

Macroeconomic Policy Strategies for Growth and Stability in Cambodia, Lao PDR, Vietnam, and Thailand



Edited by
Bhanupong Nidhibrapha,
Thammasat University

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List of Contributors

Bhanupong Nidhibrapha
Thammasat University

Phouphet Kyophilavong
National University of Laos

Chea Ravin
National Bank of Cambodia

Ung Luyna
National Bank of Cambodia

Nguyen Hong So
Vietnam National University, Hanoi

Siphath Lim
National Bank of Cambodia

Nguyen Manh Hung
Vietnam National University, Hanoi

Nguyen Thi Vu Ha
Vietnam National University, Hanoi

Nguyen Ngoc Thanh
Vietnam National University, Hanoi

Vu Quoc Huy
Vietnam National University, Hanoi

Phongthorn Wrasai
Thammasat University

Preface

This book is the result of a collaborative research project on Macroeconomic Policy of countries in Southeast Asia: Cambodia, Laos, Vietnam, and Thailand. The book provides guidelines for policy makers that must take into account heterogeneity of countries in terms of level of economic development and institutional constraints. Chapter 1 provides an understanding of Laos' economy which has been exposed to large capital inflows. Phouphet Kyophilavong studies the adverse consequences of capital flows and suggests appropriate macro policy responses. In Chapter 2, Chea Revin and Ung Luyna examine the effectiveness of Cambodia's macroeconomic policy and conclude that fiscal policy is more effective than monetary policy in stabilization. It was pointed out that price stability in Cambodia depends more on imported inflation from neighboring countries, rather than monetary growth and exchange rates. In Chapter 3, Nguyen Hong Son, Nguyen Manh Hung, and Nguyen Thi Vu Ha discuss the relationship between exchange rate and capital flow management in Vietnam. The experience of Vietnam provides valuable lessons for Lao PDR and Cambodia. They point out the interconnectedness of macroeconomic policy in Thailand and sub-Mekong regional economies. In Chapter 4, Siphath Lim explores the issue of dollarization, whether it would lead to inflation and whether inflation can be contained by tightening money supply. Chapter 5 is presented by Nguyen Ngoc Thanh, exploring Vietnam's exchange rate and its relationship with monetary policy. Vu Quoc Huy further examines in Chapter 6 the effectiveness of government spending in Vietnam. His conclusion is that the impact of fiscal expansion can be limited and the structure of fiscal spending matters for output and price stabilization. Chapters 7 and 8 are devoted to macroeconomic consequences of Thailand's exchange rate regimes and fiscal policy strategy for long term growth. In Chapter 9, Phongthorn Wrasai provides a synthesis of macroeconomic policy strategy.

The editor would like to thank Dr. Siriporn Wajjwalku for her enthusiastic support in her capacity of a Director at the Thailand Research Fund. Our researchers are grateful to the TRF's financial support that enhances the understanding of critical macroeconomic issues in the increasingly integrated region. The support of TRF has also created a network of Southeast Asian's macroeconomists.

Bhanupong Nidhiprabha

Chapter 1

Coping with Capital Inflows: Policy Option for Laos

Phouphet Kyophilavong

Faculty of Economics and Business Management, National University of Laos

Foreign capital inflows are important sources of investment finance for low income developing countries like Laos. On the other hand, massive foreign capital inflows may have adverse economic effects. This syndrome is called ‘Dutch Disease’. It refers to the phenomena that, firstly, capital inflows give rise to appreciation of the real exchange rate which causes adverse effects on traded goods production and employment. Despite the positive and negative impact of the foreign capital inflows on the Lao economy, there are very few studies on this issue. Therefore, this paper attempts to investigate the effects of foreign capital inflows on Lao economy using a simple VAR approach. The empirical results show that there is unidirectional causality running from manufacturing output to FDI respectively but the reverse is not true. Real exchange rate causes the Manufacturing output and the nexus is unidirectional. It is quite clear that Laos might have Dutch Disease syndrome. Appropriate macroeconomic management and other policy are needed to mitigate the effect of Dutch Disease in medium and long term.

Keywords: Capital inflows, impact, policy option and Laos.

JEL Classification: Q33;E600

I. Introduction

There are benefits and costs of foreign capital inflows. Inappropriate macroeconomic management on foreign capital inflow and early stage of monetary and exchange rate policy economic tools might lead to higher cost of capital inflow rather than its benefits.

Recently, Laos is facing huge capital inflow because of Foreign Direct Investment (FDI) in the resource-based sectors.¹ The massive capital inflows have positive and negative impact on the Lao economy. It has positive impact on growth but it also has side effects which appreciate real exchange rate and lead to contract the tradable sectors - the phenomenon better known as Dutch Disease (Kyophilavong, 2009a). In addition there are issues about undervaluing one's own exchange rates (kip), or to make it stronger in order to cope with dollarization.²

However, this phenomenon can be avoided if macroeconomic policy is managed properly (Codon, 1981 and 1982; Usui, 1996 and 1997). The literatures specifically mention about the impossible trinity (a fixed exchange rate, free capital movement and an independent monetary policy), and we want to examine the foreign exchange management for the Laos economy under this assumption.

In order to maintain sustainable growth, appropriate macroeconomic management is the key. However, there is limited research on this issue, to examine the relationship between foreign capital inflows, exchange rate and manufacturing output. This quantitative exercise that we propose is a fill-up in this direction. To be specific, we will try to address the following questions

1. What is the impact of capital inflows? Does it appreciate real exchange rate?
2. Do foreign capital inflows increase manufacturing output?
3. Does strong Kip (appreciation of exchange rate) reduce manufacturing output?
4. What are the policy options for coping with capital inflows?

In order to respond to above questions, VAR approach is used, and used data from 1989 to 2008. The rest of this paper is organized as follows. Section 2 provides background on macroeconomic condition of Laos. Section 3 provides information on background of financial reform and banking reform. Section 4 overviews current situation and issues of monetary and exchange rate policy. Section 5 reviews literatures on the impact of foreign capital inflows and methodologies to estimate it. Section 6 provides methodology to estimate the impact of foreign capital inflows on Lao economy. Section 7 discusses the empirical results. The final section concludes and contains policy recommendation.

¹ About 80% FDI comes towards mining and hydropower project. (Kyophilavong, 2008; 2009a)

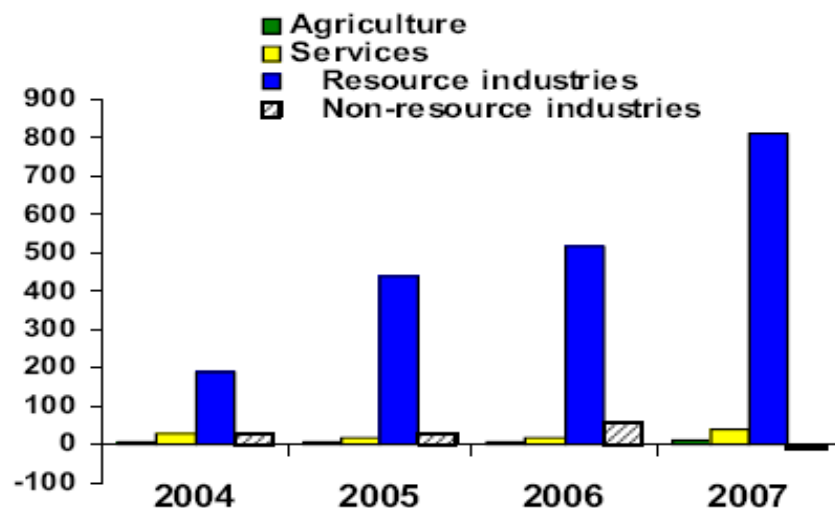
² About 60% of total deposit is in foreign currency (Kyophilavong, 2009b).

II. FDI Policy and Capital Inflows

The National Development Goal is to liberate the country from the group of LDCs by the year 2020. Government of Laos (GoL) has established the National Growth and Poverty Eradication Strategy (NGPES) in 2004 to support the development goal. In this strategies, develop and promote all economic sectors, particularly the private sector, including Foreign Direct Investment (FDI) is one of most key component. In order to promote FDI in Laos, the first investment law was adopted in 1988; the first revision of the law was conducted in 1994, the second revision in 2004 and third revision in 2010 (Kyophilavong, 2008). In addition, the current Mining Law was promulgated by the National Assembly in 1994; the first revision of this mining law was conducted in 2008.

FDI inflows gradually increased particularly since introducing Foreign Investments Promotion Law in 1988. Since 2002, FDI has flowed in to Laos rapidly especially in resource sectors (i.e., mining and hydropower sectors). Recently, Laos is ranked as one of the resources-rich countries in Asia. There are more than 570 mineral deposits identified, including gold, copper, zinc and lead (World Bank, 2004). In addition, Laos is also traditionally known as a high potential hydropower producer, about 26,000 MW (excluding mainstream Mekong), only 9% of its capacity being used in 2004 (Pholsena and Phonekeo, 2004).

Figure 1.1: FDI by sector (mil. US\$)



Source: World Bank (2008).

Figure 1.1 shows that FDI has suddenly increased since 2004. This is mainly because foreign mining companies began to increase production in the mining sector. In 2007, the actual FDI inflows are estimated as about US\$950 million, which shows an increase by 60% from 2006, and about 90% of the values are related to the resource industry. The economic growth was about 7.5% in 2007, of which 2.5% was from the resource sector (World Bank, 2008). The FDI is the sources of growth for Lao economy but it also has side effect.

III. Foreign Capital Inflows and Real Exchange Rate

The relationship of foreign capital inflows and real exchange rate is shown in table 1.1. We divide data from 1989 to 2006 into three periods followed Warr (2005). Period 1: from 1989-1994 is called “post-reform adjustment”, period 2: 1995-1999 is called “hyperinflation and exchange rate depreciation”, and period 3: 2000-2006 is called “sustained growth and foreign capital inflows”. Period 1 (1989-1994) was a period of beginning economic reforms in Laos. The first investment law was adopted in 1988. Thereafter, foreign capital inflows in terms of FDI and ODA increased sharply. As a result, during this period, the real exchange rate was appreciated about 4.3%. Period 2 (1995-1999) was a period of macroeconomic turmoil in Laos and Asian countries.

Due to the Asian crisis which caused in Thailand in 1997, Laos experienced macroeconomic instability, hyperinflation, and nominal exchange rate chaos. Real exchange rate depreciation in this period was mainly caused by high depreciation of nominal exchange rate. During that period, the degree of the Lao currency, kip, was highest among the affected currencies by the Asian crisis. Period 3 (2000-2006) is categorized as the high growth period with huge foreign capital inflows. Price and nominal exchange rate became stable. The massive FDI of mining and hydroelectricity sectors has flowed to Laos. There are several mining and hydropower projects under way (Kyophilavong, 2009). For one of the biggest projects in hydroelectric power development in Laos, called “Nam Theun 2”, total investments are about US\$ 1.03 billion (about 35% of GDP in 2005). For the mining sector, the most successful project is called “Sepon Mining Project” in the south of Laos. This project has been operated by Oxiana Resources Ltd of Australia. From massive inflows of foreign capital during this period, the real exchange rate appreciated was about 3.3 % per year.

Table 1.1: Changes of real exchange rate and foreign capital inflows

	1989-1994	1995-1999	2000-2006
Real exchange rate	-4.3	12.5	-3.3
FDI inflow	106.7	61.6	118.6
ODA inflow	26	81.3	16.7
Total inflow (FDI+ODA)	36.7	67.4	46.3

Source: authors' calculation.

IV. Macroeconomic Conditions

The national development goal is to liberate the country from the group of least developed countries (LDC) by the year 2020 (GoL, 2004). To achieve the national goal, government announced the National Growth and Poverty Eradication Strategy (NGPES). As infrastructure development, human resources and productivity is poor, promotion of FDI and ODA is one of the main priorities for the Government of Laos.

Since the NEM was introduced in 1986, Laos has been in transition from a centrally planned economy to a more market-oriented economy. As a result, with the exception of a period of negative growth following the Asia financial crisis of 1997, Laos had generally been achieving

high rates of economic growth with low inflation. Average economic growth was about 7 % during 2000-2007. Inflation has been maintained below double digits since 2005, about 4.5 % in 2007 (World Bank, 2008). Since 2005 the exchange rate has appreciated, 9,670 kip per US\$ in 2007 compared to 10,655 kip per US\$ in 2005. Laos is an agriculture-based economy, in total GDP of 2.8 US\$ billion, agriculture sector covered 44% of GDP, industry sector was 30% and services was 26% in 2005 (World Bank, 2008). However, since 2003, industry sector have grown more than 10%, which has caused agriculture share of GDP declined.

Even though Laos has been maintaining high economic growth with low inflation and a stable exchange rate, there are still serious macroeconomic issues to overcome. Laos is basically facing chronic twin deficits in both government spending and international trade deficit. Deficit financing is mainly depended on foreign sources. Budget deficit to GDP was 2.5% in 2007 (fiscal year) compared to 4.4% in 2005 (fiscal year) (World Bank, 2008). Current account balance deficit to GDP was 17.8% in 2005 compared to 17.4% in 2007 (IMF, 2008). Particularly, the fiscal issue is very serious in Laos. If the budget deficit continues to expand, it will cause an accelerating inflation rate and devaluation of the kip (Lao currency), and could lead to economic instability as during the Asian financial crisis (Okonjo-Iweala et al, 1999). The more details of macroeconomic indicators are in table 1.2.

Table 1.2: Lao PDR: Macroeconomic and Financial Indicators (1995 to 2008)

	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005 ^{1/}	2006 ^{2/}	2007	2008
1. Macroeconomic indicators														
GDP (billion kip)	1430.4	1725.7	2201.0	4240.0	10329.0	13669.5	15701.8	18390.0	20307.1	26590.1	30599.9	35983.0	39874.0	46700.0
GDP Growth (real)	7.0	6.9	7.2	4.0	5.2	5.8	5.8	5.9	5.8	6.9	7.3	8.4	7.5	7.2
GDP per-capita (US\$)	381.8	394.3	360.6	198.6	285.5	333.8	332.5	338.9	384.6	443.1	478.7	594.0	679.0	856.0
Government deficit/GDP (%)	-6.0	-5.5	-7.5	-2.9	-4.6	-4.4	-3.4	-5.7	-8.2	-6.5	-8.3	-2.9	-2.0	-3.4
Outstanding debt/GDP (%)	38.0	41.3	52.2	101.0	73.4	64.4	68.1	70.2	65.0	78.4	78.2	97.1	104.5	97.6
2. Monetary Aggregate														
Base money (billion of kip)	n.a	104.4	150.1	281.8	481.8	766.7	822.5	1079.1	1369.1	1545.3	1823.2	1998.0	3065.0	3215.0
M2 (billion of kip)	n.a	244.9	406.0	865.9	1544.0	2252.1	2704.1	3435.5	4094.7	4999.9	5416.3	7046.0	9774.0	11181.0
Central bank discount rate (%)	n.a	n.a	n.a	n.a	0.4	0.4	0.4	0.2	0.3	0.3	0.3	-	-	-
Deposit rates ^{3/} (%)	17.5	17.5	18.0	22.0	20.0	20.0	15.0	15.5	15.5	13.0	12.5	6.8	6.8	6.8
Prime lending rate ^{4/} (%)	21.5	18.5	19.0	23.0	27.0	21.0	22.0	21.0	22.0	20.0	19.8	13.0	12.5	12.5
Inflation rate (%)	19.6	15.8	19.5	90.1	128.4	23.1	7.8	10.6	15.5	10.5	7.2	6.8	4.5	7.6
Dollarization ratio ^{5/} (%)	42.5	40.4	56.6	67.1	83.7	78.4	78.0	75.5	68.7	68.0	68.5	58.2	54.5	50.4
3. Exchange rates														
Nominal exchange rate ^{6/} (kip/US\$)	834.2	938.7	1304.8	3422.0	7437.7	7935.0	8938.0	10111.2	10609.4	10644.5	10672.9	9695.0	9423.0	8797.0
Real exchange rate (kip/US\$)	na	na	na	na	na	na	100.8	96.9	97.5	100.2	104.0	105.5	104.3	123.5
Balance of payments/GDP (%)	1.8	4.1	-3.4	0.2	-0.4	2.0	-0.4	3.4	0.9	0.5	0.4	2.8	4.8	1.9
Current account balance/GDP (%)	-7.6	-12.5	-10.0	-3.0	-5.1	-0.3	-3.9	0.2	-2.0	-7.6	-6.8	-10.3	-15.8	-16.5
Exchange reserves/GDP (%)	5.3	9.1	6.3	11.4	7.3	8.1	7.5	10.7	10.1	9.1	8.4	9.4	12.9	11.8
Exchange market interventions	n.a	n.a	n.a	n.a	12.2	11.1	0.2	19.2	-25.9	17.1	-8.96	n.a	n.a	n.a

Source: The Bank of Laos and International Monetary Fund.

Note: 1/ Data from 1995 to 2005 is from the Bank of Lao PDR

2/ Data from 2006 to 2008 is from International Monetary Fund (IMF Country Report No. 08/340)

3/ Deposit rates refers to average of deposit rate in the local bank.

4/ Prime lending rate refers to average of deposit rate in the local bank.

5/ Dollarization ratio refers to ratio of total Foreign Currency Deposit (FCD) to total deposit.

6/ Exchange rate measured at the end of period.

n.a refers not available.

V. Financial Reform and Banking Reform

Prior to 1988, the State Bank conducted both central and commercial banking activities. The State Bank's principal operations were to accept deposits from SOEs and provide credit to them under the central government's economic plan; to act as the government's treasury; and to manage the supply of currency.

During this period, Lao PDR experienced the era of financial repression regime because monetary policy framework was operated through direct monetary instruments; mono-banking sector and its policy framework was influenced by fiscal needs. Due to the principal aim of monetary policy of fulfilling the development plan, credits were often requested by state enterprises (Kyophilavong, 2010).

In March 1988, the government began major reforms aimed at transforming the financial system in line with the objectives of the NEM. With a view of making the banking sector more market oriented and improving the mobilization and allocation of resources, the State Bank was reorganized into a two-tier system, with central banking separated from commercial banking (Kyophilavong, 2010).

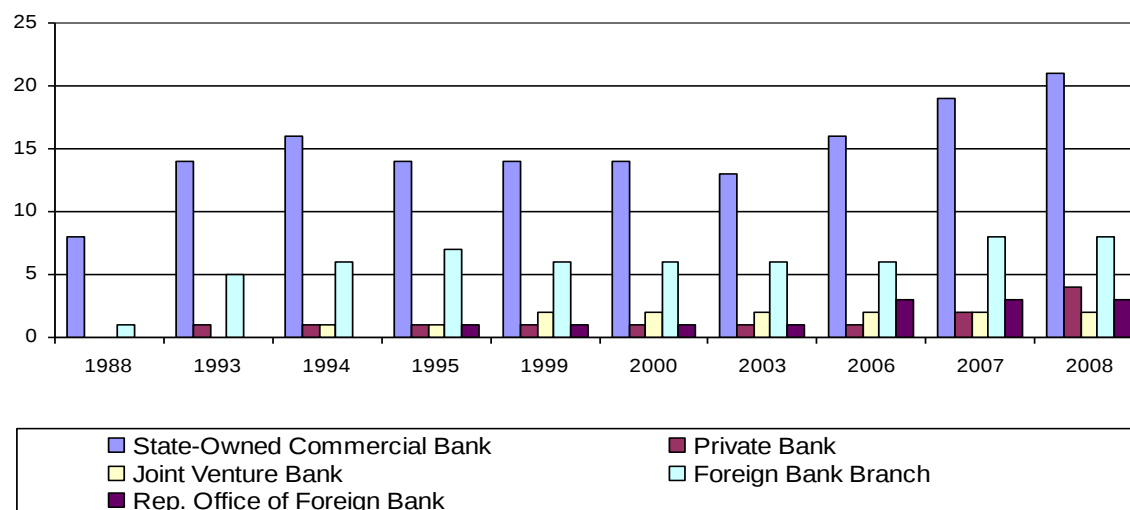
The central banking activities of the State Bank were formally separated with the enactment of the Central Bank Law in June 1990, which established the BOL as a central bank, defined its role and functions, granted it the necessary powers, and assigned it as primarily responsible to exercise control over monetary and financial developments and developing indirect instruments. Under the new role of central bank, in September 1991, a centralized system of international reserve management was put in place by transferring assets from the Banque pour le Commerce Extérieur Lao (BCEL), which had held most of the official international reserves, to the BOL.

Under the two-tier banking system, commercial banks have played their roles by providing banking services to the public such as mobilizing deposit and allocating credit. During the reform period (1988-2005), commercial banks functions have been expanded and diversified. For instance:

As of the end of 2008 (Figure 1.2), the banking sector now consists of (a) four SOCBs; (b) two joint-venture banks between private and government; (c) five private bank including joint venture; (d) nine branches of foreign banks; and (e) three representative office of foreign bank. However, merely SOCBs are allowed to establish and operate their branches in other provinces.

At year-end 2008, the financial sector in Lao PDR comprised of (a) 21 commercial banks (Figure 1.1); and (b) 37 Non-banks and financial institutions. SOCBs dominate the market with more than half of the total assets and loans; and more than two-thirds of the total deposits (Table 1.3). The two largest banks (BCEL and LDB) are fully owned by government. BCEL maintains a dominant position accounting for approximately half of total deposits and loans. It refers that Lao-banking sector is dominated by SOCBs.

Figure 1.1: Number of banks in Lao PDR, 1988-2008



Source: Bank of Lao PDR

Table 1.3: Market Share of Banking Institutions, (as of June 2008)

Financial institutions types	Number	Assets		Deposit		Loan	
		Kip billion	%	Kip billion	%	Kip billion	%
State-owned Commercial Bank	4	7704	61	6542	69	2912	74
Joint Venture Bank + Private Bank	6	2971	24	1854	20	521	13
Foreign Bank Branch*	11	1942	15	1050	11	521	13
Total	21	12617	100	9445	100	3955	100

Source: the Bank of Lao PDR

Note: * including representative Office of Foreign Bank

The Lao financial market is relatively small during the initial stage of development because there were no alternative sources of fund. Only the banking sector supply the credit to the economy³, but still small ratio compared to the size of the economy, with neither bond nor stock market not fully developed yet. Table 1.3 also shows that although T-bills are existent in the money market, its size is relatively small in relation to the size of the economy.

Lao-banking sector is relatively small when compared to the size of the economy. For instance, the ratio of total assets of the banking system to GDP is about 27 percent (Table 1.4). This is particularly low for an economy with a non-diversified financial system, and bank-based system (e.g. with no alternative, but bank mainly supplies loans).

³ This ratio is formal banking data; informal financial data is not included.

Table 1.4 shows how low the saving mobilization in Lao PDR is. There are fundamental reasons that can explain the low saving mobilization in Lao PDR. Firstly, banking sector has limited reach in the rural areas and thus savings is overwhelmingly concentrated in the urban areas. Secondly, there is limited use of other payment modes such as checks, which leads to a cash-based economy. Thirdly, Lao economy has low income (BOL, ADB and WB, 2002). Fourthly, people in rural area mostly save in term of gold and silver (Toyoda and Kyophilavong, 2005).

Table 1.4: Contribution of Banking Sector to Lao Economy (from December 2005 to June 2008)
(%)

Share by GDP	2005	2006	2007	2008*
Total assets	22.4	25.8	28.49	27.02
Total deposits	17.4	19.1	22.08	20.23
Total loans	8.3	8.8	8.79	8.47
T-bills	0.68	0.74*	n.a	n.a

Source: Bank of Lao PDR

Note: on June of 2008

n.a refers not available.

The low ratio of credit to GDP as shown in Table 1.4 is due to three main causes namely lack of skilled human resources, distorting price signals and weak legal enforcement of NPLs. The first reason is that providing well-functioning banking services, the Lao-banking sector faces a limitation in skilled labor. The second reason is distorting price signal in the banking system limiting the corporate sector access to banking services. Lastly, there is a certain degree of credit risk in this financial system due to weak legal enforcement particularly to address high existing NPLs in the banking sector.

VI. Monetary and Exchange Rate Policy

Under the two-tier system, BOL has fully implemented monetary policy. At the beginning of the banking sector evolution, it was still unclear whether a monetary policy framework operated. Monetary instruments had been applied through the mixture of direct and indirect tools without clear monetary channels and objectives (Kyophilavong, 2010).

BOL had relied on direct instruments, including interest rate control (both on lending and deposit rates) during the 1990s and a credit ceiling (as % of total loans outstanding) to limit and target credit expansion from 1995 to 1996. However, indirect instrument such as reserve requirements⁴ and market operations⁵ were introduced in 1999. Subsequently, BOL adopted a monetary policy framework as an IMF-supported program (2001-2005). According to this monetary policy

⁴ According to Dalaloy (2006), before 1995, the reserve requirement ratio did not separate between kip and foreign currency; it was 5% in 1985, 10% in 1994 and 12% in 1995. The reserve requirement ratio for kip and foreign currency has been introduced since 2000; it was 6% (kip), and 12% (foreign currency) in 2000; 8% (kip) and 15% (foreign currency) in 2002; and 5% (kip) and 10% (foreign currency) in 2006.

