Doctor Program in Economics and Business Administration
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THE EFFECTS OF FDI ON ECONOMIC GROWTH AND INEQUALITY IN LAOS

by

VANTHANA NOLINTHA

A dissertation submitted in partial fulfillment of the requirement for the degree of

Doctor of Philosophy in Economics

Supervisor: Prof. Lau Sim Yee

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DECLARATION

I hereby declare that this dissertation is the result of my own investigations, except for the citation and quoted summaries from references, which have been duly acknowledged.

29 October 2014

VANTHANA NOLINTHA

Abstract

The Laotian economy has grown rapidly in the last two decades. Laos's remarkable economic performance has been essentially driven by the boom in the natural resource sector. However, there are increasing concerns about sustainability, inclusiveness and the distribution of benefits of growth in Laos. In view of the above problems, this dissertation aims to examine the impact of the inflows of FDI on Laotian economy. More specifically, the empirical inquiry of this dissertation covers the following three questions. First, how the FDI inflows into the natural resource sector has contributed to the economic growth in Laos. Second, how the linkage of the garment industry, which is the leading FDI driven manufacturing industry in Laos, with the global production network has affected firms' performance. Third, how inequality in Laos has changed and its relationship with FDI inflows.

The analytical result substantiated that Laos has gained from the inflow of FDI through capital accumulation and economic growth. In addition, high inflation and real effective exchange rate appreciation have caused a negative effect on growth in Laos, implying the important role of macroeconomic stability.

The case study of Laotian garment industry verified industry-level evidences of the role of FDI in Laotian economy. Although the competitiveness of garment industry has indeed declined, garment firms in Laos have been upgrading their technological capabilities to a certain extent. FDI is an important source of technology and human resource development supports for local subsidiaries whereas local firms rely on their foreign buyers and suppliers to provide the technological supports. However, participation in the global production network alone does not always come with technological transfer. Ownership type and regional linkage

are not significant in explaining Laotian garment firms' technological capabilities. Export intensities and the quality of host institutions are found to be important for firms' technological improvement.

The empirical analysis on the change in inequality in Laos and the link between widening the disparity and increase in FDI has derived several important findings. First, based on many inequality indicators the study found that inequality in Laos has increased between 2007/08 and 2002/03 when there was a large inflow of FDI into the natural resource sector. Asset inequality increased at a more rapid pace compared with the conventional consumption inequality. Second, inequality decomposition found that consumption inequality was largely contributed from with-in growth disparity while the major sources of asset inequality is between-group inequality. These empirical evidences suggest that Laos requires different type of policy in order to respond to these different types of inequality. Third, urban-rural disparity become smaller in consumption expenditure but wider in asset. Using growth incidence curve analysis, the presence of urban poverty problem is found in Laos. Fourth, inequality has a negative impact on poverty in Laos. Finally, the rise in inequality in Laos was influenced by the inflow of FDI. The areas with higher FDI inflows are found to have higher inequality in consumption expenditure and in asset. This is due to the unevenness in the distribution of FDI across sectors and regions. Therefore, the gains from FDI are not distributed equally across regions and sectors.

The analytical results and related discussions in this study have several policy recommendations for the policy making community in Laos. Laos needs to diversify FDI inflows into non-resource sector and promotes more even distribution of FDI across regions. In the short-term, the policy should aim at minimizing the risk associated with natural-resource-

sector-oriented economic growth while in the middle term, the Laotian government will have to put in place a policy framework that encompasses incentives for a higher level of employment generation and a viable strategy for industrial transformation to a higher value added and a higher technology-intensive, export-oriented manufacturing sector. In the long term, the policy should aim at transforming the Laotian economy from a natural-resource-based economy to a more sustainable one. In order to correct inequality in consumption expenditure, region-specific measures should be implemented to rectify inequality among people residing in the same area whereas broad-based policy measures are needed to rectify inequality in assets.

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Chapter 1 Introduction

1. Background

After becoming independent in 1975, Lao PDR (Laos hereafter) adopted a centrally planned economic system. Under this economic system, the main objective of the government then was to rebuild and reconstruct the Laotian economy from the war ruins. The government implemented all the key economic decisions on what and how much to produce, how much to sell, and thus how inputs and outputs should be allocated in the economy. Economic development was promoted in tandem with the application of the three revolutions, viz., the production relation revolution, the science and technology revolution, and the ideological and cultural revolution. Under the catch-up phrase of the production relation revolution, collectivization of agriculture production and formation of large industrial groups of state-owned enterprises were implemented in 1978.

Under the centrally planned economic system, Laotian economy faced a variety of problems. The transfer of new technology from abroad was limited and aid was at a low level as there were only a few donors, such as the former Soviet Union and Vietnam. Collective farms were inefficient and unsuccessful, while only a few small, industrial units were acceptable in the application of the production relation revolution (Arshad 2003). Heavy reliance on aid from the former Soviet Union and Vietnam had limited the financing capacity of government. Consequently, the government's expenditures were supported by printing

money, which in turn aggravated the inflation rate. Wages had also failed to keep up with the soaring inflation.

In order to respond to the challenges and difficulties faced by the Laotian economy together with the repercussion of the unsuccessful collectivization of agriculture, the Laotian government decided to take corrective measures by placing more emphasis on market-based incentives in production. This initiative was evident in the seventh resolution of the Lao Revolutionary Party in 1979, which outlined its emphasis on both socialist and capitalist aspects of economic growth. As a result, economic activities on agricultural production, livestock, forestry, and profitable hydropower were increased. These measures allowed the government to improve the management of expenditures and revenues, facilitating stabilization of the financial and monetary situation. Subsequently, the seventh Party Congress decided to undertake a more comprehensive reform, known as "the New Economic Mechanism" (NEM hereafter) in 1986. This decision marked the beginning of the transition from a planned economic system to a market-based system. The Laotian government started the systematic transformation with the guarantee of free participation by private enterprises in production and distribution. Several other major reforms, like price liberalization, agriculture reform, state-owned enterprises reform, banking and financial sector reform, fiscal reform, trade reform, foreign investment policy reform, and legal and institution frameworks reform, were also included into NEM. Since then, the Laotian economy has strengthened its integration with the regional and global economy.[1]

[1] Detailed discussions on the integration of Laotian economy and its impact on local industries are provided in Chapter 4 of this dissertation.

Laotian economy has grown impressively since the introduction of the reform package based on market principles in 1986. Gross domestic product (GDP) grew at an average annual rate of 6.5% between 1991 and 1995. The growth rate slowed down in the late 1990s due to negative influence from the Asian Financial Crisis in 1997 and 1998. However, the economy recuperated after the negative effect of the crisis diminished in the early 2000s. The growth was most significant in the industry sector, followed by the service and agriculture sectors, respectively. For instance, the average annual growth rate from 2003 to 2013 was 12.2% for the industry sector, 8.3% for the service sector, and 3.3% for the agriculture sector. As a result, the shares of the industry sector and the service sector have expanded from 19.7% and 35.6% in 2003 to 28.1% and 38.9%, respectively, in 2013. The share of the agriculture, on the other hand, has contracted from 39.1% in 2003 to 25.2% in 2013. Expansion of the industry sector was characterized by rapid growth in the mining sector in the second half of the 2000s. Growth decomposition showed that the natural resource sector (mining and electricity export) averagely contributed about one-fourth of the growth rate between 2003 and 2010.

Inflows of FDI have flourished since the early 2000s, which fueled the expansion in the mining and hydropower sectors. Notwithstanding a huge volume of foreign capital inflows into the mining and hydropower sectors, their influence on local employment was limited because these projects imported capital-intensive equipment and high-skill technicians from overseas, especially during the construction period. On the contrary, in spite of the potential to create more employment opportunities in labor-intensive sectors such as agriculture, manufacturing, and service, FDI inflows are small scale, or those foreign capital inflows were targeting only smaller projects with limited scope in scaling up their investment frontiers.

Enhanced integration of Laotian economy into the Association of Southeast Asia Nation (ASEAN) and the free trade agreement with China have also brought about larger expansion in trade volume, although the high volume of mining output and electricity production were the main drivers of export expansion after the mid 2000s. Unimpressively, manufacturing exports grew slower than the natural resource sector and therefore its share in total export contracted. Import continued to grow due to an increase of imported capital goods geared for investment projects, petroleum and gas, and vehicles.

Despite outstanding progress on economic development, inclusiveness of growth dividends has been a recent subject of concern. Poverty incidence has substantially reduced in both urban and rural areas coupled with rapid economic growth. However, the Gini coefficient[2], which measures the intensity of inequality, increased from 0.33 in 2002/03 to 0.35 in 2007/08. Widening disparity has been observed in both urban and rural areas. Therefore, economic development during this natural resource boom period was characterized by rapid increase in income, decline in poverty incidence, but a rise in inequality. Although such characteristics can be explained by Kuznets hypothesis, the causality between resource boom and inequality is still debatable, as a bulk of literature shows opposing views. For instance, Deaton (1999) contends that over-reliance on the mineral sector, together with low quality investment and a low level of education, contribute to the relationship between resource boom and inequality in Africa. There are also other studies that argue that less developed countries, which often have relatively weaker physical infrastructure, ill-formulated economic policy, and rudimentary organization of institutions, face negative impacts of

[2] Gini coefficient is the most commonly used measure of inequality. The coefficient varies between 0, which reflects complete equality, and 1, which indicates complete inequality (meaning that one person has all the income or consumption, all others have none). For more detailed discussions on the derivation of Gini coefficient and its implications, see World Bank (2012b).

resource boom in terms of increased rent-seeking and inequality (for instance, see Lane and Tornell 1995). However, Goderis and Malone (2011) conducted a panel data econometric analysis of ninety countries and found the opposite result regarding the impact of resource boom on inequality. They found that the resource boom helped lower the income inequality during the boom period, but over time that positive effect gradually reduced to the inequality level prior to the boom[3].

2. Defining the problems

Laos's remarkable economic performance has been essentially driven by the boom in the natural resource sector. The boom has boosted the expansion of exports, especially in the export of mining and electricity, FDI inflows, and, consequently, GDP growth. However, because of the continuous growth there are increasing concerns about sustainability, particularly in the aspect of long-term benefits from the resource sector. Moreover, many observers assert that while the expansion of the natural resource sector has increased GDP level, economic growth did not bring about a higher impact on overall living standards as measured in terms of people's incomes. Such assertion is reasoned from the fact that the natural resource sector generally, by nature, is a very capital-intensive one and in that context the mining sector in Laos, in particular, has failed to create large employment opportunities. Hence, the expansion of the natural resource sector has contributed marginally to total employment. For instance, employment-output elasticity in the mining sector is estimated at 0.29, which is the lowest compared to other sectors. The elasticity for the whole economy is 0.40, and in the service sector it is 0.94 (UNDP and MPI 2009).

[3] The concern for growth inclusiveness in Laos will be further discussed in Chapter 3.

Many empirical studies show that resource rich countries have not necessarily achieved long-term economic growth that is commensurate to their potential. For instance, Frankel (2010) conducts a comprehensive survey of literature on natural resource curse and his findings show that the main problems of resource-based growth are long-term, downward trends in world commodity prices, volatilities in prices, crowding out effect on manufacturing sectors, civil war, poor institutions, and the Dutch Diseases. Sachs and Warner (2001) show that resource-abundant countries have had stagnated growth since early 1970s. They find that even after controlling for geographical or climate variables, resource abundance is still an important determinant of poor economic performance. The overall impact of growth in the resource sector on GDP growth is unclear, but admittedly the growth in that sector provides opportunities and considerable threats. The opportunities are the rise of exports and the increase of FDI inflows (increased foreign currency earnings and capital formation), in which those outcomes help to promote economic growth and strengthen government revenue. However, at the same time, the growth in the natural resource sector also threatens the growth performance of other sectors in the economy considerably. There are at least two most notable concerns: first, the large FDI inflows into the resource sector over the medium term could crowd out investments in other sectors like manufacturing; second, the rise in export of mineral resources triggers the rise in real exchange rate and wages, which in turn affects the exports of other tradable sectors like agriculture and manufacturing. The latter is typically known as the "Dutch Disease." [4]

[4] This issue will be acknowledged again in Chapter 3.

Equally critical, a high dependency on natural resource exports increases the country's volatile to external shocks caused by fluctuation of the world commodity prices (IMF, 2008)[5]. Insisienmay (2008) shows that, in recent years, the exceptional surge of growth rate in the natural resource sector in Laos has amplified government spending because of more revenue received from the resource sector. If economic management is not vigilant the growth in the natural resource sector will not be a blessing for Laos, but instead it will be a disguise of the entrapment of the "resource curse" hypothesis. The "resource curse" hypothesis is a notion that claims that in reality many developing countries endowed with abundant natural resources have grown slower than countries with limited natural resources. Thus, against the background of the natural resource sector based economic growth, if this hypothesis is valid for a small, landlocked, and underdeveloped country like Laos, then it is of the greatest concern for Laotian policy makers. The concern is twofold, viz., how to avoid the "resource curse" on the one hand and reap the benefits of well-endowed natural resources for driving long-term development on the other hand. The booming resource sector ought to become the driver for poverty eradication and income growth, instead of becoming the impediment for income growth. Poverty alleviation is the country's top priority and commitment[6] but that progress is still slow and below the intended targets, although some improvements have been made in recent years. In this context, therefore, the ability to channel benefits from the growth in the natural resource sector to poverty alleviation across the country is the most crucial aspect in promoting long-term development of Laos.

[5] Our fiscal deficit is forecasted to be -1% to -1.4% of GDP over the next 5 years; the deficit could rise to -2% of GDP if either the price of copper or gold declines by 10%.

[6]One of the key objectives of the 8th Resolution of Lao People's Revolutionary Party is to primarily eradicate the poverty in Laos by the end of the 6th five-year socio-economic development plan in 2010. In addition, the target of Laos to fulfill the MDG is to halve the 1990 poverty level by 2015.

In views of the above problems, the objective of this empirical study is to examine the impact of the inflows of FDI, especially into the natural resource sector on Laotian economy. More specifically, this dissertation intends to investigate the following three questions. First, how have FDI inflows into the natural resource sector contributed to the economic growth in Laos? For this purpose, the analytical scope focuses particularly on the role of capital accumulation in the promotion of economic growth. Second, how has the linkage of the garment industry—which is the leading manufacturing industry in Laos—with the global production network affected the performance of firms? In order to assess the competitiveness of the garment industry, several competiveness indices will be calculated and compared against major garment producers. This empirical inquiry will use both statistical difference and statistical relationship to clarify the role of FDI in the Laotian garment industry. Third, how has inequality in Laos changed, and what is its relationship with FDI inflows? For this purpose the empirical inquiry will analyze the changes of inequality in consumption expenditure and assets in Laos. The relationship between inequality and poverty in Laos will also be examined. Finally, this empirical analysis extends to clarify how a surge in FDI has affected the change in inequality in Laos by comparing provinces/districts that have more FDI inflows with those that receive minimum FDI inflows.

3. Structure of the dissertation

This dissertation comprises nine chapters and the outline of each chapter is as follows:

Chapter 1 outlines the background of the study, which is the rationale for defining the objectives and the scope of this thesis. This chapter also highlights the transformation of Laotian economy from a centrally planned economic system to a market-oriented system.

Chapter 2 reviews several categories of literature that are associated with this empirical study. Specifically, the review is focused on growth theories, foreign direct investment behaviors, resource curse hypothesis, and Dutch Disease, and the relationship between growth, poverty, and inequality. The review covers both theoretical and empirical studies to provide a robust foundation for the analysis in this dissertation.

Chapter 3 provides an overview of Laotian economic development driven by the market economic system transformation initiated in early 1990s. The overview puts particular emphasis on the growth performances and macroeconomic stability before and after the natural resource boom. This chapter also provides a distinct comparison of the performance between resource and non-resource sectors. Furthermore, this chapter attempts to examine the Dutch Disease symptoms, which are caused by the outstanding growth of the natural resource sector in the Laotian economy. In this connection, this chapter discusses various economic and social development indicators for the purpose of clarifying growth inclusiveness in Laos. Finally, the discussions also extended to explain major challenges of Laotian economy.

Chapter 4 analyzes how the integration of Laotian economy with regional and global economy has affected local industries. More specifically, the analysis focuses on how special economic zones (SEZs) have contributed to attract FDI to Laos. Moreover, this chapter explains how the implementation of tariff and non-tariff eliminations in the frameworks of AFTA and ACFTA will affect price competitiveness of Laotian domestic industry. For this purpose, this chapter analyzes three industries, viz., motorcycle industry, wooden furniture industry, and cement industry.

Chapter 5 formulates the analytical framework based on the background, objective, and the scope of this study and the related literature reviews. The analytical framework of this

study comprises three parts. The first part defines the procedures for substantiating how capital accumulation has brought about economic growth in Laos. The second part formulates the analytical method in discerning firms' performances in Laotian garment industry and its linkage to the external economy. The final part provides two analytical approaches: the methodology of estimating inequality rates in Laos and the relationship between FDI and inequality in Laos.

Chapter 6 examines the economic growth in Laos with particular emphasis on the role of capital accumulation and FDI inflows into the natural resources sector. Then, it analyzes the contributions of labor, capital, and technical change to economic growth. For this purpose, this chapter conducts an estimation of the capital stock for Laotian economy.

Chapter 7 examines firms' performances of the garment industry in Laos. Garment industry is the leading manufacturing industry in Laos. The analysis focuses on the competitiveness of this industry, institutional supports, and linkage with the global production network. A variety of indicators for competitiveness of the Laotian garment industry are estimated. In addition, this inquiry also uses statistical inference and regression analysis in order to clarify the role of FDI and regional linkage in the Laotian garment industry.

Chapter 8 estimates the inequality rates in consumption and in assets in Laos by using consumption and asset data sets made available from a large nationwide household survey conducted by Lao Statistics Bureau in 2002/03 and 2007/08. In order to identify the sources of inequality, the analytical investigation decomposes inequality rates. Then, analytical results are used to discuss what kind of intervention would be effective to improve inequality in Laos. Additionally, this chapter analyzes the link between inequality and poverty reduction in order

to understand the cost of inequality on poverty reduction. The final part of the analysis in this chapter clarifies the relationship between FDI and Laos.

Chapter 9 summarizes the findings, conclusions, and policy recommendation of this thesis. Furthermore, this chapter highlights the limitation of the study and also future research direction.

Chapter 2 Literature Review

1. Introduction

Achieving high economic growth has always been among the most important economic goals of any country. Economic growth is usually measured as the expansion of GDP. There are large differences in the level of economic growth across the world, among the developed and the developing, but also between those in the same regional or economic blocks. At the same time, the sources and constraints of growth also vary considerably across countries and regions. With constraints of low domestic saving and low purchasing power in the domestic market, the growth of developing countries is constrained by the saving-investment gap and they have to rely on the inflow of foreign capital. Also, a developing country has to enhance its export to facilitate the import of goods that could not be produced domestically and to extend its market frontiers to the international market place. For the latter, it has to depend on FDI and the importation of technology. Developed countries, on the other hand, rely on the supply of finished goods, which are cheaper from the developing countries, to support their domestic consumption. Such interdependence is enhanced by market mechanism, openness, free trade, and the free movement of capital. However, openness and free movement of capital also create volatility and uncertainty in short-term business cycles. The economic slowdown of the US and Eurozone in the recent years as a result of undisciplined and overliberalized financial sectors has prompted scholars and policymakers to rethink about the conventional wisdom on growth mechanisms. Although economic growth is driven by external and domestic demands, analyzing the sources of economic growth is becoming more complex in the increasingly interdependent economic environment.

The study of economic development in general, and economic growth in particular, was pioneered by Adam Smith in the late eighteenth century. Essentially, his insights into the development and growth mechanism were centred at the division of labor, capital accumulation, and labor productivity. The importance of supply and demand and free trade were addressed elegantly in his *Wealth of Nations*.

Contrasting Smith's "absolute advantage," David Ricardo[7] propounded the principal of comparative advantage, which conceptualized the principal of specialization. This theory explains that all trading partners benefit from free trade. Comparative advantage conceptualizes a two-countries-two-sectors (goods) model, in which each country specializes its production on a good (sector) that has a higher opportunity cost (or lower relative cost); both countries will be better off trading with one another. Ricardo's theory laid the basic foundations for the development of conventional international trade theory.

In the era of David Ricardo, the movement of productive factors was limited. Thus, comparative advantage was conditioned by factor endowment, technological gap, climate, and others. Consequently, international division of labor was in the form of vertical trade. With the advancement of transportation and communication technologies, the concept of comparative advantage had to incorporate the mobility of production factors. For this reason, Heckscher and Ohlin extended Ricardo's model to cover two countries, two production factors (labor and capital), and two goods (sectors). Essentially, Heckscher-Ohlin theory[8] explains that a

[7] The theory of comparative advantages becomes well known in Ricardo's work titled "On the Principles of Political Economy and Taxation" in 1817.

[8] The Heckscher-Ohlin Theorem is rejected by Leontief in his work (Leontief 1953). This is known as the Leontief Paradox. Leontief finds that USA, which was the world's most capital-abundant nation, exported labor-intensive commodities and imported capital-intensive commodities. This contradicts the Heckscher-Ohlin Theorem.

country's factor price is closely related to the allocation of factors across sectors, and therefore, their interactions influence the change of trade structure. This theoretical perspective was extended to explain the type of international division of labor, allocation, and mobility of capital and labor across national boundaries.

The importance of the value of factor inputs and production cost were further refined by the principle of marginal utility and diminishing returns expounded by Alfred Marshall[9] in the late nineteenth century. Marginal utility is a concept that explains how an individual maximizes his or her utility by holding the value (price) constant, which mainly depends on demand. According to Marshall's economic theory, economic growth is the process of maximizing welfare, which is comprised of producer surplus and consumer surplus. These concepts became the foundation for the development of welfare economics and the general equilibrium model in economics.

Since the 1950s, the study of economic growth has been extended to focus on the analysis of the developing world. Economic growth in many developing countries faces a common problem, viz., inequality in the distribution of income. In the past few decades, income gap between developing and developed countries has not only risen, but inequality within a developing country—particularly in low income and lower middle income groups—has also increased. Conventional growth theory is not able to explain why the rise of per capita income has resulted in the worsening of the inequality rate. Therefore, the issue of inequality has received more attention, not only scholarly but also at policy level, because income equality among the population is a crucial factor for stability in development.

[9] Marshall (1890)

The purpose of this chapter is to review several theories that are closely associated with the scope of this study. The outcome of this review will be used to construct an analytical framework for this thesis. This chapter is organized as follows: Section 2 examines the key essence of growth theory; Section 3 reviews several theories on foreign direct investment behavior; Section 4 discusses the resource curse and Dutch Disease hypothesis; Section 5 explores the theoretical discussions on the relationship between growth and inequality. The last session summarizes this chapter.

2. Growth theory

The origin of the theory on economic growth dates back to the work of Adam Smith in 1776. During that era, both prices and outputs depended on labor input; hence, labor was the single most important determinant of production output. The coordination of supply and demand was seen as an "invisible hand" that facilitated all individuals in the economy to behave in such a way that the social good emerged. A *laissez-faire* society was therefore encouraged under this classical school. Hence, the classical school of economic thought claimed that free competition and free trade, free from government intervention, were the best approaches to promote economic growth and thus build the wealth of a nation. Smith (1776) highlighted the importance of inter-linkages between division of labor, capital accumulation, technological progress, and labor productivity growth as crucial conditions for increasing the wealth of the nation. In that era, although labor was still considered as the most important determinant of growth, Thomas Robert Malthus raised concerns over the danger of rapid population growth [10]. Malthus (1798) argued that population grew geometrically while agriculture output grew arithmetically; therefore, the former eventually outstripped the latter.

[10] One of Malthus's masterpieces is "An Essay on the Principle of Population" published in 1798.

For this reason, economic growth would have eventually been constrained by the population. Put differently, Malthus wanted to warn of the limit on the expansion of growth, based on labor alone.

The Harrod-Domar model of economic growth propounded the importance of capital-output ratio, saving ratio, and the rate of increase of the labor force in long-run economic growth. In essence, the Harrod-Domar model predicted that economic growth relied on two types of growth rates, viz., the natural rates of growth and the warranted rate of growth. The former depended on the increase of labor force, whereas the latter relied on the saving and investment behavior of households and firms. However, Solow (1956) argued that the assumption of non-substitutability between labor and capital of the Harrod-Domar model was unrealistic. According to Solow, as income increased, along with economic growth, demands for goods and services also shifted; consequently, the allocations of capital and labor also changed. Equally crucial, technological progress—which was exogenously determined—induced higher labor productivity, which affected the demand of labor, too. Such interactions in the allocation of factor inputs and technology in the market offered massive chances for substitution between labor and capital.

Because of the coordination for the allocation of factor inputs in the market, the neoclassical school of thought asserted that efficient resource allocations would be ultimately determined by the price mechanism—the interaction between demand and supply in markets characterized by perfect competition. In other words, prices were a vital signal for economic agents to attain efficiency in resource allocation for fostering economic growth in neoclassical economic framework. The introduction of Solow's growth model has consolidated the neoclassical approach to economic growth. The central proposition of Solow's growth model

was that "the equilibrium rate of growth is not only not proportional to the saving (investment) rate, but is independent of the saving (investment) rate. A developing economy that succeeds in permanently increasing its saving (investment) rate will have a higher level of output than if it has not done so, and must therefore grow faster for a while. But it will not achieve a permanent rate of growth of output" (Solow 1970).

There were two remarkable predictions from the neoclassical growth model. The first one is the conditional convergence. It predicted that the lower the starting level of real GDP per capita, relative to the long-run or steady-state position, the faster the growth rate. Put differently, economies that had less capital per worker (relative to their long-run capital per worker) were likely to have higher rates of return and a higher growth rate. The second prediction stated that in the absence of continuing improvements in technology, per capita growth must eventually come to an end.

By extending his neoclassical growth model, Solow (1957) expounded one of the most important methodologies in analyzing the sources of economic growth. Although Adam Smith (1776) emphasized that technology was a crucial contributory factor of economic growth, rigorous economic analysis on the role of technology or the mechanism of technical progress in economic growth was not obvious until the seminal work of Solow in 1957. Consequently, literature on the study of the relationship between technological change and economic growth has grown significantly. Essentially, the basic methodology for growth accounting is to use a neoclassical production function to estimate the contribution of capital and labor to the measured growth of output. Any portion from the measured output growth that is not derived from the factor inputs is defined as technological change or total factor productivity (TFP). In other words, rate of growth of TFP is the "residual," derived from the difference between the

rate of growth of output and the rate of growth of capital and rate of growth of labor. This growth accounting concept has given particular meaning to the analysis of sources of growth in the neoclassical school of thought. Also, it can be said that growth accounting has wielded a great deal of its influence not only in the industrialized world, but it has also greatly influenced policy makers in the developing countries.

However, results from empirical works based on the neoclassical growth model have been mixed. Jorgenson (1995) indicated that the key driver of economic growth in the developed world was technical progress or TFP. However, the explanatory power of growth accounting in the East Asia region is mixed. Marti (1996) found contributory roles of capital and technological advancement in propelling growth in the East Asia region. However, Young (1994 and 1995) asserted that capital accumulation explained much of the economic growth in East Asia, while the technological change played limited role in raising productivity. Similarly, Collins and Bosworth (1997), in their labor-augmented production function that incorporated education into their regression, found that capital accumulation was the main driver of economic growth in East Asia, whereas the role of technological progress was insignificant.

Growth accounting methodology has both strengths and weaknesses. The key strength is its simplicity in the mechanic, which enables economists to estimate the separate effects of capital, labor, and technology, respectively, and to what extent they have contributed to economic growth. In addition, the convergence hypothesis allows cross-country empirical studies on the variations of growth and their contributory factors. There are several limitations in growth accounting, especially in relation to the application of its analytical method in the developing world. First, the conclusion that long-term economic growth relies on exogenous

factors limits the application of its analytical implications in the policy sphere in a developing country. In other words, the model limits the application of important policy measures that could influence long-term growth. More critically, this analytical method does not provide answers to those questions that address the sources and developments of the technological progress. Secondly, while the assumption of the smooth and perfect substitution between labor and capital has made the model simple, that assumption may not be realistic in developing countries. Thirdly, the model does not take into account the significance of expectations[11] and how they influence macroeconomics, especially the lack of investment function[12]. This shortcoming is partly because investment function is a Keynesian type of argument that stresses the importance of short-term fluctuations in the economy.

The convergence hypothesis of the neoclassical growth model suggests that developing countries tend to grow faster than developed countries and therefore the gap between developed and developing countries will eventually become smaller over time. However, notwithstanding the sophistication of convergence hypothesis, Baumol (1986) showed, based on a large sample of countries, that convergence theory did not explain the differences of growth rate between the developing and developed countries. Instead, empirical evidence showed that there was a convergence only among a set of countries and not for the whole sample.

[11] Stiglitz (1973) comments that from extensive research after the introduction of Solow model, it found that the model is as debatable as the theory of Harrod because Solow's model does not include the role of expectations and that the economy could smoothly converge to the balanced growth path.

[12] More discussion in Sen (1970)

3. Foreign direct investment behaviors

Literature on growth theories has shed light on the importance of capital formation for economic development. For developing countries, FDI is especially important as a source of capital, technology transfers, and employment generation. The academic interest in international production has emerged since the 1960s; prior to that, much attention was given to international trade. The switch took place when the benefits from trade were fully exploited, domestic nonrenewable resources became scarcer, and technology and organizational capacity became more important for firms' competitiveness[13]. Consequently, multinational companies (MNCs) started to realize the importance of production outside their national boundaries. This section of the paper will discuss some of the major FDI theories that seek to explain the behavior of FDI and answer the basic questions of why firms invest overseas and where they invest.

3.1 Eclectic (OLI) Paradigm

Dunning's Eclectic paradigm is one of the prominent theories on FDI that explains the reasons behind the expansion of FDIs. The origin of the eclectic theory could be traced back to the work by Dunning in his PhD dissertation during the mid-1950s, which later became a publication in 1958[14]. The theory, at the origin, attempted to explain the motives for FDI from the USA in the manufacturing sector in the UK. The theory concluded that at least during the 1950s the difference between the productivity of firms in the US and the UK could be partly explained by the ownership (O) and location (L) of specific characteristics. The ownership advantage refers to a group of spatially-transferable, intangible assets of parent companies.

[13] Dunning (1988a, p.9-10).

[14] Dunning (2001) provides a good discussion on the origins and evolutions of the eclectic theory.

The location advantage refers to a set of nontransferable characteristics of the parent companies. Later, in taking into account changes in international business environment, Dunning extended his analysis and produced many subsequent papers in the 1970s.[15] Dunning later added the internalization of advantages (I), the third component of the complete eclectic (OIL) theory, to further explain why firms decided to generate and exploit their ownership-specific advantages internally.

The OIL theory expounds that the extent and pattern of international production are determined by the following forces[16]. First, there exists an ownership (O) advantage, which could come from the privileged access to a firm's income-generating assets, or the ability to coordinate these assets across national boundaries. This ownership advantage could be a firm's specific knowledge capital, such as human capital (managers), patents, technologies, brand, and reputation. Such assets could be replicated in other countries without losing their value, and by doing so firms will have competitive advantage against their competitors. Second, there is an advantage in locating (L) the value-adding activities overseas. The reasons include locating the production base closer to consumers, saving transport costs, sourcing cheaper production inputs, and overcoming trade barriers. Finally, firms decide to internalize (I) the use of firms' specific ownership advantages rather than selling them in the market. Firms face a decision between engaging in the value-adding activities beyond the national boundaries by themselves or subcontracting such activities to foreign entities. The latter entails several risks, including the transfer of firm-specific advantages to outsiders who might become potential competitors.

[15] Dunning (1972) discusses the implications from Britain's membership in the European Common Market (ECM). Dunning (1973) integrates the industrial organization and location factors in the explanation of FDI behaviors.

[16] Dunning (1988b, 2001).

The eclectic theory has been modified to accommodate the changes and progress of the world economy. In Dunning (1981) and other subsequent works[17], the eclectic paradigm was extended to explain the evolutions of international productions through different stages of host countries' economic development. This conceptual framework is known as the investment development cycle, in which the dynamic relationship between a country's level of development and the flow of inward and outward FDI is explored. According to the investment development cycle, a country progresses through five stages of development. First, at the preindustrialization stage, there is no or little inbound and outbound foreign investment because of insufficient location-specific advantage. At this stage, governments focus on improving basic infrastructures and human capital. In the second stage, with enhanced government policies, better infrastructure, and a growing local market, the inbound FDI will increase. In the third stage, the strength of the "O" advantage of domestic firms and the increase in domestic cost of production encourage domestic firms to increasingly explore FDI opportunities in foreign markets. The government plays two roles, viz., to attract FDI inflows to the industries in which domestic firms are not able to fully exploit the "L" advantages, and to provide the right incentives for FDI outflows in the industries in which domestic firms possess significant "O" advantages. In the fourth stage, the stock of outbound FDI might equal or surpasses the inbound FDI. The "O" advantages of domestic firms are very strong and can compete both in local and foreign markets, and the rationales for outbound FDI become more diversified. At the final stage, the significance of inbound and outbound FDI reach a more balanced level. Firms that engage in FDI at this stage do not only exploit their "O" advantages in foreign markets but also improve such advantages by acquiring complementary assets or

[17] Dunning (1988a and 1993); and Dunning and Narula (1996).

new markets. Developed countries receive inbound market-seeking and asset-seeking FDIs from less-developed countries. FDI outflow depends more on the international production network strategy of MNCs.

Dunning's OLI theory has well explained the reasons for the direction of FDI which set the pattern of international production by an MNC. The investment development cycle also explains the evolutions of FDI in past decades, showing the significance of government policies in improving their location-specific advantages, shaping up the international competitiveness of local firms by facilitating them to make outbound FDI.

3.2 Flying Geese Model

(1) The origin

Flying Geese Model (FG) is the leading framework that explains the catching-up process in the industrialization of latecomers, especially in the context of the East Asian region. The FG framework was originally developed by Akamatsu to explain the change of the industrial structure in Japan. In Akamatsu's FG original model, the development of an industry is divided into three stages: import, domestic production, and export (Akamatsu 1961; Kojima 1978; Kasahara 2004). In the first stage, both consumption and capital goods are imported from more advanced countries. After a certain period of learning process, domestic firms begin to produce some import-substituted goods with the support of government protectionist policy. When domestic production increases in the scale of production, together with improvement in productivity, the economy now reaches the stage when the export of final consumer goods begins to flourish. To successfully progress from import to exports, production cost has to be lower than the international average level and product quality has to be improved (Kojima 1978, p.66).

(2) Kojima model

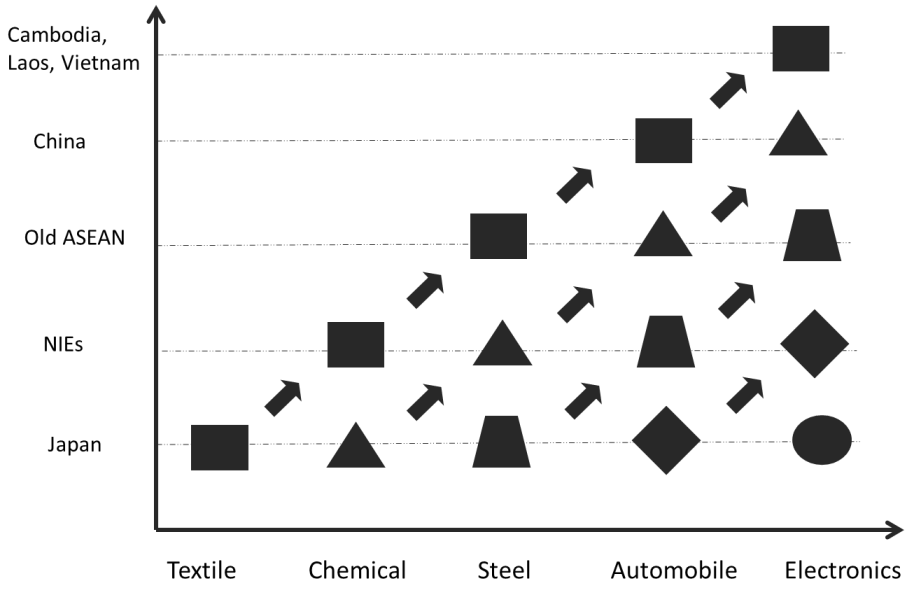
Kojima (1978) introduced the role of FDI and argued that the flow of real and financial assets from the lead economy to the follower economy expanded the benefits from cross-country economic linkage. This was the formal inclusion of FDI into the FG model. Kojima's investment frontier concept describes how the FDI pattern of a lead country in a follower country is based on differences in stages of industrial development between home and host countries (Kojima, 2000). The transformation of industry sector based on the FG model is illustrated in Figure 2.1.

Kojima's FG model highlighted the importance of development based on regional integration. The comparative advantage of the consumer goods industry in the lead country declines as wages increase over time. Hence, the company in the lead country has to inevitably invest in a follower country where its wage is relatively lower by transferring capital, technology, and managerial skills. By doing so, both countries benefit from such a division of labor. A similar pattern is then replicated in the other follower countries over time on similar rationales through "pro-trade oriented FDI." MNCs, therefore, play important roles in facilitating this transformation. Kojima (2000) also argued that there were other spillover benefits, including the emergence of backward and forward industrial linkages, employment creation, labor-skills improvement, and inducement of reforms in the host countries.

The FG model elegantly explains FDI inflow, especially the catching-up process in the East Asia region. The industrialization in this region goes through the relocation of industry along the regional hierarchy of development levels from the leading country, viz., Japan, to the

first-tier, newly industrializing economies (NIEs) like Korea, Taiwan, Singapore, and Hong Kong. Then, a similar process is replicated in the second-tier NIEs, like more-developed ASEAN

Figure 2.1: The transformation of the industrial structures in East Asia based on the FGM



Source: Derived from Kojima (2000), modified by the author.

countries, and then to China and other latecomers, such as less-developed ASEAN counties. Such industrial linkages in the East Asian region help to create a regional production base for numerous MNCs.

However, there are some limitations of this theory in explaining the pattern of FDI inflow and the industrialization of developing countries. The theory assumes that industrial transformation in all economies is a linear process. In reality, each economy has different paths for industrialization and the development of the industrial sector does not necessarily replicate the pattern of the leading countries. The industrial progress in China allows certain

manufacturing subsectors to progress ahead of the industries in earlier tier counties. Another important limitation of this hypothesis is the prediction that a developing country will always be following the lead goose, i.e., advanced country, and, consequently, a less-developed country has no opportunity to surpass an advanced country. However, in the observed reality, there are latecomers that have "leap-frogged" from a low value-added industry to a higher value-added industry in terms of technological intensity.

3.3 Vernon product life cycle theory

The Product Life Cycle (PLC) theory analyzes the behavior of an individual firm by determining the locations of its production facilities at different stages of product development. Vernon (1966) postulated that each manufactured product went through three stages: novelty, maturity, and standardization. At the novelty stage of product development, the advanced economy, for example, USA, which is more abundant in research and development and skilled labor, will design and produce a new product in the domestic market with minimal export. When production expands to the maturity stage with a specialization of the production in the home market and scale economy is reached, the export will increase with more prominence in other high-income countries with similar per capita income and taste. Finally, when the product reaches the standardization stage, in which production technology becomes routine and cost savings become more important, the production will be relocated to other industrialized and subsequently developing countries. With the improvement in the transport system and information and communication technology, MNC can improve their competitiveness by producing in a low-cost country and then importing back to home markets as well as selling to a third country.

The key limitation of the PLC theory is related to the assumption regarding innovation. In this theory, innovation is located in a parent company's home country. However, today, innovation activities seem to be located in several locations across MNC's affiliated companies in order to benefit from the advancement in R&D across national boundaries.

4. Resource Curse hypothesis and the Dutch Disease

4.1 Resource Curse hypothesis

Resource Curse hypothesis has received scholarly attention since its formation (Frankel 2010). The theory explains that resource-rich countries tend to perform poorer than those countries that have limited resources. From the 1970s to the 1990s, resource-rich countries achieved lower growth in real income per capita compared to the resource-poor countries (Sachs and Warner 2001). Many countries with limited natural resources, for example Japan, Korea, Taiwan, Singapore and Hong Kong, achieved high economic growth, driven by export and remarkable expansions of the manufacturing sector. Still, even among resource-rich countries, some perform better than the others (Stiglitz 2004). Take, for instance, Botswana and Sierra Leone. Though both are rich in diamonds, Botswana has recorded a remarkable economic growth of over 7% per year for two decades while Sierra Leone has faced civil strife and a decline in GDP per capita (Humphreys, Sachs and Stiglitz 2007).

There are several channels of impact through which resource-rich countries may record substandard economic performance. These include a long-term downward trend of world

commodity prices,[18] the volatility of natural resource prices, the crowding out of manufacturing sectors, the source of civil war, poor institutions, and the Dutch Disease (Frankel 2010). Other sources of the resource curse include unequal expertise on the extracted resource, the depletion of capitals, poor investment in education,[19] and inducement for corruptions[20] (Humphreys, Sachs and Stiglitz 2007).

Empirical works on the Resource Curse hypothesis are often based on cross-country regression analyses.[21] The conventional analysis is to regress the long-term growth rate by the initial GDP and the initial natural resource wealth. The natural resource wealth can be in the form of natural resource intensity (for example, the share of natural resource exports in total GDP), natural resource dependency (for example, the share of mineral production in the GDP), or the natural resource exports in total exports. The expected negative sign of coefficient on natural resource intensity or dependency exhibits the resource curse hypothesis. Empirical works often extend the regression to include other controlled variables that could affect growths. Common controlled variables are trade openness, fiscal deficits and average inflation, rent-seeking behavior, institution quality, and commodity price shocks. After controlling the effects from other explanatory variables, Sachs and Warner (1997) still found the evidence of

[18] There are also many papers that suggest the upward trend in commodity prices. Detailed discussions on both sides could be found in Frankel (2010, pp.4-9). In general, Frankel (2010) concludes that the long-term trend of world commodity price depends on the selected period for the study.

[19] Gylfason (2001) finds that government spending in education is negatively correlated with the abundance of natural resource. The study covers ninety countries in the period of 1980 to 1997. Gylfason argues that the low investment in education will present a threat for a country's long-term growth, especially when there is a need to diversify to nonresource sectors in the future.

[20] Leite and Weidmann (1999) constructed the Endogenous Growth Model to find the determinants of corruption, using data from seventy-seven countries. The study finds that the corruption seems to be higher in countries with more abundance of natural resources, especially capital-intensive natural resources. Corruption is also found to have negative impact on long-term growth. One standard deviation shock of corruption (lower corruption) leads to a 1.4% point increase in the average growth rate.

[21] For example, Sachs and Warner (1997); Arezki & Ploeg (2007).

negative association between resource wealth and growth. In addition to the OLS regression, another popular technique is the Instrumental Variable (IV) estimation. That estimation is used to deal with the endogeneity problem among the explanatory variables found in the OLS estimates. Arezki and Ploeg (2007), in addition to OLS analysis, use the IV estimate approach to examine the relationship between natural resource abundance and growth. This paper finds instrumental variables that could explain rule of law and de facto openness. They find a negative direct impact of natural resource abundance on income per capital, as well as an indirect effect of natural resource on institution. Similarly, Collier and Goderis (2007), using the cross-country error correction model (ECM), find that commodity booms have positive short-term effects but adverse long-term effects on output.

The literature on Resource Curse provides theoretical and empirical evidence on the risks and challenges associated with resource-based growth. Empirical analysis based on cross-country data could provide overall and generalized evidence on this issue. However, a country-level analysis would require a large micro-level data set, which is often unavailable in developing countries. This is one of the major challenges in the research on resource curse in developing countries.

4.2 Dutch Disease

The Dutch Disease was termed [22] after observing the severe, adverse effect gas discoveries in the Netherlands had on the non-resource traded sector through the macroeconomic channels in the late 1950s. After the discovery of natural gas, the Netherlands recorded a rapid economic growth while the manufacturing sector grew much slower and

[22] The term was first used in the printed document by the Economist magazine in the article "The Dutch Disease", dated 26 November1977 (Corden, 1984).

employment in manufacturing declined significantly. More specifically, the growth rate of the manufacturing sector declined from an average of 6.5% from 1963-73 to 0.9% from 1974-78 and 0.3% from 1979-83 (Rudd and Lowry 1996). Also, there was a contraction in employment in the manufacturing sector after the natural gas boom. For instance, the annual average growth rate of employment in the manufacturing sector was -0.5% from 1963-73, -2.7% from 1974-78 and -2.8% from 1979-83. Many other resource-rich countries face similar experiences as the Netherlands, leading to the terminology of Dutch Disease to describe the adverse effect of the booming sector on the lagged sectors.

In a broad sense, the symptoms of the Dutch Disease include the real appreciation of local currency (nominal appreciation for floating exchange rate and higher inflation for fixed exchange rate); increases in spending; increase in prices of non-traded goods relative to traded goods; a shift of endowments from the non-resource traded sector; and bigger current account deficits (Frankel 2010). Corden and Neary (1982), who developed the first theoretical model[23] to examine the effects of the booming sector on the lagged sector, classified these macroeconomic symptoms into spending and resource movement effects. The model assumes that the economy comprises of three sectors, viz., traded resource, traded non-resource, and non-traded sectors. There are two channels of impact from traded resource sector to the rest of the economy. First, booming resource sector generates large inflows of foreign currencies in the form of FDI and export revenues. Such boom causes an increase in spending and domestic demand, and consequently these lead to increasing domestic prices and imports. Increase in

[23] Other Dutch Disease models include the Dynamic Dutch Disease Endogenous Growth Model by Sachs and Warner (1995). This model shows that the economy with temporary resource boom will have slower growth in several subsequent periods compared to the country without the resource boom shock. Also, the model argues that the immediate impact of the resource boom on the non-resource sector depends on the degree of capital intensities in those industries. If the non-traded sector is more capital intensive than the manufacturing, the immediate effect of resource boom on the non-resource GDP will be positive.

domestic prices, assuming unchanged or slower growth of prices in the trading partners, leads to an appreciation of real exchange rate by conventional calculation of real effective exchange rate. Alternatively, real appreciation can be viewed from the increase in relative price between non-tradable and tradable. This appreciation has a negative impact on the competitiveness of the tradable non-resource sector. This so-called spending effect could have a positive effect on the non-tradable sector through increase in domestic demand. The resource movement effect concerns with the impact of a booming resource sector in attracting factors (capital and labor) directly from other sectors. Direct effect is the movement of inputs from the lagged sector, which is the traded non-resource sector like manufacturing, to the booming resource sector. In addition, the expansion in the non-traded sector might add another round of resource movement effect by attracting inputs also from the traded non-resource sector.

There has been ample empirical evidence on the presence of Dutch Disease. Ismail (2010), using pool data econometric regression, examines the Dutch Disease in the oil-exporting countries and finds that a permanent increase in the price of oil has a negative impact on the output of the manufacturing sector. The effects of oil windfall shocks on manufacturing sectors are more severe in countries with a higher degree of openness in the capital market and those with less capital-intensive manufacturing sectors. Bunte (2011), using the fixed effect panel data regression of eighteen OECD countries, finds that institutional characteristics[24] at the time of resource discovery could prevent the Dutch Disease. Saab (2010), using a panel data Granger Causality test for Egypt, Jordan, Lebanon, and Syria, asserts that workers' remittance, foreign grants, and oil revenues were the main factors behind

[24] Coordinated Market Economies (Austria, Belgium, Denmark, Finland, France, Germany, Italy, Japan, Netherlands, Norway, Sweden, and Switzerland) could prevent the Dutch Disease, while the Liberal Market Economies (Australia, Canada, Ireland, New Zealand, UK, and the USA) experience it.

the Dutch Disease problem in that region. These empirical studies show the existence of Dutch Disease in many resource rich countries.[25]

Dutch Disease problem has extended to cover the impacts of other types of inflows, including foreign aid and migration remittances. Foreign aid is a transfer of foreign currency, hence, it could affect local economy through an increase in domestic demand and spending. Increase in demand could result in the expansion of the non-tradable sector (e.g. higher demand in the construction of infrastructure projects), an increase in imports, and possible shifts of production from exports to import substitute sectors (Barder, 2006). The last two effects are means to free up some productive resources for non-tradable sector expansion, which is similar to the resource movement effects of the theory. Increased demand could add pressure on domestic prices (prices of non-tradable goods and factors), while the conversion of foreign currencies to local currencies for government or NGO's expenses will add pressure on currency appreciation. Heightened domestic cost and an increase in relative price could have sizable effects on the manufacturing sector. The size, and even the nature of impact vary, depends on whether foreign aid could help improve the productivity of domestic economy, which could, in medium and long term, create positive effects on growth. For instance, Sundberng and Lofgren (2005)[26] find that if there is no productivity gain from aid, doubling the amount of aid from 20% to 40% of GDP will lead to a fall of export by 6% of GDP over a ten-year period in Ethiopia. Similarly, Rajan and Subramanian (2005) find that without productivity gain from aid, an increase in aid of 20% of GDP leads to 30% reduction of

[25] Magud and Sosa (2010) conduct a literature survey and find many supportive examples of Dutch disease, especially in terms of the impact of natural resource or capital inflow on currency appreciation, lower tradable output in relation to non-tradable output, factor reallocation, and lower net export. However, there is weak evidence of such impact in terms of lower overall growth.

[26] The authors use the Macquette for MDG Simulation (MAMS), which is a dynamic CGE model including a module that cover MDGS related to poverty, health, education, and water sanitation.

exports. However, a study by Adam and Bevan (2004) shows that aid has positive effect on productivity, which in turn causes net positive impact of foreign aid and could be, in fact, positive. More specifically, they used a dynamic simulation model to examine the effects of aid on Uganda, which showed that a modest productivity benefit from aid was enough to offset the possible dynamic cost of export contraction from the Dutch Disease effect.

5. Growth, FDI, and income distribution

The relationship between economic inequality and the growth of income per capita was first propounded by Kuznets (Kuznets 1955, 1963). Kuznets (1955) observed that income inequality initially increased, but it decreased when income per capita surpassed a threshold. This inverted U-shape relationship between inequality and income per capita is known as a strong or unconditional Kuznets hypothesis. A weak or conditional version of Kuznets hypothesis allows other factors, such as demographic changes, migration, specific public policies, trade liberalization, and the endowment level of natural resources, to influence the relationship between inequality and income per capita. Empirical evidence on Kuznets hypothesis, particularly the unconditional version, has been mixed. Paukert (1973) and Ahluwalia (1976) are the most popularly-cited studies that support the Kuznets theory. Later on, other studies carried out by Deininger and Squire (1996), Higgins and Williamson (1999), and Oshima (1994) have not defined sufficient empirical evidence to support the unconditional Kuznets hypothesis.

In recent years, empirical study on inequality and economic growth has expanded to examine how FDI inflows in the developed world have influenced the change in income inequality. Nunnenkamp, Schweickert, and Wiebelt (2006) focus on the distributional effect of FDI inflows in Bolivia and then they analyze how the interactions between FDI inflows and

economic policies have affected poor households. By using the general equilibrium model for poverty impact analysis, they discern the causality between FDI inflow and inequality. Their empirical findings substantiated that FDI inflow has contributed to poverty reduction on the one hand, but it has raised inequality rates in Bolivia on the other hand. More specifically, this study shows that the rise of FDI inflow has improved income distribution in urban areas but it has worsened income distribution in rural areas. In addition, even by incorporating policy variables, such as a lower corporate tax, a higher labor mobility, and an increase in labor productivity (all of which are consequences brought about by the FDI inflows), this empirical study concludes that the rise of FDI causes net adverse effects on income distribution. Similarly, Jaumotte, Lall, and Papageorgiou (2013), using a panel of fifty-one countries over a twenty-three-year period, from 1981 to 2003, show that technological progress has resulted in greater impact on inequality than on the pace of globalization. They assert that although trade globalization has a positive effect on the reduction of inequality rate, technological change and financial globalization—particularly in the form of FDI—have a negative impact on inequality. This study also substantiates that better access to education and a shift of employment from the agriculture sector to other sectors could mitigate the negative impact on inequality.

Wei, Yao, and Liu (2007) examine the relationship between FDI and regional inequality in China. They use panel data of all Chinese regions covering the period from 1979 to 2003. They find that FDI has a positive effect on the regional economic growth. The effect of FDI on economic growth is weak among the Western provinces, where FDI inflows are relatively smaller than other regions. In other words, this study has verified that FDI has a positive influence on economic growth in China but the uneven distribution of FDI inflows

between different regions in China have caused higher regional disparities. Notwithstanding, the study suggests that efforts in luring FDI should continue to be encouraged but the government should introduce preferential policies to direct FDI inflows to less-developed areas in the West and Central regions in China. Similarly, Lessman (2012) finds adverse impact of FDI on regional inequality in China, but the negative effect is diminished when the government implements the policy to attract FDI to the less-developed areas.

There are other views on FDI-inequality relation. Bhandari (2007) has attempted to examine the link between FDI and income inequality in Eastern European and Central Asian countries for the period from 1990 to 2002. His empirical analysis was based on a theoretical model, which predicts that inward FDI helps to reduce inequality in income for an economy where the number of people who own capital is less than the number of wage earners. Using a fixed effect model, this study finds that FDI does not have a net impact on the change of inequality income. However, after introducing several types of inequality into the model, the author finds that FDI inflows have indeed caused the rise in inequality in wage income but it decreases inequality in capital income.

