectives: alleviation of poverty, and structuring of employment and the ownership of assets. From that period onward, Malaysia took outward-oriented industrialization as the primary element in industrial development and carried out some strategic manufacturing export promotion policies which covers two distinct features: introducing various incentive measures to stimulate domestic industries to export part of their output, establishing Export Processing Free Zones (EPFZ) to speed up direct exports. The first feature takes place along four categories:

- Providing an export allowance to companies that allow a reduction from taxable income
- Making an accelerated depreciation allowance available for industries modernization, particularly those industries exporting at least 20% of production
- Allowing promotional expenses for export to be deductible from taxable income
- Operating various export financing facilities that provide domestic exporters with credit at preferential rates of interest.

These incentives are also provided to industries of EPFZ, which started in 1972 for exclusively export market-oriented industries and to attract FDI, together with additional measures, including low cost infrastructure facilities, a complete free-trade regime, and minimum customs formalities. Manufacturing sector broadened its activities in response to these incentives as FDI created subsidiaries, particularly for labor-intensive garment and electronic assembly, both in wholly-private and public-private partnership firms. While promoting non-traditional manufacturing exports, the country was continuing to provide

support for diversification of natural resource based industries, mainly palm oil refineries and petroleum development.

In the early 1980s, the second period, Malaysia faced a recession which revealed the weakness in depending on primary exports, of which price and exchange earnings are volatile. In response to the negative growth, the government started to provide more attractive incentives for foreign investment focusing on production of manufactured goods for exports, emphasizing promoting export-led growth.

Subsequently, from the mid-1980s which marks the renewed period of export growth, growing exports increasingly relied on imports of capital goods and manufacturing inputs to support the manufacturing sector growth, moving away from primary commodities. The new trend implied the greater interdependence of the exports and imports, which had not been the case when the country was relying mostly on primary exports. The relationship between exports, imports and economic growth were revealed as manufactures increase proportionally to Malaysia's exports, where policies of export base expansion were accompanied by the emergence of domestic measures to redistribute income. Public spending increased through investment in education, government land development schemes, and infrastructure—also dependent on imported equipment and machinery. These policies broadened both trade linkages and domestic market as Khalafalla and Webb (2001) stated: "these measures helped assure a broad-based participation in the nation's economic growth leading to the emergence of a wide array of indigenous services and manufacturing enterprises, a growing number of which are focused on the domestic market" (p.1713-1714).

South Asia

All countries in South Asia had exhibited import substitution policies with very high tariffs; up to 335 percent in India and 450 percent in Pakistan, until the mid-1980s when many countries faced current account deficit, lost foreign reserves and had high inflation rate, all of which, in many cases, led to decline in real GDP growth rate and restriction of foreign exchange

markets (Santos-Paulino, 2002). In hoping to restore the macroeconomic situation, all countries adopted some structural adjustments and received adjustment loans in the late 1980s. Many parts of export policy have been reformed since then. Despite the different level of export taxes and duties which remained similarly high prior to reform, incentives for exports have been significantly increased. Some examples include the expansion of duty drawback system, implementation of tax holidays, payment of tax rebates, and simplification of direct subsidy schemes. In addition, direct controls on imported inputs for export sectors were reduced with the attempt to neutralize the effects of import barriers. Quantitative restrictions, bans, quotas and domestic content requirements were removed in Sri Lanka in 1985; whereas in India, duty drawback compensation scheme for exports was introduced and restrictions on manufacturing exports were finally removed by 1993 (Santos-Paulino, 2002). At the same time, incentives of raw material and intermediate goods imports for export industries were provided in Pakistan although export tax on the agricultural sector remained high.

The experience of some countries in the region infers that despite the difference level of development, pattern and pace of reforms, East and South Asia undertook liberalization and became outward-oriented during the mid-1980s by implementing some of the important common actions in the first phase of reforms including the removal of obstacles to exporting, provision of incentives to export-oriented investors, and improvement of competitiveness through exchange rate policy. The second phase of the reforms was generally taken after the government budget balance and balance of payment were strengthened (Santos-Paulino, 2002). The procedures returned this sub-region with a vital experience of great success.