⁵ The instrument of open market operation included BOL bill and Treasury bill.

framework, price stability is an ultimate goal of the BOL's policy implementation, which also supports economic growth in order to reduce poverty. This policy involves implementation of monetary and exchange rate policies within the confines of a framework that establishes floors for international reserves and ceilings for net domestic assets of the central bank. BOL conducts monetary policy by using the Quantity Theory of Money theoretical framework to set the annual growth rate of the money supply as an intermediate target in line with the rate of growth and price stability. Reserve money and interest rates are closely monitored as operational targets in order to attain the intermediate target. A reserve requirement rate, BOL bills, treasury bills, bank rates and refinancing facilities are the main monetary policy instruments⁶.

Before economic reform in 1986, there existed seven different exchange rates⁷, ranging from 10 to 400 Kip/US\$ dollar under a fixed exchange rate regime. Lao authorities began a dramatic reform of the exchange regime in September 1987 (Otani and Pham, 1996). According to Prime Minister Decree No. 18/CCM dated July 1989, a managed floating exchange regime was adopted. Under this regime, the official rate was adjusted proportionally to be in line with the parallel market rate. For example, a benchmark was set for BOL to maintain a spread of less than 10 percent between the official rate and market rate. In tandem with these policy initiatives, various reforms of the financial sector were undertaken. The government allowed non-bank foreign exchange dealers in 1990 and restrictions on deposits in foreign currency were also abolished (Otani and Pham, 1996). In addition, the difference between the official rate and the market rate was reduced to 2 percent under the enhanced IMF structural adjustment program. Under the managed floating exchange rate regime, BOL currently determines the daily reference rate of Kip against US\$. This reference rate is calculated by a weighted average of previous foreign exchange transactions of commercial banks and market rates⁸. This reference rate is modified corresponding to particular conditions (Kyophilavong, 2010).

⁶ Under the BOL Law No.5, all the key monetary and exchange rate policies have to be approved by the Government. Applying instruments has to be approved by the Governor. The Monetary Policy Department directly monitors and adjusts the above tools in order to achieve policy targets. The Banking Operation Department mainly operates those tools that work together with financial institutions.

⁷ These included a symbolic official rate of 10 kip per U.S. dollar; a commercial rate of 95 kip per U.S. dollar, at which most transactions by state enterprises were made; and several rates close to the then-prevailing parallel market rate of roughly 400 kip per U.S. dollar, which applied to transactions by the prefecture of Vientiane (Otani and Pham, 1996).

⁸ Like monetary policy, the key exchange rate policies have to be approved by the Government. The Monetary Policy Department also responds directly to adjusting the reference exchange rate daily. The Banking Operation Department calculates the BOL exchange rate and uses it as a reference for foreign exchange in the interbank market amongst financial institutions.

VII. Literature Reviews

There have been various studies done on the impact of resource boom/foreign capital inflows into developing countries using different approaches. Computable General Equilibrium (CGE) approach is popular among them. Devaranjan et al (1993) developed 1-2-3 model to estimate the change in the equilibrium real exchange rate in terms of trade shock and changes in foreign capital inflows. This model is popular and is used to analyze the effects of Dutch Disease. The results are consistent with those of multi-sector computable general equilibrium models. Benjamin (1990) added the investments dimension by incorporating two-period optimization in a multi-sectors CGE model for Cameroon. This model is used to test the impact of foreign-capital inflows, tariff policy, and policy toward public firms. Levy (2007) used a CGE model to study the impact of using Chad's annual oil revenue for public investments, which focused on development of road and irrigation infrastructure. The results showed that Dutch Disease is not an unavoidable consequence of oil booms in Chad. Benjamin et al (1989) used a CGE model to look at the impact of an oil boom on Cameroon's economy. The results showed that one of the standard Dutch Disease results can be reversed, the agricultural sector is most likely to be hurt, but not all the traded good sectors will contract, whereas some of the manufacturing sectors will benefit. In addition, Usui (1996) also used macroeconomic model to analyze the effect of two policy adjustments, namely exchange rate devaluation and the accumulation of budget surpluses to the oil export boom in Indonesia.

There is rich literature on the impact of capital inflow in general. There are a number of methodologies to analyze the impact of capital inflow on macroeconomic variables. However, recently Time Series Econometric tool: Vector Autoregressive (VAR) model seems to be popular. I have reviewed the impact of foreign capital inflows, resource booms, and commodity price on macroeconomic variables as follows.

The relationship between oil price and macroeconomic variables can be found by Eltony and Al-Awadi (2001), Olomola and Adejumo (2006), Bjornland (1998), Mehrara and Oskoui (2007), Farzanegan and Markwardt (2009). Eltony and Al-Awadi (2001) use VAR model VECM to examine the impact of oil price fluctuation on seven key macroeconomic variables for Kuwaiti economy. The result shows that the significant of the CPI in explaining a notable part of variation of both types of government expenditure and significant part of M2 variance is explained by the variance in oil revenues. Olomola and Adejumo (2006) uses VAR model to analyze the relationship between oil price and macroeconomic activities in Nigeria. The finding shows that oil price shock does not affect output and inflation. However, oil price shocks do significantly influence the real exchange rate. Bjornland (1998) uses VAR model to investigate whether there is evidence of a "Dutch Disease" that is whether energy booms have had adverse effects on manufacturing in Norway and the UK. There is only weak evidence of a Dutch Disease in the UK, whereas manufacturing output in Norway has actually benefited from energy discoveries and higher oil price. Mehrara Oskoui (2007) uses a structural VAR approach to assess the sources of macroeconomic fluctuation in oil-exporting countries (Iran, Saudi Arabia, Kuwait, and Indonesia). The result shows that Oil price shocks are the main source of output fluctuations in Saudi Arabia and Iran, but not in Kuwait and Indonesia. Farzanegan and Markwardt (2009) analyzes the dynamic relationship between oil price shocks and major macroeconomic variables in Iran by applying a VAR approach. They find a strong positive

relationship between oil price changes and industrial output growth. Furthermore, they observe the Dutch Disease syndrome though significant real effective exchange rate appreciation.

In addition, there are some studies the relationship between resource boom: primary sector and real exchange which diagnose on Dutch Disease Olsui and Olagunju (2005) and Hutchison (1994). Olsui and Olagunju (2005) uses a VAR modeling consisting of impulse response function and variance decomposition analysis to examine whether the Dutch Disease in present Nigeria. Results show that Dutch Disease was diagnosed, albeit, as a delayed occurrence. Hutchison (1994) uses cointegration analysis and the Vector Error Correction Modeling (VECM) approach to assess whether the development of the oil and gas sectors has adverse effects on the manufacturing sector in Norway, the Netherlands, and the United Kingdom.

The impact of capital inflows on growth and saving are also investigated by Baharumshah and Thanoon (2006), Ramirez (2000), Mallick and Moore (2008), and Agenor (1998). Baharumshah and Thanoon (2006) assess the effect of various types of capital inflow on the growth process of the East Asian Countries including China by using dynamic panel data. The empirical analysis shows that domestic saving contributes positively to long-term economic growth. FDI is growth enhancing and that its impact is felt both in the short and long run. Ramirez (2000) assesses the foreign direct investment on economic growth and labour productivity in Mexico by using the Error Correction Model (ECM). The empirical analysis shows that FDI has positive impact on growth and on the rate of labour productivity growth. Mallick and Moore (2008) investigates the impact of financial capital on economic growth for a panel 60 developing countries. Private FDI flows exert beneficial complementarity effects on the domestic capital formation across all income group countries, the official financial flows contribute to increasing investment in the middle income economies but not in the low income countries. Agenor (1998) examines the effects of a falling in world interest rates on capital inflows and the real exchange rate. Result shows that the real exchange rate appreciates in the net debtor case but may either appreciate or depreciate in the net creditor case.

Capital inflows increase the use of existing capacity and to stimulate investment. However, capital inflow can bring with them their own problems such as appreciation of real exchange rate, expansion of nontradables at the expense of tradables, larger trade deficits, and in regimes with a fixed exchange rate, higher inflation and an accumulation of foreign reserves.

Policy option for massive capital inflows are also investigated by Cordo (1996), Menon (2008), Mishkin (1999), Calvo et al. (1994), and Reisen (1996) suggest that in the long run a tight fiscal policy seems to be the most effective means of minimizing the appreciation of the real exchange rate caused by a capital inflow. Letting domestic interest rates fall to levels consistent with international interest rate seems to abate the inflows of short-term, speculative capital. Menon (2008) examines the reasons behind the apparent paradox between a decade of economic and political improvements and continued dollarization, and drawing policy implications from it. He suggests that instead on accelerating accommodative reforms, especially in the financial sector and on legal and institutional reforms. Mishkin (1999) provides information an asymmetric information analysis the recent East Asian crisis. He concludes that although capital flows did contribute to the crisis and exchange rate controls are unlikely to be a useful strategy to avoid future crisis. Calvo et al (1994) discuss the pros and cons of the policy option on capital inflows

which are associated with inflationary pressure, a real exchange rate appreciation, a deterioration in the current account, and a boom in bank lending. Reisen (1996) draws five policy lessons for heavy capital inflows: identify the origin of rising foreign exchange reserves; identify the limits of foreign debt; discourage above-limit, short-term inflows; observe the tradeoff between price stability and competitiveness, and design policies to target monetary aggregates and exchange rate, including fiscal policy; sterilized intervention, reserve requirement and exchange rate management.

There are very few studies on the impact of capital inflows and policy option for this. Kyophilavong and Toyoda (2008) used macroeconomic model to estimate the impact of capital inflows. However, their model has some constraints to overcome. Therefore, it needs more appreciate model such as time series data analysis approach.

VIII. Methodology and data

The background of VAR methodology

The VAR system is based on empirical regularities embedded in data. The VAR model may be viewed as a system of reduced from equations in which each of the endogenous variables is regressed on its own lagged values and the lagged values of all other variable in the system. An n variable VAR system is followed by Eltony and Al-awadi (2001), which can be written as

$$A(l)Y_t = A + U_t \quad (8-1)$$

And

$$A(l) = I - A_1l - A_2L^2 - A_m l^m \quad (8-2)$$

When Y_t is an $n \times 1$ vector of macroeconomic variables, A is an $n \times 1$ vector of constraints, and U_t is an $n \times 1$ vector of random variable, each of which is serially uncorrelated with constant variance and zero mean. Equation (2) is an $n \times n$ matrix of normalized polynomials in the lag operator l ($l^{ky}_t = Y_{t-k}$) with the first entry of each polynomial on A 's being unity

Since the error terms (U_t) in the above model are serially uncorrelated, an ordinary-least-squares (OLS) technique would be appropriate to estimate this model. However, before estimating the parameters of the model $A(t)$ meaningfully, one must limit the length of the lag in the polynomials. If l is the lag length, the number of coefficients to be estimated is $n(nl + c)$, where c is the number of constants.

In the VAR model above, the current innovations (U_t) are unanticipated but become part of the information set in the next period. This implies that the anticipated impact of a variable is captured in the coefficients of lagged polynomial while the residuals capture unforeseen contemporaneous events. Therefore, an important feature of the VAR methodology is the use of the estimated residuals, called VAR innovations, in dynamic analysis. Unlike in conventional economic modeling, these VAR innovations are treated as an inherent part of the system.

In order to analyse the impact of unanticipated policy shocks on the macroeconomic variables in a more convenient and comprehensive way, Sims (1980) proposed the use of impulse response functions (IRFs) and forecast error variable decompositions (FEVDs). IRFs and FEVDs are obtained from a moving average representation of the VAR model [Equation (1) and (2) as shown below

$$Y_t = \text{Constant} + H_t(l)U \quad (8-3)$$

And

$$H(l) = I + H_1^l + H_2^l + \dots \quad (8-4)$$

Where H is the coefficient matrix of the moving average representation which can be obtained by successive substitution in Equation (1) and (2). The elements of the H matrix trace the response over time of a variable I due to a unit shock given to variable j. In fact, these impulse response functions will provide the means to analyse the dynamic behavior of the macroeconomic variable due to unanticipated shocks in the exogenous variables.

Having derived the variance-covariance matrix from the moving-average representation, the FEVDs can be constructed. FEVDs represent the decomposition of forecast error variances and therefore give estimates of the contributions of distinct innovations to the variances. Thus, they can be interpreted as showing the portion of variance in the prediction for each variable in the system that is attributable to its own innovations and to shocks to other variables in the system.

There are some weaknesses of VAR approach. A very important point that should be mentioned here is that the major shortcoming of the VAR approach is its lack of theoretical substance (Cooly and LeRoy, 1985; Leamer, 1985). In response to this criticism, Bernanke (1986) developed procedures, called the structural vector autoregression (SVAR) approach, which combines the features of the traditional structural modeling with those of the VAR methodology.

Vector error correction methodology

Dickey and Fuller (1979) have emphasized the necessity of analyzing the time-series properties of the variables before their relationship can be established. This is necessary because if the variables in question are nonstationary, then the estimated equation will yield spurious and misleading regression results. If the variables in a relationship are stationary then it is generally true that any linear combination of these variables is said to be cointegrated. Johansen's test (1991) is commonly used to test for cointegration between more than two time series. It also provides estimates of the possible long-term relationships, i.e the parameters of the relationships ensures cointegration. In this study, a vector error correction model (VECM) was also estimated. The VECM is basically a VAR system that builds on Johansen's test for cointegration and is usually referred to in the literatures as the restricted VAR.

Data collection

The first step in estimating a VAR model is to make a choice of the macroeconomic variables that are essential for the analysis. Three key macroeconomic variables, capital inflows, the real effective exchange rate, and manufacturing output. The notations of these variables are as follow:

MO Manufacturing Output (real)

FDI Foreign Direct Investment (real)

ER Real effective exchange rate

Quarterly data for the period 1989-2008 were utilized in this study. The definition and sources of data is shown in table 1.5

Table 1.5: Data for model

Symbol	Variables/definition	Sources
FDI	Foregn Capital Inflows <i>FDI</i>	IFS 2009
MO	Manufacturing output	WDI 2009
REE	Real effective exchange rate	Calculation

Note: IFS: International Financial Statistics

WDI: World Development Indicator

All data are in natural logarithms. The analysis is confined to the period 1988-2008 due to data availability. All the data are converted to the real terms by using the Consumer Price Index (CPI). All the data used in the study are in logarithmic form. This transformation can reduce the problem of heteroskedasticity as log transformation compresses the scale in which the variables are measured.

IX. Empirical Results

The estimation begins with an examination of time series behavior of variables at hand. In order to obtain a better understanding of the behavior of economic activity, foreign capital inflow and real exchange rate, a preliminary analysis of the data is first carried out. Table 1.6 presents summary of the logarithms of the real Manufacturing Output, real Foreign Direct Investment and real Exchange Rate for Lao PDR.

Table 1.6: Descriptive statistics

	LMO	LFDI	LER
Mean	5.78	4.99	4.63
Median	5.04	5.02	4.63
Maximum	7.35	7.09	4.79
Minimum	3.36	3.10	4.45
Std. Dev.	1.25	1.15	0.08
Skewness	-0.03	0.11	-0.47
Kurtosis	1.57	1.94	3.25
Jarque-Bera	1.77	1.02	0.84
Probability	0.41	0.60	0.65
Sum	121.52	104.87	97.22
Sum Sq. Dev.	31.35	26.65	0.139
Observations	21	21	21

Note: LMO: Log of Manufacturing Output; LFDI: Log of Foreign Direct Investment and LER: Log of Real effective exchange rate.

The data series we use in this study are time series data. Empirical work based on time series data assumes that the underlying time series is stationary. However, many studies have shown that majority of time series variables are non-stationary or integrated of order 1 (Engle and Granger, 1987). Usually time series analysis considers stationary time series in empirical studies. If the series is non-stationary, the relationship between the independent and dependent variables may exhibit misleading inferences leading for spurious regression. A series said to be stationary if the mean and auto covariance of the series does not depend on time. In order to examine whether each variable's time series is integrated and has a unit root, the study has considered widely used popular unit root tests-ADF test. Both tests use the null hypothesis that the series does contain a unit root (non-stationary variable) against a stationary variable in the alternative hypothesis. If the calculated test statistics is higher than the critical value then one does not reject the null hypothesis and the concerned variable is nonstationary; if not, that is stationary. The test is based on the following regression equation:

$$\Delta y_t = a_1 + a_{2t} + by_{t-1} + \sum_{i=1}^m p_i \Delta y_{t-1} + \vartheta_t \quad (9-1)$$

Where, $\Delta y_t = Y_t - Y_{t-1}$ and Y is the variable under consideration, m is the number of lags in the dependent variable chosen by Akaike Information Criterion (AIC) and ϑ_t is the stochastic error term. The null hypothesis of a unit root implies that the coefficient of Y_{t-1} is zero. The ADF is widely used due to stability of its critical values as well as its power over different sampling experiment.

Table 1.7: Unit Root Test Results

		ADF	Process	KPSS	Process
Levels intercept	LMO	-1.86	I(1)	0.50**	I(0)
	LFDI	-1.22	I(1)	0.08***	I(0)
	LER	-1.22	I(1)	0.20**	I(0)
Levels intercept and trend	LMO	-2.22	I(1)	0.11***	I(0)
	LFDI	-4.12	I(1)	0.08***	I(0)
	LER	-1.31	I(1)	0.16**	I(0)
First differences intercept	Δ LMO	-4.65***	I(0)	0.11	I(1)
	Δ LFDI	-4.82***	I(0)	0.10	I(1)
	Δ LER	-4.45***	I(0)	0.44	I(1)
First differences intercept and trend	Δ LMO	-4.54***	I(0)	0.07	I(1)
	Δ LFDI	-1.78*	I(0)	0.10	I(1)
	Δ LER	-4.55**	I(0)	0.50	I(1)

Notes: For ADF, the optimal lag length is selected using AIC method. *, ** and *** denotes rejection of the null at 10%, 5% and 1% level of significance. The null hypothesis states that the variable has a unit root. The critical values and details of the tests are presented in Dicky and Fuller (1979, 1981). The AIC determines the lag length (P) in the ADF tests (see Stock and Watson 2007:561 for details) The lag truncation parameter for the KPSS test is selected using the formula

$4(T/100)^{1/4}$. KPSS test has the null of stationarity against a nonstationary alternative

The estimation procedure begins with testing the time series properties of the data. Table 1.7 presents the unit root test results of the variables. For ADF tests, both with constant and constant and trend, one is unable to reject the null at level and is able to reject when first differenced series is used. Optimal lag length for ADF is selected using general AIC method. In total, it emerges from the unit root test results that both the variables (LMO, LER, LFDI) are integrated of order 1, I(1).

Similarly, for KPSS tests, the null (of stationarity) is rejected at levels but accepted when applied to first differenced data. Therefore the unit root test results suggest that both the variables are integrated of order 1.

Once it is established that variables are I(1), the next step is to test for existence of any cointegrating relationship among them.

Since the variables are integrated of order 1, i.e. I(1), we can test whether they are cointegrated or not (Engel and Granger, 1987). We test for the number of cointegrating relationships using the approach proposed by Johansen (1988) and Johansen and Juselius (1990). The optimal lag length of the level VAR system is determined using the Akaike Information Criterion (AIC), Hernan-Quinn criterion (HQ) and Schwartz criterion (SC). Table 1.8 below reports the number of cointegrating relationships among the variables under consideration.

Table 1.8: Cointegration test Results

Null	Eigenvalues	Trace Test		Max Eigenvalue Test	
		$\lambda - trace$	p-value	$\lambda - max$	p-value
$r \leq 0$	0.79	54.31	0.0000	29.96	0.0022
$r \leq 1$	0.54	24.34	0.0018	15.04	0.0375
$r \leq 2$	0.38	9.30	0.0023	9.30	0.0023
Note: (i) λ_{Trace} indicates Trace and λ_{Max} states Maximum Eigen value unrestricted co-integration rank Test, (ii) One asterisk (*) denotes significance at 5% level, (iii) r denotes the number of co-integrating vectors					

Once it is established that variables are $I(1)$, the next step is to test for existence of any cointegrating relationship the variables. The Johansen (1991) LR test of cointegration is applied and results are showed in Table 1.9. The λ -trace statistic rejects the null of $r \leq 0$ but cannot reject $r \geq 1$ and also, the λ -max statistic rejects the null of $r = 0$ but fails to reject $r = 1$ at 5% level. These Eigenvalue tests based on stochastic matrix indicate existence of the cointegrating relationship between output, FDI and real exchange rate. Results of both Trace and Maximum Eigenvalue tests suggest the existence of at least three cointegrating relationships among the variables in the series at 5% level of significance. This model also satisfies the stability condition. The stability of the VAR models is found to be satisfactory. No roots of the characteristic polynomial in the VAR estimation lie outside the unit circle.⁹

If the variables are $I(1)$, Engle and Granger (1987) assert that causality must exist in, at least, one direction. The Granger causality test is then augmented with an error correction term (ECT) as shown below:

$\Delta LMO = \delta_0 + \sum_{i=1}^q \delta_{1i} \Delta LMO_{t-1} + \sum_{i=1}^q \delta_{2i} \Delta LFDI_{t-1} + \sum_{i=1}^q \delta_{3i} \Delta LER_{t-1} + \delta_4 Z_{t-1} + v_t$	(9-2)
$\Delta LFDI = \varphi_0 + \sum_{i=1}^n \varphi_{1i} \Delta LFDI_{t-1} + \sum_{i=1}^n \varphi_{2i} \Delta LMO_{t-1} + \sum_{i=1}^n \varphi_{3i} \Delta LER_{t-1} + \varphi_4 Z_{t-1} + \varepsilon_t$	(9-3)
$\Delta LER = \beta_0 + \sum_{i=1}^m \beta_{1i} \Delta LER_{t-1} + \sum_{i=1}^m \beta_{2i} \Delta LMO_{t-1} + \sum_{i=1}^m \beta_{3i} \Delta LFDI_{t-1} + \beta_4 Z_{t-1} + \mu_t$	(9-4)

where Z_{t-1} is the ECT obtained from the long run cointegrating relationship between real manufacturing output, real foreign direct investment and real effective exchange rate. The above error correction model (ECM) implies that for each of the model possible sources of causality are two: lagged dynamic regressors and lagged error correction term. If estimated coefficients of either sources of causation turn out to be significant, the null of no causality is rejected. For

⁹ The numbers are not reported here to conserve space.

instance, by equation (5), given the presence of real foreign direct investment and real effective exchange rate Granger cause real manufacturing output, if the null of either $\sum_{i=1}^q \delta_{2,i} = 0$ or $\delta_4 = 0$ is rejected. On the other hand, if we cannot reject either of the null hypothesis, it is concluded that no causation exist from independent variables to dependent variable.

Table 1.9: Multivariate Granger Causality Results

	DLC	DLE	DLY	ECT_{t-1} (t-statistic)
DLC		1.85 [0.17]	0.54 [0.58]	0.00 [0.99]
DLE	1.12 [0.34]		2.37 [0.11]	1.18 [0.32]
DLY	10.63* [0.00]	1.52 [0.23]		6.92*[0.00]
Note: (*) rejects the null at 5% level of significance and figures in parenthesis are probability values.				

Null Hypotheses	Lag 2	Lag 3	Lag 4
LFDI does not Granger Cause LMO	0.26	0.4	0.37
	[0.77]	[0.75]	[0.81]
LMO does not Granger Cause LFDI	5.54	2.81	5.37
	[0.01]	[0.08]	[0.02]
LER does not Granger Cause LMO	1.28	11.45	6.17
	[0.30]	[0.00]	[0.01]
LMO does not Granger Cause LER	0.19	0.48	0.87
	[0.82]	[0.69]	[0.51]
LER does not Granger Cause LFDI	2.06	0.88	0.57
	[0.16]	[0.4811]	[0.68]
LFDI does not Granger Cause LER	0.25	0.15072	0.14
	[0.78]	[0.9271]	[0.95]
Note: The elements in the table are F-statistics with respective P-values in parentheses. The numbers are significant at the 1 and 5 and 10 percent significance level when bold.			

Granger causality F -statistics for up to 4 lags and their corresponding p -values are presented in Table 1.9. Manufacturing output causes FDI in Lao PDR. The picture of causality in these tests is unidirectional. The F -statistics for the output-FDI causality are significant at the 5 and 10 percent levels for lags 2 through 4, respectively but the reverse is not true. Real exchange Rate causes the Manufacturing output and the relationship is unidirectional. The F -statistics for the Exchange rate-output- causality are significant at the 5 percent levels for lags 3 and 4, respectively but the reverse is not true.