In addition to FDI, empirical evidence shows that there are other causes of inequality. Bourguignon, Ferreira, and Lustig (2005) analyze the dynamics of income distribution in selected countries in East Asia and Latin America. They propose a new technique called "counterfactual microsimulation methodology" that could conduct much disaggregated analysis of changes in the distribution and at the same time allowed for distinction between changes from price and quantity. They find that higher return to human capital, in particular education, contributes to increasing inequality. Some evidences of Kuznets's relationship are found in Indonesian and Malaysian case studies, where movements of labor from agriculture

to industrial and service sector in the urban area contribute to higher inequality. Education expansion is good for poverty reduction but it leads to an increase in inequality. Finally, gender equality is found to be good for inequality.

Xu and Zou (2000), using the occupation choice model between the state and private sector, analyze the changes of income distribution in China. They find that inequality increases with the reduction of the share of state-owned enterprises in GDP, high inflation, economic growth, and, to a lesser extent, the increasing exposure to foreign trade. Resources are shifted from rich and poor households to the middle class. Schooling and urbanization are not significant in explaining changes of income distribution in China.

OECD (2011) assesses the causes, consequences, and policy implications for inequality problem in OECD countries. This study uses a partial equilibrium approach to assess different channels and steps in which various macroeconomic variables could affect household income inequality. They find that increase in trade integration or financial openness does not have significant impact on inequality within OECD countries. However, technology progress has contributed to increased inequality. In addition, OECD (2011) analyzes the causes of inequality and relevant policy challenges in major emerging economies. They find that key sources of inequality in emerging economies are large informal sectors, an increasing gap between different regions (including the urban-rural gap), unequal access to education, unequal employment opportunities for women, and difficulty in career progress for women. The study concludes that the tax and other redistribution systems have played a small role in improving the distribution of income in emerging economies.

Inequality analysis in Laos has recently attracted attention from academia and policymakers. Epprecht et al (2008) is one of the most comprehensive studies that touches on the issue of inequality in Laos. The study uses a "small area estimation" to estimate various measures of poverty and inequality for the provinces, districts, and villages in Laos. The method is applied by combining information from the 2002-03 Lao Expenditure and Consumption Survey (LECS 3) and the 2005 Population and Housing Census. In terms of inequality, they found that inequality was greatest in urban areas and some parts of the northern upland areas and it was the lowest in the south and central highlands. Areas with better economic opportunities were not associated with higher inequality, as expected. The study has shed light on inequality in Laos, although its measurement was based on data in 2002-03. Messerli et al (2008) have also used the same data set and technique to produce socio-economic ATLAS, which is an economic mapping of Laotian socioeconomic conditions. The findings are similar as Epprecht et al (2008) but it illustrates richer geographical presentations.

The *2013 Human Development Report* stresses the importance of inequality, especially its adverse impact on human development in Laos (UNDP, 2013). The report suggests that Laos had made significant progress in economic growth and social development. Substantial progress has been made in the main human development indices, such as life expectancy, years of schooling, and Gross National Income (GNI) per capita. However, after discounted for inequality, Laos' HDI has been reduced by 25%. This report stresses that inequality could affect the efforts to advance development in Laos.

Nolintha et al (2014) provides a preliminary assessment on growth inclusiveness, including the descriptive assessment on inequality in Laotian economy. They show that Laos

generally performed well in generating economic growth and improving livelihoods. However, the composite inclusive growth index[27] for Laos is 5.6, which is considered moderate, because there are mixed performances in both income and non-income aspects of growth inclusiveness. In addition, that study also shows that the inequality rate had fallen during the aftermath of the Asian financial crisis, but it has risen again in recent years. The inequality rate in urban and rural areas has risen. Land slope and altitude level have influences on inequality rate. The study has helped to clarify inequality in Laos, but the analysis relies on secondary data and empirical data on inequalities derived by other studies.[28]

OECD (2013) examined how and if economic reform in Cambodia, Laos, Myanmar, and Vietnam (CLMV) has contributed to poverty reduction and income inequality. The study finds that Cambodia, Laos, and Vietnam have effectively used economic reform to rebuild their economies. However, these countries accomplished differently in terms of poverty and inequality reduction. Despite having a robust economic growth, Laos is the only country in this subregion that has experienced a rise in the inequality rate in recent years. The study attempts to relate the widening of inequality in Laos to Kuznets's hypothesis. The study asserts that economic growth alone is not the only answer for economic problems in CLMV; instead, benefits from growth should be equally shared.

7. Summary

Literature review in this chapter provides a good theoretical foundation for analysis of the Laotian economy. There are several important implications from the growth model. First,

[27] The issue of inclusive growth will be dealt with in Chapter 3 and detailed discussion on the composite inclusive growth index is provided in Appendix 1.

[28] Epprecht et al (2008) and Messerli et al (2008).

the challenges of developing countries might not be their scarcity in capital relative to labor force, as suggested in the Solow model, but the availability of human capital and technological knowledge. Developing countries therefore should focus on investments in their education system and infrastructures in order to strengthen human capital. In addition, developing countries should provide the supportive environment for private firms to increase investment in research and development activities or provide the right incentives to attract foreign, advanced technological firms.

Major FDI theories, discussed in this chapter, differ in terms of their assumptions, country, or regional context, and theoretical foundations (hence, implications and policy recommendations from each theory), could also vary. Natural resource endowments, investment climate (wage level, policy, and infrastructure) in the recipient countries, trade, and FDI liberalization policies are important determinants of FDI. A certain period of moderate protectionist policy that promotes domestic import-substituted industries is allowed in the Akamatsu original FG model, and to a certain extent, the Vernon PLC theory. Regional integration approach to development is clearly promoted in Kojima's FG model. Finally, in all of the models, it is clear that a country's development should be planned on the long-term horizon as the comparative advantage can evolve in a dynamic manner over time. Although the degree of intervention may vary, the government has an important role to improve domestic environment and shape the country's competitiveness edge.

The review of literature on Resource Curse and Dutch Disease hypotheses suggest that there are considerable risks and challenges for economic growth that mainly rely on the natural resource sector. The volatility of natural resource prices is an important challenge for macroeconomic management and stability. Other risks include poor institution, inducement for

corruption, and social problems. The review of literature on Dutch Disease, in particular, suggests that there are macroeconomic risks associated with the booming of the natural resource sector. These risks include real appreciation of local currency and adverse effect on the traded non-resource sector. The same type of impact could be applied to other sources of inflows, such as foreign aid and migration remittance. These suggest that developing countries that receive large inflows, either from exporting natural resources, official development assistances, or remittances, need to properly manage the inflows in order to avoid the adverse impacts on local economy.

Improving income distribution has become an important objective of development policy. The Kuznets hypothesis suggests that the change in inequality could follow a self-correcting path from increasing inequality during the early stage of development and decreasing inequality at the later stage. Several empirical analyses on the hypothesis have revealed mixed experiences. In addition, several empirical studies find that FDI could have an adverse impact on inequality. Consequently, inequality could have considerable impacts on economic development—in particular, on growth and poverty reduction.

As for the case of Laos, the existing studies were confined to the description of the characteristics of inequality in Laos. The studies are short of empirical analysis on the relationship between FDI and inequality in Laos. In addition, all studies being reviewed here used consumption data for inequality analysis, because those are the only reliable micro data available in Laos. Hence, this thesis intends to fill the gap with regard to the relationship of FDI and inequality in Laos.

Chapter 3 Laotian Economic Developments and the Natural Resource Boom

1. Introduction

Since the adoption in 1986 of the "New Economic Mechanism," a market-oriented economic policy, Laos has made significant progress in both social and economic development. The economy has grown at a remarkable rate over the past two decades. The population increased from 4.5 million in 1995 to 6.5 million in 2013. On the social ground, some progress has been observed. The poverty headcount ratio at national poverty line has fallen; the literacy rate for both male and female has risen, coupled with the improvement of primary school completion rate, as well as the total enrollment rate. Furthermore, all of the health indicators, such as infant mortality rate and life expectancy, have also shown some improvements.

Following the open-door policy, trade and investment have expanded significantly. The natural resource sector is becoming the fastest growing sector and it has also contributed to most of the recent expansion of exports, FDI inflows, and thus the GDP. Value added of the mining sector began to increase at a remarkable rate since 2003. The electricity sector has also become another major engine of growth. For the purpose of this study, the period beginning in 2003 in the Laotian economy is considered to be the natural resource boom period.

This chapter aims to examine the progress of economic development in Laos with particular focus on before and after the natural resource boom.[29] The next section discusses

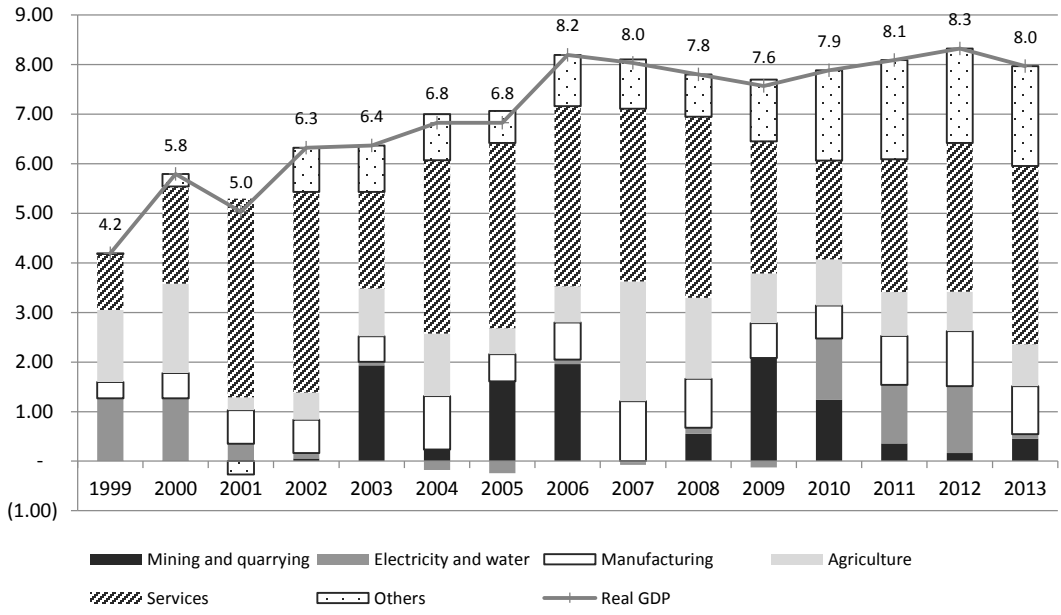
[29] Most of the analysis in this chapter is updated from several of my published works. Specific reference will be made in each corresponding session.

the performance of Laotian economy and the growth of the natural resource sector. Section 3 examines the macroeconomic stability. Section 4 discusses the Dutch Disease symptoms in the Laotian economy. Section 5 evaluates the inclusive growth in Laos. The last section provides a summary of this chapter.

2. Economic growth and the performance of the natural resource sector

The Laotian economy has grown rapidly in the last two decades at the average of 6.3% before 2003 and then at 7.5% from 2003 to 2013. Despite the recent global financial crisis, the Laotian economy grew by 7.8% in 2008 and 7.5% in 2009. GDP per capita has risen from US$ 319 in 2001 to over US$ 1,500 in 2013. During this period, the industry grew 10.8% per year, mainly driven by the mining industry and later by electricity production. The contribution of the mining sector to GDP growth increased from the level below 1% before 2003 to reach one-fifth of the growth during the peak period between 2003 and 2010 (Figure 3.1). The hydropower sector has played a more important role in the economy since 2010, when several large hydropower generators began their operations for enhancing the export of electricity. From 2010 to 2012, the value added of the electricity production sector grew at 35% per year and it contributed 15% to total GDP growth in this period. The boom in the natural resource sector also contributes to a higher demand for services in the economy. The banking and financial sector, hotel and restaurant sector, and real estate and construction sector grew more rapidly after the boom (Table 3.1).

Figure 3.1. Annual GDP growth and its compositions from major sectors (%)



Source: Calculated by the author from data compiled from *Annual Statistical Yearbooks* from 1999 to 2013 produced by Lao Statistics Bureau

Table 3.1: Annual growth rate by industry sector (%)

	1991-2000	2001-2005	2006-2013
Agriculture	1.25	1.57	3.61
Industry	5.04	8.52	12.53
Mining	1.13	225.40	18.00
Electricity and water supply	30.4	0.13	13.54
Manufacturing	1.24	8.60	9.84
Construction	11.8	5.77	16.3
Service	2.11	11.14	8.17
Wholesale and Retail trade	1.53	16.15	7.79
Hotel and Restaurant	1.40	2.48	7.33
Transport and Telecommunication	1.38	12.10	8.30
Bank and Financial Services	2.71	9.53	22.52
Real Estate	7.50	2.68	5.21

Source: Calculated by the author from data compiled from various *Annual Statistical Yearbooks* from 1991 to 2013 produced by Lao Statistics Bureau

Consequently, these industries have caused the expansion of the service sector. The growth of the service sector increased from an average of 4.9% before the natural resource boom to 8.3% after the boom. The agriculture sector also grew slightly faster, from an annual average of 2.2% before the boom to 3.2% after the boom.

2.1 Structure of Laotian economy

The composition of GDP has changed significantly over the last decade. In the 1990s, agriculture was the dominant sector of the Laotian economy; it accounted for 45% of the GDP but has contracted to 25% in 2013. The share of the industry sector increased from 18.4% in 1997 to 28% in 2013. Similarly, the share of the service sector has increased from 30.8% in 1997 to 38.9% in 2013. The share of mining sector in the Laotian economy has increased dramatically since 2003 because of the influx of FDI to that sector (Figure 3.2). In addition, the resource sector is expected to continue its important role over the next decade because of the government's plan for hydroelectric power development projects to be operationalized by 2020. These projects are expected to contribute to electricity production growth rate of not less than 20% annually on average. Furthermore, the untapped potential in the mining sector is huge. It is estimated that the potential reserves of gold and copper could be five to eight times the size of the currently proven reserves[30] (Brahmbhatt and Ekaterina, 2010). Based on present developments and future projections, the natural resource sector will continue to be an important driver of growth in the coming decade.

[30] Proven reserve for gold and copper in 2009 is 1,676,000 and 72 tons respectively (Marutani, 2006).

Table 3.2. GDP per capita and GDP composition by production sector, selected years

	1998	2004	2006	2007	2008	2009	2010	2013
GDP per capita (USD)	336	404	571	691	830	903	1,026	1,534
GDP Composition (% of nominal GDP)								
Crops and livestock	35.1	29.3	24.5	23.5	22.8	23.5	22.7	21.1
Forestry	6.0	3.7	2.9	4.0	4.1	3.5	2.9	1.1
Fishery	4.9	4.1	3.7	3.5	3.4	3.4	3.3	2.9
Mining	0.2	2.2	11.2	11.0	10.1	7.7	8.6	7.2
Manufacturing	8.1	8.3	7.8	8.2	8.6	9.8	9.6	9.6
Electricity and water	2.6	4.3	3.1	2.7	2.5	2.7	3.5	4.5
Construction service	7.5	4.7	4.5	4.9	4.8	4.8	5.2	6.8
Wholesale and retail	13.6	18.6	19.3	19.6	19.7	19.5	19.3	19.2
Hotel and restaurant	0.9	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Transport and telecom	4.0	4.5	4.9	4.9	4.9	4.8	4.8	4.9
Financial service	1.4	1.9	2.6	3.0	3.3	3.4	3.4	3.7
Real estate	4.3	4.0	3.5	3.4	3.3	3.2	3.0	3.1
Other services	6.1	7.7	4.6	4.1	5.2	6.8	6.0	7.2
Custom and duty	5.4	5.9	6.4	6.5	6.6	6.3	7.0	7.9

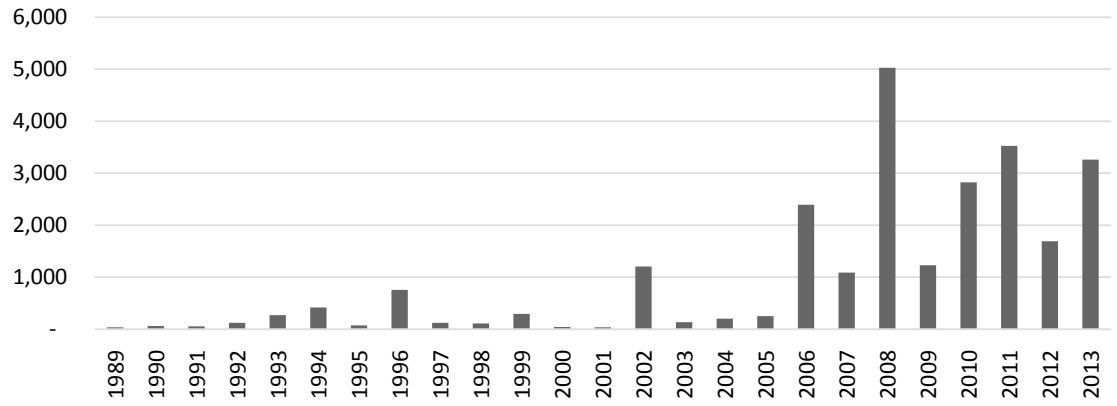
Source: Calculated by the author from data compiled from various *Annual Statistical Yearbooks* from 1999 to 2013 produced by Lao Statistics Bureau

Table 3.3: Total employment and composition in each sector, selected years

	1998	2003	2008	2013
Total employment	2,433,730	2,579,700	2,798,654	3,692,494
Share of employment by sector (% of total)				
Agriculture	77.78	73.73	68.45	66.14
Mining and hydropower	0.00	0.21	0.49	0.63
Manufacturing	4.60	5.94	7.68	7.04
Construction	2.47	2.90	3.47	3.69
Services	15.15	17.22	19.91	22.50

Source: Calculated by the author from data compiled from various *Annual Statistical Yearbooks* from 1998 to 2013 produced by Lao Statistics Bureau

Figure 3.2 Committed FDI (in US$ million)



Source: NERI's data set on committed FDI provided by the Department of Investment Promotion

While the structure of the Laotian economy has transformed rapidly, the majority of the workforce remains in the agriculture sector. More specifically, the share of employment in agriculture declined from 74% in 2003 to 66% in 2013. The share in service and construction increased from 20.1% in 2003 to 26.2% in 2013. The employment share in the manufacturing sector increased only slightly from 5.9% in 2003 to 7.04% in 2013, while that share in the natural resource sector (mining and hydropower) increased from below 0.2% in 2003 to 0.6% in 2013. The change of employment share in the natural resource sector is small, because the natural resource sector has a high ratio of capital to output; hence, the expansion of the natural resource sector has limited benefits on employment. For instance, the sector produced 11.7% of Laos' GDP in 2013 with only 23,000 people.

2.2 Foreign Direct Investment in Laos

FDI inflow has grown rapidly. The value of committed FDI increased from an annual average of US$ 256 million before the natural resource boom to US$ 1.9 billion after the boom. The influx of FDI has been driven by the boom of the mining and hydropower sector (Figure 3.2). The share of FDI in the resource sector increased from below 20% before the boom to above 50% after the boom (Table 3.4). Particularly, the share of the mining sector alone increased from a level below 5% during 2001-03 to almost 30% between 2004 and 2013. However, the share of FDI in manufacturing declined from 15% during 1991-96 to 10% between 2001 and 2010. FDI inflow to the agriculture and wood sector has been quite stable, whereas the share of FDI in the service sector has declined gradually. Most FDI inflows to Laos have been from neighboring countries (Table 3.5). The top investor has been always one of the three major neighboring countries, such as Thailand in the period before 2005, Vietnam for the period from 2006-10, and China in the most recent period.

Table 3.4: Share of committed FDI in Laos by sector (% of total FDI)

	1991-95	1996-2000	2001-05	2006-10	2011-13
Mining and hydropower	19	12	64	50	73
Manufacturing	15	8	10	10	4
Agriculture and Wood industry	12	14	9	15	10
Services	55	66	17	26	13

Source: Calculated by the author based on the data set on committed FDI provided by the Department of Investment Promotion

Table 3.5: Share of committed FDI in Laos by country (% of total FDI)

No.	2001-2005		2006-2010		2011-2013	
	Country	% FDI	Country	% FDI	Country	% FDI
1	Thailand	29.28	Vietnam	29.36	China	37.6
2	France	19.94	China	27	Vietnam	34.08
3	Australia	15.15	Thailand	23.03	Thailand	9.58
4	China	13.51	Korea	5	Netherlands	3.83
5	Vietnam	6.01	Japan	4.71	Korea	0.1
6	Others	16.11	Others	10.91	Others	14.81

Source: Calculated by the author based on the data set on committed FDI provided by the Department of Investment Promotion

2.3 Trade performances

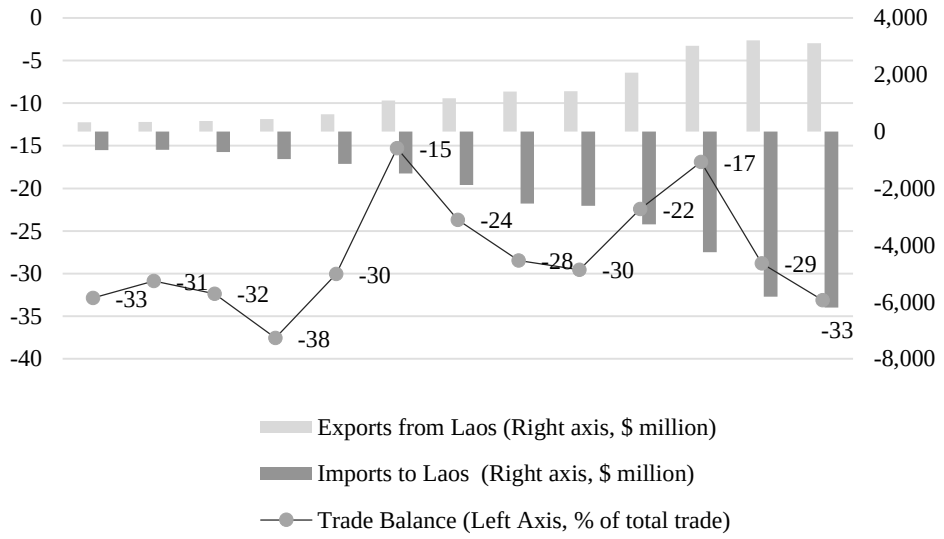
Since the introduction of open door policy in the early 1990s, exports and imports have increased dramatically. Exports increased from US$ 328 million in 2003 to US$ 607 in 2005 and further increased to US$ 3,110 million in 2013 after the export boom in the mining sector. Despite better performance on the export side, trade deficit still remains large and chronic (Figure 3.7). The growth of imports results from several factors. First, most of the exports in Laos require a lot of imports of raw materials, parts, and components. Therefore, an increase in export also comes with soaring imports. Second, most FDI projects require the import of a lot of capital goods from abroad. Finally, the growing domestic demand in recent years also requires an import of consumption goods.

The export basket has been highly concentrated; the top six major export products, altogether, accounted for about 60% to 80% of total exports from 2001 to 2013 (Table 3.6). As a result of the recent mining sector boom, copper has become the largest exported commodity since 2006. It increased dramatically from an insignificant level of about US$ 30 million in 2001 to US$ 982 million in 2013. Other major export goods are wood, textiles, and in recent years, electricity. Main export destinations are Thailand (59%), Australia (19%), Vietnam (8.9%), and China (4.1%).

Major import goods are fuel, machineries, electrical products, vehicles, and machineries (Table 3.7). The top six imported products accounted for more than 70% of total imports in 2013 (Table 2). The import of mineral fuel, the largest import item, was worth more than US$ 1 billion in 2013, which came mainly from Thailand (91%). The second largest import products were vehicles and parts from Thailand (65%), China (14%), and Japan (8%). In addition, machinery imports listed as the third place in 2013. Thailand, China, and Germany were major suppliers.

Neighboring countries are Laos' major trade partners. Thailand represents the most significant trading partner of Laos, with trade volume accounting for more than 50% of total trade (Table 3.8). Vietnam and China are the second and third largest trading partners, respectively. Thailand, Vietnam, and China accounted for about 75% of Laos's total trade volume for the period 2001-12. The geographical condition of being a landlocked country inevitably forces the country to trade with the markets with close proximity. The type of export products and the degree of integration with the global market are also influenced by such market concentration.

Figure 3.3 Trade performance, 2001-2013 (US$ million)



Sources: Calculated by the author from data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 3 August 2014)

Table 3.6: Major export products from Laos

HS	Export goods	Value in Million $				% of Total Exports			
		2001	2005	2008	2013	2001	2005	2008	2013
74	Copper and articles thereof	0.1	82.1	518.0	665.5	0.01	13.51	36.8	21.4
44	Wood and articles of wood, wood charcoal	118.5	170.5	254.4	517.1	36.05	28.06	18.07	16.6
61	Articles of apparel, knit or crochet	53.0	95.1	129.8	104.4	16.11	15.66	9.22	3.4
62	Articles of apparel, not knit or crochet	77.4	84.1	104.7	159.3	23.55	13.84	7.43	5.1
9	Coffee, tea, mate, and spices	11.9	16.2	44.9	66.4	3.61	2.66	3.19	2.1
26	Ores, slag, and ash	4.7	3.0	60.0	471.1	1.42	0.5	4.26	15.1
	All products	328.7	607.	1,407.	3,111.	100	100	100	100
	Top 6 products	265.5	450.	1,111.	1,983.	80.76	74.2	78.9	63.8

Sources: Calculated by the author from data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 3 August 2014)

Table 3.7: Major import products to Laos

HS	Import goods	Value in Million $				% of Total Import			
		2001	2005	2008	2013	2001	2005	2008	2013
27	Mineral fuels, oils, distillation products	82.2	208.1	527.8	1,051.56	12.7	18.4	20.9	17.0
87	Vehicles other than railway, tramway	69.2	130.0	374.4	1,002.15	10.7	11.5	14.8	16.2
84	Nuclear reactors, boilers, machinery	53.6	116.4	275.6	938.99	8.3	10.3	10.9	15.2
85	Electrical, electronic equipment	89.1	89.3	211.4	883.37	13.8	7.9	8.4	14.3
73	Articles of iron or steel	8.9	25.5	111.5	239.98	1.4	2.3	4.4	3.9
72	Iron and steel	15.7	38.5	124.7	205.95	2.4	3.4	4.9	3.3
22	Beverages, spirits, and vinegar	27.7	55.5	64.7	78.12	4.3	4.9	2.6	1.3
	All products	646.8	1,134.4	2,530.7	6,192.11	100	100	100	100
	Top 6 products	346.4	663.2	1,690.0	4,400.1	49.3	53.6	64.2	71.1

Sources: Calculated by the author from data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 3 August 2014)

Table 3.8: Major trading partners of Laos (% of total trade volume)

	2001	2005	2006	2007	2008	2009	2010	2011	2012
Thailand	51.1	57.0	59.3	58.4	60.0	52.2	54.1	53.9	53.7
China	6.33	7.39	8.52	8.65	10.2	18.4	20.3	17.9	19.1
Vietnam	13.5	9.56	10.2	10.5	11.1	10.4	9.22	10.2	9.80
France	5.03	3.60	2.00	1.69	1.32	1.98	1.51	2.24	0.63
Germany	3.51	2.59	2.07	2.69	1.81	1.81	1.62	1.71	2.58
Japan	1.91	1.58	1.28	1.63	2.04	2.55	1.88	2.41	2.90
United	1.98	2.75	2.25	1.75	1.62	2.02	1.61	1.73	1.25
Korea	0.69	0.92	1.60	4.13	2.69	1.82	2.48	2.19	1.96
Singapore	2.74	2.37	1.63	1.33	0.67	0.91	0.48	0.48	0.39
Belgium	1.44	1.67	0.98	0.71	0.83	1.09	0.70	0.67	0.57

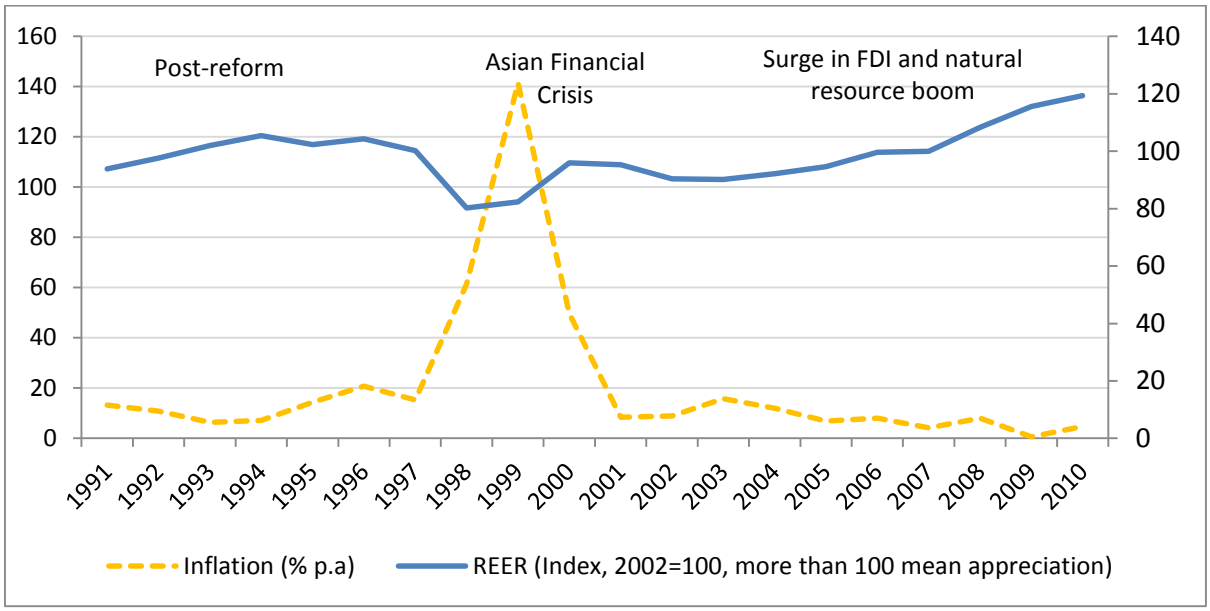
Sources: Calculated by the author from data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 3 August 2014)

3. Macroeconomic stability

Achieving macroeconomic stability has been an important goal of Laotian economic policy. Reflecting on the experiences in the 1990s, the cost of macroeconomic instability was large and the recovery was time consuming and painful. The Laotian government has tried to achieve rapid economic growth in tandem with macroeconomic stability. This section discusses the key elements of macroeconomic stability in the Laotian economy.

3.1 Inflation

Figure 3.4: Inflation and REER in Laos

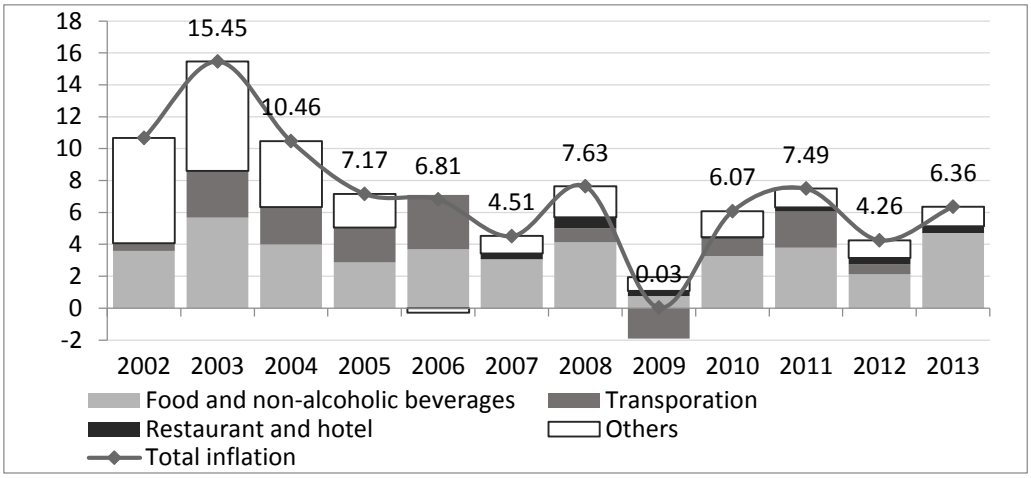


Source: Inflation data is calculated by the author based on NERI's data set on CPI and REER is calculated from the data set from Danvas (2012).

The inflation rate in Laos has gradually declined. The annual average inflation rate was around 13% before the Asian financial crisis in 1997 but it reached 87% in 1998 and it further aggravated to 134% in 1999 (Figure 3.4). This extraordinarily high inflation rate was due to two reasons: first, the extensive printing of money to finance the government's expenditure to mitigate the recessionary impact of the Asian financial crisis; second, the huge devaluation of the Laotian currency Kip (LAK). In order to response to the inflation problem, the government issued a substantial amount of BOL (the Bank of Laos) bills in order to absorb the excess liquidity of the economy; consequently, the inflation rate dropped to 27% in 2000, and subsequently, inflation rate has gradually stabilized.

However, inflation in Laos in recent years was largely caused by an increase in food prices (Figure 3.5). This was created by supply and demand factors. On the demand side, the

Figure 3.5 Inflation and the major contributors



Source: Calculated by the author based on NERI's data set on inflation. The data set was compiled from various Monthly Inflation Report produced by Lao Statistics Bureau.

rapid growth of the Laotian economy caused a continuous increase in total demand, including demand for food. However, the supply of food in Laos, although it has expanded, continuously faced bottlenecks. More specifically, productivity in the agriculture sector remains low and there were better incentives for farmers to allocate more land for cultivating other cash crops for exports instead of for growing food for domestic consumption.

The inflation in Laos has traditionally been influenced substantially by foreign inflations, especially from its major trading partners. More than 60% of Laos' imports have come from Thailand, thus price increases in Thailand should have exerted a significant impact on the price level of Laos through import price inflation. In addition, the heavy reliance of imports on Thai products would make the foreign exchange rate of LAK against the Thai Baht another important determinant of inflation in Laos. Empirical evidence from Insisienmay and Nolintha (2010) show that inflation in Laos is influenced by inflation in Thailand and the nominal exchange rate against Thai Baht, while domestic money supply and output growth

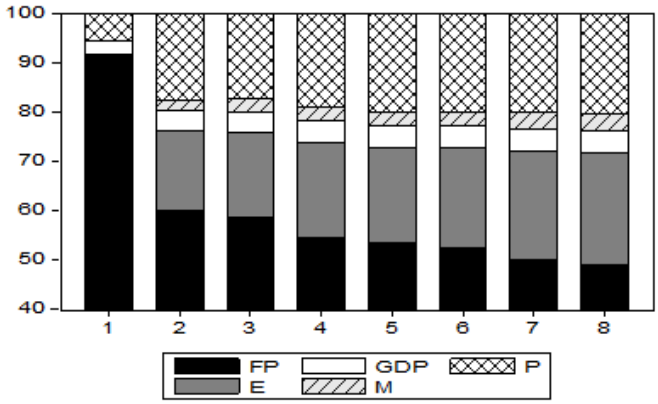
have minimal impact on inflation. Using the accumulated impulse response, based on the Structure Vector Autoregressive model of inflation, the study finds that Thai inflation explains about 92% of the variation in Lao inflation in the short term (Figure 3.6). Over the medium and long term, 47% of the variation comes from the Thai inflation, 24% from the nominal exchange rate between LAK against Thai Baht, 4.5% from the rate of economic growth, and 3.4% comes from money supply growth. These analytical findings substantiate the impact of imported inflation in Laos; thus, its economy needs a policy anchor for maintaining exchange rate stability in order to control price stability.

3.2 Exchange rate

The value of LAK has changed in two major trends. In early 2000s, LAK depreciated against both Thai Baht and the US Dollar. However, the exchange rate reversed the trend and the appreciation of LAK against the US Dollar has been observed since 2003, when there was an influx of FDI to Laos (Figure 3.7). The export sector expressed their concerns about the impact of continuous currency appreciation on their competitiveness. Although the net impact of the nominal exchange rate appreciation was apparent, it was inconclusive in the medium term because Laos will benefit from the imports of consumption and capital goods.

However, the concern over the loss of competitiveness was valid because it was affected by the appreciation of the real effective exchange rate (REER) since 2002 (Figure 3.7). After the boom of the natural resource sector, the REER of LAK increased more rapidly than other countries in the subregion. This is consistent with the symptoms of the Dutch Disease problem as discussed in Chapter 2.

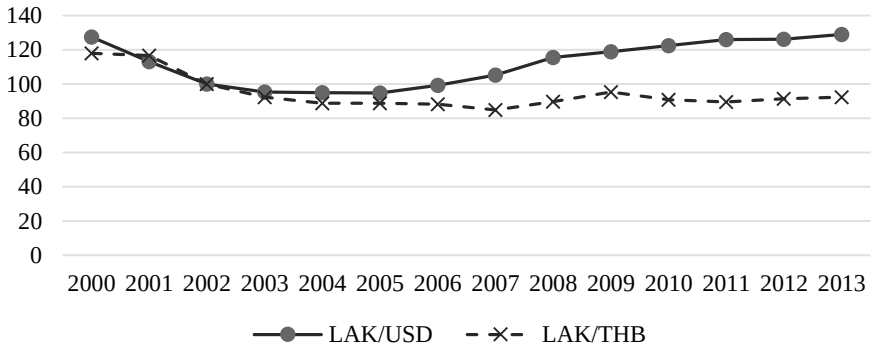
Figure 3.6: Variance decomposition of inflation in Laos



Note: FP denotes inflation in Thailand, E denotes the exchange rate between Lao Kip and Thai Baht, GDP denotes the output growth in Laos, M denotes the growth of money supply in Laos and P denotes the one period lag inflation in Laos.

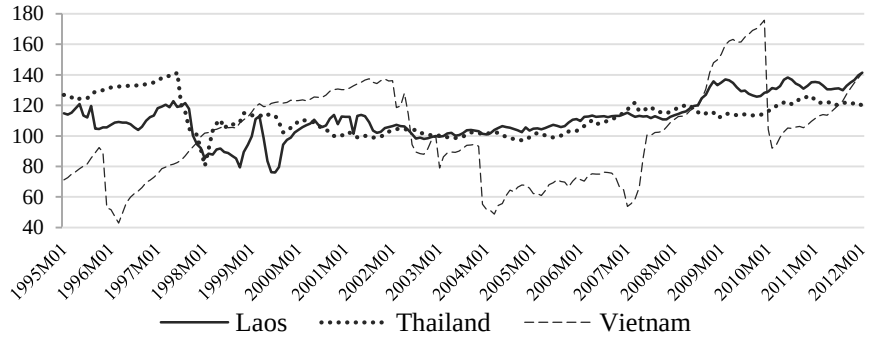
Source: Insisienmay and Nolintha (2010)

Figure 3.7: Nominal exchange rate of LAK against US Dollar and Thai Baht



Note: 2002=100. Increase of the index indicates an appreciation of the currency.
Source: Calculated by the author using NERI's data set on exchange compiled from *Monthly Reports* by the Bank of Laos

Figure 3.8: Real effective exchange rate



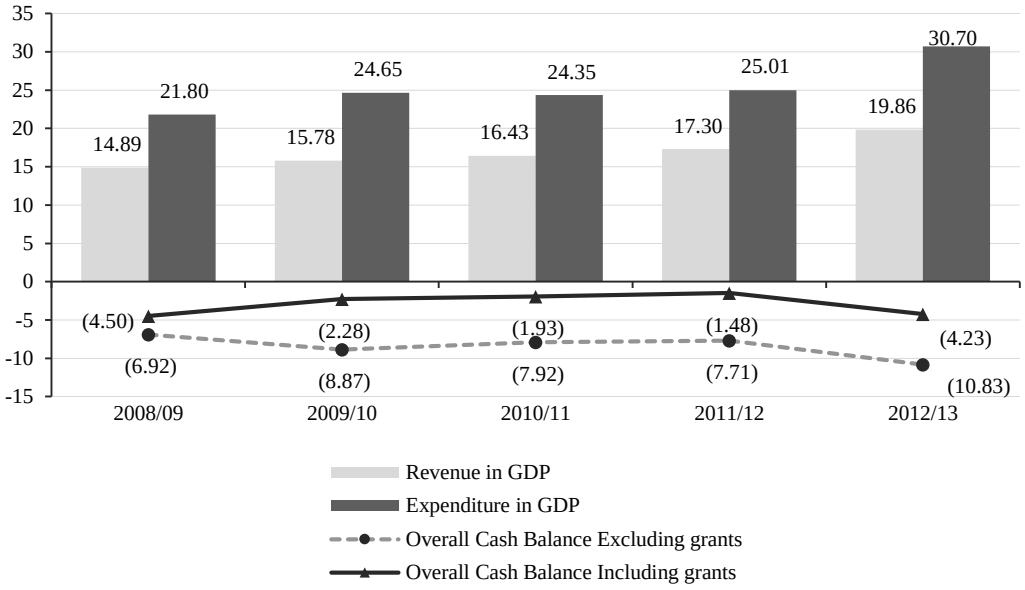
Note: December 2002 = 100. Increase means appreciation.
Source: Calculated by the author using data set from Darvas (2012).

However, carefulness must be taken into account when explaining the causes of the rise in REER. The surge in the export of natural resources and the large inflow of foreign capital could theoretically contribute to the appreciation of the real exchange rate. But this is difficult to detect in the early stage in the sense that during the same period, especially since 2000, macroeconomic stabilization policy has been the main focus of the government in economic policy. Part of that was the "de-dollarized" effort, the attempt for improving the trust and confidence in national currency. The policy was quite effective because the trended nominal depreciation has been halted and reversed. From this viewpoint, it is possible that the real appreciation of the LAK was caused by both inflow of capital and the macroeconomic stabilization policy.

3.3 Dollarization in the Laotian economy

The Laotian economy is facing the problem of dollarization. From 1992 to 2009 foreign currency deposit accounted for 65% of total deposits. The ratio declined to 43% in 2012. There were several reasons for dollarization in the Laotian economy. Macroeconomic instabilities in the early stage of the transition process caused a loss of confidence in holding domestic currency and consequently local people switched to foreign currencies, especially the US Dollar and Thai Baht. Empirical analytical findings show that the main contributing factors of dollarization in Laos are the expected rate of return from holding the foreign currency, followed by inflation rate and exchange rate (Songvilay 2009). The decline in the rate of dollarization has reflected the success of the central bank's policy in combating inflation and building up confidence in local currency. De-dollarization was achieved through recent substantial inflows of FDI in the mining and hydropower sector. However, continued pursuit of the strong LAK policy could cause adverse impact on the competitiveness of the manufacturing sector.

Figure 3.9: Fiscal balances



Source: Calculated by the author using NERI's data set on fiscal sector. The data set was compiled from various *Annual Fiscal Reports* from year 2008/09 to 2012/13 produced by the Mistry of Finance.

3.4 Fiscal balances

The Laotian economy has experienced fiscal deficits for a long time. Because of the limited domestic resource, Laos relied on grants and loans to finance public investment projects. The annual average amount of the grants was as large as 3% of GDP between 2000 and 2010, but the inflow of grants has been unstable. More than half of public expenditure was allocated to public investment projects. With the expected increase in the revenue stream from mining and hydropower, the government decided to provide living allowances and increase salary for government officials in the fiscal year 2012/13. Therefore, the share of current expenditure in total expenditure was 64%, equivalent to 99.6% of domestic revenue in that year. Such policy had a good intention to improve the livelihoods of government officials who had long been underpaid. However, the policy has a serious impact on the fiscal balance position of the

government (Figure 3.9). Fiscal deficit increased from 7.7% of GDP in 2011/12 to 10.8% in 2012/13. The aggravated fiscal imbalance forced the government to postpone several investment projects, which were already in the pipeline. In order to deal with the fiscal difficulty, the government decided to postpone the implementation of a plan that would further increase salary of government officials from 2013/14, and it has also stopped the monthly allowance, which was introduced in 2012/13. *Ceteris paribus*, this fiscal expenditure, together with other measures, both in revenue and expenditure sides, is expected to reduce fiscal deficit to a more manageable level and ultimately to achieve primary fiscal balance.

4. Symptoms of the Dutch Disease in the Laotian economy[31]

Although the inflow of foreign currency in the form of export earning, FDI and ODA, has contributed substantially to economic growth and industrial development, this growth model could pose several risks to Laotian economy. Chapter 2 has explained that resource-driven growth might not be sustainable in the long term because commodity prices have a downward trend and they are also volatile. Resource-rich countries are also prone to the Dutch Disease problem, which is a phenomenon that explains the deterioration of the international competitiveness of manufacturing exports due to appreciation of the currency caused by the rise of commodity exports. This situation is harmful to the economy and consequently it creates impediments to the industrialization process, especially in a developing country like Laos.

Chapter 2 has shown that many empirical studies validate the Dutch Disease phenomenon by observing the movement of the exchange rate, the growth of the non-resource

[31] This section of the chapter is updated substantially from my previous published work: Park, I., Insisienmay, S. & Nolintha, V. (2013).

tradable sector, the development in the non-tradable service sector driven by rising demand or increasing purchasing power, trends in private and government spending, labor productivity, and resource movement across sectors.[32] These are the indicators that warn of the existence of Dutch Disease. Real appreciation of LAK is already discussed in the earlier section. The rest of this section will discuss other symptoms in the Laotian economy in order to clarify the Dutch Disease problem in the Laotian economy.

The non-tradable service sector has increasingly become a more important part of the Laotian economy. As shown earlier, the service sector grew most rapidly compared to the industry and agriculture sector. After the natural resource boom, the wholesale and retail, real estate, transportation, and construction sectors expanded significantly. With the lack of input-output table data in the time of the study, a formal examination of the links between the booming natural resource sector and the non-tradable service sector is not possible. However, these sequences of development illustrate that the non-resource, non-trade sector has also grown impressively during the period of resource boom, and they are the causes and consequences hypothesized by the Dutch Disease.

It is worth noting that the non-resource tradable sector continues to grow after the natural resource boom. The value added of the tradable non-resource sector has increased in tandem with the expansion of the resource sector (Figure 3.10). For instance, the manufacturing sector grew at an annual average rate of 9.8% from 2004 to 2013 and it was higher than the growth rate before the boom. In addition, exports of non-resource and resource sectors grew in similar trends since

[32] See Frankel (2010) and Corden and Neary (1982) for more detail discussion.

Table 3.9. Monthly household consumption index in selected years

	1997/98	2002/03	2007/08
Laos	100	150	354
Urban	100	150	309
Rural	100	133	338

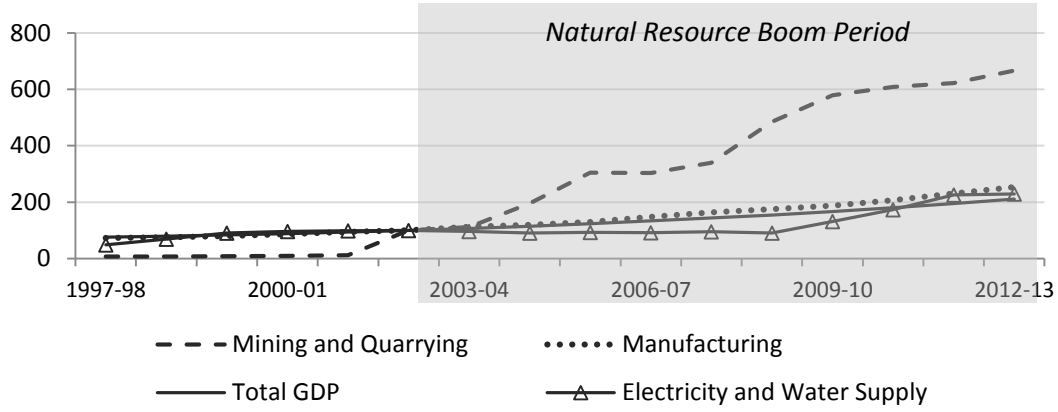
Note: FY 1998 is based to 100.
Source: Calculated by the author based on data set on LECS provided by the Lao Statistics Bureau.

2003. The export growth of the resource sector was faster than that of the non-resource sector, i.e, 32% compared to 20% from 2004 to 2013 (Figure 3.11). Therefore, the non-resource tradable sector in the Laotian economy has continued to expand after the natural resource sector boom. This observation contradicts the Dutch Disease hypothesis.

Spending in the Laotian economy increased more rapidly after the natural resource boom. Based on the *Lao Expenditure and Consumption Survey*, the average annual growth of real consumption increase was 10% during the period from 1998 to 2003, but it jumped to 27% during the period from 2003 to 2008. The increase in consumption has occurred in both urban and rural areas (Table 3.9). In addition, government expenditure has grown continuously. The share of government expenditure in the GDP increased from an average of 6.2% during the period 2001-03 to 18% during the period 2004-06, then to 14.5% during the period 2007-09 (Figure 3.12). The increase in the government expenditure was mostly attributed to salary and other current expenditures, such as the procurement of office materials and supplies. The increase in domestic demand contributed to a surge in imports of consumer goods. For instance, the value of the import of consumer goods jumped from an annual average of US$ 200 million from 1994 to 2003 to US$ 600 million in 2008 and US$ 1.2 billion in 2012.

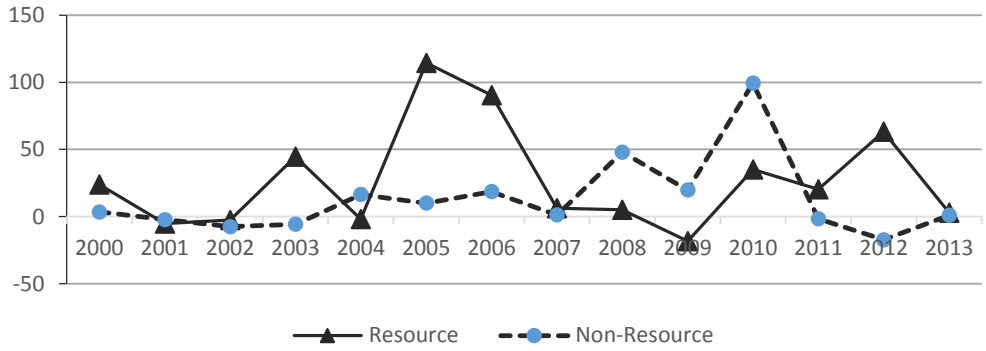
Finally, another symptom of the Dutch Disease can be diagnosed by examining the movement of factors of production between the resource and non-resource sectors. Chapter 2 has explained that if there was a resource movement effect of the Dutch disease, factors of production such as labor would be attracted from the tradable non-resource sector, i.e., manufacturing, to the booming resource sector and the growing non-tradable non-resource service sector. According to *Economic Census 2006*, the mining sector employed only 1.3% of labor in non-agricultural sector or 0.3% of total labor force, and hydropower sector employed 1% of non-agricultural labors or 0.24% of total labor force. Therefore, the resource sector in the Laotian economy is very capital intensive, hence, the expansion of this sector has not significantly affected the movement of labor. By looking at the changing structure of labor force in the past, there are some interesting observations. The share of labor force in the agricultural sector declined by 7.6% from 2003 to 2013, while the share in the industrial sector increased by 1.5%. This shows that the service sector has absorbed more labor flow from the agricultural sector than the industrial sector. In addition, the share of labor force in the manufacturing sector increased 1% in this period. These imply that because of the spending effect from Dutch Disease a boom in the non-tradable non-resource service sector has attracted more labor from agriculture, which is also a tradable non-resource sector, rather than the manufacturing sector. The movement of labor from agriculture could benefit the Laotian economy because labor was moved to a more value added sector. From these developments, the resource movement effect of the Dutch Disease appears to be insignificant in Laotian economy.

Figure 3.10: GDP, value added of resource and non-resource sectors



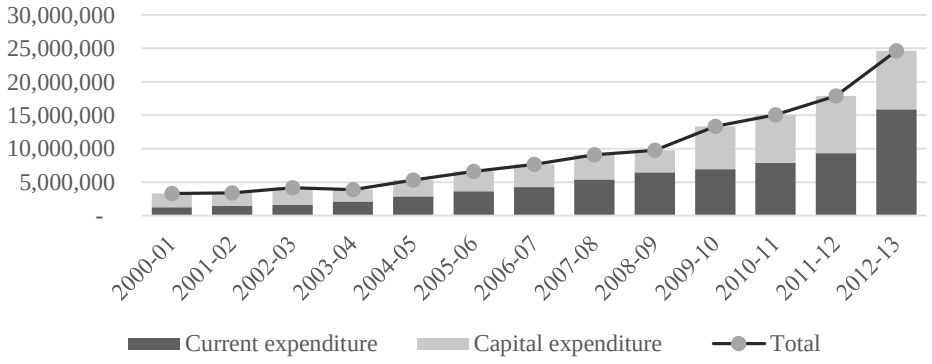
Note: GDP is in constant price. The value in the fiscal year 2003 is set to 100 as a base year.
Source: Calculated by the author based on NERI's data set on GDP. The data set was compiled from several Annual Statistical Yearbooks published by Lao Statistics Bureau.

Figure 3.11: Export growth of resource and non-resource sector



Sources: Calculated by the author from data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 3 August 2014)

Figure 3.12 Government Expenditure



Source: Calculated by the author using NERI's data set on fiscal sector. The data set was compiled from various *Annual Fiscal Reports* from year 2000/01 to 2012/13 produced by the Mistry of Finance.