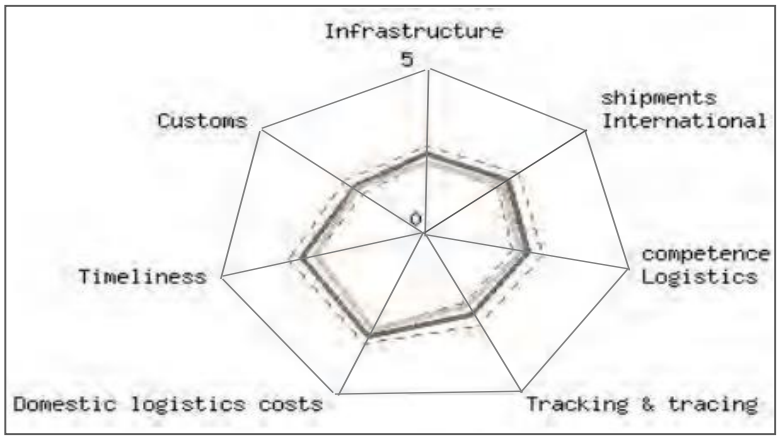
6.5.3. Trade and Infrastructure Environment: Cambodia and Other Countries

Progress and challenges in relation to trade and business are evident from a number of indicators. Cambodia ranked 129th among 155 countries in 2010 Logistic Performance Index

Progress and challenges in relation to trade and business are evident from a number of indicators. Cambodia ranked 129th among 155 countries in 2010 Logistic Performance Index

based on indicators given in Figure 6.6. Investment climate survey showed some improvements of average time of border clearance which went down from 4.5 days in 2003 to 4.3 days in 2007 for export and from 6.5 to 3.7 days for import (with more improvement for garment industry) (MOC, 2012). Despite improvements, Ministry of Commerce (2012) reported that: "Feedback from private sector points to the need to further facilitate trade, simplify processes and make them transparent." (p.14).

Figure 6.6: Logistic Performance Indicators (1-5, best)



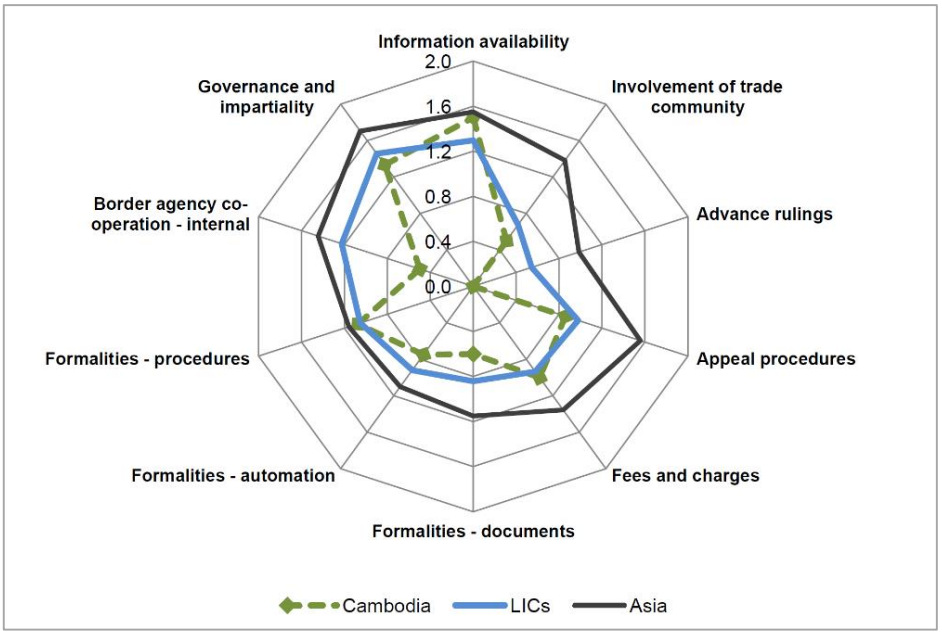
Note: The dashed line shows the confidence interval
Source: Ministry of Commerce (2012)

To identify areas for action and enable the impact of trade facilitation reforms to be assessed, OECD has introduced a series of trade facilitation indicators (OECD, 2013):

- Information availability: Publication of trade information which includes on internet and enquiry points.
- Governance and Impartiality: Customs structure and functions, accountability, and ethics policy.
- Border agency co-operation-Internal: Cooperation between various domestic border agencies, control delegation to customs authorities.
- Border agency co-operation-External: Cooperation between neighboring and third counties.

- Formalities-Procedures: Streamlining of border controls, single windows for all required documentation, post-clearance controls, authorized economic operators.
- Formalities-Automation: automated border procedures, online access of data exchange, risk management.
- Formalities-Documents: simplification and harmonization of trade-related documents in accordance with international standards, acceptance of copies.
- Fees and Charges: Regulations of the fees and charges imposed on exports and imports and the procedures.
- Appeal Procedures: The possibility and modalities to appeal administrative decision by border agencies.
- Advance Rulings: Prior statements by the administration to requesting traders concerning documentation such as classification, origin, valuation method, applied to

Figure 6.7: Trade Facilitation Performance, OECD Indicators, 2 represents best performance



LICs: Low income countries (World Bank classification)
Note: Insufficient reliable data is available at this stage for indication "Border agency co-operation-External".
Source: OECD Trade Policy Paper N0. 144, 2013

specific goods at the time of importation, the rules and process applied to such statements.

