Resource Boom, Growth and Poverty in Laos
- What Can We Learn From Other Countries and Policy Simulations?-

RESEARCH PROPOSAL

presented to

PEP Network

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1. Abstract (100 to 250 words)

Theoretically, abundant natural resources could promote growth through more investment in infrastructure, health care and human capital development. However, various empirical studies have illustrated that resource-rich countries fail in accelerating growth compared with resource-poor countries. There are various factors for low growth in resource-rich countries, but one of the most important factors is the so-called "Dutch disease".

Laos is a small, open Least Developed Country (LDC) in Southeast Asia. Laos was ranked 130th out of 177 countries. 34 percent of the population lives below the poverty line. However, it is a resource-rich economy with over 570 mineral deposits identified. As a result, since 2003, Laos has experienced massive foreign capital inflows in terms of Foreign Direct Investment (FDI) in the mining and hydropower sectors. Resource sectors contributed about 2.5% of GDP during 2000-2007; resource sector revenues account for 18% of total tax revenue (2007). On the other hand, resource sectors also have a negative impact on economy through appreciation of the real exchange rate and declining non-resource sectors.

Despite the significant potential for both positive and negative impacts from resource booms on the Lao economy, there is a gap in the research on this issue in Laos. Therefore, the main objective of this study is to quantify the possible impacts of resource booms on nation-wide economy and poverty using a Computable General Equilibrium (CGE) model. The simulations of macroeconomic adjustment policies will also be investigated in order to evaluate ways to escape Dutch disease.

2. Main research questions and core research objectives

The main objective of this study is to quantify the possible impacts of resource booms on the Lao economy using a Computable General Equilibrium (CGE) model, specifically:

1) To assess the impacts of resource booms at the level of the national economy, identifying which sectors will gain and which sectors will lose.
2) To assess the impacts of resource booms on poverty and income distribution.
3) To assess government policies to be put in place in order to avoid Dutch disease.

3. Scientific contribution of the research

There is a rich literature on Dutch disease in general and there are a number of economic tools for analyzing Dutch Disease. Firstly, Input-Output analysis is economic tool for evaluation the impact of mineral projects (Bocoum and Labys, 1993; Swisko, 1989) and others. Secondly, regression model is also popular econometric tools for analyzing the impact of resource boom on economic development (Sachs and Warner, 2001; Fardmanesh,1991; Gylfasson, 2001;Brunnschweiler, 2007; Nyatepe-Coo, 1994) and others.

Thirdly, macroeconomic modeling is also used for analyzing the impact of resource boom and policy simulation (Lawler, 1991; Usui, 1996; Kyophilavong and Toyoda, 2009) and others. Fourthly, Time Serial Data Analysis is also popular methodology for diagnosing Dutch Disease and the impact of government policy on economy (Al-Awadi and Eltony, 2001; Bjornland, 1998; Hutchison, 1994; Kutan and Wyzan, 2003; Oomes and Kalcheva, 2007 and Raju and Melo, 2003). The last economic tools is Computable General Equilibrium (CGE) Model which is very popular for analyzing the impact of resource booms.

However, we focus on the CGE model approach for an analysis of the Dutch disease. Devaranjan et al (1993) developed a 1-2-3 CGE model to estimate changes in the equilibrium real exchange rate in terms of trade shocks and changes in foreign capital flows. This model is popular and used to analyze Dutch disease. Benjamin et al (1989) used CGE model to examine the impact of an oil boom on Cameroon's economy. The results showed that one of the standard Dutch disease results can be reversed. Although the agricultural sector is most likely to be hurt, not all traded good sectors will contract, whereas and some of the manufacturing sectors will benefit.

Benjamin (1990) added the investment dimension by incorporating a two-period optimization in a multisectoral computable general equilibrium (CGE) model for Cameroon. This model is used to test the impact of foreign-capital flow, tariff policy, and policy toward public firms. The simulation results showed the key role of import substitutes, specifically manufacturing in this case. Levy (2007) used a CGE model to study the impact of using Chad's annual oil revenue for public investment, which focused on development of road and irrigation infrastructure. The results showed that Dutch disease in not an unavoidable consequence of oil booms in Chad. There are a number of studies of Dutch disease using CGE model in other countries. Qiang (1999) and Clement, Ahammad and Qaing (1997) used CGE model to evaluate the impact of new mining and mineral processing projects in Western Australia on employment and the macro-economy. The analysis shows that both mining and mineral-processing projects will have substantial flow-on benefits to the Western Australia.
Chand and Levantis (2000) used CGE model to investigate the mining of mineral boom in Papua New Guinea. The result confirmed that a resources boom will deliver a net welfare benefit, but far smaller than cost to equilty.