5. Inclusive growth in Laos

Economic growth is the fundamental objective of governments in both developed and developing countries. However, the development objective has shifted from a purely rapid growth focus to the improvement of sustainable development and in recent years to the emphasis on inclusive growth.

Sustainable development is defined as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations 1987). In line with this notion, development strategies for growth have focused on achieving the balance of economic growth and the preservation of the environment and natural resources. As such, sustainable growth deals with intertemporal choices. On the other hand, inclusive growth emphasizes sustainable growth that expands economic opportunities, which ensure accessibility for all. The World Bank (2009) defines inclusive growth as growth that is broad-based across all sectors; it is a growth process that allows a large part of the country's labor force to contribute to and benefit from it. Similarly, ADB (2008b) defines inclusive growth as a sustainable growth that creates and expands economic opportunities, this consequently ensures that broad members of society can participate in and benefit from growth. Inclusive growth also deals with the pace and pattern of growth, with particular emphasis on both employment and productivity growth in which the government plays a facilitating role.

The government of Laos has integrated the concepts of sustainable development and inclusiveness into its core objectives of development. Among other things, reducing poverty and disparities between urban and rural areas and between districts, provinces, and regions are the main objectives of the *Seventh Five Year Socio-Economic Development Plan*, which defines major policy directions pertaining to development strategies and priorities for the

period between 2011 and 2015. In addition, this seventh plan also makes an explicit link between economic growth, social development, and environmental protection. These policy directions show that the government places the importance of sustainable and inclusive growth as integrated concepts in its development agenda.

Growth inclusiveness is a new concept, hence, there is a lack of standard measurement technique to quantify the inclusiveness of growth. McKinley (2010) was one of the pioneers who created a methodology to evaluate growth inclusiveness. Building upon the Asian Development Bank's definition of inclusive growth, McKinley (2010) proposes that the assessment on growth inclusiveness should cover four areas: (1) economic growth rate, the availability of quality employment opportunity (the term "productive employment" is used), and access to economic infrastructure; (2) the progress in poverty reduction and in reducing inequality; (3) the development of human capital; and (4) the availability of an enhanced social protection system. The composite inclusive growth index for Laos has been calculated using the methodology proposed in McKinley (2010) and the results are provided in Appendix 1. ADB (2011) provided a similar but broader set of indicators to examine the stage of growth inclusiveness. They proposed thirty-five indicators, which can be grouped into eight dimensions: poverty and inequality; economic growth and employment; key infrastructure endowment; access to education and health; access to basic infrastructure utilities and services; gender equality and opportunity; social safety nets; and good governance and institutions. More recently, Anand, Mushra, and Peiris (2013) provided a quantitative technique to measure inclusive growth. They applied the microeconomic concept of a social mobility function at the macroeconomic level. Based on this methodology, inclusive growth

depends on income growth and income distribution. This technique has been used in many subsequent works of IMF research staff in evaluating the inclusive growth in several countries.

In order to assess the present situation of growth inclusiveness in Laos, this section examines several indicators of growth inclusiveness in line with the definition and concept of inclusive growth. Most the indicators are already discussed in earlier sections, so the discussion in this section attempts to elucidate the inclusive growth dimension.

5.1 Growth, employment, and access to economic resources

As discussed in Section 2, GDP and per capita GDP growth rates have been relatively high in the last two decades, excepting a slight interruption during the Asian financial crisis. A good performance of per capita income growth is fundamental in enhancing inclusive growth, because this is the basis for creating and expanding economic opportunities, which are important elements of inclusive growth.

GDP growth has been driven by the expansion of mining and hydropower sectors in Laos, which are capital intensive. Therefore, economic growth in Laos has not been commensurate to broad-based increase in employment. For instance, the value added of the mining sector accounted for 7.2% of GDP in 2013, but this sector employed only 11,900 people, which is equivalent to 0.3% of total employment. Similarly, the share of the hydropower sector is 4.5% of GDP, while its share in total employment is also 0.3%. In addition, more than 60% of employment remains in the agriculture sector, and the majority of those labor forces rely on the vulnerable income source. According to the *Population Census* in 2005, the share of self-employed and unpaid family workers in total labor force were 46% and 42%, respectively.

This group of workers is considered as vulnerable employment in the UN's Millennium Development Goals.

Access to economic resources has improved gradually in Laos. The electrification improved considerably at national level (Figure 3.13). However, the difference between urban and rural areas in terms of access to electricity remains large. For instance, the electricity coverage in urban areas rose from 91% in 1997/98 to 99.2% in 2007/08, while the coverage in rural areas increased from 16% in 1997/98 to 48.5% in 2007/08. Moreover, access to land has improved significantly (Figure 3.14). In 1997/98 only 51% of urban households had access to land, compared with 93% of rural households. In 2007/08, almost 100% of households in both urban and rural areas had access to land. Finally, access to main roads has also improved. The percentage of households that could access roads increased in both urban and rural areas and in both seasons (Table 3.10). For instance, 71% of households could access roads during the dry season in 2002/03, and it increased to 99.8% in 2007/08. Similarly, the percentage of households that could access roads in the rainy season also increased from 54% in 2002/03 to 84.2% in 2007/08.

The evidence presented above suggests that although the Laotian economy has grown remarkably in tandem with improved accessibility to economic resources, the economy was not able to generate broad-based employment opportunities and consequently there are still many workers who continue to engage in vulnerable employment. Improvement in access to economic resources in rural areas also needs to be strengthened in order to promote better equality from growth.

5.2 Poverty and inequality

The assessment of inclusive growth requires parallel analysis of poverty and inequality. It was argued that before the introduction of the inclusive growth concept, development policy focused too much on addressing extreme poverty while widespread income and wealth inequalities were neglected (McKinley, 2010). Change in inequality is the core factor in the analytical frameworks used by much of the IMF staff. This subsection discusses changes in poverty and inequality in Laos. Detailed analysis on these two subjects will be dealt with in Chapter 7.

The progress in poverty reduction has been impressive. The poverty incidence, both in terms of the national and international poverty line, has declined substantially. The poverty gap[33] and poverty severity[34] have also decreased (Table 3.11). However, the situation has varied considerably across different regions and areas. The south has performed better than other regions, while the situation in the north has lagged behind. The border area with Thailand, which is the most populous border area and has the highest degree of foreign trade integration, has the most outstanding poverty reduction; consequently, it has a lower poverty incidence than the rest of the country. Elevation seems to have a positive correlation with poverty. The upland area, which has lower population but is abundantly endowed with rich natural resources, has the highest incidence of poverty and the lowest rate of poverty reduction.

[33] Poverty gap captures the mean aggregate income or consumption shortfall relative to the poverty line across the whole population. It is calculated by adding up all of the shortfalls of the poor and dividing by the population. This shows how far off households are from the poverty line. This indicator is also known as the depth of poverty.

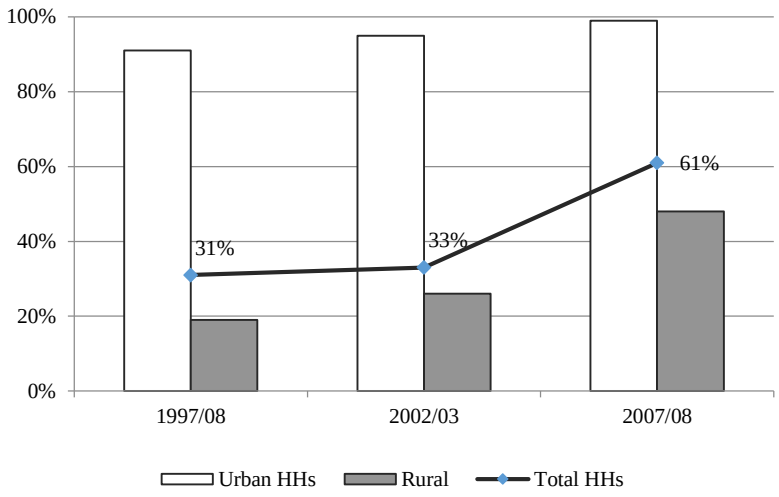
[34] Poverty severity is known as the square of poverty gap. It is calculated by taking the average of squares of poverty gap relative to poverty line. This indicator therefore takes into account both the distance between the poor and poverty line and inequality among the poor. More weight is given to households who are further away from the poverty line.

Areas with the best links to markets and infrastructures have the fastest reduction rate declines in poverty.

In a low-income or lower-middle-income country, inequality tends to increase along with the rise in income. This is also true for Laos. However, compared with countries at similar levels of income, inequality in Laos is considered moderate. Inequality increased from 1992/93 to 1997/98, but it declined from 1997/98 to 2002/03, and the disparity has widened again from 2002/03 to 2007/08. The increase in inequality in the most recent period might have created a lower impact of GDP growth on poverty reduction, as discussed above. This study intends to examine the relationship between growth, poverty and inequality in Chapter 7.

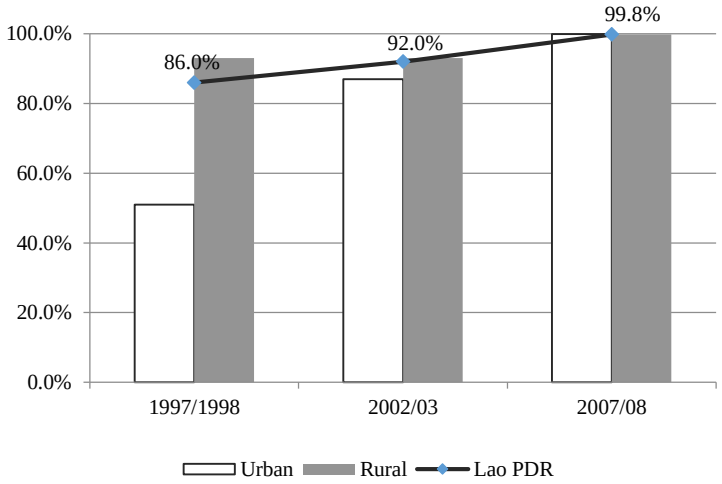
Gender equality in terms of access to education has been improved. The ratio of female students to male students in secondary education increased from 75.9% in 2005/06 to 84.29% in 2011/12 (Figure 3.15). There is still a room for improvement, particularly in the adult literacy rate, in which the female literacy rate is still lower than that of males (Table 3.12).

Figure 3.13. Percentage of villages with electricity



Source: Compiled from Lao Consumption and Expenditure Surveys reports in 1998, 2003, and 2008 published by the Lao Statistics Bureau

Figure 3.14. Household access to land



Source: Compiled from Lao Consumption and Expenditure Surveys reports in 1998, 2003, and 2008 published by the Lao Statistics Bureau

Table 3.10: Percentage of household that can access to main road

	Access to road in dry season		Access to road in raining season	
	2002/03	2007/08	2002/03	2007/08
Laos	71	99.8	54	84
Urban	100	100	97	98
Rural	84	100	65	80

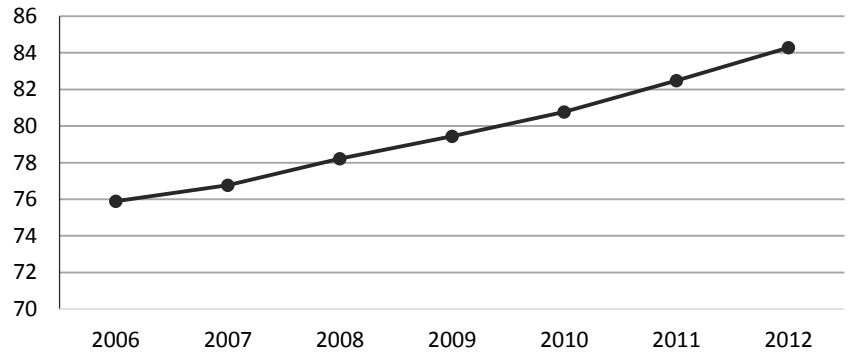
Source: Compiled from Lao Consumption and Expenditure Surveys reports in 1998, 2003, and 2008 published by the Lao Statistics Bureau

Table 3.11: Poverty in Laos

	1992-93	1997-98	2002-03	2007-08
Poverty headcount				
International poverty line	55.7	49.3	44	33.9
National poverty line	46.0	39.1	33.5	27.6
Urban	26.5	22.1	19.7	17.4
Rural	51.8	42.5	37.6	31.7
Poverty gap	11.2	10.3	8.0	6.5
Poverty severity	3.9	3.9	2.8	2.3

Source: Compiled from Lao Consumption and Expenditure Surveys reports in 1998, 2003, and 2008, published by the Lao Statistics Bureau

Figure 3.15 Ratio of female students to male students in secondary education



Source: NERI's data set on social variables. Data on education was compiled from the *Annual Report on Education* from 2006 to 2012 produced by the Ministry of Education.

Table 3.12: Adult literacy rate (%)

	1995	2000	2005
Total	60.25	69.58	72.7
Male	73.5	81.3	82.5
Female	47.9	58.4	63.2

Source: NERI's data set on social variables. Data on adult literacy rate was compiled from the Population Census Report in 1995, 2000, and 2005 produced by the Lao Statistics Bureau.

5.3 Human development

So far, inclusive growth has been addressed in terms of the demand side factors of achieving equitable access to opportunities. The supply side is also equally important, because it determines whether the working population possesses the capabilities required to be productively employed and to take advantage of available economic opportunities. Education and health are key determinants of progress in human development.

Laos has made remarkable progress in boosting school enrollments for both male and female students. The net primary school enrollment rate has continuously increased (Figure 3.16). The gap between primary school enrollment rates of boys and girls has also narrowed. In addition, the lower secondary school enrollment rate has also increased, but at a much slower pace than in primary schools. Progress in improving basic health care has been noteworthy. Child and infant mortality rates have declined by more than half over the last two decades (Figure 3.17). However, progress in reducing malnutrition and undernutrition has been mixed. Underweight children among under-fives declined from 37.1% in 2006 to 26.6% in 2012, but the rate is still high. The prevalence rate of stunting among under-five children, instead of declining, has increased from 40.4% in 2006 to 44.2% in 2012. The prevalence of wasting declined moderately, from 6.5% in 2006 to 5.9% in 2012 (Figure 3.18).

From the above education- and health-related indicators, it can be reasonable to judge that considerable progress has been made in Laos. However, there is still room for improvements in order to strengthen the Laotian people's capacities and to enhance their employability in taking advantage of economic opportunities.

5.4 Social protection

Social protection is the area that needs the highest level of attention. ADB (2008b) found that Laos was ranked twenty-third in the strength of the social protection system among thirty-one countries in the Asia Pacific region. Government spending on social protection, both in terms of coverage and impact, is the lowest in Laos. The average social protection

expenditure for each poor beneficiary in Laos is 7% of the poverty line,[35] which is lower than the average of 23% in the region.

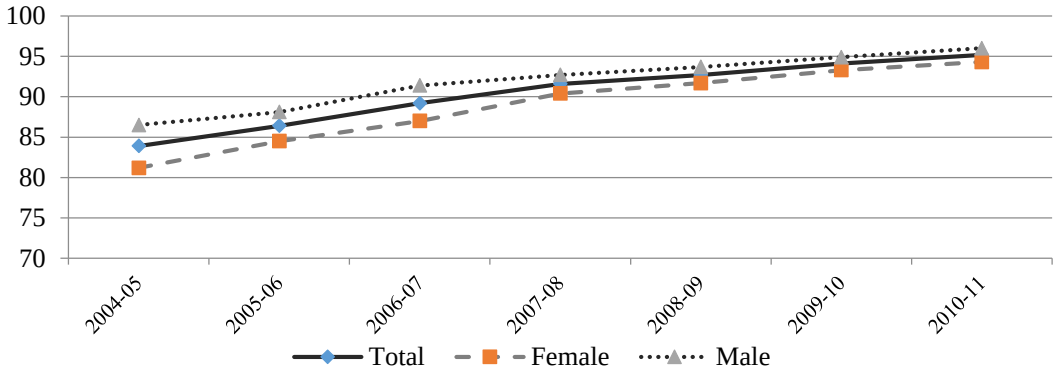
Moreover, only 21% of the population is covered by social protection programs, and this is again lower than the average of 35% in the region. By comparing the situation of social protection in Laos with the best performing country in the samples, the condition of social protection in Laos needs a lot of improvement (Figure 3.19).

TheWorld Bank (2012a) also found similar results on social protection in Laos. The World Bank's assessment on country policy and institution in 2012 gave Laos a score of two (out of six) on the quality of social protection. Laos was ranked low in terms of policy and strategy, coordination, coverage, monitoring, and evaluating mechanism.

However, in recent years the government has implemented several strategies and policies to improve social safety nets in Laos, with particular focus on health, labor, and social welfare. The implementation of the endorsed policies has faced considerable constraints, especially the lack of resources. In addition, coordination among existing programs needs further strengthening, and most of the programs are donor funded. Also, most programs cover small numbers of vulnerable people in selected communities.

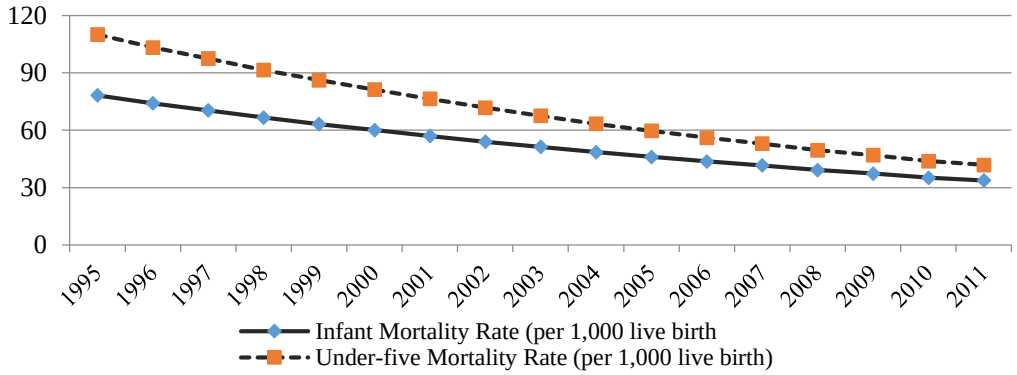
[35] The social protection impact index is defined as the per capita social protection expenditure going to the poor expressed in terms of a percentage of the country's current poverty line. The poverty line is used as the denominator because this indicator aims to examine the effectiveness of social protection intervention, especially on poverty reduction. Therefore, the expenditure on social protection expenditure is compared against the poverty line.

Figure 3.16 Net primary enrollment (%)



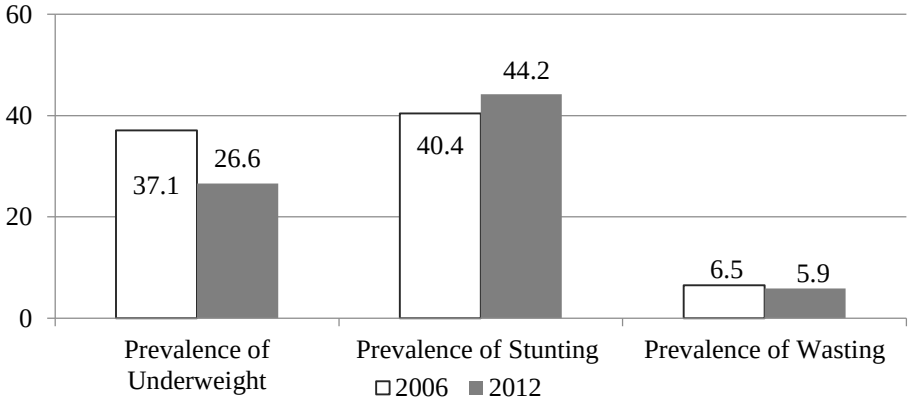
Source: NERI's data set on social variables. Data on education was compiled from the *Annual Report on Education* from 2005 to 2011 produced by the Ministry of Education.

Figure 3.17. Under-five and infant mortality rates



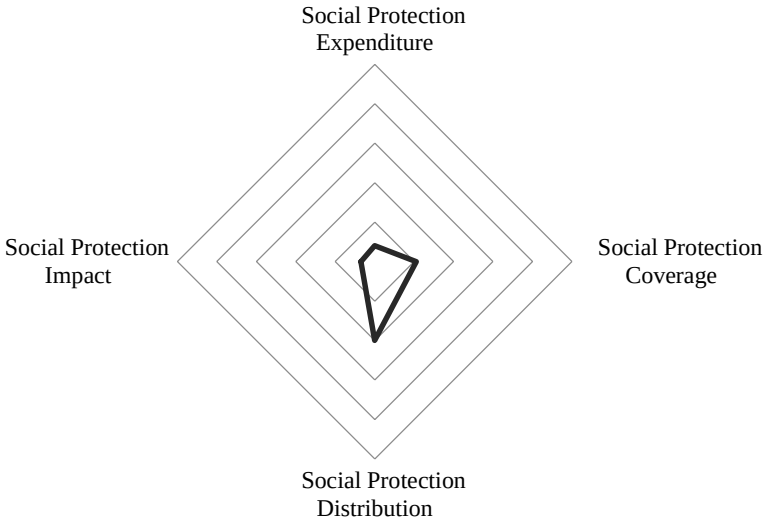
Source: World Development Indicators, http://data.worldbank.org/indicator/SP.DYN.IMRT.IN, accessed on 13 September 2012.

Figure 3.18. Undernutrition and malnutrition among children under five (%)



Source: NERI's data set on social variables. Data on health was compiled from *Annual Report on Health* in 2006 and 2012 produced by the Ministry of Health.

Figure 3.19 Social protection in Laos (% of the highest score in each dimension)



Source: ADB (2008b)

5.4 Conclusion on inclusive growth in Laos

Laos has generally performed well in generating rapid economic growth and improving livelihoods. However, the inclusiveness of growth has been moderate[36] because there have been mixed performances in both income and non-income aspects of growth inclusiveness. GDP growth has not been accommodated by broad-based employment. Therefore, gains from the growing economy have not been well distributed. An increase in inequality in the recent period may contribute to the decrease in the impact of growth on poverty.

6. Summary

This chapter has provided a concise review of Laotian economic development since the launch of NEM in 1986, but with particular emphasis on the contributory role of the natural resource sector in relation to FDI inflows. After the opening up of the Laotian economy, Laos has enjoyed persistent economic growth with minor interruptions because of external adverse

[36] The composite index of inclusive growth in Laos is calculated and provided in Appendix 1.

shocks. The most rapid growth has been achieved after the boom of the natural resource sector in the mid 2000s. After the boom, FDI and exports increased substantially. The growth in FDI and exports is largely driven by mining and hydropower sectors and other primary commodities. Major investors and trade partners are still the neighboring countries. In tandem with the robust economic growth, Laos could maintain macroeconomic stability relatively well. However, the economy faced fiscal difficulties in the more recent period after the government's decision to provide living allowances and increase salary for civil servants. Such a decision was made based on the expected increase in revenue, particularly from the resource sector.

The diagnosis of the Dutch Disease phenomenon in the Laotian economy finds some evidence of the spending effects. The demand in the economy seems to have grown rapidly, mainly propelled by massive increase in household consumption, imports of consumption goods, and government expenditures. LAK has appreciated in real term in parallel with the inflow of foreign capital and export revenues. The non-tradable service sector has also performed well. The resource movement effect has not been detected. In addition, the adverse impact of the booming resource sector on the tradable non-resource sector, which is the central problem of the Dutch Disease, has not been observed in the Laotian economy at the time of this study. Although the manufacture sector is continuously growing, the loss of competiveness brought by the real appreciation in LAK could have a serious impact in the long term.

Despite having a robust growth performance, the country is beginning to encounter a rise in disparity across different regions and different groups of people. On the other hand, growth inclusiveness has been moderate and the available evidence reveals that productive

employment and a social safety net are two aspects that need more policy attention. Other dimensions of the Laotian economy that face challenges include the narrow scope of tradable products and limited trading partners, heavy dependence on large FDI-driven projects in the natural resource sector, and reliance on external aid.

Chapter 4 Overcoming Landlocked Constraints: Economic Integration and its Impact on Local Industries

1. Introduction

Laos is a landlocked country surrounded by Thailand in the west, Myanmar and China in the northeast and north, Vietnam in the east, and Cambodia in the south. In order to overcome the challenge of being a landlocked country, Laos has gradually increased its integration with the subregional, regional, and global economy. Such increased integration aims to accelerate economic growth in Laos through attracting more FDI and opening up to more export markets. The Laotian government engages in several types of economic integrations, including participation in free trade agreements (FTAs), such as the ASEAN Free Trade Area (AFTA), and membership in multilateral trade agreements (MTAs), such as those under the World Trade Organization (WTO). With FTAs, countries can accelerate their economic integration by forming strategic and preferential relationships among a smaller group of countries to permit deeper market access, have lower trade barriers than non-member countries in penetrating export markets, and allow faster liberalization in new and sensitive areas. In addition, the government has promoted the development of special economic zones as a means to attract FDI into the non-resource sector. These, together, aim to enhance the openness of the Laotian economy and deepen its integration into the world economy.

Deepening integration into the world economy causes both positive and negative impacts on local economy. Local firms and industries gain from spillover benefits, such as increased inflow of capital as well as a transfer of know-how and technology. However, at the same time, increasing economic integration also causes adverse impacts on local industries, which are not competitive. For these reasons, this chapter intends to examine how integration of the Laotian economy into the world economy could affect the performance of the local economy. The next section reviews major economic integration initiatives in which Laos has engaged. Section 3 addresses the openness of the Laotian economy by examining the development of special economic zones. Section 4 analyzes the impact of AFTA and ASEAN-China Free Trade Area (ACFTA) on selected local industries; the findings shed light on how engagement in FTAs would create impacts on local economy. Section 5 summarizes this chapter.

2. Regional integration initiatives

The first major regional linkage was established in 1992 when Laos became a member of Greater Mekong Subregion cooperation (GMS). The GMS is a regional development program of six riparian states of the Mekong River cooperation program supported by the Asian Development Bank (ADB). GMS aims to enhance economic relations, build on shared histories and cultures, and cover nine priority sectors in the Mekong river basin (ADB 2011). The outstanding ADB-GMS projects include the promotion of East-West and North-South economic corridors, which has contributed to the transformation of Laos from landlocked to land-linked status.

Laos's accession to the Association of Southeast Asian Nations (ASEAN) in 1997 reaffirmed its determination to deepen economic integration into Southeast Asian economy.

The ASEAN is a comprehensive regional grouping working concertedly to establish the ASEAN Community by 2015. According to the ASEAN declaration,[37] "the main aims and purposes of ASEAN are acceleration of economic growth, social progress and cultural development; promotion of peace and stability; promotion of active collaboration and mutual assistance; provision of assistance in the form of training and research; collaboration for better utilization of resources and capacity in priority sectors; promotion of Southeast Asian studies; and promotion of close and beneficial cooperation with other existing international and regional organizations." The commitment of the membership states to establish the ASEAN Community by 2015 was reaffirmed in the Cebu Declaration of 2007 at the 12th ASEAN Summit. The ASEAN Community will consist of the ASEAN Political-Security Community, the ASEAN Economic Community (AEC), and the ASEAN Social-Cultural Community. AFTA is the key pillar of AEC and it is the most observable outcome of the ASEAN cooperation in the economic sphere, which aims to remove trade barriers between member countries. In addition, ASEAN has signed bilateral and multilateral FTAs with major countries and other regional groupings as part of its efforts to strengthen its integration into the global economy. To date, ASEAN has established ASEAN-China FTA, ASEAN-Japan Comprehensive Economic Partnership, ASEAN-Korea FTA, ASEAN-Australia-New Zealand FTA, and ASEAN-India FTA.

At the subregional level, Laos is a member of the Irrawaddy-Chao Phraya-Mekong Economic Cooperation Strategy (ACMECS) and the Cambodia-Laos-Vietnam Development Triangle (CLV). These two subregional cooperation initiatives intensify Laos' economic

[37] ASEAN Secretariat website, http://www.asean.org/news/item/the-asean-declaration-bangkok-declaration, accessed on 13 March 2013.

linkages with its neighbors. The geographical proximity of these two subregional groupings complements other broader regional initiatives.

The ACMECS is a cooperation framework between Cambodia, Laos, Myanmar, Thailand, and Vietnam. This framework, which was originally called the Economic Cooperation, was established in 2003 by Cambodia, Laos, Myanmar, and Thailand, and later Vietnam joined this cooperation in 2004. According to the Bagan Declaration,[38] the main objectives of this cooperation are to "increase competitiveness and generate greater growth along the borders; facilitate relocation of agricultural and manufacturing industries to areas with comparative advantage; create employment opportunities and manufacturing among the member countries; and enhance peace, stability and shared prosperity for all in a sustainable manner." The most outstanding outcome of ACMECS is the signing of an MOU between Laos and Thailand regarding cooperation in the promotion of contract farming in 2013 in the 5th ACMECS summit. This MOU provides a formal framework that supports the existing provincial-level cooperation in contract farming between several Laotian and Thai provinces along the Mekong River.

The CLV was officially established in 2004. The idea of establishing the development cooperation in the triangle border area dates back to 1999 when the leaders of Cambodia, Laos, and Vietnam agreed to establish the development triangle area. However, the official establishment was in 2004 when the Vientiane Declaration was signed in Laos. According to this declaration, the objectives of CLV are to coordinate infrastructure development; strengthen cooperation in agriculture, forestry, and tourism; build human resource capacity in

[38] Bagan Declaration, Ministry of Foreign Affair of Myanmar, http://www.mofa.gov.mm/declarations/bagan_press_statement.html, accessed on 13 March 2013.

the area of agriculture, tourism, and other related industries; and facilitate the flow of goods, people, and capital across the border (Ishida 2012). This cooperation framework covers thirteen provinces in the member countries, viz., Kratie, Mondol Kiri, Ratanak Kiri, and Stung Treng in Cambodia; Champasack, Saravane, Attapeu, and Sekong in Laos; and Binh Phuoc, Dak Lak, Dak Nong, Gia Lai, and Kon Tum in Vietnam. Based on the request from the CLV to the Japanese government, Japan has been the main development partner of the CLV. In order to implement the 2004 Vientiane Declaration, the Laotian government has developed the Socio-economic Development and Cooperation Master Plan for the Development of the Triangle Area of Laos for the period 2010 to 2020. This master plan provides key development directions for the development of triangle areas in Champasack, Saravane, Attapeu, and Sekong provinces.

Membership of the WTO in 2013 marks the new landmark of Laos' integration into the global economy. WTO accession is explicitly promoted in the country's development plan. The requirements of WTO accession and the road map for the accessions were included in the reform measures of several Annual Socioeconomic Development Plans of Laos. In addition, WTO membership was listed as one of the top priorities of the country's economic integration policy in the 7th Five Year Socioeconomic Development Plan. Like other economic integrations, membership of the WTO has both benefits and costs for the Laotian economy. The economic analysis of WTO accession by a general equilibrium model concludes that the Laotian economy will gain only marginally from WTO membership (particularly from tariff reduction) while trade deficit will increase and output in some vulnerable sectors will decline (Kyophilavong et al 2010). The plausible reason for such a low welfare gain from tariff reductions because of WTO accession is that that the Laotian economy is relatively small and

the existing tariffs between Laos and its trading partners are already low. However, contrasting Kyophilavong et al's (2010) contention, Laos will still be able to gain from other benefits of a multilateral trade regime. More specifically, potential benefits will come from the diversification of Laotian exports to wider markets and the enhancement of confidence from the international community, especially from foreign investors toward the Laotian economy. In addition, WTO membership creates an opportunity for Laos to undertake serious reform in policy, institutional, and structure levels in order to strengthen the competitiveness of local industries. These efforts will surely bring about long-term benefits to the Laotian economy.

3. Special economic zones development[39]

Many economies in Asia achieve their current levels of economic progress through the formation of industrial parks and/or special economic zones (SEZ). The boom in SEZs dates to the 1960s and 1970s when many Asian economies such as Taiwan, South Korea and China, and Southeast Asian countries in the 1980s and 1990s set up SEZs as a means to attract FDI for stimulating economic growth. At present, there are more than four hundred SEZs around the world and the number is continuously growing as many developing countries are following the success of others. The Shenzhen SEZ in China is regarded as one of the most successful SEZs in the region, if not the world, and this has inspired the development of SEZs in many countries across the world (Wei 2000). There are also unsuccessful cases, such as those in Bombay and Khanla of India. The development of SEZs in Laos began in the early 2000s, when the prime minister signed the decree on the formation of the Savan-Seno Special Economic Zone in Savannakhet province. Since then, there have been many ups and downs in the country's SEZ development.

[39] This section of the chapter is updated from my published work: Nolintha, V. (2011).

In the case of Laos, a separate government authority has been set up to promote and administer the development of the SEZs. In recognition of the importance of such zones, the government has designated the National Committee for Special Economic Zones (NCSEZ), chaired by the standing deputy prime minister, for overseeing the development and management of SEZs. In addition, the SEZ Secretariat Committee was also established to support the function of the NCSEZ. There are two types of SEZ in Laos, viz., Special Economic Zones and Specific Economic Zones. The special economic zone has more autonomy in approving investment licenses and it has the purview of multi-objectives and covers a land area of at least 10,000 hectares. The specific economic zone, on the other hand, should have one or a few specific objectives and must cover less than 10,000 hectares of land area. Following the establishment of this new authority, there have been many proposals from various provinces to establish SEZs. To date, there are two special economic zones and eight specific economics zones approved by the government. Additionally, there are many other SEZ development projects under the review of the government.

3.1 Savan-Seno special economic zone

The Savan-Seno Special Economic Zone (SaSEZ hereafter) is the first SEZ in Laos established in 2003. SaSEZ was set up to capitalize on foreign and domestic investment in the non-resource sector by way of the location advantage of the province. SaSEZ is located at the center point of the East-West Economic Corridor (EWEC), right next to the Second Lao-Thai Friendship Bridge. Investment in this SEZ has several channels for accessing a seaport. The most popular route is via the Second Lao-Thai Friendship Bridge then to the Laem Chabang port in Thailand. This route is approximately 720 kilometers from the SEZ. Another possible route is via the regional highway Route 9 or EWEC to Da Nang port in Vietnam. Although

this second route is about 220 kilometers shorter, exporters still rely more on the Thailand route. With completion of the EWEC,[40] investors can also access the seaport in Myanmar. In addition to these existing routes, another alternative is Road No. 12 of Khammuane province, connecting to Vung Ang port in North-Central Vietnam. This route is considered a new east-west corridor, providing the shortest distance to a seaport for the export of agro-processing products from the central part of Laos.

SaSEZ is governed by the Savan-SENO Special Economic Zone Authority (SEZA), which has the mandate to promote and facilitate investment in this zone. The SEZA is working under the direct supervision of the standing Deputy Prime Minister and has the authority to approve investment licenses. Therefore, investors in SaSEZ will receive full support from both the central and local governments. SaSEZ is divided into four sites designated for different investment purposes.

Despite the government's strong commitment to the development of SaSEZ, progress was rather slow during the first five years. The major obstacles were the problem of land clearance at Site A, and a lack of capital and viable developers for infrastructure development. Some other issues include the absence of a national strategic road map for overall SEZ development; difficulties in horizontal and vertical institutional cooperation; a weak legal framework; the slight technical capacities of officials in SEZ management, investment analysis, and negotiations with investors; and poor information dissemination (ADB 2008a). Most of the early works concentrated on the formulation of specific rules and regulations for the Prime Minister Decree and land clearance instead of on promotion of the investment

[40] This road transport network is subjected to the development of a road network that links to a seaport in Myanmar.

opportunities. In 2007, the SEZA entered an agreement with the Thai Airport Grounds Services (TAGS) from Thailand to develop Site A into a trade and service hub. However, with the impact from the Lehman shocks, Eurozone crisis, and the recent political turmoil in Thailand, development of Site A is being delayed.

The development of SaSEZ has been progressing since the partnership with the developer from Malaysia. In 2008, the SEZA signed an agreement with the Pacifica Streams Development Company from Malaysia to develop Site C into a commercial and industrial hub with the official name of Savan Park Special Economic Zone. The investment was made through the joint-venture company Savan Pacifica Development, with 70% of equity belonging to the Malaysian developer. Finally, in 2014, the government entered into an agreement with a Lao-Japanese joint venture to develop the Site B of this SEZ into another manufacturing zone. Site B began to attract large companies, such as Nikon, which assembles parts of the digital single-lens reflex camera, and Koyo, which produces components for Nikon.

Savan Park is the most developed site of the SaSEZ and the most advanced SEZ in Laos. Its development spreads over four phases. Each phase covers about fifty hectares of land and the development in each phase will take seven years. Since Savan Park's establishment in 2008 there has been a lot of investment in infrastructure development, including land clearance, land development, a high-voltage electricity transmission network, a separate electricity substation, and a water supply pipeline. Investments inside Savan Park enjoy many generous and clear incentives, including lower taxes, longer land leases, and fixed land concession fees. In light of progress in the physical development, Savan Park has been

successful in attracting investors from all over the world, including MNCs like Toyota Boshoku, Essilor, and Aeroworks.

The presence of MNCs in the SEZ in Savannakhet has enhanced the linkage between the Laotian economy and the global production network. Laotian factories are considered as part of the production defragmentation of large Japanese companies based in Thailand. The regional headquarters in Thailand relocate, partially or fully, the labor-intensive production process to Laos to benefit from cheaper wage and lower utility cost. The outputs from Laotian factories will then be further assembled or processed in the Thai mother factories. This trend of FDI has only emerged recently, after the hike of labor cost in Thailand. Reduction in transportation cost due to improvement in transport infrastructure between Laos and Thailand, more simplified and more efficient cross-border custom clearance, and a better investment climate in Laos have also contributed to a wider and deeper division of labor between Laos and neighboring countries.

There are several factors leading to the success of the SEZ in Savannakhet. The commitment and flexibility of the SEZA in acting as the coordinating agency between the government and the investors have played crucial roles. The autonomy of the SEZA and the direct communication channel with the central government allow the authority to address various problems that have emerged from time to time in a timely manner. Continuously, strengthening the capacity of SEZA officials and further improving horizontal cooperation with other government authorities within Savannakhet will surely boost effectiveness and efficiency to a higher level. In addition, the SEZA could play a more active role in pushing the liberalization of trade and customs procedures at the implementation level in accordance with the policy direction. Besides the commitment of the government, the recent achievements in

SaSEZ's development, to a large extent, could be attributed to the professionalism of the Malaysian developer. The company has shown a number of initiatives for accelerating the site's development, it has been active in attracting prospective investors, and it has also made substantial investments in marketing. The development of SaSEZ could be a good case study for further SEZ development in Laos in terms of the government management and promotion mechanism, the formation of partnerships with foreign developers, and the importance and choice of capital mobilization for the development of public utility.

3.2 Densavanh border trade commercial zone

The Densavanh Border Trade Commercial Zone (SaBTZ) is located at the Laos-Vietnam border of Savannakhet province. The development of SaBTZ is in parallel with the establishment of a similar zone on the Vietnamese side. The zone spreads over nineteen kilometers from the Laos-Vietnam border along Route 9 (EWEC) covering one kilometer of each side of the road with a total area of 1,823 hectares. SaBTZ benefits from preferential policies, such as exemptions on land leasing, duty incentives, profit tax privileges, and taxation incentives, among many other privileges offered to investors in this zone. The investment license could be approved within the zone and is subject to the final approval of the government.

Progress in SaBTZ's development has been slow compared to the border trade zone on the Vietnamese side and SaSEZ. Major obstacles at SaBTZ include the lack of financing for the necessary infrastructure, such as water supply, high-voltage electricity supply, and land clearance; an insufficient institutional framework; inadequate government officials for the management of SaBTZ; and a large area of land covered by unexploded ordnance (Khonthapane, Insisienmay and Nolintha, 2006). Reportedly, some obstacles have been

recently addressed, such as the completed construction of the water supply and high-voltage electricity from Vietnam. Local authorities have discussed the full implementation of the prime minister decree on formulation of the zone many times, but so far no conclusions have been reached. Because of the delay in infrastructure development, many project plans by foreign investors have been suspended.

3.3 SEZs in Vientiane Capital

The SEZ development in Vientiane is the earliest SEZ project in Laos, with the planning process beginning as early as 1995. However, progress has been very slow due to the lack of resources for developing the necessary infrastructure in this potential SEZ, both from the government and the private sector. Even without an SEZ, Vientiane has been very successful in the past in attracting both domestic and foreign investors who wanted to take advantage of the country's most advanced infrastructure and supporting facilities. The present overall advantage of Vientiane has reduced interest in developing a zone designated for industrial production. Following the government's current policy priority in the promotion of SEZ development, there are at present five specific economic zone projects located in Vientiane Capital. Vientiane Industry and Trade Park is for manufacturing and services. Saysettha Development Zone has objectives of attracting investments to develop a new modern town, which includes both manufacturing zones and residential areas. Other SEZs are Thatluang Lake Specific Economic Zone, Longthanh-Vientiane Specific Economic Zone, and Dongphosy Specific Economic Zone, which focuses on residential service and other services.

The Vientiane Industry and Trade Park (VITA Park) is the most advance SEZ in Vientiane Capital. VITA Park is a joint venture between the Laotian government (30%) and the Taiwanese investor Ban Wei Development Company Limited (70%). This SEZ is located

about 21 km from the center of the capital, with a close proximity to the first Lao-Thai Frienship Bridge, which is the main gateway to the seaport in Thailand. VITA Park covers a total land area of 110 hectares with a contract of seventy-five years (extendable). The park is located close to the planned Vientiane train station and the planned new international airport. VITA Park aims to attract mainly manufacturing factories, while a small area is dedicated to trade and services. Supporting services, such as a vocational school, factory dormitory, healthcare centers, and school, are being planned so as to provide full support to investors in the park. At present, there are many factories operating in the park, e.g., MMC Electronics, a part of Mitsubishi Group, as well as many other smaller companies in the manufacturing sector. VITA Park could be a good competitor of the Savan-Seno SEZ in Savannakhet.

3.4 Policy implications on SEZ development

The rapid expansion of SEZs raises the question as to whether SEZ development is the right policy choice for Laos. If it is, then the next question is how should Laos develop more SEZs? Laos could either develop many SEZs across the country, like the current trend, or concentrate support on the development of a few SEZs that have the most potential before expanding to other regions. This trade-off still has no clear answer until more rigorous empirical analyses are available. The reasons for supporting simultaneous SEZ development include: (1) complementarities among various regions and sectors; (2) lower possibility of inefficient resource allocation due to concentration in just a few areas; and (3) the reduced risk of rising disparity across provinces or regions (Wei 2000). However, the opposite arguments include the fact that the limited resources of developing countries are better utilized by concentrating in just a few potential areas. Furthermore, by focusing on a few areas the

country can learn from the strengths and weaknesses of earlier starters and later can apply the knowledge to latecomers to ensure their success.

This author argues that if Laos chooses the former track then the potential benefits from SEZs might not be maximized. Because Laos is a relatively small country, when too many SEZs are built across the country then the total area of SEZs vis-à-vis non-SEZ will certainly increase. Therefore, the difference between investing inside and outside of SEZs will diminish and finally be eliminated. Consequently, above an optimal number of SEZs, SEZs will then be indifferent to other parts of the country and Laos would no longer benefit from this model of development. The SEZ in Khammuane and Savannakhet provinces, presently, are good case studies in the abovementioned trade-off. Both SEZs are located within a close proximity. There is therefore a considerable degree of competition between these two SEZs because of their similar characteristics and development policy directions. Both are located along the linkage of east-west transportation routes, which connect Thailand from the west to Vietnam in the east. The governments in Khammuane and Savannakhet should cooperate to search for ways of creating synergy among the provincial development potentials rather than allowing competition for the individual benefit of spatial development at large.

4. The impact of the free trade area on the competitiveness of Lao industries[41]

AFTA and ASEAN-China Free Trade Area (ACFTA) are the two most important free trade agreements for Laos. As discussed in Chapter 3, Laos has largely traded with neighboring countries, hence, membership in these two FTAs is expected to bring about both

[41] This section of the chapter is updated from my previous published work: Leebouapao, L., Insisienmay, S., & Nolintha, V. (2012). The paper has been substantially revised in Leebouapao, L., Insisienmay, S., & Nolintha, V. (2015).

opportunities and challenges for the economy, especially for the local industries. The rest of this chapter discusses the potential impacts of AFTA and ACFTA on local industries.

4.1 Commitments under AFTA and ACFTA

At the summit meeting of ASEAN Heads of State in January 1992, the six original ASEAN member countries (or ASEAN6) agreed to establish AFTA by the year 2008. This deadline was then moved forward to the year 2003. The centerpiece of the AFTA is the implementation of Common Effective Preference Tariff (CEPT). According to its timeframe, the tariff rate of more than 85% of tariff lines in the Inclusion List[42] (for ASEAN6) will be 0 to 5% in 2000 (ASEAN Secretariat, 1992). Laos joined ASEAN on 23 July 1997, and its obligations for implementing the inclusion list ended in 2008. The tariff on products in the Normal Sensitive List[43] was reduced to 0-5% by 2010, whereas the tariff on products in the Highly Sensitive list[44] will be reduced to 0-5% by 2015. There are 533 tariff lines in the inclusion list, which represent 15% of all tariff lines in Laos. There are 2,818 tariff lines, which account for 80% of all tariff lines, included in the temporary exclusion list.[45] Some of

[42] Products, which are included in the inclusion list, are subject to immediate liberalization in terms of a reduction of tariff rates, a removal of quantitative restrictions, and other nontariff barriers.

[43] Unprocessed agricultural products are usually included in the Sensitive List. Products in this Sensitive List are given a longer time frame before being integrated into the free trade area. In the Sensitive List, the products can be further classified into Normal Sensitive List and Highly Sensitive List. Products included in the latter will have a longer time for liberalization.

[44] The explanation is provided in footnote 42 above.

[45] Products in the Temporary Exclusion List are exempted from trade liberalization for a temporary period of time. However, at a certain specified timeframe all these products would have to be transferred into the Inclusion List and begin a process of tariff reduction.

these tariff lines were put in the inclusion list in 2005, but eighty-one tariff lines are still left in the General Exception List.[46]

The Agreement on Trade in Goods of the Framework Agreement on Comprehensive Economic Co-operation between ASEAN and the People's Republic of China (PRC) was signed at the 10th ASEAN Summit in Vientiane in November 2004. A key feature of this agreement is the nonmaintenance of quantitative restrictions and elimination of nontariff barriers. Laos, as an ASEAN member state, is subjected to commitments made under the ACFTA. Effective from 1 January 2010, the ACFTA called for the elimination of all tariffs on 6,682 tariff posts in 17 sectors (12 in manufacturing and 5 in the agriculture, mining, and maritime sectors). The ACFTA envisages all tariff barriers being lowered and eliminated by dividing them into either a Normal Track[47] or a Sensitive Track. In principle, all ASEAN members are subjected to full commitments made under the ACFTA. For the Normal Track, ASEAN6 and the PRC reduced tariff rates to between 0% and 5% in 2005. The newer ASEAN members (Cambodia, Laos, Myanmar, and Vietnam) reduced Normal Track tariff rates to between 0% and 5% in 2010, and will complete their removal by 2015. For the Sensitive Track, ASEAN6 and the PRC reduced tariff rates to 20% in 2012 and will further reduce rates to between 0% and 5% by 2018. The Sensitive Track schedule for Laos and other new ASEAN members designates 2015 and 2020 as their targets for tariff reduction to rates of 20% and between 0% and 5%, respectively.

[46] Products included in the General Exception List are permanently exempted from the free trade area. Reasons for the exception are protection of national security, public morals, human, animal, or plant life, and health and articles of artistic, historic, and archaeological value.

[47] Under ACFTA, products in the Sensitive Track will have longer timeframes for liberalization than the products in the Normal Track.

Although it is too early to evaluate the actual impact of the AFTA and ACFTA, this section attempts to assess the impacts of these two FTAs by conducting case studies of three industries, viz., motorcycle assembly, cement production, and wood processing. This analysis aims to illustrate the industrial development process in Laos in the context of enhanced regional economic integration.

4.2 Potential impacts on the motorcycle assembly industry

The development of the motorcycle assembly industry in Laos was initiated in the early 1990s by two premier assemblers, viz., Honda and Suzuki. In 2003, Kolao, which is a Korean FDI, also began assembling motorcycles in Laos. In addition to these large motorcycle assemblers, there are dozens of smaller Chinese motorcycle assembly companies across the country supplying a variety of motorcycles to meet domestic demand, but most of them often assemble motorcycles that imitate popular Japanese models.

The Laotian motorcycle assembly industry is relatively small and young compared with the same industries in other ASEAN countries, such as Thailand, Malaysia, Indonesia, and Vietnam. When tariffs and nontariff barriers on the motorcycle trade are removed across ASEAN and with the PRC, the Laotian motorcycle industry will have to compete against imports, but it will have more opportunities in overseas markets. The competitiveness of the industry at the present time and in the future can be deducted from current and future price differences between motorcycles assembled in Laos and imported motorcycles.

There are two scenarios of price changes under AFTA and ACFTA. The first one represents tariff reduction according to the FTA scheme, which leads to cheaper prices of imported motorcycles. The second scenario is related to the price competitiveness of Laotian-

assembled motorcycles in a third country. In this case, Laotian motorcycle assemblers will try to penetrate a major neighboring motorcycle market, such as that of Thailand. The simulated results are provided in Table 4.1 and 4.2.

With regard to the first scenario, our analysis shows that the price competitiveness of motorcycle assemblers varies substantially. Kolao motorcycles, Chinese motorcycles assembled in Laos, and locally assembled Suzuki motorcycles maintain their competitiveness in domestic markets, even after the AFTA and ACFTA has been fully implemented, whereas Honda motorcycles become uncompetitive. However, the territorial restrictions of Honda—such as the ban on sales in foreign markets where Honda already has its own assembly plant—would protect them for a number of years. Finally, 125 cc motorcycles (Table 4.2) seem to be relatively more competitive than 110 cc and 115 cc models (Table 4.1).

Regarding competition in a third market, such as Thailand, there is room for Kolao and Chinese motorcycles assembled in Laos to enter the market. However, the price gap between Laos and Thai motorcycles is rather small, while the real and perceived gaps in quality tend to be quite high. Only after the manufacturers have established their brand reputations, improved research and development (R&D) capacities, and spent more in product development instead of product imitation will such price differences help to capture a market share in Thailand. Therefore, the infant motorcycle industry in Laos has to enhance labor productivity, and the Laotian government needs to provide incentives for local manufacturers to invest in R&D and strengthen the quality of their workforces. Relevant authorities have to strengthen the standards for quality, safety, the environment, and intellectual property rights, and raise awareness of Laos' commitments under AFTA and ACFTA and its opportunities in the industry. Moreover, this industry should be looking outward in order to exploit potential

markets, such as Thailand and Vietnam. Import-export procedures and costs need to be minimized.

4.2 Potential impacts on the wood processing industry

The wood processing industry in Laos is at an infant stage. Most furniture factories are of medium and small scale and many of them are family-owned cottage industries that serve the domestic market. About 20% of the factories are engaged in primary and secondary wood-processing operations. The industry is characterized by low-skilled workers, but most of them are seasonal labor. Therefore, workforce can be reduced by as much as 50% during the rice planting and harvesting seasons.

Product designs are rather traditional and they are characterized by bulky and material-consuming products. Export and import markets for wooden products are determined largely by geographic and logistical conditions. The export share of high value-added wooden products like wooden furniture remains relatively low compared to the export of low value-added wooden products. Conversely, the import share of wooden furniture is comparatively higher than other imported wooden products. However, due to the government's ban on the export of logs and primary wood-processing products, exports of high value-added products such as wooden furniture have been gradually increasing and the major markets are PRC, Thailand, and Vietnam.

Table 4.1: Prices of Laos's motorcycles in domestic and Thai markets (110 and 115 cc engines)

Manufacturer	Brand	Type	Price in domestic market			Price in Thai market		
			2010	2015	2020	2010	2012	2018
Honda	Wave 110	Local	65,500	65,500	65,500	120,620	94,420	84,595
	Wave 110i	Thai	65,500	58,000	52,403	36,000	36,000	36,000
Yamaha	Fino	Thai	72,000	68,630	61,955	44,500	44,500	44,500
	Mio	Thai	77,000	64,010	57,785	41,500	41,500	41,500
	Nouvo MX 2009	Thai	85,360	75,560	68,210	49,000	49,000	49,000
Suzuki	Smash Revolution	Thai	63,610	56,310	50,835	36,500	36,500	36,500
	Smash Junior	Local	42,000*	42,000*	42,000*	77,380	60,580	54,280
	Smash Revolution	Local	52,000*	52,000*	52,000	95,780	74,980	67,180
	Smash Unlimited	Local	44,500*	44,500*	44,500*	81,980	64,180	57,505
Kolao	Sonata	Local	19,900*	19,900*	19,900*	36,716*	28,756*	25,771*
	My Love	Local	27,900*	27,900*	27,900*	51,436	40,276*	36,091*

Notes:
1. Prices of imported motorcycles are estimated based on current retail prices in Thailand, duty tax under the FTA, Laos domestic excise tax of 20%, Laos domestic value-added tax (VAT) of 10%, transportation costs of THB100 per unit, and administration cost of 4%.
2. The prices of locally assembled motorcycles and imported motorcycles are the retail prices at motorcycle shops in Vientiane. Prices of local motorcycles are assumed to remain constant from 2010 to 2020.
3. * indicates that the product is price competitive with the nearest competitor.
Source: National Economic Research Institute (NERI) interviews with motorcycle shop owners in Vientiane in 2010 and http://www.motorcycle.in.th/.

