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Export-Led Growth in Cambodia: An Empirical Study

Tuck cheong Tang

*Department of Economics, School of Business, Monash
University Sunway campus*

Ravin Chea

National Bank of Cambodia (NBC)

Abstract

The study examines the export-led growth (ELG) hypothesis for Cambodia. The sample covers annual observations between 1972 and 2008. The Granger's non-causality tests support ELG as well as the growth-led exports. Also, there is causality from imports growth to exports growth. The study also presents the results of impulse response functions and variance decomposition. Some policy implications are viewed in the study.

1. Introduction

Cambodia is a transition economy, and she has been classified by UNCTAD (Handbook of Statistics 2009) as one of the low-income developing countries. The country has undergone through different stages of economic reforms during the past two decades from a command economy in the late 1980s to a free market economy. Cambodia has joined the AFTA (ASEAN (Association of Southeast Asian Nations) Free Trade Agreement) with a reduction of tariff rates on imported goods from ASEAN members improving market access in the region. Also, Cambodia is a member of WTO (World Trade Organization) in 2003 with a view of fostering the country's integration into the world economy in order to achieve higher growth, poverty reduction and sustainable development. The country has achieved a remarkable growth of about 10 percent per year for the period 1998-2007. It can be largely contributed by the rapid export growth, in particular, the exports from textile and garment industry, which has dramatically increased from 16 percent of GDP in 1993 to 60 percent of GDP in 2009. Cambodia's traditional export markets are generally comprised of the U.S., the European Union, Singapore, Thailand, and Malaysia. The Cambodia's Trade Integration Strategy was formed in 2007, which has identified 19 products and services (e.g. garments, footwear, rice, cassava, rubber, fish, cashew nuts, silk, soybeans, corn, wood products, light manufacturing, and tourism) that have export potential.¹ In 2004, Cambodia had recorded 79.3% of manufactured imports, 10% for fuel, and 8% for imported foods, while the country was exporting 97% of manufactures with a sustainable economic growth of 10.3%.² It is worthy to note, that the Cambodia's trade policies are based on the export-led growth (ELG) approach - a standard model of development through rapid liberalization and further integration into the global economy. The ELG strategy has considered the need to attract (foreign) investments to the major 'growth poles' such as Phnom Pehn, Siem Reap and Sihanoukville, and in rural areas that may translate into accelerated poverty reduction in the context of overall sector and economy wide poverty reduction strategies.³

The objective of this study is to investigate the causal relationships between exports and economic growth in Cambodia. This study examines the ELG hypothesis. A bulk of empirical studies of ELG is documented in the literature. For example, Giles and Williams (2000a; 2000b) have surveyed more than 150 ELG studies. Their studies have re-examined the ELG hypothesis for Portugal and Canada by employing the methods (cointegration tests) to deal with the "spurious regression" problem from the non-stationarity variables. This study addresses the potential bias of using bivariate framework in ELG study. Mah's (2005) study supports a long-run causality between export and growth for China. As criticized by the ELG literature (Tang, 2006), however, Mah's (2005) bivariate framework may be misspecified. According to Riezman *et al.* (1996), imports variable is important to be included into the ELG framework. The failure to include it [imports] in the test could lead to a biased conclusion as the role of imports is mainly intermediate inputs in exports. For an economy that depends on exports for its growth process, imports are important in restoring external imbalances to its sustainable steady-state path. Tang (2006) has re-examined Mah's (2005) study by adding imports as an additional variable in order to form a trivariate framework for testing the causal relationships between exports and economic growth in China. The study has found no long-run relationships (cointegration) among exports, real GDP and imports, but economic growth

¹ Box 1.6: Export Diversification Strategy: The Case of Cambodia.

http://www.undp.org/content/dam/undp/library/Poverty%20Reduction/Inclusive%20development/Towards%20Human%20Resilience/Towards_SustainingMDGProgress_Chapter1.pdf Accessed: 14 September 2012.

² The figures are taken from the *World Tables*, World Bank.

³ http://www.cdc-crdb.gov.kh/cdc/ngo_statement/trade_policy_62.htm

does Granger-cause imports in the short run for the period 1970-2001. From the ELG literature, no study is available for the case of Cambodia. A relevant study by Tang and Wong (2011) has found a causal relationship between inward FDI, exports and imports of merchandise (as well as services) in Cambodia. The results show that inward FDI not only can promote both merchandise and services exports, but also indicate the presence of backward and forward linkages, which could result in positive externalities. Their study does not examine the ELG hypothesis.