X. Conclusion and recommendation

The paper investigates the relationship between Manufacturing Output; Foreign Direct Investment and Real effective exchange rate in Lao PDR. The ADF for both trend and intercept test Granger Causality test and Co-integration Models are employed taking care of stochastic properties of the variables. For ADF tests, both with constant and constant and trend, one is unable to reject the null at level and is able to reject when first differenced series is used. In total, it emerges from the unit root test results that both the variables (LMO, LER, LFDI) are integrated of order 1, $I(1)$. The Eigenvalue tests based on stochastic matrix indicate existence of the cointegrating relationship between output, FDI and real exchange rate. The most interesting result is that both Trace and Maximum Eigenvalue tests suggest the existence of at least two cointegrating relationships among the variables in the series at 5% level of significance. This model also satisfies the stability condition. There is unidirectional causality from manufacturing output causes FDI in Lao PDR respectively but the reverse is not true. Real exchange Rate causes the manufacturing output and the nexus is unidirectional. It is clear that appreciation of real effective exchange rate causes manufacturing output which shows syndrome of Dutch Disease in Laos. This paper faces several weaknesses for improvement in future. Firstly, there is data limitation. This study used annual data which has short time period, it is important to use quarterly data or monthly data. Secondly, this study omitted some important macroeconomic variables. This study focuses on relationship between foreign capital inflows and real exchange rate and manufacturing output. However, important macroeconomic variables such as inflation, dollarization, and export of non-booming sector should be included in future study.

There are various policies available in order to mitigate Dutch disease (Hausmann and Rigobon, 2002; Rosenberg and Saavalainen, 1998). 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). 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). In addition, dealing with capital inflows is discussed by Calvo et al (1994) and Calvo and Rodriguez (1997).

We give three points in order to mitigate or avoid Dutch Disease in Laos. Firstly, it is clear evidence that increasing expenditure from windfalls lead to accelerate appreciation of the real exchange rate, which will contract non-booming sector. Therefore, it is important for policy maker to make Balance Budget Principle. Expenditure should focus on promote tradable goods

especially expenditure must focus on human resource development, infrastructure and health care. Secondly, countries with booming sectors are attractive to donors. Increasing foreign borrowing during booming period will have severe impact on tradable goods through appreciation of the real exchange rate. Therefore, reduce/maintain low level of foreign borrowing is important for Laos during booming sector. In addition, borrowing should spend on human resource and infrastructure and health care development projects. Thirdly, Laos is facing high external debt, as increase domestic expending will lead to appreciation of real exchange rate which will contract non-booming sector. Therefore, it is crucial to pay back debt as soon as possible during government has windfall from mining. Fourthly, windfall from booming sector will finish one day in future. Therefore, it is important saving windfall for using when booming sector finishing. Setting up mining fund for saving or investment in abroad is crucial.

In addition, as financial sector is very weak in Laos, improvement in banking supervision is also important factors to deal with capital inflow particularly short-term speculative capital inflows. Since tools of monetary and exchange rate policy is not well established, it is also important to improve these tools in order to deal with managing capital inflows.

XI. References

Agenor, P. R. (1998), Capital Inflows, External Shock, and the Real Exchange Rate, *Journal of International Money and Finance*, 17, pp. 713-740.

Athukorala, P and Rajapatirana, S. (2003). Capital inflows and the real exchange rate: a comparative study of Asia and Latin America. *World Economy*, 26 (4). pp. 613-637.

Asseery, A & Peel, D.A (1991), The effects of exchange rate volatility on exports: some new estimates, *Economics Letters*,

Anaya, J.A.G (2000), Exchange rate pass-through and partial dollarization: Is there a link?, *Working paper* No. 81, Stanford University.

Baharumshah, A. Z., and Thanoon, M. A. (2006), Foreign Capital Inflows and Economic Growth in East Asian Countries, *China Economic Review*, 17, pp. 70-83.

Benjamin, N.C. (1990). "Investment, the Real Exchange Rate, and Dutch Disease: A Two-Period General Equilibrium Model of Cameroon", *Journal of Policy Modeling*, 12(1).

Benjamin, N.C., Devarajan, S., and Weiner, R.J. (1989). "The Dutch Disease in a Developing Country – Oil Reserves in Cameroon-", *Journal of Development Economics*, 30

Bernanke B.S. (1986), Alternative explanation for money-income correlation, *Carregie-Rochester Conference Series on Public Policy*, Vol. 25, pp. 49-98.

Bjornland, H.C. (1998), The Economic Effect of North Sea Oil on the Manufacturing Sector, *Scotish Journal of Political Economy*, Vol. 45, No. 5, pp. 553-585.

Calvo, G., Leiderman, L., and Reinhart, C. (1994), The Capital Inflows Problem: Concepts and Issues, *Contemporary Economic Policy*, Vo. 12, pp. 54-66.

Calvo, G. A. and Rodriguez, C. A. (1997). "A Model of Exchange Rate Determination under Currency Substitution and Rational Expectations", *Journal of Political Economy*, Vol. 85, 617-625.

Coden, W. M. (1981). The exchange rate, monetary policy and North Sea oil: the economic theory of the squeeze on tradables. *Oxford Economic Paper*, 33 (July).

Coden, W. M. (1982). Exchange rate policy and resource boom. *Economic Record*, 58 (March).

Coden, W. M. (1984) Booming Sector and Dutch Disease Economics: Survey and Consolidation, *Oxford Economic Papers*, New Series, Vol.36, No.3 (Nov.), pp. 359-380

Cooley, T., and LeRoy, S. (1985), A theoretical Measurement: a Critique, *Journal of Monetary Economics*, 16, pp. 283-308.

Cordo, V. (1996), Macroeconomic Adjustment to Capital Inflows: Lessons From Recent Latin American and East Asian Experience, the *World Bank Research Observer*, Vol. 11, No. 1, pp. 61-85.

Civcir, I. (2003). "Dollarization and Its Long-run Determinants in Turkey", *Middle East Economics*.

Devaranjan, S., J.D. Lewis, and S. Robinson. (1993), External Shocks, Purchasing Power Parity, and the Equilibrium Real Exchange Rate. *World Bank Economic Review* 7: 45-63

Dickey, D.A, and Fuller, W.A. (1979), Distribution of the Estimators for Autoregressive Time Series: a Unit Root, *Economic Journal*, 92(4), pp. 427-431.

Eltony, M.N. and M.Al-Awadi (2001). "Oil price fluctuations and their impact on the macroeconomic variables of Kuwait: a case study using a VAR model", *International Journal of Energy Research* 25 (11), 939-959.

Enders, W. (1995). *Applied Econometric Time Series*, Wiley, New York.

Engle, Robert E. and Granger, C. (1987). "Cointegration and Error-Correction: Representation, Estimation, and Testing", *Econometrica*. 55:251-76.

Farzanegan, M. R., and Markwardt, G. (2009), The Effects of Oil Price Shocks on the Iranian Economy, *Energy Economics*, 31, pp. 134-151.

Hausmann, Ricardo, and Roberto Rigobon (2002), "An Alternative Interpretation of the 'Resource Curse: Theory and Policy Implications.'" NBER Working Paper No. 9424. Cambridge, MA: National Bureau of Economic Research.

Hutchison, M. (1994), Manufacturing Sector Resiliency to Energy Booms: Empirical Evidence from Norway, the Netherlands, and the United Kingdom, *Oxford Economic Paper*, Vol. 46, No. 2, pp. 311-329.

Johansen, S. (1991), Estimation and Hypothesis Testing of Co-integration Vectors in Gaussian Vector Autoregressive Model, *Econometrica*, 59, pp. 1551-1580.

Kenen, P.B & Rodrik, D (1986), Measuring and analyzing the effects of short-term volatility in real exchange rates, *The Review of Economics and Statistics*.

Kyophilavong, P. (2009a). "Mining Sector in Laos", *BRC Discussion Paper Series No. 18*, Bangkok Research Center (BRC), IDE-JETRO.

Kyophilavong, P. (2009b). "Evaluation of Macroeconomic Policy in Laos", *Discussion Paper No. 171*, Economic Research Center, Graduate School of Economics, Nagoya University.

Kyophilavong, P. and Toyoda T.(2008). "Foreign Capital Inflows in Natural Resource Sector: The Impact on Lao Economy", Conference Paper, the international conference, "The Future of Economic Integration in Asia" co-organized by the Faculty of Economics, Thammasat University and Japan Bank for International Cooperation (JBIC), the Imperial Queen's Park Hotel, Bangkok, 20-21 November 2008.

Kyophilavong, P. (2010). "Lao PDR: Coping with Multiple Currencies." in eds., Capannelli. G and Menon. J, *Dealing with Multiple Currencies in Transitional Economies*, Manila, Asian Development Bank.

Lartey, E. K. K (2007), Capital inflows and the real exchange rate: An Empirical Study of Sub-Saharan Africa, *International Trade & Economic Development*, Vol. 16, No. 3: 337-357.

Larsen, E. R. (2006), Escaping the Resource Curse and the Dutch Disease?. *American Journal of Economics and Sociology*, 65: 605–640.

Leamer, E. E. (1985), Vector Autoregression for Casual Inference?, *Carregie-Rochester Conference Series on Public Policy*, Vol. 25, pp. 255-303.

Levy, S. (2007). "Public Investment to Reverse Dutch Disease: The Case of Chad", *Journal of African Economies*, Volume 16, Number 3.

Mallick, S. and Moore, T. (2008), Foreign Capital in a Growth Model, *Review of Development Economics*, 12(1), pp. 143-159.

Mishkin, F. S. (1999), Lessons From the Asian Crisis, *Journal of International Money and Finance*, 18, pp. 709-723.

Menon, J. (2008), Cambodia's Persistent Dollarization: Causes and Policy Options, Working Paper Series on Regional Economic Integration No. 19, ADB.

Mehrara, M., Oskoui, K. N. (2007), The Sources of Macroeconomic Fluctuations in Oil Exporting Countries: A Comparative Study, *Economic Modelling*, 24, pp. 365-379.

Olomola, P.A., and Adejumo, A. (2006), Oil Price Shock and Macroeconomic Activities in Nigeria, *International Research Journal of Finance and Economics*, Issue 3, pp. 28-34

Olsui, J.O., and Olagunju, M. A. (2005), The Primary Sectors of the Economy and the Dutch Disease in Nigeria, *the Pakistan Development Review*, 44: 2, pp. 159-175.

Pholsena, S and Phonekeo. D. (2004). *Lao hydropower potential and policy in the GMS context*, United Nations Symposium on Hydropower and Sustainable Development, Beijing International Convention Centre.

Ramirez, M. (2000), Foreign Direct Investment in Mexico: A Cointegration Analysis, *The Journal of Development Studies*, Vol.37, No. 1, pp. 138-162.

Reisen, H. (1996), Managing Volatile Capital Inflows: the Experience of the 1990s, *Asian Development Reviews*, Vol.14, No. 1, pp. 47-64.

Rosenberg, C.B. and T.O. Saavalainen (1998). 'How to Deal with Azerbaijan's Oil Boom: Policy Strategies in a Resource-Rich Transition Economy.' IMF Working Paper WP/98/6, Washington, D.C., IMF.

Sims, C.A. (1980), Macroeconomics and Reality, *Econometrica*, 48, pp.1-48.

Toyoda, T. and Kyophilavong, P. (2005). "Macroeconomic Management of the Lao Economy - An Econometric Evaluation -", *Journal of Economic Sciences*, Vol.9, No.1, September 2005.

Usui, N. (1996). Policy adjustments to the oil boom and their evaluation: the Dutch Disease in Indonesia. *World Development*, 24 (5).

Usui, N. (1997). Dutch Disease and policy adjustments to the oil boom: a comparative study of Indonesia and Mexico. *Resource Policy*, 23 (4): 151-162.

Warr, P. (2006). "the Gregory Thesis Visits the Tropics", *the Economic Record*, Vol. 82, No. 257, 177-194.

World Bank. (2004). *Lao PDR Country Economic Memorandum: Realizing the Development Potential of Lao PDR*, World Bank, Vientiane.

World Bank. (2008). *Lao PDR Economic Monitor*, World Bank, Vientiane Office.

Chapter 2

The Effectiveness of Macroeconomic Policies in Cambodia

Chea Ravin and Ung Luyna¹

National Bank of Cambodia

The remarkable achievements of macroeconomic stability in Cambodia for last decade have inspired a lot of debates over its determinants, in particular the macroeconomic policies. To clear the doubt, the study attempts to examine the effectiveness of fiscal and monetary policies in Cambodia by employing Vector Autoregressive (VAR) approach to detect an impact of a policy shock on other economic variables, namely output growth and inflation. Quarterly data of real GDP, monetary aggregate (M2), real effective exchange rate (REEX), government expenditure (G) and consumer price index (CPI) is used for estimation. After all necessary conditions for regression are satisfied, granger causality test is conducted to examine the causal relationship among all variables. Moreover, impulse response and variance decomposition are also derived to explore the response of all variables to a policy shock and to see the explanatory power of each variable.

The results suggest that fiscal policy is more powerful than monetary policy in boosting economic growth in medium term. Surprisingly, fiscal policy has negative link to inflation, implying that increase in government expenditure would result in decrease in inflation rate. In addition, price level does not virtually respond to monetary policy shock, indicating that money supply may not be an effective tool in controlling inflation. On the other hand, the linkages between real exchange rate and inflation are not statistically significant because inflation may be explained by external factors, in particular that of neighboring countries through prices of imported goods. These empirical findings provide policymakers with clear insight into what are appropriate tools which could be employed to achieve macroeconomic objectives and cope with external shocks.

¹ Authors would like to express our deep thanks to Dr. Sirinporn Wajjwalku, Director of Thai Research Fund (TRF) who kindly provides financial supports for the CLTV project. Secondly, our special gratitude would be dedicated to Prof. Bhanupong Niddiprabha who gives us a golden opportunity to participate in the project, sharing the views and experience on Cambodian macroeconomic policies.

I. Introduction

The effectiveness of fiscal and monetary policies remains a controversial issue being debated by many researchers and economists, some of whom have advocated Keynesian view in favor of fiscal policy influencing economic growth, while others have believed in monetary policy raised by monetarists. Despite the differences over the two policies, the consensus is that sound macroeconomic policies have been viewed as vital for stabilizing the economy. However, their effects on the economic activities differ across countries based on the nature of their economic structures and complexity. There have been a handful of literatures and studies which have attempted to solve the puzzle through some empirical evidences. For instance, Rahman H. (2005) conducted a study in Bangladesh; Arjisafe, et al. (2002) carried out an empirical study in Nigeria using VAR approach; Batten et al. (1983) conducted study in advanced economies and Ali, S. et. al. (2008) conducted a research in South Asian countries to explore the effectiveness of fiscal and monetary policies in stimulating economic growth, suggesting that monetary policy has more influence than fiscal policy. In contrast, some findings in favor of fiscal policy were identified by Andersen and Jorden (1986) and Chowdhury who examined the two policy effectiveness in Bangladesh in 1986.

For transitional economy-like Cambodia that has undergone through transitional period of economic transformation from centrally-planned to free market economy couple with an experience of high “dollarization”², designing an appropriate macroeconomic policy to sustain economic growth is a difficult task to accomplish. Surprisingly, since Cambodia obtained full peace in 1998 and implemented huge reform programs as well as regional and international grouping, the economy has enjoyed high growth with an annual average of more than 9% and reaching double digit in some years from 1999 to 2007 before declining to negative growth in 2009 due to global economic downturn (NBC bulletin, 2009). Inflation has had broadly stable around 1% from 2000 to 2005 before rising to double digit in 2007 due to dramatic surge in oil and food prices. In addition, unemployment rate has hovered around 3 percent (ADB, 2009). With regard to government budget operation, the deficit has significantly decreased from 6 percent of GDP in 2002 to 2.9% in 2008 resulting from increase in tax revenues collection induced by public sector reforms. For external sector, the current account deficit (including official transfer) rose to 12.5% of GDP in 2008 due to hike of oil prices and demand for imports. In 2009, the current deficit declines significantly to around 3.4% of GDP as a result of sharp drop in imports.

The remarkable above-mentioned results of economic resilience have been so impressive that a lot of questions have been posed about its determinants, in particular the successful implementation of macroeconomic policies. Some argued that the conduct of monetary policy in highly dollarized economy like Cambodia is very complicated in the sense that since the central bank is only able to control domestic money supply, the scope for effectiveness of monetary and exchange rate policies is minimal (Kem, 2002). The same conclusion was drawn by Zamaroczy et al. (2002) who carried out his research on “*The macroeconomic adjustment in highly dollarized economy: Cambodia case*” and Hoffmaister and Vegh (1995) who conducted

² Dollarization refers to a situation where foreign currencies serve the same function as domestic currency - store of value, unit of account and medium of exchange.

an empirical analysis of “*Disinflation and Recession Now vs. Later Hypothesis: Evidence from Uruguay*”. However, only a few empirical researches have been touched upon the links between fiscal or monetary policy instruments and macroeconomic objectives. In this context, it may leave some rooms for us to set a stage for empirical study about the roles of both fiscal and monetary policies in accelerating economic growth and controlling inflation in a highly dollarized economy-Cambodia. Importantly, the research is conducted with an expectation that the empirical findings will provide some policy makers and other researchers with an insight into the Cambodia’s macroeconomic stances and appropriate tools which should be used to stabilize the economy. Hence, this research attempts to answer a question of relative effectiveness of fiscal and monetary policies within Cambodia’s context.

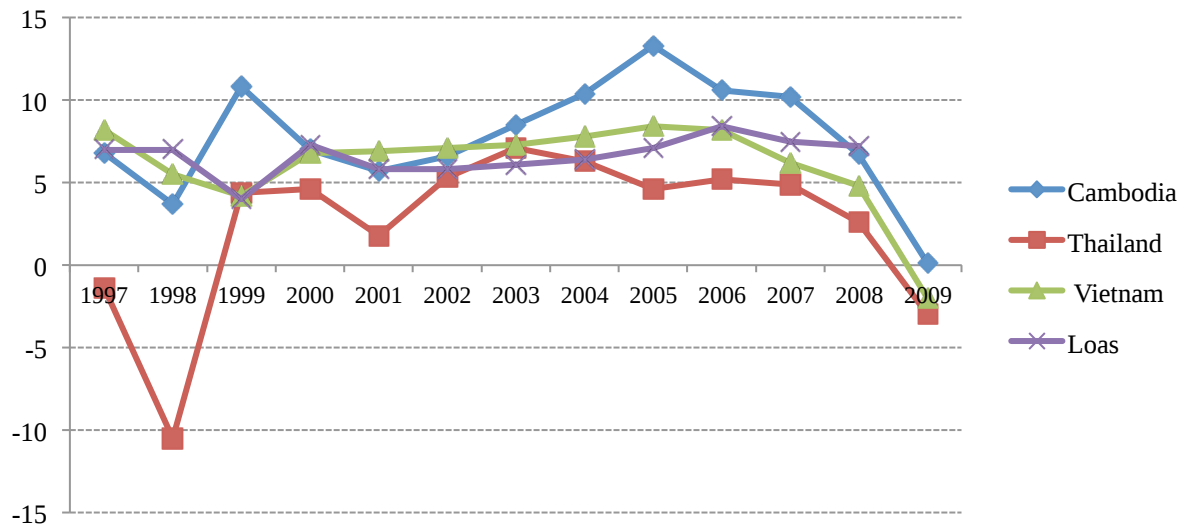
The study is organized as follows. Following an introduction in Section I, Section II provides an overview of Cambodian economy by highlighting the stylized facts of its monetary and fiscal development. Section III sheds a light on literature review of macroeconomic policies by examining the effectiveness of both fiscal and monetary policies. Section IV places an emphasis on the empirical studies by using Vector Auto Regression (VAR) to explore the relationship between output and inflation to macroeconomic variables such as government expenditure, monetary aggregate (M2), and real effective exchange rate. Section V draws policy implication and recommendations to improve the current economic performance so as to achieve macroeconomic stability which is not prone to external shocks.

II. Overview of Cambodian Economy

1. Growth Performance

Prior to 1990s, Cambodia undertook centrally-planned economy, which followed Soviet Union’s style. The commencement of economic liberalization in 1985 accelerated the enhancement of private property rights and lift of price controls in 1989. Importantly, the national election sponsored by UNTAC in 1993, marked the beginning of free market economy orientation into Cambodia. Since then Cambodia has changed its face both politically and economically. The Royal Government of Cambodia (RGC) with international community supports began a huge stabilization and rehabilitation reform programs aimed at economic development and growth. To achieve this, priority was given to the restoration of legal and institutional frameworks as well as development plan. The government embarked on dramatic reform evidenced by large-scale privatization of state-owned enterprises and the banking system, deregulation of the financial system and trade liberalization. In addition, National Development Plan (2001-2016), which has been propped up by Triangular and Rectangular Strategies, was developed and served as a roadmap for the Royal Government to achieve Millennium Development Goals (MDGs) and its objective of a sustainable development.

Figure 2.1: Growth Performance for Some ASEAN members

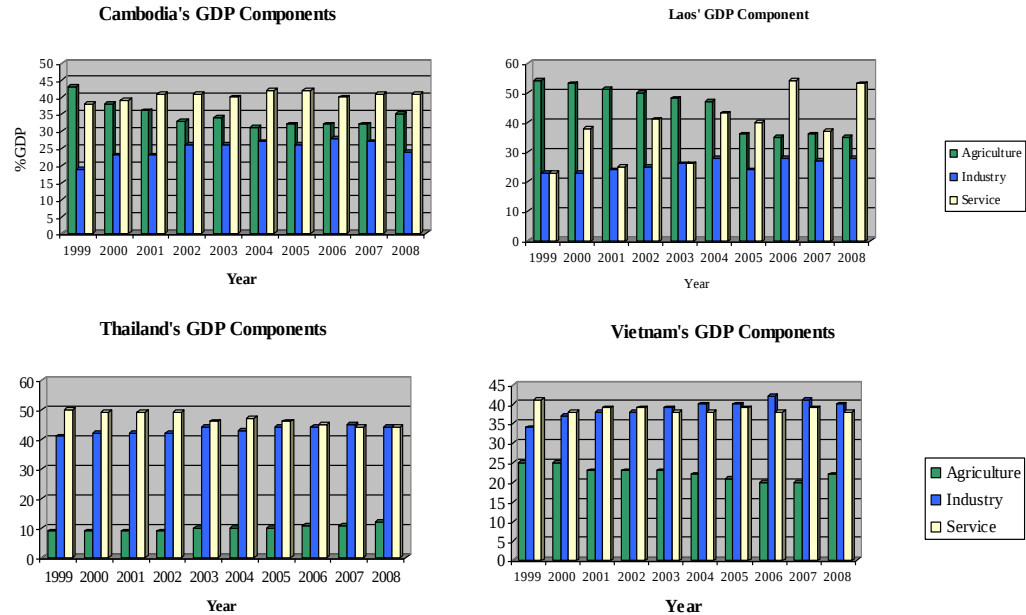


Source: IMF (2009)

As a result, as shown in figure 2.1, among ASEAN members, Cambodia broke the record of highest economic growth, in particular in period of 1999-2008 followed by Laos and Vietnam whose economies had grown about 7% and 8%, respectively. In aftermath of financial crisis and internal conflict in 1997, GDP growth rate dropped significantly to 3%. After the political situation returned to normal, Cambodian real GDP recovered by growing on average around 9% from 2000 to 2004 and then reaching its peak of 13.5% in 2005 before declining to around 5% in 2008 due to surge in oil price and global economic downturn. In 2010, GDP is positively projected to grow an average of 4.8% in aftermath of an estimate of nearly zero growth in 2009 (MEF, 2009).

Figure 2.2 shows the share of each component of GDP for four ASEAN members. Cambodia and Laos share common characteristics in terms of agricultural production which remains a crucial source of economic growth and poverty alleviation though it has been on downward trend. For instance, in Cambodia, the share of agriculture is around 33% of GDP which has declined from 43% in 1999 to 35% in 2008 while in Laos, the share decreased by 10% from 53% in 1999 to 43% in 2008. Service and industrial sectors in the two countries have been in an increasing trend. In contrast, share of agriculture in GDP of Thailand and Vietnam - the largest rice exporters in the world - are the lowest, accounted for only 10% and 21% of GDP, respectively, while the service and industrial sectors have the largest share.

Figure 2.2: Share of GDP by Sector for some ASEAN members



Source: World Bank's data available online, 2010

It should be noticed that a majority of Cambodian people relies heavily on agriculture and livestock which are considered as subsistence. However, the agriculture productivity is low due to poor infrastructure including irrigation system and roads in rural areas, use of traditional methods for farming, low level of mechanization and limited access to credits. It was compounded by the fact that this sector is not attractive to foreign investors because as shown in table 2.1, the amount of foreign investment was an average of \$8.3 million (3% of total FDI) from 1998 to 2005. Interestingly, flow of FDI into this sector reached \$130 million in 2006 and 118\$ in 2007. Of agricultural crops, rice is the main agricultural production which is accounted for 84% of the cultivation land. In 2008, total land for rice production was 2.6 million hectares, which yielded 7.15 million tons, of which around 2.5 million tons were formally and informally exported. Other crops are also planted including cassava, cashew nuts, maize, rubber, tobacco etc. The agricultural sector had employed 63% of labor forces followed by service sector creating jobs of average 24.65% (IMF, 2008).