Table 4.2: Prices of Laos' motorcycles in domestic and Thai markets (125 cc engine)

Motorcycle	Brand	Type	Price in domestic market			Price in Thai market		
			2010	2015	2020	2010	2012	2018
Honda	Wave 125	Local	75,000	75,000	75,000	138,100	108,100	96,850
	Wave 125	Thai	74,920	66,320	59,870	43,000	43,000	43,000
Yamaha	Mio GT 125	Thai	76,660	67,860	61,260	NA	NA	NA
	Nouvo MX 2009	Thai	85,360	75,560	68,210	NA	NA	NA
Suzuki	Jelato 3-Star	Thai	79,966	70,786	63,901	44,000	44,000	44,000
	Step New	Thai	71,440	63,240	57,090	45,900	45,900	45,900
	Smash Step Automatic	Local	54,000*	54,000*	54,000*	41,000	41,000	41,000
Koloa	My Love	Local	29,700*	29,700*	29,700*	99,460	77,860	69,760
	Veracruz	Local	32,700*	32,700*	32,700*	51,778	45,838	41,383*
	Sorento	Local	28,900*	28,900*	28,900*	56,998	50,458	45,553
Chinese	Fekon	Local	22,500*	22,500*	22,500*	50,386	44,606	40,271*
	Longsin	Local	21,500*	21,500*	21,500*	41,500	32,500*	29,125*
	Fino Haobo	Local	37,500*	37,500*	37,500*	39660*	31,060*	27,835*
	Hongxin	Local	19,000*	19,000*	19,000*	69,100	54,100	48,475
	Dafeng	Local	26,000*	26,000*	26,000*	33160*	29,360*	26,510*
	Shinery	Local	23,000*	23,000*	23,000*	45,340	40,140*	36,240*

Notes:
1. Prices of Laos motorcycles exported to Thailand are based on the current retail price in Vientiane, tariff rates under the FTA, Thai excise and multiple taxes of 13%, value-added tax (VAT) in Thailand of 7%, transportation costs of THB100 per unit, and administration cost of 4%.
2. The prices of motorcycle in Thailand are the retail prices and are assumed to be constant from 2010 to 2018.
3. * indicates that the product is price competitive with the nearest competitor.
Source: National Economic Research Institute (NERI) interviews with motorcycle shop owners in Vientiane in 2010 and http://www.motorcycle.in.th/.

Table 4.3: Prices of domestic and imported furniture in Laos, LAK, 2009 and 2015

Item	2009	2015	Is the domestic furniture price competitive?	
			2009	2015
Teak bed (Laos)	4,200,000	4,200,000	Yes	No
Bed (PRC)	5,095,000	3,057,000	N/A	N/A
Round table with 4 seats (Laos)	3,000,000	3,000,000	Yes	No
Round table with 4 seats (PRC)	3,035,000	1,821000	N/A	N/A

Notes:

1. Expected prices are based on current market prices and the tariff reduction schedule. The 2015 price is subject to tariff reduction under ACFTA.
2. Conclusions on price competitiveness in 2009 and 2015 compare the price of Laos's furniture with comparable imports.
3. This comparison only provides an approximation of price differentials and cannot account for potential consumer bias in terms of materials used to make furniture. Imported furniture products, in general, are made from nonhard wood and other nonwood materials, and are segmented to mass market demand. On the other hand, Laos's furniture products are mostly made from hard wood and target high-end markets.

Source: Author's estimation based on field survey.

The wood processing industry in Laos presently enjoys government protections through import tariffs, ranging from the lowest rate of 8% for HS4401[48] to 25% for HS9403.[49] As a result, the industry's competitiveness is affected by the reduction of tariff after the implementation of AFTA and ACFTA. The analysis focuses on the Chinese market because China is the main market for wood export from Laos and also the main source of imports of wood products.

For an evaluation of the FTA's impacts on the wood industry, we compare the prices of domestic and imported furniture from the PRC before and after 2015. The results are provided in Table 4.3. Due to current tariff restrictions, the furniture industry in Laos can compete with imported furniture fairly well. However, when tariff reductions are fully implemented, the price competitiveness of Laotian furniture will change significantly as furniture imported from the PRC will be less expensive than domestically produced furniture.

[48] fuel wood, wood in chips or particles, sawdust, wood waste, and scrap

[49] wooden furniture

With ACFTA and AFTA, more than four hundred small furniture factories serving the domestic market will soon face increased competition from similar firms in other ASEAN countries and the PRC that are known for having well-designed, higher-quality furniture. The demand for furniture is determined by prices in which they incorporate the value of product design, customer satisfaction, and personal tastes. Laotians seem to prefer furniture made of hard wood. This preference shields a particular segment of Laos' furniture market from lower-priced imported products that are made of nonhard wood. However, imported products are of a variety of product designs and are also of a better quality, which influences the preferences of Laotian consumers. From interviews with the owners and managers of many small furniture factories it was apparent that sales volumes are already decreasing due to competition from imported furniture, particularly from the PRC and Thailand, even though the prices of imported furniture are currently higher than local products. Therefore, under the ACFTA and AFTA scheme, small domestic furniture factories will soon face the challenge of price competition in addition to competition with respect to quality and design.

4.3 Potential impacts on the cement industry

The cement industry in Laos has been gradually developed since the 1990s. The demand for cement in Laos has increased substantially and it is likely to double from its current level by 2015. On the supply side, the industry is able to respond to almost 70% of total domestic demand and is expected to meet an increased share of domestic demand by 2015 after the construction of several new cement plants. The cement industry produces two types of cement and has gradually won the trust of local users. The distribution of cement is concentrated in only a few provinces located in close proximity to the plants. Due to domestic transportation constraints, areas located far from the plants rely on imported cement from

neighboring countries, especially Thailand, and to a lesser extent Vietnam and the PRC. This means Laotian cement is able to compete with imported cement only in areas where domestic infrastructure is well developed, such as in the central region and its surroundings. This will be one of the key challenges facing the cement industry under the AFTA and ACFTA scheme.

At present, the cement industry enjoys protections from the government through tariffs and, more importantly, quantitative restrictions. AFTA and ACFTA commitments include both reductions in tariffs and the removal of quantitative restrictions. Currently, the tariff rate on the types of imported cement that are also produced domestically (HS 252329) is 8%, which is a recent reduction from the longstanding rate of 10%. In 2011, the rate was cut to 5% before being further reduced to 0% by 2015. For other types of cement that are not domestically available, such as hydraulic cement, the tariff rate remains at 5% until 2014 before falling to 0% in 2015.

The evaluation of the impacts of the AFTA and ACFTA on the cement industry in Laos employs a simple comparison of prices between domestic cement and imported cement from Thailand, the PRC, and Vietnam before and after the realization of tariff reductions. The comparison of prices only covers cement for regular usage; in other words, imported cement allowed by the government for large construction projects is not included. The selected areas of comparison cover the home provinces of the cement plants and provinces that border neighboring countries that are the main exporters of cement to Laos. The results are provided in Table 4.4.

The comparison results show that local cement can compete with imported cement on a price basis fairly well, especially in provinces that are in close proximity to cement plants.

Specifically, the local cement can compete with Thai cement in all major provinces, except in provinces that are far from the cement plants and closer to the Thai border. Second, the price competitiveness of Laotian cement will fall substantially when tariffs are fully eliminated. This effect will be particularly severe in the provinces that are far from domestic plants. Third, this industry will have difficulty in competing with imports in terms of quality. While some local products have improved in quality since the 1990s, generally, the quality of domestic cement is inferior to imported cement, especially with regard to cement used in heavy construction.

In addition to actual differences in quality between domestic and imported cements, local products also face problems with perceptions about the low quality of their products. As price differences become less favorable to local cement under the FTA scheme, the gap in quality perceptions will have more influence on the decision making of domestic users. Finally, the expected increase in the production and capacity of the local cement producers could be either an opportunity to meet increased domestic demand or a challenge in terms of downward pressure on prices (and profits) from an oversupply of cement.

4.4 Policy implications on strengthening the competiveness of local industries in response to greater economic integration

In general, the evaluation of the three industries shows that price competitiveness will diminish substantially in all cases after tariffs have been completely removed under AFTA and ACFTA. However, the intensity of impact, both domestic and abroad, varies substantially across industries. In order to respond to these challenges, the Laotian government has to implement the following policy measures.

The infant motorcycle assembly industry needs to be supported through policies that enhance labor productivity and enforce standards for quality and safety as well as protect intellectual property rights and environment. Moreover, policies should facilitate the expansion of local content to engage in higher value-added and higher technological upgrading of the industry. To do so, the government should provide more attractive incentives for local industries to invest in R&D and training for their workforces. The Laotian government should raise awareness of AFTA and ACFTA commitments and their potential impact on the industry. In addition, procedures need to be simplified, and costs related to the import–export process need to be reduced.

For the wood processing industry, measures should be taken to ensure clear policies that promote a higher value-added wood processing, a fair allocation of the quota of raw logs that is consistent with factories' actual performances, and the enforcement of reforestation policy. Moreover, in order to market Laotian wood products better both domestically and internationally there is a need to enhance the capacity in product designs, such as emphasizing efficient use of raw material, lighter weight, and higher value added, and incorporate international designs according to continuous change in global trends and fashions.

Table 4.4: Prices of domestic and imported cement by province (LAK/ton)

Location	Type of Cement	2009	2014	2015	Is local cement Completive in 2015?
Vientiane	Lao P525 Red (Bull)	800,000		800,000	No
	Lao P425 Blue (Bull)	750,000		750,000	No
	Lao P425 Green (Bull)	730,000		730,000	No
	Thai Portland (Elephant)	800,000	776,000	737,200	n.a.
	Thai Mix	680,000	659,600	626,620	n.a.
Khammouan	Lao P525 Red (Lion)	665,000		665,000	Yes
	Lao P425 Green (Lion)	600,000		600,000	Yes
	Lao P425 Blue (Bull)	700,000		700,000	Yes
	Thai Portland (Elephant)	810,000	785,700	746,415	n.a.
	Thai Mix (Tiger)	765,000	742,050	704,948	n.a.
	Thai Mix (Bird)	735,000	712,950	677,303	n.a.
	Thai Portland (Diamond)	800,000	776,000	737,200	n.a.
Savannakhet	Lao P525 Red (Bull)	720,000		720,000	Yes
	Lao P425 Blue (Bull)	640,000		640,000	Yes
	Thai Mix[#] (Tiger)	787,000		724,000	n.a.
Champasak	Lao P425 Green (Bull)	680,000		680,000	Yes*
	Lao P425 Red (Bull)	740,000		740,000	No
	Thai Portland (Elephant)	750,000	727,500	691,125	n.a.
	Thai Mix (Bird)	740,000	717,800	681,910	n.a.
	Thai Portland (TPI Red)	790,000	766,300	727,985	n.a.
	Thai Mix (TPI Green)	700,000	679,000	645,000	n.a.
Luang	Lao P525 Red (Deer)	730,000		730,000	Yes*
Prabang	Lao P425 Green (Deer)	690,000		690,000	No
	Lao P525 Red (Bull)	830,000		830,000	No
	Lao P425 Blue (Bull)	760,000		760,000	No
	Thai Portland (Elephant)	860,000	834,200	792,490	n.a.
	Thai Portland (Red Bull)	920,000	892,400	847,780	n.a.
	Vietnamese Portland	690,000	669,300	635,835	n.a.
Oudomxay	Lao P525 Red (Bull)	910,000		910,000	No
	Lao P425 Blue (Bull)	780,000		780,000	No
	Thai Portland	980,000	950,600	903,070	n.a.
	Chinese Portland	700,000	679,000	645,050	n.a.

Notes:

1. Expected prices are based on current market prices and the FTA tariff reduction schedule. Import tariff reduced to 5% in 2014 and reduces to 0% in 2015.
2. Price competitiveness in 2009 and 2015 compares the price of Laos cement with comparable imports of similar quality.
3. * denotes a weak conclusion.
4. Because of the lack of data, the price of Thai mix (Tiger) cement in Savannakhet is estimated to be about 3% higher than the same cement sold in Khammuane.

Source: Author's estimations based on current retail price data from the Ministry of Industry and Commerce and the Cement Producers Group.

For the cement industry, the government should continue to support a more favorable business environment, especially with respect to competitiveness. Means of monitoring domestic demand for cement and raw material availability should be put in place in order to prevent cement shortages that could lead to unnecessarily high prices. Other areas to be addressed include the improvement of infrastructure and logistics systems to reduce transportation costs and the bolstering of the reputation of Laos cement products. Moreover, given that future demand is promising, more investments in the cement industry should be encouraged with incentives in the context of economies of scale.

5. Summary

This chapter has examined how the international economic integration of Laos could affect its local economy. The Laotian government is intensively engaging in the economic integration frameworks at subregional, regional, and global levels. The initiatives at the subregional level have sped up liberalization in those areas in which regional or global initiatives would have had difficulty. In other words, the economic integration initiatives at every level are complementary for Laotian economy.

The government promotes the development of SEZ in order to maximize the limited resources in improving the business and investment infrastructures in some selected areas. SEZs have therefore provided better investment environments, both in terms of the quality of infrastructures and attractive investment incentives. SEZs in Laos are usually located along important economic corridors that provide good access to foreign markets. Since the beginning of development in the early 2000s, the progress has been slow, mainly due to the lack of government budget in improving the required basic infrastructures. The development of SEZs began to expand quickly when the government started to cooperate with established

foreign developers. To date, a few SEZs have attracted several MNCs, based in Thailand, that have established their satellite factories in Laos as part of their production fragmentation strategy. These MNCs have created opportunities for Laotian industries to link with the international production network. However, the success of one SEZ has encouraged many other SEZs to be established in Laos. There is a concern that if the government continues to approve many new SEZs in the years to come the benefit from this development model may diminish. Competition among SEZs could lead to fierce competition in offering incentives, and, consequently, gains to the local economy will become smaller.

Participating in regional and global preferential trade agreements provides both opportunities and challenges for the Laotian economy. Three case studies have shown how local industries could be affected by ACFTA and AFTA. More specifically, the competitiveness of all of the three selected industries (viz., motorcycle assembly, cement manufacturing, and wood processing) will decrease substantially after the fulfilment of the commitments. The three industries were selected to represent different types of industry in Laos. Moreover, the case studies find that the degree of impact varies quite significantly across industries. For domestic and import-substituted industries (wood products and cement, respectively) price competitiveness and product quality will become serious issues when tariffs are removed. Ensuring product quality in light of increased competition from neighboring countries will surely become crucial for the two industries to maintain domestic market share on the one hand, and, if possible, expand into ASEAN and PRC markets on the other hand. For an FDI-led industry such as motorcycle assembly, the concern over price competitiveness seems to be less significant across all motorcycle brands. However, product quality and brand reputation will be important challenges for Laotian motorcycle assemblers.

It is particularly crucial for the local and Chinese motorcycles if they intend to penetrate the Thai market. The findings of these case studies at industry level complement analytical works that pertain to the potential negative impacts of regional FTAs on domestic industries in a participating country that is small in economic size.[50] The case studies show that negative adjustments are likely to be short term. The findings are also valid when applied to any other FTA scheme that Laos has engaged. In order to minimize, if not eliminate, the negative effects, the Laotian government has to work closely with the private sector to strengthen their capacity to adapt to an FTA scheme before the full implementation of the agreement.

[1] Particularly, the findings support the arguments of Gradziuk (2010) and Park, Park, and Estrada (2008).

Chapter 5 Analytical Framework

1. Introduction

This dissertation, as defined in Chapter 1, aims to examine the impact of the inflow of FDI, especially into the natural resource sector of the Laotian economy. First, the study aims to investigate the role of capital accumulation, which is largely driven by FDI, in promoting economic growth. Second, the study intends to examine the role of the linkage with the global production network on the performance of the FDI-led garment industry in Laos. Finally, the study also investigates the changes of inequality in Laos and its relationship with FDI. The conceptual foundations, both in terms of theoretical and empirical grounds for the analysis of sources of growth, industrial linkages, and inequality, are derived from the literature review in Chapter 2.

The analysis in this study has three stages. The first stage is devoted to the investigation of how FDI inflows into the natural resource sector have contributed to economic growth in Laos. The empirical inquiry focuses particularly on the capital accumulation that has been mainly driven by FDI because of a relatively large saving-investment gap, the consequence of low income in Laos. The second stage intends to analyze the role of FDI as the source for technological upgrading, linkage to the global production network, and enhancement of competitiveness. For this purpose, this study conducts a case study on the garment industry in Laos. The purpose of the third stage is twofold: to investigate the changes of inequality in Laos then to clarify the role of FDI in causing the widening of

inequality. This study computes inequality rate in both consumption and asset from two household survey data sets. From the empirical findings, this study then clarifies how FDI inflow has influenced changes in the inequality rate in Laos by comparing provinces/districts that have received more inflows with those that have not.

This chapter is organized as follows. Section 2 shows the conceptual linkages between the boom in the natural resource sector, FDI inflow, capital accumulation, economic growth, and inequality in the Laotian economy. Section 3 is devoted to the construction of the analytical framework for discerning the role of capital accumulation on the growth of the Laotian economy. Section 4 explains the methodology for analyzing the role of FDI in technological upgrading, linking with global competitiveness, and enhancing the performance of the garment industry. Section 5 defines the procedures to measure inequality and then clarify the change in inequality and its relationship with FDI. The last section summarizes this chapter.

2. The linkages between natural resource boom, economic growth, and inequality in the Laotian economy

Since the introduction of the open-door policy, the Laotian government has promoted the inflow of FDI through the gradual liberalization of trade and investment sectors. The natural resource sector in Laos has always been one of the main sectors that has attracted substantial inflows of FDI, which seek to take advantage of the country's abundance of natural resource. The wood industry and hydropower sector were the pioneer areas that received attention from foreign investors. However, the development of the natural resource sector only began to expand rapidly in the mid 2000s, after the operation of large gold and copper mines

began. As demonstrated in Chapter 3, as a result of the natural resource boom the value of exports has increased significantly, and that, in turn, has caused rapid economic growth for several consecutive years. The growth in the natural resource sector has brought about the transformation of the Laotian economy from an agriculture-based to a more industrial and service-based economy. The existing literature has shown that resource endowment and natural resources are the key pull factors in attracting FDI inflows. FDI inflows into Laos are no exception because those foreign capitals have focused primarily on the natural resource sector. Moreover, from Chapter 2, it is clear that FDI inflows have a large impact on economic growth in terms of sources of capital, technological transfer, and other positive spillover effects. From these viewpoints, FDI has contributed crucially in promoting economic growth in Laos.

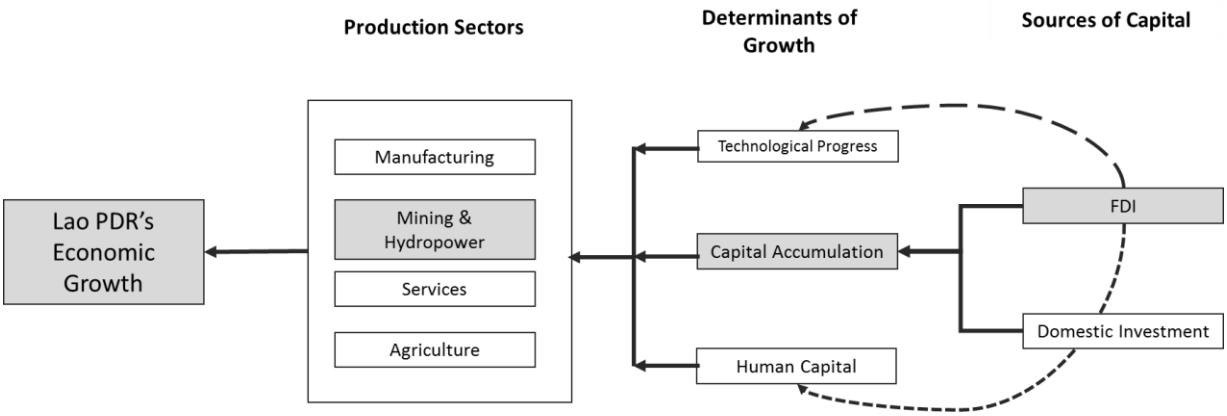
On the other hand, economic growth has also caused the widening of disparities in Laos. Chapter 3 has explained that inequality in Laos worsened in the period between 2002/03 and 2007/08, when that period had a large inflow of FDI into the natural resource sector. The rise of inequality in Laos is a concern, not only from the viewpoint of imbalanced growth, but because the worsening inequality rate is in contradiction to the experiences observed in the neighboring countries and in other countries that are of the same income level. Furthermore, the literature review in Chapter 2 elucidates that inequality has negative consequences on development, particularly on growth sustainability and poverty reduction. Similarly, FDI can potentially create an adverse impact on inequality. FDI inflows have a different magnitude of impacts on different industries or sectors of the economy. The sectors or industries which have received FDI, or those sectors that have linkage to the FDI recipient sectors, have gained relatively more than other sectors. Similarly, this also applies to the regions or areas that have

received FDI; they also gained more than other areas. Therefore, accordingly, the distribution of FDI across sectors and regions has the potential to influence inequality.

3. The linkage between FDI and economic growth in Laos

Chapter 3 and Chapter 4 have explained that the natural resource sector in Laos has attracted a large FDI inflow since the middle of the 2000s. Following the boom of the natural resource sector, the Laotian economy achieved high economic growth rate. Chapter 2 has shown that FDI plays a substantial role in the recipient economy, especially as an important source of capital and technology transfer. For this reason, the objective of the first part of the analytical framework is to verify the role of FDI in promoting economic growth in Laos. The empirical analysis is to take into account the characteristics of Laotian economy, the stage of development, and the level of data availability. From the perspective of the neoclassical growth model, economic growth is based on three sources, namely, capital accumulation, labor, and technological progress. A developing country has a low-income level, and therefore its saving level is also low. As such, in order to fill the saving-investment gap, a developing country has to rely on external sources of capital, one of which is in the form of FDI, to finance development. Theoretical explanation of the saving-investment gap is elegantly explained in the Harrod-Domar model. This analysis does not disaggregate FDI from capital accumulation so that the specification of the neoclassical growth model is maintained. FDI also has direct influences on the determinants of growth, such as technological progress and human capital or labor. Local companies established by FDI benefit from technology provided by their parent companies. Furthermore, this technology transfer also includes human resource development in local companies through the provision of on-the-job training and the use of standard operation manuals for employees.

Figure 5.1 The impact of FDI on Laos economic growth.



Equally important, technology transfer facilitated by FDI also has spillover effects to the recipient economy. Therefore, although FDI inflows into Laos were largely concentrated in the natural resource sectors, especially in the mining and hydropower sector, they are expected to cause substantial positive impacts on the economic growth of the Laotian economy. Figure 5.1 shows the linkage between FDI, determinants of growth, production sectors, and economic growth in Laos.

For the purpose of empirical analysis, the Laotian economy is expressed by the neoclassical production function in the form of the Cobb-Douglass production function[51] as shown in Eq.1. The letter *Y* represents GDP, *A* represents the constant term, *K* denotes capital stock, L stands for labor, and $e^{\alpha t}$ is the time trend, which denotes the technical progress known as total factor productivity (TFP).

$$Y = A\, e^{\alpha t}\, K^{\beta_1} L^{\beta_2} \qquad (1)$$

[51] See McQuinn and Whelany (2006); Mankiw, Romer, and Weil (1992)

We transform the Eq.1 into a linear function, which is shown in Eq.2. In order to obtain an equation that alludes to the decomposition of GDP growth rate, we total differentiate Eq. 2 and thus it becomes Eq. 3. In this equation, $\frac{dY}{Y}$ is the growth rate of output, $\frac{dK}{K}$ is capita growth rate, $\frac{dL}{L}$ is labor growth rate, dt is the growth of time trend, β_1 is the output elasticity of capital, β_2 is the output elasticity of labor and α is the rate of TFP change. Using Eq. 3, we can examine the relationship between output and inputs by time series regressions.

$$\ln(Y) = \ln(A) + \alpha t + \beta_1 \ln(K) + \beta_2 \ln(L) \quad (2)$$

$$\frac{dY}{Y} = \alpha\, dt + \beta_1 \frac{dK}{K} + \beta_2 \frac{dL}{L} \quad (3)$$

In addition, in order to examine the relationship between output per labor (i.e. labor productivity) and capital per labor (i.e. capital intensity), we can divide both sides of Eq.1 by labor (L) and then it becomes Eq.4. With the assumption[52] of a constant return to scale ($\beta_1 + \beta_2 = 1$), the Eq. 1 can be denoted in the form of output per labor (i.e., labor productivity) as shown in Eq. 4. We can further transform Eq. 4 to a linear function as shown in Eq.5. On that basis, we can make a regression of the output per labor on a constant, time trend, and capital per labor (K/L, i.e., capital intensity).

$$\frac{Y}{L} = A\, e^{\alpha t} \left(\frac{K}{L}\right)^{\beta_1} \quad (4)$$

[52] In the Cobb-Douglass production function, constant return to scale is commonly assumed (see Joshesk et al, 2011 and Felipe and Adams, 2005). However, the natural resource sector intuitively is increasing return because of its capital-intensive, production-oriented activities. As such, the sum of the output elasticity of capital and labor will be greater than one. However, this study assumes the constant return to scale in order to make the findings from the study comparable to earlier studies on Laotian economic growth, which also made the assumption of constant return to scale (for instance, Insisienmay, 2006).

$$\ln\left(\frac{Y}{L}\right) = \ln(A) + \alpha\, t + \beta_1 \ln\left(\frac{K}{L}\right) \quad (5)$$

In order to control for other macroeconomic factors that could have affected growth, we extend Eq. 3 to include other controlled variables that are considered to have influenced the growth performance of the Laotian economy. Undoubtedly, macroeconomic stability is a crucial factor for growth because positive output growth also influences prices of goods and services. However, the relationship between prices and output could be either positive or negative (Samuelson and Nordhaus 1992, p.595). In addition, empirical studies by Kamin and Rogers (2000) and Husain *et al* (2005) demonstrate that the real exchange rate volatility is the result of poor macroeconomic policies, which consequently hinder economic growth. From these perspectives, our study selects inflation (INFL) and the growth rate of real effective exchange rate (REER) as key factors that exert influence on output growth. Furthermore, we extend the model to reflect two major structural changes, such as the Asian Financial Crisis and the increasing share of FDI in the natural resource sector. Therefore, the dummy variable CRISIS and the share of FDI in the resource sector (FDINAT) are also included in the extended equation. These specifications are shown in Eq.6. In other words, Eq.6 is used for the purpose of verifying the relationship between the growth rate of output and the growth rate of inputs after controlling for other macroeconomic factors and structural changes. The expected sign on β_3 and β_5 is negative for REER[53] and CRISIS respectively, positive for β_6 but for β_4 it can be either positive or negative.

[53] REER indicates the relative prices between home and foreign market, hence, real appreciation (increase in REER) could reduce the price competitiveness of the country's overall export. Hence, REER is expected to have negative impact on the output growth. The equation introduces the lagged value of REER to capture the time lag of the impact from REER change to output.

$$\frac{dY}{Y} = \alpha\, dt \; + \beta_1 \frac{dK}{K} + \beta_2 \frac{dL}{L} + \beta_3 \frac{d\, REER}{REER} + \beta_4\, INFL + \beta_5\, CRISIS \; + \beta_6\, FDINAT \quad (6)$$

$$y_t = C + \Gamma_1 y_{t-1} + \Gamma_2 y_{t-2} + \ldots + \Gamma_p y_{t-p} + \varepsilon_t \quad (7)$$

The structural approach to time series modeling uses the production function in order to specify how the dependent variable $\left(\frac{dY}{Y}\right)$ is influenced by those independent variables which are the focus of our empirical inquiry. For this purpose, we have to extend our investigation so as to include dynamic specifications which identify the relationships among those independent variables that fit into empirical analytical framework. In this context, we construct a vector autoregressive (VAR) model by treating every endogenous variable as a function of the lagged values of all endogenous variables in the system. Such a VAR(p) model involves a system of equations being denoted by Eq.7 where y_t is a column vector of the endogenous variables (i.e., output growth rate, capital growth rate, labor growth rate, and inflation), C is a vector of constant, p is the order of time lag, each Γ_1, Γ_2,...., Γ_p is a coefficient matrix, each y_{t-1}, y_{t-2}..., y_{t-p} is a vector of the lag endogenous variables, and ε_t is a vector of the random error term in the system. The appropriate lag length for our system of equations is one time period, meaning that we include one year lagged for all variables to the right-hand side of the equation.

4. FDI, technological upgrading, and performance of garment firms in Laos

As illustrated in Figure 5.1, FDI could promote economic growth in Laos by influencing the technological upgrading and human resources development of local firms. The garment industry has become the most promising manufacturing sector in Laos. The development of this industry has been driven by FDI. Although the share of this industry in

GDP has contracted in recent years due to the boom of the natural resource sector, this industry has continued to be significant for the economy in terms of employment and exports.

In order to clarify the relationship between FDI, technological upgrading, and local firms' performance, the second part of the analytical framework attempts to examine the role of FDI as being the source of technological upgrading, linkage with the global production network, and improving firms' competitiveness in the garment industry in Laos. This industrial-level case study is expected to provide an example of how an FDI-led industry like the garment sector has improved its performance and technological capabilities on the one hand while also providing first-hand evidence on the roles and importance of FDI for a recipient country on the other hand.

In order to examine the overall level of linkage and competitiveness of this industry, several indicators are constructed for the Laotian garment industry. First, industrial competitiveness is analyzed by calculating several key indicators, like the Revealed Comparative Advantage (RAC) index, Relative Trade Advantage (RTA) index, and the Revealed Competitiveness (RC) index. RTA and RC are calculated following Vollrath, T.L. (1991). Intra-industry linkage is examined by constructing the Grubel Lloyd (GL) index. The country is considered to have an advantage in goods or services if the value of RCA is greater than one or the value of RTA and RC greater than zero. GL index ranges from 0 to 1. The former means there is no intra-industry trade but only inter-industry trade. On the contrary, the latter means all trades are intra-industry. These indices are calculated using the following equations.

$$\mathrm{RCA} = \frac{\frac{X_{ij}}{X_{ik}}}{\frac{X_{nj}}{X_{nk}}} \quad (8)$$

$$\mathrm{RTA} = \mathrm{RXA} - \mathrm{RMA} \quad (9)$$

$$\mathrm{RXA} = \mathrm{RCA} \quad (10)$$

$$\mathrm{RMA} = \frac{\frac{M_{ij}}{M_{ik}}}{\frac{M_{nj}}{M_{nk}}} \quad (11)$$

$$\mathrm{RTA} = \frac{\frac{X_{ij}}{X_{ik}}}{\frac{X_{nj}}{X_{nk}}} - \frac{\frac{M_{ij}}{M_{ik}}}{\frac{M_{nj}}{M_{nk}}} \quad (12)$$

$$RC = \ln RXA - \ln RMA \quad (13)$$

$$\mathrm{GL}_i = 1 - \frac{|X_i - M_i|}{X_i + M_i} \quad (14)$$

In this set of equations *X* represents exports, *M* represents imports, *i* is a country index, *j* is a commodity, *k* is a set of commodities, and *n* is a set of countries.

In order to examine the role of FDI in the Laotian garment industry, a combination of statistical inference and econometric analysis are used in the empirical inquiry. First, two-tailed t-tests are used to examine the statistical significance of firms' productivity, export performance, level of regional integration, and availability of technological upgrading between foreign and local firms. The levels of technological capabilities are comparable among firms with different export performance, regardless of the ownership of the firms. Performance and technological capabilities are also compared among firms with different levels of regional linkages.

The following specifications are used to estimate the determinants of export performance and technological capabilities of Laotian garment firms. Model specifications are adapted from Rasiah and Gachino (2004). OLS regression is used and the dependent variable is export performance (the share of export in total production) in Eq.15. Tobit regression is conducted in Eq.16 and Eq.17 where the dependent variable is technological capability (TC).

$$\frac{\mathrm{E}}{\mathrm{Y}} = \mathrm{C} + \beta_1 \mathrm{TC} + \beta_2 \mathrm{FO} + \beta_3 \frac{\mathrm{Y}}{\mathrm{L}} + \beta_4 \mathrm{AGE} + \beta_5 \mathrm{SIZE} \quad (15)$$

$$\mathrm{TC} = \mathrm{C} + \beta_1 \frac{\mathrm{E}}{\mathrm{Y}} + \beta_2 \mathrm{HI} + \beta_3 \mathrm{FO} + \beta_4 \mathrm{RL} + \beta_5 \mathrm{AGE} + \beta_6 \mathrm{SIZE} \quad (16)$$

$\frac{E}{Y}$ is the share of export in total production. *FO* is the dummy variable for foreign ownership (*FO* equals 1 if the share of foreign ownership is greater than 51%). $\frac{Y}{L}$ is the output per labor or labor productivity. *Age* is the number of years after the establishment. *FA* is a dummy variable for foreign affiliation (*FA* equals 1 if the company reports that it has an affiliation with foreign counterpart). *Size* is the number of permanent worker in the company. *HI* is firms' assessment on the quality of support and linkage from institution. *HI* is derived from the framework of meso organizations based on the Systematic Quad model introduced by Rasiah, Nolintha, and Songvilay (2011). Likert scale scores ranging from 0 to 5 are used to score firms' rating of the quality of connections and coordination with critical institutions.

Regional production linkage (RL) is estimated using the following formula expressed in Eq.18. Region in this analysis refers to East Asia.

$$\mathrm{RL} = \frac{\text{Regional sale} + \text{Regional purchases}}{\text{Total sale and purchases}} \quad (17)$$

In order to estimate technological index in this chapter, we use similar methodologies as specified in Rasiah (2006, 2008, 2010). Technological capability (TC) is estimated by the five proxies specified in the following formula.

$$\mathrm{TC} = \mathrm{F}(\mathrm{CIQT}, \mathrm{AC}, \mathrm{PD}, \mathrm{RD}, \mathrm{TE}) \quad (18)$$

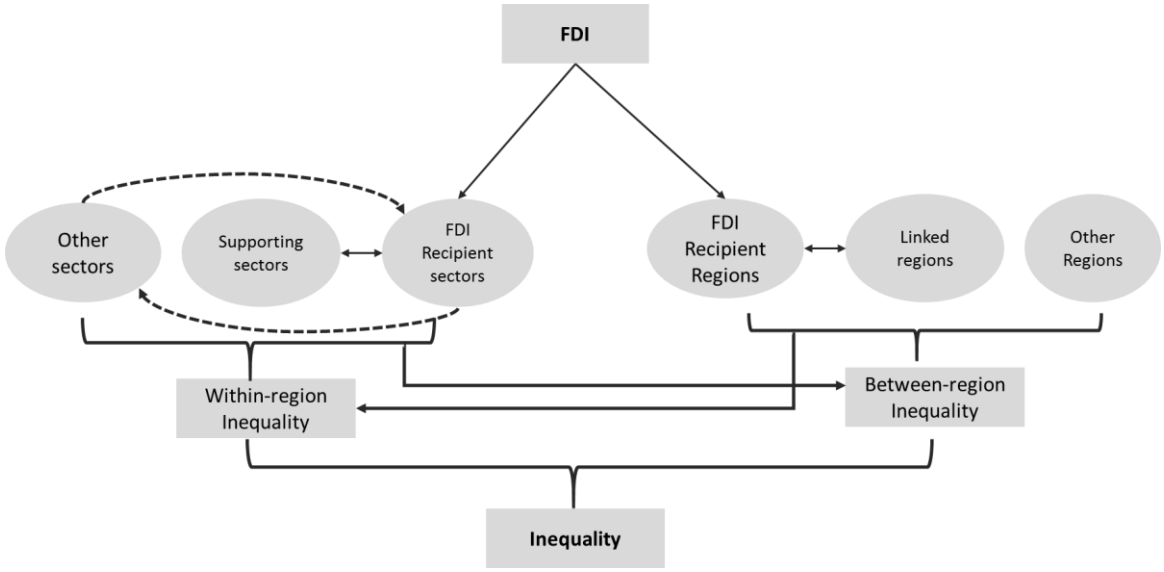
CIQT refers to the cutting-edge inventory and quality control techniques of statistical process control, quality control circles, any one of the international standard organization series, total preventive maintenance, integrated materials resource planning, and total quality management. A score of 1 is added for the presence of each of these techniques. *AC* refers to the presence of adaptive capabilities on process, layouts, machinery, and products. A score of 1 is given for the presence of each of them. *PD* refers to the presence of product development (1 if existed and 0 otherwise). *RD* is the share of research and development expenditure in sales. *TE* is the share of training in payrolls. Finally, the value of the proxies is converted to a number between 0 and 1 by using the following normalization formula before summation.

$$\mathrm{X} = \frac{\mathrm{X_i} - \mathrm{X_{min}}}{\mathrm{X_{max}} - \mathrm{X_{min}}} \quad (19)$$

X_i, X_{min} and X_{max} refer to the observed, minimum, and maximum value, respectively.

Technological intensity (TI) was estimated from three proxies, viz., *CIQT, HC* and *TE*. *HC* refers to the share of high skill labors (managers, engineers, technicians, and supervisor) in the total employment. *CIQT* and *TE* are specified the same as in Eq.19. Normalization is used before the summation.

Figure 5.2 The linkage between FDI and inequality in the Laotian economy



5. Economic growth, FDI, and inequality in Laos

Inequality in Laos has deteriorated in the environment of rapid economic growth and large inflows of FDI. As discussed in Chapter 2, the relationship between growth and inequality is debatable. Kuznets hypothesis asserts that inequality is expected to increase with the rise of income per capita in the initial stage of development, but inequality is expected to decline when income per capita has surpassed a certain threshold. However, Chapter 2 has already shown that there are several studies which have substantiated that inequality causes negative impacts on growth and also creates adverse effects on other development indicators. Hence, inequality should not be neglected in any stage of development. In addition, many empirical studies have substantiated that FDI inflows have an adverse impact on inequality. In the context of Laos, there are two main channels through which FDI could influence inequality (Figure 5.2). First, as discussed in the Chapter 4, FDI inflow into Laos has concentrated in some sectors, especially the natural resource sector. Many empirical studies show that FDI is

good for local economy, hence, the sector that receives FDI inflow can benefit relatively more than other sectors. Put differently, incomes of businesses and individuals in the FDI recipient sectors, and those in some related sectors, are likely to grow relatively faster than other sectors. Consequently, this widens the disparity. Moreover, the disparity could arise within the same region or between regions. Second, FDI inflow into Laos has concentrated in selected regions that are richly endowed with natural resources, better economic infrastructure, and better access to export markets. Like in the first case, the income of businesses and individuals in the FDI recipient regions and those in the neighboring regions or regions that are closely linked are likely to grow faster than other regions. As a result, between-region disparity increases. From these two channels, a large FDI inflow in a relatively short period of time creates an adverse impact on inequality.

The analysis on inequality in Laos is made of three parts. The first part examines the change in equality in Laos by constructing various inequality indicators. These indicators are helpful for measuring the changes of inequality in Laos. In addition to consumption-based inequality, which is a popularly used indicator in other previous studies, this study calculates asset-based inequality. Inequality in both dimensions allows more rigorous analysis on inequality in Laos. The second part deals with the investigation of the relationship between FDI and inequality in Laos. For this purpose, this analytical part compares the regions with different trends of inequality against the magnitude of FDI inflow and other controlled development variables. More specifically, it compares inequality level between the areas with large inflow of FDI and those areas with small inflow of FDI. In the last part, the analysis conducts a simple linear econometric regression to examine the relationship between FDI and inequality.

In order to quantify inequality in Laos, this analysis uses four primary criteria: anonymity principle, population principle, relative income principle, and the Dalton principle propounded by Atkinson (1974) and Sen (1973). These criterions are useful in determining the appropriate inequality measures. In addition, the analysis also covers some of the common indicators on inequalities, such as deciles dispersion ratios, Gini coefficient, Theil index, and Atkinson index.

Decile dispersion ratio is the most simple and widely used measure of inequality. Decile dispersion ratio presents the ratio of the average income of the richest 10% of the population over the average income of the poorest 10% of the population. This approach could be applied to other percentiles, such as the ratio between the richest 5% and the poorest 5%, and the ratio between the 80^{th} percentile (richest 20%) and the 20^{th} percentile (poorest 20%). Decile dispersion ratio is also known as Kuznets ratio because this kind of ratio is used in Kuznets (1955) to discuss the relationship between inequality and growth. The advantage of this group of inequality measures is the ease of calculation and interpretation. However, decile dispersion ratio does not reveal much information on the situation of the middle deciles or the distribution of income within the top and bottom deciles.

The Gini coefficient is the most popular inequality indicator, particularly in empirical work. The Gini coefficient takes the value from 0 to 1. The former means complete equality and the latter shows complete inequality. Graphically, the Gini coefficient is represented by the area between the line of equality and the Lorenz curve, which maps the cumulative income share on the vertical axis and the cumulative distribution of population on the horizontal. The Gini coefficient could be defined mathematically by the following formula.

$$G = \frac{\left(\frac{1}{2n^2}\right)\sum_{i=1}^{n}\sum_{j=1}^{n}|y_i - y_j|}{\left(\frac{1}{n}\right)\sum_{i=1}^{n} y_i} \quad (20)$$

$\sum_{i=1}^{n}\sum_{j=1}^{n}|y_i - y_j|$ is the mean absolute difference between all pairs (y_i, y_j) and $\left(\frac{1}{n}\right)\sum_{i=1}^{n} y_i$ is the mean level of the variable *y* (Pyatt 1976). Because of its close link with the Lorenz curve, the Gini coefficient is very intuitive. The Gini coefficient also satisfies all four principles of inequality measures (Ray 1998). However, the biggest disadvantage of this index is that the coefficient is not additive across subgroups; hence, the total index cannot be decomposed into Gini coefficients of the subgroups (World Bank Institute 2005). In addition, the same Gini coefficient could be achieved from a different shape of distribution (a different Lorenz curve); hence, the same value could have slightly different meaning in terms of the actual distributions. This puts some limitations on the analysis of inequality.[54]

The Theil index belongs to the generalized entropy inequality measure (GE) group. The Theil index is another widely used inequality measure that could overcome some of the major constraints of the Gini coefficient. Mathematically, GE could be calculated by the following formula.

$$GE(\alpha) = \frac{1}{\alpha(\alpha - 1)}\left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{\alpha} - 1\right] \quad (21)$$

Here, $\bar{y}$ is the mean value of income, expenditure, or other welfare indicator. The values of GE vary between 0 and ∞. Zero represents an equal distribution and higher values suggest higher

[54] Pyatt (1976) discusses ways that Gini coefficients could be decomposed into subgroups. However, due to the complexity of the calculation, this approach does not receive much attention in the empirical exercises.

levels of inequality. The sensitivity parameter α is the weight given to distance between the values under the study (for example income) at different levels of the income distributions. For lower values of α, the index is more sensitive to disparity at the lower part of the distribution, while for higher values the index is more sensitive to change that affects upper part of the distribution. Common values of α are 0, 1, and 2. GE(0) is also known as Theil's *L* index, or mean log deviation measure. GE(1) is known as Thiel's *T* index. Thiel indices also satisfied all four principles of criteria for inequality measures (Ray, 1998). In addition, the Theil index is additive; hence, it could overcome the limitation of nondecomposability of the Gini coefficient. Theil indices have additional properties of decomposability. Foster (1983) argues that such simple decomposability properties make the Theil index very useful and more preferable for inequality measures compared to others. Decomposition of inequality into with-in group components and between group components could be useful for the analysis of distribution of income based on some criteria, e.g., race, education, gender, economic sector, geography, and sources of income, that could divide population into mutually exclusive subgroups (Conceicao and Galbraith, 2000). For the population being divided into *m* groups, $g_1, \ldots, g_m$, and each group with n_j individuals, j=1, …, *m*, the decomposition of the Theil index could be achieved by the following equations.

$$T = \sum_{j=1}^{m} p_j R_j \log R_j + \sum_{j=1}^{m} p_j R_j T_j \tag{22}$$

$$T_j = \frac{1}{n_j} \sum_{i \in g_j} r_i \log r_i \tag{23}$$

Here, p_j is the population proportion in each group, R_j is the ratio of average group income to overall average income, T is the Theil Index of the subgroup, and r_i is the ratio between individual income and average income.

Atkinson inequality is another class of inequality measure that satisfies all of the criteria of inequality measures. Atkinson (1970) introduces the inequality measure, which was built from the direct social welfare function. The Atkinson index could be calculated by following equations.

$$A_\varepsilon = 1 - \left[\frac{1}{N}\sum_{i=1}^{N}\left(\frac{y_i}{\bar{y}}\right)^{1-\varepsilon}\right]^{\frac{1}{(1-\varepsilon)}} \text{ for } \varepsilon \neq 1, \text{ and } A_\varepsilon = 1 - \frac{\prod_{i=1}^{N}\left(y_i^{\left(\frac{1}{N}\right)}\right)}{\bar{y}} \text{ for } \varepsilon = 1 \quad (24)$$

Here, y_i is individual income, $\bar{y}$ mean income, and ε is inequality aversion parameter. For the bigger value of ε (approaching 1), the index is more sensitive to changes at the lower tail of the distribution, while a lower value (ε closer to zero) of the index is more sensitive to variations at the upper tail of the distribution. The Atkinson index could be also decomposed by similar methodology as discussed in Theil index decompositions.

In addition, the Sen-Shorrocks-Thon (SST) index will be calculated to examine the relationships between poverty and inequality. SST index is a poverty indicator that combines the effects of the number of poor, the depth of poverty, and the inequality among the poor (Haughton and Khandker 2009). Change in SST index could be decomposed into change in poverty headcount, change in poverty gap for the poor, and change in inequality among the poor. Mathematically, the SST index is expressed by Eq.25.

$$SST = P_0 P_1^p (1 + G^p) \quad (25)$$

Here, P_o is the poverty headcount, P_1^p is the poverty gap index for the poor and G^p is the Gini coefficient among the poor.

In order to estimate some inequality indices, Stata,[55] which is a statistical software, was used (StataCorp 2013). Stata commands were used to estimate Gini, Theil indices, poverty, and inequality graphs. Brief explanations on the main Stata commands are provided in Appendix 1. Other inequality indices and the simulation on the impacts of inequality on poverty were manually calculated.

6. Summary

This chapter has formulated the analytical framework for this dissertation. Building upon the literature reviews and the discussion of Laotian economic performances, this study attempts to investigate the impact of the inflow of FDI, especially into the natural resource sector on Laotian economy. The empirical analysis comprises of three parts. First, the study examines the role of FDI in promoting economic growth, particularly through capital accumulation. The analysis will be based on the neoclassical framework to examine the role of capital and labor in influencing growth of the Laotian economy. Chapter 6 will focus on this subject matter.

The second part of the empirical inquiry deals with the clarification of the role of FDI in promoting technological upgrading, strengthening the linkage with the global production network, and improving the performance of firms. Chapter 2 has shown that FDI plays a substantial role in the recipient economy, especially as an important source of capital and technology transfer and human resource development. Therefore, the case study on the

[55] A licensed Stata software (version 13) was used. The serial number is 401306273882 and the software is licensed to NERI UNICEF04, National Economic Research Institute.

Laotian garment industry is conducted to clarify these important relationships. The empirical analysis will use both statistical inference and econometric regression. Chapter 7 will carry out this case study.

Finally, the empirical inquiry examines the change in inequality in Laos and at the same time it attempts to substantiate how a rapid increase in FDI has influenced inequality. The study will compute several inequality indicators based on primary household survey data. This study will use the consumption data, which is the conventional indicator for inequality analysis, together with asset data, for inequality analysis in Laos. In order to examine the linkage between inequality and FDI, the study will combine several methodologies from simple statistical comparison to a regression analysis to enrich the understandings of this complicated relationship. Chapter 8 will provide detailed analysis of the issues of concern.

Chapter 6 The Role of Capital Accumulation and Economic Growth in Laos[56]

1. Introduction

As discussed in detail in Chapter 3, Laos has performed remarkably well since the introduction of the NEM, which is the reform package for the promotion of transition from a planned to a market-oriented economy. The economy has grown persistently at an annual rate of 6.7% in the past two decades. The GDP per capita increased from US$ 319 in 2001 to more than US$ 1,500 in 2013. Such rapid economic growth has been supported by increased integration of the Laotian economy with the regional economy and the rest of world through active participation in the ASEAN framework, FTA with China, and the accession to WTO. Because of these enhanced economic relations, the volume of exports and FDI inflows has increased in the last decade. In such a vibrant economic environment, the natural resource sector is the fastest growing sector. After a rocket-like soar in 2003,[57] the value added part of the mining sector has continuously grown at an annual average of 30% for five consecutive years. As a consequence, the share of the mining sector to total GDP increased from an average of 0.2% before 2002 to 10% from 2006 to 2010. In addition, the share of export from this sector[58] has accounted for an average of 42% total exports in the late 90s and increased to 75% from 2006 to 2010. Finally, the share of FDI in the natural resource sector was 52% of

[56] An earlier version (Nolintha and Lau, 2015b) is soon to be published in *Reitaku International Journal of Economic Studies* in 2015.

[57] GDP of mining sector in 2003 is equivalent to ten times the level in 2002.

[58] Exports from the natural resource sector include wood and wood products, electricity, mining, and nontimber forest product (NTFP).

total committed FDI over the past decade and the figure topped at over 90% in 2003 when there were approvals of big hydroelectric projects.

The objective of this chapter is to examine the growth of the Laotian economy with particular focus on the role of capital accumulation and the natural resource sector. The analytical framework is based on the methodology developed in Chapter 5. The rest of this chapter is organized as follows. Section 2 outlines the data source to be used in the analysis. Section 3 deals with the estimation of capital stock in Laos. Section 4 discusses the empirical findings. The last section summarizes the analytical findings.

2. Data sources

The empirical analysis uses time series data compiled from several sources. All data used for the analysis in this chapter is explained in Table 6.1. Most of the data is collected from the Lao Statistics Bureau. The data set includes GDP (Y), gross fixed capital formation (GFCF), labor force (L) and inflation. REER is computed from the data set of Darvas (2012). FDI data is compiled from the *Annual Investment Reports* produced by the Department of Investment Promotion under the Ministry of Planning and Investment. Trade statistics are compiled from *Annual BOL Reports* published by the Bank of Laos. Capital stock is then estimated by the author using GFCF data. The documentation on capital stock estimation is provided in the following section.

3. Estimation of capital stocks

For the purpose of growth accounting, this study needs to estimate capital stock of the Laotian economy. There were a few attempts in estimating capital stock in the Laotian economy, but their methodologies were too simplified. For example, Kyophilavong (2004)

estimates the capital stock by making two strong assumptions: capital stock equals output in the initial year, and there is no capital depreciation. These assumptions are too simplified, hence, they are questionable in terms of the reliability of the estimated results. Insisienmay (2006), by adopting Kuznets (1955) model, incorporates annual capital depreciation rate and the author estimates the initial capital stock by considering lagged relationship between investment growth and capital.

In order to overcome the limitation of the existing studies in Laos, we place particular emphasis on the influence of a long-term rate of investment growth, which depicts the long-term relationship between capital and output closer to the observed reality in the Laotian economy. From this perspective, our estimation is quite similar to the methodology used in Selia (2011) and UNIDO (2008). In our model, as shown in Eq. 26, the capital stock in the base year is estimated by considering the long-term investment growth. K_T is the capital stock of the base year, I_T is the investment in the base year, i is the average growth rate of investment for a period of ten years prior to the base year, and d_T is the depreciation rate in the base year.

$$K_T = \frac{I_T}{(i + d_T)} \tag{26}$$

$$K_t = K_{t-1} + I_t - DEP_t \tag{27}$$

In order to incorporate capital depreciation, we use the conventional Perpetual Inventory Method (Eq.27). K_t and $K_{t-1,}$ respectively represent capital stock in year t and $t-1$; I_t is gross capital formation in year t and DEP_t is the capital depreciation in year t. Our depreciation rate is estimated following Kuznets (1955) and Insisienmay (2006). From this approach, the annual capital depreciation is 6.13% in Laos, which is consistent with the

depreciation in the subregion.[59] Accordingly, Eq. 27 allows us to estimate the capital stock in the years after the initial year. Using the above methodology, capital stock of Laos can be estimated and the results are shown in Table 6.2.

After the booming of the natural resource sector in the early 2000s, capital stock in Laos has been accumulating at a more rapid pace. The growth of capital stock increased from an average of 5.4% per year from 1991 to 2002. The growth rate increased to 7.2% from 2003 to 2010. The ratio of capital to labor has also increased significantly, especially after the natural resource boom period. This confirms that the Laotian economy has become more capital intensive. The ratio between capital per output has declined gradually. This implies that capital stock growth has surpassed the output growth.

[59] Depreciation was 5% for Cambodia, 6% for Vietnam, and 7% for Thailand; see Seila (2011).

