

The Impact of Chinese FDI on Economy and Poverty of Lao PDR

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Abstract

Concentrated in the resources sector such as mining and hydropower, Chinese FDI in Laos has increased significantly. Using a computable general equilibrium (CGE) model, this paper aims to investigate the impact of Chinese FDI on the economy and poverty in Laos. From the simulation results, we conclude that Chinese FDI has a positive impact on macroeconomic variables such as GDP, welfare and exports. However, it also has side-effects through the appreciation of the real exchange rate and a negative impact on production factors of non-resources sectors – a phenomenon which is called the Dutch disease effect.

Keywords: *Chinese FDI, impacts, CGE model, Laos*

1. Introduction

Capital inflows from foreign direct investment (FDI) provide an important source of financing for low-income and developing countries by promoting economic growth and enhancing technology capability in the long term. However, FDI can also have negative impact on the local economy in the low-income country. This phenomenon is called the Dutch disease, which occurs when FDI leads to real exchange-rate appreciation that negatively impacts the production of tradable goods (Corden and Neary, 1982). The impact of FDI on an economy depends on various factors such as the type of FDI, macroeconomic management, FDI policies of host countries and characteristics of the host country economy. Therefore, the impact of FDI is still not clear in the case of Laos due to lack of studies.

One national development goal of Laos is to no longer be categorized as a least developed country (LDC) by 2020 (GoL, 2004). In order to overcome

poor infrastructure, limited human resources and low productivity, the government of Laos has enthusiastically promoted foreign direct investment (FDI). The foreign direct investment inflows in 2007 is estimated to be US\$950 million, recording a 60% increase over the previous year. About 90% of the FDI was linked to the resource industry and accounted for most of the increase (Kyophilavong, 2012). From 1989 to 2008, there were 1,547 projects worth US\$9 billion. FDI in the natural resources sector constituted more than 70% of total investment in Laos in the same period. Among all the foreign countries investing in Laos, China is ranked the highest in terms of total amount of investment and number of firms. Similarly, Chinese FDI is mainly concentrated in the resource-related sector, such as mining and hydropower (Kyophilavong, 2012).

The main impacts of Chinese FDI on the economic development of Laos occur through four channels. First, Chinese FDI has both positive demand and supply-side effects on national GDP because of increased investment and capital stocks. Second, Chinese FDI promotes exports and helps to reduce trade deficits. Third, Chinese FDI increases government revenues. The royalties and taxes collected from Chinese FDI projects could thus lower the government's budget deficit. Fourth, the investment generates employment because it requires a significant input of labour. In addition, Chinese FDI could promote technology development.

However, Chinese FDI could have negative impacts on the Lao economy in the long term given the fact that most Chinese FDI is concentrated in natural resource extraction sectors (mining and hydropower in particular). Chinese FDI in natural resource extraction sectors leads to decline in the other sectors, such as agriculture and industry, which must compete internationally under real exchange-rate appreciation. While a number of studies examine the impact of Chinese FDI on the host country economy, there is no study of the impact of Chinese FDI on the Lao economy using a quantitative approach such as the computable general equilibrium (CGE) model or macroeconomic model (Jenkins and Edwards, 2006; Gu, 2009). Therefore, the main objective of this study is to quantify the potential impact of Chinese FDI on the Lao economy and on poverty in Laos by using the CGE model.

2. Lao Economic Development and Poverty Reduction

Since introducing the New Economic Mechanism (NEM) in 1986, Laos transitioned from a centrally planned economy to a more market-oriented one. As a result, Laos was able to deliver high economic growth except during the Asian Financial Crisis of the late 1990s. Economic growth averaged about 8% from 1990-2013 (Table 1). In 2013, the GDP was distributed across the agricultural (25.2%), industrial (28.0%) and service (38.9%) sectors