This study contributes to the existing ELG literature by an examination of the causal relationships between exports, imports and growth for a transition economy, Cambodia. Also, the finding of a bilateral causal relationship between exports and growth supports the ELG. It provides an insight to policymakers on the feasibility of ELG based policies.

2. Data and methods

The empirical tests are based on the annual data for the period of 1972-2008. The raw data are obtained from World Tables, World Bank.⁴ The real GDP (Y), real exports (X) and real imports (M) variables are measured in local currency (Riels) in millions.⁵ They were transformed into natural logarithmic form, \ln in analysis. A visual inspection from Figure 1 shows that the variables are co-moving with a rapid growth of exports and imports (goods and services) since 1985. Also, the Cambodian trade account records balance deficits for the sample period 1972-2008. Table 1 presents the augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) unit root tests. The Phillip-Perron (PP) tests suggest that three variables ($\ln Y$, $\ln X$ and $\ln M$) are in first-differenced stationary, or in $I(1)$ process. On the other hand, the Engle-Granger tests suggest the existence of two cointegrating relations.⁶

Given the non-stationarity of the $\ln Y$, $\ln X$ and $\ln M$, the structure of VAR(d) for the Granger's non-causality test is designed with variables in first-differenced. In addition, two dummy variables are taken into account; (1) KHMER (value one for 1975-1979 but value zero for other years) for the Khmer Rouge period (1975-1979) and (2) AFTA (value one for 1999-2008, and value zero otherwise) that captures the effect of Cambodia's entry into the ASEAN Free Trade Area (AFTA) in 1999 that offers substantial potential for the country's integration with international economies (Huot & Kakinaka, 2007). It is to say, for equation (1), the exports growth ($\Delta \ln X$) does Granger-cause economic growth ($\Delta \ln Y$) if the sum of β_l statistically significant. And, the statistical significance of coefficients γ_l reflects causality from imports ($\Delta \ln M$) to growth ($\Delta \ln Y$). Similar interpretations are applied to equations (2) and (3), respectively.

⁴ The quarterly data are available from 2002Q1 to 2007Q4 as obtained from the relevant official databases that such a short sample span is not feasible for the present study.

⁵ The raw data for GDP, exports and imports are obtained from the World Tables, World Bank. The nominal variables are deflated by GDP deflator that is the nominal GDP divided by real GDP then multiplying by 100. The nominal GDP is not available for the period 1975-1986. Hence, the GDP deflator for those periods has been constructed by Purchasing Power Parity (PPP) assumption, $e = p^f/p^d$, where e is nominal exchange rate, and p^f and p^d are foreign and domestic price, respectively. The relevant variables e , p^f and p^d are available from the Penn World Table 6.2. The data including its construction are available from the corresponding author upon request.

⁶ The p -values of tau-statistics for these two relations $\ln M - \ln X - \ln Y$, and $\ln X - \ln M - \ln Y$ are 0.015 and 0.035, respectively. The other relation $\ln Y - \ln M - \ln X$ has a large p -value of the Engle-Granger's tau-statistic, 0.320 suggesting non-cointegration.