Table 2.1: Foreign direct investment (FDI) by sector (in \$million)

Sectors/Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total	242.8	232.2	148.5	149.4	145.1	84.0	131.4	381.2	483.2	867.3	815.2	530.2
Enterprise	242.1	208.7	144.8	122.5	171.5	81.7	118.0	326.8	409.8	699.9	471.1	363.7
Beverage	2.7	2.7	12.6	11.5	0.0	1.8	0.0	13.4	12.2	31.8	5.4	0.0
Cigarette	0.2	0.1	0.2	1.6	0.0	2.7	5.3	10.4	0.0	2.7	0.0	1.6
Service	132.4	89.3	(48.3)	4.1	15.8	15.6	1.2	25.4	27.7	273.2	218.2	72.6
Wood Product	56.6	38.4	51.8	3.7	1.4	0.0	0.0	0.6	0.0	6.8	3.5	15.0
Petroleum	1.9	0.7	0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Packaging	0.6	6.6	5.6	0.5	1.1	1.1	6.9	14.3	0.0	19.0	4.4	0.0
Agriculture	12.3	(8.6)	5.8	4.8	28.8	0.8	9.9	12.5	130.6	118.0	72.3	88.4
Garment Industry	56.3	56.8	62.1	20.1	30.0	31.8	64.9	131.1	128.3	170.8	103.2	96.7
Others	(20.9)	22.8	54.8	75.8	94.5	27.8	29.8	119.1	111.0	77.6	64.1	89.5
Commercial Bank	0.7	23.6	3.7	26.9	(26.4)	2.3	13.4	54.4	73.4	167.4	344.1	166.4

Source: Data provided by NBC's officials

Cambodia had received a huge flow of FDI into service sector inclusively of banking sector, accounted for \$133.1 million in 1998 in which a big chunk was invested in hotel industry and then dropped significantly to \$14.6 million in 2004. Since 2005 onward, the investment in this sector had increased steadily, reaching its peak of \$562.3 million in 2008 in which a lot of investment was poured into banking industry. Moreover, the growth of service sector has been spurred by tourism which has grown by 22 percent annually from the period of 2002-2007. During the global downturn and the chaos in Thailand, its growth rate considerably decreased to 5.48 percent in 2008 and 1.7 percent in 2009. Most of tourists are Vietnamese, increased by 50.92 percent followed by Americans and Britain, while number of Korean and Japan visitors dropped by 25.81 percent and 10.7 percent in 2009.

Though garment and footwear industries have significantly contributed to recent rapid growth of industrial sector, accounted for 17% of GDP in 2007 and 70-80% of total exports, the amounts invested in this sector was accounted for only \$56.3 million (21% of total FDI) in 1998 and reached \$170.8 million in 2007. This sector has absorbed not only a lot of job opportunities, but also encouraged the capital formation, which has brought about new technologies into Cambodia. For instance, the number of garment factories had increased substantially from 7 in 1994 to 292 in 2008 and employed 35,2000 workers in September, 2008 (Jalilian et al, 2009). Unfortunately, the industry has been hard hit by the global crisis due to the fact that USA and Europe are the main destination for garment exports. As a consequence, about 50 textile and apparel factories had been closed in early 2009 resulting in 51,000 job losses or an approximately wage loss of 4-5 million per month because most of them are belong to foreign investors from crisis-stricken countries such as Taiwan, Hong Kong, South Korea and China. On the other hand, the construction sector also plays a significant role in speeding up the industrial sector in Cambodia, accounted for 7% of GDP in 2007 with annual growth rate of 20% in 2006 and about 300,000 workers were employed in this sector. The real

estate boom with huge jump in its price and input costs was burst due to sharp slump in incomes and credits resulting from global turmoil. As a consequence, the sales volumes have substantially dropped by 50-80% and property prices have declined by 30-40% and about 15,000 jobs were lost.

Inflation

The rapid monetary expansion during fiscal deficit induced inflation to rocket above 200% in 1991 and 176.8% in 1992. After the commencement of economic reform, inflation had been brought down to a single digit during the period of 1994-2000. For instance, the inflation rate has reduced substantially from 31% in 1993 to about 1% in 1995, then rose slightly to about 10% during the period of 1996-1998. From 1999 until 2006, the inflation rate stayed less than 5% on average and then hiked to double digit in 2007 and 2008 due to surge in oil and commodity prices (NBC, 2009).

Table 2.2: Inflation in some high and low degree of dollarized countries

Year	Cambodia	Bolivia	Uruguay	Loa PDR	Vietnam	China	Thailand
1998	15	8	11	91	7	-1	8
1999	4	2	6	128	4	-1	0
2000	-1	5	5	25	-2	0	2
2001	-1	2	4	8	0	1	2
2002	3	1	14	11	4	-1	1
2003	1	3	19	15	3	1	2
2004	4	4	9	10	8	4	3
2005	6.3	5.4	4.7	7.2	8.4	1.8	4.5
2006	6.1	4.3	6.4	6.8	7.5	1.5	4.6
2007	11.77	8.7	8.1	4.5	8.5	4.8	2.2
2008 (Sep.)	26.44	14	7.9	7.6	6.2	5.9	5.5

Source: IMF (2009) & Plate (2008)

As observed, inflation performance in dollarized economies has been mixed. High dollarized economies such as Cambodia and Bolivia have enjoyed single digit of inflation rate for decade, while Laos PDR had undergone through high inflation during the period of 1998-2000. It means that some countries have done a better job than other in terms of inflation achievement. However, some countries with low degree of dollarization including China and Thailand have appeared to be successful in achieving low inflation rate compared to highly dollarized economies. Plate et. al, (2008) conducted Granger causality test for Cambodia and Bolivia to investigate into the relationship between dollarization and inflation. The result did not support the hypothesis. In addition, they used VAR model to explore the impact of exchange rate fluctuation on domestic inflation in dollarized countries including Cambodia. The result was statistically significant, implying that the depreciation of exchange rate led to increase in CPI.

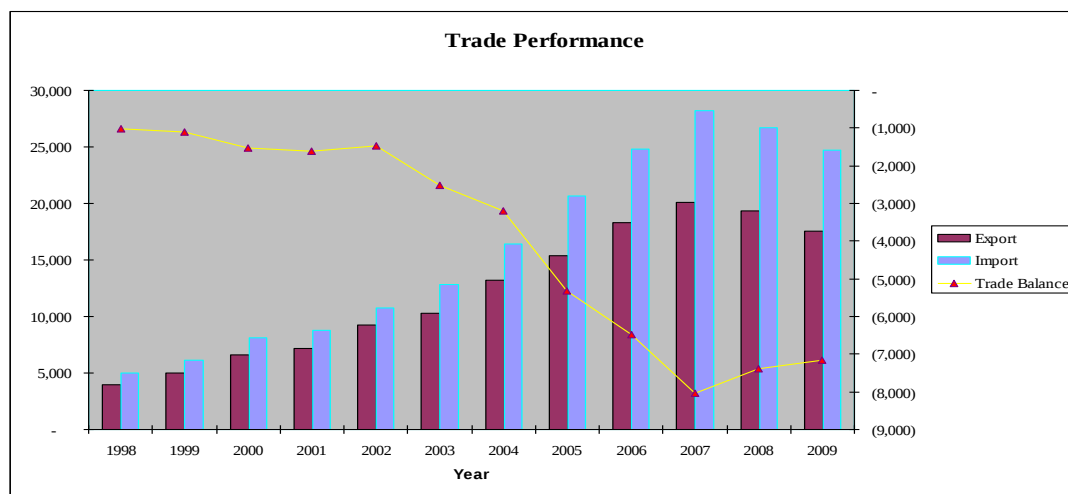
However, its impact was found to be smaller in Cambodia, Bolivia and Uruguay than in Argentina, Peru and Laos.

On the other hand, Ginting and Bird (2009) conducted an empirical study of the root cause of inflation in Cambodia by using Error Correction Model, suggesting that inflation in Cambodia has positive link to that of main trading partners, in particular Thailand and Vietnam since Cambodia is an importing country. Moreover, the growth of narrow money (M1) resulting in increase in domestic demand fuels the price of non-traded goods. Surprisingly, exchange rate movement is not statistically significant in explaining inflation in Cambodia. They also maintained that in an economy adopting the currency board or common currency arrangement, the impact of exchange rate pass-through on inflation appeared to be deteriorated.

External sector

Following the trade liberalization and economic openness in early 1990s, the exports as percentage of GDP increased substantially from 19.6% in 1994 to 29.1% in 1995 and had grown remarkably from 28.7% in 1997 to 65.3% in 2007. The major merchandise exports consist of textile which contributed to 70-80% of total exports, and agriculture products including logs, rubber, woods, sawn timber and tobacco. However, the garment exports dropped significantly from \$250 million to \$100 million in early year 2009 due to slowdown in demand for import from USA market which occupied 65% in 2008. At the same time, imports as percentage of GDP also increased considerably from 30% in 1994 to 80.4% in 2007, resulting in current account deficit as percentage of GDP of about 3.4% (IMF, 2009).

Figure 2.3: Trade Balance



Source: IMF (2009)

The current account deficit was estimated to rise to 8% in 2007 and about 16% in 2008 due to slowdown in demand for textile goods caused by global financial turbulence. However, agricultural exports, in particular rice, have escaped unscathed from the crisis with surplus of around 3.5 million tons for export according to Ministry of Agriculture, Forestry and Fisheries,

while import growth declined by 8.6% due to weaker demand for luxury goods including cars, motobikes, buses etc. (Jalilian et al., 2009).

2. Fiscal Development

Since 1993, customs reforms have been launched and tax system was also introduced. Moreover, under public financial management reform program, the revenue could cover the budget in light of strong economic activity and improved administration. The reforms were accelerated by the fact that the Royal Government of Cambodia signed a memorandum of understanding with IMF that provides financial support for RGC with regard to Poverty Reduction and Growth Facility (PRGF). The documents highlight some policy conditions including the requirement to increase collection of revenue and improve expenditure practices as follows:

- *Ceiling on net domestic financing of the budget*
- *No foreign commercial borrowing*
- *Minimum maintenance of foreign currency reserves*
- *Limited credit by NBC to government*

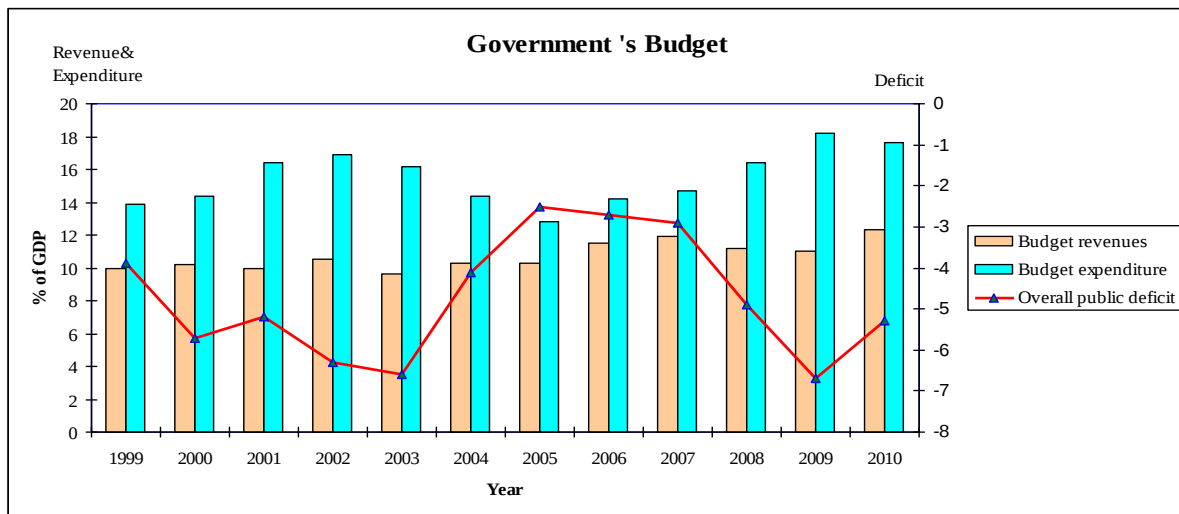
At the same time, a Poverty Reduction Strategy Paper (PRSP-I) which provides a comprehensive macroeconomic framework covering the period of 1997-2004, requires the government to increase its expenditure-to-GDP ratio, but uphold the fiscal deficit below 5% of GDP. To achieve this, fiscal consolidation is recommended to generate additional revenue while ensuring the increase in expenditure on social sector. Importantly, the budget shall be allocated to four main prioritized sectors including health, education, agriculture and rural development in order to achieve a goal of poverty reduction. In the mean time, the government also developed “Socio-Economic Development Plan II (SEDP-ii)” which served as a roadmap for growth and poverty alleviation through enhancement of governance. The plan provides detail of public investment program which lists all prioritized projects. In addition, under Medium Term Expenditure Framework (MTEF), multiple-year budgeting was put in place to match between development plans and government budgets. Similarly, this framework highlights the allocation of resources across sector, indicating the attempts to turn resource from defense and security to the four sectors which were pointed out in the I-PRSP and SEDP-ii.

While several proposals have been raised to improve revenue collection, a lot of policy documents have cited the gloomy prospect for possibility to increase revenue as percentage of GDP. D-MTEF assumed that the revenue generation would be in better position if the economy is growing faster. For instance, as assumed in the D-MTEF, the revenue would be increased by 1 percentage point if the GDP grew from 12.8% in 2002 to 13.9% in 2005 (Roy, 2004). In contrast, many economists have identified the possibility to increase revenue through improvement in tax administration and structure. The resource mobilization through domestic borrowing is not really feasible at the moment since the financial market opening is postponed to next year (2011) and the borrowing is subject to IMF conditionality which limits the government’s capacity to resort to domestic borrowing on the ground that it may crowd out private investments which hinders growth. In addition, less-developed banking system and financial market have posed an obstacle to mobilize savings which are mostly kept under

mattress at home and in form of gold or informally lend to private firms in lure of depositing abroad.

Even though fiscal measures have been managed in prudent manner, since 1999, the budget deficit as percentage of GDP had increased from 3% to a record high of 7% in 2003 as a result of dramatic surge in government outlays and then improved remarkably to less than 3% in 2007 after a lot of efforts made by Ministry of Economy and Finance to improve revenue collection (see annex I). The deficit jumped back to 7% in 2009 due to the implementation of fiscal stimulus measures against the economic turbulence.

Figure 2.4: Government's Budget Operations



Source: IMF

Fiscal constraint

Despite a lot of efforts made by the government to improve budgetary performance, tax revenue as percentage of GDP is very low compared to regional standard due to poor tax and customs administration and untaxed activities (IMF, 2007). Followings are some key constraints faced by tax and customs authorities:

- Low capacity staff with very low public pays, inspiring red-tape practices which induce a lot of tax avoidance and evasion
- A lot of smuggling activities along borders
- Tax is not applied to every one
- Lack of cooperation between tax department, customs and excise department, and the Ministry of Commerce for cross-border check
- Provision of very generous incentives such as tax holiday, exemption of import duties on particular goods and VAT to garment industry, for instance and incomes generated from this industry are not properly taxed.
- Tax on wealth is not applicable. For example, tax on capital gain is not yet implemented and property tax is not yet passed by National Assembly

Government Revenues and Tax Structure

Tax system in Cambodia has undergone through dramatic changes since 1990s after huge reforms of tax structure have been carried out to keep pace with economic growth and cope with new challenges when Cambodia embarked on openness of its economy to the world. In fact, since the new government was formed in 1993, the taxes have been considered as the main source of government revenue, contributing more than 70% of total revenues. The tax system in Cambodia is consisted of two regimes: “self-assessment regime and estimated regime”. The “self-assessment regime” refers to a regime which taxpayers are responsible for calculating and paying taxable amounts by themselves. Any contractual firm with government, service company, and merchandise company generating respective minimum turnover of \$125 million, \$250 million and \$500 million will be considered to be self-assessment regime. Revenue generated from this type of regime contributed to large amount of taxes on industrial profits (Hang, 2009). The estimated regime, on the other hand, is applied for small companies which have lower turnover compared to self-assessment regime.

In 2002, the government had made efforts to improve the collection of tax revenue through enhancement of personnel integrity, strengthening of enforcement measure and handling of smuggling issue. The aim of this action was to reduce the reliance on international trade taxes by enhancing the tax base. In addition in 2003 and 2004, tax and customs departments had adopted a lot of administrative measures to improve tax collection by imposing heavier penalty, re-designing organizational structure, introducing computerized system for tax collection, audit and reconciliation and providing training on audit and tax avoidance to tax department officials (see in Annex I). Importantly, Law on Customs and other regulations were promulgated and anti-smuggling activities had been beefed up. Moreover, customs fraud investigation unit was established and inspection procedure of traded goods was trimmed down to boost international trade flows. On the other hand, some actions had been undertaken to administer non-tax revenue including commencement of collecting non-tax revenue outstanding, and auditing contracts and leases to check their compliance. As a result, the revenues as percentage of GDP have increased considerably from about 5.4% in 1994 to about 10% in 2000 and maintained around 11% annually till 2007 and returned to 10% for the following years due to the sharp decline in international trade customs revenue. Examined the components of revenues, indirect taxes and trade revenues have significantly contributed to government revenues, accounted for 50% and 22% respectively while share of non-tax revenues was 21%.

Table 2.3: Government's Budget Operation

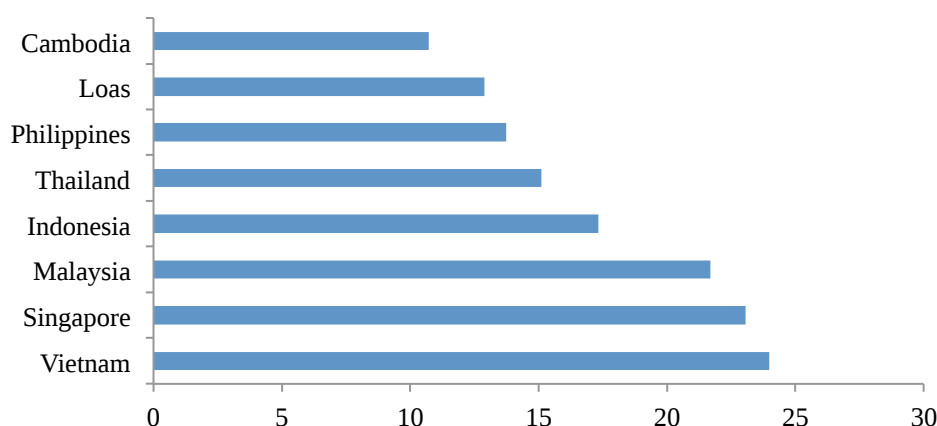
<i>In billion riels</i>	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total Revenues	1316	1441	1561	1762	1776	2203	2653	3431	4165	4109	5397
Tax Revenues	949	1055	1128	1245	1219	1645	1948	2372	3343	3248	5105
Direct Taxes	83	136	140	132	150	158	222	331	480	456	746
Indirect Taxes	433	484	558	640	607	884	1057	1920	2676	2624	3324
Trade Revenues	433	390	376	424	395	513	573	644	903	858	1032
Non-Tax Revenues	353	351	424	501	525	544	508	681	613	710	871
Capital Revenues	15	31	9	16	31	19	127	377	45	157	183
Total Expenditure	1825	2119	2366	2833	3004	3082	3303	4244	5164	5680	7417
Current Expenditure	1097	1223	1391	1579	1804	1890	2032	2527	3043	3569	4658
Wages	525.4	512	488	689	749	755	835	935	1058	1242	1730
Civil admin.	194.1	211	214	405	451	446	516	635	774	939	1148
Defense & security	331.3	301	274	293	299	309	319	341	284	302	583.7
Non-wage	548.3	677	866	858	969	1025	1066	1372	1766	2120	2572
Operating expenses	410.1	497	602	690	736	717	783	974	1129	945	
Economic transfers	12	31	30	51	60	60	85	137	65	73	
Social transfers	103.8	104	109	25	30	26	28	34	501	441	
Interest	22.4	21	22	28	34	49	55	50	70	75	100
Provincial expenditure	23.5	33	37	23	85	110	130	220	207	347	357
Capital Expenditure	727.8	896	974	1253	1196	1282	1441	1639	1685	2111	2759
Domestic Financing	223.6	301	262	338	333	296	315	446	436	711	966
External financing	504.2	594	712	915	863	986	956	1336	1772	1400	1700
Overall Balance	(508)	(676)	(805)	(1056)	(1235)	(974)	(862)	(813)	(999)	(1571)	(2020)
Foreign Financing	515	594	763	1122	1002	1008	1246	1418	1768	1501	1895

Source: IMF & MEF

It should be noticed that the average total revenue as percentage of GDP in Cambodia is considered to be the lowest as compared to that of some ASEAN countries, while Vietnam and Singapore achieved the highest ratio, averaging more than 20 percent (figure 2.5). This clearly indicates that Cambodia's ability to collect and generate revenues is minimal, affecting the

budget for expenditure. In the future, Cambodia like other new ASEAN members would be facing a great deal of challenges in terms of reduction of intra-regional tariffs and non-tariff barriers in compliance with Common Effective Preferential Tariff (CEPT) scheme. Cambodia is expected to fulfill its obligations to reduce tariffs to 0-5% for goods in inclusion list and temporary exclusion list in 2010 and for goods in sensitive list in 2017 (Lao-Araya, 2002). Of new ASEAN members, Cambodia is predicted to be strongly affected by the scheme because tax on international trade has been considered to be one of the main sources of government revenues, and average tax rate on good in Inclusion List (IL) was 10.4 in 2001 and 7.96 in 2003.

Figure 2.5: Government revenue as percentage of GDP for ASEAN members



Source: IMF

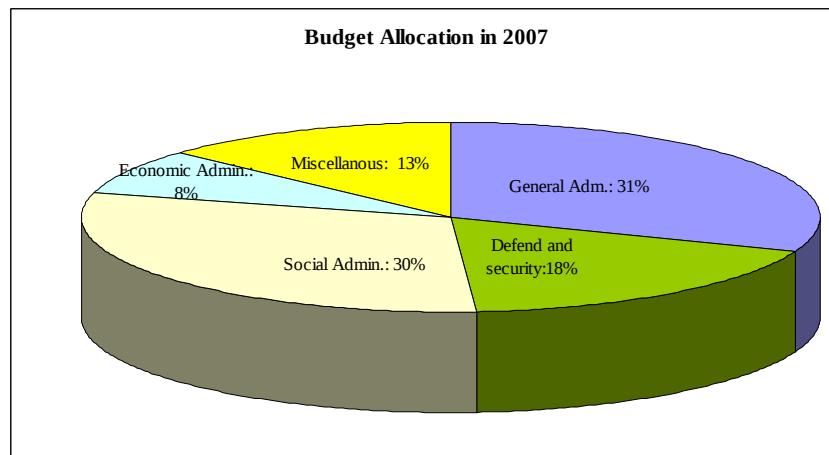
In addition, Cambodia included more goods in Temporary Exclusion List (TEL) than Lao PDR, Myanmar or Vietnam. Nevertheless, it was believed that the AFTA would boost trade volumes among member countries, and economic activities as a result of trade liberalization as well as decline in cross-border smugglings. Even though, a lot of benefits would expect to be reaped by ASEAN members, it is important for Cambodia like other new ASEAN members to strengthen its current tax system by increasing more tax bases so as to provide a solid cushion against unanticipated shocks following tax reduction. In order to cope with the future challenges of declining tax revenue on international trades, the government reconsidered some investment incentives which take form of “tax holiday” and exemption of import duties and VAT. The cost associated with tax holiday incentive was estimated to be 6 percent of GDP. In addition, these incentives to lure foreign investment appeared to be misleading (IMF, 2006).

Government Expenditures

The budget would be in good position (manageable deficit or surplus) if it is used in prudent manner that will not impair the government’s ability to service the debt. It should be noticed that current government revenues can cover the current expenditure while capital expenditures are mainly financed by external funds in form of grants or loans. For instance, the expenditure as percentage of GDP increased from 11.2% in 1994 to around 15% in 2000, reaching its peak of 16.9% in 2002 and then stayed around 13% till 2007. According to table 2.2, most of the

budget has been devoted to current expenditures which were double compared to capital expenditure. For example, the current expenditures increased from 1,097 billion riel in 1999 to 4,658 billion riel in 2009, while capital expenditure rose slightly from 727.8 billion riel to 2,759 billion riel during the same period. As proposed in the I-PRSP, SEDii, and MTEF, the budget was allocated in favor of social administration and general administration which were accounted for 30% and 31% respectively while respective 18% and 13% of total budget were devoted to defense and security and economic administration in 2007. For general administration, most amount of budget was allocated to priority ministries including Ministry of Education, Ministry of Health, Ministry of Agriculture, Fishery and Forestry, Ministry of Women Affair, Ministry of Rural Development, Ministry of Justice and Ministry of Land Management, Urbanization and Construction.

Figure 2.6: Budget Allocation



Source: SNEC, 2007

The capital expenditure was 5.6% of GDP, which was mainly financed by external donors. The budget deficits have been funded mainly by external financing which was accounted for around 5% of GDP, while domestic financing contributed about half compared to external financing.

