

# Unfavorable Truth of Currency Integration: The Case of Laos\*

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## Abstract

There exists a clear divide of economic development between two groups of countries in ASEAN. To discuss on economic integration in East Asia, we must understand macroeconomic reality in such a country as Laos, where development of financial institutions is still very low. Furthermore, Laos has a peculiar three currency phenomenon. We put some shed on this special multiple currency phenomenon. We study how exchange rate management has been implemented and which currency or a basket of currencies should be manipulated to attain macroeconomic stability under the complicated multiple currency environment. We also investigate macroeconomic effects of alternative exchange rate arrangements using econometric simulations.

We find that Laos will be deteriorated, particularly in its trade balance, by currency integration led by developed countries in the region. Based upon the analysis, we conclude that developing countries need more time to be integrated into a more or less homogeneous community in East Asia and developed countries should assist them more, particularly to reform and improve financial institutions and macroeconomic management.

## 1. Introduction

In recent years many economic/political discussions have been flourished on possible economic integration in East Asia including all ASEAN countries. Asian common money (ACM) or Asian common unit (ACU) has been also proposed by several authors. Although this movement has been stemmed mainly from the idea to avoid such a serious economic and financial crisis in the late 1990's, we must pay careful attention to the late comer ASEAN countries, i.e., Cambodia, Laos, Myanmar and Vietnam (CLMV). Many discussions on integration issues seem to disregard the reality of deep divide, compared to more developed countries in the region, both in terms of income per capita and underdeveloped financial institutions in CLMV countries.<sup>1)</sup>

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1) In recent years, the economic and business development of Vietnam is outstanding; therefore we may restrict attention to only CLM in this context.

To establish a successful economic integration in this region, it is very important not to disregard but to include CLMV countries. To do so, the developed countries should assist CLMV countries by various means to narrow the gap between the two groups of countries in East Asia.

In this paper, we do not discuss on this divide issues directly. We concentrate on macroeconomic issues of Lao PDR in order to point out its problems and challenges existing ahead of possible integration with other East Asian countries.

In the next section we consider the peculiar multicurrency phenomenon (MCP) in Laos. This MCP has merits and demerits (Menon (2006)) and itself is a not necessarily bad phenomenon. However, it restricts effectiveness of monetary policy and also provides complicated situation when we consider currency integration.

In section three, we conduct some empirical studies on effects of MCP. First, we inquire into the causal relations of the two popular foreign currencies in Laos, i.e., the US dollar rate and the Thai baht rate of the domestic currency, kip. Following that, we conduct econometric simulation analyses based on an econometric model with alternative foreign exchange arrangements, including kip/dollar rate, kip/baht rate, nominal effective rate, and an Asian common unit. In the last section, we conclude our arguments.

## **2. Characteristics of Dollarization in Laos**

### *2.1 General Concept of Dollarization*

Dollarization is a phenomenon of a country's portfolio shift away from domestic currency to foreign currency (or currencies) to maintain the main function of money as a store of value, unit of account, and/or medium of exchange. Historically, the US dollar and Deutsche mark (or euro in recent years) has been widely used as money together with domestic currency in developing and transition economies.

The depth and range of dollarization vary across countries. The most popular experiences have been observed in Latin American countries, where the US dollar has been widely used in parallel with domestic currencies. Some countries abolish domestic currency and officially adopt the US dollar as their currency. Examples include Ecuador, El Salvador and Panama. By doing so, they have effectively adopted and followed the US monetary policy to maintain macroeconomic stability. This is called full or official dollarization. (Watanabe (2006), Menon (2007)). In many developing and transition countries, however, dollarization has been naturally and gradually developed to attain partial dollarization. The case of Laos is not an exception.

## 2.2 *Three Currency Phenomenon as Dollarization*

As mentioned above, usual dollarization is a phenomenon that both foreign and domestic currencies are used as money. In that sense, dollarization is sometimes called as multiple currency phenomenons (MCP) (Menon (2007)). In Asian developing countries, the US dollar dominates the lists of foreign currencies; therefore it is widely used in addition to domestic currency. In Laos, however, the Thai baht as well as the US dollar is widely used in addition to the domestic currency, kip. This three currency phenomenon or MCP constitutes the most significant peculiarity of dollarization in Laos.

