How International Trade and Government Integrity Affect the Structural Transformation of Lao PDR and Cambodia

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Abstract:

This paper explores the how international trade and government integrity affect the structural transformation of Lao PDR and Cambodia. This empirical study is conducted by using the methodology based on Chenery-Syrquin model with several control groups that have impacted on structural transformation in Lao PDR and Cambodia. Moreover, the obtained data is from 1993 to 2021 to find out how these two countries transform from being agriculture dominant economy to being more industry-and services-oriented economy. This study has confirmed non-linear effects of both income and population on the sectoral shares and found that trade has facilitated structural transformation in Lao PDR but that didn't happen in Cambodia. The political corruption index affected the sectional sectors in different ways in Lao PDR and Cambodia, but the results are not statistically significant.

JEL Classification: F14, F62, F63, F43, H11
Keywords: Trade, Role of Government, Economic Development, Economic impacts of globalization

1.0 INTRODUCTION

The transformation of economics is long running interest topic for scientists focused on the development economics. As the previous study (Hnatkovska and Lahiri, 2014), the structural transformation of economics is closely related to the process of development. The process of structural transformation is characterized by systematic changes in the reallocation of economic productive factors, which shift from the primarily agricultural activities to the industrial and service sectors (Restuccia,2011). By shifting the productive factors towards to export, international trade is a force in expediting the structural transformation (Federico and Tena-Janguito, 2019). Additionally, the governance and political system play an important role in long-term economic growth. The governance performance, such as corruption and lack of regulation, would bring uncertainty into economic relationships and lead to economic inefficiency (Derviş, 2016).

There are many similarities between Lao PDR and Cambodia. For example, there are some similar characteristics of the political socio-cultures for these two countries. The similar political structure, described by Oliver Wolters as Mandala, is as circles of power forming part more encompassing circles of power. According to Boike Rehbein (2005), Mandala still has a deep influence in the political structure in these areas. For both countries, patrimonial is the primary characteristic of the political culture. However, there are also differences between two countries. Compared to Lao PDR, Cambodia has a bigger population, which means the larger number of labors and higher population density. Additionally, Cambodia is less mountainous with the access to ocean, whereas Lao PDR has none. Within this ambient, this paper is going to explore the relationship among trade openness, structural change and government integrity for Lao PDR and Cambodia.

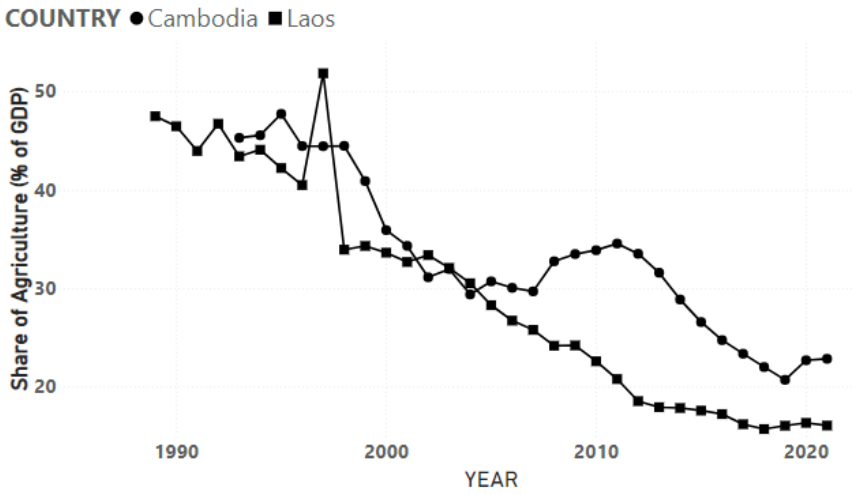
This paper is structured as follows: Section 2 gives the brief trend and stylized facts. Section 3 gives the brief literature review. Section 4 gives data sources and an extensive discussion for the empirical methodology based on Chenery-Syrquin model. The panel diagnostic tests and estimation results are in Section 5 while the Section 6 concludes the paper with economic and political thoughts.

2.0 TREND AND SYLIZED FACTS

This section outlines some stylized facts on the structural transformation of Lao PDR and Cambodia, which includes the changing structure of production, and to what extent the economic composition of these two countries has shifted towards the industrial and service sectors over time.