Table 6.1 The descriptions of variables used in growth regression

Variables	Description	Source
Y	GDP (in 2002 prices)	Lao Statistics Bureau (LSB)
GFCF	Gross Fix Capital Formation (in 2002 prices)	LSB
L	Labor force	LSB
K	Capital Stock in Laos (in 2002 prices)	Estimated by the author
π	Annual Inflation	LSB
REER	Real Effective Exchange Rate, CPI-based, weighted against 138 trading partners	Data set from Darvas (2012)
FDI	Foreign Direct Investment	Ministry of Planning and Investment, Laos
TRADE	Trade data	Balance of Payment data, Bank of Laos

Table 6.2: Capital stock of Laotian economy

	Capital stock (million LAK)	Labor (person)	Growth of capital stock	Capital/labor	Capital/output
1991	36,719,197	2,098,240		17.5	4.2
1992	38,497,086	2,138,727	4.8	18	4.1
1993	40,820,549	2,182,917	6	18.7	4.1
1994	43,059,947	2,219,585	5.5	19.4	4
1995	45,758,215	2,265,258	6.3	20.2	3.9
1996	48,370,576	2,314,382	5.7	20.9	3.9
1997	51,058,507	2,363,820	5.6	21.6	3.9
1998	53,835,116	2,414,131	5.4	22.3	3.8
1999	56,568,099	2,459,483	5.1	23	3.8
2000	60,084,767	2,514,007	6.2	23.9	3.9
2001	63,017,438	2,582,682	4.9	24.4	3.9
2002	65,457,563	2,650,104	3.9	24.7	3.8
2003	68,761,071	2,675,528	5.1	25.7	3.7
2004	73,067,084	2,706,188	6.3	27	3.7
2005	77,830,514	2,740,511	6.5	28.4	3.7
2006	83,368,471	2,816,502	7.1	29.6	3.6
2007	90,754,048	2,881,081	8.9	31.5	3.7
2008	97,846,643	2,938,338	7.8	33.3	3.7
2009	105,537,528	2,998,225	7.9	35.2	3.7
2010	113,707,097	3,064,881	7.7	37.1	3.7

Source: Estimated by the author using the data on gross fix capital formation provided by Lao Statistics Bureau

4. Regression analysis

4.1 Growth accounting

Before the regression analysis on Eq.3 we conducted standard unit root tests in order to ensure our time series data was stationary.[60] For this purpose, the augmented Dickey-Fuller (ADF) test and the Dickey-Fuller Test with GLS detrending (DFGLS) test are conducted for all the data series. The unit root test results are provided in Table 6.4. The results show that we could not reject the null hypothesis of an existence of a unit root in Log (Y), Log (K), and Log (L). However, the first difference series of Log (Y), Log (K), and Log (L) used in the regression are stationary. In this regard, therefore, the time series regression on Eq.3 uses the first difference series to analyze the relationship between output, input, and TFP in the Laotian economy. The regression results in the relationship between the output growth rate, capital growth rate, labor growth rate, and the time trend (which reflects the change of TFP as specified in Eq.3) are summarized in Table 6.4. The coefficient on $\frac{dK}{K}$ and *dt* (time trend) are positive and statistically significant. These suggest that change in output is positively related to change in capital. The TFP is statistically significant in explaining that the technical progress has contributed to growth in the Laotian economy. Specifically, 1% increase in capital growth rate pushes up output growth rate by 0.51%. Equally important, the estimated results show that a 1% increase in technical progress (i.e., TFP) causes 0.03% rise in output growth rate.

[60] A stationary time series data means that series has a constant mean and variance over time, which implies that the series fluctuates around the mean value and thus is not affected by the time trend.

Furthermore, the empirical relation between labor productivity (output per labor) and capital intensity (capital per labor) is examined following Eq.5. However, in order to overcome the unit root problem in the data, first difference is used instead of the data in level (the results of unit root test are provided in Table 6.3). Therefore, the first difference series of ln(Y/L) and ln(K/L) are used and the regression results are summarized in Table 6.5. The estimated coefficient on capital per labor and the time trend are statistically significant. More specifically, 1% increase in capital per labor is associated with 0.56% increase in output per labor. These results suggest that capital deepening helps to strengthen labor productivity.

In addition, the relationship between output per labor and capital per labor, as shown in Figure 6.1, provides additional insights into the dynamics of this relationship. Figure 6.1 shows that a small increase in capital per labor immediately after the NEM reform is associated with substantial increase in output per labor (labor productivity) in the 1990s. However, a large increase in capital intensity during the natural resource boom (from the mid 2000s) is associated with a small increase in labor productivity. The rise of capital intensity has influenced labor productivity from two sources. First, when capital goods are imported to Laos, the technology is in fact embodied in the capital good (Lau 1997). Second, most of manufacturing firms in Laos rely on their parent companies or clients overseas to provide technology and training for their staff.[61]

[61] Rasiah, Nolintha, and Songvilay (2011) substantiated that garment firms in Laos rely on their parent companies (in the case of subsidiary companies) or their suppliers/customers (for local funded companies) as major sources of technology improvement and staff training.

Table 6.3: Unit root test

	ADF Test			DF-GLS Test		
	k	Test-statistic		*k*	ERS Test-statistics	
Ln(Y)	1	0.85		2	0.14	
Ln(K)	0	3.30		1	-0.01	
Ln(L)	0	-0.16		1	0.05	
Ln(Y/L)	1	0.72		2	-0.44	
Ln(K/L)	0	3.30		1	-0.01	
Δ ln(Y)	0	-3.37	**	0	-2.76	***
Δ ln(L)	0	-3.18	**	0	-3.27	***
Δ ln(K)	0	-2.01		0	-2.01	**
Δ Ln(Y/L)	0	-3.25	**	0	-2.72	***
Δ Ln(K/L)	0	-2.08		0	-2.01	**
π	0	-2.32		0	-2.38	**
ΔREER	1	-3.79	**	0	-3.38	***
TRADE	0	-2.77	*	0	-2.56	**

Note: (1) The test equations include constant. Null hypothesis: series has a unit root. (2) In DF-GLS test, the critical values are -3.69, -1.96, and -1.61 for the 1%, 5%, and 10% level, respectively. (3) The lag length (*k*) is selected by the minimum AIC with maximum lag = 3. (4) ***, **, * denote rejection of null hypothesis at the 1%, 5% and 10% level of significance, respectively.

Table 6.4 Regression results, relationship between outputs, capital, labor, and TFP, 1990 to 2010

$\frac{dY}{Y}$ (Dependent)	Eq.3	
	Coef.	
$\frac{dK}{K}$	0.51	(3.12)***
$\frac{dL}{L}$	0.06	(0.14)
dt	0.03	(2.60)***
R2		0.38
Adjusted R2		0.29
Durbin-Watson		1.87
Degree of freedom		18

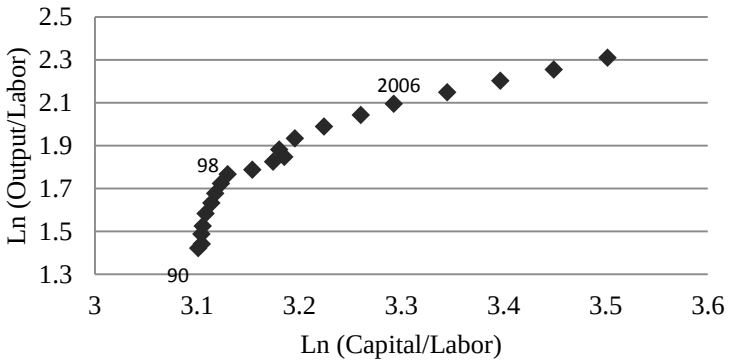
Source: Estimated by the author.

Table 6.5 Regression result, change in output per labor and change in capital per labor, 1990 to 2010

$\Delta \ln\left(\frac{Y}{L}\right)$ (Dependent)	Eq.5	
	Coef.	
C	-0.01	(-0.58)
Δt	0.02	(3.63)***
$\Delta \ln\left(\frac{K}{L}\right)$	0.56	(3.66)***
R2		0.45
Adjusted R2		0.38
Durbin-Watson		1.88
Degree of freedom		18

Source: Estimated by the author

Figure 6.1: Labor productivity and capital intensity



Source: Estimated by the author.

4.2 Influence of REER, inflation, and structural changes

The regression result of Eq.6 is summarized in Table 6.7. As explained in Chapter 5, Eq.6 extends the standard production function originated from Cobb Douglas production function to include other explanatory variables like REER, inflation, and structural changes in order to control for their effects on growth. Because of the strong correlation between inflation and the dummy on the Asian Financial Crisis (Table 6.6), these two variables are run separately in the regression analysis. The estimated coefficient of capital growth rate and the time trend (TFP) remain statistically significant in both equations. 1% increase in capital growth rate pushes up output growth rate by 0.58% and 0.54%, respectively. However, the estimated coefficient of labor growth rate is statistically insignificant in all equations. These results imply that capital growth rate contributes to output growth rate in Laos, even after controlling for other factors, while labor growth does not contribute to GDP growth. TFP also provides a contributory role in pushing economic growth in the Laotian economy. In other words, 1% increase in TFP causes output growth rate to rise by 0.02% and 0.03%, respectively, in both estimations of Eq.6.

The empirical findings in this study have other implications for the Laotian economy. The estimated coefficients of the dummy on the Asian Financial Crisis and the share of FDI in the natural resource sector are statistically significant and have the anticipated sign. These findings suggest that negative external shocks hamper growth. More specifically, the Asian Financial crisis reduces the output growth rate by 0.68%. 1% increase in the share of FDI in the natural resource sector increases the output growth rate by 0.001%. The estimated coefficient on REER and inflation are, however, statistically insignificant.

The estimated results from the VAR model, which is summarized in Table 6.8, could complement the discussion from multivariate regression results in the preceding paragraphs. Because of insufficient time series samples, these analytical findings from the VAR model are not appropriate for concrete statistical inference of causality. Nonetheless, the results can be used to examine the correlation among variables, viz., output growth rate, capital growth rate, and labor growth rate between the present year and the previous year. It is apparent from Table 6.8 that the output growth rate of the previous year (i.e., $\frac{\Delta Y}{Y}(-1)$) is correlated to capital growth of present year (i.e., $\frac{\Delta K}{K}$). Likewise, the capital growth rate of the previous year (i.e., $\frac{\Delta K}{K}(-1)$) has correlation with output growth rate (i.e., $\frac{\Delta Y}{Y}$), capital growth rate, and labor growth rate (i.e., $\frac{\Delta L}{L}$) of the present year. On the contrary, the labor growth rate of previous year (i.e., $\frac{\Delta L}{L}(-1)$) does not correlate with output growth rate (i.e., $\frac{\Delta Y}{Y}$), capital growth rate (i.e., $\frac{\Delta K}{K}$), and labor growth rate of present year (i.e., $\frac{\Delta L}{L}$).

These empirical analyses conclude that capital accumulation is the main driving force of economic growth in Laos. Capital, which is accumulated from domestic investments and FDI inflows, affects the economic performance in several ways. First, being a low saving economy,[62] Laos relies on the excess saving from overseas (in the form of FDI and ODA) to finance the country's economic development. FDI inflows into the natural resource sector, which account for about half of the total foreign capital inflows, indeed have contributed significantly to economic growth in Laos. Second, labor productivity is influenced by capital intensity. This implies that the rise of capital stock, accumulated by investments, influences

[62] Based on the National Account, the Gross Saving Rate in Laos is 23% of GNI, but the adjusted net saving rate is only 9% (Ruta 2010). This is lower than the average of the East Asian Region.

growth through imported technology embodied in capital goods and training activities (on-the-job training or off-the-job training) provided for more effective use of those capital goods.

5. Summary of discussions

This chapter investigates the contribution of capital input, which is accumulated from both domestic investments and FDI inflows. In the first regression model, constructed from a Cobb-Douglass production function, the results illustrate that capital, instead of labor, has contributed to output growth in Laos. In order to control for effects from other factors that are important for growth, we extend the basic model to include other explanatory variables. Even after controlling for other effects, our regression results show that capital remains as a significant contributor to growth in Laos instead of labor input. In the simplest form, we use a Cobb-Douglass production function to specify the relationship between output per labor (labor productivity) and capital per labor (capital intensity). Our results indicate that capital intensity influences labor productivity. The role of total factor productivity is confirmed in the Laotian economy.

Table 6.6 Correlation matrix between variable in Eq.6

	ΔLn(Y)	ΔLn(K)	Δln(L)	INFL	ΔLn(REER)	CRISIS
ΔLn(Y)	1.00	0.61	0.04	-0.66	0.07	-0.53
ΔLn(K)	0.61	1.00	0.02	-0.30	0.34	-0.19
Δln(L)	0.04	0.02	1.00	-0.03	-0.04	0.00
INFL	-0.66	-0.30	-0.03	1.00	-0.14	**0.85**
ΔLn(REER)	0.07	0.34	-0.04	-0.14	1.00	-0.16
CRISIS	-0.53	-0.19	0.00	0.85	-0.16	1.00

Table 6.7 Regression result, relationship between output growth rate and input growth, 1990 to 2010

$\frac{LY}{Y}$ (Dependent)	Eq.6			
Lt	0.02	(2.65)**	0.03	(2.42)**
$\frac{LK}{K}$	0.58	(3.51)***	0.54	(3.68)***
$\frac{LL}{L}$	0.46	(1.02)	0.38	(1.01)
LINFL	-0.001	(-0.23)		
Lln(REER)	-0.005	(0.03)	-0.01	(-0.46)
LFDINAT	0.001	(2.13)*	0.001	(1.92)*
CRISIS			-0.68	(-2.22)**
R2	0.56		0.68	
Adjusted R2	0.39		0.56	
Durbin-Watson	2.18		2.98	
F Statistics	4.84		8.48	
Prob > F	0.02		0.00	

Note: *L* is used as the symbol representing first difference of each variable. *, **, and *** denote the statistically significant at 10%, 5%, and 1% level, respectively.
Source: Estimated by the author.

Table 6.8 Regression results, VAR model

	$\frac{\Delta Y}{Y}$		$\frac{\Delta K}{K}$		$\frac{\Delta L}{L}$	
$\frac{\Delta Y}{Y}(-1)$	-0.2		0.69	**	-0.2	
$\frac{\Delta K}{K}(-1)$	0.449	*	0.497	**	0.236	*
$\frac{\Delta L}{L}(-1)$	-0.13		-0.26		0.26	
Const.	0.059	*	0		0.0127	
R2	0.53		0.69		0.28	
F Statistics	3.61		7.29		1.28	
Log Likelihood	64.02		65.31		74.09	
Akaike AIC	-6.55		-6.7		-7.67	
Schwarz SC	-6.31		-6.45		-7.42	

Note: *, **, and *** denote the statistically significant at 10%, 5%, and 1% level, respectively.
Source: Estimated by the author.

Chapter 7 FDI as the Source for Technological Upgrading, Global Production Chain Linkage, and Enhancement of Competitiveness: A Case Study on the Laotian Garment Industry[63]

1. Introduction

The garment industry has been at the forefront in the development of manufacturing in Laos. Garments contributed 12.6% of the manufacturing sector's value added between 2005 and 2012. The Lao garment industry started with just one state-owned garment factory in 1984 and the number increased to more than one-hundred factories in 2012 in which fifty-four factories were export oriented. FDI inflow to the Laotian garment industry began to emerge in the early 1990s to benefit from the garment's export quota from Laos to EU under the Multi Fibre Arrangement. FDI in the garment sector accounted for 7.3% of total approved FDI in Laos in the early 1990s. The share of garment exports in manufactured export fluctuated between 70% and 98% over the period 1995-2009, but it declined to 54% in 2011. Garments contributed around 30% of total export revenue between the late 90s and early 2000s. In addition, this industry has become an important source of off-farm employment and technology upgrading in the manufacturing sector in Laos. The total employment in the garment sector increased from 800 workers in 1990 to over 30,000 workers in 2012. The share

[63] This chapter is updated from my previous published works: Rasiah, R., Nolintha, V. & Songvilay, L. (2011) and Nolintha, V. & Jajri, I. (2015)

of employment in this sector is equivalent to 19.6% of employment in the manufacturing sector and 1% of total employment in 2012.[64]

FDI inflows into Laos opened the way for Laos to enter garment production chains in the early 1990s. Production location in Laos has benefited from several channels, including sources of investors, raw material supply, markets for finished goods, and other marketing and logistic supports. However, garment production has fallen in relative significance since 2005 owing to competition from other countries, an appreciation in LAK, and rising production costs.

The analytical framework in this chapter is developed in Chapter 5. The purpose of this chapter is to examine two crucial aspects of Laotian industry. The first aspect pertains to whether the host site has had a bearing in technological capabilities. The second one deals with the relationship between regional linkages of this industry and technological capabilities. The case study on the garment industry presents a good example of how linking the manufacturing sector with the global economy has affected the competitiveness of local industries. This industrial-level analysis could provide evidence, in support or against, the conventional understanding of the benefits gained from FDI in local economy. The rest of this chapter comprises the following: Section 2 provides an overview of policy environment for industrial developments in Laos, Section 3 describes data sources for the analysis in this chapter, Section 4 discusses the empirical findings, and Section 5 summarizes this chapter.

[64] Interviews with the Association of the Lao Garment Industry, 2013

2. Policy environment for industrial developments in Laos

Industrial policy in Laos could be traced to the NEM in 1986. Since then, several policies have been implemented to promote industrial development in Laos. The government enacted the Business Law in 1994 to create a more equal playing field for all businesses in Laos so that the environment is favorable to industrial development. All types of businesses, regardless of the type of ownership—whether private, state-owned enterprises, union-owned enterprises, or joint-venture enterprises—are treated equally before the law. The private sector is encouraged to participate in various sectors of the economy, except some sensitive sectors ,such as fuel, electricity, water, telecommunications, timber, mining, medicine, alcohol, and tobacco.

The introduction of the Industrialization and Modernization Strategy (2001-20) in 2002 reaffirmed the government's intention to develop the industrial sector as the engine of growth in the economy. This strategy is one of the main thrusts of the 2020 Development Vision. Industrialization and modernization was defined as "the process of transforming national economy from one dominated by the agriculture sector, traditional workforce, low productivity and inefficient production to one that is based on dominance of industrial production supported by modern technology and know-how" (CPC, 2002). The main objectives of the strategy include strengthening the domestic economy in order to be less reliant on the external sector, the modernization of production, expanding the share of industry and service sectors in the economy, bringing electrification to the whole nation, and maximizing the benefits from the increased opportunities arising from integration with the regional and world economy. The implementation of this strategy is divided into three periods, namely, the beginning of the integration with regional and global economy from 2001 to 2005, industrialization and modernization from 2006 to 2010, and completing the industrial

foundations to graduate from the status of Least Developed Country (LDC) between 2011 and 2020 (Oraboune 2011).

The new Investment Promotion Law (IPL) was promulgated in 2009 in order to provide a clear policy in managing both private domestic investment and FDI in Laos (GOL, 2009). This law is particularly important for local investors because before that FDI was treated more favourably than domestic investment. Based on this law, both local and foreign businesses enjoy the same set of duty and tax incentives as well as other benefits. The law also recognizes and assures the protection of lawful ownership, rights, and benefits of investors. The Prime Minister Decree on Special Economic Zones and Specific Economic Zones in Laos was introduced in 2010 (GOL 2010) as a subordinate legislation to the IPL. The objective of this decree is to define the principles, regulations, organization, activities, and policies relating to special economic zones and specific economic zones.

Laos' foreign trade policies and related trade arrangements also provide a favorable environment for industrial development. Laos has been active in negotiating trade agreements at bilateral, regional, and multilateral levels. As of 2013, Laos has trade relations with fifty economies in the world and has engaged in bilateral trade agreements (BTAs) with sixteen countries and regions, such as ASEAN, China, East Asia, Eastern and Central Europe, Argentina, and the USA. Laos's BTAs are slightly different from conventional ones, in which most of the BTAs focus on the Most Favored Nation treatment, followed by cooperation promotion rather than increasing market access (NSC 2007). Exceptions are in the cases of BTAs with Thailand and Vietnam, in which market access promotions are the main objectives. At the regional level, Laos is a member of AFTA and is committed to fully implement the Common Effective Preferential Tariffs (CEPT) scheme by 2015. Membership to ACFTA has also provided both

opportunities and challenges to local industries in Laos. Finally, membership in the WTO in 2013 has lifted Laos to a higher plane of economic integration with the global economy, which is expected to bring more opportunities and bigger challenges.

3. Data sources

The analysis in this chapter used two types of data. The first is international trade statistics from the International Trade Center. These data were used for calculating GLI, RCA, and RTA, and they are at the two- and four-digit level. The data used in this empirical analysis was drawn from a firm-level survey[65] conducted in 2013. The questionnaire set is provided in Appendix 3. Unless otherwise stated, all information presented is for the year 2012. Due to the small scale of the garment industry in Laos, the questionnaires were sent to all garment firms in Laos. Based on the statistics from the Laotian Garment Association, there were 108 garment firms in Laos in 2012. However, our checks showed that only 60 firms were in active production in 2013. From the field survey of the 60 active garment firms, 52 firms (86.6%) responded.

3. Empirical results and discussions

3.1 Intra-industry trade linkages

The development of the garment sector in Laos is linked substantially to the external sector. More than half of the total factories are either foreign owned or jointly owned by national and foreign capital. The export market is the main source of demand for Laotian garment firms. A large number of Laotian garment firms, especially the small- and medium-sized firms, are

[65] The survey was a collaboration between authors and researchers from Laos's National Economic Research Institute (NERI). The questionnaire used was developed for the Global Production Networks and Host-Site Industrial Upgrading: Evidence from Car, Clothes, and Semiconductor Project supported by the Economic Research Institute for ASEAN and East Asia (ERIA).

subcontractors engaged in simple cut, make, and trim (CMT) operations. About one quarter of Lao garment factories engage in more comprehensive operations, such as purchasing raw materials and coordinating part of the transportation of both the inputs and the output. More than 60% of foreign-affiliated firms replied that their foreign counterparts, viz., parent companies, suppliers or buyers, are their major source of financial and technological supports. Similarly, domestic garment factories replied that their foreign buyers or suppliers provide technological and other know-how supports but they use domestic sources for financing their business.

In order to empirically examine linkages between the Lao garment industry and the overseas market, we estimated the Grubel-Lloyd index (GL) for the period 2001-13. In general, there is still a low intensity of intra-industry trade in the Laotian garment industry. The average GL index was 0.16 over the period 2001-13. However, the index is relatively large when compared to other major garment producers (Table 7.1). The GL index for Laos at the two-digit trade statistics is closer to that of Thailand. There are several implications from this result. The majority of Laotian garment factories are engaging in CMT operations, hence, their outputs are mostly exported, but Laos has to reimport similar types of products for domestic consumption. After further disaggregation of trade statistics to the 4 digits level, the GL index on average is slightly higher (Table 7.2). The disaggregation also reduces data aggregation problems for some years. At the four-digit level, the GL index seems to be stable and fluctuates smoother around its mean of 20%, which implies that the intra-industry state of the garment sector in Laos has remained unchanged. These findings contrast other more advanced countries like Thailand and Indonesia where their GL indices have increased over time.

3.2 International competitiveness

Although garment is one of the strongest exports of Laos, the competitiveness of this sector against the neighbouring countries has remained weak. In 2013, the share of garment exports from Laos in global garment export was only 0.06%, compared to 1.71% of Cambodia, 4.3% of Vietnam, 0.7% of Thailand, and 0.27% of Myanmar. Against this background, this section intends to evaluate the competitiveness of Laos' garment industry by using various competitiveness indices, productivity, and costs.

Intuitively, Laos has a comparative advantage in garment exports. This can be verified by indicators such as RCA, RTA, and RC. Their formulations are explained in Chapter 5. The calculated RCA is greater than one and the RTA and RC are greater than zero. Table 7.3 shows Laos' RCA is also higher than many other countries in the comparison group except Cambodia, Bangladesh, and Sri Lanka. However, Laos' comparative advantage in garment has declined substantially since 2005, while the RCA of the competitors either has remained stable or has increased. The RCA has dropped significantly since 2006, which was the beginning of the natural resource boom. For this reason, garment has declined in terms of its role as a major hard currency earner.

In addition to a falling RCA in recent years, the industry is facing several other challenges that have had negative effects on its competitiveness. The respondents of our survey claim that LAK appreciation, increasing production costs, low labor productivity, and unfavourable external shocks are the major challenges and they have made the future of the industry uncertain.

Table 7.1: GL indices of garments (2 digits) for selected countries, 2001-13

Year	Bangladesh	Cambodia	China	Indonesia	Laos	Myanmar	Pakistan	Sri Lanka	Thailand	Vietnam
2001	0.09	0.06	0.07	0.01	0.12			0.08	0.07	0.41
2004	0.10	0.05	0.05	0.01	0.12		0.01	0.07	0.10	0.16
2005	0.07	0.04	0.04	0.02	0.11		0.01	0.06	0.10	0.11
2006	0.04	0.04	0.04	0.02	0.08		0.02	0.05	0.12	0.06
2007	0.04	0.05	0.03	0.04	0.08		0.03	0.05	0.16	0.04
2008	0.01	0.02	0.04	0.07	0.06		0.03	0.05	0.18	0.05
2009	0.01	0.03	0.03	0.07	0.25		0.02	0.05	0.20	0.05
2012	0.02	0.03	0.05	0.10	0.14	0.17	0.03	0.07	0.35	0.05
2013	0.02	0.05	0.06	0.12	0.11	0.21	0.02	0.07	0.38	0.49
Mean (2001-2013)	0.05	0.04	0.05	0.05	0.16	0.15	0.02	0.06	0.18	0.15

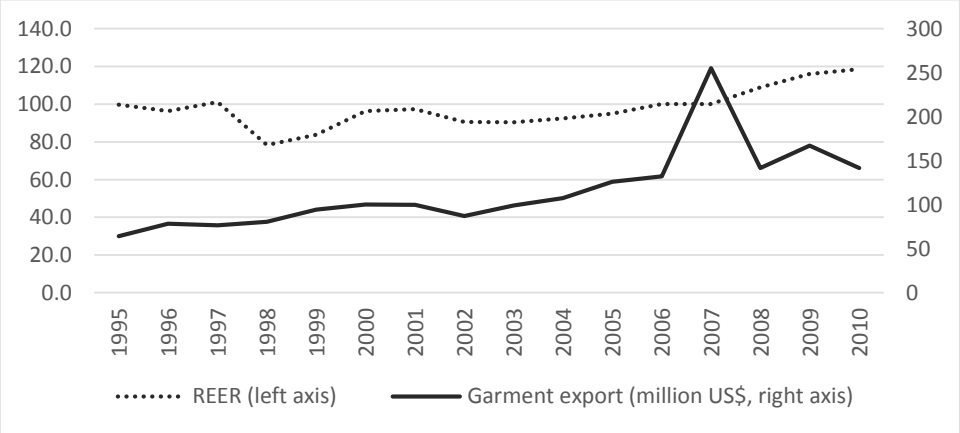
Sources: Calculated by the author using data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 1 October 2014)

Table 7.2: GL index of garments (2 and 4 digits) for Laos, 2001-13

	Laos	
	4-digit	2-digit
Year	34 product categories	2 product categories
2001	0.19	0.12
2004	0.26	0.12
2005	0.19	0.11
2006	0.15	0.08
2007	0.22	0.08
2008	0.13	0.06
2009	0.22	0.25
2012	0.15	0.14
2013	0.16	0.11
Mean (2001-2013)	0.20	0.16

Note: Trade-weighted average GL index, different levels of aggregation.
Sources: Calculated by the author using data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 1 October 2014)

Figure 7.1: Laotian garment exports and REER of LAK



Sources: REER is calculated using data from Danvas (2002) and garment export is from International Trade Center.

Survey responses regarding the changing business environments for Laotian garment firms are provided in Appendix 7.[66]Although the REER of LAK has appreciated continuously since 2006, the export of garment has remained in the increasing trend (Figure 7.1). However, the more obvious challenge is the impact of nominal appreciation on firms' production costs. Nominal appreciation of LAK[67] has translated into higher costs because most export-oriented garment factories receive their revenues in US dollars but LAK is used for local payments. More specifically, from our survey, 84% of firms' revenues are in USD while 92% of their expenditures on wages and salaries are in LAK. Firm-level evidence shows that the appreciation of LAK alone has caused the production cost of garment firms to rise by 12.1% from 2006 to 2011 (Insisienmay and Bannalath 2013).

Increased labor cost and low labor productivity have added more cost to the industry. Most garment workers in Laos are unskilled. Hence, they only earn the minimum wage set by the government. The minimum wage increased from US$ 30 USD monthly in 2004 to US$ 67 in 2009 and US$ 79 in 2012. The problem is more severe among CMT firms because labor cost accounted for 63% of their total production costs (Nolintha and Saiyavong 2011). Unit production costs after adjusting for the labor productivity of Laos' garment industry was estimated to be 15% lower than Cambodia and 20% lower than Vietnam in 2010 (Nolintha and Saiyavong 2011). In addition, utility costs have also increased. For instance, the government decided to raise the electricity price for the industrial sector, which has been subsidized for a long period of time, in 2012; consequently, the electricity price in that year

[66] The firm survey on this section (changing macroeconomic environment) received a low response rate (40-60%); hence, the results should be used with caution.
[67] LAK in nominal term has appreciated by 21% against USD from 2006 to 2011.

increased 20% from 2011. Falling competitiveness has forced several garment factories to close down.

3.3 Institutional support, integration, and technological capabilities

3.3.1 Statistical differences

From our survey, the average age of the sampled firms is 11.1 years, in which the oldest firm was established in 1984. More than half of the respondents have operated for less than 10 years, and only 15.4% have over 20 years of operating experience. Firm size varies substantially with the average employment size being 295 persons. In terms of ownership, 36.5% of total firms are foreign owned with an average number of 470 employees, while 42.3% are domestic owned with an average number of 171 employees. The remaining firms accounted for 19.2% and are joint venture firms with an average number of 472 employees. Garment firms were generally satisfied with the quality of institutional support in Laos. Firms' assessments on the quality of infrastructure, basic, and technical institutions are provided in Table 7.6.

Physical infrastructures have been improved and the qualities of educational institutions, such as primary schools, vocational training centers, and universities, were perceived to be better in 2012 than in 2006. However, the quality of high skilled professionals as well as government supports and incentives for R&D were perceived to be weak in Laos (Table 7.7). These assessments by the survey respondents implied that R&D activities and specific industry support programs are the areas that need more attention from the government in order to further improve the business environment for the development of the private sector in Laos.

Table 7.3: RCA of garments for selected countries, 2001-2013

Year	Bangladesh	Cambodia	China	Indonesia	Laos	Myanmar	Pakistan	Sri Lanka	Thailand	Vietnam
2001	24.77	24.92	4.02	2.55	13.13			16.34	1.61	4.00
2002	24.57	22.23	3.68	2.18	13.32			15.60	1.44	5.03
2003	26.40	25.22	3.50	2.19	13.92		6.61	16.53	1.27	5.64
2004	27.52	25.75	3.37	2.19	14.66		7.09	17.68	1.30	5.70
2005	28.17	28.01	3.32	2.20	11.43		7.14	17.12	1.22	5.39
2006	27.89	29.19	3.62	2.17	7.20		7.59	17.04	1.09	5.38
2007	28.65	30.39	3.60	1.99	6.94		7.29	16.57	0.89	5.99
2008	35.49	30.44	3.49	1.94	7.38		7.07	17.72	0.88	5.98
2009	32.00	18.95	3.25	1.89	5.67		6.39	17.00	0.76	5.66
2010	35.09	23.42	3.31	1.78	5.05	1.91	6.94	17.22	0.72	6.05
2011	36.41	26.33	3.34	1.68	4.18	4.50	7.02	17.64	0.64	5.86
2012	37.32	24.47	3.24	1.69	3.69	4.76	6.74	18.09	0.58	5.51
2013	35.76	30.12	3.14	1.70	3.56	4.59	6.63	20.19	0.53	5.57
Mean (2001-2013)	30.77	26.11	3.45	2.01	8.47	3.94	6.95	17.29	0.99	5.52

Sources: Calculated by the author using data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 1 October 2014)

Table 7.4: Competitiveness indices, garments, Laos, 2001-13

	RCA	RTA	RC
2001	13.13	12.71	3.44
2002	13.32	13.01	3.79
2003	13.92	13.46	3.41
2004	14.66	14.24	3.56
2005	11.43	11.08	3.48
2006	7.20	6.98	3.47
2007	6.94	6.75	3.60
2008	7.38	7.25	4.03
2009	5.67	5.21	2.51
2010	5.05	3.42	1.13
2011	4.18	4.03	3.30
2012	3.69	3.53	3.12
2013	3.56	3.45	3.44
Average 2001-2013	8.47	8.08	3.25

Note: The country is said to have a comparative advantage of RCA > 1, RTA > 0, or RC > 0.
Sources: Calculated by the author using data provided by the International Trade Center, http://www.trademap.org/ (Accessed on 1 October 2014)

Table 7.5: Basic statistics of respondents (garment firms) in 2012

	N	Minimum	Maximum	Mean	Std Deviation
Age	52	0	28	10	8
Foreign ownership	52	0	100	47	47
Employees	50	9	2,340	295	393
Sales (USD)	46	15,231	18,779,490	2,566,511	4,423,663
Exports (USD)	46	0	18,779,490	2,537,186	4,439,166

Source: Compiled from NERI Survey in 2013

Table 7.6: Firms assessment on the quality of basic and technical bodies, Laos, 2006 and 2012

Variable	2006 (n=87)	2012 (n=52)
Transport services	2.2	3.40
Power supply	3.0	3.71
Water supply	2.7	3.46
Telecommunication network	2.3	3.63
Public health facilities	2.0	3.37
Primary schools	2.1	3.50
Technical training institutions	1.3	2.81
University education	1.5	3.21
R&D scientists and engineers		2.71
Incentives for R&D activities		2.46
R&D grants		2.25
R&D organizations		2.25

Note: Likert scale score of firms (0-5 with from none to highest possible rating);
Source: Data for 2006 from Rasiah, Nolintha and Songvilay (2011); Data for 2012 from NERI Survey in 2013.

Table 7.7: Firms assessment of support mechanisms, 2012

Support mechanism	N. observations	Mean	Std. Dev.	Min	Max
Government support programs	41	2.14	1.31	1	5
Industry association	41	2.15	1.31	1	5
Purchasers/sellers reputation	41	2.63	1.37	1	5
External private marketing agents	41	3.05	1.20	1	5

Note: Likert scale score of firms (0-5 with from none to highest possible rating).
Source: Compiled from NERI Survey, 2013

In order to examine the role of FDI in the Laotian garment industry, productivity, export performance, level of regional integration, and technology capabilities are compared between foreign and local firms. The results are provided in Table 7.8. From the survey, local garment firms had higher profit margin and productivity but the difference was not statistically significant. However, foreign firms exported more; consequently, they had a deeper integration with the regional market. For instance, foreign garment factories exported 95% of their production in 2012, whereas local firms only exported 61% of their outputs. Similarly, the level of regional linkage was 96% for foreign firms and 47% for local firms. These results are not surprising, because foreign firms are export oriented and they are subsidiary factories of parents companies located in Thailand and other countries; hence, foreign firms export most of their products. However, it is worth noting that the technological capabilities and the strength of human capital were only slightly higher than local firms and that the difference was statistically insignificant. This finding, although surprising, is consistent with Vixathep (2011) that ownership does not matter for the level of technical efficiency of Laotian garment factories.[68] Comparison with overseas affiliation finds that garment manufacturers with foreign affiliation recorded higher profit margin and productivity (Table 7.9). Firms that engage in merger or acquisition also performed better and the difference is statistically significant.

In order to clarify the role of technological capabilities, firms' performances and their technological upgrading practices are compared and the results are provided in Table 7.10. Firms with higher technological capabilities were found to have higher value added and

[68] Vixaythep (2011) argues that both foreign and domestic garment factories face the same set of constraints that limit firms' capacities in realizing their potentials. The constraints are inappropriate infrastructure, bottlenecks in transportation, and falling behind in information and communication technology.

productivity; however, the difference was only statistically significant for the variable designated for value added. Firms that conducted more quality, inventory, and maintenance practices have performed better, though the differences were not statistically significant.

Firms with different degrees of export intensity (EI) show different technological intensities (Table 7.11). Despite having similar workforce structures, high EI firms appear to have higher technological intensity. For instance, TC is higher in high EI firms than low EI firms, and the difference was statistically significant. In addition, high EI firms engage more in adaptive capability practices and spend more on training their employees. These suggest that regardless of the ownership, export-oriented firms in Laos are more interested in improving their human resources and technology because they realize the importance of those investments. Apparently, high EI firms also had higher productivity than low EI firms and the difference was statistically significantly.

Finally, in order to examine the role of regional linkages (RL), technological capabilities and firms' performances are compared among firms with different levels of RL. The results are provided in Tables 7.12. Firms are divided into two groups, viz., low RL and high RL firms, and the median is used as the cutting point. The East Asia market is selected for this analysis because East Asia is a major market for the Laotian garment industry both in terms of exports and imports. The results are mixed for firms' performances. Although high RL firms had a higher share of foreign capital, their value added are lower and the differences were statistically significant. In addition, the differences between high and low RL firms were not statistically significant in terms of their technological capabilities and their expenditure in training.

3.3.2 Statistical inference

The statistical comparisons in earlier sections show—to a certain extent, although not conclusively—evidence of benefits from FDI and regional linkages on firms' performances and technological upgrading. Based on the model specifications explained in Chapter 5, this subsection attempts to provide quantitative analysis on the role of FDI, regional trade linkages, and host institutional support on technological capabilities and firm performance.

The econometric analysis seems to confirm some of the findings from the univariate analysis in the proceeding section. Based on Eq.15 in Chapter 5, the relationship between export performance and a firm's performance is examined and the result is provided in Table 7.13. The model specification of Eq.15 explains 33% of the relationship between dependent and independent variables. Export performance has a strong and positive relationship with technological capability and foreign ownership. A 1% increase in TC caused export performance to increase by about 12%. These confirm that firms that can export more are associated with those that have higher technological capabilities. Again, the coefficient on the foreign ownership is positive and statistically significant, hence, foreign firms are exporting more. More specifically, a 1% increase in FO caused export performance to increase by about 30%. In addition, high-export intensity firms are related to firms with higher labor productivity. Controlling for differences in firms' productivity and ownership types, garment firms that possess higher technological capability could export more. On the contrary, size and age of firms are not statistically significant in determining the export performance of Laotian garment firms.

The relationship between firms' technological capabilities and firms' integration with the regional market are examined and the results are provided in Table 7.15. Regional linkage (RL), type of ownership (FO), and export performance (EI) are highly correlated (Table 7.14); hence, they are run in a separate equation to avoid the multicollinearity problem. The results show that export intensity and the quality of host institutions are correlated with technological capabilities (Table 7.15). The findings of Tobit regression from table 7.15 suggest that one unit increase of export intensity (EI) and host institution (HI) raises 0.01 and 0.38 unit of technological capability (TC), respectively. Regional linkage and foreign ownership are statistically insignificant as the determinants of the technological capability of Laotian garment firms.

4. Summary of discussions

The garment industry has been one of the key drivers of industrialization in Laos. The sector has a large share in manufacturing exports and FDI in the industrial sector. Although its relative importance has declined in recent years after the booming of the natural resource sector, this sector continues to be an important hub for off-farm employment opportunities. With recent macroeconomic changes and turmoil in the global economy, the Lao garment industry has faced numerous challenges. The comparative advantages of this sector, in terms of RCA, have declined substantially. Other challenges facing the competitiveness of the Lao garment industry include the appreciation of LAK, low labor productivity, wage hike, and rising utility cost.

The industry has been integrated in the global production network. Most of the garment firms are either directly linked with the global economy as being invested by foreign capitals or having affiliation with foreign companies. Firms which are engaged in merger and

acquisitions seem to perform relatively better in terms of productivity and value added. However, the type of ownership does not matter for firms' performances. In addition, foreign affiliated firms rely on product technology from the parent companies while local companies rely on know-how provided by their foreign buyers. These characteristics support the ownership-specific know-how advantage under the Dunning's Electic model. Despite being integrated in the global production network, the activities of Lao garment firms are still confined to the low value-added and low technological activities of the industry.

Empirical evidence from our survey show that garment firms in Laos have been upgrading their technologies. Export intensity is an important factor in explaining higher firms' performances and technological capabilities. The quality of host-site institutional support, particularly basic infrastructure, is significant for technological capability improvement. Although foreign ownership is statistically significant with respect to export performance, foreign ownership and regional linkages are not statistically significant as the determinants of firms' technological capabilities. Garment firms have invested little to strengthen human resources in their firms. Likewise, investment in R&D has also been small. These suggest that participation in the global production network is not sufficient for the industry to reap higher benefits from technological upgrading.

Laotian government should continue the current momentum in improving trade, investment, and business environments. Specific support programs on R&D development, industry development, and the strengthening of competitiveness are crucial for the garment industry to survive and compete in an era when the Laotian economy has become increasingly integrated with the regional and global economy. Laotian government should introduce more incentives in order to encourage private firms to invest more in human resource development,

innovation, R&D, and technology improvement. Local meso institutions, such as vocational training institutions and other high-tech institutions, should be further strengthened in order to attract higher levels of technology and higher value-added segments of the global production network to Laos. Specific export promotion programs and export-led industrialization should be considered as the main engine to drive Laotian economic growth in the coming period.

Table 7.8: Firms performance, technological capabilities, and ownership type

	Foreign firms	Local firms	T-test for equality of means	
			t	
Export intensity (% of outputs)	95.0	60.9	3.14	***
Value added (% sales)	26.0	33.3	-0.96	
Productivity (Y/L)	5,544.8	8,434.2	-0.91	
Regional linkage (RL)	95.6	47.1	2.89	***
Technological capability (TC)	1.0	0.9	0.54	
R&D expense (% payrolls)	3.1	5.1	-0.89	
Human capital (HC)	0.168	0.167	0.03	
Average training hour	466.3	95.4	1.21	
Training expenditure (% payrolls)	0.03	0.06	-1.06	
Assessment on host country's institutions	3.3	3.5	-0.75	

Note: The estimation of TC, RL, and HC are explained in Chapter 5. *** refers to statistical significance at the 1% level.
Source: Calculated by the author based on data from NERI Survey in 2013.

Table 7.9: Firms performance and overseas affiliations

	Overseas affiliate		Merger & Acquisition	
	Yes	No	Yes	No
Profit margin	36	25.7	60*	29*
Sale/workers	7,645	6,629	7,308*	2,858*

Note: * refers to statistical significance at the 10% level.
Source: Calculated by the author based on data from NERI Survey in 2013.

Table 7.10: Firm's performance and technological Capabilities

	Number of Quality, inventory, maintenance system practices		Technology upgrading	
	> 1	≤ 1	Engaged	Not engaged
Profit margin (%)	32.2	18.9	33.4**	22.1**
Productivity (USD per worker)	8,313	6,476	8,376	5,152

Note: ** refers to the statistical significance at the 10% level.
Source: Calculated by the author based on data from NERI Survey in 2013.

Table 7.11: Technological intensity and export intensity, garments, Laos, 2012

	High EI	Low EI	P-value of T statistics (2-tailed)
Technical and professional staff in workforce (%)	15.6	19.38	0.332
Training expenses (% of payroll)	5.8	0.4	0.003 ***
Training hours per person per year	280	97	0.272
R&D expenditure (% of total sales)	5.84	6.24	0.049 **
Presence of Adaptive Capability Practices	2.72	1.19	0.05 **
Technological Capabilities	1.16	0.99	0.017 ***
Productivity	8,832	2,454	0.007 ***

Note: *** and ** refers to statistical significance at 1% and 5%, respectively.
Source: Compiled from NERI Survey, 2013

Table 7.12: Technological intensity and firm performance by regional linkages, garments, Laos, 2012

	N		Mean		T-test for equality of means
	High RL	Low RL	High RL	Low RL	t
Productivity	26	20	7,796	6,230	0.49
Value added (%)	23	20	23	39	-2.35 **
Foreign ownership	29	23	60	31	2.35 **
Technological capability	26	22	0.97	0.92	0.17
Training expenditure as % of payroll	12	10	0.06	0.03	0.96
Average training hours	14	9	323	112	1.04

Note: ** refers to statistical significance at 5% level.
Source: Compiled from NERI Survey, 2013

Table 7.13: Determinants of export performance of Laotian garment firms, 2012

EI (Dependent)	Eq.15	
C	41.56	(3.14)***
Technical capability (TC)	11.71	(1.92)*
Foreign ownership (FO)	29.91	(2.34)**
Labor productivity $\left(\frac{Y}{L}\right)$	0.001	(1.91)*
Age	-0.196	-0.24
Size	0.018	1.15
N	45	
F-Stat	4.23	
R^2	0.35	
Adjusted R^2	0.33	

Note: ***, **, and * refer to the statistical significance at the 1%, 5%, and 10% level, respectively.
Source: Calculated by the author using the results of NERI firm survey in 2013

Table 7.14: Correlation matrix between right-hand-side variables in Eq.16

	FO	hi	RL_EA	EI	Age	labor
FO	1					
hi	-0.11	1.00				
RL_EA	0.38***	-0.04	1.00			
EI	0.40***	-0.04	0.55***	1.00		
Age	-0.20	0.06	-0.13	-0.07	1.00	
Labor	0.32	-0.31	0.05	0.34	0.27	1.00

Note: *** refers to the statistical significance at the 1% level.

Table 7.15: Determinants of technological capabilities, garment firms, Laos, 2012

TC (Dependent)	Eq.16					
C	-0.86	(-1.01)	-0.75	(-0.88)	-1.07	(-130)
Host institution (HI)	0.38	(1.70)*	0.38	(1.68)*	0.3	(1.37)
Foreign ownership (FO)			0.001	(0.31)		
Regional linkage (RL)	0.002	(0.74)				
Export intensity (EI)					0.01	(2.48)**
Size	0.001	(1.68)*	0.001	(1.44)	0.001	(0.74)
Age	0.003	(0.16)	0.002	(0.11)	0.01	(0.31)
N	48		48		45	
Log likelihood	-65.23		-65.46		-59.38	
Pseudo R2	0.04		0.04		0.07	
Prob > χ^2	0.25		0.30		0.05	

Note: ** and * refer to statistical significance at the 5% and 10% level, respectively.
The figures in parenthesis refer to z-statistics.
Source: Calculated by the author using the results of NERI firm survey in 2013

Chapter 8 Inequality in Laos and the Role of FDI[69]

1. Introduction

Laotian economy has grown rapidly since 2005 as a result of rapid inflow of FDI to the natural resource sector, particularly in the hydropower and mining sectors. The value of total committed FDI increased from US$ 3.6 billion in the period between 1998 and 2002 to US$ 7.8 billion in the period between 2003 and 2007. The volume jumped to US$ 14.5 billion between 2008 and 2012. The distribution of economic sector and geographical location that attracted FDI has also changed over time. In this period of rapid growth, anecdotal evidence suggests that economic disparity in the Laotian economy has widened considerably. In addition, international aid agencies assert that inequality has affected the progress of human development in Laos (UNDP 2013).

The purpose of this chapter is to analyze the changes of inequality in consumption expenditure and assets in Laos. In addition, this empirical analysis extends to clarify how a surge in FDI has affected the change in inequality in Laos by comparing provinces/districts that have more FDI inflows with those that did not or those that receive minimum FDI inflows. It is expected that this comparison discerns the influence of FDI inflows on inequality change in the Laotian economy.

[69] The paper was presented at SIBR-Thammasat 2014 Bangkok Conference on Interdisciplinary Business and Economic Research, organized by the Society of Interdisciplinary Business Research, in June 2014, Thailand. The revised version (Nolintha and Lau, 2015a) is to be published in the *International Journal of Economic Policy in Emerging Economies* by Inderscience Publishers.

The empirical inquiry is based on the analytical framework developed in Chapter 5. The rest of the chapter is organized as follows: Section 2 explains the data sources of this empirical analysis, Section 3 shows the empirical findings and discussions, Section 4 presents the policy recommendations derived from the findings, and Section 5 summarizes the chapter.

2. Data sources

In order to measure inequality in Laos, and then for the purpose of clarifying its relationship with FDI, this empirical study uses two main types of data sets, viz., household level data and aggregate district/province level data. These primary data sets are collected from the Laotian Household Expenditure and Consumption Survey (LECS), conducted by the Lao Statistics Bureau (LSB). LECS has been conducted in five-year intervals since 1992. LECS is a national-level sample survey, covering every province and district in Laos. The survey is conducted for the period of twelve months in order to capture expenditure and consumption patterns of households in all seasons in a year. The primary data sets are from the surveys conducted in 2002/03 (LECS 3) and 2007/08 (LECS 4). The former covers 8,092 households from 540 villages and the latter covers 8,304 households from 518 villages. Selected parts of the questionnaire are provided in Appendix 4.

Sample selection for both LECS 3 and LECS 4 was, respectively, conducted in two stages. In the first stage, a random sample of villages was selected. Village units were then distributed according to the following stratum: villages were classified by province, district, rural area with access to road, and rural area without access to road. The number of sample villages in each province ranged from twelve to forty-eight in LECS 3 and seventeen to forty-eight in LECS 4, depending on the number of villages and the number of households in each province. The second stage dealt with household sample selection. The number of sample

households per village was fifteen in LECS 3 and sixteen in LECS 4. In LECS 4, half of the numbers of households were the same as households that were surveyed in LECS 3. Household samples were selected with systematic sampling technique. From sixteen sample households in each village, eight samples were the same households as LECS3. Therefore, these sample households were selected using the lottery system among LECS 3 households in the sample village. Eight new sample households were selected among the other households in the village using the same methodology.

The survey data set contains detail regarding household level information on expenditure and consumption; household situation on health, education, and livelihood; time use; and prices. LECS was supplemented by a village-level survey on demographic, economic conditions of village, access to services, agriculture practices, and prices. Additional explanations on the linkage between the questionnaire and the variables used in this empirical analysis are provided in Appendix 5. Such rich information on consumption and livelihoods of households enables us to examine the evolution of consumption, livelihood, and inequality during a time of changing economic structure that has oriented to a more resource-based and FDI-dependent economy. In particular, the availability of panel made from these two data sets enable the analysis to conduct comparison over the study period.

The key variables used in the welfare analysis, and for the calculation of subsequent inequality indices in this analysis, is per capita household consumption and per capita asset possession. Undoubtedly, a survey-based welfare measurement, which is derived from individual welfare measures, based on economic theories is preferable for any welfare analysis. However, consumption-based measurement is more preferred for welfare analysis in developing countries both on theoretical and practical grounds. Based on the permanent

income hypothesis (Freidman 1957), individuals base their consumption on their permanent income rather than current disposable income, which includes temporary income; hence, they are likely to maintain a smooth consumption despite the variation in income. On this ground, consumption could be a better proxy of welfare or living standard than current disposable income. In addition, consumption is more superior in terms of practicality because it is easier to collect data on consumption than from income and there exist adequate consumer price indices to convert nominal measure to real term (Deaton and Dreze 2002). However, the property of smoothness in consumption data in itself could have limitations for analyzing inequality. The magnitude of change in income inequality may not be well reflected in the change in consumption inequality (Krueger and Fabrizio 2002). For instance, when a household receives a significant increase in income, the household may only increase consumption marginally; hence, the change in consumption may not necessary reflect the magnitude of change in income. Therefore, consumption inequality may not reflect the total change in income inequality. For these reasons, this analysis uses asset data to supplement the consumption data for inequality analysis. In any welfare analysis, other measures of well-being are needed to be used to supplement the standard consumption- or income-based measures (Deaton 1997). However, it must be noted that the value of asset is self-evaluated by the household because the household head is asked to give the value for their asset on the "willingness to sell" basis.

All consumption and asset data is deflated to 2002 prices using the consumer price index[70] provided by the LSB. Weight is used in most of our analysis. Weight is needed in the

[70] Because of the lack of time series data on asset prices, CPI is used to deflate asset prices. Changes of CPI might underestimate the change of asset prices because in an emerging economy like Laos asset prices usually grow very rapidly.

welfare analysis when the findings aim to represent the population and any subpopulation (Deaton 1997). The calculated means in our analysis, for example household per capita consumption, is used in order to represent the population as well as its subgroups such as regions or provinces. Hence, weight is used in calculating mean value and in other welfare analysis. In particular, the calculation of inequality indices uses frequency weight so that the calculation duplicates each observation by its weight in order to reflect the number of observations that the household really represents.

Finally, the analysis of the relationship between inequality and FDI in Laos uses other aggregate data. One important meaningful variable is the value of FDI inflow into different regions in Laos. This data is compiled from the annual reports of the Provincial Department of Planning and Investments between 1997 and 2008. However, the data is on the committed FDI and not actual FDI. Although this data poses limitations, committed FDI could still be a good proxy for FDI inflow to Laos because the Laotian government has been very serious in pushing investors to materialize their FDI commitments. Based on the Investment Promotion Law, the government could cancel the investment license if the investor does not begin their investment in the specified timeframe of the agreement. Other variables that show the level and stage of economic development in each region include poverty, accessibility, and level of government investment (Table 8.1).