However, there are very few studies in the Laos context on this phenomenon. Kyophilavong (2007) used a CGE model to analyze the impact of the ASEAN Free Trade Area (AFTA) on the Lao economy. This model is based on two sectors and represents a simple model which could usefully be updated in future. In addition, Kyophilavong and Toyoda (2008) used a macroeconomic model to investigate the impact of foreign capital inflow in the mining and hydro power sectors. Warr (2006) used a CGE model – 1-2-3 model framework with multi-households to investigate Dutch disease in Laos. This model is not adequate to identify Dutch disease; however there are some limitations with respect to government policy simulations.

Many empirical studies suggest that naturally resource-rich countries have suffered from low economic growth if compared with naturally resource-scare countries (Sachs and Warner,

1995; Papyrakis and Gerlagh, 2004; Leite and Weidmann, 1999). There are various reasons for failures to effectively transform natural resources to growth including the Dutch disease (Coden 1981; 1982; 1984 and Coden and Neary, 1982). But countries such as Indonesia and Botswana have been successful in escaping Dutch disease and maintaining high rates of economic growth (Lange, 2004; Usui, 1997). As Laos is one of the remaining resource-rich countries in Southeast Asia, it is crucial to seek to answer the following questions in order to escape from the Dutch disease:

1) What is the impact of resource booms? Which sectors may potentially lose and which sectors may gain?
2) Who benefits from resource booms? Are there pro-poor benefits?
3) What kind of policies should the government put in place in order to avoid Dutch disease?
4) What kinds of lesson can the Lao government learn from other countries? Are these lessons applicable to the Lao context?

These are vital questions as Laos develops its economy. Due to a lack of studies on the impacts of resource booms on the Lao economy and poverty, the above questions have yet to be answered properly. This research will address this knowledge gap.

4. Policy relevance

According to the literature survey, there are very few studies on Lao CGE building. Moreover, there are few studies on the impacts of resource booms on poverty and income distribution. Therefore, building a Lao CGE model will be a vital economic tool for the Government of Lao (GoL). The results from this study will provide important information for the GoL in order to clarify the impacts of resource booms on the national economic and poverty; this research result will help the GoL to identify which sectors and which groups of households are likely to gain and to lose from a resource boom. Moreover, the simulation scenarios resulting from this study will help the GoL to form strategies to avoid the potential negative impacts of resource booms.

5. Methodology

In order to analyze the potential impact of resource booms on the Lao economy, a CGE model approach will be used. We will use PEP-1-1 model- Single-country static version which developed by Decaluwe et al (2009a) and will use PEP-1-t model –Single-country recursive dynamic version which developed by Decaluwe et al (2009b).

The characteristics of the model are explained as follows:
1) Static and drynamic CGE model, single-country, 5-sectors including Mining, Agriculture, Industry, Private service and public service; 2) Multi-stage, constant-return to scale production technologies with substitution between inputs, including intermediate inputs, CES

value added production function, investment demand distinguishes between gross fixed capital formation (GFCF) and changes in inventories. 3) Imperfect substitution between domestic and foreign commodities on both the import and export side (Armington assumption); 4) Competitive markets, neoclassical macro-closure, small country assumption; 5) Factor product is from skilled-labor, unskilled-labor, capital and natural resource for mining sector; 6) Mining sector will have specifics production function which including resource input in factor product; 7) Closure: Simulate fixed and endogenous Current Account Balance; 8) Single representative household will be used in first step in model building. After first step of model perform well then the households are divided into two groups, the rural household group and the urban household group; each group of households is also divided into 20 households (10 urban households and 10 rural household).

There are a few approaches for dealing with income distribution analysis in a CGE model. The traditional one is the representative household method, where it is assumed the income or expenditures of households follows a certain functional form distribution. However, the most recent approach is multiplying the number of households into as many as households as are available in the household level data. This is the integrated- microsimulation- CGE model approach and has been implemented in various studies including Annabi et al. (2005) for Senegal, and Cororaton et al (2005) and Cororaton and Cockburn (2006) for the Philippines. An integrated- microsimulation- CGE model approach will be used to investigate the impacts of resource booms on poverty in Laos.