In general, Figure 1 illustrates that the share of agriculture has declined over time for both countries. For Cambodia, the share of agriculture experienced a slightly increase from 1993 to 1995 then generally declined with some fluctuations. It continued to decline until 2019 reaching the lowest point of 20.712%. From 2019 to 2021, the share of agriculture increased slightly, but still remained below 25%. For Lao PDR, the share of agriculture experienced a gradually decrease from 1990 to 1995 then increased again with a peak of 51.853% in 1997. It continued to decline until 2018 reaching the lowest point of 15.709%. From 2019 to 2021, the share of agriculture increased slightly, but still remained below 17%. Overall, the share of agriculture in Lao PDR and Cambodia has been declining since the early 1990s, with some fluctuations along the way. Additionally, the share of agriculture for both countries experienced a slightly increase after 2019.

Figure1: Share of agriculture as percentage of GDP

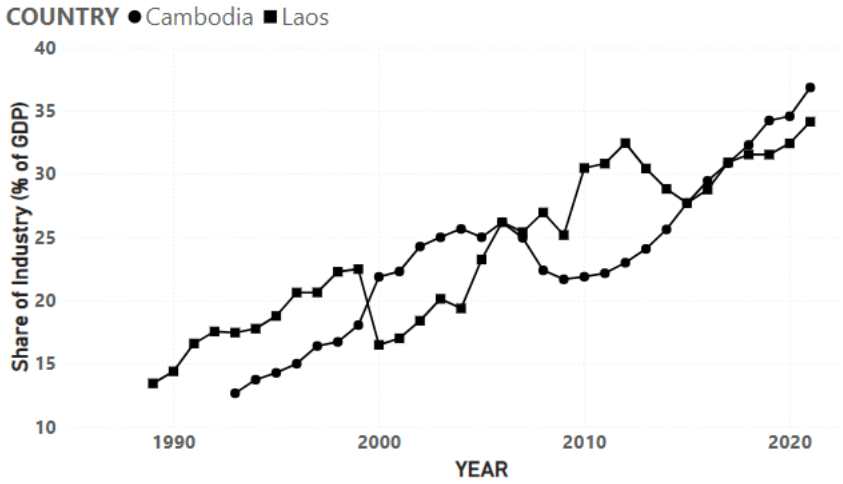


Source: Author's calculation; data collected from World Development Indicators, World Bank.

Figure 2 shows a general increasing trend in the share of industry in both countries from 1993 to 2021 with some fluctuations. For Cambodia, the share of industry only accounted for 12.646% of the economy in 1993, which had risen to 36.835% by 2021. However, it's also noted that there is a slight decrease in 2007 which is followed by a sharp drop in 2008 and 2009. For

Lao PDR, there is a general increasing trend over the past few decades. The share of industry increased to a peak of 32.437% in 2012, but there is sharp drop to from 2012 to 2014 then recovered to 34.130% in 2021.

Figure2: Share of industry as percentage of GDP

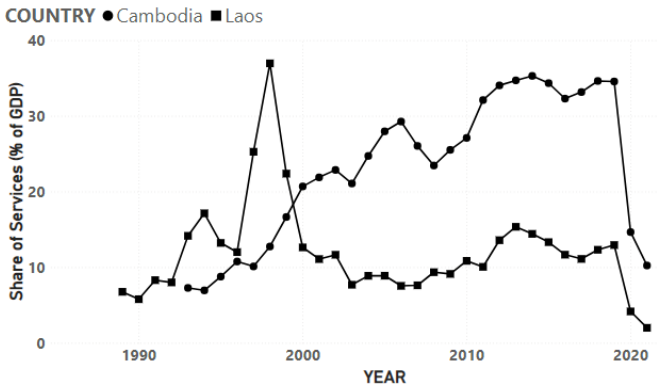


Source: Author's calculation; data collected from World Development Indicators, World Bank.

Figure 3 shows both countries have experienced significant changes in the share of services in their economies over the past few decades, with an upward trend in Cambodia before 2019 and fluctuating trend for Lao PDR.