Table 8.1 The descriptions of variables used in inequality analysis

Variables	Description	Source
Consumption	Average household consumption (in 2002 prices)	Lao Statistics Bureau (LSB)
Asset	Average value of asset owned by household	Calculated by the author. Details on the calculation are provided in Appendix 5.
Gini	Gini coefficient for the province	Calculated by the author from LECS3 and LECS4.
Poverty	Poverty incidence rate	Calculated by the author from LECS3 and LECS4.
Accessibility	The level of accessibility	Calculated by the author from LECS3 and LECS4. Detail on the estimation is provided in Appendix 5.
FDI	Foreign direct investment by province and district	Calculated by the author using data compiled from the Provincial Department of Planning and Investment.
INVESTMENT	Government investment by province and district	Calculated by the author using data compiled from the Provincial Department of Finance.

Note: Asset includes transport, land,[71] house, and building. The Gini coefficient is calculated by the author using raw data from LECS3 and LECS4. More explanation on the estimation is provided in Appendix 2. Key results from the calculation on inequality and other related data are provided in Appendix 6.

[71] Based on the Laotian constitution, land in Laos is under the ownership of the national community in which the government is in charge of the centralized management of land. An individual is entitled to a land-use right, which includes the right to protect land, use land, usufruct, transfer of the land-use right, and inheritance (Government of Laos 2003). Therefore, like other types of asset, land price in Laos is reflected by market value.

3. Empirical results and discussions

3.1 Change in consumption and assets of Lao households

After a period of rapid economic growth, booming in the mining sector, and a surge in FDI, improvements in living standards are observed through both increases in consumption and the value of asset possession. Descriptive statistics on consumption and asset are provided in Table 8.2. Mean household monthly consumption per capita increases from 145,654 in 2002/03 to 163,092 LAK in 2007/08, showing a real-term increase of 2.61% a year (Table 8.3). Consumption in urban areas is above rural areas but consumption growth is faster in the rural areas. Across the regions, the South performs the best with an average annual increase in real consumption of 5.14%, followed by the North and the Central, respectively. The mean per capita household consumption is the highest in Vientiane Capital, followed by the South. However, Vientiane Capital records the decline in real per capita household consumption. This could be due to a mixture of influences including rapid urbanization, rural-urban immigration, FDI inflow, and large government investment projects in the capital city. Other provinces experiencing a decline in real consumption are Khammuane, Borkeo, Vientiane, and Xiengkhuang (Figure 8.1). At individual household level, there are as many of those experiences increasing in real consumption as those experiencing a decline (Figure 8.1). Although, on average, the livelihood has been improved, the variations in consumption change as described above send a signal that disparity has increased during this period of rapid growth.

The structure of consumption has changed only slightly. The share of food consumption decreased from 55 to 46%. A decline in the share of food consumption, which is

also known as Engel coefficient, implies an improvement in living standards. The shares of education and health have increased slightly while the share of housing has declined (Table 8.4). Interestingly, the share of transport and communication expenses in total consumption increased almost 8% to account for one-fifth of total consumption. Such rapid increase in the share of transport and communication reflects changes in consumer behavior toward a more consumption-based economy. When people receive more income, they begin to purchase durable goods, such as vehicles (like motorcycles and cars), and mobile phones. Such behavior is observed in both urban and rural areas, and across regions (Table 8.5).

Households in Laos have increased their asset accumulation in our studied period. Mean value of household asset per capita has increased more than five times from 4.8 to 27.7 million LAK. Variations of asset value increased more rapidly compared to consumption and the standard deviation has increased significantly (Table 8.2). Asset accumulation was greatest in urban areas, in which households enjoyed an annual increase of 190%. The value of household asset per capita only increased about 5.14% a year in the rural area. This contrasting change in value of asset suggested the widening of inequality in terms of asset between urban and rural areas.

There were variations in the growth of asset value across regions and provinces (Table 8.3 and Figure 8.3). Vientiane Capital, again, showed the most rapid increase. Mean value of household asset per capital increased almost seventeen times in Vientiane Capital. Unlike the pattern observed in the consumption change, mean household asset per capita has increased in most provinces except Phongsaly province (Figure 8.3). The northern region experienced the most rapid increase with an annual increase of 11.5%, followed by the central (9.9%) and the south (2.5%).

Table 8.2: Descriptive statistics of per capita household real consumption and asset value, 2002/03 and 2007/08

	N. Observation	N. Observation (after weight)	Mean	Std. Dev.	Min	Max
Consumption in 2002/03	8092	5,519,452	145,654	127,394	15,844	3,205,875
Consumption in 2007/08	8296	5,607,628	163,092	163,969	14,193	8,380,126
Asset value in 2002/03	8067	5,502,493	4,871,248	26,600,000	-	1,560,000,000
Asset value in 2007/08	8282	5,600,301	27,700,000	1,300,000,000	1,463	108,000,000,000

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.3: Per capita household real consumption by area and region, 2002/03 and 2007/08

	2002/03	2007/08	Annualized percentage change
All samples	149,742	169,290	2.61
Urban	187,470	205,599	1.93
Rural	129,994	145,876	2.44
Region			
Vientiane Capital	240,403	228,150	-1.02
North	127,921	151,110	3.63
Central	139,032	151,295	1.76
South	132,076	165,992	5.14

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.4: Structure of real consumption, 2002/03 and 2007/08

	2002/03	2007/08	Percentage point changes
Food	55.0	46.1	-8.9
Clothing	2.0	2.0	0.0
Housing	13.0	12.6	-0.4
Education and recreation	5.0	6.2	1.2
Medical care	4.0	4.4	0.4
Transport and communication	12.0	19.8	7.8
Household utensils and operations	4.0	4.3	0.3
Others	5.0	4.6	-0.4

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

The structure of asset also has changed in this period. Land was the major type of real asset, sharing 63% of total asset value. The shares of building and vehicles have increased while the share of electronic goods and agriculture tools decreased (Table 8.7). The percentage of households owning a motorcycle, car, and mobile phone has also risen significantly. For instance, 7% of households owned a car, 51% owned a motorcycle, and 42% owned a mobile phone in 2007/08. These improvements are observed in both urban and rural areas and across regions, consistent with the changing pattern of household consumption described earlier (Table 8.8).

4.2 Changes in inequality in Laos

Based on the analytical framework defined in Chapter 5, this study computed a set of inequality rates in consumption expenditure and in asset. Table 8.9 tabulates those results. The Gini coefficient increased from 0.33 in 2002/03 to 0.35 in 2007/08, an increase of two basis points or 8.55%. The Theil T index and Atkinson index have also increased, but with a greater magnitude. Similarly, in the case of consumption expenditure, the ratio of consumption of the fifth quintile to the first quintile increased from 4.9 to 5.7. Other inequality indices also confirm the rise of inequality rates in Laos (Table 8.9).

The level of inequality in consumption is not high, but the rise is in contrast to situations in neighboring countries and in other countries with similar income levels (Table 8.10). For instance, the Gini coefficient declined from 0.42 to 0.38 in Cambodia, and that value has changed from 0.38 to 0.36 in Vietnam during the same period. Similarly, the average Gini coefficient of the low-income countries decreased from 0.42 to 0.40.

Figure 8.1: Per capita household consumption, provincial mean, 2007/08 and 2002/03

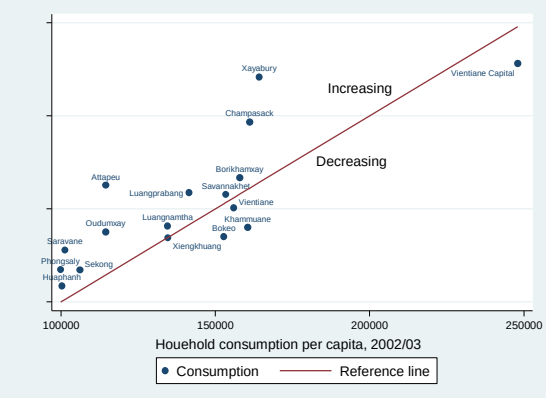
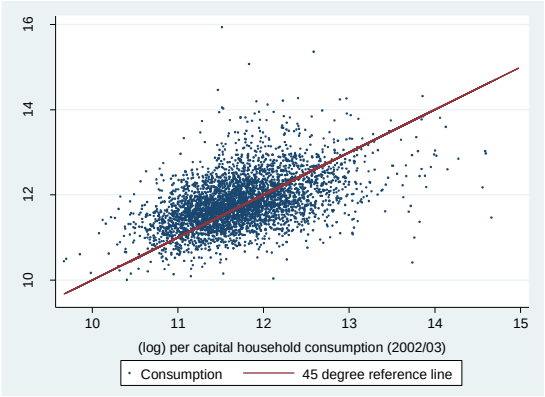
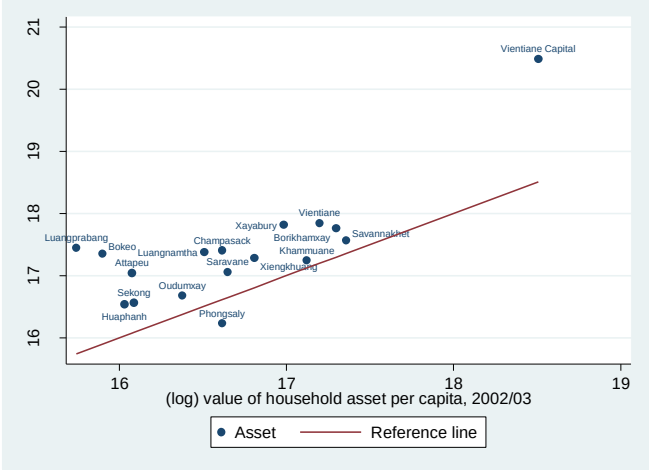


Figure 8.2: Per capita household consumption in 2007/08 and 2002/03



Note: The 45-degree line serves as a reference, whereby points lying above the line correspond to an increase in consumption and vice versa. Frequency weight is used in the calculation of provincial mean.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.3: Household asset per capita, provincial mean, 2007/08 and 2002/03



Note: The 45-degree line serves as a reference, whereby points lying above the line correspond to an increase in asset and vice versa. Frequency weight is used in the calculation of provincial mean.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.5: Per capita asset value by area and region, 2002/03 and 2007/08

	2002/03	2007/08	Annualized percentage change
All samples	4,871,248	27,700,000	93.73
Urban	7,917,201	83,800,000	191.69
Rural	3,960,299	4,957,559	5.04
Region			
Vientiane Capital	11,700,000	197,000,000	316.75
North	3,218,333	5,073,172	11.53
Central	4,556,055	6,811,273	9.90
South	4,212,455	4,737,532	2.49

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.6: Possession of selected durable goods (% of households) by areas and regions

	Car		Motorbike		Mobile phone	
	2002/03	2007/08	2002/03	2007/08	2002/03	2007/08
All samples	4	7	22	51	3	42
Urban	11	15	54	67	10	65
Rural	1	4	11	44	1	32
Vientiane Capital	15	24	65	80	14	81
North	2	4	12	33	1	25
Center	6	10	30	61	5	55
South	1	4	17	54	1	39

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.7: Compositions of household asset (% of total asset value), 2002/03 and 2007/08

	2002/03	2007/08	Basis point changes
Land	56.72	63.11	6.39
Building	1.09	7.97	6.88
Transport	9.37	13.89	4.52
Electronic goods	16.26	6.93	-9.33
Agriculture tools	16.56	8.10	-8.46

Source: Data from LECS 3 and LECS 4, Lao Statistics Bureau, calculated by the author.

Table 8.8: Percentage of households owning selected durable goods

	Car		Motorbike		Mobile phone	
	2002/03	2007/08	2002/03	2007/08	2002/03	2007/08
All samples	4	7	22	51	3	42
Urban	11	15	54	67	10	65
Rural	1	4	11	44	1	32
Vientiane Capital	15	24	65	80	14	81
North	2	4	12	33	1	25
Center	6	10	30	61	5	55
South	1	4	17	54	1	39

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.9: Changes in inequality in real consumption and asset

	2002/03	2007/08	Percentage change
Consumption:			
Gini coefficient	0.33	0.35	8.55
Theil T	0.20	0.25	23.45
Other measures of inequality			
LogAM – logGM	0.17	0.21	18.92
Atkinson (sensitivity=0.5)	0.09	0.11	19.38
Atkinson (sensitivity=1)	0.16	0.19	17.04
Atkinson (sensitivity=2)	0.27	0.31	14.50
5th quantile/1st quantile	4.9	5.7	16.53
10th decile/1st decile	7.6	9.2	20.69
Share of bottom 20%	0.085	0.078	-8.47
Asset:			
Gini coefficient	0.79	0.87	10.40
Theil T	1.68	4.39	161.68
Other measures of inequality			
LogAM - logGM	1.62	1.95	20.69
Atkinson (sensitivity=0.5)	0.55	0.74	34.75
Atkinson (sensitivity=1)	0.80	0.86	6.91
Atkinson (sensitivity=2)	0.99	0.97	-1.93
5th quantile/1st quantile	240.6	241.2	0.24
10th decile/1st decile	840.9	1037.1	23.33
Share of bottom 20%	0.0034	0.0037	8.40

Note: This table shows measures of inequality in consumption and asset. All data are expressed in 2002 prices. AM is the arithmetic mean and GM is the geometric mean. The difference in their logarithms is the mean relative deviation, a measure of inequality (Deaton 2002). Atkinson index is calculated with three inequality aversion parameters; higher parameter is more sensitive to differences at the bottom of the distribution.

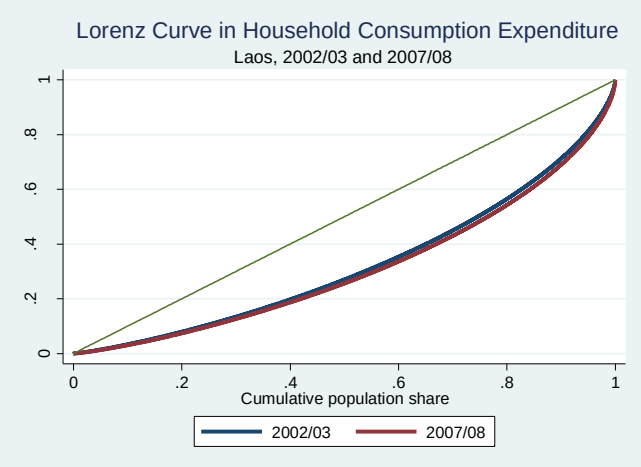
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.10: Gini coefficient of Laos and selected countries

	Gini	Year	Gini	Year	Percentage change
Laos	0.326	2002/03	0.354	2007/08	8.55
Cambodia	0.419	2004	0.379	2008	-9.55
Vietnam	0.376	2002	0.356	2008	-5.32
China	0.426	2002	0.426	2008	0.00
Thailand	0.420	2002	0.405	2008	-3.57
Lower middle-income countries	0.433	2001-2003	0.419	2006-2008	-3.23
Low-income countries	0.422	2001-2003	0.395	2006-2008	-6.40
East Asia and the Pacifics	0.412	2001-2003	0.395	2006-2008	-4.13

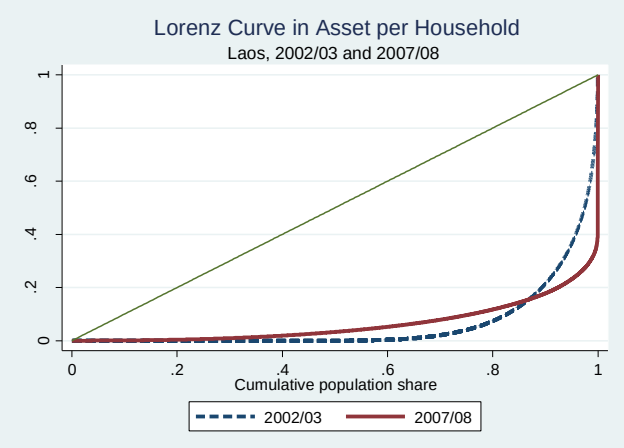
Source: Data for Laos is calculated by the author. Data for other countries and country groupings are from 2013 World Development Indicator Database, World Bank.

Figure 8.4: Lorenz curve in consumption



Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.5: Lorenz curve in asset



Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Inequality in asset has also increased. The Gini coefficient for asset increased from 0.79 to 0.87, a rise of eight basis points or 10.4%. Other indicators also show the rise in inequality rates in assets but with higher magnitude. As expected, inequality in asset is greater than inequality in consumption. It is noteworthy that this analysis shows that the Atkinson index with lower inequality aversion parameter has risen more rapidly. This suggests that disparity is more acute at the upper part of the distribution in the analytical period. Direct comparisons of the Lorenz curve could supplement the analysis of inequality using all of the abovementioned inequality measures. The Lorenz curve on consumption expenditure shows that inequality increases slightly and the cumulative share in total consumption expenditure tends to be higher with greater cumulative population share. On the other hand, the cumulative share in total assets for 2007/08 is only greater than the level in 2002/03 at the highest cumulative population share of the distribution. This confirms the findings that the Atkinson index has changed to a greater value at the upper quintile.

4.2.1 Urban-rural inequality

Changes in inequality could be examined for urban and rural areas (Table 8.11). Although the mean per capita household consumption was higher in the urban area in both periods, it has grown faster in the rural area. Therefore, the gap between the urban and rural area becomes smaller. However, the opposite situation is observed in terms of asset where the mean household asset per capita grows substantially faster in the urban area. Such contrasting facts suggest that consumption and saving behaviors differ in urban and rural areas. Put differently, it is plausible that households in urban areas have saved substantial parts of their income for the purpose of accumulating more assets whereas households in rural areas have

consumed most of their income because of lower income. The Gini coefficient for urban and rural areas has increased from 0.35 to 0.36 and from 0.30 to 0.33, respectively.

This phenomenon can be observed clearer with the growth incidence curve, which is the growth rate in percentiles ranked by consumption expenditure per capita. Figure 8.6 shows mixed experiences faced by different groups of households in urban areas: firstly, the consumption expenditure growth rate of the poor people is significantly lower than its mean growth rate in an urban area; secondly, the rich households have significantly higher growth rates; and thirdly, the middle quintiles have a similar growth rate in consumption expenditure. On the other hand, Figure 8.7 shows that in rural areas the growth rate of consumption expenditure has increased with higher percentiles of population. This means richer households in rural areas had a higher growth. As a consequence, inequality in rural areas has risen at a faster pace than urban areas.

Panel B of Figure 8.6 shows that poor urban households have experienced a decline in real consumption expenditure. The rich households have a significant and a positive consumption growth rate while real consumption expenditure of most households in the middle deciles was unchanged. This finding suggests that the livelihood of the urban poor has deteriorated in absolute and relative terms. This implies that urban poverty has become evident in Laos. This is a serious problem because it has occurred during the period where the Laotian economy has grown rapidly along with a large influx of FDI. Poverty reduction strategy in many developing countries seem to be ineffective in daling with urban poverty. Poor households in urban areas are neglected by poverty reduction programs because poverty reduction efforts are often concentrated in rural areas. In some countries, the depth of urban poverty represented as the presence of slums is worse than that in rural areas (Harpham, Tim

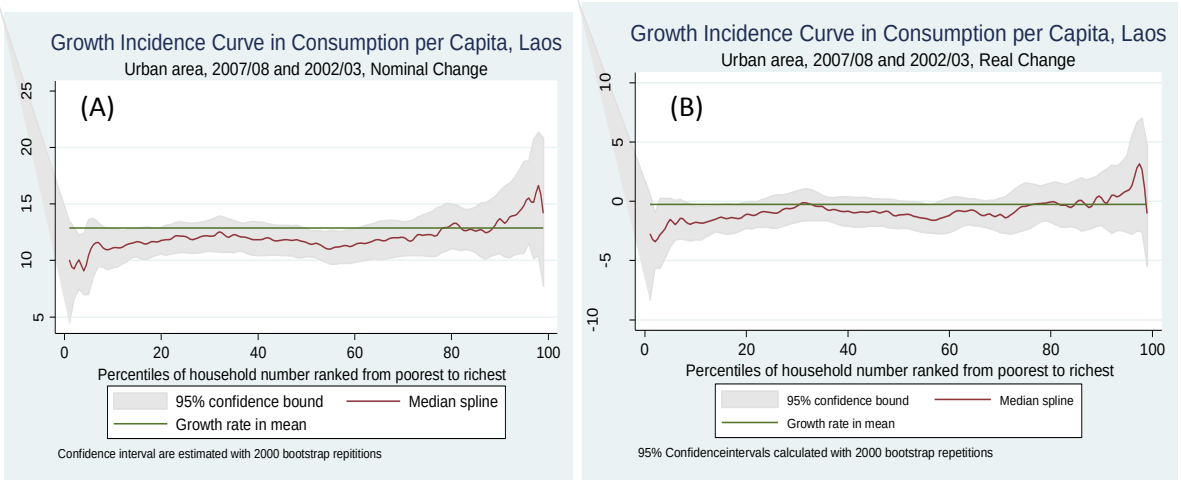
and Patrick 1988). Urban poverty is vulnerable to environmental and health risks, subsistence in commercial exchange-based jobs and activities, social fragmentation, and the rise in crime rates (Wratten 1995). In the context of Laos, where its economy has grown rapidly along with a large inflow of foreign capital, it is inevitable that those beneficiaries of this stage of economic expansion were those people who have sufficient educations and skills. For this reason, employment opportunities of poor urban households are restricted to other less-productive or low value-added sectors. At the same time, poor urban households are subjected to higher costs of living than those people who live in rural areas. Therefore, in order to alleviate urban poverty in Laos, urban poor will require more attention from the government, especially in the areas of enhanced social safety nets and capacity building so that they will be able to benefit from the growing urban economy.

Table 8.11: Urban and rural inequality in Laos.

	2002/03	2007/08	Percentage change
Consumption:			
Average per capita household consumption (urban)	187,469	205,599	9.67
Average per capita household consumption (rural)	129,994	145,876	12.22
Gini (urban)	0.35	0.36	4.35
Gini (rural)	0.30	0.33	10.12
Theil L (urban)	0.20	0.22	9.31
Theil L (rural)	0.15	0.19	23.18
Theil T (urban)	0.23	0.25	8.81
Theil L (rural)	0.17	0.23	33.62
Asset:			
Average household asset per capita (urban, million LAK)	49	345	603.46
Average household asset per capita (rural, million LAK)	25	32	26.30
Gini (urban)	0.73	0.91	24.19
Gini (rural)	0.80	0.63	-20.41
Theil L (urban)	1.39	2.20	57.50
Theil L (rural)	1.63	0.93	-43.13
Theil T (urban)	1.14	4.46	290.06
Theil L (rural)	1.92	0.89	-53.52

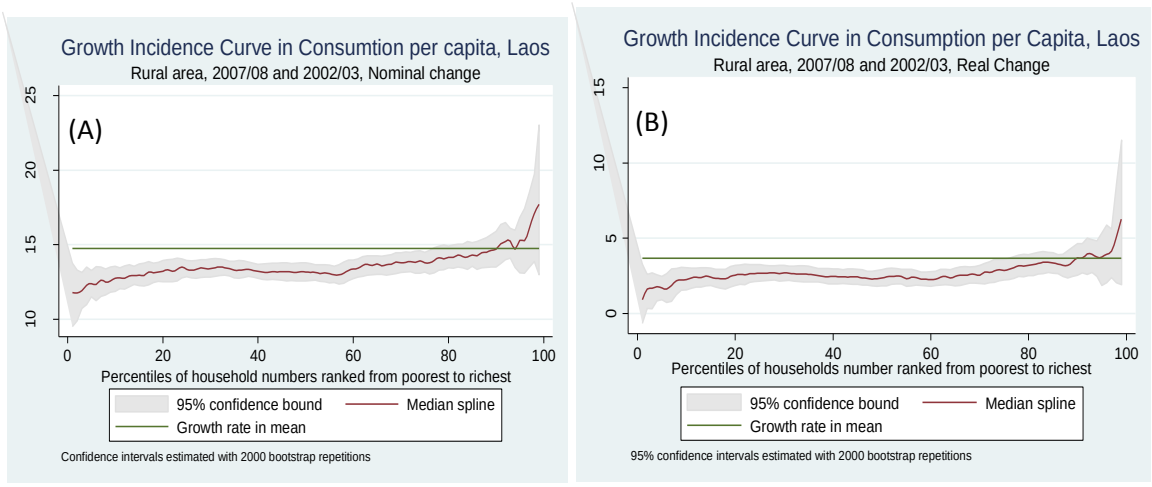
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.6: Growth incidence curve on consumption in urban areas



Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.7: Growth incidence curve on consumption in rural areas



Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.12: Inequality decomposition for urban and rural, provinces and districts

	Inequality in consumption		Inequality in asset	
	2002/03	2007/08	2002/03	2007/08
Urban-Rural inequality				
Within-group inequality (%)	93.42	94.77	97.29	66.28
Between-group inequality (%)	6.58	5.23	2.71	33.72
Inequality across provinces				
Within-group inequality (%)	85.63	89.76	92.09	51.67
Between-group inequality (%)	14.37	10.24	7.91	48.33
Inequality across districts				
Within-group inequality (%)	75.7	74.12	82.85	35.57
Between-group inequality (%)	24.3	25.88	17.15	64.43

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

4.2.2 Decomposition of inequality

In order to identify the attributes that have caused the rise in inequality in Laos, this analysis conducted decomposition analyses for within-group inequality and between-group inequality with regard to different subgroups, such as urban, rural, provinces, and districts. The results are shown in Table 8.12. Decomposition analysis is important for policy purpose because information of different sources of inequality helps to formulate appropriate policy interventions. Our decomposition analysis uses the Theil Index because it can be decomposed into different partitions of the population in an additive way. Detailed discussion on decomposition technique is provided in Chapter 5.

Within-group inequality is the major attribute of inequality in consumption expenditure for all the subgroups. This finding suggests that inequality was mainly caused by disparity among people of a same group. More specifically, the overall urban-rural inequality in consumption expenditure in 2002/03 was made up of 93.42% of within-group inequality and 6.58% of between-group inequality. In 2007/08, the composition was 94.77% of within-group inequality and 5.23% of between-group inequality. Furthermore, between 2002/03 and 2007/08, the

share of between-group inequality has declined for rural-urban and provincial inequality, respectively, whereas it has increased slightly for inequality across districts.

The analytical findings show that the sources of asset inequality are quite different. It is apparent that the share of between-group inequality increases significantly for all the three subgroups. The share of between-group inequality in assets is about one-third of urban-rural inequality and half of all inequality across provinces. Therefore, disparities in assets between groups have increased rapidly from 2002/03 to 2007/08. These findings imply that the Laotian government has to offer different policy responses to reduce inequality in consumption expenditure and inequality in assets. Particularly, in order to reduce inequality in consumption expenditure, policy needs to intervene to narrow the gap between people who live in the same area. For the correction of inequality of assets, it is crucial to introduce policy that aims to close the gap between people of different groups.

4.3 Poverty and Inequality

Discussion on changes in poverty could provide further understanding regarding changes in inequality in Laos and their interrelationships. The relationship between poverty and inequality has been studied extensively, in particular, on empirical grounds. The relationship between poverty and growth depends on the distributional corrections (Ravallion 1997). In addition, Ravallion (2004) improves his earlier empirical model and finds that income could have a different rate of impact on poverty, conditioned on the initial level of inequality. In this study, a 1% increase in income could lead to a reduction of 4.3% in poverty for a very low-inequality country and 0.6% for high-inequality countries. Inequality could affect poverty in two channels (Bourguignon 2003). First, a permanent redistribution of income could reduce poverty instantaneously. Second, redistribution of income could

contribute to permanent increase in the growth elasticity of poverty reduction. Therefore, when these two effects are combined, improvement in income distribution will lead to higher impact of growth on poverty. This section intends to highlight changes in poverty in Laos and then examine the impact of inequality on growth in Laos.

Poverty in Laos declined during the studied period by all measures (Table 8.13). Headcount poverty ratio declines from 33.51% in 2002/03 to 27.58% in 2007/08. Poverty gap and poverty severity have also improved. As expected, poverty in the rural area is still higher than the urban area but the rate of decline is relatively faster in the rural area. Across regions, poverty reduction is most outstanding in the South, where poverty is the lowest and the rate of decline is also the fastest. In addition, there are large variations in poverty reduction across provinces (Table 8.14). The champions in poverty reduction are Champasack and Attapue in the Southern region, where poverty has declined more than 40% in the same period.

The relationship between poverty and inequality in Laos could be shown by using the Sen-Shorrocks-Thon (SST) index. As explained in Chapter 5, change in SST index could be decomposed into change in poverty headcount, change in poverty gap for the poor, and change in inequality among the poor. Adopting Osberg and Xu (1999), this study calculated the SST index for Laos and it is decomposed for the period between 2007/08 and 2002/03. These results are shown in Table 8.15. The SST index for Laos has declined by 19% from 2007/08 to 2002/03 due to a reduction in poverty headcount, a falling poverty gap for the poor, and increasing inequality among the poor. A similar situation is observed in rural areas, urban areas, and across regions. Unlike other subgroups, the SST index for Vientiane Capital has increased in the studied period mainly due to more rapid increase in inequality among the poor than the reduction in poverty rate and poverty gap. The decomposition of SST index in Laos

shows that the reduction in poverty is due to a decrease in the number of people in poverty and the size of poverty gap per poor person rather than distribution among the poor.

In order to further examine the relationship between growth, poverty, and inequality in Laos, changes in poverty in Laos can be decomposed into a growth component and distribution component. This analysis will adapt the methodology used by Deaton (2002) in his analysis of inequality in India. This analysis will, however, focus on nominal change in poverty so that poverty line and the estimates are consistent with official statistics in Laos. The findings are shown in Table 8.16. The impact of inequality on poverty could be estimated by comparing the actual poverty in 2007/08 with the estimated poverty given a fixed inequality between 2007/08 and 2002/03. If all households have enjoyed the same rate of increase in consumption between the two study periods (i.e. the inequality is fixed), the poverty rate (or poverty headcount ratio) in 2007/08 would be 27.58%; hence, poverty could have declined by 10.94%. However, with the increase in inequality in this period the actual poverty rate has declined by 5.9%. These imply that changes in equality in this period contributed to an increase of poverty by 5% (Table 8.16). Similar exercises could be applied to other poverty indicators, like poverty gap and poverty severity (Table 8.16). We extend this analysis by decomposing poverty into growth and distribution components for subgroups and the results are provided in Table 8.17. Holding the inequality rate fixed at the level in 2002/03, poverty rates across urban and rural areas in Vientiane Capital, North, Central and South would have reduced further by 11% to 31%. The analysis confirms that poverty in most regions could have been lower if inequality had not increased. These findings support the contention of the impact of inequality on growth-poverty reduction. In other words, growth must be accompanied by better distributions in order to achieve more effective poverty reduction in Laos.

4.4 Causes of inequality in Laos

Taking into account the lack of data for a rigorous econometric exercise, this chapter will examine characteristics of provinces with increasing and decreasing inequality in order to capture any commonality. Later, simple regression will be used to examine any statistical relationship between inequality and interested factors, including FDI.

4.4.1 Inequality and characteristics of provinces

This section focuses on the characteristics of provinces with different paths of inequality. More specifically, provinces or regions are compared based on some common variables such as inequality (Gini coefficient), poverty rate (or poverty headcount ratio), FDI inflow (% of FDI in total), size of government investment (% government investment) and ease of access (average distance to school, hospital, road, and city center).

Each region is ranked on each variable from 1 (smallest) to 4 (highest), while each province is ranked from 1 to 17. Comparison across regions reveals the importance of accessibility for inequality. Vientiane has the highest level of inequality but the lowest poverty. Vientiane Capital has the best accessibility and the highest government investments. On the other hand, the Northern region has the second highest level of inequality and the highest poverty rate. This region faces the most challenging accessibility problem. However, FDI inflow to this region is also quite high. For instance, from 2003 to 2007, the North received 20% of the total FDI. Government investment (per capita) in the social sector is also the highest in this region. Government investment is partly to deal with the poverty problem. The situation in the South is very interesting.

Table 8.13: Poverty indicators, Laos

	Poverty rate		Poverty gap		Poverty severity		Percentage change		
	2002/03	2007/08	2002/03	2007/08	2002/03	2007/08	Poverty rate	Poverty gap	Poverty severity
All samples	33.51	27.58	8.02	6.50	2.76	2.32	-5.93	-1.51	-0.44
Urban	19.71	17.36	4.05	3.44	1.25	1.13	-2.35	-0.61	-0.13
Rural	37.63	31.72	9.20	7.74	3.21	2.80	-5.90	-1.46	-0.41
Vientiane	16.68	15.24	3.39	3.37	1.02	1.24	-1.44	-0.03	0.22
North	37.92	32.53	9.42	7.74	3.28	2.66	-5.39	-1.69	-0.62
Central	35.36	29.84	8.44	6.94	2.96	2.50	-5.52	-1.50	-0.46
South	32.62	22.81	7.62	5.58	2.54	2.08	-9.81	-2.04	-0.46

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.14: Poverty by provinces

	2002/03	2007/08	Percentage change
Vientiane Capital	16.7	15.2	-8.7
Phongsaly	50.8	46.0	-9.4
Luangnamtha	22.8	30.5	33.7
Oudumxay	45.1	33.7	-25.2
Bokeo	21.1	32.6	54.3
Luangprabang	39.5	27.2	-31.3
Huaphan	51.5	50.5	-1.9
Xayabury	25.0	15.7	-37.4
Xiengkhuang	41.6	42.0	1.0
Vientiane	19.0	28.0	47.6
Borikhamxay	28.7	21.5	-25.0
Khammuane	33.7	31.4	-6.8
Savannakhet	43.1	28.5	-34.0
Saravane	54.3	36.3	-33.1
Sekong	41.8	51.8	23.9
Champasack	18.4	10.0	-45.8
Attapeu	44.0	24.6	-44.1

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.15: Changes in Sen-Shorrocks-Thon (SST) index during 2002/03 to 2007/08

	All	Urban	Rural	Vientiane	North	Center	South
$\Delta \ln P_0$	-0.19	-0.13	-0.17	-0.09	-0.15	-0.17	-0.36
$\Delta \ln P^P{}_1$	-0.21	-0.16	-0.17	-0.01	-0.20	-0.20	-0.31
$\Delta \ln(1+G^P)$	0.05	0.04	0.05	0.14	0.03	0.03	0.10
ΔlnSST Index	-0.35	-0.25	-0.29	0.04	-0.32	-0.33	-0.57

Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.16: Change in poverty, growth, and inequality impacts, 2007/08 to 2002/03

	Poverty rate	Poverty gap	Poverty severity
Poverty in 2002/03	33.51	8.02	2.76
Poverty in 2007/08 (Actual)	27.58	6.5	2.32
Estimated Poverty in 2007/08 (Inequality fixed)*	22.56	4.9	1.59
Actual change in poverty (basis points)	-5.93	-1.51	-0.44
Estimated change in poverty if inequality is fixed (basis points)	-10.94	-3.12	-1.17
Implied effect of inequality on poverty (basis points)	5.02	1.61	0.73

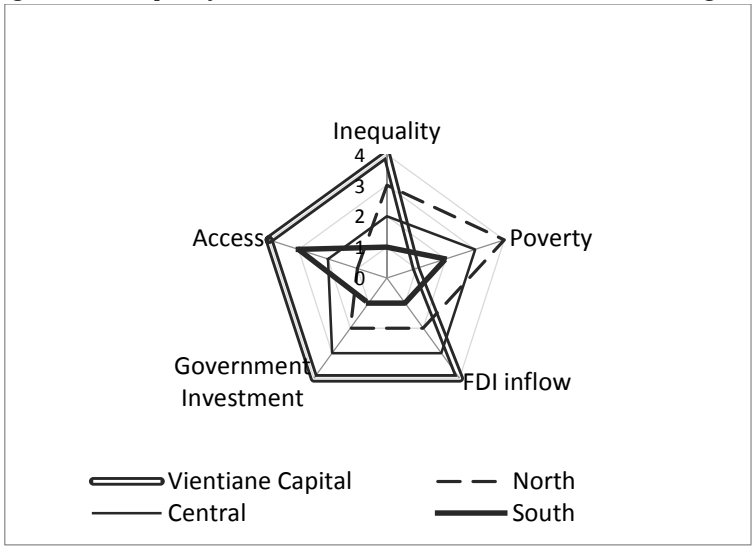
Note: * All households are assumed to enjoy the same rate of increase in consumption during 2002/03 to 2007/08. The technique is adapted from Deaton (2002) in which real change in consumption was used. In this exercise, nominal change in consumption is used so that the poverty line and the estimates are consistent with official statistics.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Table 8.17 Change in poverty by area, growth, and inequality impacts, 2007/08 to 2002/03

	Poverty rate			Percentage point change in poverty		
	2002/03	2007/08 (Actual)	2007/08* (Inequality fixed)	Actual	Inequality fixed	Effect of inequality
All samples	33.51	27.58	22.56	-5.93	-10.94	5.02
Urban	19.71	17.36	5.37	-2.35	-14.34	11.99
Rural	37.63	31.72	0.55	-5.9	-37.08	31.18
Vientiane Capital	16.68	15.24	4.31	-1.44	-12.37	10.93
North	37.92	32.53	12.26	-5.39	-25.66	20.27
Central	35.36	29.84	12.47	-5.52	-22.89	17.37
South	32.62	22.81	11.9	-9.81	-20.73	10.92

Note: *All households are assumed to enjoy the same rate of increase in consumption during 2002/03 to 2007/08. The technique is adapted from Deaton (2002) in which real change in consumption was used. In this exercise, nominal change in consumption is used so that the poverty line and the estimates are consistent with official statistics.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.8: Inequality and some main characteristics of different regions.



Source: Calculated by the author based on data from Provincial Statistic Yearbooks from 1998 to 2008, Department of Planning and Investments.

The southern region has the lowest inequality and an extremely low poverty rate. Interestingly, FDI inflow is the lowest in this region. The type of FDI is also very different from other regions in which the FDI has concentrated on tourism and agroprocessing. Government investment in this region has focused more on the social sector. The advantage of this area is the enhanced transportation infrastructure, which strengthens the accessibility in this area (second only to Vientiane Capital). Finally, the Central region has moderate inequality and poverty rates. This region has also received relatively high FDI inflow (26% of FDI) and government investment, but the accessibility is also quite moderate. The characteristics of each region suggest that accessibility is a crucial factor that influences inequality. Although the linkage between FDI and inequality is not explicitly validated, it is reasonable to argue that if accessibility and FDI are associated then, indirectly, FDI has a bearing on inequality.

Many provinces have higher inequality rates during the studied periods, in which a few provinces actually have inequality rates that are above the national level. At the same time, however, there are a few provinces that have reduced their inequality rates (Figure 8.8 and Table 8.18). It is therefore worthwhile to compare the characteristics of these two distinct groups. Provinces that experienced an increase in inequality rates above the national level are Xayabury, Vientiane Capital, Xiengkhuang, and Sekong. Few observations could be derived from comparing the characteristics of these provinces (Figure 8.9). First, except Vientiane Capital, all provinces face an accessibility problem. Second, poverty rate is not the same across these provinces. Poverty incidence is very high for Sekong and Xiengkhuang, while it is very low for Xayabury and Vientiane Capital. Third, government investment tends to be low in all provinces except Vientiane Capital. In particular, investment in the social sector is only high in the very poor province of Sekong. Finally, the size of FDI varies substantially among the provinces in this group. These observations imply that provinces with high and increasing inequality rates tend to face low accessibility and low government investment in the social sector.

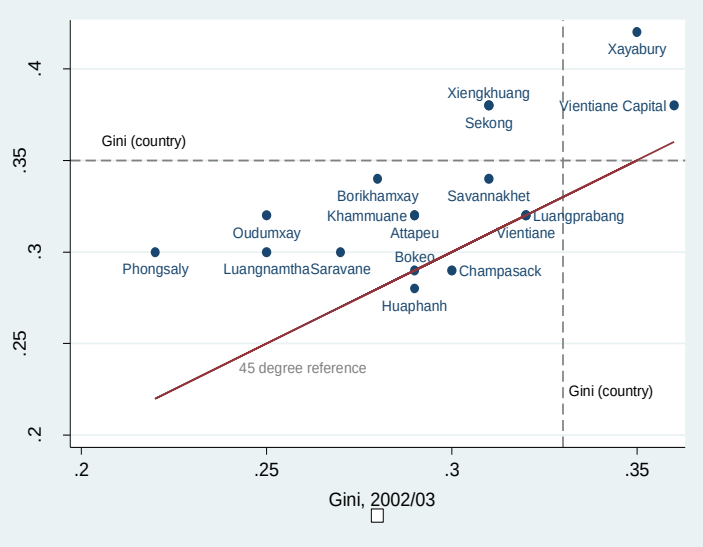
The characteristics of provinces that have low and declining inequality rates are less common. The poverty level is high in Huaphan, moderate in Borkeo, and low in Champasack. Accessibility is high for Champasack but rather poor for the other two provinces. FDI and government investment tend to be between moderate and high. In particular, government investment in the social sector is quite high for Huaphan and Borkeo. These unique characteristics are attributed to the following. Champasack is an economic centre of the southern region where major drivers of economic growth are agriculture, trade, and tourism. Equally important, economic infrastructure is very well developed with good access to

Thailand and Vietnam. Borkeo is a smaller province in the North, sharing a border with Thailand. This province focuses on trade and agriculture, particularly contract farming with Thailand. Hence, Borkeo is a window for cross-border trade with Thailand and distribution to the upper Northern region. Huaphan is very different among the three. This province is very poor with accessibility problems. The province was very important for historical and political reasons, but there is no major economic sector that could promote economic growth. The inhabitants in these provinces largely rely on the agriculture sector and some border trade with Vietnam.

4.4.2 Inequality and the level of economic development

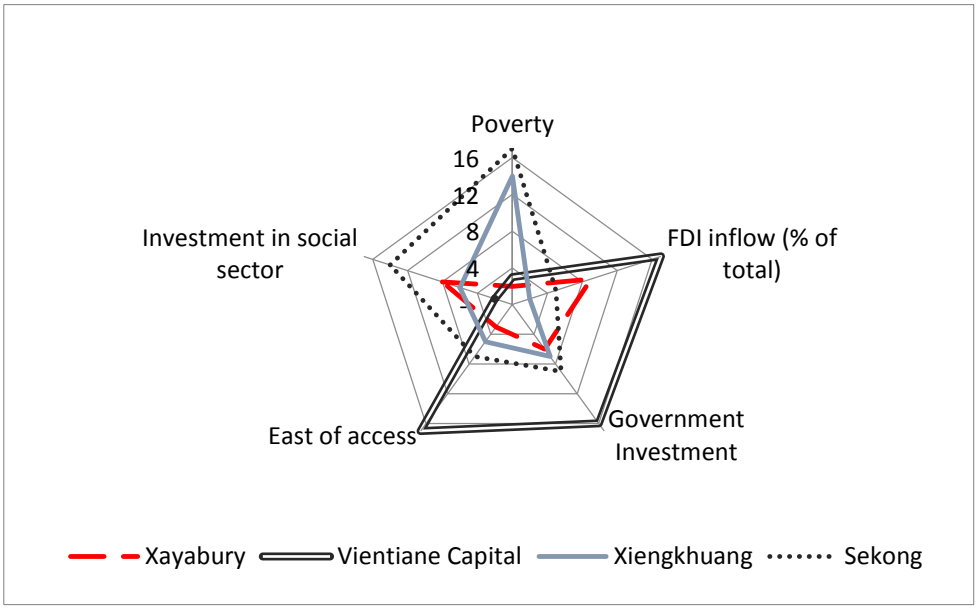
The level of economic development seems to have influences on inequality in Laos. The relationship between inequality and the level of economic development is still debatable in the existing literature. The debate is the centerpiece of Kuznets's hypothesis. In order to clarify this issue in Laos, this study uses provincial average consumption as the proxy for provincial mean income and the level of provincial economic development. Notwithstanding data constraints, this study conducts a regression analysis to examine some statistical relationships between the logarithm of the provincial Gini coefficient and the logarithm of the provincial mean consumption expenditure.

Figure 8.9: Provinces inequality in 2002/03 and 2007/08



Note: Gini in consumption by provinces, 2002/03 and 2007/08. The figures are in 2002 prices. The 45-degree line serves as a reference, whereby points lying above the line correspond to an increase in inequality and vice versa. The horizontal reference line shows the average Gini for Laos in 2007/08 and the vertical line is a reference for 2002/03. The Frequency weight is used in the estimation of Gini.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.10: Characteristics of provinces with inequality above the national level and increasing



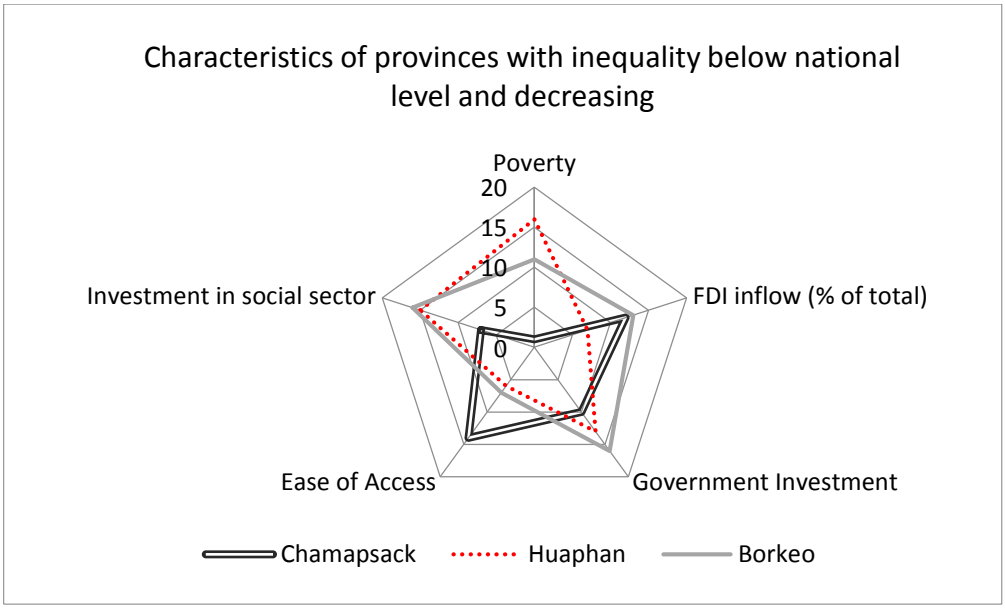
Source: Calculated by the author based on data from Provincial Statistic Yearbooks from 1998 to 2008, Department of Planning and Investments.

Table 8.18: Inequality across provinces

	Gini			Theil T		
	2002/03	2007/08	Percentage change	2002/03	2007/08	Percentage change
Vientiane Capital	0.36	0.38	5.6	0.24	0.27	13.9
Phongsaly	0.22	0.30	34.1	0.09	0.17	84.1
Luangnamtha	0.25	0.30	18.6	0.11	0.18	59.6
Oudumxay	0.25	0.32	28.0	0.11	0.19	84.2
Bokeo	0.29	0.29	-0.4	0.19	0.15	-19.5
Luangprabang	0.32	0.32	0.2	0.19	0.18	-8.5
Huaphan	0.29	0.28	-2.1	0.15	0.16	12.2
Xayabury	0.35	0.42	21.4	0.25	0.44	76.5
Xiengkhuang	0.31	0.38	20.8	0.18	0.28	53.9
Vientiane	0.32	0.32	1.7	0.21	0.19	-9.7
Borikhamxay	0.28	0.34	21.5	0.13	0.27	101.4
Khammuane	0.29	0.32	9.0	0.15	0.23	51.6
Savannakhet	0.31	0.34	9.4	0.18	0.22	22.7
Saravane	0.27	0.30	10.4	0.15	0.17	13.7
Sekong	0.31	0.38	23.3	0.19	0.25	31.9
Champasack	0.30	0.29	-4.1	0.15	0.15	-5.6
Attapeu	0.29	0.32	10.2	0.16	0.20	19.1

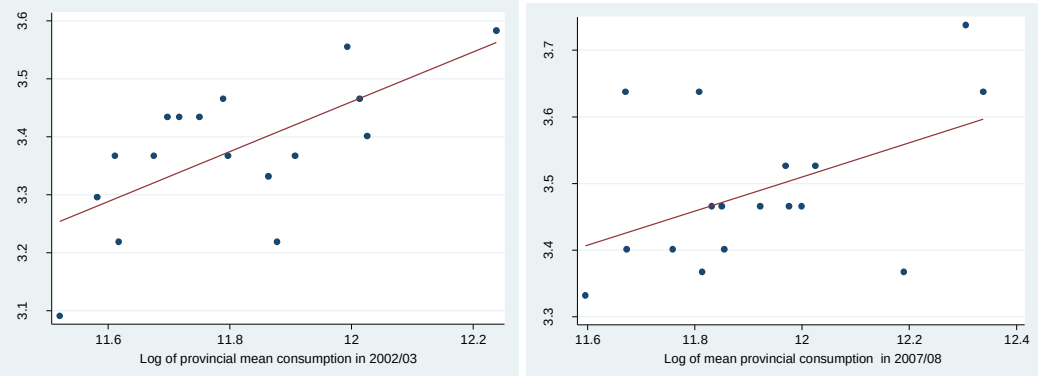
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.11: Characteristics of provinces with inequality below the national level and decreasing



Source: Calculated by the author based on data from Provincial Statistic Yearbooks from 1998 to 2008, Department of Planning and Investments.

Figure 8.12: Inequality and the level of economic development at provincial level



Note: These figures show the relationship between inequality (Gini) and provincial mean consumption in two periods (2002/03 and 2007/08). The points in this figure can be used to estimate a linear regression, lgini03 = -1.7 + 0.43lcons03 (t=3.45) and lgini08 = -0.417 + 0.26 lcons08 (t=2.09). The fitted lines display the fitted value estimated from the regressions. Frequency weight is used in the estimation of provincial means. These findings should be used carefully because observations are only seventeen in each regression.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

The results are plotted on the scatter diagram for 2002/03 and 2007/08 as shown in Figure 8.12. The regression results show that there is a positive relationship between the levels of average consumption expenditure and inequality rates in both periods. More specifically, for 2002/03, 1% rise in consumption expenditure induces 0.43% increase in Gini coefficient; for 2007/08, 1% rise in consumption expenditure induces 0.26% rise in Gini coefficient. Provinces with higher consumption expenditures (i.e. provinces with a higher level of economic development) are associated with provinces with higher inequality rates. It is interesting to note that the elasticity between the level of economic development (proxied in consumption expenditure) and the inequality rate become smaller as consumption expenditure increases. These infer that Laos is likely to progress along the inverted U shape of Kuznets hypothesis on the relationship between inequality and level of economic development.

4.4.3 FDI and inequality

It is widely accepted that FDI contributes to economic growth. FDI plays a role of filling the saving-investment gap in a recipient country. Thus, FDI is essential for promoting

economic growth in developing countries that are short of the resources to accomplish their economic growth objectives (Lee 2005). In addition, FDI is also a key driver of economic growth through technological transfer and spillover of technological knowledge that can cause the rise of productivity at firm levels in a recipient country (Nakamura 2002). Equally important, FDI generates employment and it also creates linkages between a recipient country and the international market place.

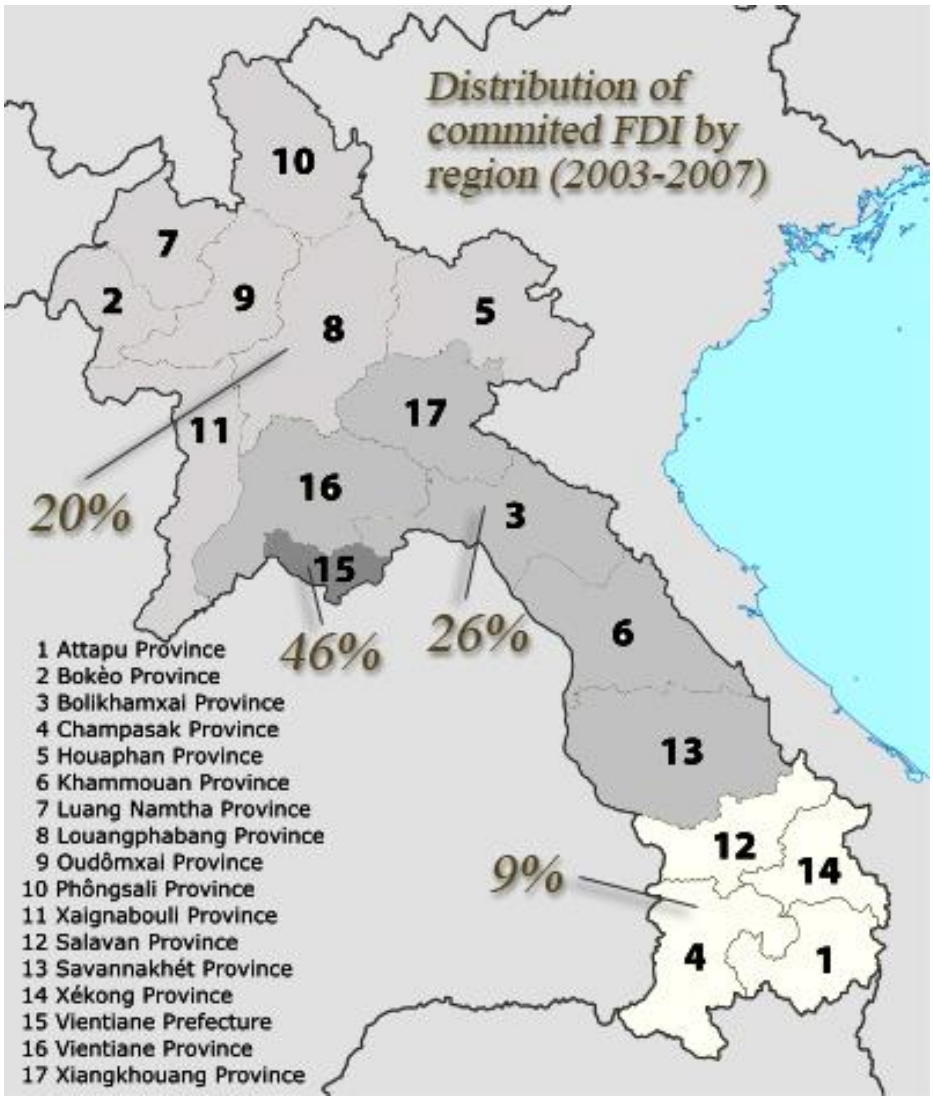
This FDI-growth relationship has been substantiated in Laos. Nolintha (2009), using the Vector Autoregressive (VAR) model, finds a statistically significant causality from FDI to growth in the Laotian economy. Similarly, Nolintha and Lau (2014), using both the Cobb-Douglass production function and the VAR model, find that capital growth, which is largely accumulated from FDI inflows, has contributed to gross domestic product (GDP) growth in the Laotian economy while the role of labor growth is statistically insignificant. However, FDI in Laos was concentrated in some areas, in particular the hub of each region with appropriate accessibility to external markets with relatively better economic infrastructure (Figure 8.13, 8.14, and 8.15). The concentration of FDI has therefore benefited the areas that received FDI relatively more than other areas. Therefore, our findings infer that although rapid inflow of FDI from 2003 to 2007 has benefited growth, the uneven distribution of FDI has created adverse effects on inequality. This finding is consistent with experiences in China where FDI has become an important engine of growth in China, but the distribution of FDI rather than the FDI itself was the cause of inequality in China (Wei, Yao, and Lui 2007).