We can distinguish three states (or causes) of dollarization in Lao PDR.<sup>2)</sup> First, like many other developing countries, Laos has been receiving foreign currencies through both official and non-official means, including ODA, lending programs, foreign direct investment, and remittance from overseas to families and relatives. Injection of foreign currencies through official and non-official transfer (mainly the US dollar) is an important source of dollarization in Laos.

The second state is currency substitution, which refers to the state where foreign currencies (mainly the US dollar and the Thai baht) are used in parallel with kip as a means of payment. As shown in Table 2.1, the trade balance is in chronic deficit reflecting high demand for imports. This means that the formal banking system and the Bank of Laos do not have sufficient foreign currencies for accommodating the strong currency demand for importing purposes. This forces people to go to the parallel market outside the formal banking system for foreign currency, which is also available at a higher exchange rate (Chaleunsinh (2003)). In addition to this conventional process of dollarization, there is a unique geographical reason for Laos. Chaleunsinh (2003) and the Economist Group (2007) point out that Lao PDR has long frontiers with five neighboring countries, which use different currencies (e.g., Thai baht, Vietnamese dong, Chinese yuan, Cambodian riel, and Myanmar kyat). The border trade along the Lao frontier, particularly with Thailand along the Mekong, plays an important role to inject foreign currencies to Laos. Chaleunsinh (2003) estimates the rough shares of each currencies to be used at the border transactions from the Lao side, which reports that kip's share is only 30 percent, while baht's share is also 30 percent and 10 percent each of the dollar, yuan and dong currencies. Considering both domestic and border transactions, the Thai baht as well as the US dollar constitute the two major foreign currencies with high liquidity in Lao PDR.

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2) Watanabe (2006) points out that the usual literature classifies the state of dollarization into the two states, i.e., currency substitution and asset substitution. However, we consider three states are important in Lao PDR.

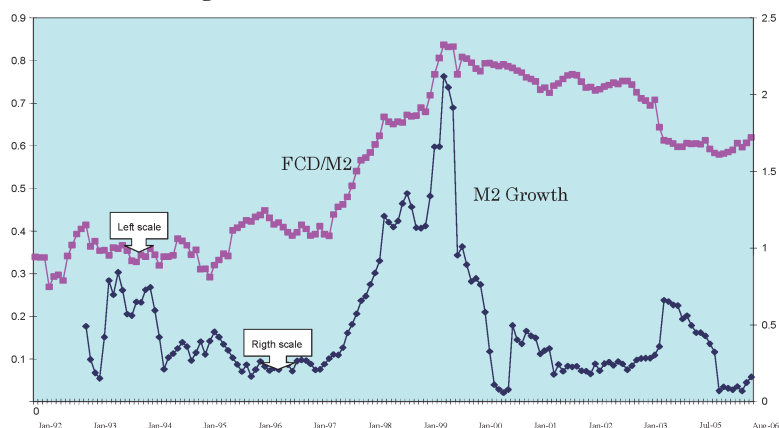
Table 2.1 Macroeconomic and Financial Indicators

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
<b>1. Macroeconomic indicators</b>											
GDP (billion kip)	1430.36	1725.70	2201.00	4240.00	10329.00	13669.50	15701.80	18390.00	20307.10	26590.10	30599.90
GDP Growth (real)	7.00%	6.90%	7.20%	4.00%	5.20%	5.80%	5.76%	5.90%	5.79%	6.88%	7.29%
GDP per-capita (US\$)	381.76	394.33	360.58	198.63	285.50	333.84	332.52	338.86	384.62	443.08	478.69
Government deficit/GDP	-5.99%	-5.47%	-7.50%	-2.91%	-4.58%	-4.45%	-3.41%	-5.69%	-8.20%	-6.50%	-8.32%
Outstanding debt/GDP	37.95%	41.29%	52.18%	101.04%	73.41%	64.39%	68.10%	70.16%	64.96%	78.35%	78.21%
<b>2. Monetary Aggregate</b>											
Base money (billion of kip)	na	104.37	150.09	281.75	481.75	766.65	822.50	1,079.10	1,369.10	1,545.30	1,823.23
M2 (billion of kip)	na	244.93	406.00	865.93	1,544.00	2,252.10	2,704.10	3,435.50	4,094.70	4,999.85	5,416.34
Central bank discount rate (%)	na	na	na	na	0.35	0.35	0.35	0.20	0.30	0.30	0.30
Deposit rates (%)	17.50%	17.50%	18.00%	22.00%	20.00%	20.00%	15.00%	15.50%	15.50%	13.00%	12.50%
Prime lending rate (%)	21.50%	18.50%	19.00%	23.00%	27.00%	21.00%	22.00%	21.00%	22.00%	20.00%	19.75%
Inflation rate (%)	19.56%	15.84%	19.50%	90.12%	128.38%	23.14%	7.81%	10.63%	15.49%	10.46%	7.16%
Dollarization ratio (%)	na	na	na	na	83.70%	78.40%	78.04%	75.45%	68.74%	67.97%	68.48%
<b>3. Exchange rates</b>											
Nominal exchange rate (vis-à-vis the US\$)	834.22	938.72	1,304.80	3,422.02	7,437.70	7,935.00	8,938.00	10,111.20	10,609.40	10,644.50	10,672.90
Real exchange rate (vis-à-vis the US\$)	na	na	na	na	na	na	100.80	96.90	97.50	100.20	104.00
Balance of payments/GDP	1.78%	4.15%	-3.41%	0.21%	-0.45%	1.99%	-0.42%	3.42%	0.92%	0.48%	0.39%
Current account balance/GDP	-7.60%	-12.50%	-10.00%	-3.00%	-5.10%	-0.30%	-3.90%	0.20%	-2.00%	-7.60%	-6.80%
Exchange reserves/GDP	5.32%	9.14%	6.34%	11.43%	7.31%	8.09%	7.54%	10.65%	10.12%	9.09%	8.44%
Exchange market interventions	na	na	na	na	12.18	11.13	0.20	19.20	(25.90)	17.12	(8.96)