- Involvement of the Trade Community: Consultations with traders.

The development of the indicators are able to help governments to reduce trade costs, improve border procedures, and thus boost trade flows and reap greater benefits from doing trade. Using the estimates based on the indicators, the government can also prioritize necessary actions and mobilize resources, technical assistance and capacity building efforts in a more targeted and efficient manners.

Figure 6.7 displays the trade facilitation performance of Cambodia. And shows that Cambodia performs well in the area of information availability, procedure formalities, and fees and charges. However, its performance is in general below the average level of Asian or low income countries. In particular, Cambodia seems to critically underperform in the area of internal border agency cooperation, document formalities, and advance rulings as sketched in Figure 6.7.

In addition, other areas of central concern includes infrastructure services, investment environment as well as trade across borders. Table 6.10 displays some figures related to these three areas by comparing Cambodia status with average levels of developing countries in East and South Asia. Inadequate infrastructure in Cambodia tends to hinder export expansion. Paved roads in East Asia and South Asia were respectively 15 and 56 percent of total roads in general in 2004-05; it was only 6 percent in Cambodia (WDI, 2012). The level of electricity consumption is also low in Cambodia in comparison to average levels in the two sub-regions, while mobile subscriptions per 100 people is relatively high in Cambodia due to the high level of involvement of the private sector in this area. A more detailed country comparison can be found in the study by De (2006) who divided infrastructure into four indices:

(1) agriculture infrastructure (access to fertilizer consumption, irrigation and agricultural machinery), (2) economic infrastructure (access to electricity, banking facility, and

telecommunication services), (3) social infrastructure (access to education, health care, media) and (4) transportation infrastructure (access to roadways, ports, railways and airways) (p.721).

These indices are helpful to understand the impact of related infrastructure on trading behavior of major Asian nations. As given in Table 6.11, the scores range from the highest for countries with more developed infrastructure to the lowest for countries with relatively poor infrastructure development. Cambodia ranked low in almost all the indices suggesting that improvement and more investment in infrastructure are seriously needed.

Table 6.10: Infrastructure, Starting a Business, Trade across Borders, Cambodia, East and South Asia

			East Asia (Develping only)	South Asia	Cambodia
Infrastructure	Paved roads (% of total)	2004/2005	15.86	56.10	6.29
	Electricity consumption(kWh per capita)	2010	2337.09	555.49	146.06
	Mobile subscriptions (per 100 people)	2011	80.91	68.78	96.17
Starting a Business	Procedures (number)	2004	9.05	8.71	11.00
		2011	8.45	7.38	10.00
	Time (days)	2004	54.58	46.71	94.00
		2011	45.75	24.81	102.00
	Cost (% of income per capita)	2004	84.63	46.70	534.80
		2011	39.38	27.21	127.50
Trading Across Borders	Documents to export (number)	2006	6.70	8.00	6.00
		2011	6.40	8.13	8.00
	Time to export (days)	2006	27.85	35.88	43.00
		2011	23.40	32.25	22.00
	Cost to export (US$ per container)	2006	926.40	1176.75	736.00
		2011	871.90	1557.63	732.00

Source: World Development Indicators, 2012; International Financial Corporation-WB

With respect to business regulatory environment, although with some positive improvement from 2004 to 2011, Cambodia still seems to require quite a relatively complicated procedure, and more time and cost before a firm can start to operate (Table 6.10). However, a lower gap between trading across borders in Cambodia and that in the rest of the sub-regions can be found, indicating that trade facilitation is quite favorable for outward in this country.

Table 6.11: Infrastructure in Asia, 2001

Countries	AII		EII		SII		TII	
	Score	Rank	Score	Rank	Score	Rank	Score	Rank
Brunei	1.59	9	6.09	5	13.43	3	2.09	7
Cambodia	0.38	15	0.17	15	8.02	15	0.24	13
China	2.34	5	2.46	8	11.82	6	3.12	5
Hong Kong	1.76	7	10.27	3	13.34	4	4.28	4
India	1.83	6	0.84	11	9.73	13	2.20	6
Indonesia	0.86	14	1.05	10	10.46	12	0.59	12
Japan	6.33	1	12.37	1	15.82	2	8.08	1
LaoPDR	0.97	11	0.27	14	8.05	14	0.23	14
Malaysia	0.95	12	5.60	6	10.67	10	1.40	10
Myanmar	1.01	10	0.41	13	10.48	11	0.11	15
Philippines	0.91	13	1.44	9	11.51	8	0.67	11
Singapore	5.14	2	10.43	2	12.80	5	7.57	2
South Korea	4.17	3	9.27	4	16.12	1	5.95	3
Thailand	1.63	8	2.53	7	11.70	7	2.06	8
Vietnam	2.55	4	0.74	12	10.93	9	1.42	9

AII: Agriculture Infrastructure Index, EII: Economic Infrastructure Index, SII: Social Infrastructure Index, TII: Transportation Infrastructure Index
Source: De, 2006 (p 721)

The complicated and delayed procedures strongly affect investment decision and, in many cases, reduce investment inflows and export volumes.