In the case of Laos, our analysis shows that income distribution among households in provinces that have received high inflows of FDI supports the relationship between FDI and inequality. We have classified households into two groups, viz., households living in

provinces with high inflows of FDI and those residing in provinces with low inflows of FDI. Each province was classified into quintiles based on the value of committed FDI inflows to each province from 2003 to 2007. On this basis, we constructed the Lorenz Curve in consumption expenditure and in assets, respectively. The results are illustrated in Figure 8.16. Inequality in both consumption expenditure and asset is relatively higher in provinces that have received larger FDI inflows. For instance, the Gini coefficient on consumption expenditure is 0.15 for provinces that have received low FDI and 0.31 for provinces with a high influx of FDI. Similarly, the Gini coefficient on asset is 0.64 for low FDI recipients and 0.88 for high FDI recipients. Hence, taking into consideration the findings from the decomposition analysis of inequality, the disparity among households is higher in those provinces which have received more FDI.

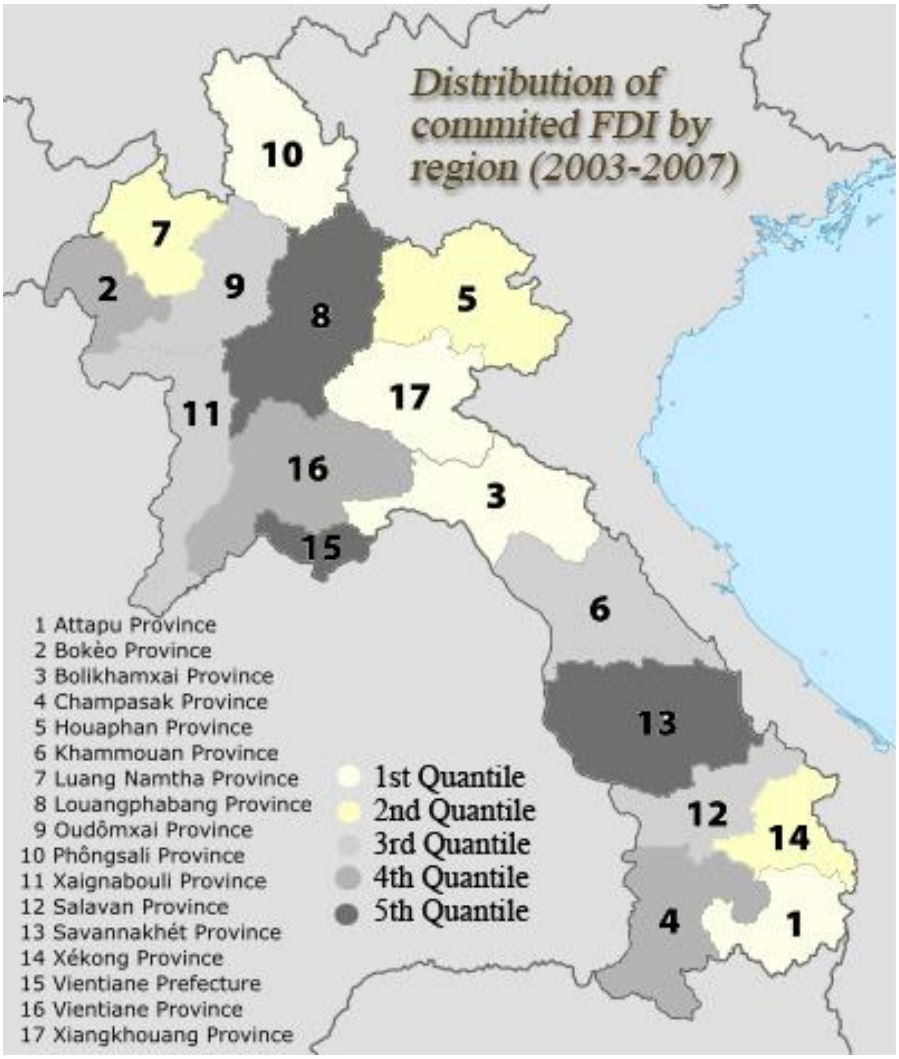
Furthermore, we have also examined the direct relationship between FDI and inequality. Figure 6 shows the regression results between inequality in 2007/2008 and committed FDI during 2003 to 2007 by districts. The Gini coefficient of consumption in expenditure is shown in panel A, and the Gini coefficient of assets is shown in panel B of Figure 8.16. There are positive correlations between FDI and inequality both in terms of consumption expenditure and in assets. The coefficient on logarithm of committed FDI is positive and statistically significant at 1% level for both equations. More specifically, 1% increase in committed FDI induces 0.05% increase in Gini coefficient or 0.09% in Thiel T index. However, variation in FDI explains about 11% of variation in inequality. In this regard, this investigation suspects there are other factors that have influenced this relationship but this question is out of the scope of this study.

Figure 8.13: Distribution of committed FDI by regions



Source: Maps are produced by the author with support from Soulaxay Bounthideth using data compiled from various provincial statistical yearbooks, Department of Planning and Investments.

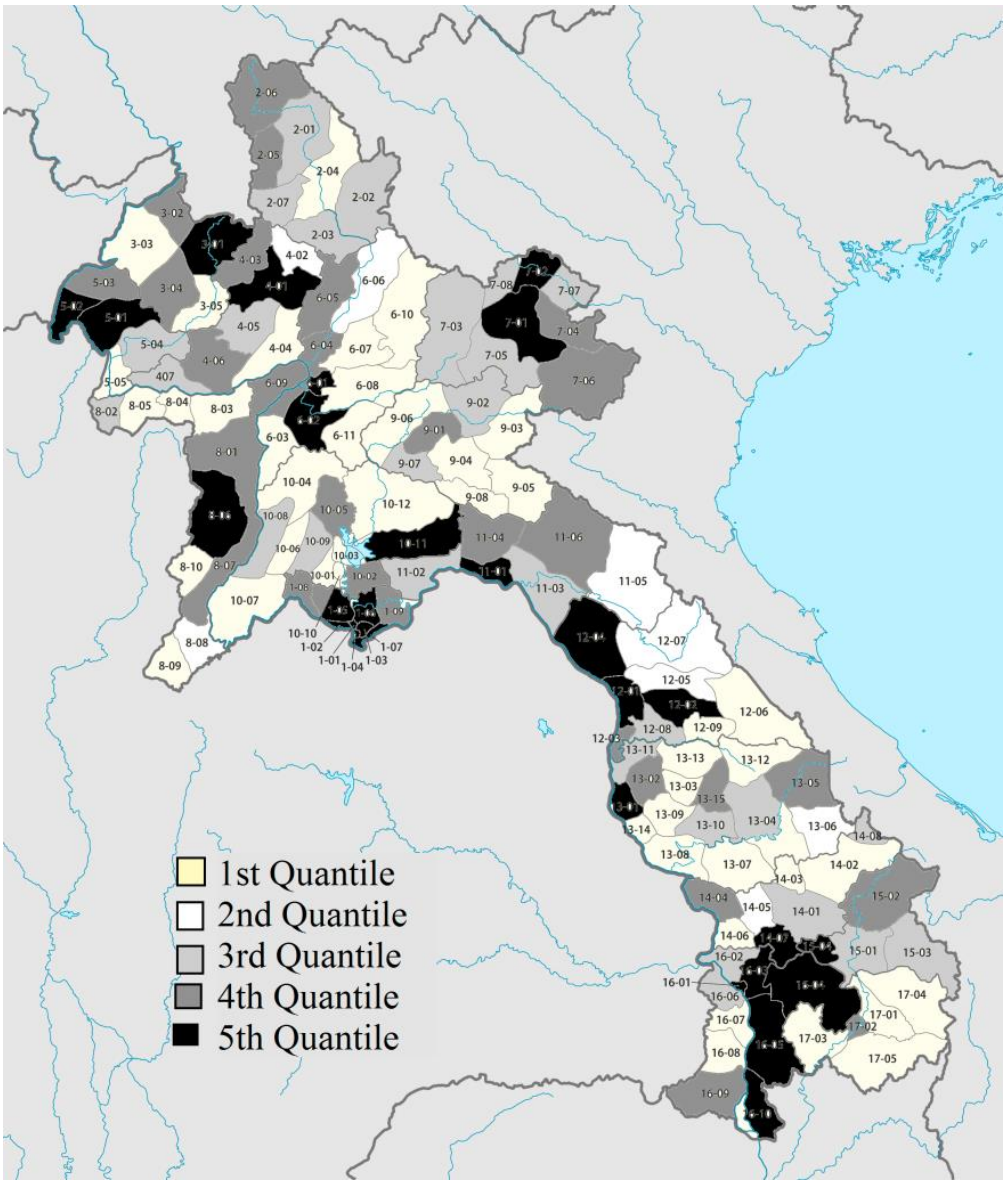
Figure 8.14: Distribution of committed FDI during 2003 to 2007 by provinces



Note: Committed FDI in each province is ranked and classified into 5 quintiles from lowest (1st quintile) to highest (5th Quintile).

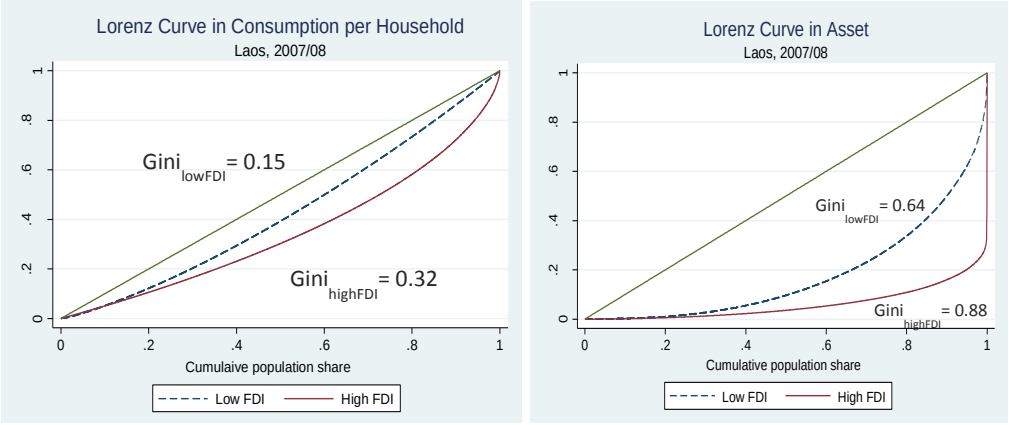
Source: Maps are produced by the author with support from Soulaxay Bounthideth using data compiled from various provincial statistical yearbooks, Department of Planning and Investments.

Figure 8.15: Distribution of committed FDI during 2003 to 2007 by districts



Note: Committed FDI in district is ranked classified into 5 quintiles from 1st Quintile (lowest) to 5th Quintile (highest).
Source: Maps are produced by the author with support from Soulaxay Bounthideth using data compiled from various provincial statistical yearbooks, Department of Planning and Investments.

Figure 8.16: Lorenz curve for low- and high-FDI areas



Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

Figure 8.17: Inequality and size of FDI

Note: These figures show district inequality in 2007/08 by committed FDI during 2003 to 2007. The points in these figures can be used to estimate a regression lnGini 2007/8 = -2.11 + 0.05 lnFDI03-07 (t = 3.39) and lnGiniAsset 2007/8 = -2.02 + 0.09 lnFDI03-07 (t = 2.83). The fitted lines display the fitted values estimated from the regressions. The findings should be used carefully because the number of the sample in each district is quite small. Hence the estimation of inequality by districts should be used with caution.
Source: Calculated by the author using data from LECS3 and LECS4, Lao Statistics Bureau

5. Conclusions and discussions

This chapter has analyzed the changes of inequality in Laos from 2002/03 to 2007/08, when there was a surge in FDI inflows. Our findings show that inequality in consumption expenditure and assets has risen. This study verifies that all of the conventional inequality indicators have deteriorated. Although the nationwide inequality in consumption expenditure has increased slightly, the decomposition analysis shows that the situation has been aggravated not only in terms of subregions across Laos but also in comparison with other countries that are of a similar income level. More critically, the results show inequality in assets is higher and that the rate grew quite rapidly between 2002/03 to 2007/08. It is apparent that disparity at the upper tail of our sample has escalated relatively faster than other parts of the income distribution. In addition, this study has confirmed that disparity among people in the same group is the major cause of inequality in consumption expenditure, whereas the difference among people from different groups has contributed to inequality in asset.

The results of the decomposition analysis reveal that the gap between urban and rural areas is smaller in consumption expenditure but wider in asset. In other words, marginal propensity of expenditure of households is higher in rural areas, whereas it is lower in urban dwellers because their additional incomes are invested into assets. Using growth incidence curve analysis, the analysis finds that poor households in urban areas experience a real decline in consumption during the studied period, while the rich enjoy a significant increase in consumption. This finding suggests that Laos is beginning to experience the urban poverty problem, a common defining factor in both developing and developed countries. Therefore, poverty reduction policy in Laos should not overlook this growing poverty inside the city area.

Urban poor require improvements in social safety nets and increases in their absorption capacity in order to benefit from the growing city economy.

Inequality has an important impact on poverty in Laos. This study finds that poverty by all measures declined during the study period. However, we find that poverty in Laos could have decreased more rapidly if inequality had not increased during the period between 2002/03 and 2007/08. An increase in inequality in this period is estimated to have contributed to an increase in poverty by 5%. The impact is quite substantial, considering the fact that the Laotian government considers poverty reduction an important priority in its development agenda. Therefore, growth that results in a more even distribution of income makes poverty reduction efforts more effective in Laos. Bringing down the inequality rate is therefore an important means for alleviating poverty amid growth in Laos. This school of thought is consistent with pro-poor growth and inclusive growth.

This study has substantiated that the rise in inequality in Laos was influenced by the inflow of FDI. Those areas that received higher FDI inflows have shown higher inequality in consumption expenditure and in asset. This outcome is associated with the characteristics of FDI inflows to Laos, where, during the period of our analysis, they concentrated in a hub area in every region that was well endowed with a natural resources sector supported by better economic infrastructures and thus better accessibility to export markets. The level of accessibility and government investment in the social sector has also influenced the inequality.

Reducing inequality has to be one of the key priorities for development objectives in Laos. While FDI has fueled economic growth, that process has brought about the rise in inequality. It is quite tempting to accept Kuznets's hypothesis, which claims inequality rises with the increase of income per capita initially but it will be corrected at the later stage when

income per capita has reached a certain threshold. But our findings show that the increase in inequality had a negative effect on poverty reduction in Laos. Poverty rates in Laos are one of the highest in the Southeast Asia region; hence, poverty alleviation is a commitment of the Laotian government to fulfill the Millennium Development Goals. From this perspective, in order to lift more people above the absolute poverty line, policymakers in Laos have to pay more attention to remedying inequality.

Chapter 9 Conclusion

1. Summary of the findings

This thesis has attempted to elucidate how one of the major contributory factors—FDI—has played a crucial role in fostering economic growth in Laos. FDI inflows in the 2000s have indeed filled the substantial portion of the saving-investment gap in the growth process of Laos, but those external capital resources were channeled into the Laotian natural resource sector. As a consequence, FDI inflows have stimulated particularly outstanding growth in the trade sector (resource and non-resource based), which has been consistently exhibited throughout the thesis. Notwithstanding positive results, this FDI-led growth process has also caused negative impacts on the Laotian economy. Macroeconomic stability, appreciation of LAK, inclusiveness of growth in terms of human development indicators, poverty, and inequality have become serious issues of concern for the policy-making and research community in Laos. Against this broad negative concern, with regard to the impact of FDI on the Laotian economy, this thesis has aimed to answer the following three questions, as defined in the outset of this thesis. First, how did the FDI inflows into the natural resource sector contribute to the economic growth in Laos? More specifically, this analysis was intended to elucidate the role of capital accumulation—where FDI contributed substantially—in promoting economic growth in Laos. Second, taking the garment industry—which is a leading export-oriented manufacturing sector that has been intensified by foreign firms—as a case study, this thesis tried to discern its linkage with the global production networks, which in turn reinforced its performances. Third, this study has examined how the inflows of FDI have

caused negative impacts on the Laotian economy with particular focus on its influence on inequality. Essentially, the empirical findings are summarized as follows.

The analytical findings confirm that the expansion of the natural resources sector, driven by FDI, has not contributed to employment generation. Also, the empirical results from the investigation of the relationship between FDI and economic growth in Laos in Chapter 6 shows that Laos's economic growth is positively associated with capital growth rate, which is largely driven by FDI inflow into the natural resource sector. Labor growth rate is, however, statistically insignificant in explaining output growth rate in Laos. Capital intensity is also found to have a positive relation with labor productivity. There are two channels in which an increase in capital intensity could benefit labor productivity in Laos. First, when capital goods are imported to Laos the technology is in fact embodied in the capital good. Labor productivity could therefore benefit from improvement in technology. Second, most of the manufacturing firms in Laos rely on parent firms or clients overseas to provide technology and training to local staff. Therefore, with an increase in FDI, not only will that capital accumulation increase but the productivity can also be enhanced. These empirical results confirm that, like other East Asian economies, a small landlocked country like Laos also gains from the inflow of FDI through capital accumulation and economic growth. The results also provide other important implications for the Laotian economy. High inflation and real effective exchange rate appreciation have a negative effect on growth in Laos, implying the important role of macroeconomic stability. Such findings support the literature on Dutch Disease regarding the macroeconomic challenge of a resource-based economy.

The case study of the Lao garment industry in Chapter 7 finds industry-level evidence of the role of FDI in Laotian economy. This case study provides a good example of how a

manufacturing sector in Laos has been developed in the environment of the growing natural resource sector. The analysis finds that the price competitiveness of the garment industry has indeed declined due to several factors, including the appreciation of LAK. Despite such challenges, garment firms in Laos have been upgrading their technological capabilities to a certain extent. FDI is an important source of technology and human resource development support for local subsidiaries, whereas local firms rely on their foreign buyers and suppliers to provide technological support. However, participation in the global production network alone does not always come with technological transfer. Ownership type and regional linkage are not significant in explaining Laotian garment firms' technological capabilities. Export intensities and the quality of host institutions are found to be important for the technological improvement of firms.

The empirical analysis on the change in inequality in Laos, and the link between widening the disparity and increase in FDI which was conducted in Chapter 8, has derived several important findings. First, based on many inequality indicators, the study found that inequality in Laos had increased between 2007/08 and 2002/03 when there was a large inflow of FDI into the natural resource sector. Asset inequality increased at a more rapid pace compared with the conventional consumption inequality. The disparity at the upper tail of our sample has escalated relatively faster than other parts of the income distribution.

Second, inequality decomposition found different sources of inequality in Laos. Consumption inequality was largely contributed from within growth disparity, meaning the difference among people in the same group (same region, same gender, etc.). However, the major sources of asset inequality were between-group inequality or disparities among people

from different groups. These empirical evidences suggest that Laos requires different types of policies in order to respond to these different types of inequality.

Third, urban-rural disparity becomes smaller in consumption expenditure but wider in asset. Using growth incidence curve analysis, we find that poor households in urban area experienced a real decline in consumption during the studied period, suggesting the presence of an urban poverty problem in Laos.

Fourth, inequality has an important impact on poverty in Laos. In order to quantify that cost of inequality on the poverty in Laos, this analysis used Sen-Shorrocks-Thon (SST) index and poverty decomposition exercise to estimate the impact of inequality on poverty. We find that if inequality had not increased, poverty in Laos could have been lower by 5 basis points. This size of impact is large for a poor country like Laos.

Finally, we find that the rise in inequality in Laos was influenced by the inflow of FDI. The areas with higher FDI inflows are found to have higher inequality in consumption expenditure and in asset. This is due to unevenness in the distribution of FDI across sectors and regions. Therefore, the gains from FDI are not distributed equally across regions and sectors.

2. Conclusion and policy implication

This study has attempted to investigate the impact of FDI on the natural resource sector in the Laotian economy. After the transition from a centrally-planned economy to a market-oriented system, the Laotian government has pursued an open-door policy that has enhanced its economic integration with the regional and global economy. Notwithstanding the effort since the late 1980s, the economy only began to takeoff in the mid 2000s after the boom of the

natural resource sector caused by a large inflow of FDI into the mining sector. The benefit of the natural resource boom has transmitted to several economic spheres, like capital accumulation, surge in export earnings, increase in government revenue, and growing domestic demand. Nevertheless, the experiences of other resource-rich economies suggest that growth driven by the natural resource sector has inherent risks that undermine long-term growth sustainability, because that kind of growth creates an adverse impact on the tradable non-resource sector, such as manufacturing, widening the inequality gap, and worsening rent seeking behaviors. In those contexts, the Laotian economy is encountering a spectrum of challenges associated with the resource-based economy.

This thesis identified some symptoms of the Dutch Disease in the Laotian economy, especially such as the spending effects, rapid increase in private consumption and government spending, the surge in inflation rates, and the appreciation of REER in LAK. These problems are sources of macroeconomic instability and the deterioration of cost competitiveness. At the same time, domestic demand has brought about the growth in the non-tradable sector, such as the service and construction sectors. However, the tradable non-resource sectors, such as manufacturing, have grown at a slower pace. In spite of a slower growth in the manufacturing sector, it should be regarded as a crucial sector for long-term, outward-oriented economic growth. From this perspective, the case study on the garment industry has highlighted that the linkage with the global production network is an important driver for this industry to improve its competitiveness in an environment that is filled with several obstacles, including a stronger LAK.

This study has validated that FDI has contributed to economic growth in Laos in the form of capital accumulation. The contribution of FDI in capital accumulation also has a

strong and positive relation with output growth. More importantly, an increase in capital intensity has enhanced labor productivity in the Laotian economy. These findings show that the boom in the natural resource sector driven by FDI has a strong impact on the growth of the Laotian economy. Moreover, empirical evidence also confirms that the growth in the natural resource sector has caused adverse impacts of high inflation and real appreciation of LAK on the growth of the Laotian economy. These suggest that the Bank of Laos has to enhance its ability in managing price stability on the one hand and to ensure that LAK remains stable, reflecting economic fundamentals, on the other hand.

Our empirical investigation of the inequality in Laos finds that inequality increased rapidly in Laos during the boom period of large FDI inflow. Our empirical analysis on asset inequality provides new evidence that the inequality problem in Laos is, in fact, an alarming development issue. The findings also validate that Laos is facing an urban poverty phenomenon that is a common problem in other countries. The empirical analysis on the growth-poverty-inequality relationship suggests that an increase in equality has a high cost for development in Laos because it restricts positive impacts from growth on poverty reduction. Finally, the findings substantiated that FDI inflows in Laos have caused the widening of the inequality gap in Laos because of the unevenness of FDI distribution across regions and the concentration of FDI in the natural resource sector. The degree of accessibility across regions/provinces is a key factor that exerts a significant effect on inequality in Laos.

The analytical results and related discussions in this study can derive policy recommendations for two broad areas of interest for the policy-making community in Laos.

The first area pertains to the needs for diversifying FDI inflows. FDI inflows have been playing a crucial role in promoting a high economic growth rate in Laos. To date, the

natural resource sector, especially mining and hydroelectricity, has attracted enormous amounts of FDI. However, the FDI-led natural resource sector's driven economic growth process has also triggered Dutch Disease symptoms, which have negative consequences on the Laotian economy. So that the natural resource sector will not impede the sustainability of economic growth rate, and for the purpose of enhancing employment generation capacity, the Laotian government ought to put in place a policy framework that would enhance the diversification of FDI inflows. This diversification effort would have to be responded to in short-, middle-, and long-term horizons.

In the short-term, it is imperative to minimize the risk associated with natural-resource-sector-oriented economic growth in tandem with the necessity to maximize growth dividends from the sector. There is especially a need to establish a mechanism that would utilize foreign capital inflows to enhance the productivity of export-oriented manufacturing and agroprocessing sector as well as to strengthen investment in the education sector. Equally important, it is essential to channel foreign hard currencies earned from the export of natural resources to strategic saving mechanisms, such as a natural resources fund or sovereign wealth fund or savings fund, which in turn would effectively help to avoid the spending effects of private and government sectors inherent in the Dutch Disease.

In the middle term, the Laotian government will have to put in place a policy framework that encompasses incentives for a higher level of employment generation and a viable strategy for industrial transformation to a higher value added and a higher technology-intensive, export-oriented manufacturing sector. For this purpose, it is a prerequisite for the government to strengthen its investment on human resources as well as give incentives to enhance human capital formation, R&D, and innovation capacity at firms' levels. At the same

time, the government will have to place particular emphasis in strengthening the international competiveness of local firms and also to strengthen their linkages with MNCs, which in turn will help create a conducive environment that would effectively induce spillover effects to promote the local economy.

In the long term, the policy should aim at transforming the Laotian economy from a natural-resource-based economy to a service-and-knowledge-based economy. Such a development path is preferable because Laos has a small population size. In order to achieve this transformation, investment in human capital is the key. Experiences from other countries, for instance Singapore and Switzerland, that have successfully developed their service-and-knowledge-based economies should be carefully studied.

The second area is related to the rectification of inequality and poverty alleviation. The study has demonstrated that inequality is clearly a critical development issue that requires greater attention from policy makers and practitioners. Inequality could not be self-correcting in a natural path as suggested by the Kuznets hypothesis. Within-group inequality has influenced inequality in consumption expenditure while between-group inequality has caused the rise of inequality in assets. Therefore, there should be different policies for different types of inequality. We suggest two types of policy intervention in remedying inequality in Laos.

In order to correct inequality in consumption expenditure, it is crucial to region-specific measures—viz., urban area-, rural area-, region- or province-specific measures—to rectify inequality among people residing in the same area. In this connection, intervention priority should be given to provinces that have a high and increasing inequality rate. Policy interventions can be in the form of community development programs or development programs specific to each particular region. Furthermore, measures in reducing inequality in

consumption expenditure must address the between-group component of inequality. Realistic policy measures include the allocation of more of the public investment budget to poorer provinces. This kind of intervention surely promotes the convergence of income levels across regions. A similar objective is also practical with regards to FDI promotion policy. The Laotian government should put priority in accruing FDI more evenly across the country. The current policy on giving more incentives to less developed or more disadvantaged areas should be continued. This effort can also be supported by creating new linkages between the already established hubs for FDI with nearby provinces so that they generate spillover benefits.

Moreover, broad-based policy measures are needed to rectify inequality in assets. The policy should aim to strengthen opportunities for equal access to assets, and the protection of the asset ownership of individuals should be supported by the introduction of progressive tax rates on assets. This intervention is expected to bring about a higher equal distribution of assets. Critics would argue that such a redistribution policy reduces market efficiency, but we support that kind of intervention because a broad-based approach minimizes the trade-off between equality and efficiency. Another preventive measure of wealth concentration is the introduction of a good regulatory framework that demands a transparent and accountable process of divestiture of state assets. Land reform is also an important avenue to strengthen equal opportunity to acquire land supported by fair and strong protection of asset ownership. Furthermore, enhancing investment in human capital, strengthening the social safety net, and increasing accessibility to credit access for low-income groups certainly reinforces their ability to acquire assets, which in turn helps to reduce inequality.

3. Contribution to the Existing Literature

This study demonstrates how capital inflow, which is largely accumulated from FDI in the natural resource sector, has contributed to economic growth in Laos. These empirical results contribute to the existing literature with regard to the subject on the role of capital accumulation for economic growth in East Asia in general, and from the perspective of a small and a land-locked country like Laos in particular. The empirical results have substantiated that macroeconomic stability is important for economic growth. This evidence validates the claims of Resource Curse or Dutch Disease hypothesis, like how the mismanagement of growth in the natural resource sector can cause macroeconomic instability. Therefore, this study contributes a new chapter to the existing literature in explaining the growth process in Laos.

Another important contribution of this study is on the measurement of inequality in Laos. The empirical studies on inequality in developing countries encounter the problem of data reliability. However, this study has been able to utilize primary data from household surveys to compute inequality rates in consumption and in assets. Therefore, this thesis adds to the accumulation of literature that pertains to empirical studies of Laotian economic development.

4. Limitation and Future Research Direction

Needless to say, Laos is a latecomer in the market-oriented economic system; hence, the analysis of Laotian economic affairs is constrained by the reliability and availability of data. As such, this study has encountered several limitations that can shed some new light on future research directions.

First, our empirical analysis on the role of FDI in economic growth uses total gross fixed capital formation, which includes both domestic and foreign investment. When data becomes available, future studies should estimate the capital stock separately from domestic and foreign investment. This will provide a clearer link between FDI and economic growth.

Second, our empirical inquiry on the link between inequality in Laos and the inflow of FDI does not use a comprehensive econometric model due to the lack of good macroeconomic data at a disaggregate level. Although this study has quantified the consumption-based inequality rate, that measurement could have underestimated the magnitude of the inequality problem. As already discussed in welfare analysis literature, consumption data is a good measure of welfare because consumption tends to be smooth irrespective of fluctuations in current income flow. However, for inequality analysis the smoothness in consumption may not reflect the change in income; hence, it cannot capture the real magnitude of the change in the disparity. For a more comprehensive inequality analysis, not only should the analysis construct different types of inequality indicators, but different types of welfare data (for instance value of asset possession) also need to be used to supplement the analysis. Thus, future research can extend this empirical work by focusing the analysis on the link between FDI and inequality in selected provinces or districts using experimental and micro-level research.

Third, our discussion on the Dutch Disease phenomenon in Laos use a descriptive and somewhat basic statistic approach. This is again due to the limitation of detailed input-output type data that clearly shows the linkage of different economic agents. When such data becomes available, future research can use a CGE-type model to re-examine the Dutch Disease problem in Laos.

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Appendix 1: Composite Index for Inclusive Growth in Laos

Nolintha et al (2014) attempts to construct the composite index for inclusive growth in Laos following the methodology proposed in McKinley (2010). The index is calculated from many growth inclusiveness, as explained in Chapter 3. The score for each indicator and subindicator reflects the discussion and judgement of the research team and representative from many relevant agencies.[72] The methodology is as follows. First, the research team presents the evidence on growth inclusiveness in Laos. Second, the research team proposes a score, ranging from 0 to 10, for each indicator based on the performance in each area. Finally, all participants discuss and comment and the score is revised in the consultative and participatory process. Therefore, the score for each indicator and the derived index are very judgmental and they reflect the perception of the researcher and the participants of the meeting. In order to derive the index, first the score for each subindicator is multiplied by the weight then the index is the sum of all weighted scores. The results are provided in the below table.

The calculation yields a value of 5.6, which places Laos in the middle of the satisfactory range. This suggests that although Laos has enjoyed rapid growth over the past two decades, growth inclusiveness needs to be improved so that benefits from growth can be shared among broader stakeholders. For growth to be more inclusive, Laos needs to address major challenges, such as: diversifying the sources of growth, reforming the public investment program, better aligning formal education and vocational training, improving the poverty reduction program, and investing in the development of a good social protection system.

[72] The Laos research team organized a consultation workshop on calculation of the composite inclusive growth index on 5 March 2013 with representatives from relevant ministries and international organizations in Laos.

Table 1A: Composite inclusive growth index for Laos

Indicators	Weight	Score	Weighted Score
Success in achieving growth, employment generation, and access to economic infrastructure			
Economic growth	0.25	8	2
Productive employment	0.15	3	0.45
Access to economic infrastructure	0.10	5	0.5
Success in reducing extreme poverty, moderate poverty, and inequality			
Poverty measures	0.10	7	0.7
Inequality measure	0.10	5	0.5
Incorporating gender equity into inclusive growth	0.05	6	0.3
Success in enhancing human capabilities			
Health and nutrition	0.05	5	0.25
Education	0.05	6	0.3
Sanitation	0.05	6	0.3
Social protection	0.10	3	0.3
Inclusive Growth Composite Index			**5.6**

Source: Nolintha et al (2014)

Appendix 2: Stata Commands Used in the Empirical Analysis on Poverty and Inequality

In order to estimate some poverty and inequality indices, the statistical software *Stata* was used. More information on the software can be obtained from the homepage of StataCorp.[73] Version 13 was used and the software is licensed to NERI UNICEF04, National Economic Research Institute. The serial number is 401306273882. *Stata* commands were used to estimate several inequality indices, poverty indicators, and inequality-related graphs and diagrams. Brief descriptions of the main commands used in the empirical analysis are provided in the following table.

[73] http://www.stata.com/

Command name	Descriptions	Author(s)
ineqdeco	It calculates common inequality indices including Gini, Thiel, and Atkinson. With some extensions to the command, inequality by subgroup can also be computed. Different sensitivity parameters of inequality can also be set. The formula used for the calculation is consistent with the ones explained in Chapter 5.	Stephen P. Jenkins, Institute for Social and Economic Research, University of Essex, U.K.
ginidesc	This command is used to decompose inequality into with-in group and between-group components of inequality. In order to use this command, *ineqdeco* command must be first installed in *Stata*. The formula used for the decomposition is provided in Chapter 5.	Roger Aliaga y Silvia Montoya, Instituto de Estudios de la Realidad Argentina y Latinoamericana (IERAL), Argentina
gicurve	This command produces the growth incidence curve. This curve reflects growth rates by quintiles, which is ranked by welfare measure (which is consumption for this study).	Michael Lokshin, DECRG, The World Bank.
glcurve	This command is used to derive the Generalized Lorenz Curve, which is a conventional graph that illustrates the distribution of income (or other welfare measures) across the samples. With some extensions, users can construct Lorenz Curve for different timeframes or different subsamples.	Philippe Van Kerm, CEPS/INSTEAD, Luxembourg Stephen P. Jenkins, ISER, University of Essex, UK.
povdeco	This command is used to calculate three major poverty measures: poverty headcount, poverty gap, and poverty severity indices. With some extensions, this command can also be used to calculate poverty by subgroups.	Stephen P. Jenkins, ISER, University of Essex, UK.
boothstrap	This command, which is a built-in command in *Stata*, executes commands multiple times by resampling observations (with replacement) from the data in memory. The number of times resampling is allowed can be set manually by the user. This method is commonly referred to as the nonparametric bootstrap. This process allows the user to obtain the confidence interval of the estimation.	StataCorp

Note: The above explanations are extracted from *Help* function provided in *Stata.*

Appendix 3: Firm questionnaire on the Garment Industry in Laos

A. Firm characteristics

1. Name of firm: _____ Year established:_____
2. What is the main product of your firm (by sales value)?_____
3. What is the nature of your firm's main business (by sales value) activity (You may tick more than one)? (a) High volume manufacturer □ (c) Primary processor (assembler) □ (c) Secondary processor (assembler) (d) Final processor (assembler) □ (e) Small batch producer □ (f)Component manufacturer □ (g) □ (h) Contract manufacturer □ (i) R&D operations □ (j) Designing □ (k) Integrated operations.
4. What is the ownership structure of your firm?
   (a) State owned (100%) □
   (b) 100% foreign owned □
   (c) 100% locally owned □
   (d) Joint venture □ (local share:_____%, foreign share:_____%)
5. Does your firm have overseas affiliates/subsidiaries? (a) No □ (b) □
6. Was your firm a result of a merger or acquisition? (a) Yes □ (b) No □
7. What was your firm's total full-time equivalent of employment? (a) 2000_____ (b) 2006_____, (c) 2011 _____
8. What was your firm's sales, inputs, and exports (*please specify currency*)?

	2000	2006	2011
a. Gross Sales			
b. Gross Inputs			
c. Export sales			
d. Sales to domestic export companies			

9. What share of your firm's exports go to (%):

	2000	2006	2011
a. ASEAN			
b. Japan			
c. Korea			
d. China			
e. N. America and Europe			
f. Others			

10. Your firm's total fixed assets? (*specify currency*) (a) 2000_____ (b) 2006 _____(c) 2011

B. Process and product technology

1. Which quality and inventory control and maintenance systems does your firm use?

(You can select more than one) (See glossary at the end of the questionnaire for the acronyms in full)

(a) TPM □ (b) TQM □ (c) QCC □ (d) MRP, MRP1 or MRP2 (e) QS □

(f) JIT □ (g) Kaizen □ (h) □ ISO 9000, ISO14000 □ (i) Others □ _____

2.Has your firm engaged in incremental innovation activities?

a. Yes □ b. No □ If yes, in which of the following activities?

a. Adapting machinery and equipment □

b. Adapting process layout □

c. Adapting product technology □

d. Adapting inventory and quality control systems □

3. How would you rate the average quality of your firm's production machinery (*please tick one only*)? (a) World class □ (b) Highly advanced (c) Advanced □ (d) Not very advanced □ (e) Dated □

4. What is your firm's average order-lead time?

(a) Export orders	→	(a) < 3 Days	(c) > 3 - 10 Days
		(b) 10 – 30 Days	(d) Over 30 Days
(b) host-country	→	(a) < 3 Days	(c) Over 10 Days
		(b) 3 – 10 Days	(d) Over 30 Days

5. Has your firm been involved in new product development?

(a)No □ (b) Yes □ → No. of times in the past 6 years? (a) 1 – 3 (b) 4 – 10 (c) Over 10

6. How was the new product technology obtained?

(a) Licensing? □ (c) Own development? □

(b) Foreign subsidiaries?□ (d) Others: (specify):_____

7. Were the new products new to:

(a) Your firm □ (b) Local market □ (c) Regional market (d) Global market □

8.Were the new products registered under intellectual property rights (IPR) instruments?

(a) Copyrights □ (b) Industrial designs □ (c) Patents □ (d) Trademarks □ (e) Others □

If others, please specify _____

9. Does your firm undertake contract R&D with domestic individuals and institutions in the host country? (a) Yes □ (b) No □.

10. How many patents did your firm file in the last 6 years?

(a)in host country_____ (b) in the United States_____

11. How much did your firm spend on R&D (excluding quality control and testing) as % of total sales in:

(a) 2000? _____% (b) 2006 ? _____% (c) 2011 ? _____%

12. No. of persons engaged in R&D. *(Total full-time equivalent)*

(a) 2000_____ (b) 2006_____ (b) 2011 ? _____%

13. Did your firm receive any government assistance *(direct grants, subsidies)* for R&D over the last 3 years? (a) Yes □ (b) No □

14. Has your firm recorded significant levels of technological upgrading (process and product) over its existence in your present country?

(a) Yes □ (b) No □.

If yes, how would you rate the significance of the following in supporting technological upgrading in your firm?

	Low to High Rating
a. Firm strategy	1 2 3 4 5
b. Favorable input and sales process	1 2 3 4 5
c. Proximity to buyers and sellers	1 2 3 4 5
d. Regional production networks (ASEAN and East Asia)	1 2 3 4 5
e. Grant from government to support R&D and training	1 2 3 4 5
f. Human capital supply in country	1 2 3 4 5
g. Liberal immigration laws that attract human capital from abroad	1 2 3 4 5
h. Levy on training	1 2 3 4 5
i. Technological collaboration with buyers and suppliers	1 2 3 4 5
k. Favorable access to finance (e.g. subsidized interest rates and low collateral)	1 2 3 4 5
l. Strong support from R&D labs, standards organizations, and universities	1 2 3 4 5
m. Others	

C. Human resource

1. What is the breakdown of your firm's workforce (%) in 2011?

(a) Managers and professionals ____ (d) Supervisory and Clerical ____

(b) Engineers and technicians ____ (e) Skilled direct workers ____

(c) Unskilled workers ____ (f) General ____

2. Did your firm participate in training workers? (a) Yes □ (b) No □.

If, yes please answer at least one of the following:

a. Training expenses as % of payroll in (a) 2000 _____(b) 2006 ____(c) 2011 _____

b. Training hours per person per year in (b) 2000 ____(b) 2006 ____(c) 2011 _____

3. Are your firm's workers unionized? (a) Yes □ (b) No □

4. How important are the following practices to your firm?

Please circle your rank (1-5 – from weakest to strongest)

Practices	Rating
a. Emphasis on teamwork	1 2 3 4 5
b. Informal contact between managers of different units	1 2 3 4 5
c. Multi-skilling and cross-expertise sharing	1 2 3 4 5
d. Feedback from marketing for technology and R&D	1 2 3 4 5
e. Participation from lower-level employees	1 2 3 4 5
f. Independent and group learning	1 2 3 4 5
g. Strong upward mobility of employees	1 2 3 4 5
h. Environment-friendly measures facing employees	1 2 3 4 5
i. Others (please specify)	1 2 3 4 5

D. Infrastructure and Business Environment

1. How do you rate the quality of the following institutions in your host country? *Please circle your rating (1-5 from weakest to strongest)*

Services	Likert-scale Rating
a. Transport services	1 2 3 4 5
b. Power supply	1 2 3 4 5
c. Water supply	1 2 3 4 5
d. Telecommunication network	1 2 3 4 5
e. Public health facilities	1 2 3 4 5
g. Primary Schools	1 2 3 4 5
h. Technical Training institutions	1 2 3 4 5
i. University education	1 2 3 4 5
j. R&D scientists and engineers	1 2 3 4 5
k. Incentives for R&D activities	1 2 3 4 5
l. R&D grants	1 2 3 4 5
m. R&D organizations	1 2 3 4 5

2. How did the following constrain your firm's efforts to develop technology and compete?

Instruments	Rating
a. Customs procedures	1 2 3 4 5
b. Licensing arrangements	1 2 3 4 5
c. Local duties and levies	1 2 3 4 5
d. Access to land, (registration cost and procedures)	1 2 3 4 5
e. Municipal regulations	1 2 3 4 5
f. Official corruption	1 2 3 4 5
g. Regulation on hiring foreign workers/managers	1 2 3 4 5
h. Labor standards	1 2 3 4 5
i. Environmental standards	1 2 3 4 5
j. Others (please specify)	1 2 3 4 5

E. Capital and Finance

1. What has been your firm's main source of finance (%)?

Source of finance for working capital	2000	2006	2011
a. Domestic banks			
b. Foreign banks			
c. Nonbank institutions			
d. Family/friends			
e. Partner/affiliate firms			
f. Credit from buyers			
g. Credit from suppliers			
h. Equity market			
i. Retained earnings			
j. Government grants			
k. Others (*specify)*			
l.			
T O T A L	100	100	100

F. Marketing

1. What was your firm's marketing expenditure (% of sales)?

(a) in 2000 _____ (b) in 2006 _____(c) 2011 _____%

2. Did your firm benefit from marketing support from the following institutions? *Please circle your rank (1-5 – from weakest to strongest)*

Support mechanism	Likert-scale Rating
a. Government support programmes	1 2 3 4 5
b. Industry association	1 2 3 4 5
c. Purchasers/buyers reputation	1 2 3 4 5
d. External private marketing agents	1 2 3 4 5
e. Others (please specify)	1 2 3 4 5

G. Linkage and spillovers

1. What % of your firm's gross input was sourced domestically? (a) 2000 __ (b) 2006___

   (c) 2011 _____%

2. Breakdown of imported inputs by source (%):

	2000	2006	2011
a. ASEAN			
b. Japan			
c. Korea			
d. China			
e. N. America and Europe			
f. Others			

3. Name of domestic suppliers of inputs (including production and designing and R&D):

1._____
2._____
3._____
4._____
5._____
6._____
7._____
8._____
9._____

3. Name of domestic buyers of production output

1._____
2._____
3._____
4._____
5._____
6._____
7._____

5. How have the following helped the development of domestic buyers and suppliers? *Please circle your rank (1-5 - from weakest to strongest).*

Type	Likert-scale Rating
a. Finance for supplier training institutions	1 2 3 4 5
b. Presence of an initial local supplier base	1 2 3 4 5
c. Presence of business networks	1 2 3 4 5
d. Your firm's business strategy	1 2 3 4 5
e. Participation in government-firm technology transfer coordination councils	1 2 3 4 5
f. SME support programs	1 2 3 4 5
g) Technical collaboration with buyers/suppliers	
h) Others (please specify)	1 2 3 4 5

Glossary

ASEAN – Association of Southeast Asian Nations

ISO – International Standards Organization

JIT – Just in time

Kaizen - Continuous improvement

MRP - Materials Requirement Planning

MRP1 – Materials Resource Planning

MRP2 – Integrated Materials Resource Planning

QCC – Quality Control Circle

QS – Quality standard

TPM - Total preventive maintenance

TQM – Total quality management

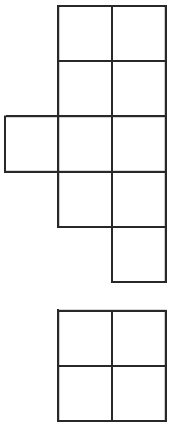
Appendix 4: Lao Expenditure and Consumption Survey (LECS) Questionnaire

LECS were conducted by the Lao Statistic Bureau. The questionnaire contains five modules, such as: (1) diary on household transactions; (2) household conditions; (3) time usage of household members; (4) prices; and (5) village characteristics. This appendix shows selected questions module 1, 2, and 5, which are relevant to the empirical analysis in this study. The format of the questionnaire may vary according to the original format.

Confidential

Expenditure and Consumption Survey 2007/2008

Household Questionnaire DRAFT

Identification	
Province _____	
District _____-____	
Village _____	
Household No. _____	
EA (Urban=1; Rural with road=2; Rural without road=3)	
Date 0f interview _____	
Month of interview _____	

Respondent's name _____

Interviewer's name _____

Field supervisor;s name _____

Office supervisor's name _____

Module 1: Diary Sheet for Household Transactions

(all expenditures, all income, all consumption of own produced food, all own produced food given away)

For household			For NSC	For household			For Enumerators		
Date	Item description	Unit of quan-tity	Code unit of quantity	Quan-tity	Value in KIP	Kind of transaction. 1 = Expenditure in cash or in kind 2 = Own consumption of own produced food 3 = Own produced food given away 4 = Income in cash or in kind (Circle code)	Bought where? (if expenditure) 1 = In Lao 2 = Abroad (Circle code)	Purpose: a = Agriculture h = Household b = Business (Circle code)	Item code
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	
						1 2 3 4	1 2	a h b	

Module 2: Household characteristics and conditions

I. Household compositions

	1	2	3	4			5	7	8
	Who usually lives in the household?	What is (name)'s relationship to head of household?	Is (name) male or female?	When was (name) born?			How old was (name) at his/her last birthday?	What is the (name)'s marital status?	What is (name's) ethnic origin?
		Head of household 1							
I	***Record all names***	*Spouse 2*						*Never marri 1*	***See code list***
D		*Parent/parent in law 3*		***Probe for birth***				*Married 2*	
		Son/daughter 4		***certificate***			***Completed***	*Divorced 3*	
C		*Son/daughter in law 5*		***or ID-card***			***age***	*Separated 3*	
O		*Brother/sister 6*					***(If <1 year***	*Widowed 4*	
D		*Brother/sister in law 7*		***If day/month/year***			***record 00)***		
E		*Other relatives 8*	*Male = 1*			*>>7*		***For all persons younger***	
		Non relative 9	*Female=2*					***than 10 years, record 1***	
				DAY	MONT	YEAR	YEAR	***directly***	
1									
2									
3									
4									
5									
6									
7									
8									
9									
10									
11									
12									
13									

II. Parents

	1	2	3	4	5		6	7	8	9	10	
	Is the natural father of (name) living in this household?	***Copy ID code for the father***	Is the father of (name) still alive?	Did the father of (name) attend school?	What was the highest level and class he completed?		Is the natural mother of (name) living in this household?	***Copy ID code for the mother***	Is the mother of (name) still alive?	Did the mother of (name) attend school?	What was the highest level and class she completed?	
I D C O D E					LEVEL	CLASS					LEVEL	CLASS
					Primary =1	*1 - 5*					*Primary =1*	*1 - 5*
		Then go to 6		*Yes = 1*	*Lower secondary =2*	*1 - 3*		***Then go to next person***			*Lower secondary =2*	*1 - 3*
				No = 2	*Upper secondary =3*	*1 - 3*					*Upper secondary =3*	*1 - 3*
				>>6	*Vocational train. =4*	*1 - 3*					*Vocational train. =4*	*1 - 3*
	Yes = 1		*Yes = 1*	*DK = 3*	*University/ institute =5*	*1 - 9*	*Yes = 1*		*Yes = 1* *No = 2* ***>>Next***	*Yes = 1* *No = 2>Next person* *DK = 3 >Next person*	*University/ institute =5*	*1 - 9*
	No = 2>>3		*No = 2*	>>6	*Don't know=6*		*No = 2 >>8*				*Don't know =6*	
		ID CODE	>>6		LEVEL	CLASS		ID CODE	***person***		LEVEL	CLASS
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												

III. Education

	1	2	3	4	5	6	7		8	9	10	11		12
I D C O D E	Can you read a letter? *Yes, without difficulty=1* *Yes, but with difficulty=2* *No =3*	Can you write a letter? *Yes, without difficulty=1* *Yes, but with difficulty=2* *No =3*	Have you ever been to school? *Yes = 1* **>> 5** *No = 2*	Which is the main reason why have you never attended school? *Too young = 1* *Too expensive = 2* *No interest = 3* *Had to work = 4* *School too far = 5* *No teachers/ supplies = 6* *Illness = 7* *Language = 8* *Other, specify…. 9* ***Go to next person***	Did you attend preschool (at least one year) before beginning primary school? *Yes = 1* *No = 2*	Are you enrolled in school now? *Yes = 1* *Yes, but on vacation = 2* *No = 3* **>> 9**	What level and class are you enrolled in now or were you enrolled in the last school- LEVEL / CLASS *Preprimary =0* 0 *Primary =1* 1 - 5 *Lower secondary=2* 1 - 3 *Upper secondary=3* 1 - 3 *Vocational train.=4* 1 - 3 *University/ institute =5* 1 - 5	LEVEL / CLASS	What type of school are you attending/ did you attend last school-year? *Public = 1* *Private= 2* *Other = 3* ***Go to 10***	***If 12 years and above - >> 10*** ***If 6 - 11 years:*** Why are you not enrolled in school now? *Completed studies= 1* *Too old = 2* *Too expensive = 3* *No interest = 4* *Work = 5* *School too far = 6* *No teachers/ supplies = 7* *Illness = 8* *Language = 9* *Other, specify…… 10*	In what year did you begin Class 1 of Primary School? YEAR	What is the highest level and class you have completed in school? LEVEL / CLASS *Preprimary =0* 0 *Primary =1* 1 - 5 *Lower secondary=2* 1 - 3 *Upper secondary=3* 1 - 3 *Vocational train.=4* 1 - 3 *University/ institute =5* 1 - 5 LEVEL / CLASS		***If 12 - 24 years and only Primary school*** Why were you not enrolled in school after Primary school? *Too expensive = 1* *No interest = 2* *Work = 3* *School too far = 4* *No teachers/ supplies = 5* *Illness = 6* *Language = 7* *Other, specify……..8*

List the ID codes of all household members that are enrolled in school now or were enrolled last school year

If no household members enrolled in school now or last school year go to IV.

Ask Question 14- 26 for all household members enrolled in school now or last school-year.