For Cambodia, the total trend for share of services was increasing from 1993 to 2019 but experienced a slight decline from 2007 to 2008 and a sharp decline in 2020 and 2021. It increased from 7.3% in 1993 to a 34.0% in 2012, then keep stable around 34% until 2019. However, it dropped sharply to 14.7% in 2020, and keep decreasing to 10.2% in 2021. For Lao PDR, it shows a fluctuating trend in the share of services in the past decades. There is a clear upward trend from before 1998 but dropped sharply in 1999 and remained relatively stable at a lower level until 2008. From 2008 to 2019, it shows a gradual increase trend with some fluctuations, but dropped sharply again in 2020 and 2021.

Figure3: Share of services as percentage of GDP



Source: Author's calculation; data collected from World Development Indicators, World Bank.

3.0 LITERATURE REVIEW

Traditional explanations of the structural transformation based on one or both of two mechanisms (Chenery and Srinivasan, 1988): (i) the income elasticity of demand for agriculture products is less than one and (ii) faster total factor productivity growth in agriculture sector relative to other sectors in the economy. The first mechanism implies that as the economy grows, the demand for farm goods decreased, consequently, the labor working for agriculture declines. The second mechanism implies that fewer labor force is needed to produce the same amount of farm goods.

Duarte and Restuccia (2010) investigated the structural transformation through reallocation of labor across countries, which implied the first mechanism: the demand for farm goods would decrease as the economy grows up. For countries featuring low productivity in all sectors, they found that a big share of labor was allocated to agriculture while a small share of labor was allocated to services and industries. With positive productivity growth in all sectors, labor would be reallocated away from agriculture toward industry and services. According to another research published in 2006, Duarte and Restuccia found the structural transformation helped the GDP growth in Portugal from 1956 to 1995. During this period, a bigger share of labor was allocated to industry, and in turn, the smaller share of labor was allocated to agriculture and services sectors.

Caselli and Coleman investigated the U.S. Structural Transformation and Regional Convergence, which implied the second mechanism: structural transformation is caused by a faster productivity growth in agriculture sector. Due to the declining education/training costs, an

increasing proportion of the labor force is shifting away from the (unskilled) agriculture sector and toward the (skilled) non-agricultural sector.

According to United Nations Department of Economic and Social Affairs in 2017, international trade always played a role in supporting the economic growth and poverty alleviation in many nations. In some countries, the economy relied on export-led growth to accelerate structural transformations toward industrial and services factors. Spatafora et al. also mentioned the importance of international trade in stimulating the development of the service sector as percentage of GDP. In 2007, the cross-border service exports have been recorded amounted to $3.3 trillion, as 20% of the total trade globally.

Generally, the empirical research focusing on the effectiveness of international trade on structural transformation are based on two frameworks: (i) non-homothetic preferences, and (ii) asymmetric sectoral productivity growth. The first framework, non-homothetic preferences, is a demand-side mechanism emphasized that the consumption basket would shift towards to manufactured goods from the agricultural products as the countries become richer. The second framework, Baumol effect (also called asymmetric sectoral productivity growth), is a supply-side mechanism emphasized that the share of agriculture, industry, and services would change overtime.

Through the demand-side mechanism, Erten and Leight (2021) studied how exports surge in China led to the structural changes after joining the WTO. As the uncertainty of tariff had decreased, the surge in manufactured product exports boost the economic growth which led to a structural transformation.

Through the supply-side mechanism, McCaig and Pavcnik (2018) studied the re-allocation of productive factors between informal and formal enterprises under the manufacturing sector in Vietnam after the 2001 US-Vietnam Bilateral Trade Agreement. They found that the proportion of labor working in informal household enterprises decreased significantly compared to formal enterprises. As productivity increased due to international trade, McCaig and Pavcnik documented how the productive factors were re-allocated within industry sector in Vietnam.

Although there is no direct evidence showing how government performance and integrity affect the structural transformation, it is widely recognized that they have significant effects on the economic development. According to J. Liu et al. in 2018, good governance performance

would bring a significant positive effect on developing the economy. Additionally, good governance is also regarded as playing a role in reducing risk for investors and attracting foreign direct investment. Mengistu and Adhikary (2011) investigates how governance affect the foreign direct investment (FDI) inflows in 15 Asian countries from 1996 to 2007. They found that six components of good governance, including control of corruption, are the key determinants of FDI inflows.