Fiscal measures against global economic downturn

Against the backdrop of global financial turmoil in 2008, the government undertook fiscal stimulus as part of fiscal expansion by increasing the expenditure from 16.1% which was allocated in the budget to about 17.6% of GDP (Sidgwick and Poullang, 2010). In addition, the government spent \$10 million to train some workers laid off by closed factories caused by slow demand for imports by foreign buyers. At the same time, additional measures had been taken including the reduction of tax for tourism and garment industries, and tariff free on fertilizers and machines imported for agricultural production. Due to the decline in revenues caused by decrease in imports and increase in government outlays including 20% increase in public servant wages along with provision of some allowances, overall budget deficits were estimated to increase to approximately 5.9% of GDP in 2009. All these measures are expected to help bring the Cambodian economy back on track by achieving around 4.8% according to government forecast.

Debt Sustainability

The current reliance on external financing for capital investment has brought about great concerns over accumulation of debts despite the fact that RGC has entered the agreement with IMF on the limits to borrowing from abroad. Fortunately, most funds have taken forms of grants and concessional loans from either bilateral or multilateral donors. Since early 1990s, multilateral debts have become the main source of budget financing, while a huge amount of bilateral debts were owed to Russia Federation and United States of America resulting from the earlier period of internal conflict. At the end of 2008, the debt stock as percentage of GDP was 25% in nominal term and is predicted to increase to 30% in 2009 caused by global downturn.

Table 2.4: Total external outstanding debt

In million \$	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
Total debt	2,315	2,394	2,489	1,551	1,801	2,038	2,120	2,554	2,582	2,773	3,170
Multilateral debt	400	470	557	740	955	1,124	1,149	1,200	1,359		
WB	180	207	240	303	396	464	460	501	536		
ADB	147	189	232	328	434	530	568	656	721		
IMF	73	73	80	95	102	97	81	0	0		
Bilateral debt	1,915	1,923	7,74	811	846	914	971	1,054	1,223		

Source: IMF

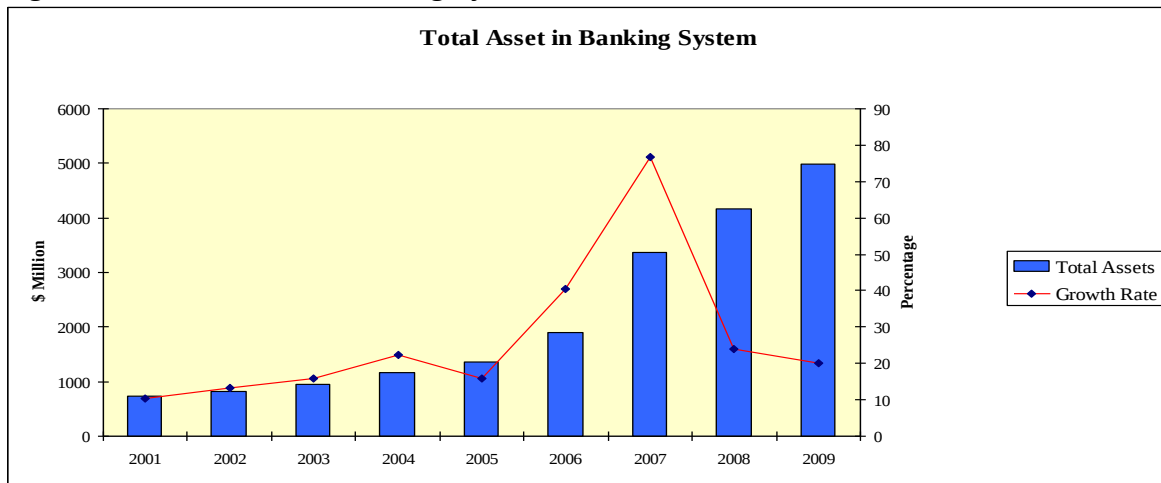
In 1999, the external debts outstanding was \$2.3 billion, in which bilateral debts possessed the largest share, amounted for 82% while the share of multilateral debts were only 17%. The debt had significantly dropped to \$1.55 billion in 2002 and then gradually increased up to \$ 3.1 billion in 2009. Interestingly, the share of multilateral debt had been on upward trend, reaching 54% in 2007, while share of bilateral debt had declined to 45% in the same period.

3. Monetary Development

Banking Sector Development

Currency and the banking system were abolished from 1975 to 1979 and resumed its operation in the form of mono-banking system in early 1980. Under this system, the monetary authority functioned both as central and commercial banks through a network of provincial branches and agencies. In the aftermath of political and economic reform in 1993, the mono banking system was transformed to a two-tier one. As a result, the number of banks rose considerably to 24 at the end of 1994. This number further increased to 31 by the end of 1998. Those banks comprised 2 state-owned banks, 7 foreign bank affiliations and 22 commercial banks owned by foreigners and local bankers. After the commencement of bank restructuring which required higher minimum capital requirement and higher reserves depositing in the NBC under IMF support in 1999, this number was trimmed to 18 banks (IMF, 2002). Currently, because of favorable economic conditions, the number of commercial banks and microfinance institutions rose to 42, of which 26 are commercial banks (NBC's bulletin, 3Q2009).

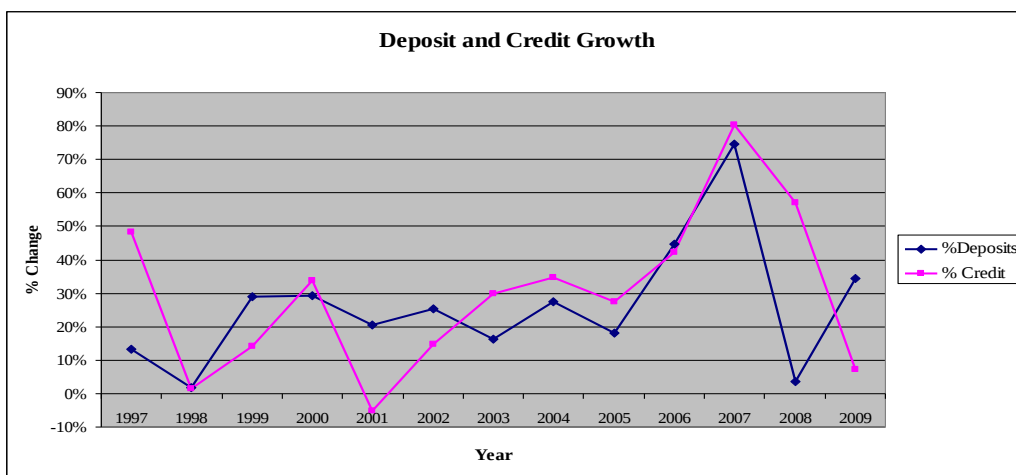
Figure 2.7: Total Asset in Banking Systems



Source: NBC (2009)

As a result, total assets in banking sector had increased substantially from \$729 million in 2001 to \$4,996 million in 2009 with annual growth rate of 10.26% in 2001 and registered a high record of 76.6% in 2007 before declining to 20% in 2009 (figure 2.7). This reflects the rapid increase in banking activities. For instance, deposits in banking sector have increased considerably from 13% in 1997 to about 74% in 2007 and then dropped significantly to 4% in 2008 before rising again to 35% in 2009. Meanwhile, according to the figure 2.8, the credits have followed the same path of the deposit by jumping up to 48% in 1997, but dropped dramatically to 1% in 1998 resulting from Asian financial crisis and internal conflict and became negative growth of -5% in 2001.

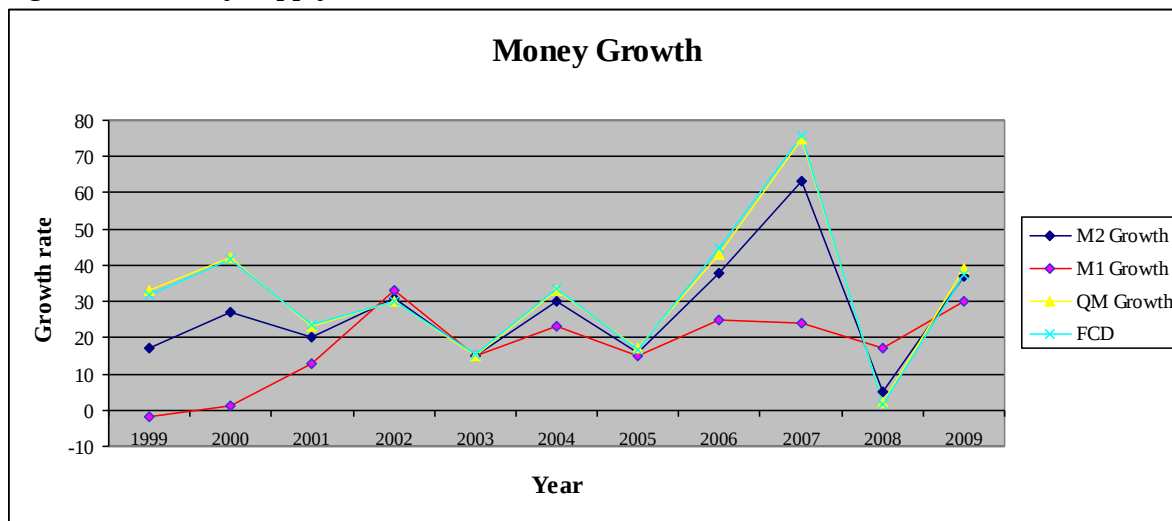
Figure 2.8: Deposits and Credit in Banking System



Source: NBC

Since 2002, credits to private sectors including wholesale and retail trading activities, and service sector have grown steadily and reached its peak of 80% in 2007 in line with high economic growth. However, 2008 global financial crisis caused the credit growth to decline substantially to around 7% in 2009 due to the fact that most investments in banking and financial sectors were obtained from crisis-hit countries such as Korea, Malaysia, China and Thailand. By and large, the private banks are very cautious to provide more loans to vulnerable sectors, especially both commercial and residential real estates due to fear of unforeseeable risks which may hinder the borrowers' abilities to repay the loans.

Figure 2.9: Money supply



Source: NBC (2009)

The rapid growth of banking activities has contributed to gradual expansion of M2 with an annual average of 17% in 1999 and registered a highest record of 63% in 2007 prior to dramatic decline to 5% in 2008 and slightly increased to 37% in 2009. As shown in figure 2.9, foreign currency deposit had positively moved with monetary aggregate, reflecting that Cambodia is a highly dollarized economy.

Monetary and Exchange Rate Policies

Monetary Policy Goal and Targets

Though goals of monetary policy vary across countries depending on macroeconomic situations, a common goal set by many central banks including NBC is price stability³. The policy goal can be achieved through targets and its instruments. It appears that monetary aggregate and exchange rate have been viewed as intermediate targets for monetary policies in Cambodia. In other words, exchange rate is likely to play a role as nominal anchor of monetary

³ See Article 3 of "Law on the Conduct and Organization of the National Bank of Cambodia"

policy because NBC always intervenes in exchange market to stabilize exchange rate fluctuation in a bid to maintain price stability. However, there is no clear policy framework for operating targets, and intermediate target in monetary policy implementation.

Monetary Policy Instruments

A gloomy aspect of monetary system of Cambodia is that there have not been seen any effective monetary instruments issued to conduct monetary policy and aimed at attaining the ultimate goal of monetary policy. Hence, Cambodia is still in its infancy in establishing market-based instruments. Against the backdrop of bank reform from mono to two-tier banking systems, the National Bank of Cambodia has tried to introduce direct and indirect monetary policy instruments. Nevertheless, direct policy tools have rarely used as part of monetary policy operations since it is believed to hinder the effectiveness of banking system. On the outset of free market orientation and huge banking reform in Cambodia, a lot of efforts have been made to set up the following indirect instruments:

1-Reserve Requirement: In December 1993, NBC introduced reserve requirement instrument by demanding all commercial banks to maintain 5% of all deposit liabilities at NBC in a bid to control the commercial banks' abilities to create money supply. Following 1997 Asian financial crisis and against the backdrop of bank restructuring, NBC increased the rate to 8% of total deposits. In response to global crisis in 2008, NBC conducted the monetary policy tightening by imposing higher required reserve up to 16% of total foreign currency deposits aimed at slowing down the dramatic surge in credit before the crisis. Then the rate was reduced to 12%, while the rate applied to riel deposits stayed at 8%. Though change in reserve ratio would have impact on Dollar deposit, the riel liquidity in the market might not change. In this context, this instrument may only play a role as prudential measure to reduce credit extension to private sectors and maintain liquidity in the banking system in time of crisis. Nevertheless, under-developed inter-bank market poses an obstacle to reallocate the excess reserves to the problem banks.

2. Standing facilities

Fixed deposits: the deposits are offered for both riels and USD with maturities date of three, six and twelve months. This facility may help cope with the tendency toward placement of funds with offshore correspondent banks and manage liquidity.

Overdraft facility: it was launched in January 2009 in order to handle the lack of short-term liquidity. The interest rate for the overdraft is 8% per annum. So far, only few banks have been engaged in this operation.

Table 2.5: Tools of Monetary Policy for Mekong River Countries

Goals/ Instruments	Cambodia	Laos	Thailand	Vietnam
Goals	Price stability	Monetary stability	-Low inflation (inflation targeting) - Stable exchange rate	Stabilization of the currency value
Exchange Rate	Managed floating exchange rate - Official rate - Parallel market rate The gap between the two rates is maintained by 1%	-Managed floating exchange rate -Range: +/- 0.25% for kip/USD and 0.5% for kip/THB and kip/EUR -Other currency: < 2%	Effective exchange rate stability	-Managed floating exchange rate - Pegged exchange rate: limit to 1% depreciation of Dong in 2004
Discount Rate	-Fixed deposits: 3, 6 and 12 months -Overdraft facility: was introduced in Jan. 2009 to facilitate short-term liquidity. -Refinancing window: a currency swap which allows for exchanging riels into \$US deposit	-Policy rate: reduced from 10% to 8% in 2008 -In Jan., 2010: 5%	- End of day liquidity adjustment window: Fixed policy rate: +0.5% (the margin is now temporarily set at 0.25% for 3 months) - ILF spillovers -	- Refinancing: 6% in 2005 - Discount facility: 4% per annum -
Reserve Requirement	-Sept, 1993: 5% for riel and USD -1999: 8% for riel and USD deposit -2008-present: *Riel: 8% of deposit liabilities *USD: 12% of deposit liabilities	-Kip: 5% -Foreign currency: 10%, of which 2% is securities	- 6% of deposits and short-term foreign borrowings (2 week period)	- Dong: 2-5% - FC: 4-8%
Open Market Operation	-Dollar auction is used as OMO for injecting more money into circulation -Promotion of interbank market -A formal OMO will be put in place when financial market is established sooner rather than later.	-Inter-bank and foreign exchange markets -Allow for purchase and sale of FX up to max. 20 million kip per day for each customer -BOL bills in kip and USD is used for OMO	- Repurchase operation - Outright purchase/sale of securities - Issuance of BOT bonds - FX swaps - Electronic BOT debt security window	- July 2000: purchase and sales of government securities, state bank bills, or others selected by SBV

Source: NBC, BOT, Chanthachack S.(2009) and SBV

Refinancing window: the facility was introduced in 1994 in order to satisfy the commercial bank's need of short-term liquidity. The most favorable asset for this facility is trade bill denominated in riel since the government securities have not yet been issued. The lender is able to repurchase the facility before maturity date at 70% of face value (IMF, 1997). Nevertheless, it has not been used by commercial bank since most banks receive deposits and provide loan in foreign currencies which hinder the function of NBC as a lender of last resort. So far only a few microfinance institutions have been engaged in the operation. The discount rate of 6% per annum is applied to this facility.

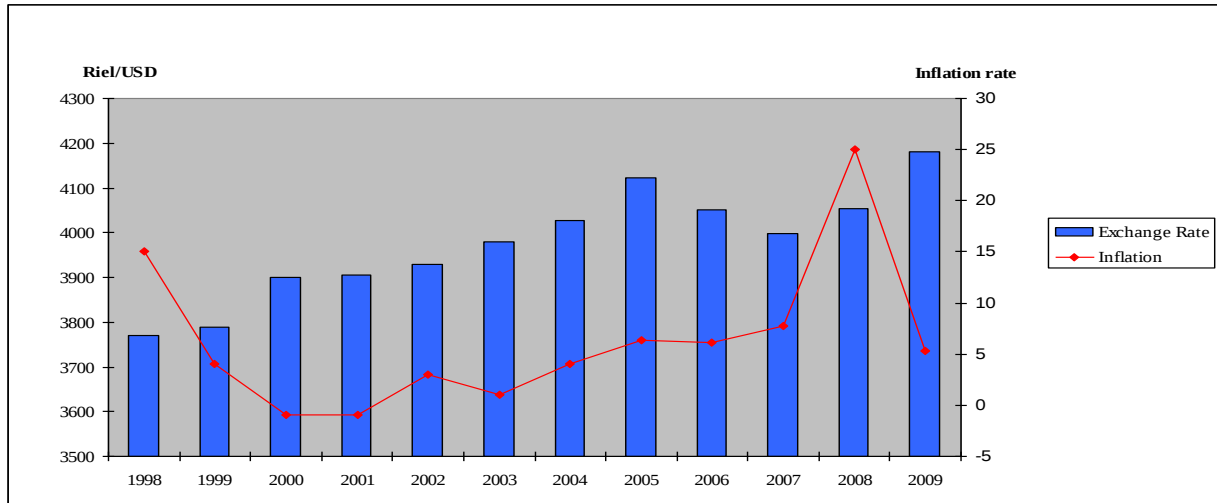
3. Open market operation

This instrument is commonly used by many countries where, in particular, financial system is well-developed. Open market purchase or sales of securities have been conducted in order to pump or absorb money from circulation aimed at controlling inflation and fostering output growth. Since financial market in Cambodia has not come into existence and so has its instruments, the tool has not been employed so far, even though the government had tried to issue T-bill to finance its budget deficit which can be bought by central bank to alter money supply in the economy.

Foreign exchange intervention

Cambodia has adopted managed floating exchange rate regime since 1992, which implies that the National Bank of Cambodia occasionally intervenes in the market so as to stabilize the exchange rates which consist of market exchange rate and official exchange rate. While the economic agents undertake market rate, NBC also determines the official rate for any transaction between NBC, government and the public sector. The gap between parallel market rate and official rate is maintained by less than 1 percent. In the absence of market-based securities, foreign exchange intervention plays a crucial role in effectively liquidating Riel circulation and maintaining exchange rate variability. It is noticed that the National Bank of Cambodia resorted to the US dollar auction to smooth the exchange rate fluctuation, thereby achieving price stability (IMF, 1997). In September 1993, periodic foreign exchange auctions were introduced. Since most bank transactions were conducted in US dollars, commercial banks and microfinance institutions have not actively joined the auction. That is only money changer in the parallel foreign exchange market engaged in the auction. In 2009, for instance, NBC had intervened in the exchange rate market by launching the purchase auction of US dollar for 34 times worth of \$88.92 million equivalent to 367.3 million riel. Then, recognising the downward swing of the riel, NBC began conducting subsequent sale auction of \$54 million. The intervention in foreign exchange market was cited as a success of smoothing exchange rate fluctuation in Cambodia. Some economists maintained that the exchange rate policy in dollarized economy is tantamount to monetary policy.

Figure 2.10: Nominal exchange rate and inflation



Source: NBC

It might be the case for Cambodia where the central bank regularly intervenes in exchange market with a view to smoothing the exchange rate fluctuation, thereby maintaining price stability and restore the confidence in local currency. However, De Zamaroczy (2002) argued that the exchange rate flexibility might not survive the high dollarization environment since it hinders the effective adjustment of exchange rate in the presence of any unanticipated shocks. According to the figure 2.10, the nominal effective exchange rate has appeared to be broadly stable from 1998 to 2006, depreciating by 7% from 3770 to 4052 riel per USD, while inflation rate was around 2.8 % on average, dropping significantly from 15% in 1998 to 11.77% in 2007 and then rocketed to 26.44 % in September, 2008 due to dramatic surge in oil and commodity prices. To sum up, the achievement of low inflation rate in Cambodia has not been attributable to stable exchange rate since most of imported goods have been sold in foreign currencies, in particular USD.

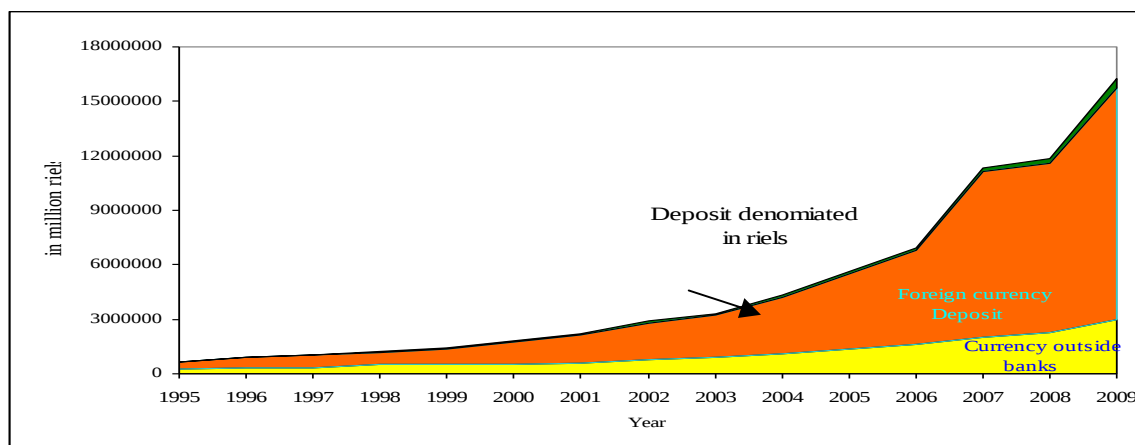
The Effects of Dollarization on Cambodia's Monetary System

A striking feature of the Cambodian monetary system is that it is characterized by a high degree of dollarization and cash transactions. Cambodian currency, riel, has been broadly used in small transactions, paying public servants, and taxes while other foreign currencies such as Thai baht, and Vietnamese dong have been accepted for medium of exchange along border trades. In reality, the motivation for Cambodian residents to hold foreign currency was resulted from the distrust of domestic currency. In addition, the legacy of political situation laid fear for Cambodian people to hold national currency, which was no longer in use when the political regimes changed. Hence, people prefer holding the stable currency or equivalent assets such as gold instead. A huge inflow of US dollars, baht and dong in Cambodia has begun since the Cambodia opened its economy to outside world in early 1990 and the United Nations spent about \$1.7 billion for the peacekeeping and national election in 1993. It is compounded by poor banking system, leaving the US dollars and other foreign currencies to circulate outside banking system. Therefore, currency substitution in Cambodia is less likely attributed to high inflation. Cambodia is regarded as a very highly dollarized economy in the world evidenced by

high ratio of foreign currency deposit by residents to M2 which increased from 56% in 1995 to around 78% at the end of 2009 (NBC Bulletin, 2009).

Not surprisingly, most commercial banks' operations such as deposits-taking and lending are conducted in US dollars, and other currencies beside riel. Only microfinance institutions mostly provide loans in riel to the poor. In addition, US dollars are not only used in daily transactions, but also in booking entry by using the daily exchange rate to convert the local currency (Riel) into US dollars. For instance, figure 2.11 indicates that though NBC has adopted de-dollarization policy as a long term goal, the foreign currency deposit has been in increasing trend.

Figure 2.11: Composition of money supply 1995-2009

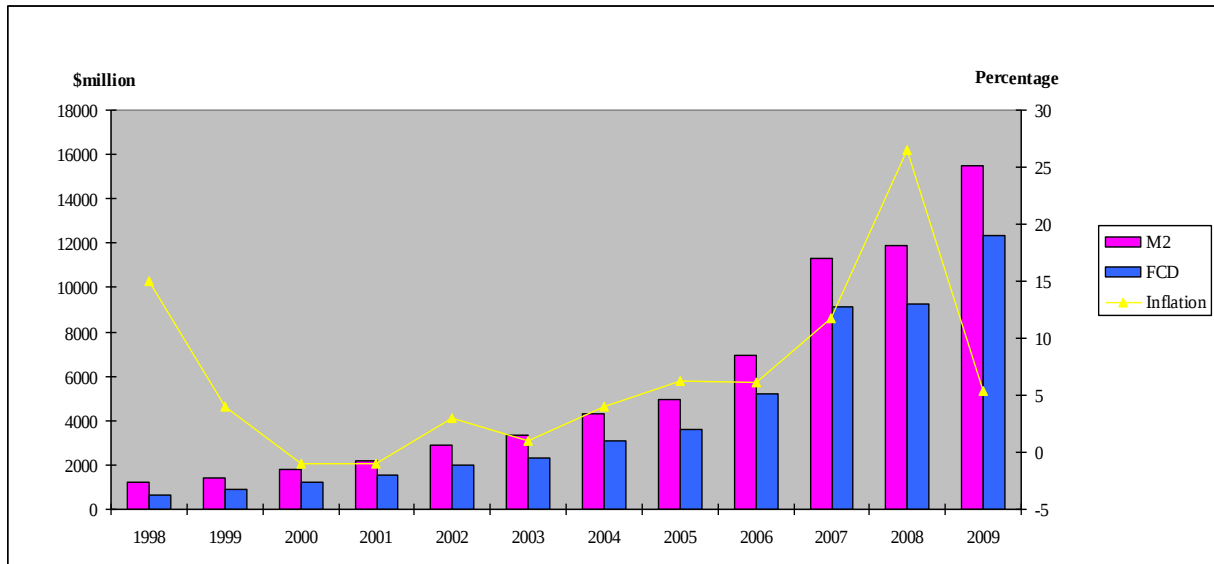


Source: NBC

The conduct of monetary policy within this situation, on the other hand, is very complicated in the sense that since the central bank is only able to control the small proportion of total money supply, thus the scope for effectiveness of monetary and exchange rate policies is minimal. In other words, the NBC has no control over foreign currency, part of M2, particularly the foreign currency in circulation which was estimated by De Zamaroczy (2002) to be as large as Cambodia's GDP. In addition, currency substitution may theoretically bring about exchange rate fluctuation. In other words, the higher the degree of dollarization, the more volatile the exchange rate is due to expected exchange rate depreciation (Kem, 2002).