Table 1 Lao PDR – Changes in Key Macroeconomic Indicators

<i>Macroeconomic indicator</i>	<i>2011-2013</i>	<i>2006-2010</i>	<i>2001-2005</i>	<i>1996-2000</i>	<i>1990-1995</i>
Population growth (%)	2.04	2.16	1.58	2.07	2.71
GDP growth (%)	7.98	7.98	6.24	6.17	6.28
GDP per capita (constant 2000 US\$)	1329	841	371	302	243
GDP per capita growth (%)	6.10	5.90	4.58	4.00	3.44
Money supply growth (%)	31.90	38.34	20.18	66.04	30.92
Inflation, CPI (%)	5.92	4.98	10.31	57.00	15.27
Trade balance/GDP (%)	-0.30	-0.59	-10.43	-17.03	-13.02
External debt stock (% of GDP)	76.50	101.10	129.86	152.99	160.25
Budget deficit/GDP (%) – including grants	-2.85	-2.53	-4.13	-4.87	-7.95
Budget deficit/GDP (%) – excluding grants	-9.26	-6.05	-6.04	-8.88	-11.52
Exchange rate (kip per US\$)	8018	9056	10164	4094	727

Sources: World Bank online database, *World Development Indicators*. Asian Development Bank (ADB).

and others (7.9%). In addition, the country's macroeconomic situation was relatively stable, evidenced by the stability of the average inflation rate and the exchange rate from 2011-2013. Meanwhile, GDP per capita increased significantly from US\$310 in 1980 to US\$984 in 2010 before reaching US\$1,000 in 2012. These economic developments resulted in Laos moving from "Low Income" status to a "Low-Middle Income" country category by 2012, according to the World Bank.

There are three main important reasons why economic reform promotes economic growth. First, the liberalization of investment and trade provides more incentives for increased productivity and production in various sectors. Second, it can result in increasing domestic demand through foreign direct investment (FDI), official development assistance (ODA) and remittance. Third, economic reform can allow for increases in production and export activities, especially in hydropower and the mining sector. Lastly, human resources, infrastructure and government spending play important roles for economic development.

Before the economic reforms of 1986, Laos was extremely poor. Since 1986, poverty has decreased significantly. The poverty reduction program has been supported by multinational corporations, international organizations

and other parties. In order to eradicate poverty by 2020, the government has implemented the National Growth and Poverty Eradication Strategy (NGPES), an overall development and poverty alleviation framework (GoL, 2004). Analysis of four Laos Expenditure and Consumption Surveys (LECS) by the World Bank (WB) and Department of Statistics showed that the incidence of poverty has fallen since LECS 1, though it fell slowly from 1997-98. The incidence of poverty fell from 46% in LECS 1 to 39% in LECS 2, and from 33.5% in LECS 3 to 28% in LECS 4 (Table 2). While poverty has gone down, inequality has gone up, especially in Vientiane and other urban areas. The Gini coefficient increased from 30.5 in LECS1 (1992/93) to 35.4 in LECS 4 (2007/08). In Vientiane, the Gini coefficient increased from 29.7 in LECS1 (1992/93) to 38.00 in LECS 4 (2007/08) (Table 3). Reforms have reduced poverty significantly but have also led to increased inequality.

In the meanwhile, the economic reforms have strengthened property rights and land ownership providing more incentives for households and enterprises to increase production and productivity. In addition, improvement of infrastructure provides opportunities for farmers to access markets which increase their revenues. Moreover, the government also has a clear plan and strategy to reduce poverty in rural areas in particular.

Even though Laos has been maintaining high economic growth, low inflation and a stable exchange rate, serious macroeconomic challenges still remain. First, Laos has faced chronic twin deficits in government and trade

Table 2 Lao PDR: Relative Poverty, 1993-2013 (%)

	<i>LECS1</i> 1992/93	<i>LECS2</i> 1997/98	<i>LECS3</i> 2002/03	<i>LECS4</i> 2007/08	<i>LECS5</i> 2012/13
Laos	64	39.1	33.5	28	23.2
Urban	27	22	20	17	10
Rural					
With road	43	32	31	30	28.6
Without road	61	51	46	43	
Lowland			28	20.5	
Midland			36.5	29	
Upland			34	33	

Note: LECS – Lao Expenditure and Consumption Survey.

Source: World Bank and Department of Statistics (Laos); Lao Statistic Bureau (LSB) (2014).