4.0 DATA AND EMPIRICAL METHODOLOGY

4.1 Data

Time series data on most of the economic factors, GDP per capita (current $US), and share of agriculture, industry and services as percentage of GDP, is from the World Development Indicators (WDI) 2022. The population data is from U.S. Census Bureau. Data on Foreign direct investment inflows ($US millions) are sourced from UN Conference on Trade and Development. Data on government integrity is expressed as political corruption index (0-1, higher is more corrupt) using a model estimated method from V-Dem Institute. The data period for Cambodia is from 1992 to 2021 and for Lao PDR is it is from 1989 to 2021. The summary statistics of each country is given in the following Table 1 and Table 2. The Table 1 reveals highest volatility in share of services and lowest volatility in share of industry in Cambodia. The Table 2 reveals highest volatility in share of agriculture and lowest volatility in share of industry in Lao PDR.

Table 1. Summary Statistics of Variables for Cambodia

Variable	N	Mean	Std. dev.	Min	Max
Share of agriculture	29	33.023	7.885	20.712	47.725
Share of industry	29	23.741	6.360	12.646	36.835
Share of services	29	23.236	9.613	6.953	35.291
Ln (GDP per capita)	29	6.418	0.663	5.511	7.421
Ln (GDP per capita) ^2	29	41.612	8.571	30.369	55.077
Ln (POPULATION)	29	16.428	0.123	16.188	16.621
Ln (POPULATION) ^2	29	269.908	4.046	262.037	276.245
Ln (FDI inflows)	29	6.382	1.375	3.991	8.206
Polit. corruption index	29	0.894	0.011	0.863	0.899

Table 2. Summary Statistics of Variables for Lao PDR

Variable	N	Mean	Std. dev.	Min	Max
Share of agriculture	33	29.678	11.436	15.709	51.853
Share of industry	33	23.941	6.187	13.428	34.130
Share of services	33	12.009	6.416	2.004	36.948
Ln (GDP per capita)	33	6.507	0.933	5.137	7.863
Ln (GDP per capita) ^2	33	43.181	12.391	26.393	61.822
Ln (POPULATION)	33	15.572	0.183	15.225	15.850
Ln (POPULATION)^2	33	242.505	5.691	231.798	251.211
Ln (FDI inflows)	33	4.712	1.871	1.386	7.430
Polit. corruption index	33	0.763	0.008	0.733	0.770

4.2 Empirical Model

The model for this study is adopted from the principal specification of Chenery and Syrquin (1975) and Syrquin and Chenery (1989) for structural transformation:

$$\ln Xit = \beta 0 + \beta 1(\ln Yit) + \beta 3(\ln Nit) + \varepsilon it, \quad (1)$$

where, the variable Xit represents the shares of different sectors, namely agriculture, industry, and services as percentage of GDP of country i at time t. Yit denotes the per capita GDP of country i at time t, which reflects the income level. Nit represents the population of country i at time t. The equation (1) aims to demonstrate that output share of each sector is influenced by both per capita income and size of the population.

Chenery and Taylor (1968) introduced a quadratic term in their model as it was evident that diminishing income elasticities would be observed with increasing income levels. Later, Chenery and Syrquin (1989) adopted a more general specification to capture the non-linear effects of both income and population. That specification is presented below:

$$Xit = \beta 0 + \beta 1(\ln Yit) + \beta 2(\ln Yit)2 + \beta 3(\ln Nit) + \beta 4(\ln Nit)2 + \varepsilon it, \quad (2)$$

In order to determine how international trade and government integrity affect the structure transformation, variable capturing FDI inflows and political corruption index are added into Equation (3):

$$Xit = \beta 0 + \beta 1\ (\ln Yit) + \beta 2(\ln Yit)^2 + \beta 3\ (\ln Nit) + \beta 4(\ln Nit)^2 + \beta 5(\ln FDIi) + \beta 6(Government\ Integrityi) + \varepsilon it, \quad (3)$$

5.0 EMPIRICAL RESULTS

The regression results are given in Table 3 and Table 4.