6.6. Concluding Remarks

This chapter studied the impacts of improvement of trade transaction across borders on the Cambodian economy by incorporating a trade facilitation framework in the Computable General Equilibrium (CGE) model. Tariff equivalents of time to trade enter the model to represent trade facilitation. This study was the first attempt to measure the impacts of trade facilitation in Cambodia utilizing the CGE model (PEP). While previous policies have usually focused on the reduction of the direct costs, the attention on time costs or time delays for export promotion have been limited. The current study, therefore, estimated the improvement in the time in trade by using time delays as a converted cost unit.

The simulation results revealed that reducing time delays in export and import procedures would favor economic gains due to the improvement in the terms of trade. Exports accelerate, which is explained by the fall in export costs that traders would be able to save when

trade is facilitated, making export more beneficial without deteriorating domestic sales, resulting in an increase in total outputs and investment. Household income increases as employment and wage rates rise, particularly for low- and medium-skilled laborers, whereas welfare progresses as private consumption surges in response to the import price fall.

Notably, saving time costs in trade does not benefit every sector in the same way. While agriculture, office equipment, and machinery exports see the largest impacts since these industries have a high sensitivity to trading time, rubber, other manufacturing and hotel service see the lowest impacts. These findings are also consistent with previous studies which suggest that perishable (food) products and high value-added products are more responsive to time savings, while bulk products such as crude oil, fertilizer, and natural resource-intensive goods are the opposite (Hummels et al., 2007; Zaki, 2014). The results also demonstrate that Cambodia would be able to diversify its exports and production structure towards such trading time sensitive products, particularly agriculture, agro-food, office equipment, and machinery, following trade facilitation reform initiatives.

On the other hand, the reduction of the same proportion of import tariffs leads to an increase in household income and welfare due to the fall in prices and the rise in consumption; yet investment declines substantially since the government budget and thus savings drop following the decrease in tariff revenues. This suggests that gains from trade liberalization would be more significant if combined with more efficient trade facilitation efforts.

From a policy point of view, while trade regime is critical in expanding international sales, gains from exports cannot be fully realized if barriers at the borders are not minimized. Time cost barriers, those other than the marginal costs of production itself, delay export activities and consequently reduce the volume of exports. To tackle this issue, the improvement of the trade environment can be encouraged by the government through an increase in investment related to trade public services such as the transportation and administration sectors. The former may include enhancement of physical infrastructure, electricity and

communication, and the latter should take the form of improving customs registration and clearance procedures through computerization, a more efficient business environment, capacity building and higher wages of customs agent to avoid informal costs. The combination between the two is crucial because the former cannot be developed effectively without the enhancement of the supporting environment of the institutional procedure and risk management, which are still in an early stage of development in Cambodia. The findings prove that the investment initiative would enlarge further the economic gains generated by trade facilitation since it would not only boost trade and production diversification but also upgrade economic productivity and public sector efficiency.

Chapter 7: Conclusion and Policy Implications

The rapid growth of the newly industrialized economies of East Asia—Hong Kong, South Korea, Singapore and Taiwan—has influenced the economic view of the potential gains of export orientation. Exports are no longer an element of income but a leader of growth. This is also evidenced in the second tier of export-led growth economies such as Malaysia, Thailand, the Philippines and Indonesia. Other countries in the region have been following this path, but the achievements have been less pronounced. Cambodia is among them. Exports have performed well since the start of liberalization in the early 1990s, but questions emerge as to how robust and sustainable the performance is. The slow progress of diversification and the low value added of the current manufacturing exports make Cambodia's export market vulnerable to external shocks and unable to contribute widely to the domestic economy. In addition, a number of cross-cutting constraints related to trade facilitation hinder the growth of both exports and other sectors although export potential exists. The limitations include the cost and time of customs, standards, and logistics, together with the investment environment and trade barriers across borders.