Theoretically, currency substitution has had impact on inflation via what is so-called 'monetary-growth induced inflation' and 'speculative bubble induced inflation' (Kem, 2002). Regarding monetary-induced inflation, inflation is expected to rise when money growth increases. The Cambodian government has so far used inflation tax to partly finance its budget deficit. Since residents have been holding both foreign and domestic currencies, some amounts of inflation tax have been lost. Hence, a certain amount of inflation tax creation has to be followed by a rapid increase in domestic money supply, as a result of which domestic inflation also follows suit.

Figure 2.12: Money supply, foreign currency deposit and inflation



Source: NBC

As far as speculative bubble-induced inflation is concerned, an increase in inflationary pressure inspired by the rational expectation of a rise in money supply, threatens those who are holding domestic currency, thereby forcing them to substitute for foreign currency to avoid inflation tax. In this context, this tends to put pressure on the domestic currency to depreciate against the foreign currency (US dollar). The depreciation of the domestic currency, in fact, implies higher prices of goods quoted in the domestic currency (Riel).

It seems to be the case for Cambodia where inflation and broad money (M2) had moved the same direction from period of 2000 to 2007. However, from 2008 to 2009, the inflation had dropped from the peak of 26.44% to 5.32% in 2009, while M2 had still increased from \$ 11,902 million to \$15,515 million in 2009. Surprisingly, what had been argued by many researchers that dollarization contributes to low inflation rate might not be true for Cambodia since foreign currency deposits to M2 (which is a measure of degree of dollarization) have been on upward trend from 54% in 1998 to 79% in 2009, while the inflation rate had slightly increased within acceptable and manageable level.

III. Literature Review

1. Theoretical framework

There was a contradiction view between Keynesian and monetarists over the effectiveness of fiscal and monetary policies in terms of stimulating economic growth. Keynesian believed that fiscal policy played more important roles in boosting economy, while monetarists stressed the influential role of monetary policy in stimulating economic growth. For IS-LM framework developed by Roy Harrod, John R. Hicks and James Meade in 1936, fiscal policy expansion increases the interest rate which has negative effect on private investment. In an open economy,

higher interest rate will attract capital inflow, putting upward pressure on exchange rate which in turn worsens current account balance. On the other hand, high interest rate as a result of fiscal expansion would crowd out investment if the demand for money is highly sensitive to change in income and interest rate. In addition, the effectiveness of fiscal and monetary policies depends upon the choice of exchange rate regime. It is argued that fiscal policy under floating exchange rate with capital mobility is less effective than monetary policy in relation to spurring economic growth in the sense that increase in interest rate resulting from fiscal policy expansion leads to appreciation of domestic currency which affects net export and aggregate demand. Under fixed exchange regime, however, with perfect capital mobility, monetary policy seems less powerful in boosting the output than fiscal policy. For instance, monetary policy expansion decreases interest rate which leads to capital outflow, putting pressure on exchange rate to depreciate. To maintain fixed exchange rate, central bank intervenes in the exchange market by selling foreign currency which tends to reduce money supply in circulation.

In general, monetary and fiscal policies are inter-connected by government's budget constraint. Any action taken by central bank to change money supply causes the interest rate fluctuation which in turn affects the interest-bearing debts. Higher interest rate will squeeze government budget in terms of interest payment.

Keynesian viewed that a fiscal measure by raising government expenditure or tax cut would increase GDP through multiplier which becomes larger if people consume more than they save. The larger the multiplier, the more effective the fiscal policy is. This is particularly true for developing countries where the poor is going to spend more than they save if additional income is generated. The interesting fact is that most developing countries have undergone through budget deficit which has different implication for economic impacts within the period of contraction and boom (full employment). The worse case is when the government runs budget deficit in the recessionary period as the crowding out of investment occurs. The private investors view the rising deficit as a threat to an economy and investment status. However, crowding out can be mitigated by monetary policy expansion which lowers interest rate, encouraging investment. In addition, the fiscal expansion enhances economic activities and growth, which are favorable for more investments.

According to Eskesen L. (2008), the effectiveness of fiscal policy may be attributable to sound macroeconomic fundamentals, nominal wage and price stickiness and/or economic agents with finite horizon and liquidity constraint. In addition, it may depend on the size of government debts and fiscal stimulus. He argued that tax has less effect than expenditure because the government investment has the largest impact on economic activity and inflation. He concluded that some factors which contribute to the success of implementation of fiscal policy include timing of fiscal response, the macroeconomic conditions and appropriate actions taken to affect aggregate demand. Based on new Keynesian, monetary policy has real effects on the economy in the short to medium term because of nominal and real rigidities.

Arestis (2010) argued that for traditional view with fixed price, fiscal policy has significant impact on aggregate demand which in turn fosters production, income and employment. With inflexible price, the fiscal multiplier size may be affected by some factors such as productivity, higher interest rates, currency depreciation, and fiscal measure in which spending is more

effective than tax. For new consensus framework, empirical evidence suggested that the mentioned factors weakened fiscal policy effectiveness as the main tool of macroeconomic stabilization. However, Wren-Lewis concluded that in short-run, aggregate demand would be affected by changes in government spending and taxes. For new consensus macroeconomics, fiscal policy will affect the aggregate demand and supply through the change in future income and wealth and employment status. The role of expectation and wealth effects is likely to dominate the multiplier effects raised by Keynesian. In fact, the economic agents would reduce their current consumptions in response to an increase in government's budget deficit resulting from increase in its spending which is believed to be financed by increasing taxes, lowering the agents' future income and wealth. For supply side, on the other hand, the fiscal policy expansion would induce higher demand for labors, putting upward pressure on wages which have adverse impact on investment due to deterioration of the company profits. Most economists agreed that when the market is internationally integrated, fiscal policy become less effective in the sense that fiscal measure would induce some demands for imports (Ostrup, 2006).

Theoretically, fiscal policy plays a crucial role in achieving macroeconomic objectives through government spending and resource allocation. Inappropriate actions on fiscal management have provoked some problems such as high inflation, current account deficit, and decline in output growth. In general, fiscal policy adjustment handles the issues by influencing the macroeconomic variables including the components of aggregate demand, saving, money supply and affecting the microeconomic fundamentals such as improvement of resource allocation, institutions and infrastructure. Inflation can be influenced by the way the government expenditure is financed. It implies that if government spending is financed by inflation tax, the inflationary pressure is inevitable in the sense that the money grows excessively by borrowing from banking system, accelerating aggregate demand. On the other hand, fiscal policy expansion by increasing spending has worsened current account balance due to increase in demand for import of foreign goods. The fiscal deficit must be filled by domestic savings.

Blanchard et.al. (2010) expressed their views, in the wake of 2008 global financial crisis, on macroeconomic policy that when calculating the inflation both core inflation and oil or housing prices should be included because when the crisis broke out, the core inflation was broadly stable. They argued that monetary policy with low inflation seemed to be less effective than fiscal policy because the economy has not yet been recovered though some central bank has reduced its policy rate to nearly zero. In this situation, fiscal stimulus measure is inevitable as the recession was expected to long live. The crisis gave a lesson that many targets of macroeconomic policy should be turned from monetary policy to "fiscal and regulatory instruments". Nevertheless, the consensus is that output and inflation stability remains the goal of macroeconomic policy. To cope with future shocks, fiscal space should be beefed up by avoiding pro-cyclical measure during the boom periods and debt burden should be reduced rather than financing expenditures or taking tax measures.

Stiglitz (2002) pointed out three approaches for macroeconomic policy. Firstly, an approach which is known as "conventional economic approach" referred to the use of fiscal and monetary policy easing through reduction of tax, increase in government spending and lowering interest rate to boost economy. However, this measure may squeeze government

budget, leading to higher deficit for developing countries where financing is found difficult due to under-developed financial markets. Secondly, “conservative approach” supports a view that government expenditure expansion may be ineffective in the sense that the public investment sometimes yields an undesirable result as expected. Keynes supports the notion that increase in deficit would stimulate economy, while conservatives believe the deficit reduction help the economic situation. Lastly, the “heterodox approach” places an emphasis on the role of “expectation” which influences consumer and investors’ decisions on whether they should consume and invest today or tomorrow. By and large, lifetime income rather than tax cut influences consumer’s decision on consumption.

2. Previous Empirical Studies

Hundreds of empirical studies, using vector autoregression (VAR) have been conducted to investigate the response of output and inflation to policy tools, i.e, fiscal and monetary policies. However, the results have been mixed for one country to another, depending on their economic situations. For instance, Boivin, et al. (2003) employed identified VAR to examine the effect of monetary policy shocks on output, inflation and fed fund rate for United State in the period of prior to 1980 and after 1980. The result showed that monetary policy may be more effective in stabilizing the economy in terms of response to its own shocks and other shocks such as real demand and supply disturbances.

According to empirical evidence studied by Walsh E. C. (2003), it is clear that there exists a high positive correlation between money supply growth and inflation, but a sign of causality among the two variables is not seen in the studies. McCandless (1984), and Weber, Boschen and Mills (1995) concluded that the money growth and output growth were positively correlated, but no correlation between output growth and inflation. In contrast, Kormendi and Meguire, and Monnet and Weber (2001), and Mishikin (1992) found that money supply growth would not affect output growth in long run. Fisher equation emphasizes the relationship between nominal interest rate and expected rate of inflation which is strongly correlated with money growth; hence the nominal interest rate has a positive link to money growth.

Examining the short-run relationship between money, inflation and output may provide insight into how economic agents behave and monetary policy makers respond to economic shocks. In USA, plotting the quarterly data of real GDP, M0 and M2 shows that narrow money-M0 data had stronger positive relationship with real GDP than broad money-M2 at lags. Moreover, short-term interest rates in USA had stronger link to real output than long-run interest rates. Friedman and Schwartz (1963) concluded from empirical study that higher or lower output growth happened in light of higher or lower money growth.

Arjisafe, et al., (2002) carried out an empirical study by employing VAR to investigate into the effectiveness of monetary and fiscal policy in Nigeria, arguing that monetary policy has more influence on growth than fiscal policy. In other words, money growth has more impact on economic activity than changes in expenditure. The same result was cited by Batten, et al., (1983), who conducted study in advanced economies. In contrast, a research conducted by Andersen and Jorden (1986), Chowdhury who examined the two policy effectiveness in Bangladesh in 1986 suggested that the fiscal measures took effects much quicker than monetary policy.

Plate et. al, (2008) conducted Granger causality test for Cambodia and Bolivia to investigate into the relationship between dollarization and inflation. The result did not support the hypothesis. In addition, VAR model was employed to explore the relationship among macroeconomic variables including nominal exchange rate, CPI, money supply and output gap in dollarized countries. The result was statistically significant, implying that the depreciation of domestic currency led to increase in CPI. However, its impact was found to be smaller in Cambodia, Bolivia and Uruguay than in Argentina, Peru and Laos. In contrast, Ewards, S., et al., (2001) explored the relationship between dollarization and growth, and inflation. The study suggested that dollarized economies have experienced with lower inflation than non-dollarized economies which were claimed to have achieved higher economic growth because dollarized economies have found themselves difficult in response to external shocks.

Castillo, S. (2006) used Generalized Least Square (GLS) to estimate the impact of dollarization and macroeconomic variables on GDP growth and inflation for 21 Latin American countries. The results suggested that dollarization had positive impact on growth and helped reduce inflation. In addition, growth of monetary aggregate led to surge in inflation.

Ali, S. et. al. (2008) explored the effectiveness of fiscal and monetary policies on growth in short-run and long run for South Asian countries, using the Autoregressive Distributed Lag Model (ARDL) and Error Correction Model (ECM). The results indicated that monetary policy is more effective than fiscal policy in spurring economic growth in short-run and long run. The same findings were advocated by Rahman H. (2005) who conducted a study about “The Relative Effectiveness of Monetary and Fiscal Policies on Output Growth in Bangladesh: A VAR approach”. Unrestricted VAR framework which contains main variables such as real government expenditure (G), real money, real interest rate and real GDP was employed to generate the variance decomposition and impulse response. The results indicated that monetary policy was more effective than fiscal policy.

Owing to a study conducted by Girardin et. al. (2006) by using VAR to explore the effect of monetary policy shock in China from 1997 to 2005, output and price level were significantly explained by M1, but not M2. In addition, the results of empirical analysis of fiscal and monetary policies in China conducted by Hsin, Y. et.al (2010) using VAR model indicated that in the short run, fiscal policy is more powerful than monetary policy, while it works in opposite way in the long run.

Nasir M., et.al (2010) used VAR model to examine mix of fiscal and monetary policies in Pakistan, suggesting that there is evidence of weak or very little coordination among the policies.

IV. Empirical Study

1. Methodology

Modeling the dynamic relationship between two time series models can be structured, in the case of two variables, as follow:

$$y_{1t} = \beta_{10} + \alpha_{12}y_{2t} + \beta_{11}y_{1t-1} + \dots + \beta_{1p}y_{1t-p} + \gamma_{12}y_{2t-1} + \dots + \gamma_{1p}y_{2t-p} + u_{1t}$$

$$y_{2t} = \beta_{20} + \alpha_{21}y_{1t} + \beta_{21}y_{1t-1} + \dots + \beta_{2p}y_{1t-p} + \gamma_{22}y_{2t-1} + \dots + \gamma_{2p}y_{2t-p} + u_{2t}$$

In this system equation, y_1 is affected by the current value of y_2 , past value of y_1 and past value of y_2 . Similarly, y_2 is explained by current values of y_1 , past value of y_1 and past value of y_2 . In other word, this system allows us to see the dynamic relationship between y_1 and y_2 through time. However, this system has endogeneity problem, which could not estimate by using OLS. This system equation can be expanded by adding more variables and written in matrix form as follows:

$$Ay_t = \Gamma^0 + \Gamma^1 y_{t-1} + \dots + \Gamma^p y_{t-p} + \epsilon_t$$

Where,

$$A = \begin{bmatrix} 1 & \dots & \alpha_{1k} \\ \vdots & \ddots & \vdots \\ \alpha_{k1} & \dots & 1 \end{bmatrix} A = \begin{bmatrix} 1 & \dots & \alpha_{1k} \\ \vdots & \ddots & \vdots \\ \alpha_{k1} & \dots & 1 \end{bmatrix} \Gamma^0 = \begin{bmatrix} \beta_{10} \\ \vdots \\ \beta_{k0} \end{bmatrix} \Gamma^0 = \begin{bmatrix} \beta_{10} \\ \vdots \\ \beta_{k0} \end{bmatrix}$$

$$\Gamma^1 = \begin{bmatrix} \beta_{11} & \dots & \beta_{1p} \\ \vdots & \ddots & \vdots \\ \beta_{k1} & \dots & \beta_{kp} \end{bmatrix} \Gamma^1 = \begin{bmatrix} \beta_{11} & \dots & \beta_{1p} \\ \vdots & \ddots & \vdots \\ \beta_{k1} & \dots & \beta_{kp} \end{bmatrix} \Gamma^p = \begin{bmatrix} \gamma_{11} & \dots & \gamma_{1p} \\ \vdots & \ddots & \vdots \\ \gamma_{k1} & \dots & \gamma_{kp} \end{bmatrix}$$

$$\Gamma^p = \begin{bmatrix} \gamma_{11} & \dots & \gamma_{1p} \\ \vdots & \ddots & \vdots \\ \gamma_{k1} & \dots & \gamma_{kp} \end{bmatrix}$$

Reduced form of VAR can be written in matrix as follows:

$$y_t = B_0 + B_1 y_{t-1} + \dots + B_p y_{t-p} + e_t$$

Where

$$B_0 = A^{-1} \Gamma^0$$

$$B_1 = A^{-1} \Gamma^1$$

$$B_p = A^{-1} \Gamma^p$$

$$e_t = A^{-1} \epsilon_t$$

In the above equation, y_t is a k vector of endogenous variables, $B_1, \dots, B_p$ are matrices of coefficients to be estimated, p is lag operators and e_t is a vector of error terms. The reduced form is called Vector Auto-Regressive (VAR). Since only lagged values of the endogenous variables appear on the right-hand side of each equation, the simultaneity is no longer an issue, and OLS is an appropriate estimation technique. The assumption that the

disturbances are not serially correlated is not restrictive because any serial correlation could be absorbed by adding more lags of y 's. Moreover, e_t may be contemporaneously correlated with each other but are uncorrelated with their own lagged values and uncorrelated with all of the right-hand side variables. Without contemporaneous correlation, VAR equation can be estimated separately by using OLS. Even though the above model can be estimated, it is not clear how the estimated coefficients are interpreted. However, VAR could provide three types of inference: block significant, impulse responses and variance decomposition.

Unit Root Test

Prior to estimation of the model, a unit root test is conducted in order to investigate whether series are stationary or not, because if those series are non-stationary the result of OLS estimation may be 'spurious' (Verbeek, 2001). It means that even though an estimation sometimes shows a desirable result such as high R-square, significant coefficients and low standard errors, the economic meaning does not make any sense. Any time series can be written a first-order autoregressive (AR1) as follows: $y_t = \phi y_{t-1} + u_t$. When $\phi = 1$, the time series contain unit root, which is stationary, because the effect of shock on u_t , will die out through time. Therefore, testing null hypothesis $\phi = 1$ can be conducted by using t-statistics. Dickey and Fuller (1979) transform the equation into $\Delta y_t = \psi y_{t-1} + u_t$ by making it easy to test null hypothesis $\psi = 0$ and check whether series is stationary with drift and/or trend. The Dickey-Fuller (DF) test is performed to figure out whether series are stationary or not. In addition, the Phillips Perron (PP) test may be conducted to complement the Dickey-Fuller because the test corrects both autocorrelation and heteroskedasticity. In addition, a shock to the system will gradually die away, if all variables are stationary. That is, a shock during time t will have a smaller effect in time $t+1$, and even smaller in $t+2$ and continue until no effect. However, test statistics does not follow the usual t-distribution under the null hypothesis. Therefore, test-conclusion is drawn based on special Dickey-Fuller critical value. On the other hand, the optimal lags of all variables are determined by using comparative statistics such as Likelihood Ratio (LR), Akaike information, Schwarz criteria and Hannan-Quinn. Importantly, the stability test of the parameters in the model is performed in order to ensure power of the model. The model is said to satisfy stability condition if all characteristics roots lie inside the unit circle.

Co-integration Test

Engle and Granger (1987) pointed out that a linear combination of two or more non-stationary series may be stationary. If such a stationary, or $I(0)$, linear combination exists, the non-stationary (with a unit root), time series are said to be co-integrated. The stationary linear combination is called the co-integrating equation and may be interpreted as a long-run equilibrium relationship between the variables. Testing for co-integration can be performed using residual-based approach pointed out by Engle and Granger (1987). First, OLS is run to estimate the relation between two variables which are not stationary. The residual from that regression could be used to test for unit root. In case of VAR system, Johansen technique is multivariate of Engle and Granger step. The test for co-integration is calculated by examining the rank of long-run coefficient matrices via its eigenvalue (characteristic root). If the rank of matrix is equal to characteristic root and its first difference is zero, the variables are said to be

co-integrated. Moreover, trace and maximum-eigenvalue are used in this testing (Brooks, 2008).

Granger Causality Test

Granger causality analysis is used to examine whether one time series can exactly forecast another (Granger, 1969). In other words, lagged values of a variable may have explanatory power of its variable and other variables at time t . The restrictions can be tested using simple F tests in the single equations of the VAR model. In addition, this can be used to test the weak exogeneity to the system. If lagged values of a variable have no explanatory power for *any* of the variables in a system, then that variable can be considered as weakly exogenous to the system.

Impulse Response and Variance decomposition

VAR allows for tracing out the responsiveness of the dependent variables to shocks variables in the system. For each variable from each separate equation, a unit shock is applied to the error, and the effects upon the VAR system over time can be constructed. The number impulse response can generate is a square of number of variables.

Another method of examining VAR dynamic system is variance decomposition which gives the proportion of the movements in the dependent variables caused by ‘own’ shocks, versus shocks to the other variables. A shock to a variable will directly affect not only the variable itself, but also transmits to all of the other variables in the system through the dynamic structure of VAR. To some extent, impulse responses and variance decompositions offer very similar information. In fact, impulse response and variance decomposition are notoriously difficult to interpret accurately.

2. Model Specification

Theoretically, fiscal policy could be used to stimulate GDP growth, curb inflation and influence exchange rate (in case of Cambodia). The effectiveness of fiscal policy could be viewed as how price level, exchange and GDP respond to the shock of government spending. Similarly, monetary policy is effective if the effects of monetary aggregate on price level, and outputs can be detected. In addition, fiscal policy is considered to have more impact on price level and output than monetary policy. Hence, the model takes form with respect to following order: government spending, monetary aggregates, price level, exchange rate and real GDP:

$$\begin{aligned}
 G_t &= \sum_{i=1}^t \alpha_{1i} G_{t-i} + \sum_{i=1}^t \beta_{1i} M_{t-i} + \sum_{i=1}^t \gamma_{1i} P_{t-i} + \sum_{i=1}^t \mu_{1i} E_{t-i} + \sum_{i=1}^t \delta_{1i} Y_{t-i} + \epsilon_{1t} \\
 M_t &= \sum_{i=1}^t \alpha_{2i} G_{t-i} + \sum_{i=1}^t \beta_{2i} M_{t-i} + \sum_{i=1}^t \gamma_{2i} P_{t-i} + \sum_{i=1}^t \mu_{2i} E_{t-i} + \sum_{i=1}^t \delta_{2i} Y_{t-i} + \epsilon_{2t} \\
 P_t &= \sum_{i=1}^t \alpha_{3i} G_{t-i} + \sum_{i=1}^t \beta_{3i} M_{t-i} + \sum_{i=1}^t \gamma_{3i} P_{t-i} + \sum_{i=1}^t \mu_{3i} E_{t-i} + \sum_{i=1}^t \delta_{3i} Y_{t-i} + \epsilon_{3t}
 \end{aligned}$$

$$E_t = \sum_{i=1}^t \alpha_{4i} G_{t-i} + \sum_{i=1}^t \beta_{4i} M_{t-i} + \sum_{i=1}^t \gamma_{4i} P_{t-i} + \sum_{i=1}^t \mu_{4i} E_{t-i} + \sum_{i=1}^t \delta_{4i} Y_{t-i} + \epsilon_{4t}$$

$$Y_t = \sum_{i=1}^t \alpha_{5i} G_{t-i} + \sum_{i=1}^t \beta_{5i} M_{t-i} + \sum_{i=1}^t \gamma_{5i} P_{t-i} + \sum_{i=1}^t \mu_{5i} E_{t-i} + \sum_{i=1}^t \delta_{5i} Y_{t-i} + \epsilon_{5t}$$

- Y_t : is real GDP measured in billion riels.
- G_t is government spending in million riels, which includes both government purchases and capital expenditure.
- P_t is consumer price index
- E_t is nominal effective exchange rate index which was calculated by averaging of trading partners' exchange rate, weighting relative trade balances of main trading partners.
- M_t is broad money (M2) in million riels which include money in circulation, deposits in riels and US dollars.
- ϵ_t is error terms

2. Data Description

Data ranging from 1998 to 2008 has been collected from various sources including Ministry of Economy and Finance (MEF), National Institute of Statistics (NIS), and National Bank of Cambodia (NBC). Quarterly data is used for this study.

Table 2.6: Descriptive Statistics

	CPI	EXPEN	M2	REER	GDP
Mean	104.2494	770.9339	4156.895	4.63349	4518177
Median	101.7200	680.5855	2920.866	4.628264	4246152
Maximum	149.9800	1909.055	12697.86	4.737578	7445189
Minimum	78.82000	229.6969	902.0743	4.55898	2532241
Std. Dev.	14.34613	423.8427	3478.701	0.036299	1513734
Skewness	1.703988	1.138511	1.266585	0.698148	0.438991
Kurtosis	6.314448	3.805720	3.475416	3.534442	1.905717
Jarque-Bera	45.19973	11.66804	13.28594	4.470542	3.936612
Probability	0.000000	0.002926	0.001303	0.106963	0.139693
Sum	5003.970	37004.83	199531.0	222.4075	2.17E+08
Sum Sq. Dev.	9673.136	8443203.	5.69E+08	0.061928	1.08E+14
Observations	48	48	48	48	48

3. Unit Root Test Result

Table 2.7 summarizes the results of unit root test by using ADF, suggesting that all variables in log forms are none-stationary at level, but trend stationary at first difference. Since all ADF statistics are less than critical value at 5% significant level, the null hypothesis of a having a unit root process is rejected. Hence, the series are integrated at first difference, i.e., I(1). All variables are random walk with drift.