ID CODE	14 How much has your household spent on NAME's education in this/the last school year for: ***Include monetary value of in-kind payments*** ***After asking individual amounts, calculate total and ask:*** "So, altogether you have spent ___ kip on (NAME's) education in this/the last school-year. Is that right? ***Probe and reconcile.***								15 Did any people who are not members of the household, such as relatives or friends, pay any of NAME'S educational expenses during the last school year? *Yes = 1* *No = 2* ***If No >>17***	16 How much money did this person (these persons) pay for NAME'S educational expenses during the last school year?	17 How far away from NAME'S home is the school NAME has attended most recently? ***If less than one kilometer put zero***
	A. Tuition and other required fees?	B. Parent association fees?	C. Uniforms and other clothing?	D. Textbooks?	E. Other education materials (exercise books, pens, etc.)	F. Meals, transportation and or lodging?	G. Other expenses (extra classes, optional fees)?	H. TOTAL			
	AMOUNTS IN KIP									AMOUNT IN KIP	KILOMETERS

	18		19	20	21	22	23	24	25	26
	How long does it take NAME		How does NAME go school?	Does NAME have complete set of	Does NAME share these textbooks	How many	Is NAME currently	How many days has NAME'S school been	How many days has	If NAME was absent any days,
I	to go to		*Walk* 1	textbooks for	with other	hours of	attending	open in the past 7	NAME	what was the
D	school?		*Bicycle* 2	his/her use?	students or are	homework	school?	days?	attended	reason?
			Motorcycle 3		they for his/her	does NAME			school in	
C			*Car* 4		exclusive use?	do in a			the past 7	*Agricultural work=1*
O			*Tuc-tuc* 5			typical		***If 0 days***	days?	*Work at house/home =2*
D			*Bus* 6			week?	*Yes = 1*	***>> next***		*Other work =3*
E			*Boat* 7	*Yes, complete=1*	*Shared = 1*		*No = 2*	***person***	*If no absence*	*Illness = 4*
			Animal 8	*No, only some=2*	*Exclusive*		***If NO >>***		*>>next person*	*Family illness/death=5*
			Other, specify 9	*No, none = 3*	*use = 2*		***next***			*Other (specify…) 6*
	HOURS	MINUTES	……			HOURS	***person***	DAYS	DAYS	

IV. Labor force

IV.1. Labour force participation last seven days

All persons 10 years and older

Name ***(Transfer names of all persons in the household 10 years and above)***	ID Code	1 During the past 7 days have you worked on your own account or in a business belonging to you or someone in your household? *Yes = 1* *No = 2*	2 During the past 7 days, have you performed any activity on a farm operated by you or a member of your household? *Yes = 1* *No = 2*	3 During the past 7 days, have you performed any activity for someone who is not living in this household, for example an enterprise, the public sector or any other individual? *Yes = 1* *No = 2*	4 CHECK THE ANSWERS TO Q 1, Q2 AND Q3 *Any Yes =* ***>>IV.2*** *No = 2*	5 Do you have a permanent job even though you did not work in the last 7 days? *Yes = 1* ***>>IV.2*** *No = 2*	6 Have you looked for work in the last 7 days? *Yes = 1* ***>>IV.3*** *No = 2*	7 What is the main reason you did not work in the last 7 days? Student = 1 Housewife/childcare = 2 Too old/retired = 3 Handicapped = 4 Sick/family illness = 5 Waiting for reply/recall by employer = 6 Waiting for busy season = 7 Other, specify…… …… = 8

IV.2 Overview of work in the last 7 days

I would like to ask some questions about the activities you performed in the last 7 days, whether on a farm, in a household business, or for someone else
Exclude own housework (cleaning, washing, childcare etc)

Name	ID CODE	1 What did you do? *USE ONE ACTIVITY PER LINE. REPEAT THE ID FOR ALL THE DIFFERENT ACTIVITIES DONE BY THE SAME PERSON*		2 For how many days in the last 7 days did you do this activity?	3 For how many hours in total in the last 7 days did you do this activity?
		WRITTEN DESCRIPTION	*INDUSTRY CODE*	*DAYS PER WEEK*	*HOURS IN THE WEEK*

IV.3 Main activities in the past 12 months

Name	ID CODE	1							2	3
		Which of the following activities were you engaged in during the last 12 months? Think only of the ***main activity*** you were engaged in each month							Have you been a Buddhist munk/nun in the last 12 months?	How many days did you spend in temple as munk/nun in the last 12 months?
		A. Working, but ***not in farming*** (as paid employee, employer, self-employed or unpaid family worker) *No = 0* *Yes = No. of months*	B. Working in ***farming***, incl fishing and forestry. *No = 0* *Yes = No. of months*	C. Not working but looking for work. *No = 0* *Yes = No. of months*	D. Not working because of studies *No = 0* *Yes = No. of months*	E. Working mainly with household duties (homemaker/ childcare) *No = 0* *Yes = No. of months*	F. Not working because retired or too old *No = 0* *Yes = No. of months*	G. Not working because disabled or long-term ill *No = 0* *Yes = No. of months*	*Yes = 1* *No = 2*	DAYS

VIII. Household assets and possession of durables

1				2	1 (CONT.)				2 (CONT.)
Which of the following goods does this household have access to or own?				If you wanted to sell this/these (ITEM/S) that you own today how much would you receive?	Which of the following goods does this household have acces to or own?				If you wanted to sell this/these (ITEM/S) that you own today how much would you receive?
ID	***Item***	***Access to, but do not own*** ***How many?***	***Own*** ***How many?***	***Amount in KIP***	**ID**	***Item***	***Access to, but do not own*** ***How many?***	***Own*** ***How many?***	***Amount in KIP***
1	Plots of land				17	Agr. equipment			
2	House				18	Tools small and large			
3	Building				19	Boat			
	Transport equipment				20	Fishing net			
4	Vehicle (Car, Van ..-.)				21	Cart			
5	Motor cycle				**TV, radio, phones**				
6	Bicycle				22	Television			
7	Tuk-tuk				23	Radio/ VCD, etc			
	House equipment				24	Telephone			
8	Refrigerator/freezer				25	Mobile phone			
9	Sewing machine				26	Camera			
10	Washing machine					**Other goods**			
11	Vacuum cleaner				27	Satellite disc/connection			
12	Electric rice cooker				18	Computer			
13	Steam rice cooker				29	Air conditioner			
14	Food processor				30	Jewelry			
	Agriculture/businesses				31	Mosquito net			
15	Two-wheeled tractor					Other goods (Specify) ..			
16	Four-wheeled tractor					..-..-..-..-..-..-..-..-..-..-.-			

IX. Housing conditions

1	2	3		4	5	6		7	7b
What is the tenure status of this household? *Owner/purchaser = 1* *Tenant = 2* *In tied accomm. = 3* *Other, specify = 4*	If someone wanted to rent a house like this one how much would she/he have to pay in rent for one year?	What is the major construction material external walls? *Brick =1* *Concrete =2* *Unbaked brick =3* *Wood = 4* *Bamboo = 5* *Tin = 6* *Mud = 7* *Other, specify = 8*		What is the major material of the roof? *Concrete =1* *Wood = 2* *Metal sheets/zinks =3* *Tile = 4* *Grass = 5* *Leaves = 6* *Other, specify = 7*	What is the primary material of the floor? *Marble/ceramic = 1* *Floor tile/cement = 2* *Concrete/brick = 3* *Wood = 4* *Bamboo = 5* *Earth/clay = 6* *Other, specify = 7*	How old is this dwelling? ***If more than 3 years do not require months***		What is the floor area of the house/dwelling unit occupied by your household? ***Do not count kitchen and balconys***	How many rooms are used by the household in this house/dwelling unit? ***Do not count kitchen***
	AMOUNT	FIRST	SECOND			YEARS	MONTHS	SQUARE METER	SQUARE METER

8	9	10	11	12	13	14	15
What is the main source of drinking water in the rainy season? *Piped water in/outside = 1* *Well/borehole protected = 2* *Well/borehole unprotected = 3* *River, dam, lake etc. = 4* *Rain water from tank/jar = 5* *Other, specify = 6*	What is the distance to the drinking water source in the rainy season? ***If in/outside house or in yard near house = 0 meter***	What is the main source of drinking water in the dry season? *Piped water in/outside = 1* *Well/borehole protected = 2* *Well/borehole unprotected = 3* *River, dam, lake etc. = 4* *Rain water from tank/jar = 5* *Other, specify = 6*	What is the distance to the drinking water source in the dry season?	What kind of latrine is mainly used? *Modern toilet = 1* *Normal toilet = 2* *Dry toilet = 3* *Other, specify = 4* *None = 5*	What kind of kitchen does this household mainly use? *Inside the house = 1* *Outside roofed = 2* *Outside unroofed = 3* *Other specify = 4*	What is the household's main source of energy for cooking? *Electricity = 1* *Paraffin = 2* *Wood = 3* *Coal = 4* *Charcoal = 5* *Sawdust = 6* *Gas = 7* *Other, specify = 8*	What is the household's main source of energy for lighting? *Electricity from public network=1* *El. from generator=2* *El. from battery=3* *Kerosene lamp=4* *Candle=5* *Other, specify = 6*
	METERS		METERS				

XV. Income and transfers (Last week)

1 Has anyone in your household during the last month received any income, transfer or remittances in cash or in kind? Which person and how much?

Name	ID Code	**Main income** *Do **NOT** include income from agricultural production or household business*			**Property income**				**Transfer and other benefits**					
		Wages, salaries in cash	Social security	Wages, salaries in kind	Interest and royalties	Dividends	Other rent	Land rent	Pension and life insurance	Remittance/ gifts in cash fr Laos	Remittance/ gifts in cash fr abroad	Remittance/ gifts in kind fr Laos	Remittance/ gifts in kind fr abroad	Other current tranfers Specify… .....
Item nr		800	801	802	803	804	805	806	807	808	809	810	811	812
		Amount in KIP												

Module 5: Village characteristics

No.	Question	Alternative Answer	Answer code	Skip to
I	**Organizations, services**			
			Yes ***No***	
1	Are there any of the these organizations in the village ……	*1 = Party?*	1 2	
		2 = State power?	1 2	
		3 = Lao Women's union?	1 2	
		4 = Youth league?	1 2	
		5 = Trade union?	1 2	
		6 = Village community?	1 2	
		7 = Pupils parent committee?	1 2	
		8 = Other? (Specify) ..-..-..-..-.. ..-..-..-..-..-..-..-..-..-..-..-..-..-	1 2	
2	Which of these public services are available in this village …..	*1 = Trade Union?*	1 2	
		2 = Rice bank?	1 2	
		3 = Cattle bank?	1 2	
		4 = Credit sources of	1 2	
		financial institution?	1 2	
		5 = Farmers group's shop?	1 2	
		6 = Others?	1 2	
3	How many persons live in this village?	*Number of people*	……………..	
		Of which: females	....	
4	How many persons were born in this village during the last 12 months, that is from ……… to ……..	*Number born*	……………..	
5	How many persons of this village died during the last 12 months?	*Number died*	………………	
6	How many persons have moved in to and moved out from this village in the past 12 months?	*Number moved in*	………………	
		Number moved out	………………	
7	In which type of geographical area is this village situated?	*1 = Lowland*	1	
		2 = Upland	2	
	<u>*Definitions:*</u>	*3 = Both lowland and upland*	3	
8	Now a few questions about crime. Is …… a major, minor or no problem in the village?	*Problem:*	*Major Minor No*	
		1 = Burglery	1 2 3	
		2 = Robbery	1 2 3	
		3 = Fighting, brawls	1 2 3	
	ASK ABOUT ALL ALTERNATIVES	*4 = Violence against women*	1 2 3	
		5 = Killings, murders	1 2 3	
		6 = Illegal abortion	1 2 3	
		7 = Drugs (cultivate, sell, use)	1 2 3	
		8 = Other crimes	1 2 3	

II. General economic conditions						
			First	**Second**	**Third**	
1	What are the three main sources of income for people living in this village? LIST IN ORDER OF IMPORTANCE	*1=Agriculture, crops* *2=Agriculture, livestock* *3=Forestry* *4=Fishing* *5=Industry/handicraft* *6=Trade* *7=Construction* *8=Other services*				
2	According to you, has the living standard of people in this village improved or declined compared to 5 years ago?	*1 = Improved* *2 = Declined* *3 = The same*	1 2 3			
3	Are there any current development projects in this village? *Definition:*	*1 = Yes* *2 = No*	1 2			GO TO III1
			Yes	***No***		
4	What kinds of development project? With ……..? (ASK ABOUT ALL ALTERNATIVES)	*1 = Crops?* *2 = Irrigation?* *3 = Forestry?* *4 = Commerce?* *5 = Transport?* *6 = Handicraft?* *7 = Education?* *8 = Health?* *9 = Water and sanitation?* *10 = Other? Specify.....*	1 1 1 1 1 1 1 1 1 1	2 2 2 2 2 2 2 2 2 2		
5	Is this/are these project(s) funded by ……. *(Projects can have move than one fund. Different projects can have different funds).*	*1=The village?* *2 = Bank loans?* *3 = Government budget?* *4 = Int. org loans/grants?* *5 = Other? Specify.....*	1 1 1 1 1	2 2 2 2 2		

III. Land and land use in the village				
1	How big is the total land area in this village ?	*Total area in hectares:*	..... Ha	
2	What is the total agricultural land in the village?	*No agricaltural land:* *Area in hectares:*	1 .....Ha	Go to IV
3	How much is grazing land? Forest land? Other land?	*Area of grazing land:* *Area of forest land:* *Area of other land:*	.....Ha .....Ha .....Ha	
	Make sure Q2 and Q3 sum up to Q1!			
No.	***Question***	***Alternative Answer***	***Answer code***	***Skip to***
4	How much of the agricultural land was irrigated in the last dry season?	*Area of irrigated land:*	.....Ha	
5	How much of the agricultural land is located in lowland and upland respectively?	*Percent in lowland:* *Percent in upland:*	..... Percent ..... Percent	
6	Has there been any land and forest allocation program implemented up to now in this village?	*1 = Yes* *2 = No*	1 2	

IV. Infrastructure				
	Interviewer observe:			
1	Has this village access to road?	*1 = Yes*	1	GO TO 3
	Definition:	*2 = No*	2	
2	From this village how far is it to the nearest road?	*Distance:*	…… KM	GO TO 7
3	Is it possible to reach this village by truck (car) in dry season ?	*1= Yes*	1	
		2= No	2	
4	Is it possible to reach this village by truck (car) in rainy season ?	*1= Yes*	1	
		2= No	2	
		If access to road used all around the year:		GO TO 5
		If no access to road used all around the year:		GO TO 7
5	Is there any scheduled passsenger transport stopping in this village ?	*1= Yes*	1	
		2= No	2	GO TO 6
6	How often is this public transport available according to its schedule?	*Time per day:*	……/Day	GO TO 8
		Time per week:	……/Week	GO TO 8
		Time per month:	……/Month	GO TO 8
7	How far do the villagers have to go to catch a public transport (that runs all year around)?	*Distance:*	…… KM	
8	How far away is the DISTRICT administrative headquarters?	*In village:*	1	GO TO 10
		Distance:	…… KM	
9	How long does it normally take to get there by the most common way? In dry season?		…… Hours	
		Time in dry season:	…… Minutes	
	In rainy season?		…… Hours	
		Time in rainy season:	…… Minutes	
10	How far away is the PROVINCE administrative headquarters?	*In village:*	1	GO TO 12
		Distance:	…… KM	
11	How long does it normally take to get there by the most common way? In dry season?		…… Hours	
		Time in dry season:	…… Minutes	
	In rainy season?		…… Hours	
		Time in rainy season:	…… Minutes	

No.	*Question*	*Alternative Answer*	*Answer code*	*Skip to*
12	Is this village connected to an electric network?	*1= Yes* *2= No*	1 2	 GO TO 14
13	Does this village get electricity from …….		***Yes*** ***No***	
		1= Government network?	1 2	
		2= Government generator?	1 2	
		3= Private generator?	1 2	
		4= Battery/Dynamo?	1 2	
		5= Other? (Specify)	1 2	
		..-.		
14	Is there safe water in this village ?	*1= Yes* *2= No*	1 2	
15	Is there a permanent (daily) market in this village ?	*1= Yes* *2= No*	1 2	GO TO 18
16	Is there a periodical market in this village ?	*1= Yes* *2= No*	1 2	 GO TO 18
17	How often is this periodical market open?	*Times per month:*	..... Times	
18	How far is the nearest post office?	*In village:* *Distance:*	1 ..... KM	

V. Education				
1	How many children in school age are there in this village?	*Children 6 - 10:* *Children 11 - 15:*	…….. ……..	
2	How many girls and boys in the village are currently enrolled in school? (In village or elsewhere)	*Girls 6-10:* *Boys 6- 10:* *Girls 11-15:* *Boys 11- 15:*	……. ……. ……. …….	
			Yes ***No***	
3	Is there a …….. located in this village? ASK FOR ALL ALTERNATIVES	*1= Primary school?* *2= Lower secondary school?* *3= Upper secondary school?* *4= Technical school?* *5= Institute?* *6= University?*	1 2 1 2 1 2 1 2 1 2 1 2	
			If primary school: GO TO 4 If no primary school: GO TO 9	
4	Are any teacher textbooks available in the primary school classes? Definition:	*1= Yes* *2= No*	1 2	
5	How many permanent teachers are working in this school ?	*Number of teachers:*	…….. Pers.	
6	Is this school operating regularly?	*1= Yes* *2= No*	1 2	
7	Is this school operating twin classes?	*1= Yes* *2= No*	1 2	
8	Is this school operating shift classes?	*1= Yes* *2= No*	1 2	GO TO 10 GO TO 10
No.	***Question***	***Alternative Answer***	***Answer code***	***Skip to***
9	How far is the nearest primary school attended by children of this village?	*Distance:*	....…..… KM	
10	How far is the nearest secondary school attended by children of this village?	*In village:* *Distance:*	1 ....…..… KM	
11	Has there been any adult literacy program in this village in the last 5 years?	*1 = Yes* *2 = No*	1 2	

VI. Health care				
1	Is there a Medicine Bag in the village?	*1= Yes* *2= No*	1 2	
2	Is there a Traditional Birth Attendant (TBA) in this village ?	*1= Yes* *2= No*	1 2	
3	Is there a traditional healer in this village ?	*1= Yes* *2= No*	1 2	
4	Is there a functioning community health worker living in this village ?	*1= Yes* *2= No*	1 2	
5	Is there a medical practitioner/trained nurse living in this village ?	*1= Yes* *2= No*	1 2	GO TO 7
6	Do they take care of the people in the village?	*1= Yes* *2= No*	1 2	
7	How far away is the nearest hospital?	*In village:* *Distance:*	1 …….…….. KM	GO TO 9
8	How long does it normally take to reach any hospital?	*Time for travel:*	…..…….. Hours …… Minutes	
9	Is it a government or private hospital?	*1 =Government* *2 = Private*	1 2	
10	Is there a dispensary or health post in this village?	*1 = Yes* *2 = No*	1 2	GO TO 13
11	How far away is the nearest dispensary or health post located?	*Distance:*	…….…….. KM	
12	How long does it normally take to reach the nearest dispensary/health post?	*Time per hours:* *Time per minutes:*	…… Hours …… Minutes	
13	Is there a pharmacy located in this village ?	*1= Yes* *2= No*	1 2	GO TO 15
14	Is it a licensed pharmacy ?	*1= Yes* *2= No*	1 2	

Appendix 5: Additional Information on Lao Expenditure and Consumption Survey

1. Number of sample in the survey

Target	LECS 1 (1992/93)	LECS 2 (1997/98)	LECS 3 (2002/03)	LECS 4 (2007/08)
Villages	147	450	540	518
Households	2,937	8,882	8,092	8,296

2. Number of sample village in each stratum

Code	Province	Urban	Rural with road access	Rural without road access	Total
1	Vientiane Capital	33	15	0	48
2	Phongsaly	3	8	13	24
3	Luangnamtha	5	13	5	23
4	Oudomxay	5	13	3	21
5	Bokeo	4	15	5	24
6	Luangprabang	5	19	10	34
7	Huaphan	5	27	2	34
8	Xayabury	10	24	1	35
9	Xiengkhuang	5	17	3	25
10	Vientiane	17	21	0	38
11	Borikhamxay	3	16	4	23
12	Khammuane	5	28	1	34
13	Savannakhet	10	36	2	48
14	Saravane	4	30	2	36
15	Sekong	5	8	4	17
16	Champasack	9	17	10	36
17	Attapeu	2	12	4	18
	Total	130	319	69	518

3. Household characteristic variables include the followings.
    a. Age
    b. Gender
    c. Family size
    d. Main sources of income
    e. Education
    f. Occupation
    g. Housing conditions
    h. Household business
    i. Agriculture practices

The above household characteristic variables are drawn from various questions from the Module 2. Those include questions in I, II, III, IX, and XV (Appendix 4).

4. Consumption variable

Household consumption is calculated from the questions in Module 1 (Appendix 4). Field survey enumerators stayed with the sample household for a month to collect all data on expenditure and consumption of own food. All daily transactions were captured in a diary and classified by the type of consumption. Different groups of households were surveyed at different months across a year. This was to ensure that the results on consumption could reflect the seasonality in household consumption. Both quantity and value were recorded for each transaction. The consumer price index was used to deflate transactions which did not have quantity (for example, expenses in education) in order to obtain the real value of the transactions. Items included in the consumption variable are the following:

    a. Food expenditure
    b. Own-food consumption
    c. Clothing
    d. Housing
    e. Household goods
    f. Healthcare expense
    g. Transport and communication expense
    h. Education expenses
    i. Recreation and leisure

j. Alcohol and cigarette expense
k. Personal goods

5. Durable goods

The data on durable goods is drawn from question VIII in Module 2. Variables on durable goods include the following:

a. Furniture
    Beds
    Tables and chairs
    Cupboards
    Dining room suites
    Lounge suites
    Desks and sideboards
    Stools and benches
    Carpets
    Lamps and pictures
    Others, specify
b. Household appliances
    Stove gas or electric
    Refrigerator/deep freezer
    Iron
    Air conditioner
    Electric fan
    Sewing machine
    Washing machine
c. Radio, TV, camera, etc.
    Radio or radio cassettes
    Television sets
    Parabola antenna
    Video recorders
    Cameras
    Musical instruments
    Computer and computer equipment
    Cellular phone (handsets)
    Other equipment, specify
d. Watches and jewelry
e. Agriculture tools

6. Asset variable

Data on asset is drawn from Question VIII in Module 2 (Appendix 4). Households are asked to provide the quantity and value of their real asset in nominal terms. The data is then deflated by the consumer price index to obtain the real value. Asset is the sum of the value of transportation, land, houses, and buildings. The value of each type of asset is linked to each respective question as below.

- Transportation (car, motorcycle, bicycles, etc) in Question VIII (4, 5, 6, 7)
- Land in Question VIII (1)
- Houses in Question VIII (2)
- Buildings in Question VIII (3)

7. Accessibility to markets and major public services

Data on accessibility to markets and major public services were collected from Village Questionnaire (Module 5). Field survey enumerators interviewed village chiefs about village characteristics and socioeconomic information. Specific data on distance to roads, markets, and other public services are drawn from Question IV (2, 10, 8, 18), Question V (9, 10), and Question VI (7). The variable "access" is the average distance of the followings.

a. Distance to market
b. Distance to road
c. Distance to bus station
d. Distance to school
e. Distance to hospital

Appendix 6: Data from Inequality Analysis in Chapter 8

Table 6.A: Real per capita household consumption and asset value by provinces, 2002/03 and 2007/08

	Consumption		Asset	
	2002/03	2007/08	2002/03	2007/08
Vientiane Capital	247,996	228,150	109,100,000	788,000,000
Phongsaly	99,919	117,347	16,458,490	11,200,000
Luangnamtha	134,615	140,751	14,773,230	35,300,000
Oudumxay	114,565	137,535	12,945,077	17,500,000
Bokeo	152,756	135,151	8,030,963	34,400,000
Luangprabang	141,566	158,869	6,873,763	37,800,000
Huaphan	100,412	108,674	9,173,937	15,200,000
Xayabury	164,277	220,881	23,777,150	54,700,000
Xiengkhuang	134,668	134,370	19,913,585	32,100,000
Vientiane	155,991	150,546	29,457,273	56,200,000
Borikhamxay	157,897	166,868	32,528,289	51,700,000
Khammuane	160,560	140,098	27,297,353	30,800,000
Savannakhet	153,434	157,798	34,532,686	42,600,000
Saravane	101,388	127,879	16,999,124	25,600,000
Sekong	106,144	117,082	9,705,307	15,600,000
Champasack	161,126	196,770	16,448,353	36,300,000
Attapeu	114,538	162,621	9,584,550	25,200,000

Source: Calculated by the author using raw data from LECS3 and LECS4

Table 6.B: Inequality in real consumption by provinces

Province	Gini		Theil L		Theil T	
	2002/03	2007/08	2002/03	2007/08	2002/03	2007/08
Vientiane Capital	0.36	0.38	0.21	0.24	0.21	0.27
Phongsaly	0.22	0.30	0.08	0.15	0.08	0.17
Luangnamtha	0.25	0.30	0.10	0.15	0.10	0.18
Oudumxay	0.25	0.32	0.10	0.17	0.10	0.19
Bokeo	0.29	0.29	0.15	0.14	0.15	0.15
Luangprabang	0.32	0.32	0.16	0.16	0.16	0.18
Huaphan	0.29	0.28	0.13	0.13	0.13	0.16
Xayabury	0.35	0.42	0.20	0.30	0.20	0.44
Xiengkhuang	0.31	0.38	0.17	0.24	0.17	0.28
Vientiane	0.32	0.32	0.16	0.17	0.16	0.19
Borikhamxay	0.28	0.34	0.12	0.19	0.12	0.27
Khammuane	0.29	0.32	0.14	0.17	0.14	0.23
Savannakhet	0.31	0.34	0.16	0.19	0.16	0.22
Saravane	0.27	0.30	0.12	0.15	0.12	0.17
Sekong	0.31	0.38	0.16	0.24	0.16	0.25
Champasack	0.30	0.29	0.14	0.13	0.14	0.15
Attapeu	0.29	0.32	0.14	0.17	0.14	0.20

Source: Calculated by the author using raw data from LECS3 and LECS4

Table 6.C: Inequality in real asset by provinces

	Gini		Theil L		Theil T	
Province	2002/03	2007/08	2002/03	2007/08	2002/03	2007/08
Vientiane Capital	0.75	0.93	1.52	2.44	1.15	4.21
Phongsaly	0.83	0.69	1.77	1.14	1.99	0.97
Luangnamtha	0.75	0.65	1.47	1.08	1.14	0.78
Oudumxay	0.86	0.74	2.14	1.46	2.12	1.09
Bokeo	0.73	0.59	1.39	0.71	1.09	0.77
Luangprabang	0.8	0.71	1.57	1.22	1.54	0.97
Huaphan	0.78	0.54	1.46	0.72	1.47	0.57
Xayabury	0.72	0.62	1.36	0.81	1.1	0.77
Xiengkhuang	0.74	0.6	1.55	0.89	1.16	0.71
Vientiane	0.66	0.61	1.11	0.74	0.84	1.03
Borikhamxay	0.71	0.66	1.24	0.85	1.15	0.97
Khammuane	0.74	0.66	1.3	0.87	1.28	1.22
Savannakhet	0.76	0.56	1.51	0.68	1.75	0.59
Saravane	0.89	0.56	2.24	0.65	3.32	0.65
Sekong	0.72	0.6	1.32	0.79	1.21	0.66
Champasack	0.72	0.49	1.2	0.49	1.12	0.41
Attapeu	0.75	0.58	1.36	0.72	1.27	0.68

Source: Calculated by the author using raw data from LECS3 and LECS4

Table 6.D: Committed FDI by provinces (US$)

Province	1998 to 2002	2003 to 2007
Vientiane Capital	130,000,000	1,200,000,000
Phongsaly	-	16,000,000
Louangnamtha	5,000,000	26,000,000
Oudomxai	548,370	40,000,000
Bokeo	-	130,000,000
Louangphabang	1,500,000	220,000,000
Houaphan	4,700,000	32,000,000
Xaignabouly	1,400,000	58,000,000
Xiangkhouang	1,900,000	11,000,000
Vientiane	8,300,000	140,000,000
Bolikhamxai	1,300,000	20,000,000
Khammouan	6,100,000	78,000,000
Savannakhet	9,500,000	420,000,000
Salavan	32,000,000	89,000,000
Xekong	-	22,000,000
Champasak	18,000,000	110,000,000
Attapeu	4,100,000	5,700,000

Source: Calculated by the author using raw data from LECS3 and LECS4

Table 6.E: Household real per capita household consumption and asset value by districts, 2002/03 and 2007/08

District ID	District name	Household consumption		Household asset	
		2002/03	2007/08	2002/03	2007/08
101	Chanthabouri	223,273	246,552	163,200,000	596,000,000
102	Sikhottabong	190,229	266,123	67,527,771	4,660,000,000
103	Xaisettha	222,202	251,618	111,500,000	496,000,000
104	Sisattanak	233,069	268,880	213,300,000	111,000,000
105	Naxaythong	171,314	193,553	46,045,161	102,000,000
106	Xaithani	219,752	200,863	95,497,088	159,000,000
107	Hatxayfong	203,786	218,147	94,845,426	77,800,000
108	Sangthong	109,439	129,188	133,300,000	41,000,000
109	Pak-Ngum	202,627	253,477	50,239,688	82,200,000
201	Phongsaly	110,062	152,872	12,788,634	16,100,000
202	Mai	64,509	92,811	3,371,833	8,747,152
203	Khoa	99,990	78,154	3,505,367	3,081,682
204	Samphan	95,489	81,098	1,660,333	1,831,476
205	Boun-Nua	106,959	144,229	72,888,158	21,800,000
206	Gnot-Ou	103,756	151,304	9,348,988	17,900,000
207	Boun-Tai	113,395	97,918	388,250	4,248,588
301	Namtha	151,151	167,518	14,709,416	37,000,000
302	Sing	151,472	139,643	30,711,219	44,900,000
303	Long	137,969	132,195	4,088,368	23,400,000
304	Viangphoukha	162,171	131,655	15,411,167	28,000,000
305	Nale	84,157	98,095	1,955,281	5,875,226
401	Xai	130,461	147,254	31,283,268	34,000,000
402	La	126,082	211,314	5,243,313	21,200,000
403	Namo	90,165	109,169	4,756,844	10,300,000
404	Nga	104,580	99,732	12,779,500	11,300,000
405	Beng	122,483	164,166	8,909,125	22,800,000
406	Houn	89,050	119,813	1,124,063	3,502,283
407	Pakbeng	108,979	88,426	1,630,250	1,189,710
501	Houayxay	165,727	145,021	13,317,520	40,200,000
502	Tonpheung	135,806	155,684	4,973,081	42,700,000
503	Meung	142,162	128,437	4,766,000	21,700,000
504	Pha-Oudom	112,770	85,315	3,120,292	10,300,000
505	Paktha	168,487	135,206	5,398,125	24,300,000
601	Luangphrabang	185,895	199,658	14,676,875	87,900,000
602	Xiang-Ngeun	129,715	165,384	3,802,917	12,900,000
603	Nan	175,338	142,740	14,033,333	28,000,000
604	Pak-Ou	122,579	263,222	3,919,710	11,700,000
605	Nambak	142,149	145,214	4,571,150	21,600,000
606	Ngoy	112,290	108,557	2,031,999	3,642,293

607	Pakxeng	99,188	115,645	1,224,620	3,627,648
608	Phonxai	102,297	184,380	1,186,125	5,990,880
609	Chomphet	129,165	125,236	2,748,708	48,000,000
610	Viengkham	76,893	122,646	1,743,396	8,743,659
611	Phoukhoun	178,151	209,034	15,556,250	19,300,000
701	Xam-Nua	140,906	126,725	13,162,604	30,900,000
702	Xiangkho	103,255	119,593	6,703,422	16,900,000
703	Viangthong	97,040	132,850	17,137,324	15,100,000
704	Viangxai	112,445	107,862	8,426,333	11,300,000
705	Houamuang	92,676	84,112	6,512,942	11,100,000
706	Xam-Tai	75,222	70,764	2,254,881	4,175,043
707	Sopbao	140,336	123,352	11,339,516	15,900,000
708	Et	97,665	138,637	4,212,188	10,600,000
801	Xaignabouly	138,941	163,567	17,035,000	31,400,000
802	Khop	158,913	110,491	7,130,550	26,500,000
803	Hongsa	160,064	169,489	8,617,615	19,200,000
805	Ngeun	251,744	149,489	12,186,469	30,300,000
806	Phiang	150,685	159,235	10,345,111	27,100,000
807	Paklai	146,449	313,237	27,931,359	61,800,000
808	Kenthao	203,172	331,420	43,113,318	124,000,000
809	Boten	178,168	420,664	56,545,781	111,000,000
901	Pek	148,140	183,055	38,579,514	56,600,000
902	Kham	115,810	116,512	16,189,083	31,900,000
903	Nonghet	85,015	88,299	782,469	5,147,616
904	Khoun	113,695	128,075	23,080,333	27,100,000
905	Mok-Mai	115,607	123,900	2,911,813	18,600,000
906	Phoukout	166,782	119,252	68,749,375	53,100,000
1001	Phonhong	213,830	189,960	43,708,604	51,400,000
1002	Thourakhom	185,864	169,463	37,660,263	59,700,000
1003	Keo-Oudom	190,293	158,634	21,369,563	33,900,000
1004	Kasi	116,544	160,483	12,249,071	25,300,000
1005	Vangvieng	152,875	143,430	29,492,500	121,000,000
1006	Fuang	150,979	148,193	35,239,300	68,000,000
1007	Xanakham	161,335	164,118	19,832,344	38,800,000
1008	Met	169,869	102,542	26,907,563	31,700,000
1010	Hinheup	143,898	146,727	23,144,331	34,100,000
1011	Hom	101,296	62,317	8,863,563	10,400,000
1101	Pakxan	163,640	207,560	29,166,274	49,900,000
1102	Thaphabat	169,365	166,751	138,900,000	60,000,000
1103	Pakkading	141,843	174,635	14,291,180	23,000,000
1104	Borikhan	97,162	124,887	1,542,250	6,963,150
1105	Khamkeut	96,485	105,161	16,239,027	21,000,000
1106	Viangthong	119,365	100,116	18,668,416	31,500,000

1201	Thakhek	163,974	174,545	59,004,346	64,500,000
1202	Mahaxai	148,747	135,488	13,134,583	12,700,000
1203	Nongbok	149,257	155,245	21,172,203	15,800,000
1204	Hinboun	121,192	127,550	8,795,010	16,100,000
1205	Gnommalat	107,167	113,385	2,874,208	10,200,000
1206	Boualapha	99,331	80,697	11,180,956	11,200,000
1207	Nakay	99,794		26,058,000	
1208	Xebangfai	96,013	158,684	24,508,104	24,600,000
1209	Xaybuathong	108,862	104,279	7,993,438	11,000,000
1301	Kaysone PHOMVIHANE	185,415	186,094	45,847,769	53,100,000
1302	Outhoumphon	114,864	222,128	27,941,645	48,000,000
1303	Atsaphangthong	103,920	105,297	11,473,438	38,700,000
1304	Phin	115,284	164,606	19,056,125	28,200,000
1305	Xepon	82,964	100,637	2,505,219	6,180,241
1306	Nong	124,014	88,706	18,931,875	15,400,000
1307	Thapangthong	119,742	93,334	10,407,000	17,100,000
1308	Songkhon	145,551	155,558	26,710,706	32,000,000
1309	Champhon	127,787	164,561	22,845,643	38,000,000
1310	Xonbouri	73,897	93,149	20,714,375	10,100,000
1311	Xaibouri	100,809	131,499	25,819,125	45,600,000
1312	Vilabouri	90,773	105,090	6,699,625	8,258,490
1313	Atsaphangthong	118,780	131,535	8,786,583	11,400,000
1314	Xaiphouthong	128,739	142,811	28,704,006	46,800,000
1401	Saravan	101,678	118,895	16,601,663	22,500,000
1402	Ta-Oy	82,085	71,693	1,554,000	10,500,000
1403	Toumlan	87,551	87,402	9,293,500	5,871,399
1404	Lakhonpheng	117,640	142,282	17,742,219	19,800,000
1405	Vapi	91,896	189,792	17,409,500	41,300,000
1406	Khongxedon	130,010	179,266	27,755,456	49,700,000
1407	Laongam	108,082	128,177	22,757,975	32,400,000
1408	Samouay	83,744	39,954	24,556,625	6,641,428
1501	Lamam	149,537	138,547	19,564,709	33,600,000
1502	Karum	72,339	60,103	1,363,000	1,799,118
1503	Dakchung	71,336	112,934	2,060,180	4,699,988
1504	Thateng	134,265	128,058	15,114,754	19,800,000
1601	Pakxe	201,700	217,395	51,375,872	43,300,000
1602	Xanasomboun	188,997	212,839	5,472,708	23,200,000
1603	Bachiangchareunsouk	141,003	188,746	6,406,375	27,700,000
1604	Pakxong	245,051	239,712	14,364,844	54,400,000
1605	Pathoumphon	103,670	148,474	4,269,896	20,600,000
1606	Phonthong	170,519	208,744	13,033,167	36,300,000
1607	Champasak	149,658	193,989	19,484,348	34,500,000

1608	Soukhouma	167,768	179,809	6,760,875	22,400,000
1609	Mounlapamok	154,128	208,883	10,778,813	33,700,000
1610	Khong	121,701	148,356	6,694,313	17,000,000
1701	Xaisettha	133,578	186,040	10,167,125	21,800,000
1702	Samakkhixai	121,773	171,060	16,250,396	31,100,000
1703	Sanamxai	114,131	126,674	4,747,578	14,500,000
1704	Sanxai	78,624	98,515	1,610,988	3,073,308
1705	Phouvong	97,880	205,471	4,601,750	33,100,000
1801	Saysomboun	138,557	99,091	5,167,000	38,700,000
1802	Phoon	140,526	103,251	13,647,375	14,300,000
1803	Thathom	112,315	111,275	4,985,250	12,400,000

Note: The number of the sample in each district is quite small. Although weight was used in the estimation, the results at district level should be used with caution.

Source: Calculated by the author using raw data from LECS and LECS4

Table 6.F: Inequality in consumption and asset by districts

		Gini in real consumption		Inequality in asset in 2007/08	
District	District name	2002/03	2007/08	Gini	Thiel T
101	Chanthabouri	0.32	0.43	0.40	0.27
102	Sikhottabong	0.35	0.39	0.40	0.27
103	Xaisettha	0.38	0.35	0.38	0.25
104	Sisattanak	0.36	0.51	0.51	0.65
105	Naxaythong	0.32	0.35	0.34	0.23
106	Xaithani	0.40	0.32	0.34	0.19
107	Hatxayfong	0.34	0.32	0.34	0.20
108	Sangthong	0.25	0.28	0.27	0.12
109	Pak-Ngum	0.22	0.30	0.29	0.15
201	Phongsaly	0.23	0.34	0.32	0.20
202	Mai	0.24	0.21	0.22	0.11
203	Khoa	0.17	0.24	0.23	0.09
204	Samphan	0.21	0.15	0.17	0.04
205	Boun-Nua	0.17	0.22	0.23	0.10
206	Gnot-Ou	0.22	0.22	0.22	0.09
207	Boun-Tai	0.23	0.14	0.18	0.06
301	Namtha	0.24	0.33	0.30	0.17
302	Sing	0.27	0.32	0.33	0.19
303	Long	0.23	0.24	0.22	0.09
304	Viangphoukha	0.20	0.25	0.27	0.12
305	Nale	0.13	0.20	0.24	0.09
401	Xai	0.26	0.37	0.42	0.35
402	La	0.22	0.27	0.27	0.13
403	Namo	0.19	0.23	0.24	0.10
404	Nga	0.20	0.18	0.17	0.05
405	Beng	0.23	0.18	0.19	0.07
406	Houn	0.23	0.27	0.32	0.18
407	Pakbeng	0.12	0.13	0.14	0.04
501	Houayxay	0.31	0.27	0.29	0.14
502	Tonpheung	0.21	0.25	0.26	0.11
503	Meung	0.33	0.17	0.18	0.05
504	Pha-Oudom	0.22	0.28	0.33	0.31
505	Paktha	0.33	0.29	0.31	0.18
601	Luangphrabang	0.40	0.26	0.28	0.13
602	Xiang-Ngeun	0.27	0.29	0.30	0.16
603	Nan	0.25	0.22	0.22	0.08
604	Pak-Ou	0.20	0.38	0.32	0.21
605	Nambak	0.19	0.27	0.29	0.14
606	Ngoy	0.25	0.22	0.23	0.08

607	Pakxeng	0.29	0.31	0.36	0.33
608	Phonxai	0.17	0.36	0.40	0.28
609	Chomphet	0.20	0.23	0.24	0.09
610	Viengkham	0.19	0.29	0.38	0.31
611	Phoukhoun	0.25	0.33	0.34	0.19
701	Xam-Nua	0.32	0.32	0.40	0.32
702	Xiangkho	0.21	0.21	0.22	0.08
703	Viangthong	0.25	0.32	0.37	0.29
704	Viangxai	0.16	0.17	0.19	0.06
705	Houamuang	0.21	0.22	0.22	0.08
706	Xam-Tai	0.31	0.22	0.23	0.10
707	Sopbao	0.25	0.20	0.20	0.06
708	Et	0.19	0.37	0.38	0.27
801	Xaignabouly	0.30	0.31	0.33	0.18
802	Khop	0.36	0.17	0.20	0.08
803	Hongsa	0.36	0.34	0.33	0.30
805	Ngeun	0.52	0.36	0.33	0.18
806	Phiang	0.26	0.29	0.30	0.14
807	Paklai	0.35	0.47	0.50	0.61
808	Kenthao	0.32	0.36	0.35	0.22
809	Boten	0.32	0.59	0.64	1.16
901	Pek	0.32	0.40	0.41	0.30
902	Kham	0.27	0.31	0.32	0.18
903	Nonghet	0.35	0.39	0.36	0.21
904	Khoun	0.23	0.31	0.31	0.16
905	Mok-Mai	0.25	0.34	0.36	0.26
906	Phoukout	0.24	0.16	0.16	0.04
1001	Phonhong	0.38	0.29	0.29	0.13
1002	Thourakhom	0.28	0.35	0.37	0.30
1003	Keo-Oudom	0.25	0.25	0.29	0.14
1004	Kasi	0.23	0.32	0.27	0.13
1005	Vangvieng	0.21	0.23	0.27	0.12
1006	Fuang	0.32	0.34	0.35	0.24
1007	Xanakham	0.29	0.28	0.28	0.14
1008	Met	0.31	0.23	0.25	0.12
1009	Viengkham	0.23	0.22	0.23	0.09
1010	Hinheup	0.36	0.25	0.26	0.11
1011	Hom	0.15	0.19	0.20	0.06
1101	Pakxan	0.24	0.36	0.43	0.47
1102	Thaphabat	0.29	0.23	0.26	0.12
1103	Pakkading	0.31	0.29	0.31	0.21
1104	Borikhan	0.11	0.17	0.17	0.04
1105	Khamkeut	0.21	0.23	0.24	0.12

1106	Viangthong	0.23	0.22	0.24	0.12
1201	Thakhek	0.27	0.37	0.41	0.37
1202	Mahaxai	0.30	0.24	0.29	0.19
1203	Nongbok	0.32	0.29	0.32	0.22
1204	Hinboun	0.23	0.20	0.20	0.07
1205	Gnommalat	0.29	0.28	0.28	0.13
1206	Boualapha	0.24	0.14	0.15	0.04
1208	Xebangfai	0.23	0.40	0.42	0.42
1209	Xaybuathong	0.22	0.18	0.19	0.06
1301	Kaysone PHOMVIHANE	0.28	0.30	0.30	0.15
1302	Outhoumphon	0.24	0.44	0.41	0.36
1303	Atsaphangthong	0.21	0.24	0.27	0.13
1304	Phin	0.22	0.34	0.33	0.22
1305	Xepon	0.22	0.24	0.23	0.09
1306	Nong	0.29	0.15	0.14	0.03
1307	Thapangthong	0.34	0.26	0.27	0.12
1308	Songkhon	0.32	0.23	0.27	0.15
1309	Champhon	0.28	0.32	0.29	0.17
1310	Xonbouri	0.31	0.13	0.15	0.04
1311	Xaibouri	0.27	0.27	0.28	0.14
1312	Vilabouri	0.21	0.29	0.29	0.13
1313	Atsaphangthong	0.38	0.38	0.38	0.33
1314	Xaiphouthong	0.26	0.33	0.29	0.15
1401	Saravan	0.27	0.24	0.28	0.14
1402	Ta-Oy	0.16	0.15	0.17	0.06
1403	Toumlan	0.24	0.19	0.20	0.06
1404	Lakhonpheng	0.26	0.25	0.31	0.19
1405	Vapi	0.25	0.31	0.32	0.17
1406	Khongxedon	0.34	0.32	0.31	0.17
1407	Laongam	0.19	0.22	0.23	0.08
1408	Samouay	0.17	0.18	0.19	0.06
1501	Lamam	0.30	0.37	0.41	0.28
1502	Karum	0.16	0.19	0.18	0.05
1503	Dakchung	0.23	0.47	0.48	0.42
1504	Thateng	0.23	0.23	0.24	0.10
1601	Pakxe	0.27	0.32	0.30	0.15
1602	Xanasomboun	0.32	0.27	0.28	0.14
1603	Bachiangchareunsouk	0.21	0.28	0.29	0.15
1604	Pakxong	0.28	0.25	0.27	0.14
1605	Pathoumphon	0.24	0.27	0.30	0.15
1606	Phonthong	0.25	0.26	0.25	0.10
1607	Champasak	0.25	0.26	0.30	0.17

1608	Soukhouma	0.18	0.21	0.21	0.07
1609	Mounlapamok	0.26	0.26	0.32	0.27
1610	Khong	0.31	0.29	0.29	0.17
1701	Xaisettha	0.32	0.33	0.36	0.26
1702	Samakkhixai	0.29	0.29	0.30	0.15
1703	Sanamxai	0.23	0.24	0.28	0.20
1704	Sanxai	0.27	0.22	0.24	0.09
1705	Phouvong	0.12	0.36	0.36	0.22
1801	Saysomboun	0.27	0.16	0.16	0.04
1802	Phoon	0.26	0.15	0.15	0.04
1803	Thathom	0.25	0.25	0.25	0.11

Note: The number of the sample in each district is quite small. Although weight was used in the estimation, the results at district level should be used with caution.

Source: Calculated by the author using raw data from LECS and LECS4

Table 6.G: Committed FDI by districts (US$)

District ID	District name	FDI from 1998 to 2002	FDI from 2003-2007
101	Chanthabouri	24,000,000	700,000,000
102	Sikhottabong	25,000,000	37,000,000
103	Xaisettha	10,000,000	78,000,000
104	Sisattanak	27,000,000	210,000,000
105	Naxaythong	769,178	20,000,000
106	Xaithani	9,500,000	75,000,000
107	Hatxayfong	29,000,000	65,000,000
108	Sangthong	930,000	4,200,000
109	Pak-Ngum	2,800,000	5,100,000
201	Phongsaly	-	1,200,000
202	Mai	-	2,500,000
203	Khoa	-	2,100,000
204	Samphan	-	-
205	Boun-Nua	-	3,500,000
206	Gnot-Ou	-	4,500,000
207	Boun-Tai	-	2,200,000
301	Namtha	5,000,000	21,000,000
302	Sing	-	2,700,000
303	Long	-	-
304	Viangphoukha	-	2,700,000
305	Nale	-	-
401	Xai	413,100	28,000,000
402	La	-	142,500
403	Namo	-	3,900,000
404	Nga	-	-
405	Beng	-	1,100,000
406	Houn	-	6,500,000
407	Pakbeng	135,270	750,000
501	Houayxay	-	51,000,000
502	Tonpheung	-	72,000,000
503	Meung	-	5,500,000
504	Pha-Oudom	-	2,000,000
505	Paktha	-	-
601	Luangphrabang	1,500,000	36,000,000
602	Xiang-Ngeun	-	170,000,000
603	Nan	-	-
604	Pak-Ou	-	5,000,000
605	Nambak	-	7,100,000
606	Ngoy	-	268,300
607	Pakxeng	-	-

608	Phonxai	-	-
609	Chomphet	-	3,000,000
610	Viengkham	-	-
611	Phoukhoun	-	-
612	Phonthong	-	-
701	Xam-Nua	3,200,000	8,600,000
702	Xiangkho	-	8,800,000
703	Viangthong	-	1,700,000
704	Viangxai	1,500,000	4,200,000
705	Houamuang	-	1,200,000
706	Xam-Tai	-	4,500,000
707	Sopbao	-	1,100,000
708	Et	-	1,600,000
709	Kuan	-	-
801	Xaignabouly	488,250	8,100,000
802	Khop	646,500	350,000
803	Hongsa	-	-
805	Ngeun	-	-
806	Phiang	-	43,000,000
807	Paklai	-	6,000,000
808	Kenthao	285,000	310,854
809	Boten	-	-
901	Pek	1,900,000	8,200,000
902	Kham	-	1,900,000
903	Nonghet	-	-
904	Khoun	-	-
905	Mok-Mai	-	-
906	Phoukout	-	-
907	Phaxai	-	1,000,000
908	Thathom	-	-
1001	Phonhong	-	130,000,000
1002	Thourakhom	2,900,000	7,000,000
1003	Keo-Oudom	-	-
1004	Kasi	-	-
1005	Vangvieng	-	3,200,000
1006	Fuang	5,400,000	-
1007	Xanakham	-	-
1008	Met	-	675,405
1009	Viengkham	-	1,500,000
1010	Hinheup	-	5,500,000
1011	Hom	-	-
1012	Xaisomboun	-	-
1013	Mun	-	-

1101	Pakxan	-	8,800,000
1102	Thaphabat	-	662,500
1103	Pakkading	-	1,600,000
1104	Borikhan	750,000	5,700,000
1105	Khamkeut	525,000	240,000
1106	Viangthong	-	2,500,000
1107	Xaichamphon	-	738,441
1201	Thakhek	3,700,000	15,000,000
1202	Mahaxai	2,400,000	46,000,000
1203	Nongbok	-	2,500,000
1204	Hinboun	-	12,000,000
1205	Gnommalat	-	250,000
1206	Boualapha	-	-
1207	Nakay	-	250,000
1208	Xebangfai	-	1,300,000
1209	Xaybuathong	-	-
1210	Kounkham	-	-
1301	Kaysone PHOMVIHANE	9,400,000	400,000,000
1302	Outhoumphon	-	6,500,000
1303	Atsaphangthong	-	-
1304	Phin	-	500,000
1305	Xepon	-	6,000,000
1306	Nong	-	164,977
1307	Thapangthong	-	-
1308	Songkhon	-	-
1309	Champhon	-	-
1310	Xonbouri	-	500,000
1311	Xaibouri	-	603,000
1312	Vilabouri	105,750	-
1313	Atsaphangthong	-	-
1314	Xaiphouthong	-	-
1315	Phalanxai	-	7,200,000
1401	Saravan	31,000,000	1,300,000
1402	Ta-Oy	-	-
1403	Toumlan	-	-
1404	Lakhonpheng	-	3,500,000
1405	Vapi	-	147,098
1406	Khongxedon	-	-
1407	Laongam	1,700,000	82,000,000
1408	Samouay	-	1,700,000
1501	Lamam	-	742,500
1502	Karum	-	5,400,000

1503	Dakchung	-	2,000,000
1504	Thateng	-	13,000,000
1601	Pakxe	15,000,000	44,000,000
1602	Xanasomboun	-	687,085
1603	Bachiangchareunsouk	2,600,000	11,000,000
1604	Pakxong	-	27,000,000
1605	Pathoumphon	-	11,000,000
1606	Phonthong	-	365,000
1607	Champasak	-	-
1608	Soukhouma	-	-
1609	Mounlapamok	-	4,000,000
1610	Khong	-	12,000,000
1701	Xaisettha	1,100,000	-
1702	Samakkhixai	3,000,000	5,700,000
1703	Sanamxai	-	-
1704	Sanxai	-	-
1705	Phouvong	-	-
1801	Saysomboun	-	-
1802	Phoon	-	-
1803	Thathom	-	-

Source: Compiled by the author using data from various provincial statistical yearbooks, Department of Planning and Investments.

Table 6H: Characteristics of different regions

	Inequality	Poverty rate	FDI inflow (% in total FDI) from 2003 to 2007	Government investment per capita from 2003 to 2007 (million LAK)	Access (average distance in km)
Vientiane Capital	0.39	0.15243	46%	1.65	7.5
North	0.38	0.32531	20%	1.18	31.2
Central	0.36	0.29843	26%	0.80	28.9
South	0.33	0.22814	9%	0.78	21.0

Source: Inequality, poverty rate, and access are calculated by the author using LECS3 and LECS4. Data on FAI are compiled from various provincial statistical yearbooks, Department of Planning and Investments. Data on government investment is compiled from various annual investment reports produced by the Ministry of Finance.

Appendix 7: Additional Results from the Laotian Garment Firms' Survey

Table 7A: Firms' perceptions on challenges they face

	Percentage of respondents
LAK appreciation	89%
Higher utility cost	75%
Low labor productivity	80%
High production cost	65%
High labor cost	30%

Table 7B: The composition of expenditure and revenue by different currency

	Revenue	Expenses on labor	Expenses on raw materials
LAK	5.8%	92.2%	16.5%
USD	83.8%	7.8%	69.2%
THB	10.4%	4.5%	14.3%

Table 7C: The availability of labor and raw materials

	Same	Increase	Decrease
Unskilled labor	18%	76%	6%
Skilled labor	10%	90%	0%
Raw materials	54%	14%	32%

Table 7D: The competition level in 2011 compared to 2005

	Same	Increase	Decrease
Competition with other domestic firms	55%	43%	2%
Competition with foreign firms	45%	43%	13%
Competition with imported products	43%	45%	13%