In a CGE model framework the distributional impact of any exogenous shock to the model works though market mechanisms. Optimizing firms will change their demand for factor inputs, intermediate inputs and their output. Changes in a firm's demand for factors will affect factor prices, wages and non-labor income in the factor market, with a final impact on a household's income and its distribution across households. Changes in household income together with changes in all commodity prices will simultaneously change household expenditures on various commodities. This will affect distribution of income and expenditures. How much each household's income decreases depends on its composition of factor ownership and how much the price of each factor decreases or rises. When household income falls, again this will affect household demand for commodities, and household expenditures. When a new equilibrium is found, the end result is the new distribution of a household's welfare, which can be measured by the new distribution of their (real) expenditure.

There are various policies available in order to mitigate Dutch disease. The impact of fiscal policies, exchange rate policy and foreign borrowing strategies in Indonesia during oil booms in order to escape from the Dutch disease has been discussed in Usui (1996) and Pinto (1987). Larsen (2006) examined various policies in Norway to avoid the Dutch disease including factor movement policy, spending effect policy, spillover-loss policy, education, research and development policy, labor policy, active countercyclical policy, and industrial policy. Tax policy and subsidies, as well as exchange rate protection were discussed in Coden (1984). Moreover, exchange rate policy was discussed in more detail in Coden, (1981;1982).

However, policy simulations in this study will focus on windfall management because it is crucial for sustainable economic growth and poverty reduction (Same, 2008; Warr, 2006). In addition, most developing countries seem to fail in managing windfalls from resource boom. Firstly, the trend is to expend more on non-tradable goods which could accelerates on the appreciation of the real exchange rate and declines the competitiveness of non-booming sectors. A second concerning is the government transfer mechanism, the poor does not seem to gain benefit from windfall transfers in many developing countries. As results, this increases poverty and inequality, which hinders economic development.

Baseline simulation: The impact of resource boom

The simulation of the impact of mining sector on Lao economy and poverty though increase resource input and TFP improvement in mining sector (Chand and Levantis, 2000). This simulation will directly shock to resource input and increase TFP in mining sector.

Policy simulation 1: Trade-off between tradable and non-tradable goods on windfall expenditure.

This simulation will investigate the windfall expenditure trade-off. Government windfall expenditures will be divided into an equal amount of non-tradable goods (public service sector) and tradable goods (agriculture, industry, and private service). This simulation will directly shock to the government subsidies in government budget accounts.

Policy simulation 2: **Trade-off between poor and rich household on windfall expenditure.**

Government receive royalties, taxes and dividends from resource sector and transfer to: (1) All proceeds go to urban households and are distributed among them in equal lump sum amounts. Poor rural households receive no direct benefits; (2) The proceeds are distributed across the entire population in equal lump sum amounts. Poor rural and urban households have the direct benefits. (3) All proceeds go to rural household and are distributed among them in equal lump sum amounts. Poor rural households have direct benefit but urban households do not. This simulation will directly shock to the government transfer to household variables in model.

6. Data requirements and sources

In order to build a CGE model, a CGE model data set, Social Account Matrix (SAM), is needed. However, there is no existing Social Account Matrix (SAM), Input- Output table, and National Account for the Lao economy. Therefore, we had to build the Lao SAM from various data sources.

Macro-SAM was built based on steps (Santos, 2005 and Griffen, 2005).A macro-consistent flow of funds dataset is assembled, including sector specific information for Government, External, Monetary and Private Sectors. The first three sectors are compiled using information published by the IMF (2009). This official sector information has been reclassified to fit the flow of funds format. The Private Sector accounts are compiled residually after reconciling the other sector accounts using GDP production information and

expert judgment on the private sector propensity to consume. The macro-consistent accounts are presented in an aggregate SAM format. In addition, we will also use National Account data from National Statistic Centre for building Macro-SAM. However, in order to use a standard PEP model from Decaluwe et al (2009a; 2009b), the above Marco SAM must be adjusted to follow the standard PEP model's SAM.

In order to use SAM in a CGE model, it is important to disaggregate macro-SAM from micro-SAM. There is no unique way of disaggregating and organizing the data in micro-SAM. The number of accounts in each category depends on the objectives of the study and the data conditions. In this study, due to data limitations, several assumptions will be made in order to build a micro-SAM for the Lao CGE model. The data sources for compiling the Micro-SAM is as follows.