Table 2.7: Result of Unit Root Test

Variables in log form		ADF Statistics	Probability*	Order of Integration
LCPI	Level, Intercept	-0.801575	0.8101	I(1)
	Level, Intercept and trend	-1.457581	0.8312	I(1)
	First different, intercept	-5.613447	0.0000	I(0)
	First different, Intercept and trend	-5.742885	0.0001	I(0)
LEXPEN	Level, Intercept	-0.134022	0.9395	I(1)
	Level, Intercept and trend	-2.860433	0.1846	I(1)
	First different, intercept	-18.30358	0.0000	I(0)
	First different, Intercept and trend	-18.08463	0.0000	I(0)
LM2	Level, Intercept	1.170123	0.9976	I(1)
	Level, Intercept and trend	-2.226016	0.4652	I(1)
	First different, intercept	-6.492221	0.0000	I(0)
	First different, Intercept and trend	-6.474532	0.0000	I(0)
LREER	Level, Intercept	-2.985280	0.0436	I(0)
	Level, Intercept and trend	-2.941293	0.1595	I(1)
	First different, Intercept and trend	-9.500455	0.0000	I(0)
LGDP	Level, Intercept	0.406743	0.9811	I(1)
	Level, Intercept and trend	-2.521797	0.3167	I(1)
	First different, intercept	-9.333437	0.0000	I(0)
	First different, Intercept and trend	-9.211227	0.0000	I(0)

* MacKinnon (1996) one-sided *p*-values.

Since all variables are stationary at first differences, the reduced form of VAR model turns out to be as follows:

$$\Delta G_t = c_G + \sum_{i=1}^t \alpha_{1i} \Delta G_{t-i} + \sum_{i=1}^t \beta_{1i} \Delta M_{t-i} + \sum_{i=1}^t \gamma_{1i} \Delta P_{t-i} + \sum_{i=1}^t \mu_{1i} \Delta E_{t-i} + \sum_{i=1}^t \delta_{1i} \Delta Y_{t-i} + \epsilon_{1t}$$

$$\Delta M_t = c_M + \sum_{i=1}^t \alpha_{2i} \Delta G_{t-i} + \sum_{i=1}^t \beta_{2i} \Delta M_{t-i} + \sum_{i=1}^t \gamma_{2i} \Delta P_{t-i} + \sum_{i=1}^t \mu_{2i} \Delta E_{t-i} + \sum_{i=1}^t \delta_{2i} \Delta Y_{t-i} + \epsilon_{2t}$$

$$\Delta P_t = c_P + \sum_{i=1}^t \alpha_{3i} \Delta G_{t-i} + \sum_{i=1}^t \beta_{3i} \Delta M_{t-i} + \sum_{i=1}^t \gamma_{3i} \Delta P_{t-i} + \sum_{i=1}^t \mu_{3i} \Delta E_{t-i} + \sum_{i=1}^t \delta_{3i} \Delta Y_{t-i} + \epsilon_{3t}$$

$$\Delta E_t = c_E + \sum_{i=1}^t \alpha_{4i} \Delta G_{t-i} + \sum_{i=1}^t \beta_{4i} \Delta M_{t-i} + \sum_{i=1}^t \gamma_{4i} \Delta P_{t-i} + \sum_{i=1}^t \mu_{4i} \Delta E_{t-i} + \sum_{i=1}^t \delta_{4i} \Delta Y_{t-i} + \epsilon_{4t}$$

$$\Delta Y_t = c_Y + \sum_{i=1}^t \alpha_{5i} \Delta G_{t-i} + \sum_{i=1}^t \beta_{5i} \Delta M_{t-i} + \sum_{i=1}^t \gamma_{5i} \Delta P_{t-i} + \sum_{i=1}^t \mu_{5i} \Delta E_{t-i} + \sum_{i=1}^t \delta_{5i} \Delta Y_{t-i} + \epsilon_{5t}$$

After conducting ADF test to check the stationary variables, lag of all variables is selected. A Schwarz information criterion (SIC) indicates one lag because it has the lowest value, while an Akaike information criterion (IC) indicates 4 lags. One lag is selected for this estimation on the ground that using four lags for stability test yield undesirable result. Since the characteristic roots appear inside the unit circle, as show in table 2.8, the stability of parameters in the VAR is fulfilled. Therefore, the system model will be estimated by using first lag.

Table 2.8: Lag selection

Lag	AIC	SIC
0	-13.8588	-13.654
1	-15.8955	-14.66672*
2	-16.4019	-14.1492
3	-17.4484	-14.1717
4	-17.78593*	-13.4853

AIC: Akaike Information Criteria, and SIC: Schwarz Information Criteria

Table 2.9: Stability condition (1 lags)

Root	Modulus
-0.62143	0.621431
-0.052520 - 0.434597i	0.437759
-0.052520 + 0.434597i	0.437759
-0.31034	0.310335
0.269261	0.269261

No root lies outside the unit circle and VAR satisfies the stability condition.

Result of Co-integration Test

Table 2.10 shows the results of Johansen's (1995) multivariate co-integration test. The results of both trace statistics and maximum eigenvalue statistics) indicates at least one co-integrating vector between real GDP, broad money, real effective exchange rate, consumer's price index and government spending. Hence, all variables have long run relationship.

Table 2.10: Co-integration

Null	Eigenvalues	Trace Test		Max Eigenvalue Test	
		$\lambda - trace$	$p - value$	$\lambda - max$	$p - value$
$r \leq 0$	0.777544	161.049	0.0000**	67.63608	0.0000**
$r \leq 1$	0.676195	93.41295	0.0000**	50.74256	0.0000**
$r \leq 2$	0.441858	42.67039	0.0001**	26.24139	0.0021**
$r \leq 3$	0.235572	16.429	0.0097**	12.08825	0.0352**
$r \leq 4$	0.091955	4.340754	0.0442**	4.340754	0.0442**

The result of the Granger Causality test indicates that the equation of money growth, real effective exchange rate and price level is not jointly explained by the system model. However, GDP growth is significantly explained by the system model.

Table 2.11: Granger Causality Test Result

Dependent Variable	Chi-Square	P-Value
ΔG	41.03635	0.0000**
ΔM	2.613697	0.6244
$\Delta REER$	7.401251	0.1161
ΔP	4.855811	0.3024
ΔY	35.98879	0.000**

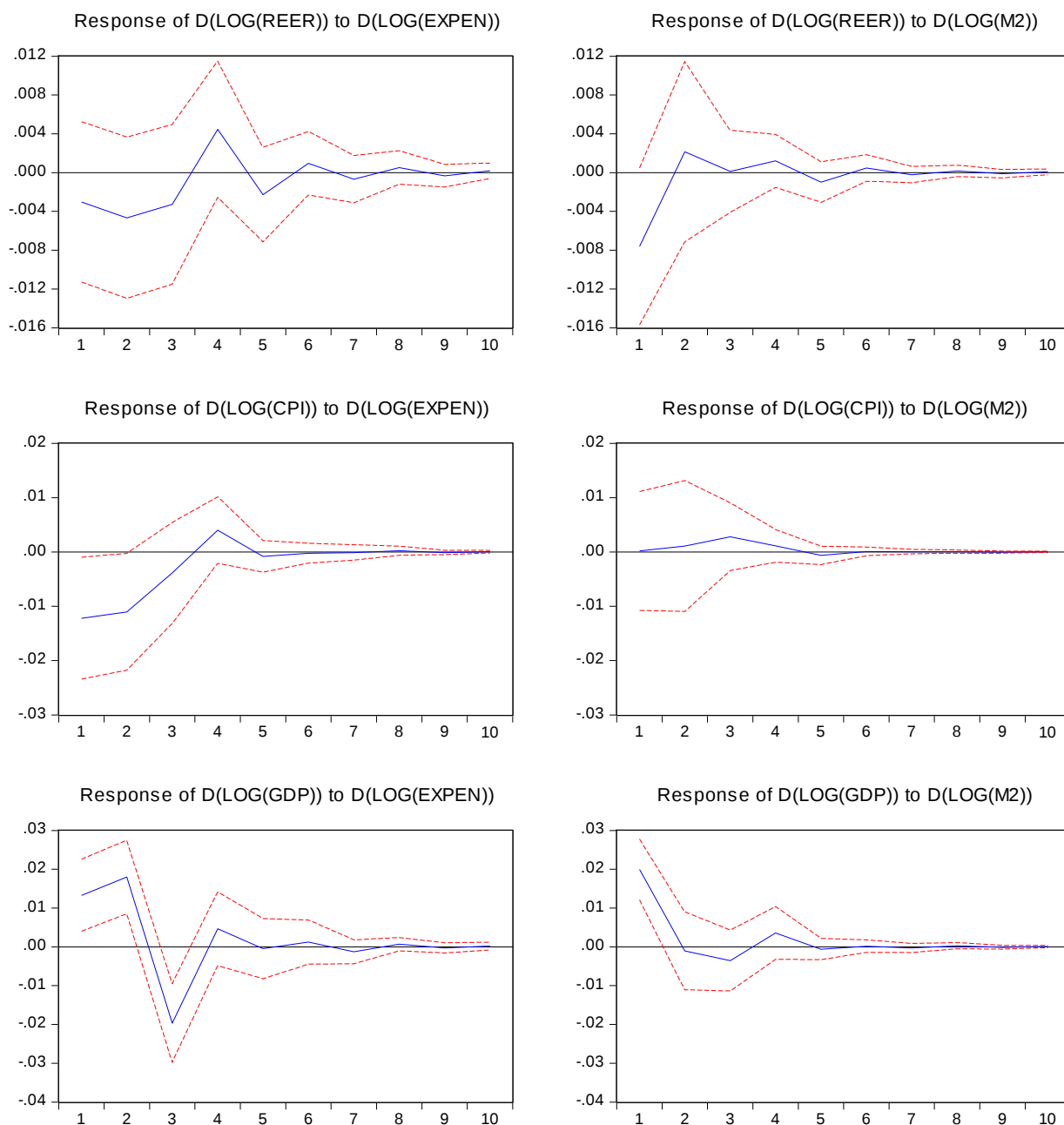
Result of Impulse Response

The estimated impulse response function is derived from 95 % confidence interval in order to examine the response of price level, nominal effective exchange rate and real GDP to the shocks of fiscal and monetary policies. The graph shows that inflation rate responds negatively to the shock of government spending, implying that fiscal policy expansion by increase in government spending causes inflation rate to decrease in next three quarters, but gradually moves upward in the fourth quarter prior to converging toward zero. In contrast, a shock of monetary aggregate (M2) results in slightly surge in inflation rate from second quarter until fourth quarter. The inference is that future inflation rate is not statistically explained by the growth of money supply. Nevertheless, the nominal effective exchange responds marginally to macroeconomic policy shocks because the impacts of either growth of government spending and money supply are minimal.

Interestingly, real GDP growth strongly responds to the growth of government spending and money supply (M2). However, the positive responses to fiscal shock are significant for the first quarter and then move downward negative sign from second quarter to third quarter before moving up toward zero. The increase of government spending leads to positive growth in the next two quarters and negative growth in third quarter. Similarly, real GDP responds positively

to shock of money supply only for first quarter and then phases out. In other words, the positive shock of broad money will lead to positive growth in the next quarter, but the effects are not significant in the following quarter. Based on these findings, a conclusion can be drawn that fiscal policy (government spending) is an effective policy tool to simulate the economy within a year time frame, while monetary policy affects the economic growth for short and medium term.

Response to Cholesky One S.D. Innovations ± 2 S.E.



Variance Decompositions

Variance decomposition of GDP growth is reported in Table 2.12.1. More than 40 percent of forecast error variance of GDP growth is by expenditure, around 30% by monetary aggregate and 25% by its own forecast. The explanatory power has covered throughout the time path. Precisely, fiscal policy has explained output growth from the second quarter. However, explanatory power of monetary policy is 37% in the first quarter, and then drops significantly to around 20% for the next quarter forecast. Similarly, self-explanation is high for the first period, but become lower for the future forecast. Overall, output growth is explained around 70% by fiscal and monetary policy though the longer forecast, the more explanatory fiscal policy is and the less powerful is the monetary policy.

Table 2.12.1: Variance Decomposition of Output Growth

Period	S.E.	ΔG	ΔM	ΔP	ΔE	ΔY
1	0.032762	15.86761 (10.2333)	37.00444** (10.7423)	3.074535 (3.71329)	1.493971 (2.61047)	42.55944** (9.27736)
2	0.037947	34.83676** (11.4678)	27.66719** (9.22260)	3.782074 (4.81109)	1.383019 (2.69664)	32.33096** (6.87511)
4	0.045416	43.70764** (9.95491)	20.78699** (7.71202)	9.337498 (6.44317)	1.461818 (2.59883)	24.70605** (5.61071)
		(10.0182)	(7.67777)	(6.48960)	(3.15066)	(5.61769)
8	0.045491	43.71704** (10.0568)	20.73065** (7.68824)	9.404403 (6.52429)	1.483172 (3.24159)	24.66474** (5.64042)
		(10.1263)	(7.71386)	(6.55086)	(3.43834)	(5.69480)
12	0.045492	43.71725** (10.1437)	20.73008** (7.72108)	9.405493 (6.55890)	1.483466 (3.48563)	24.66371** (5.70983)

Note: -Number in () are standard errors from Monte Carlo simulation (1000)

- ** 5% significant level

As shown in Table 2.12.2, the forecast error variance of inflation rate is mostly explained by its own forecast, accounted for 90 percent for the first quarter and 77 percent for next periods. It means that inflation rate is exogenously explained by external factors. In addition, both fiscal and monetary policies do not have any statistical explanation power on the forecast error variance of inflation rate, which implies that the two macro policy tools found to be ineffective in controlling inflation rate. The result may be the case for highly dollarized economy like Cambodia where inflation is externally determined and strongly tied to that of USA because Cambodia relies heavily on imports sold in foreign currencies, in particular USD.

Table 2.12.2: Variance Decomposition of inflation rate (CPI)

Period	S.E.	ΔG	ΔM	ΔP	ΔE	ΔY
1	0.038699	9.970678	7.17E-05	90.02925**	0.000000	0.000000
		(8.37873)	(2.74818)	(8.71821)	(0.00000)	(0.00000)
4	0.042145	16.75069	0.976580	77.95219**	0.832437	3.488103
		(9.43031)	(4.61176)	(11.0253)	(3.38351)	(2.63298)
8	0.042185	16.76074	1.004830	77.91442**	0.831047	3.488966
		(9.65864)	(4.73342)	(11.3466)	(3.60796)	(2.62308)
12	0.042185	16.76084	1.004919	77.91422**	0.831047	3.488969
		(9.82363)	(4.74772)	(11.5108)	(3.68898)	(2.61762)

Note: -Number in () are standard errors from Monte Carlo simulation;

- ** 5% significant level

Variance decomposition of real effective exchange rate (REER) is reported in Table 2.12.3, indicating that the forecast error variance of REER is virtually explained by its own forecast with explanatory power of over 90% in the first quarter and around 80% for the rest period. On the other hand, REER is not statistically explained by both fiscal and or monetary policies and inflation. Since Cambodia has been overwhelmed by dollarization, the exchange rate plays very limited role in either deflecting change of external inflation or improving the country's competitiveness aiming at simulating export and growth.

Table 2.12.3: Variance Decomposition of REER

Period	S.E.	ΔG	ΔM	ΔP	ΔE	ΔY
1	0.021551	0.425269	5.992559	2.624787	90.95738**	0.000000
		(3.81380)	(7.06698)	(4.79322)	(8.63939)	(0.00000)
4	0.025538	1.580795	7.464513	7.110514	83.58388**	0.260293
		(6.37822)	(7.79720)	(6.68515)	(11.3792)	(1.15223)
8	0.025705	2.216114	7.456579	7.299636	82.76271**	0.264961
		(7.64626)	(7.69415)	(6.77022)	(12.3767)	(1.16023)
12	0.025708	2.225320	7.456357	7.302668	82.75064**	0.265014
		(8.08615)	(7.68764)	(6.80224)	(12.6626)	(1.16332)

Note: -Number in () are standard errors from Monte Carlo simulation;

- ** 5% significant level

Table 2.12.4: Variance Decomposition of Expenditure Growth

Period	S.E.	ΔG	ΔM	ΔP	ΔE	ΔY
1	0.231326	100.0000**	0.000000	0.000000	0.000000	0.000000
		(0.00000)	(0.00000)	(0.00000)	(0.00000)	(0.00000)
4	0.413781	79.83372**	2.370479	13.27952	0.668423	3.847852
		(10.0279)	(4.90278)	(8.36331)	(4.66856)	(2.54196)
8	0.414772	79.79530**	2.373206	13.30521	0.688956	3.837327
		(10.7065)	(5.09952)	(8.43352)	(5.94290)	(2.60515)
12	0.414781	79.79454**	2.373308	13.30573	0.689244	3.837182
		(10.9570)	(5.14966)	(8.46508)	(6.36566)	(2.61439)

Note: -Number in () are standard errors from Monte Carlo simulation;

- ** 5% significant level

The forecast error of variance decomposition of expenditure is completely explained by its own forecast for the first quarter and then the explanatory power diminishes for the following periods. The growth of M2, CPI, REER and real GDP do not explain the variance decomposition of expenditure growth (Table 2.12.4). On the other hand, Variance decomposition of money growth is significantly explained by its own forecast error, accounted for almost 100% in the first quarter and around 93% in the subsequent quarter. All other variables did not significantly explain the variance decomposition of the money growth (Table 2.12.5). The results indicate that the fiscal and monetary policies are independent in stabilizing the macro-economy in Cambodia.

Table 2.12.5: Variance Decomposition of M2 Growth

Period	S.E.	ΔG	ΔM	ΔP	ΔE	ΔY
1	0.051591	0.362077	99.63792**	0.000000	0.000000	0.000000
		(3.84084)	(3.84084)	(0.00000)	(0.00000)	(0.00000)
4	0.053985	1.505030	93.75260**	2.345718	1.431881	0.964772
		(4.99349)	(9.05475)	(5.31396)	(4.05392)	(1.47181)
8	0.054045	1.585882	93.58949**	2.413394	1.443066	0.968166
		(5.33083)	(9.82609)	(5.51698)	(4.51719)	(1.48135)
12	0.054045	1.586821	93.58795**	2.413898	1.443155	0.968177
		(5.53511)	(10.1706)	(5.57814)	(4.76311)	(1.47996)

Note: -Number in () are standard errors from Monte Carlo simulation;

- ** 5% significant level

V. Conclusion and Recommendations

Cambodia has obtained remarkable achievements with respect to high economic growth and low inflation rate for the last decade, though its economy has undergone through a dramatic changes in its structure through transitional periods and severely suffered from political instability. In addition, it is compounded by the issue of dollarization which many economists and researchers argued that macroeconomic policy instruments are relatively effective in attaining the goals of sustainable development. By and large, the plausible results have been attributable to a great deal of efforts made by Royal Government of Cambodia to carry out the reshuffled reforms of every cornerstone of economy, in particular structural reforms which lay a firm foundation for macroeconomic stabilization. In this regard, puzzles have surfaced about the relative importance of fiscal and monetary policies in stimulating economic growth.

Following testing the above hypothesis by employing VAR model to examine effects and responses of three main macroeconomic variables, namely real GDP growth, inflation rate and real effective exchange rate to shock of government expenditure (represents fiscal policy) and money supply (monetary policy), the results suggest that monetary and fiscal policies play a crucial role in spurring economic growth, though fiscal policy has greater influence in medium terms than monetary policy in terms of magnitude which has larger impacts in short run. Surprisingly, fiscal policy has negative impact on inflation, implying that increase in government expenditure would result in decrease in inflation rate. In addition, price levels do not virtually respond to monetary policy shock, indicating that money supply may not be an effective tool in curbing volatility of inflation. In fact, it may be true for Cambodia that has experienced with currency substitution and relied heavily on imported goods whose prices are prone to external shocks because an increase in demand arising from fiscal expansion leads to higher demand for imported goods. Exchange rate pass-through, on the other hand, within dollarized economy, is less likely to occur since most imported goods are domestically sold in foreign currency, namely US dollar. Definitely, despite the fact that monetary authority can influence the nominal exchange rate by conducting purchase or sales auction of US dollar to alter the amount of riel in circulation, the costs of production and prices of goods and services, even non-traded goods, will not change because most inputs are imported and wages and other expenses are paid in US dollar. Hence, competitiveness will also be influenced by depreciation of exchange rate. Though high economic growth and low inflation rate in Cambodia are greatly resulted from external factors including the spillover effect of regional and global integration, macroeconomic policies still play role in achieving macroeconomic stability, which are one of the main prerequisites for gaining confidence from foreign investors and donors' countries.

To sum up, seeing that fiscal policy is more powerful than monetary policy, the Royal Government of Cambodia should improve fiscal discipline so that the budget spending should be prudently allocated in such a way that both macroeconomic and microeconomic objectives will eventually be achieved. Moreover, Ministry of Economy and Finance should enhance its capacity in collecting more taxes by improving the tax and customs administration through enhancement of good governance practices, and enlarging the domestic tax base in order to increase tax revenue, and reduce the dependency on customs revenues which will be prone to CEPT scheme. On the other hand, monetary policy should not be ignored in the sense that it can play a complementary role for fiscal policy in fostering economic growth and controlling inflation. Hence, the National Bank of Cambodia in its capacity as a monetary authority should

improve overall aspects of monetary policy including the building of the public confidence in banking sector and national currency, establishment of inter-bank market and more indirect instruments, and effective transmission mechanism channel through creation of financial market. To make these instruments viable, de-dollarization policy should be pursued in long term in order for central bank to effectively control money supply. However, since this objective will not be accomplished overnight, a comprehensive strategy should be put in place to regain the public confidence in riel as well as banking system. Importantly, gradual lure of big bang approach should be adopted to alter the behavior of being fond of US dollar and other foreign currencies toward local currency.

VI. References

- Arestic P., (2010). “New Consensus on Macroeconomics and Keynesian Critique”, University of Cambridge.
- Ajisafe, R.A, and Folorunso, B.A., (2002) .“Relative Effectiveness of Fiscal and Monetary Policy in Macroeconomic Management in Nigeria”, *African Economic and Business Review*, Vol.3, No.1.
- Ali, S., Irun Si., and Ali A., (2008). “Whether Fiscal Stance or Monetary Policy is Effective For Economic Growth in Case of South Asian Countries?”, *Pakistan Development Review*.
- Beresford M., Sokha N., Roy R., Sisovanna, S., and Namazie C., (2004). “The Macroeconomics of Poverty Reduction in Cambodia”, UNDP, Ponleu Khmer Printing House, Phnom Penh.
- Blanchard O., Dell’s Ariccia G.,and Mauro, P., (2010). “Rethinking Macroeconomic Policy”, IMF.
- Boivin J., and Gainnoni, M., (2003). “ Has Monetary Policy Become More Effective?”, *Working Paper No.9459*, NBER.
- Brooks C., (2008). “**Introductory Econometrics for Finance**, (2nd e.d.), Cambridge University Press.
- Castillo, S., (2006). “Dollarization and Macroeconomic Stability in Latin America”, University of Wisconsin Board of Regents.
- Cedergren, M., (1995). “ Fiscal Reforms and Macroeconomic Stabilization in Cambodia”, Department of Economics at the University of Lund, *Minor Field Study Series No.62*.
- Calderon C., and Hebbel, S.K., (2003). “ Macroeconomic Policies and Performance in Latin America”, *Working Paper No. 217*, Central Bank of Chile.
- CDC, (2010). “**Cambodia Investment Guidebook**”, Phnom Penh, Cambodia.
- De Zamaroczy, M. and Sa, S., (2002). “Macroeconomic adjustment in a highly dollarized economy: The case of Cambodia”, *IMF Working Paper, wp/02/97*, Washington, D.C.

Ekesen L.L., (2009). “Countering Cyclical-The Effectiveness of Fiscal Policy in Korea, w/09/249, IMF.

Guimbert, S., (2010). “Cambodia 1998-2008: An Episode of Rapid Growth”, Policy Research Working Paper 5271, The World Bank.

Ginting, E., and Bird, K., (2009). “Explaining Inflation in Cambodia”, Third Cambodian Economic Forum, ADB.

Hoffmaister, Alexander W. and Végh, Carlos (1995). “Disinflation and the Recession-Now-Versus-Recession-Later Hypothesis: Evidence from Uruguay”. IMF Working Paper

Hsing, Y., and Hsieh, J.W., (2010). “Impacts of Monetary, Fiscal and Exchange Rate Policies on Output in China: A VAR approach.”

Nasir, M., Ahmad, A. and Ali, A., and Rehman, U.F, (2010). “Fiscal and Monetary Policy Coordination: Evidence from Pakistan”, International Research Journal of Finance and Economics, Euro Journals Publishing, Inc., 2010.

IMF Country Report No.06/290, (2009). “Cambodia: 2008 Article IV Consultation-Staff Report”, Washington, D.C, USA.

IMF Country Report No.06/290, (2006). “Cambodia: 2006 Article IV Consultation-Staff Report”, Washington, D.C, USA.