Inspired to address these challenges, this dissertation attempted to achieve three objectives. The first objective focused on the promotion of export expansion by identifying what sectors would be promising for exports and connecting exports with economic linkages through five indicators: (1) backward and forward linkages, (2) multiplier effects on income, (3) labor intensity, (4) foreign exchange earnings, and (5) hypothetical extraction. Strategic sectors with export potential should fall into most, if not all, of the five indicators. In another words, strategic sectors should possess high backward and forward linkages with the rest of the economy, should generate high income multiplier, should require high labor content, should be net earners of foreign exchange, and should lead to an enormous impact on total outputs if the sectors were eliminated from the economy. Given the results of the first objective, this dissertation went further to examine the impacts of those key industries on economic growth,

employment and household welfare, and to measure to what extent domestic policies can work to promote export orientation in those sectors. The last objective of the study, in addition, measured how the improvement of trade facilitation, presented by tariff equivalents of time to trade, affect the economic and export structures of Cambodia.

7.1. Main Findings

Specification of Potential Industries

The results of the I-O analysis found that agriculture generates high employment, while the food industry has strong linkages, generates substantial income multipliers and requires relatively high labor intensity. Textiles would contribute to the greatest impacts on aggregate output if this sector is closed down, yet possesses weak linkages. Rubber is highly linkage-oriented and moderately significant in other indicators. For services, trade-transportation ranks high in foreign exchange earnings and the hypothetical extraction exercise, whereas hotel-restaurant is the top net exporter and is crucial in a few other indicators.

The findings suggested that high intermediate import dependency with the absence of technical inter-industry linkages is a cause of concern for the export orientation process of Cambodia. While the linkage-oriented industries, such as food and rubber, have not been able to realize their full potential in exports, the current largest industry (textiles) is unlikely to contribute enough profit to foster future growth due to the lack of linkages. The limited interaction is evident when net exports are dominated by a few sectors and when most sectors with relatively high connections 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 exports can be realized through the requirements of not only diversification but also linkage creation. According to the result of the indicators and the normalization scorings, the study suggested that attention should be given to the following four key sectors: food-beverage-tobacco, rubber, agriculture, and hotel-restaurant.

The government also recognizes the importance of the above sectors, but more strategic attention is needed. For one thing, agricultural products, particularly fishery, livestock and crops, are in the list of potential exports of the Ministry of Commerce (2007). In addition, values of agro-exports have increased gradually, accounting for five percent of total exports in 2011; meanwhile, the Industrial Development Plan (RGC, 2015) also targets an increase of processed agricultural exports to 12 percent of total exports in 2025. Cambodia has a positive prospect to expand its food-processing exports provided the agricultural wealth and significant changes in demand for ready-made food products in Asia. Despite its potential, this industry, other than the rice subsector, has received little strategic attention with regard to domestic investment and the creation of the value chains. Also, there is no national business association specific to this industry in Cambodia, resulting in the lack of public-private discussion (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 started. At the same time, the lack of compliance with quality standards of Sanitary and Phyto-Sanitary (SPS) measures is a key constraint. With these challenges, encouraging investment and value addition and improving the quality standards should be a priority.

Rubber production has increased in recent years due to investment extension and market access. Rubber exports increased more than double from 2009 to 86,052 tons in 2013, mostly in the form of natural rubber. 87 percent of formal natural rubber exports in 2007 went to Vietnam, which has suitable facilities 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) have grown due to significant expansion of production capacity and market diversification efforts (MoC, 2014). However, the remaining challenge hinder rubber exports to a wider range of markets is primarily the difficulty of meeting international standards.

The increased investment and exports of hotel-restaurant services is largely due 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). 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 revenues due to imported inputs including agro-food products—estimated to be around 25 percent—is also limiting the contribution of this sector.

Impacts of Export Sectors and Policy Options

Following the findings on the promising export products, the study performed a series of simulations to measure the impacts of those sectors on the economy, as well as to measure the policy options to help improve the export orientation. The potential sectors in focus are agro-industry (food and rubber) and agriculture. The results showed that export expansion of these industries brings positive effects on economic growth and employment at the macro level, broadens production diversification at the sectoral level, and improves welfare at the household level, particularly for the rural poor. The simulations suggested that the contribution, including the intermediate connection, of agro-exports were larger than that of agricultural exports. Priority should be given to creating production chains from agriculture to processed food and processed rubber, rather than exporting unprocessed agricultural products.