1) Intermediate Inputs
Warr (2006) and Warr and Menon (2006) build national input-output table from Savannakhet input-output table from Asra et al (2006). We will use Savannakhet's input-output table for build national input-output table for this study and will be updated using latest national accounts data.

2) Production factors
Production factors are divided into 4 factors—land, skilled labor, non-skilled labor, and capital—based on the input-output table from Savannakhet input-output table from Asra et al (2006). In addition, we will add natural resource in mining sector's production factors.

3) Households
According to Cororaton and Corong (2006) and Warr (2006), urban households gained more benefits from trade liberalization than rural households. Therefore, we divided household groups into two groups, urban households and rural households, and each of these is divided into 10 households. The disaggregation of the 20 household groups follows the method from Warr (2006) and Warr and Menon (2006), which used data from the Lao Expenditure and Consumption Survey (LECS) 2002/2003.

Balancing SAM
Due to the different data sources, the micro-SAM is unbalanced. While various methods can be used to balance the micro-SAM (Fofana et at, 2005), this paper will employ the Cross Entropy (CE) method to balance the micro-SAM (Robinso and El-Said, 2000; 1997).

Parameters
Parameters are one of the most important considerations in a CGE model. Some studies have found that different parameters lead to different policy results (Abler et al, 1999). Basically, some parameters for this study are calibrated from SAM. However, some parameters for the CGE model are not available in Laos. Therefore, I will use parameters from various sources. Parameters for the Elasticity of Substitution (ES) function between imported and domestic goods and the Elasticity of Transformation (ET) function between exports and domestic sales will come from the GTAP database.

7. Consultation and Dissemination Strategy

Research outputs will be sent to Lao government authorities including Ministry of Planning and Investment, Ministry of Industry and Commerce, Ministry of Energy and Mines and the Prime Minister's Office. In particularly, I plan to show my research results with Dr. Bounthavy SISOUPHANTHONG, Vice Minister of Ministry of Planning and Investment who is economist and give inputs to senior policy makers. In addition, we will organize national workshop on "Resource Booms and Economic Development"; presented at regional or international academic conferences; and submitted to international journals.

8. List of team members

1. Phouphet Kyophilavong (Male, 35 year old)
Ph.D in Economics
Dissertation topic: *Analyzing the Lao Economy ~ Macro-econometric Model Approach*

Related training

- **"**Seventeenth Annual Short Course in Global Trade Analysis**",** Organized by *Center for Global Trade Analysis, Purdue University*, Bangkok, Thailand, August 8-14. (2009).
- "Trade Policy Model with GAMS", organized by *EcoMod Modeling School*- Asia. Bangkok, Thailand. January 14- 18, 2008.
- "Practical General Equilibrium Modeling with GAMS", organized by *EcoMod Modeling School*- Asia . Bangkok, Thailand. January 15-20,2007.
- "Input-output table building and analysis", *Institute of Developing Economies (IDE),* supported by Japan International Cooperation Agency (JICA), Japan, June –September, 2004.

Related research papers

- Kyophilavong, P. (2009). "Mining Sector in Laos." *BRC Discussion Paper Series No. 18*, Bangkok Research Center (BRC), IDE-JETRO.
- Kyophilavong, P. (2009). "The Impact of Laos' WTO accession – GTAP model Approach",*Academic Journal of National University of Laos* (1) 2.
- Kyophilavong, P. and Toyoda, T. (2008). "Impacts of Foreign Capital Inflows on the Lao Economy." In Toyda (Ed.) *Empirical Researchon Trade and Finance in East Asia*, Research Series, Hiroshima Shudo University.
- Kyophilavong, P. (2007). "Can Laos Gain Benefit by Joining AFTA? How Much?- A CGE (ComputableGeneral Equilibrium) Model." *Academic Journal of National University of Laos (1)* 1.

2. Mr. Chanthachone SENESOUPHAP (Male, 25 year old)
Bachelor in Economics
Thesis topic: "Analyzing the impact of Num Then 2 hydropower project on Lao economy – Input- Output Analysis"

Related training

- "Building the Input-Output Table Using Non-survey Method" Organized by *European Union* . Vientiane, Laos. March 10- 14, 2007.

Related research paper

Senesouphap, C. (2007). "Impact of NT2 project on Lao Economy", FEBM Working Paper Vientiane, Laos.