Source: The Bank of Laos

The third state is asset substitution, which refers to the state where foreign currencies are held as means of savings and/or store of value. Together with the progress of currency substitution, asset substitution prevailed from a quite early stage of development. Therefore, the Lao government legalized foreign currency deposits in the banking system since the late 1980's (The Economist Group (2007)). It is difficult to grapes the correct figures of foreign currencies which are held in the private sector for the asset purposes because, first, the banking system is still underdeveloped, and second, people tend to keep foreign currencies at hand for future possible substitution with real assets like durable goods and precious metal.

**Figure 2.1 FCD/M2 and Growth of M2**



Source: The Macro and Finance Economist Group (2007)

Although the correct figures of foreign assets in Lao PDR are not available, the ratio of foreign currency deposits (FCD) to broad money, M2, is usually used as a proxy measure of dollarization in terms of asset substitution. Figure 2.1 shows the ratio of FCD to M2. Before the period of the Asian financial crisis of 1997, it fluctuated around 0.3 to 0.4, but sharply increased to around 0.8 in 1997–1999. Economic agents chose foreign currency denominated deposits as safer assets at the economically unstable period. This means a sharp increase in demand for foreign currencies (the US dollar, in particular) arose so that a sharp depreciation of domestic currency (kip) was created. The figure also shows the sharp increase in FCD and also the sharp depreciation of kip resulted in a high growth of M2. After 2000 the ratio FCD/M2 remains the same or has been a little declining and the level of M2 has been controlled as well, so that M2 growth has been kept very low and stable. Toyoda and Phouphet (2005a) also found that the percentage of savings deposits at banks denominated in

dollars is quite high, particularly in the capital city, Vientiane. The second high percentage is given by savings deposits denominated in baht. Table 2.2 shows this fact.

**Table 2.2 Private Savings Deposits at Banks Denominated by Currency**  
(expressed by %)

	State banks		Foreign banks in Laos		Foreign banks outside Laos		Total	
	Local cities	Capital	Local cities	Capital	Local cities	Capital	Local cities	Capital
US dollar	60.31	65.63	44.16	34.65	0.00	96.27	59.16	83.02
Thai baht	30.52	20.54	13.06	59.05	0.00	3.69	29.28	14.45
Kip	9.17	13.83	42.77	6.30	0.00	0.04	11.56	2.52
Total	100.00	100.00	100.00	100.00	0.00	100.00	100.00	100.00

(Source) Toyoda and Phouphet (2005b)