Table 3 Lao PDR: Gini Coefficient, 1993-2013

	<i>LECS1</i> 1992/93	<i>LECS2</i> 1997/98	<i>LECS3</i> 2002/03	<i>LECS4</i> 2007/08	<i>LECS5</i> 2012/13
Laos	30.5	34.9	32.6	35.4	36.17
Urban	30.9	39.7	34.8	36.3	37.51
Rural					
With road	29.3	32.1	30.3	33.2	32.52
Without road	27.5	30.9	29.4	33.3	
Region					
Vientiane	29.3	36.9	36	38	
North	26.9	34.5	30.7	35.2	
Central	31.5	32.5	31	34	
South	32.3	32.4	31.4	32.2	

Note: LECS – Lao Expenditure and Consumption Survey.

Source: World Bank and Department of Statistics (Laos); Lao Statistic Bureau (LSB) (2014).

balances. From 2011-2013, the budget and trade deficit accounted for about 9.2% (excluding grants) and 0.62% of GDP respectively. The budget deficit is mainly financed by official development assistance (ODA), while the trade deficit is financed by foreign direct investment (FDI) and remittances. The fiscal situation is not strong in Laos, and continued increases in budget deficits could accelerate inflation and lower the value of the kip (Lao currency), potentially leading to the type of economic instability experienced during the Asian financial crisis. Second, there is a huge gap between savings and investment. The savings rate is low because average income is low due to the underdevelopment of the financial sector. The banking sector is inhibited by the state commercial banks, which are not fully performing important banking functions.¹ Third, Laos also faces a high external debt burden. Accumulated external debt accounted for more than 76% of GDP in 2011-2013. If Laos becomes over-dependent on foreign finance, potential difficulties meeting its debt obligations could cause an external debt crisis and subsequently lead to macroeconomic instability. Fourth, as the Lao economy is dependent on the resource sector², this could have a negative long-term impact in the form of Dutch disease which is characterized by the following four features: (1) real exchange rate appreciation; (2) declining input in non-booming sectors; (3) declining exports and output in non-booming sectors; and finally, (4) declining real GDP (Corden, 1984; Corden and Neary, 1982).

3. FDI Policy and Trends

3.1. FDI Policy

Laos began to move away from a centrally planned economy when it introduced the *New Economic Mechanism (NEM)* in 1986. This reform has opened an opportunity to private sector development. The key reform programs of this legislation included: 1) price liberalization, 2) tax reform (financial reform), 3) privatization of state owned enterprises (SOEs), including collective enterprises in the agriculture sector, 4) banking reform, and 5) an open door policy. These changes released the great potential of the private sector, especially in terms of participation in international trade. A more detailed discussion of key policy measures of the reform programs follows.

Promoting multi-sectoral ownership entailed encouraging private sector ownership and privatization of SOEs, particularly private land use rights and private businesses. Laos introduced the FDI Law 1988, which was revised three times in 1994, 2004 and 2009 respectively. The amended FDI laws featured: (1) consolidated regulations for both domestic and foreign investors to participate on a “level playing field”; (2) shortened procedures for opening new businesses; (3) no terms of investment for promoted activities; (4) extended investment incentives – education and health care sectors being top priorities; (5) foreign access to local financial sources; (6) foreign invested companies having the right to own a piece of land for building their offices/residences; (7) foreigners being allowed to invest in the real estate sector; and (8) development of Special Economic Zones (SEZs) and industrial parks (Vongsay, 2013).

3.2. FDI Trends

Investment has increased from 1989 to 2015 in terms of the number of projects and registered capital (Table 4). FDI flows into Laos rose significantly after the first revised FDI law in 1994 but declined during the Asian Financial Crisis (1998 to 2001). Starting from 1993, FDI in resource sectors (mining and hydropower) has been growing rapidly. However, registered capital registered a decline in 2010 due to the global financial crisis in 2008-2010.³

The top 10 foreign investors of Laos in 1989-2015 are shown in Table 5. Lao FDI is dominated by neighbouring countries. In terms of capital registration, the top three countries are China, Thailand and Vietnam, accounting for more than 60% of all FDI in Laos.

Moreover, FDI in Laos is not diversified and is very much resource-based. Most of the FDI has been invested only in resource sectors. The energy and hydropower sector absorbed more than half of the total investment (Table 6). The electricity generation sector takes up about 30% and mining sector accounts for 23% of the total investment in the country.