3. Mr. Somnack YAWDHACKSA (Male, 29 year old)
Master in Economics
Master thesis topic: "Effects of Laos' Joining AFTA on Its Economy: An Analysis Using a Simple CGE Model.", GSICS, Kobe University, Japan**.**

Related research paper

Yawdhacksa, S. (2010). "Effects of Laos' Joining AFTA on Its Economy: Simple CGE model Approach.", *Academic Journal of National University of Laos* (2) 1. (forthcoming).

9. Expected capacity building

As an economist, I have a strong desire to assist the country's policy makers by building a model capable of analyzing the impact of resource-sector foreign capital inflows and gauging the benefits for the Lao government and the public as a whole. Therefore, I will take responsibility for directing this research project and guide various research activities to the other team members.

I have had a training and experiences in CGE modelling but I would like to have feedback and guideline from senior experts to develop Lao CGE model for poverty analysis. Once we have comprehensive Lao dynamic CGE model (5sectors and 20 households), we will be able to conduct training for graduate students, researchers in faculty, economist at the Ministry of Finance, the Bank of Lao PDR, and the Ministry of Planning and Investment and the Ministry of Industry and Commerce.

Mr. Sensesouphap will assist in building the database for the model and learn the concepts behind CGE model. In addition, he also plans to use CGE model for his master and doctoral program in near future. Mr. Yawdhacksa will also assist in building SAM, and learn the concepts of model structure and GAMS code of model. Mr. Yawdhacksa will continue to apply knowledge from this project for his doctoral program in near future.

10. Any ethical, social, gender or environmental issues or risks that should be noted.

11. List of past, current or pending projects in related areas involving team members

List of past project related areas

- Yawdhacksa, S. (2010). "Effects of Laos' Joining AFTA on Its Economy: Simple CGE model Approach.", *Academic Journal of National University of Laos* (2) 1. (forthcoming).
- Kyophilavong, P. (2009). "Mining Sector in Laos." *BRC Discussion Paper Series No. 18*, Bangkok Research Center (BRC), IDE-JETRO.
  Funded by Bangkok Research Center (BRC), IDE-JETRO, Japan.
- Kyophilavong, P. (2009). "The Impact of Laos' WTO accession – GTAP model approach." *Academic Journal of National University of Laos (1)* 2. Funded by Asian Research Center, National University of Laos, Laos.
- Kyophilavong, P. and Toyoda, T. (2008)."Impacts of Foreign Capital Inflows on the Lao Economy." In Toyda (Ed.) *Empirical Researchon Trade and Finance in East Asia*. Research Series, Hiroshima Shudo University.Funded by Asian Research Center, National University of Laos, Laos.
- Senesouphap, C. (2007). "Impact of NT2 project on Lao Economy", FEBM Working Paper Vientiane, Laos.

List of current project related areas

1 "The impact of Global Financial Crisis on Lao Economy – GTAP model approach"
No-Funding

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Appendix 1: Lao Economy and Mining Sector

1.1 The current situation of Lao economy

Since introducing the New Economic Mechanism (NEM) in 1986,[1] Laos has been in transition from a centrally planned economy to a more market-oriented economy. As a result, except during the Asia Financial Crisis of the 1990s, Laos has been achieving high rates of economic growth with low inflation. The average economic growth was about 6.53 % during 2001-2006, which increased from 6.18 % during 1996-2000.[2] The average inflation rate was maintained at one digit during 2001-2006, which is a significant decline from the average rate of 57 % during 1996-2000. The exchange rate was also stable during 2001-2006 (Table 1). Of the nation's total GDP of US$ 4,053 million in 2007, the agricultural sector accounted for 40.3 %, the industry sector for 34.1 % and the services sector for 25.6 % (World Bank, 2008). However, since 2003, the industry sector has grown more than 10%, which has caused the agricultural share of GDP to decline.