### 2.3 Dollarization and Exchange Rate

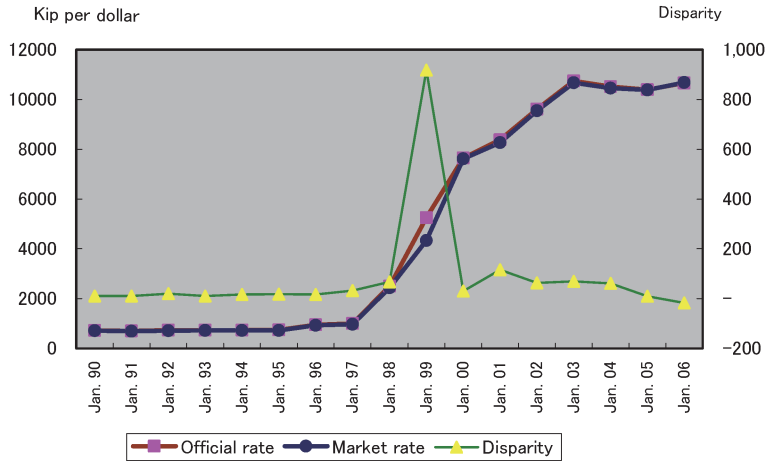
As has been analyzed above, the US dollars and the Thai baht are the major dominated foreign currencies, which can be accepted as a means of payment and also of store of value. The Bank of Laos has been implementing the so-called managed floating system. The BOL pays sole attention to the US dollars, but the actual dollarization means the widely spread use of the two foreign currencies. According to Figures 2.2 and 2.3, the US dollar rate (i.e., kip vis-à-vis dollar) and the Thai baht rate (i.e., kip vis-à-vis baht) seem to move in parallel. However, at the Asian economic and currency crisis in 1997, the Thai baht was sharply depreciated against the US dollar and kip was more depreciated than baht by several reasons. One important reason is that demand for both currencies, dollar and baht, sharply increased and a doubly-punched pressure of depreciation of kip prevailed.

However, experiencing such a sharp depreciation of the domestic currency and observing that the Thai baht was also depreciating vis-à-vis the US dollar, it was natural for the Lao authority to set a measure to adjust the domestic currency more to the US dollar (the world key currency) than any other foreign currencies.

Since 2000, the Lao authority has succeeded in keeping the exchange rate per the US dollar around 10,000 kip. Since January 2005, the Bank of Laos has been implementing an exchange rate policy based on Regulation No. 14/BOL by determining daily reference rate based on the US dollar. (The Economist Group (2007)).

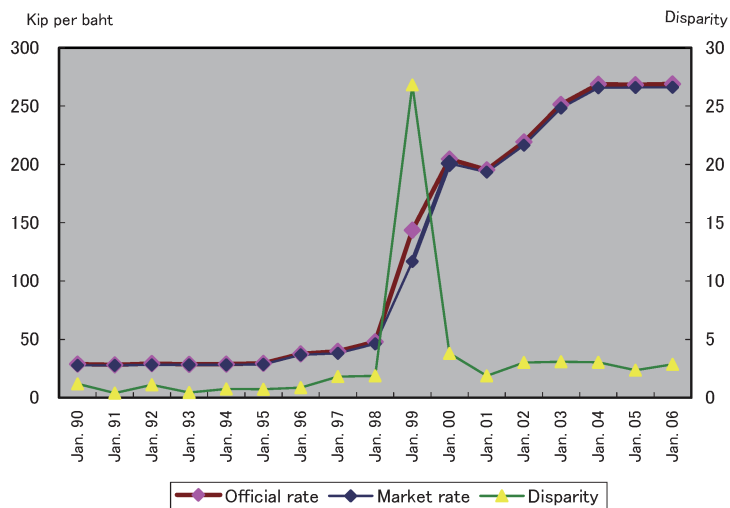
Unfavorable Truth of Currency Integration: The Case of Laos

**Figure 2.2 Kip per dollar rate**



Source: The Economist Group (2007), The Bank of Laos

**Figure 2.3 Kip per baht rate**



2.4 Causality Test of the Two Exchange Rates

We conducted some preliminary time-series analysis of the behaviors of the two official exchange rates, i.e., the US dollar rate and Thai baht rate, using monthly data for the period of 1995:1 through 2005:12. Our main intention to conduct such analysis is to find the time series properties of the Lao exchange rate and also to test statistically what is the main target foreign currency for the Lao authority, the US dollar or the Thai baht? Therefore, we use both total sample and sub-samples divided at mid 1997.