This target was also in line with the government's aim to undertake some degree of processing inside the country before exporting and to increase the total share of processed agricultural exports, set in the Industrial Development Plan 2015-2025 (MoC, 2014, RGC, 2014). Milled rice export policy initiated by the government in 2010, for instance, has been a vital road map for a significant improvement of this subsector. Besides milled rice, however, there is a lack of practical strategies to promote other industrial food processing regardless of viable opportunities to increase exports in the recent years. A more critical policy toward this sector is required, not only to create the value chains from agriculture, but also to reduce too much concentration on garment exports to minimize the high vulnerability resulting from possible fluctuation in world price and in the current pattern of competitiveness within the

garment industry. As evident in the simulation results, the negative impact as a consequence of the fluctuation in the world price of agro-exports is less severe than that of the garment exports. These findings were also consistent with previous studies which suggested that agriculture and the food industry contribute better to Cambodian domestic income while garments cannot secure long-term distribution and competition (Chan & Oum, 2011; Kobayashi et al., 2009; Kobayashi et al., 2008).

The analysis also revealed that the exporting sectors are low skilled and medium skilled-intensive, reflecting an increase in demand for those two groups of workers to keep up with the production and export supplies. Improving the productivity of these groups would further benefit the economy. In addition, for the economy to expand the benefits that the productivity of labor and capital generate, the market needs an enabling environment for more efficient utilization of capital within the targeted sectors in the short term, and more flexible movement of capital in the medium term. Finally, the influence of the potential industries would be greater if combined with preferential treatment initiatives. The study found that the provision of export subsidies or a combination of subsidy and protection policy would work as practical tools to promote the export orientation of those sectors and bring favorable impacts on both growth and employment.

Impacts of Trade Facilitation

While the direct policies are crucial for export promotion, the gains from trade cannot be realized if barriers associated with trade facilitation are not addressed. There is a consensus that trading procedures across borders plays a vital role in trade expansion as it affects both exports and imports directly and indirectly. Notwithstanding, to what extent trade facilitation affects the economy and export structure depends on the estimation tool. Tariff equivalents of time to export and import represent trade facilitation in this research, and the impacts of the tariff equivalents in relation to time delays are revealed.

The simulation results demonstrated that the reduction in time delays in export and import by half would lead to an increase in GDP by 1.63 percent and export by 1.30 percent. Household income and welfare also experience a remarkable progress. Exports accelerate, which can be explained by the fall in F.O.B costs that traders have to pay otherwise, making exports more beneficial without interrupting domestic sales, resulting in an increase in total output and investment. Notably, saving time costs in trade does not benefit every sector the same way. While agriculture, office equipment, and machinery exports see the most significant impacts, rubber, other manufacturing and hotel services see the lowest. This shows that agriculture and high value-added products are more sensitive to trading time, which is also supported by previous literature (Zaki, 2014, Hummel et al., 2007).

On the other hand, reduction in the same proportion of import tariffs resulted in an increase of household income and welfare due to a fall in price and an increase in consumption, yet GDP and investment decline. This suggested that gains from trade liberalization would be more significant if this reform is combined with a more efficient trading environment. Finally, an increase in investment in transport infrastructure and administration as a cost to finance trade facilitation improvement would be beneficial for the economy, particularly GDP and investment. Trade surged on a larger scale, with exports greater than imports, whereas production levels of all sectors see a more pronounced positive impact. Not only did agriculture exports improve at a high level, processed food and rubber exports also soared significantly. The findings reflected that the investment initiative would not only boost trade and production diversification but would also upgrade economic productivity and public sector efficiency.

7.2. Policy Implications

Having identified the potential export sectors and having learned the impacts of promotion policies as well as of trade facilitation, development strategies are needed to support export performance. Some policy implications, which can be carried out by the Ministry of Commerce and relevant policy makers, are herein proposed.

- Prioritize three targeted export sectors—the processed food industry, rubber industry, and agriculture—by strengthening industrial linkages/clusters of the three industries, securing supply chains and undertaking processing before export.
    - Establish a contracting system between agriculture and manufacture to form a private sector association related to agro-industry and to create value addition; for example, from crops, fish and animal products to processed food industrial goods, from natural to processed rubber, and from forestry to wood and furniture production.
    - Invest in clearing and storage houses for paddy rice and other produce to undergo processing activities and to link potential investors with local partners/farmers via contract farming (demand-supply contract).
- Provide production and export subsidies to encourage investment and export of these targeted sectors,
    - Provide subsidies to both local firms and large/foreign firms of the potential industries. On one hand, most domestic firms, such as food processing, small holding rubber plantations, and hotel-restaurants, are SMEs which base their operations mainly on local intermediates. Involving them in exporting activities would benefit localization. Supports such as access to duty-free measures are required. On the other hand, FDI in agro-food and rubber processing should also be encouraged through production tax holiday measures.
    - Establish geographical or technical clusters of local agro-processing firms with large/foreign firms to boost industrial connections. This can be done through subsidized infrastructure as parts of Export Processing Zones, tax reduction for export products, and tax exemption on imports for rubber and food manufacturing machinery.