Even though Laos has been maintaining high economic growth with low inflation and a stable exchange rate, it still has serious macroeconomic issues to overcome. Firstly, Laos is basically facing chronic twin deficits in both government spending and international trade. The average ratio of budget deficit to GDP was 4.4% during 2001-2006.The average ratio of current account balance deficit to GDP was 9.24 % during the same period.[3] These deficits are mainly financed by Official Development Assistant (ODA), Foreign Direct Investment (FDI), and remittances. The fiscal issue is particularly serious in Laos. If the budget deficit continues to expand, it might cause an accelerating inflation rate and the devaluation of the kip (Lao currency), and could lead to economic instability like during the period of the Asian Financial Crisis. Secondly, there is a huge gap between savings and investment. The savings rate is low because of low average incomes—GDP per capita was about US$580 in 2007 (World Bank, 2008)—and because financial sectors are underdeveloped. The banking sectors are occupied by the state commercial banks, which are unable to perform full banking functions.[4] Thirdly, Laos is also facing a high burden of external debts. The external debt accumulation was more than 60 % of GDP in 2007. If Laos becomes too dependent upon foreign finance, especially to meet its debt obligations, this could cause a foreign debt crisis and might lead to macroeconomic instability. As a result, recent resource booms are playing crucial factors on macroeconomic management in Laos

1. 2 Mining sectors

FDI has induced to Laos since Laos has induced market mechanism since 1986. From 1989 to 2008, there were 1547 FDI projects with 9,525.8 million US$ (Kyophilavong, 2009). FDI has increased sharply since 2003, of which FDI in the mining sector has the highest share. In

[1] After establishing the Lao People's Democratic Republic in 1975, the Lao government adopted a planned economy, following other socialist countries.

[2] The engine of growth during this period was capita inflows of Foreign Direct Investment (FDI) in the mining and hydropower sectors and mining production and exports. For a more detailed discussion of the impact of FDI in the mining and hydropower sectors on the Lao economy see Kyophilavong and Toyoda (2008).

[3] It is important to note that trade data which is used for this analysis is based on data from international organizations. The Lao government claimed that the trade deficit became a surplus in 2006.

[4] More details about financial issues, monetary and exchange rate policies in Laos are discussed in Kyophilavong (2010).

terms of registered capital accumulation, the energy (hydropower) sector has the highest share, about 54.4 % of total capital. The mining sector share is 18.3% of total capital, which shows that FDI in the mining sector accounts for the second largest share of accumulated registered capital after the energy sector.

Thailand has the largest investment share, which accounts for 26.5% of total capital.[5] The second largest investor is France, which accounts for 18.2 % of total capital, and the third is Vietnam (Kyophilavong, 2009). Mining development in Laos was not well-recognized until Sepon Mine[6] was implemented in 2003. As of October 2008, there are 127 domestic and foreign companies (213 projects) involved in the prospecting period, exploration period and feasibility study period. 42 companies are domestic investors and 85 companies are foreign investors. Foreign companies consist of 48 Chinese (56.5%), 19 Vietnamese (22.4%), 6 Thai (7.1%), 4 Australian (4.7%), 2 Russian (2.4%), 2 North Korean (2.4%), Canadian (1%), 1 South Korean (1.2%), and 1 Polish (1.2%) companies.

The main drivers for natural resource boom could explain as follows. Firstly, Laos is poor country with generally unfavorable social indicators, per capita GDP in 2008 was $887 as compared with a regional average (East Asia and Pacific) of $3070. the national development goal of Lao government is to escape from Least Developed Country (LDC) by 2020, in order to achieve this goal, promotion foreign direct investment including mining and hydropower sector are top priority (GoL, 2004; 2008). Secondly, Laos is a resource-rich economy with over 570 mineral deposits identified (DOG, 2008). In addition, Laos has successful mining project which called Sepon mining. It has started to produce and export gold and copper. Thirdly, it has an increasing mineral price before Global Financial Crisis also are the main driver for resource boom in Laos. As a result, since 2003, Laos has experienced massive foreign capital inflows in terms of Foreign Direct Investment (FDI) in the mining sector. As of Octorber 2008, there are 127 domestic and foreign companies (213 projects) and 85 companies are foreign investors (Kyophilavong, 2009).

There are about 35 working mines in Laos which include the Sepon and Phubia mines. Of the 35 working mines, only 2 working projects have modern production systems. There are 13 mines belonging to the Lao government: 7 mines managed by the Ministry of Energy and Mines, 5 mines managed by Ministry of Defence, and one mine managed by the Ministry of Industry and Commerce. Foreign investors manage 12 mines, of which China has 6, Thailand has 3 and Vietnam has 2. It shows that production and export from mining sector will highly increase in near future when those mining projects finish.

1. 3 Contribution of mining sector

Thanks to abundant natural resources, since mining development began in 2003/2004, the mining sector has made significant contributions towards Laos' economic development. The

[5] There are three main reasons that Thailand has the largest share of investment in Laos. First is a geographical reason, as Laos shares a long border with Thailand. The second reason is cultural, as both countries share similar customs and culture. The third reason is due to capital, technology, and know-how, as Thailand is more developed than other countries in this region and so has increased capacity to invest in Laos.