**Table 2.3 Unit Root Tests for Levels and First Differences**

Variables	Lag	DF-GLS ( $H_0$ : unit root)		KPSS ( $H_0$ : stationarity)	
		constant	constant & trend	constant	constant & trend
Dollar (level)	1	0.5364	0.6164	1.1556***	0.3132***
Baht (level)	1	0.7333	-0.7853	1.1853***	0.3071***
d(Dollar) (first diff.)	0	-6.0803***	-6.3033***	0.5697**	0.1105
d(Baht) (first diff.)	0	-7.8839***	-8.0725***	0.3999*	0.1009

Note 1: \*\*\*, \*\* and \* indicate the significant level at 1%, 5% and 10% respectively.

- 2: DF-GLS means an ADF-type test based on estimating the deterministic term first by a generalized least-squares procedure and subtracting it from the original series.
- 3: KPSS means a test for the null hypothesis that the series is stationary ( $H_0: y_t \sim I(0)$ ) against the alternative  $I(1)$  ( $H_1: y_t \sim I(1)$ ). The procedure was proposed by Kwiatowski, Phillips, Schmidt and Shin in 1992.

We first conducted tests for stationarity of the two exchange rates. Table 2.3 shows the results of DF-GLS test for unit roots and KPSS test for stationarity. Both tests show that the levels of dollar and baht series are integrated even at 1% level of significance for both cases of constant and constant & trend terms in the models. First differences of both series are shown stationary at 5% level of significance except of KPSS test with constant term in the model. Hence we conclude that both series are integrated of order 1, that is  $I(1)$ . For sub samples 1995:1–1997:6 and 1997:7–2006:9, both series show the same integrated property.

After confirming the stationarity properties of the series of first differences of the two exchange rates, we inquired into the causality between the series in Granger's sense. Our maintained hypothesis is that after the Asian financial crisis the Lao monetary authority has turned towards a more positive control or stability of the kip/dollar rate. As mentioned above, at least since January 2005, the Lao monetary authority has been actually practicing daily operation by setting a reference kip/dollar rate and then allowing commercial banks to set their rates of kip/dollar and other exchange rates within very narrow bounds. We therefore expect causality from kip/dollar rate to kip/baht rate at least after the Asian financial crisis. We first took first differences of the series to conduct the conventional two variable VAR analyses. Based on AIC criterion, we used five year lagged variables in all explanatory variables. Table 2.4 shows the result for the full sample period, 1995:1–2006:10. Tables 2.5 and 2.6 show the results for the sub-samples, 1997:7–2006:10 and 1995:1–1997:6, respectively. As shown in Table 2.5, clear one-way causality from kip/dollar rate to kip/baht rate exists after the Asian financial period. No causality of another way from kip/baht rate to kip/dollar rate exists for



the post-crisis period. This corresponds to the actual daily operation of exchange management of the Bank of Laos as explained above. Before the Asian financial crisis, completely opposite causality from kip/baht rate to kip/dollar rate was detected as shown in Table 2.6. The reason for this causality might be that the official exchange rate was determined in such a way to follow the parallel market rate primarily through kip/baht rate, the biggest portion of international transactions being made by the Thai baht. The full sample case as shown in Table 2.4 shows one-sided causality from kip/dollar rate to kip/baht rate, but this may simply be due to the fact that the number of post-crisis samples far exceeds the one of the pre-crisis samples.

**Table 2.4 Causality Test over 1995m1–2006m9 (using first difference series in VAR)**

Null Hypothesis	F-statistics				
	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5
Baht does not Granger cause dollar	1.852	0.726	0.732	0.844	1.425
Dollar does not Granger cause baht	16.936***	6.841***	4.953***	3.724***	3.550***
AIC	-7.000	-6.943	-6.895	-6.861	-6.832

Note: \*\*\*, \*\* and \* indicate the significant level at 1%, 5% and 10% respectively.

**Table 2.5 Causality Test over 1997:m7–2006m9 (using first difference series in VAR)**

Null Hypothesis	F-statistics				
	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5
Baht does not Granger cause dollar	0.161	0.138	0.294	0.910	2.289*
Dollar does not Granger cause baht	16.043***	6.832***	4.789***	3.562***	3.789***
AIC	-6.854	-6.796	-6.744	-6.719	-6.735

Note: \*\*\*, \*\* and \* indicate the significant level at 1%, 5% and 10% respectively.

**Table 2.6 Causality Test over 1995:m1–1997:m6 (using first difference series in VAR)**

Null Hypothesis	F-statistics				
	Lag-1	Lag-2	Lag-3	Lag-4	Lag-5
Baht does not Granger cause dollar	20.536***	16.232***	9.790***	10.859***	9.261***
Dollar does not Granger cause baht	0.497	0.043	0.925	1.221	1.349
AIC	-9.583	-9.274	-9.814	-10.220	-9.902

Note: \*\*\*, \*\* and \* indicate the significant level at 1%, 5% and 10% respectively.