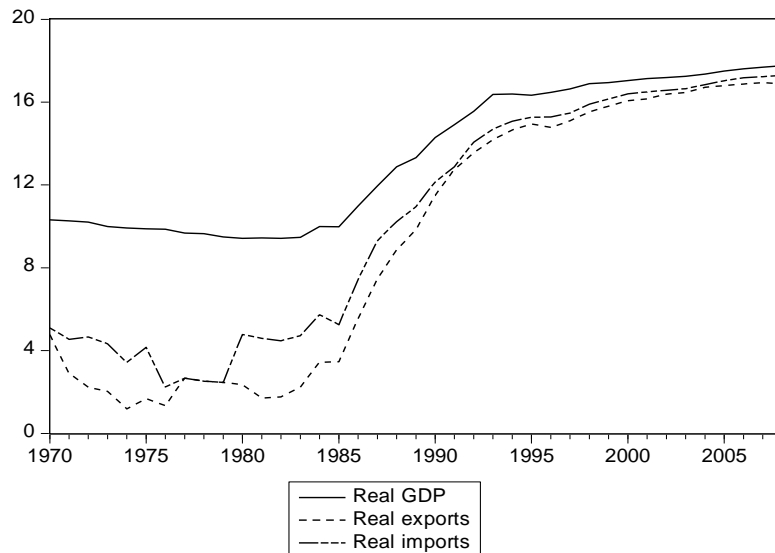


Figure 1 Plots of GDP, exports and imports for the period 1972-2008

Table 1 Unit root tests

	ADF tests	PP tests
$\ln Y$	-2.743 [2] (0.227)	-1.953 [4] (0.607)
$\Delta \ln Y$	-1.750 [1] (0.399)	-2.619* [3] (0.098)
$\ln X$	-2.245 [9] (0.449)	-2.536 [4] (0.310)
$\Delta \ln X$	-4.162*** [0] (0.0024)	-4.151*** [2] (0.003)
$\ln M$	-1.931 [0] (0.619)	-2.138 [4] (0.509)
$\Delta \ln M$	-1.552 [9] (0.493)	-5.706*** [4] (0.000)

Notes: \ln is natural logarithmic form. The unit root equations include a constant and time term for the data in levels, but only constant for the data in first differences. A maximum lag of 9 is considered for ADF tests with Akaike information criterion [·], while the value of [·] in the PP tests is bandwidth Newey-West automatic using Bartlett. ***, ** and * indicate the significance level of 1%, 5% and 10%, respectively.

$$\Delta \ln Y_t = \alpha_0 + \alpha_1 \Delta \ln Y_{t-1} + \dots + \alpha_l \Delta \ln Y_{t-l} + \beta_1 \Delta \ln X_{t-1} + \dots + \beta_l \Delta \ln X_{t-l} + \gamma_1 \Delta \ln M_{t-1} + \dots + \gamma_l \Delta \ln M_{t-l} + \theta_1 \text{KHMER} + \theta_2 \text{AFTA} + \varepsilon_t \quad (1)$$

$$\Delta \ln X_t = \alpha_0 + \alpha_1 \Delta \ln Y_{t-1} + \dots + \alpha_l \Delta \ln Y_{t-l} + \beta_1 \Delta \ln X_{t-1} + \dots + \beta_l \Delta \ln X_{t-l} + \gamma_1 \Delta \ln M_{t-1} + \dots + \gamma_l \Delta \ln M_{t-l} + \theta_1 \text{KHMER} + \theta_2 \text{AFTA} + \epsilon_t \quad (2)$$

$$\Delta \ln M_t = \alpha_0 + \alpha_1 \Delta \ln Y_{t-1} + \dots + \alpha_l \Delta \ln Y_{t-l} + \beta_1 \Delta \ln X_{t-1} + \dots + \beta_l \Delta \ln X_{t-l} + \gamma_1 \Delta \ln M_{t-1} + \dots + \gamma_l \Delta \ln M_{t-l} + \theta_1 \text{KHMER} + \theta_2 \text{AFTA} + \delta_t \quad (3)$$

3. Empirical Results

The final prediction error, Akaike information criterion, Schwarz information criterion and Hannan-Quinn information criterion are all consistently suggested one lag or VAR(1) from a maximum lag of 3 (years). The estimated parameters of equations (1)-(3) are reported in Table 2. Figure 2 shows the directions of (short-run) causality among exports, imports and economic growth. Bilateral causal relationship is found between exports and economic growth. Hence, the export-led growth hypothesis is supported by Cambodia's data as well as the growth-led exports. The empirical results also provide evidence of causality from imports to exports, but in a negative sign – demand for imports depresses the exports (in the short-run). The estimated long-run import-elasticity to exports is 0.43 that 1% increase in imports, Cambodia's exports will be at an additional roughly 0.43%.⁷ Cambodia's exports are partially manufactured by imported inputs such as raw materials, intermediate goods, and physical and human capitals. The empirical results show no (short-run) causality from the growth of exports to imports (Equation 3, Table 2). But, its [export] elasticity to imports is 0.68; a rise in exports increases imports by 0.68% in the long-run (see footnote 7). This finding reflects that Cambodia is dependent on imported inputs for producing exports - exports will drive imports.