Table 4 FDI Inflow to Laos (1989-2015)

<i>Year</i>	<i>Value of Investment (US\$ mil.)</i>	<i>No. of Projects</i>	<i>Year</i>	<i>Value of Investment (US\$ mil.)</i>	<i>No. of Projects</i>
1989	29	9	2003	65	121
1990	3.9	25	2004	217	132
1991	28	34	2005	119	175
1992	69	54	2006	789	260
1993	78	80	2007	3128	347
1994	1313	120	2008	5000	531
1995	53	82	2009	1100	616
1996	114	33	2010	2850	442
1997	659	45	2011	3550	471
1998	1385	56	2012	1850	442
1999	186	58	2013	2640	96
2000	513	61	2014	500	56
2001	72	45	2015	100	56
2002	434	66			

Source: Investment Promotion Department, Ministry of Planning and Investment, Laos.

Table 5 Top Ten FDI by Countries (1989-2015)

<i>Country</i>	<i>Value of Investment (US\$ mil.)</i>
China	5,484
Thailand	4,491
Vietnam	3,574
Malaysia	813
South Korea	751
France	491
Japan	438
Netherland	435
Norway	436
Britain	202

Source: Investment Promotion Department, Ministry of Planning and Investment, Laos

Table 6 FDI by Sector (1989-2015)

<i>No.</i>	<i>Sector</i>	<i>Value of Investment (US\$ mil.)</i>	<i>Investment Share (%)</i>
1	Electricity generation	7,303	30
2	Mining	5,698	23
3	Agriculture	2,946	12
4	Service	2,544	10
5	Industry and handicraft	2,111	9
6	Hotel and restaurant	1,023	4
7	Construction	827	3
8	Telecom industry	663	3
9	Wood	410	2
10	Banking	372	2
11	Trading	325	1
12	Garment	95	0
13	Consulting	67	0
14	Public health	64	0
15	Education	31	0
Total		24,479	100

Source: Investment Promotion Department, Ministry of Planning and Investment, Laos.

4. Literature Review

While foreign direct investment (FDI) is believed to play an important role for economic development by generating linkages and spillovers (Moran, 1998; Borensztein et al., 1998; Alfaro et al., 2004), it is also widely argued to have a negative impact on local economic growth (Alfaro et al., 2004; Usui, 1996; 1997). The negative impact came from the “Dutch disease” which appreciates the real exchange rate and leads to a contraction in the tradable sectors (Corden, 1981; 1982). In addition, FDI is also argued to have negative impacts on the environment, natural resources and sociality. Despite the existence of general discussions of FDI, there is very limited research on the specific impact of China’s investment on the Lao economy in general, and poverty and local firms in particular.

Although scarce, the existent research on Laos can be divided into two groups, one of which is descriptive analysis of the FDI policy and situation and the other is quantitative analysis on the impact of FDI. The descriptive analysis on FDI policy and situation focuses on the current situation of FDI

in Laos and FDI policy/incentives (Suzuki and Keola, 2005; Norasingh, 2013; Vongpraseuth and Choi, 2015; Tan, 2012; Kyophilavong and Nozaki, 2015; Gunawardana and Sisombat, 2008a). The current situation, trends, issues and challenges of FDI in Laos have also been studied by various researchers (Gunawardana and Sisombat, 2008b; Goto, 2010; Onphanhdala and Suruga, 2013; Freeman, 2010; Andersson et al., 2009). Among them, Kyophilavong (2012) reviewed the FDI trends and FDI in the mining sector from 1993 to 2010 and identified the benefits and costs of FDI in this sector. The study found that Chinese FDI is largely concentrated in the mining and hydropower sectors.

The second group of studies focuses on the impact of FDI on the Lao economy, most employing macroeconomic and CGE models to investigate the impact of the natural resources sector on the Lao economy and poverty in Laos. Kyophilavong and Toyoda (2012) examined the impact of FDI in the mining and hydropower sectors on the Lao economy by using a macro-econometric model, and found that FDI in the mining and hydropower sectors had a positive impact on economic growth, export and budget revenues. However, this study also found that FDI in mining and hydropower sectors has a negative impact on long term development in Laos because FDI in mining and hydropower sectors tends to increase appreciation of real exchange rates, which will reduce the non-resources sector production and exports. Meanwhile, Warr (2006) used a simple CGE model to estimate the impact of resources on development in Laos and found that Laos might be affected by the “Dutch disease”. Oh and Kyophilavong (2014) added the roles of FDI and trade facilitation to benefit trade liberalization between ASEAN and Korea. They found that FDI played important roles for poverty reduction and economic growth in Laos. In general, although many authors have the view that FDI in the mining sector has the potential to shrink the non-mining sector reflecting a vulnerability to the Dutch disease, their studies revealed very little of the total impact of Chinese FDI on Laos.