### 3. Econometric Evaluation of Alternative Currency Arrangements

#### 3.1 Analytical Framework

In this section we empirically examine macroeconomic effects of alternative exchange rate arrangements in the Lao PDR. Different from other ASEAN countries with MCP, three currencies instead of two currencies have been widely used in this developing country. In this special environment, is it a wise approach for the Lao authority to integrate with other countries through (more or less) free trade and capital movement? There are many kinds of arrangements of economic integration and the Lao PDR are already on the way of roadmap to ASEAN Economic Community and WTO, among others. We here direct our attention only to desirable exchange rate arrangement because some recent discussions refer to introduction of Asian Currency Unit (ACU) to all ASEAN countries in addition to some advanced Asian countries.<sup>3)</sup>

Our approach is rather experimental and tentative. We use a macro econometric model, LAOMACROMODL-2, which we developed in 2005 (Phouphet and Toyoda (2005a) and Toyoda and Phouphet (2005b)). The model consists of 9 behavioral equations, 3 statistical equations and 12 identities. The flow chart of causal relations of included variables is shown in Appendix 2. The estimation period is the one for 1989 to 2000. The exchange rate is assumed to be statistically related to the domestic price level. It also plays important roles both in the export and import equations. In the former model, we used only kip/dollar rate as the exchange rate variable. In this study, we alternatively use other exchange rates as proxy variables for the exchange rate. We use other three exchange rates, i.e., kip/baht rate (RATET), nominal effective rate (RATENE) and an Asian Currency Unit (RATEACU) in addition to kip/dollar rate (RATEU).

We calculated a series of RATENE as a weighted average of the Thai baht and the US dollars, in which the weight for Thai baht was calculated as relative shares of total trade between Laos and Thailand and the weight for the US dollar was calculated as relative share of total trade between Laos and the rest of the world. As to ACU (or Asian monetary unit, AMU), some authors have proposed calculated weights for currency basket. We adopted the calculated values for Laos by Ogawa and Shimizu (2006b). They considered a common currency basket system in East Asia (consisting of ASEAN plus China, Japan and Korea) and

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3) For example, Ogawa and Shimizu (2006a), Ogawa and Shimizu (2006b) and Watanabe and Ogura (2006).

proposed a regional currency basket, which is a weighted average of these thirteen countries. Laos constitutes only 0.08 percent of the calculated AMU weights, which is the smallest next to Cambodia's weight of 0.20, according to Ogawa and Shimizu. They then converted the AMU weights of each countries to G3 (i.e., the US dollar, Yen and euro) basket weights. For Laos, the converted weights (%) of AMU are 63.20 for the US dollar, 32.93 for Yen and 3.87 for euro.<sup>4)</sup> We used these values to calculate relative values of rates of kip to G3 currencies to obtain RATEACU.

### 3.2 Performances of the Model

Table 3.1 exhibits the performances of the model for each case of exchange rate. The column shows root mean-squared percentage errors (RMSPE) of dynamic simulations for each case of exchange rate. Surprisingly, there exist no clear differences between dollar rate and baht rate. Both rates show quite good results for GDP among others. However, nominal

**Table 3.1 Comparison of Model Performance by RMSPE**

	RATEU	RATET	RATENE	RATEACU
CP	15.8%	15.8%	55.4%	52.5%
EX	11.0%	10.8%	21.6%	22.7%
GDP	4.7%	4.7%	6.0%	5.8%
GDPNS	12.4%	12.4%	12.0%	12.1%
GDPS	5.3%	5.2%	5.0%	5.0%
NI	4.4%	4.4%	5.7%	5.6%
PDI	4.2%	4.2%	5.5%	5.3%
I	11.9%	11.9%	20.7%	19.9%
IM	12.4%	11.3%	22.3%	22.2%
PL	12.7%	12.4%	11.0%	12.0%
TAX	9.8%	9.9%	12.9%	12.7%
WAGE	4.5%	4.4%	5.7%	5.5%

Note: Each column shows the result of in-sample final test for some selected variables when the designated exchange rate is used in the model.