Table 2 VAR – Trivariate framework VAR(1)

	Equation (1) ($\Delta \ln Y_t$)	Equation (2) ($\Delta \ln X_t$)	Equation (3) ($\Delta \ln M_t$)
$\Delta \ln M_{t-1}$	-0.047 (0.584)	-0.549*** (0.002)	-0.480** (0.046)
$\Delta \ln X_{t-1}$	0.190* (0.063)	0.497** (0.015)	0.351 (0.202)
$\Delta \ln Y_{t-1}$	0.297 (0.151)	0.987** (0.017)	0.530 (0.342)
KHMER	-0.273* (0.079)	-0.225 (0.447)	-0.876** (0.04)
AFTA	-0.143 (0.177)	-0.263 (0.202)	-0.406 (0.161)
Constant	0.172** (0.022)	0.299** (0.039)	0.508** (0.014)
R-squared	0.536	0.548	0.289
F-statistic	7.153 (0.000)	7.505 (0.000)	2.516 (0.05)

Notes: (.) denotes the p -value. ***, ** and * indicate the significance level of 1%, 5% and 10%, respectively.

Figure 3 is about the graphical presentation of the impulse response analysis of VAR(1). The first panel shows the response of import growth rate to a unit impulse in its own growth rate, exports and economic growth. The import growth respond quickly (negatively) to its own shock, but positively to a shock in exports or economic growth until 2 years then returning to equilibrium in year 3. A shock of imports has a negative impact on export growth rate until 2 years, then a positive response from 2 – 3 years. The economic growth responses negatively to a shock of exports, imports and its own shock (the last panel) approaching the equilibrium.

The results of variance decomposition analysis are presented in Table 3. The import growth is almost 90% explained by its own. But, the import growth rate explains 28% of export growth in the years, but around 8% of export growth by the unanticipated change in the Cambodian economic growth. The growth is mainly contributed by the unanticipated change in exports (44%), its own growth (31%) and imports (25%) over the periods.

⁷ The OLS estimated long-run relations of exports and imports are $\ln X_t = -10.5 + 0.43 \ln M_t + 1.14 \ln Y_t + \varepsilon_t$, and $\ln M_t = -1.41 + 0.68 \ln X_t + 0.40 \ln Y_t + \varepsilon_t$, respectively. Most of the estimated parameters are statistically significance at 10% level.