- Combine subsidies with protection policy in the selected three sectors by reducing export tax and imposing higher tariffs. The benefits are two-fold: to protect potential industries against imports and to secure government budget when providing subsidies.

- Promote the productivity of low-skilled and medium-skilled labor through higher investment in education and vocational training according to workers' educational attainment in the selected sectors, provision of necessary skills within agro-manufacturing industries and agriculture, and encouragement of hands-on experience exchange between local and foreign specialists.
- Improve trade facilitation efficiency through reduction of time delays across borders by, at least, half of the number of days for export and import procedure. This effort would be a crucial measure to increase agricultural and food exports and to diversify production toward higher value-added commodities (as they are more responsive to trading time). This can be done through:
  - Minimization of transaction costs and trade-related procedures and elimination of informal practices at every step of transactions
  - Deregulation of customs registration: strengthen the one-stop window strategy, promote online access for customs registration and clearance, and make them more reliable and efficient
  - Establishment of a trade information body to provide precise information in border trade procedure, network with other institutions about trade-related services, collect, organize and disseminate relevant and up-to-date information to exporters and other users.
- Increase investment in transportation infrastructure and port quality and extend them to rural and border areas to shorten time delays. The increase in investment can be challenging with limited government resources and financial capacity; however, it

can be achieved through other actions such as public-private partnership and regional cooperation.

- Increase investment in administration, including the increase in public wages of customs agents to improve work efficiency.

Policy interventions can be either "functional", being available to all firms, or "selective", with some firms selected for special support, but this should be implemented with caution to avoid high cost, rent-seeking, and un-competitiveness (Weiss, 2005). In addition to the above recommendations, Policy experiences, which can be good lessons for Cambodia, from some export-led growth countries are worthwhile for a review. First, Malaysia and Thailand pursued import substitution and export promotion policy at the same time during the early export industrialization in the 1970s, making semi-manufacturing and manufacturing production and exports grew rapidly compared to total exports. Incentive were specifically provided to processed food sector in Thailand case, and rubber processing in Malaysia case. Their experience shows that the development of agro-processing industries (firstly by domestic firms in Thailand case) establishes large vertically integrated agri-business groups that combines all stages of production and sectors, including transportation, financial and marketing services (Reinhardt, 2000). Meanwhile, the two governments started the incentives to attract FDIs which played a vital role in the support and provision of marketing networks and technologies.

Second, while gradually shifting to the outward-oriented industrialization, Malaysia stimulated domestic industries to export part of their output by introducing various incentive measures such as provision of an export allowance (subsidies) to companies that allow a reduction from taxable income, allowance of accelerated depreciation, particularly for industries exporting at least 20% of production, allowance of promotional expense for export, operation of various export financing facilities that provide domestic exporters with credit at preferential rates of interest, and introduction of minimal customs formalities. Subsequently,

growing export was accompanied by imports of capital goods to support manufacturing sector growth (Khalafalla & Webb 2001).

Third, successful experience in South Korea suggests that the policy implementation can be carried out through two measures: (1) time-bound support which gives firms incentive over time to develop competitiveness, such as the case of special tariff protection, and (2) a form of competitiveness which comes through a series of "contests", allowing firms to receive special incentive, for example, according to achievement of export sales. Finally, SMEs, accounting for a large share of enterprise (also in the case of Cambodia), should be highly encouraged to get involved in export activities through the actions recommended above. As per the experience of Taiwan, SMEs have been key private actors in export and in the establishment of market niches of technology and R&D (Weiss, 2005).

7.3. Limitation and Future Studies

The study is not without limitations. First, the selected key export industries, based on the I-O analysis, which are mostly labor-intensive and with low technology, are not the best options for long-term growth. The results of this study thus should be interpreted with caution. As countries grow, movement toward skill improvement and capital-intensive investment is of central concern for development purposes. On the other hand, human capital must be improved, and as long as this occurs, wage rates are expected to rise, making labor-intensive commodities less competitive, and, in many cases, the investment would move to other locations with lower wage costs. Exports would shrink unless export sectors upgrade. Hence, although the selected industries are, to the greatest extent, important for the first stage of export-led growth, as has been experienced by almost all of the NIEs, dependency on low-tech industries should not be permanent.

Second, this current study has undertaken impact analysis based on macro simulations and static modeling while microsimulations and dynamic assumption have not been taken into account. If both assumptions were included in the estimations, the results would have been

more detailed and accurate. It is suggested that static models seem to underestimate the effects of economic changes since they do not incorporate productivity and capital gains (Zaki, 2014). Third, the 2011 SAM and 2009 household survey were used as a benchmark in the study. Although the SAM is the most current available data during the study period, household surveys of more current years were available.