5. The Impact of FDI on Nation-Wide Economy and Poverty

5.1. Methodology and Data

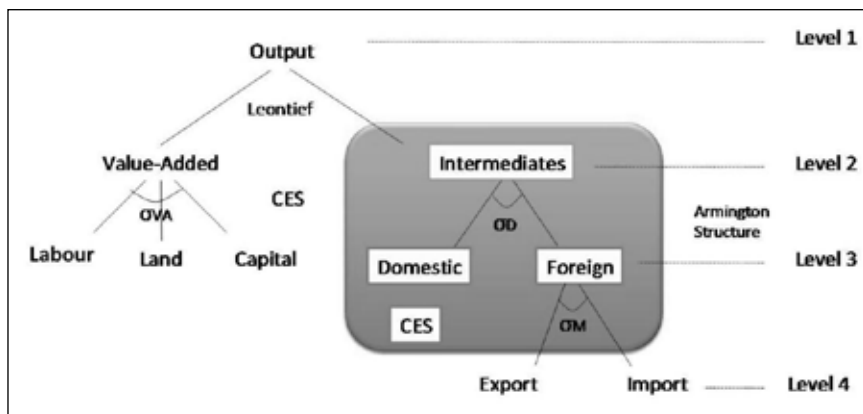
A computable general equilibrium (CGE) model was used for our analysis. It combines economic theory and empirical data to create an economic tool for policy analysis of issues such as changes in tariffs and their effects on whole economic systems. CGE models present the behaviour of economic agents (producers, consumers, and government), sectors (industry, agriculture, and services) and factors of production (labour, capital and land). The Global Trade Analysis Project (GTAP) model, a multi-regional computable equilibrium (CGE) model, is one of the most popular models for analyzing the

impact of trade policies.⁴ There are various advantages to the GTAP model. Firstly, since it is a multi-regional model of world production and trade, it can take into account the overall trade implications of AFTA as well as third-party countries. Secondly, it contains a database for different sectors and thus can explore the trade implications for various sectors of interest.⁵

The GTAP model assumes perfectly competitive markets, where the zero profit condition holds, and that all the markets are cleared. The regional household allocates expenditure across three categories: private household, government and savings. It derives income from the “sale” of primary factors to the producers, who combine them with domestically produced and imported intermediate composites to produce final goods. These final goods are in turn sold both domestically to private households and the government, and exported to the rest of the world. Both the government and private households also import consumer goods from the rest of the world. A global bank intermediates between global savings and regional investments by assembling a portfolio of regional investment goods and selling shares in this portfolio to regional households in order to meet their savings demands. Finally, a global transport sector assembles regional exports of trade, transport and insurance services and produces composite goods used to move merchandise trade among regions (Hertel, 1997). The flowchart of and production structure in the GTAP model is illustrated in Figure 1. The factors of production in value-added function include labour, land and capital. The output function is combined from value-added and intermediate goods.

The latest version of the GTAP database, version 8, is used for this study. The GTAP model was run by the GTAP data base, which is a multi-country input output table containing production, consumption, bilateral trade,

Figure 1 Production Structure in the GTAP Model



Source: Hertel, 1997.

transport and protection linkages. The current release, the GTAP 8 database, features 2004, 2007 and 2011 reference years as well as 140 regions for all 57 GTAP commodities. To facilitate our analysis, regions have been aggregated into two separate sub-regions (Laos and the rest of the world). All 57 sectors remain as delineated in the GTAP database.

The model closure and free parameters are important factors that influence the simulation result in the CGE model. Macro closure is an important factor that influences the simulation result from the GTAP model. Closure divides the variables in the model into endogenous and exogenous variables. Endogenous variables are determined by the model, but exogenous variables are determined from outside the model. Macro closure is based mainly on the characteristics of the economy in the country of focus. The closure of the GTAP model has various elements such as population growth, capital accumulation, industrial capacity, technical changes and policy variables (tax and subsidies). However, in order to simplify the closure, we use the standard GTAP closure, which is called “neo-classical” closure. This closure assumes that all prices are flexible; there is perfect competition (all firms earn zero pure profit) and full employment and factor mobility within regions; investment expenditure is determined by savings rate; and tax rates are fixed.