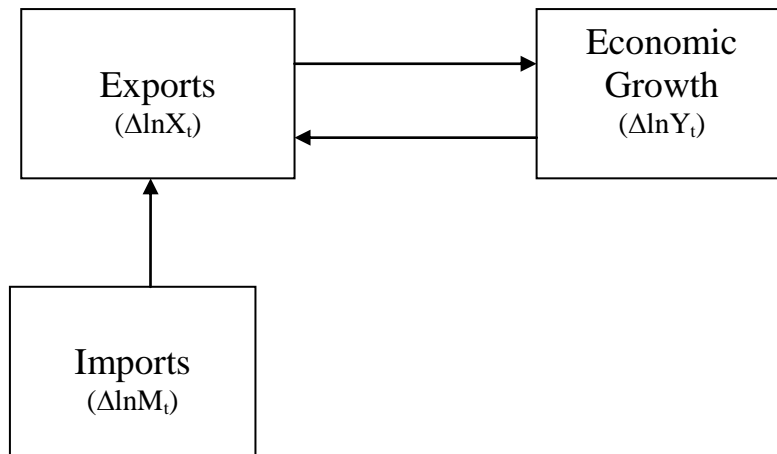


Figure 2 Short-run causality between exports, imports, and economic growth

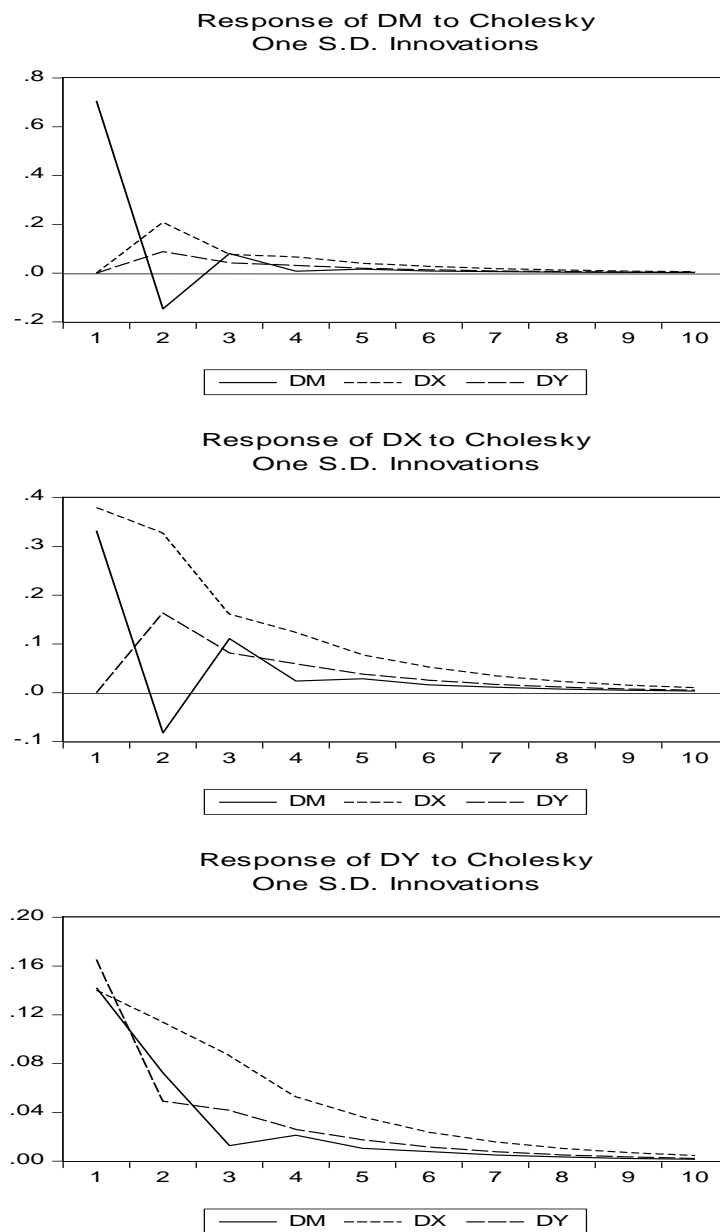


Figure 3 Impulse response functions from trivariate VAR(1)
 Notes: DM = ΔlnM, DX = ΔlnX, and DY = ΔlnY

Table 3 Variance decomposition of exports, imports and economic growth

Variance Decomposition of $\Delta \ln M$:				
Period	S.E.	$\Delta \ln M$	$\Delta \ln X$	$\Delta \ln Y$
1	0.706	100.0	0.0	0.0
2	0.755	91.1	7.6	1.3
3	0.764	90.0	8.4	1.6
4	0.768	89.2	9.0	1.8
5	0.769	89.0	9.2	1.8
6	0.770	88.8	9.4	1.8
7	0.770	88.8	9.4	1.8
8	0.770	88.7	9.4	1.9
9	0.770	88.7	9.4	1.9
10	0.770	88.7	9.4	1.9
Variance Decomposition of $\Delta \ln X$:				
1	0.504	43.4	56.6	0.0
2	0.628	29.7	63.6	6.7
3	0.663	29.4	63.0	7.6
4	0.677	28.3	63.7	8.0
5	0.683	28.0	63.8	8.2
6	0.686	27.8	63.9	8.3
7	0.687	27.8	63.9	8.3
8	0.687	27.8	63.9	8.3
9	0.688	27.7	64.0	8.3
10	0.688	27.7	64.0	8.3
Variance Decomposition of $\Delta \ln Y$:				
1	0.259	30.1	29.2	40.7
2	0.296	29.0	37.1	33.9
3	0.312	26.4	41.2	32.4
4	0.318	25.8	42.4	31.8
5	0.321	25.5	43.0	31.5
6	0.322	25.3	43.2	31.5
7	0.322	25.3	43.3	31.4
8	0.322	25.3	43.3	31.4
9	0.322	25.2	43.4	31.4
10	0.322	25.2	43.4	31.4

Notes: Cholesky Ordering: $\Delta \ln M$ $\Delta \ln X$ $\Delta \ln Y$ Standard Errors: Monte Carlo (100 repetitions)

4. Concluding Remarks

This study provides an empirical support of bilateral causal relationship between exports and growth in Cambodia, supporting both ELG and growth-led exports (GLE) hypotheses. Also, the causality is found from imports growth to exports growth. From the policy's view, a sustainable export promotion approach should be considered with the relevant trade policies on imports, in particular imported inputs for producing more output for global market. The support of GLE hypothesis suggests that export oriented policy is important in making Cambodia growth and economic prosperity.

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