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4) Williamson (2005) proposed similar converted weights of East Asian currencies to G3 basket weights. Although Williamson's result suggests almost the same values of weights of G3 currencies for Laos, we applied the more recent proposal by Ogawa and Shimizu (2006b).

effective rate (RATENE) and Asian currency unit (ACU) does not perform well, particularly for GDP and trade variables (EX and IM). This may reflect the actual international trade settlement in Lao PDR, that is, either the US dollar or the Thai baht, not the combined average, is used for trade with foreigners. A currency basket imposed from outside may not perform well in international trade settlement because it does not reflect the reality of currencies used in Lao PDR.

### 3.3 *Effects of Monetary Policy*

We next consider effects of restrictive monetary policy. The banking and financial system has not been well developed yet. In our model, only channel of an increase or decrease in money supply is through affecting on the domestic price level. We assume that a maintained decrease in money supply by 10 billion kip is implemented. There is no channel to affect on interest rate, so the effect appears on the price level directly and then affect on real variables including GDP.

Table 3.2 shows the simulated effects for four years for each case of exchange rate arrangements. We can see that, as far as monetary policy concerned, alternative exchange rate like RATENE or RATEACU performs well. However, since the effect is only through the price level, we must be careful to give any clear comparison in this case of monetary policy.

### 3.4 *Effects of Mixed Policy*

Our model has a salient feature to consider fiscal and monetary policy together. In particular, we advocated before that restrictive monetary policy should be implemented when an expansive fiscal policy is conducted. In other word, as a practically best policy mix for the present stage of economic development in Lao PDR, an expansive fiscal and restrictive monetary policy is recommended. In this section, we show the results for this policy mix by increasing both government investment and expenditure by 5 billion kip each (in total 10 billion kip) together with a decrease of money supply by 10 billion kip.

Table 3.3 shows the simulated results for four years. The case of RATEU shows a little better performance in the effects on GDP and the price level although the effects on import (IM) and export (EX) are reversed by small margins. This may reflect the actual situation that Lao trade with Thailand dominates other cases and the Thai baht rate is more sensitively reflected to the trade variables. RATENE has no remarkable results. However, RTAEACU shows a very surprising result that the effect on GDP is the best among the four cases. However, checking

**Table 3.2 Effects of Restrictive Monetary Policy**

(1) RATEU

	Year 1	Year 2	Year 3	Year 4
CP	2.65	3.98	4.54	5.00
EX	-1.23	-1.29	-1.27	-1.38
GDP	3.67	3.82	3.75	4.21
IM	8.76	8.45	7.75	8.71
PL	-9.78	-12.18	-10.53	-11.72

(2) RATET

	Year 1	Year 2	Year 3	Year 4
CP	2.76	4.17	4.81	5.46
EX	-1.40	-1.46	-1.47	-1.63
GDP	3.83	4.01	4.01	4.72
IM	9.01	8.69	8.15	9.56
PL	-10.27	-12.78	-11.24	-12.28

(3) RATENE

	Year 1	Year 2	Year 3	Year 4
CP	4.00	6.06	6.95	8.39
EX	-2.09	-2.18	-2.16	-2.99
GDP	5.55	5.84	5.75	7.61
IM	13.04	12.72	11.68	16.18
PL	-14.50	-17.50	-15.19	-17.40

(4) RATEACU

	Year 1	Year 2	Year 3	Year 4
CP	3.90	5.97	6.91	8.28
EX	-2.08	-2.18	-2.19	-2.93
GDP	5.42	5.78	5.75	7.45
IM	12.90	12.73	11.80	15.89
PL	-14.16	-16.96	-14.79	-16.93

Note: Figures show the percentage value of (simulated value – baseline value) \* 100 / (baseline value).

the effects on other variables carefully, we find that it does not help much trade variables by greatly deteriorating the trade balance in fact. Only reason why it gives a strikingly good result on GDP is solely through a very strong pressure on deflation so that real GDP is pushed

**Table 3.3 Effects of Policy Mix**

## (1) RATEU

	Year 1	Year 2	Year 3	Year 4
CP	4.50	6.46	7.19	7.97
EX	1.74	0.68	0.37	0.20
GDP	6.25	6.04	5.83	6.76
IM	13.66	12.44	11.26	12.66
PL	13.89	6.26	2.98	1.69

## (2) RATET

	Year 1	Year 2	Year 3	Year 4
CP	4.38	6.29	7.04	7.91
EX	1.95	0.78	0.42	0.34
GDP	6.08	5.88	5.72	6.78
IM	13.18	11.97	10.98	12.38
PL	14.34	6.67	3.11	2.68