[6] For more details of the project, see Sepon Gold Mine (http://www.ozminerals.com/ Operations/Mining-Operations/Sepon-Gold.html).

mining sector has direct and indirect impacts on the Lao economy. In terms of direct impact, there are four main routes (Kyophilavong, 2009). Firstly, the mining sector contributes to demand and supply-side GDP though increasing investment and capital stock. As increasing FDI flows to Laos, it leads to increased demand-side GDP; at the same time, the capital stocks also increase, which leads to an increase in supply-side GDP. According to estimates of the World Bank (2008), FDI in the resource sector, which includes mining and hydropower, contributed 2.5 % of the economic growth rate (7.5%) in 2007. Secondly, FDI in the mining sector also contributes to increased exports. As the domestic market is small, most FDI export their products to foreign countries, which contributes to narrow trade deficits. The trade deficit during 1996- 2000 was 16.06 % of GDP, but it was narrowed down to 9.24 % during 2001- 2006 (Table 1). Mining exports have the highest share of total exports; they accounted for 37.4 % of total exports during 2004-2006.

Thirdly, as Laos faces chronic budget deficits, FDI in mining also contributes to narrowing the government budget deficit. The Lao government receives royalties and taxes from mining projects. As a result, the government budget deficit has declined from 7.58 % during 1995-2000 to 6.29 % during 2001- 2006. Non-tax renewable resources, which include the mining sector, accounted for 17.1 % of total tax revenues in 2006/2007. Tax revenues from the mining sector are expected to increase when other mining projects are completed. Fourthly, as mining development requires a large amount of labor, the labor force might increase from its impact. A large mining project（e.g. Sepon Mining Project） might generate about 1000 workers.

In addition, FDI in the mining sector also indirectly contributes to economic and social development in rural areas. Firstly, mining development also contributes to infrastructure development, such as road networks and electricity connections. In addition, mining projects also provide funds for developing rural areas, such as building schools, hospitals etc. Secondly, mining projects have spillover effects on Small and Medium Enterprises (SMEs), creating enterprises which facilitate the transfer of technology and improved knowledge and skills to domestic SMEs. It generates new business for agriculture, livestock farming, and retail trade. Employment in new businesses linked to the Sepon mining project involves 35,000 to 45,000 persons. In sum, mining sector has high impacts on economic development. However, resource booms also have adverse effect on mild term and long term economic development, appreciation of real exchange rate will contract non-booming sectors which call “Dutch Disease”. Therefore, it is important to study how the impact of resource booms on Lao economy and poverty and policy implication to mitigate its negative impacts.

Table 1 Key macroeconomic indicators

Macroeconomic indicators	**2001-2006**	**1996-2000**	**1990-1995**
Population (million. person)*	5.46	4.86	4.40
Population growth (%)	2.12	2.06	2.52
GDP (current million US$) **	2,416	1,618	1,276
GDP growth (%)	6.53	6.18	6.46
GDP per capita (constant 2000 US$) **	379	307	248
GDP per capita growth (%)	4.04	3.68	3.80
Reserve Money (M2) (million US$)*	450,981	270,728	148,280
Money supply (M2) (%)*	21.14	65.99	30.92
In flation -CPI (%)	9.73	57.00	15.27
Trade Deficit (million. US$)***	-219.91	-263.21	-174.92
Trade Deficit /GDP (%)	-9.24	-16.06	-13.14
Foreign reserve (million. US$)***	220	127	48
External debt (million US$) *	2,640	2,410	1,965
External debt /GDP (%)	115	152	161
Buget Deficit (including grants)(million US$)	-104	-58	-100
Buget Deficit /GDP (%)	-4.42	-3.60	-7.61
Buget Deficit (exclude grants)(million US$)	-149	-121	-145
Buget Deficit /GDP (%)	-6.29	-7.58	-11.21
Exchange Rate (kip/US$) Official Rate***	10,163	4,094	727

Sources:

* Asian Development Bank (ADB), *Key Indicators for Asia and the Pacific 2008 www.adb.org/statistics*

** World Bank,*World Development Indicators CD-ROM (2005) and*

*** International Monetary Fund, *International Financial Statistics CD-ROM August 2008*

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