Table 3. Regression Results for Cambodia

	Share of Agriculture	Share of Industry	Share of Services
Ln (GDP per capita)	21.51 (0.46)	-15.93 (-0.49)*	212.3* (-2.49)
Ln (GDP per capita) ^2	-1.924 (-0.47)	0.706 (0.25)	20.56** (2.82)
Ln (POPULATION)	-1253.7 (-0.34)	-3216.4 (-1.26)	33437.6*** (5.04)
Ln (POPULATION)^2	35.33 (0.31)	101.4 (1.29)	-1023.6*** (-5.04)
Ln (FDI inflows)	5.077*** (3.82)	-2.708** (-2.94)	-5.213* (-2.18)
Polit. corruption index	24.86 (0.54)	10.17 (0.32)	-74.85 (-0.91)
Constant	10980.8 (0.37)	25587.3 (1.23)	-272409.8*** (-5.06)
Observations	29	29	29
Adjusted R-squared	0.919	0.940	0.822
F-statistic	53.62	73.82	22.58
Prob. F-statistic	0.0000	0.0000	0.0000
RMSE	2.2506	1.5608	4.0532

Note: t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001

The results showed in Table 3 pointed some interesting insights on the factors affecting structural transformation in Cambodia.

Considering the positive relationship between share of agriculture and GDP per capita, as the share of agriculture in a country's economy increases, GDP per capita tends to increase but at a decreasing rate. Since share of agriculture is negatively related to GDP per capita square, the growth in the share of agriculture tends to slow down as the GDP per capita increases. Conversely, as the share of industry in a country's economy increases, GDP per capita tends to decrease but the decreasing trend would slow down as GDP per capita further increases. The table also suggests that the relationship between the share of agriculture/industry/services and GDP per capita is not linear but characterized by a non-linear U-shaped relationship. For share of services, it is both positively related to GDP per capita and GDP per capita square, which means

the positive relationship between the share of services and GDP per capita would strengthen as GDP per capita increases.

While the share of agriculture and industry are negative related to Population but positive related to the Population square. That means the share of agriculture and industry in Cambodia tends to decrease as the population of a country increases, in other words, the economic growth may be associated with a larger share of agriculture/industry with a low level of population while the it may be associated with a larger share of services with higher level of population. For share of services, it is positively related to Population but negatively related to Population square, which means the share of services in Cambodia tends to increase as the population of a country increases. Due to negative coefficient on the Population square term, the relationship between the share of services and population is not linear but an inverted U-shaped relationship, which means the positive relationship would weaken as the population increases beyond a certain threshold. It indicates that there may be increased competition for resources and labor with a very high level of population, which makes the service sector fail to continue to grow at the same rate.

As far as the role of trade is concerned, it notes that the FDI inflows has statistically significant effect on shares of agriculture, industry, and services. While trade has positive impact on agricultural share, it has negative impact on industrial and services sector in Cambodia. This means that trade tends to benefit the agricultural sector more than industrial and services sectors. Despite the impact of FDI inflows, the agricultural sector remains an important part of Cambodia's economy. Hence, it infers that the overall agricultural orientation is still existing in Cambodia.

Concerning the role of political corruption, it notes that the political corruption index is positive related to the share of agriculture/industry while it is negative related to the share of services. It means that as the level of political corruption in Cambodia increases, the share of services would decrease while the share of agriculture/industry would increase. Since the significance level of political corruption index coefficients are not starred, they aren’t statistically significant.

To promote the growth of the service sector in Cambodia, government could accomplish that through providing necessary infrastructure, financial incentives, and implement anti-corruption measures to reduce the level of political corruption. As agricultural orientation is still

existing in Cambodia, the government could implement policies to promote sustainable agriculture practices, such as investing in agricultural technologies to increase productivity and encouraging the use of renewable energy sources in agricultural activities.

Table 4. Regression Results for Lao PDR

	Share of Agriculture	Share of Industry	Share of Services
Ln (GDP per capita)	-39.77	29.12	-231.5***
	（-1.14）	(1.25)	(-5.20)
Ln (GDP per capita) ^2	3.528	-2.240	18.01***
	(1.17)	(-1.12)	(4.69)
Ln (POPULATION)	4464.7	-1622.3	12933.1**
	(1.43)	(-0.78)	(3.26)
Ln (POPULATION)^2	-146.6	52.89	-417.8**
	(-1.45)	(0.79)	(-3.25)
Ln (FDI inflows)	0.114	1.214	2.978*
	(0.11)	(1.84)	(2.35)
Polit. corruption index	-286.0*	16.85	-65.72
	(-2.08)	(0.18)	(-0.38)
Constant	-33613.2	12348.7	-99298.1**
	(-1.41)	(0.78)	(-3.27)
Observations	33	33	33
Adjusted R-squared	0.931	0.896	0.644
F-statistic	72.61	46.77	10.66
Prob. F-statistic	0.0000	0.0000	0.0000
RMSE	3.0106	1.9985	3.8271