Therefore, future studies should take into account these limitations for improvement. For one thing, to sustain the long term growth and the technical progress, the promotion of Cambodia's exports should also include medium- and high-technological industries rather than relying solely on labor-intensive sectors. The potential roles of medium-tech industries should be on the next research agenda. In addition, the estimate of export orientation and trade facilitation impacts on the next step of research should integrate microsimulations and dynamic analysis, whereas more current data of socio-economic household surveys should be incorporated into the SAM as a new benchmark.

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Appendix

Table A.1: Merchandise exports by group of products (for Chapter 2, Section 2.1.2)

	2005	2006	2007	2008	2009	2010
Total exports (US$ million)	2,434.60	2,910.30	2,962.50	3,456.00	2,986.70	3,808.70
			(% of total)			
Total primary products	3.2	2.8	2.9	5.5	4.5	5.7
Agriculture	3.1	2.8	2.8	2	3.2	5.6
Food	1.2	0.8	0.9	0.8	1.3	2.1
0423 Rice, milled, semi-milled	0.1	0.1	0	0.1	0.4	0.9
Agricultural raw material	2	2	1.9	1.1	1.9	3.4
2312 Natural rubber excluding latex	1.4	1.5	1.4	0.9	1.6	2.1
2473 Wood rough, painted, preserved	0	0	0	0	0.1	0.8
Mining	0	0	0.1	3.5	1.3	0.2
Ores and other minerals	0	0	0.1	3.5	1.2	0.2
Non-ferrous metals	0	0	0	0.1	0.1	0
Fuels	0	0	0	0	0	0
Manufactures	96.3	96.7	96.5	94.1	92.5	94.2
Iron and steel	0	0	0	0	0	0.1
Chemicals	0.1	0.2	0.2	0.1	0.8	0.4
Other semi-manufactures	0.2	0.3	0.6	0.4	0.4	0.4
Machinery and transport equipment	0.5	2.1	2	3	3.8	7.1
Power generating machines	0	0.1	0	0	0	0
Other non-electrical machinery	0.1	0.5	0.1	0.1	0.3	3.8
7234 Constructing and mining machinery, n.e.s.	0	0	0	0	0	3.4
Agricultural machinery and tractors	0	0	0	0	0	0
Office machines & telecommunication equipment	0.1	0.1	0	0.1	0.1	0.1
Other electrical machines	0	0	0.1	0	0.1	0
Automotive products	0.2	0.1	0.3	0.4	0.4	0.9
7812 Motor vehicles for the transport of persons, n.e.s.	0.2	0.1	0.2	0.4	0.2	0.7
Other transport equipment	0.1	1.4	1.4	2.4	2.8	2.3
7852 Cycles not motorized	0	1.3	1.2	1.4	1.4	1.8
Textiles	1.4	1	0.7	0.4	0.4	0.5
Clothing	90.6	90.6	89.7	87.2	81.6	79.8
8442 Suits, ensembles, jackets, dresses, etc.	23.7	21.1	22.7	20.3	20.9	21.5
8453 Jerseys, pullovers, cardigans, etc., knitted/crocheted	26.2	30	25.1	20.9	21.8	16.8
8432 Suits, ensembles, jackets, trousers, etc.	13.5	13.7	14	13.4	13.1	12.7
8454 T-shirts, singlets and other vests, knitted or crocheted	1	0.9	2.4	4.6	5.5	8.1
8448 Underwear, nightwear, etc., knitted/crocheted	6.8	4.9	3.4	4.4	4.4	4.9
8447 Blouses/shirts, women´s/girls´, knitted/crocheted	5.4	6.1	8.5	8	4.5	3.8
8437 Shirts, men boys, knitted or crocheted	4.1	4.5	5.4	4.7	3.5	2.7
8438 Underwear, nightwear, bathrobes, etc.	2.2	1.1	1	2	2	2
8451 Babies' garments and clothing accessories	1.3	1.3	1.3	0.7	1	1.5
8459 Other garments knitted or crocheted	0.9	0.8	0.8	0.8	1	1.2
8456 Swimwear	0.4	0.6	0.9	1.2	1.3	0.9
8452 Garments of fabrics of 657.1, 657.2, 657.32 to 657.34	0.1	0.3	0.5	3.3	0.7	0.7
Other consumer goods	3.5	2.5	3.3	2.9	5.5	6
8514 Other footwear, leather or composition leather uppers	1.4	1.9	2.3	2.2	2.7	3
8515 Other footwear with uppers of textile materials	0	0	0.2	0.4	0.9	1.6
Other	0.6	0.5	0.6	0.4	3	0.1
Gold	0.6	0.5	0.5	0.3	2.6	0

Source: WTO, Secretariat (2011)