Parameters are one of the most important considerations in a CGE model. Basically, some parameters for this study are calibrated from the country’s Social Accounting Matrix. However, some parameters for the CGE model are not available in Laos. As there is no estimate of a free parameter in Laos⁶, we used the free parameter from Warr (2006).

A multi-sector CGE is an appropriate tool to assess the effects of Chinese FDI on the Lao economy. The model applied in this paper was developed by the Global Trade Analysis Project (GTAP) as mentioned before. The solver of this model is GEMPACK modeling software (Harrison and Pearson, 1996). The database (GTAP database version 8) was collected from a variety of international sources and it consists of more than 100 regions and 57 sectors on a global level. We aggregated regions into three – Laos, China, and the rest of the world – and aggregated sectors into 10.

From the Economic Census in 2012 (NSB, 2012), the share of Chinese investment in total investment was about 13% (Table 7). The GTAP model is formulated in percentage change which requires that exogenous shocks are also defined in relative terms. We assumed that there is increasing capital endowment from Chinese FDI in Laos⁷. In this simulation, we assumed that there is no technology transfer which would have increased total factor productivity (TFP) in those sectors which actually receive Chinese FDI. It is important to note that there are some issues in Chinese FDI shocks for the model. First is that the exercises are conducted at the aggregated level.

Table 7 Ratio of Chinese Investment in 2012

<i>Sector</i>	<i>Chinese firm</i>	<i>All firm</i>	<i>Ratio of Chinese firm (%)</i>
Agriculture, Forestry and Fishing	384.6	3,400.8	11.3
Mining and Quarrying	249.8	3,163.7	7.9
Manufacturing	1,490.2	10,232.5	14.6
Electricity and gas	150,000.0	153,176.8	97.9
Water supply and sewerage	0.0	91.4	0.0
Construction	224.5	1,076.0	20.9
Wholesale and retail trade	326.1	513,756.8	0.1
Transportation	182.9	434.0	42.1
Accommodation and food services	165.9	1,320.7	12.6
Information and communication	12.4	17,903.6	0.1
Finance and insurance	37.5	458,799.6	0.0
Real estate	19.0	159.6	11.9
Professional, scientific and technological activities	4.6	91.4	5.1
Administrative and support services	32.3	191.5	16.9
Education	0.03	349.0	0.01
Human health and social works	3.2	29.5	11.0
Arts, entertainment and recreation	5.3	1,503.6	0.4
Other services	1.2	28.1	4.3
Total	153,139.5	1,165,708.5	13.1

Source: National Statistic Bureau (NSB).

Second, it is not clear whether Chinese FDI primarily contributes to an increased supply of variable inputs (short-term liquid assets, overall value of fixed assets, total capital stock). But if Chinese FDI consists mainly of fixed assets (buildings and large machinery), the shocks implemented in the simulations are relatively low. If Chinese FDI becomes fully effective immediately as production capital, the relevant percentage increases in local capital would be significantly higher.

5.2. Simulation Results

The result of the impact of Chinese FDI on selected macroeconomic variables is shown in Table 8. The increase in Chinese FDI has positive impacts on GDP, welfare, trade balance and household income. Chinese FDI increased real GDP by 2.67%, welfare (equivalent variation) by US\$51.14 million, household income by 1.69%, and trade balance by US\$58.80 million. It indicates that Chinese FDI contribute to macroeconomic variables in Laos.

Table 8 Macroeconomic Results due to Increase in Chinese FDI

<i>Macroeconomic variables simulation</i>	<i>Increase due to Chinese FDI</i>
Real GDP (%)	2.67
Welfare (equivalent variation) (US\$ million)	51.14
Household income (%)	1.69
Trade balance (US\$ million)	58.80

Source: Authors' simulations.

Table 9 Impact of Chinese FDI on Sectoral Output

<i>No.</i>	<i>Sectors</i>	<i>Increase due to Chinese FDI</i>
1	Grains and crops	0.78
2	Livestock and meat products	0.82
3	Mining and extraction	11.3
4	Processed food	2.47
5	Textiles and clothing	14.72
6	Light manufacturing	15.34
7	Heavy manufacturing	10.46
8	Utilities and construction	0.15
9	Transport and communication	5.01
10	Other services	3.9

Source: Authors' simulations.