Note: t statistics in parentheses, * p<0.05, ** p<0.01, *** p<0.001

Table 4 also presents some intriguing findings on the factors affecting structural transformation in Lao PDR.

The negative relationship between the share of agriculture/services and GDP per capita indicates that as the GDP per capita increases, the share of agriculture/services in the economy tends to decrease but the decreasing trend would slow down as GDP per capita further increases due to the positive relationship with GDP per capita squared. On the other hand, the positive relationship between share of industry and GDP per capita means that the share of industry tends to increase as GDP per capita increases, but the increasing trend would slow down as GDP per capita further increases due to the negative relationship with GDP per capita squared. This table

also suggests a U-shaped relationship between the share of agriculture/industry/services and GDP per capita in Lao PDR.

The share of industry is negative related to Population but positive related to the Population Square. That means the share of industry in Lao PDR tends to decrease as the population increases, in other words, the economic growth may be associated with a larger share of industry with a low level of population while the it may be associated with a larger share of agriculture/services with higher level of population. For share of agriculture/services in Lao PDR, it is positively related to Population but negatively related to Population Square, which means the share of agriculture/services in Cambodia tend to increase as the population of a country increases but the positive relationship would weaken as the population increases beyond a certain threshold.

As far as the role of trade is concerned, it notes that the FDI inflows only has significant effect on shares of industry and services since the share of agriculture increase 0.11% as FDI inflows increase 1%. Compared to agriculture, FDI has a greater impact on industry and services while it benefits the services sector more than industry sector. Despite the impact of FDI inflows, it infers that an industry/services orientation has been happening in Lao PDR.

Concerning the role of political corruption, it notes that the political corruption index is positive related to the share of industry while it is negative related to the share of agriculture/services. It means that as the level of political corruption in Cambodia increases, the share of agriculture/services would decrease while the share of industry would increase.

Since Lao PDR are benefiting from foreign investment in increasing the share of industry/services, the government could keep attracting FDI by creating a more business-friendly environment, providing tax breaks, and offering financial incentives to attract the foreign investors. It also indicates that the government corruption is hindering the growth of the agriculture and services sectors. Hence, the government could increase transparency and strengthen legal frameworks to tackle this issue.

The study assumes that the relationship between all dependent and independent variables is homogeneous across all regions in Cambodia and Lao PDR. For some variables, they are not statistically significant. Additionally, the tables didn’t account for potential interactions or non-linear relationships between the variables. There may also be multicollinearity issues between the independent variables, which can affect the reliability of the coefficients and p-values.

5.0 CONCLUSION

The structural transformation is a key characteristic of economic development. The primary aim of this paper is to examine if trade and government integrity plays a role in the process structural transformation in Lao PDR and Cambodia.

Data suggests that the share of agriculture of both countries has experienced a decline with some fluctuations along the way from 1990s to 2021. For the share of industry, it showed an increasing trend with some fluctuations in both countries, but there is a sharp drop from 2008 to 2009 in Cambodia and from 2012 to 2014 in Lao PDR. For the share of services, there is an increasing trend for Cambodia and a fluctuating trend for Lao PDR.

In order to assess to role of trade and government integrity in structural transformation of Lao PDR and Cambodia, this paper used the Chenery-Syrquin model to estimate how different factors affect the structural transformation. In summary, the main findings are as follows: First, this study confirmed non-linear effects of both income and population on the sectoral shares. Secondly, the results support that trade has facilitated structural transformation in Lao PDR but that didn't happen in Cambodia. Remaining protective of the agriculture sectors could be a reason to explain the phenomenon happened in Cambodia. Thirdly, the political corruption index is only negatively related to share of services in Cambodia and only negatively related to share of agriculture/services in Lao PDR. Additionally, the coefficients for the political corruption index are not statistically significant.

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