## (3) RATENE

	Year 1	Year 2	Year 3	Year 4
CP	4.00	6.06	6.95	8.39
EX	-2.09	-2.18	-2.16	-2.99
GDP	5.55	5.84	5.75	7.61
IM	13.04	12.72	11.68	16.18
PL	-14.50	-17.50	-15.19	-17.40

## (4) RATEACU

	Year 1	Year 2	Year 3	Year 4
CP	5.82	8.59	9.77	11.86
EX	0.74	-0.16	-0.52	-1.01
GDP	8.08	8.15	8.03	10.77
IM	20.20	18.83	17.25	22.34
PL	5.12	-1.25	-3.56	-6.24

Note: Figures show the percentage values of (simulated value – baseline value) \* 100 / baseline value.

up by price effect only. Considering all relevant macro variables, we can conclude that RATEU gives the best effects on overall macroeconomic variables by policy mix of expansive fiscal and restrictive monetary policy.

## 4. Conclusion

We have studied some macroeconomic aspects of recent development of Lao PDR with special reference to economic/financial integration in East Asia. Many authors just mention of ASEAN as a region, e.g., ASEAN plus three, but there is a clear divide between the two groups of countries in the region. Among them, Laos needs several more years to develop its financial institutions and to strengthen fiscal and monetary policy channels. Under this underdeveloped macroeconomic environment, the country is going to be a possible member of an ASEAN plus X community. It is presumed assumption that every country will receive benefits from an umbrella of economic (or financial) integration, particularly avoiding a sudden financial crisis like that of 1997. However, Laos has a peculiar multi currency (actually three currencies) phenomenon and careful introduction of currency unit or exchange rate arrangement is necessary. There is strong evidence that the Lao monetary authority has shifted its reference base from the Thai baht to the US dollar after the Asian crisis. According to our econometric simulations, the current exchange rate policy is admittedly approved compared with other arrangements. However, selecting optimal weights of currencies for Lao PDR should be carefully proceeded with special reference to reality of international transactions.

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### Appendix 1: Main Variable and Data Sources

	Code	Unit	Variables	Source
Government consumption(real)	CG	Bill.Kips	Endogenous	2001 World Development Indicators CD-ROM
Private consumption (real)	CP	Bill.Kips	Endogenous	2001 World Development Indicators CD-ROM
Export (real)	EX	Bill.Kips	Endogenous	2001 International Financial Statistics CD-ROM
Import (real)	IM	Bill.Kips	Endogenous	2001 International Financial Statistics CD-ROM
General Price	PL	1995=100	Endogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Non-tax revenue (real)	NOTAX	Bill.Kips	Exogenous	Bank of The Lao PDR, Annual Report, Various Issues
Exchange rate (Kip/Dollar)	RATEU	Kip/Dollar	Exogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Government revenue (real)	REV	Bill.Kips	Endogenous	Bank of The Lao PDR, Annual Report, Various Issues
Lending rate (nominal)	RISI	Percent	Exogenous	Bank of The Lao PDR, Annual Report, Various Issues
Direct tax (real)	DTAX	Bill.Kips	Endogenous	IMF Staff Country Report Various Issues
Indirect tax (real)	ITAX	Bill.Kips	Endogenous	IMF Staff Country Report Various Issues
Foreign direct investment (real)	FDI	Bill.Kips	Exogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Gross domestic product	GDP	Bill.Kips	Endogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Potential non-agriculture GDP (real)	GDPNS	Bill.Kips	Endogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Potential agriculture GDP (real)	GDPAS	Bill.Kips	Endogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Government investment (real)	IG	Bill.Kips	Exogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Import price	IP	1995=100	Exogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Agriculture population	LA	1000 persons	Exogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Non-agriculture population	LN	1000 persons	Endogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Money supply (nominal)	MONP	Bill.Kips	Exogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Total population	NP	1000 persons	Endogenous	Key Indicators Of Developing Asian And Pacific Countries 2001
Agriculture area	HPA	1000 Hecter	Exogenous	Basic Statistic of The Lao PDR 75-2000
Capital stock (real)	K	Bill.Kips	Endogenous	Calculation
Domestic investment (real)	DI	Bill.Kips	Exogenous	National Statistic Center

Source: the authors



Appendix 2. Model Flowchart