The impact of Chinese FDI on output in Laos is shown in Table 9. Most of the sectors increased their output as a result of Chinese FDI, especially in textiles and clothing, light manufacturing, mining and extraction and heavy manufacturing. Increasing Chinese FDI stimulates investment and production and leads to increase output in Laos.

As our model does not disaggregate household by income, it is quite difficult to assess the impact of Chinese FDI on poverty and income gaps. However, according to the literature (Strutt et al., 2008), returns to unskilled labour reduces poverty and if increasing returns of unskilled labour is greater than returns of skilled labour the impact is to narrow the income gaps. The impact of Chinese FDI on poverty and income gaps are shown in Table 10. Chinese FDI increases returns to unskilled labour and skilled labour, which shows that Chinese FDI reduces poverty. In addition, because the increase

Table 10 Change in Returns to Factors of Production

<i>Factors of production</i>	<i>Increase due to Chinese FDI</i>
Returns to unskilled labour	2.39
Returns to skilled labour	0.56

Source: Authors' simulations.

in returns to unskilled labour is higher than the returns to skilled labour, the income gap is reduced by Chinese FDI.

6. Summary

As one of the top contributors to overall FDI in Laos, China has invested significantly in the mining and hydropower sectors. While the Chinese FDI has increased significantly in Laos, there are few studies of the impact of Chinese FDI on the national economy and poverty in Laos. Therefore, the main objective of this paper is to investigate the impact of Chinese FDI on the national economy and poverty in Laos using a CGE model. Our analysis suggests that Chinese FDI has a positive impact on GDP, welfare, income and exports in Laos. The simulation also indicates that Chinese FDI contributes to poverty reduction and reducing income gaps in Laos. However, as Chinese FDI is largely concentrated in resource-based investment, it may have a negative impact on the Lao economy as the FDI in resource sector tends to appreciate Laos' exchange rate and decrease production and exports of non-resource sector products, such as agricultural products and manufacturing goods. In addition, Chinese FDI has the potential to damage the natural environment and natural resources.

Given the positive impact of Chinese FDI on Laos' economy, it is important to promote Chinese FDI by improving the domestic investment climate. However, as Chinese FDI is largely concentrated in the natural resources sector (mining and hydropower sectors), it is also necessary to diversify Chinese FDI by encouraging Chinese investment in non-resources sectors, such as agriculture and manufacturing, to mitigate the negative impact of the Dutch disease and ensure the long term development of Laos. However, although this study has performed a relatively thorough assessment of Chinese FDI and its impact on the economy and poverty in Laos, the study can be further strengthened by examining externalities from the Chinese investment environment. It is suggested that a future study can be conducted to capture more economic factors influenced by the capital inflow to deepen our understanding of Chinese investment in Laos.

Notes

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1. More details about financial issues, and monetary and exchange rate policies in Laos are discussed in Kyophilavong (2010).
 2. According to the World Bank (2014), the resources sector contributed about 2.83 percentage points to the growth rate over 2008 to 2013. The resources sector also accounted for about 60% of all exports in 2013, a share that is expected to increase under expected ongoing development in the hydroelectricity and mining sectors. Revenues from the resource sectors as a share of total revenues rose to 2.6% of GDP in 2010, a share that is expected to rise with continued growth in the sector.
 3. The main reason for the increase in FDI projects during the global crisis was that the Lao government had revised the FDI Law in 2009. This new FDI law provides more incentives to invest in Laos especially in the agriculture and services sector (Nozaki and Kyophilavong, 2015).

4. The GTAP model is based on the ORANI model, a single country CGE model for the Australian economy (Dixon et al., 1982). The GTAP model extended the ORANI model by allowing international trade, which introduced a global transportation sector and savings institution.
5. For more details, see Hertel, 1997. A graphic presentation of the GTAP model, with particular emphasis on the accounting relationships, is given by Brockmeier (1996).
6. The free parameter is a parameter not produced from the data in the model. The author used this parameter which is based on the literature.
7. It is important to note that we analysed only FDI and not FEI (foreign equity investment) and FC (foreign credit).

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