IMF Country Report No.06/290, (2007). “Cambodia: 2007 Article IV Consultation-Staff Report”, Washington, D.C, USA.

Jalilian H., Sophal C., Reyes G., Hang C.S., Dalis P., Dorina P., (2009). “Global Financial Crisis Discussion Series Paper 4: Cambodia, Overseas Development Institute, London.

Kildegaard, C.A., and Fernandez, O.R., (1999). “Dollarization in Cuba and implication for the future transition”, lanic.utexas.edu/la/cb/cuba/asce/cuba9/kil_orro.pdf.

Kem, R. V., (2002). “Currency substitution and exchange rate volatility in Cambodia”, part of the thesis submitted for degree of Doctor of Philosophy at National Center for Development Studies, the Australian National University, Canberra.

Lao-Araya, K., (2002). “How can Cambodia, Lao PDR, Myanmar and Vietnam Cope With Revenue Lost Due to AFTA Tariff Reductions?”, *ERD Working Paper No.29*, ADB, Manila.

Hang, Ch. N., (2009). “**Public Finance in Cambodia**”, Supreme National Economic Council, Phnom Penh. NBC Bulletin, 3rd Quarter, 2009.

Ostrup, F. and L. Oxelheim (2006), "The Impact of International Integration on Macroeconomic Policy Effectiveness", *Conference Paper*, International Conference on European Financial Integration and China, May 12-13, Fudan/Durham University, Shanghai.

Phalla, P., 2009. “Fiscal Analysis in 2007”, Supreme National Economic Council, Phnom Penh.

Plate V.P. and Herrero, G.A., (2008). “*To Dollarize or De-dollarizes: Consequences for Monetary Policy*”, Paper prepared for the Asian Development Bank.

Rahman, H., (2005). “Relative Effectiveness of Monetary and Fiscal Policies on Output Growth in Bangladesh: A VAR Approach”, working paper: wp0601, Bangladesh Bank.

Sang Sinavith, (2006). “Cambodian Tax Revenue and Non-Tax Revenue”,
kamome.lib.ynu.ac.jp/dspace/bitstream/10131/.../KJ00004473294.pdf

Stiglitz, E.J., (2002). “Alternative Approach to Stabilization Policy: An Overview”, Preliminary Draft of a Paper Prepared for IPD Task Force Meeting, Barcelona.

Sidgwick E., and Poullang D., (2010). “Asian Development Outlook 2010”, ADB.

Verbeek, M., (2000). “Modern Econometrics”, John Wiley and Sons Ltd, England.

Walsh E. C, 2003. “ ***Monetary Theory and Policy***”, (2nd ed.), Massachusetts Institute of Technology, USA.

Annex I: Fiscal Reforms

Year	Description	Remarks
2002-2003	1. Government Revenue To increase revenues, following measures would be taken: • Increase excise rate on beer from 10% to 20% • Raise excise rate on gasoline and diesel has been increased by 2 cents per liter and 4 cents respectively. • Increase share of garment quotas from 10% to at least 20% • Increase loyal fees for casinos and revenue sharing contract with Angkor monument complex and for telecommunication. • Receive technical advisor under Technical Cooperation Action Plan(TCAP) • Establish anti-smuggling task force to combat smuggling • Enhancing the staff integrity • For non-tax revenues, ensure proper transfer of profit to the budget • Impose lower tax rate in exchange for reducing tax exemptions 2. Expenditure measures: • Allocating funds to priority sectors. education, health, agriculture and rural development (better roads) • Demobilizing military forces of 15000 soldiers by end of 2001, resulting in decrease in defense and security spending. However, the burden of 0.1% of GDP would be shared by government • Increase in wage bill below 4% of GDP • Set up contingency funds for unexpected needs: national election (0.2% of GDP), servicing external debts outstanding (0.2% of GDP) and expected cost of recapitalization of FTB is 0.3% of current expenditure per annum. • Conduct civil service reform by redistributing large portion to education ministry and raising civil service wages 3. Public Expenditure Program • Attempt to effective control over aggregate spending, but no clear procedure • Under TCAP support, a comprehensive strategy was laid down by placing an emphasis on: ▪ <i>Expenditure control</i>: a uniform budget execution mechanism and internal audit will be developed ▪ <i>Cash management</i>: improve revenue collection through implementing a rules-based system ▪ <i>Treasury reform</i>: harmonize government accounts held with NBC in one operational structure of accounts. Delineate the role of the National Treasury with other departments in MEF and NBC ▪ <i>Accounting and financial reporting</i>: establish accounting procedure and methodology for public sector	
2004	1. Revenue administration a. Tax administration ▪ Try to collect outstanding amounts of tax by imposing stricter penalty measures	

Year	Description	Remarks
	▪ Define new organizational structure, recruit new staff and provide more training ▪ Launch de-registration program and new audit program ▪ Apply the same procedures for large taxpayers to medium taxpayers ▪ Introduce new computerized system for collection, audit and cross-checking ▪ Instill staff on international audit and tax avoidance b. Custom Administration ▪ Pass law on customs and other supporting regulations ▪ Continue to strengthen anti-smuggling efforts ▪ Automate customs systems and procedures ▪ Reduce number of required inspections to facilitate trade ▪ Implement new organizational structure ▪ Set up a Customs Fraud Investigation Unit c. Non-tax revenues ▪ Consolidate various non-tax revenue units in one department ▪ Identify and start collecting non-tax arrears ▪ Audit operations of contracts and leases to verify compliance ▪ Review financial terms of contracts with significant fiscal implications	
2006	Revenue - Full and equitable enforcement of the Law on Taxation - Conduct audits of taxpayers and re-design organizational structure - Introduction of computerized system for Customs: ASYCUDA - Enhancing bidding procedures for government contracts with private sectors - Tax incentives will be thoroughly examined to make it more competitive with neighboring countries Expenditure - Implementing public financial sector management reform in order to improve outlays - Adopting new chart of account	
2007	Tax revenue - Strengthen customs and excise department: improving the way to assess the import and combat smuggling - Enhance the efficiency and equity of the tax system - Plan to enlarge the VAT and apply property tax ▪ The utility bill: electricity and water will be subject to VAT ▪ A property tax is earmarked to construction and land - Tax on capital gain was imposed - Some imports are exempted from VAT such as seeds, breeding animals, and machineries for agricultural production	

Chapter 3

Exchange Rate and Capital Flow Management in Vietnam

Nguyen Hong Son, Nguyen Manh Hung, and Nguyen Thi Vu Ha
College of Economics, Vietnam National University, Hanoi

Capital flow is a powerful phenomenon in the current context of Vietnam, especially in the post-WTO accession. Vietnam's policies of capital control have been experimented. However, there have not been enough efforts to examine the impact of these policies. The failure to alter inappropriate policies related to capital control may undermine price stability, slow down foreign trade, and result in the fall of the GDP. The instability in 2008 provided clear evidence.

Considering the real effective exchange rate a crucial indicator that measures the health of Vietnamese economy, this paper answers two questions: i) How has the movement of capital inflow impacted the movement of real effective exchange rate in Vietnam? and ii) What are the effective short-term and long-term measures to cushion the effects of capital inflows on exchange rate?

Although targeting a nominal exchange rate has been so far an effective tool to intervene into the foreign exchange market, it may not solve all problems in the long run under the impact of capital inflows. Current policy to stabilize the foreign exchange market tended to move toward freer exchange rate mechanism and unavoidable depreciation of VND. Allowing VND depreciate may help Vietnam boost up its export and reduce trade deficit. However, given the multifaceted impacts of capital inflow, exchange rate policy alone is not enough, and the depreciation of VND may have negative impact on other exporting economies, especially Vietnam's neighbors.

The lessons from Vietnam provide important policy implications for Lao PDR and Cambodia as the low-income countries in the Greater Mekong Sub-region and policy implication for the role of Thailand in sub-regional economic cooperation for the purpose of sustained economic growth.

I. Introduction

Capital inflows are defined as the increase in net international indebtedness of the private and the public sectors during a given period of time (Leiderman and Reinhart, 1996). In order to manage capital inflows effectively, we must understand the differences between two types of inflows. One is inflows that are driven by fundamental economic factors and another is not. While the first type is expected to be continuous overtime (if the economic fundamentals are good), the second type may be reversed in the future (Kawai and Takagi, 2008).

There are several reasons that explain how capital control is powerful factor that influences economic growth, inflation and other macroeconomic indicators of Vietnam and these also have important policy implications for Cambodia and Lao PDR.

It is possible to see from the reality that capital flows will be poured into an economy once it integrates widely into the global financial market. This situation has created the pressure of pushing up the domestic currency's value against the US dollar. In order to loosen the increasing value pressure of domestic currency, the Central Bank must intervene into the foreign exchange market to buy the US dollar from the commercial banks. The increase of domestic currency supply has put more pressure on capital inflation. This is one of the most important explanations for the occurrence of two-digit inflation rate in Vietnam in the period of 2007-2008.

Together with other macroeconomic policies, capital control policies are applied to legally change the scale and structure of the capital flows into Viet Nam with the tendency of encouraging long-term capital sources, especially when much capital has been poured into the financial investment and real estate sector after Viet Nam became the member of the World Trade Organization (WTO). Therefore the government should carefully track change and analyze the impacts of these policy frameworks. The failure to alter inappropriate policies related to capital control may result in the fall of GDP below the long-term growth path and undermine price stability.

In the context of post-WTO accession, Vietnam has achieved a high level of economic openness. The country's openness index measured by the ratio of foreign trade to GDP is as high as 150%. Total volume of the foreign trade has increased from merely US\$ 30 billion in 2000 to US\$ 124 billion in 2009. At the same time, trade deficit reached a high recorded level of more than 20% of the GDP in 2009.

Considering the real effective exchange rate as a crucial factor that affects not only foreign trade but also growth and economic stability of Vietnam given that the country's economic growth depends heavily on trade, the research ask the following questions:

- *How has the movement of capital inflow impacted the movement of real effective exchange rate in Vietnam? and*
- *What are the effective short-term and long-term measures to cushion the effects of capital inflows on exchange rate?*

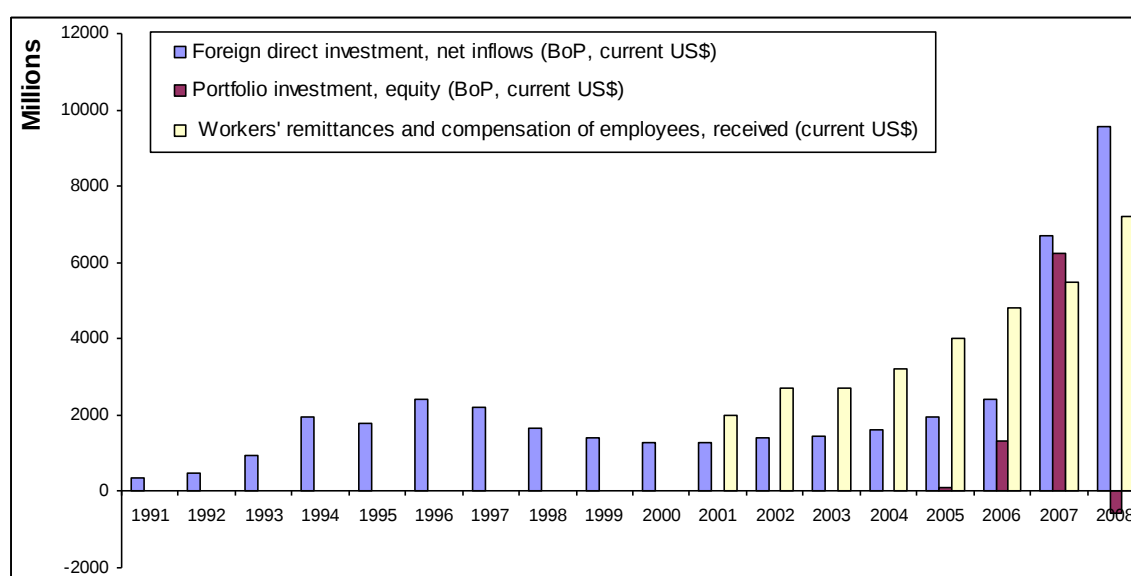
By answering these questions, the research expect to: *i) Provide policy recommendations to the Vietnamese government with regards to the management of capital control, and exchange rate, especially in the current context of increased openness of the Vietnamese economy; ii)*

Provide policy implication to Lao PDR and Cambodia with regard to the similar issue from the case study of Vietnam; and *iii*) Provide policy implication for the role of Thailand in sub-regional economic cooperation for the purpose of sustained economic growth.

II. Overview of Capital Flows in Vietnam

Full time-series data on capital inflows into Vietnam is extremely difficult to acquire. Data on various components of capital inflows often faces with discontinuity and inconsistency. This is not only caused by statistical inadequacy but also historical dissonance. For example, the data on official development assistance (ODA) is available only since 1993, when ODA was resumed, whereas data on FDI could be found for the earlier period, and portfolio data has not been officially collected until recently. Given this shortcoming, it is difficult to have a comprehensive picture of the capital inflows in Vietnam even though they have been acknowledged for years. However, it is possible to show that, as in the simple chart below (Figure 3.1), the surge in capital inflows with three most popular and largest components -- FDI, ODA and portfolio investment -- has become an overwhelming phenomenon over the past few years, especially since Vietnam's accession into the WTO. This is also accompanied with the volatility as evidenced by the contraction of the portfolio component in 2008 under the impact of the global financial crisis.

Figure 3.1: Capital Flow into Vietnam, 1991-2008



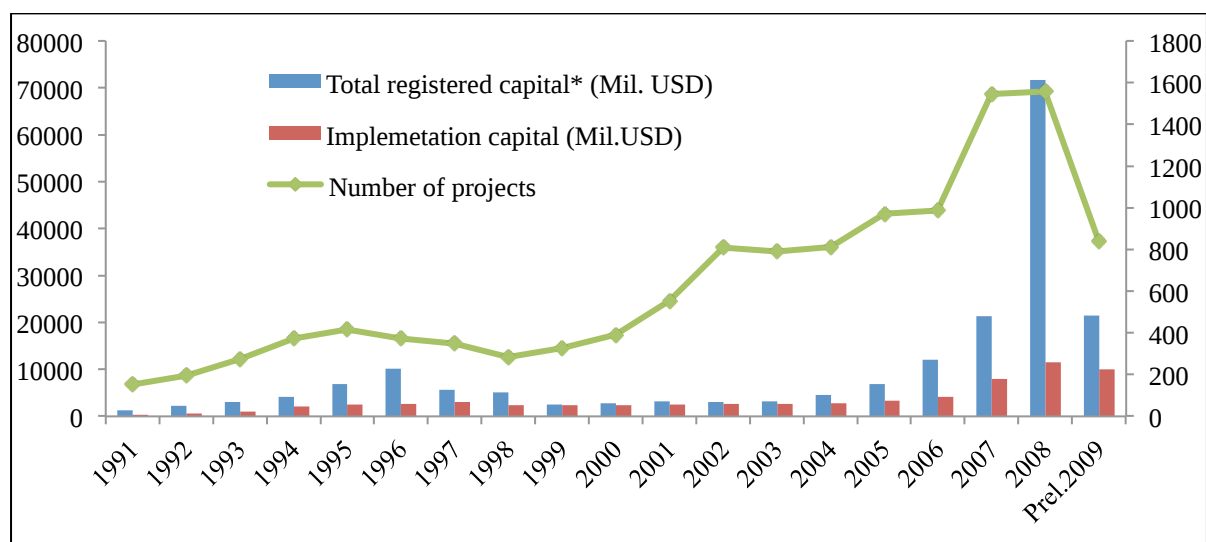
Source: World Development Indicator 2010

1. Foreign Direct Investment

In December 1987, Vietnam introduced its first-ever Foreign Investment Law to commence the efforts to attract foreign capital. From 1991 to 2009, Viet Nam received 11,995 FDI projects with the total registered capital of \$US 191.2 billion, 35% of which were implemented. After peaking in 1996, FDI inflows into Viet Nam had declined following the Asian crisis. However, since 2004, it has expanded rapidly, reaching more than \$US 12

billion and \$US 21.3 billion in terms of commitments in 2006 and 2007, respectively. FDI inflow reached its peak again in 2008 with the total registered capital of \$US 71.73 billion. The surge of FDI in recent years reflects investors' confidence in Vietnam's economic reform and development prospect as well as the shift of FDI in labor-intensive industries such as outsourcing logistics, electronics, garments and manufacturing from PRC to Viet Nam (Vo, 2008).

Figure 3.2: FDI into Vietnam, 1991-2009

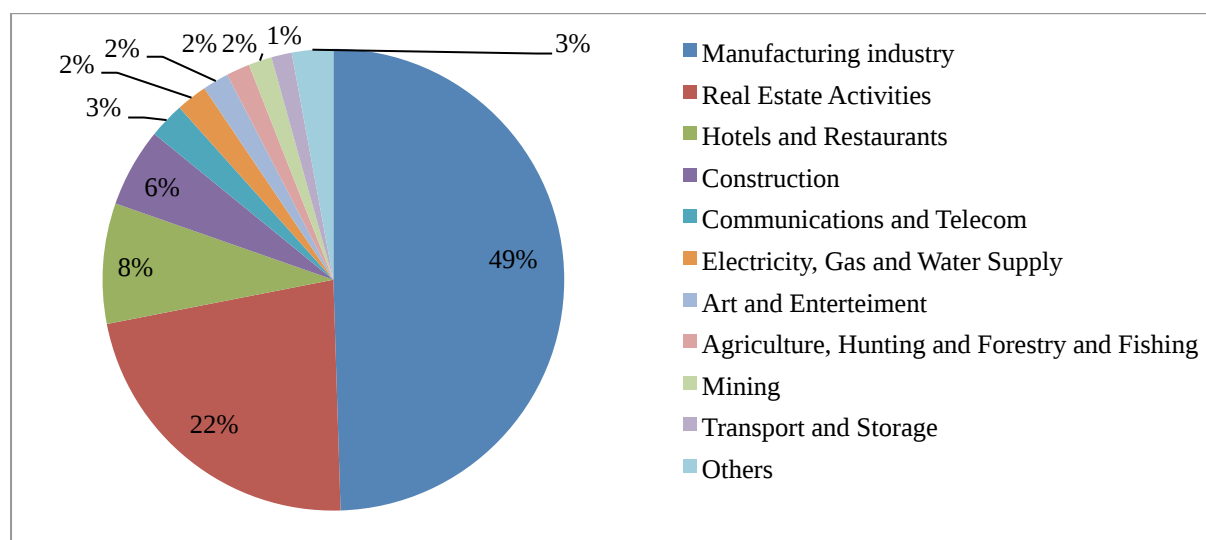


*Including supplementary capital to licensed projects in previous years

Source: Statistical Handbook 2009 - GSO

Until 20th July, 2010, the registered (accumulated) FDI has been allocated mainly in manufacturing industry, real estate activities, hotels and restaurants, construction and communications and telecom. In the 1990s, FDI was concentrated in import substitution industries. Since 2000, it has been shifted to export manufacturing sector and services sector. From 2008 until now, FDI was poured into real estate businesses, creating a powerful factor to cause a boom in real estate.

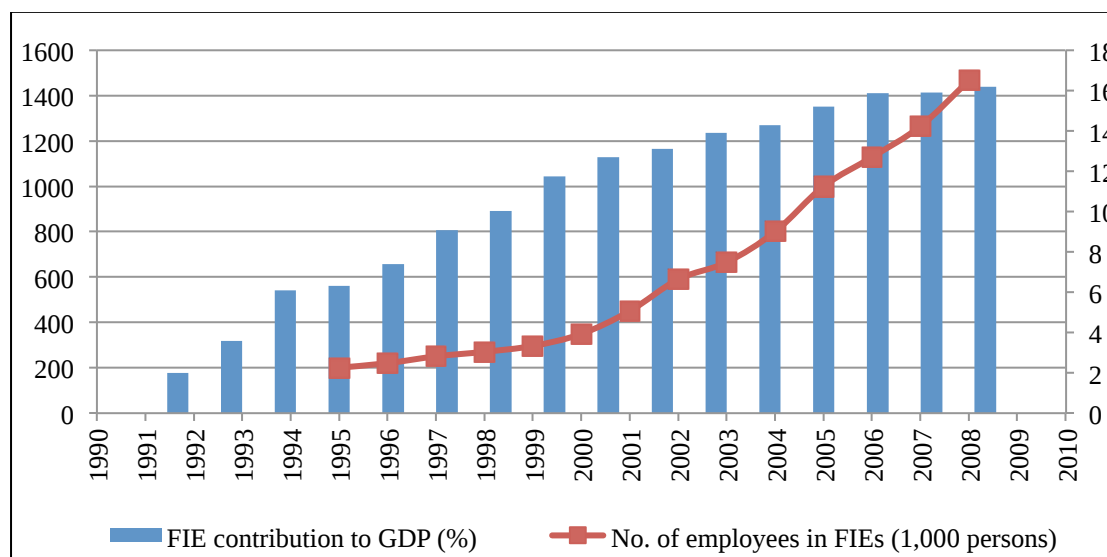
Figure 3.3: Share of FDI by Sector by 2009



Source: MPI, 2009.

The foreign invested enterprises (FIE) played an increasingly significant role in Viet Nam's economy. In 1995, FIEs directly employed 220,000 workers and accounted for 6.3% of the GDP. In 2007, these figures increased to 1,265,000 employees and 16.2% of the GDP. The growth rate of FIE sector was usually higher than other sectors in Vietnam. Moreover, the FIE sector is currently a dynamic force for Viet Nam's exports and the development of various manufacturing industries (Vo, 2008).

Figure 3.4: Foreign Invested Enterprises, 1990-2010



Source: MPI, 2010

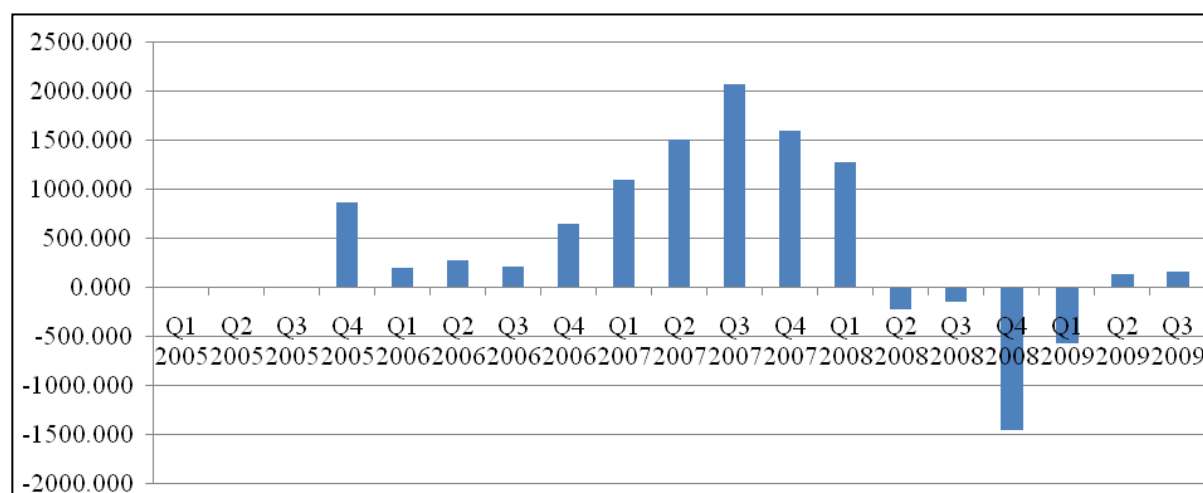
2. Foreign Portfolio Investment (FPI)

Since 2001, it has been known that FPI into Vietnam has increased with several funds in Vietnam having an average capital of \$US 5-20 million each, but overall data of FPI is not available. FPI capital inflows in Vietnam increased rapidly in 2006, thanks to investments on the stock market by international financial groups and funds. Foreign investment funds brought in \$US 2 billion worth of FPI into Vietnam at the end of 2006. Foreign portfolio inflows accounted for 2.2% and 10.4% of the GDP in 2006 and 2007, respectively. There were 436 foreign investors as of 2005, including 38 institutional investors and 389 individual investors.

The number of foreign accounts increased by nearly twenty-fold from 2005 to 8,140 in 2007. The trading volume of foreign investors is rather high, accounting for 21% of the total market trading volume in 2006. This number increased to 29% by the end of 2007. In 2007, the foreign trading value increased significantly to around 55% of total market trading value. In 2006, Vietnam had received around \$US 1.3 billion of total FPI, of which 70% was invested in stocks, bonds and real estate, and 30% was held as deposits in the banking system. In 2007, FPI increased sharply to USD 7.4 billion (Vo, 2008).

After a sharp fall in 2008 due to the global financial crisis, the FPI has come back to local shares since the beginning of 2009. Vietnam's stock market now accounts for 40% of the GDP, with the listings of 555 companies and 926,000 trading accounts, including over 14,000 of foreign investors holding approximately \$US 8 billion worth of Vietnamese shares (Security Investment Online, 4/8/2010).

Figure 3.5: Portfolio Investment – Liabilities (\$US Million)

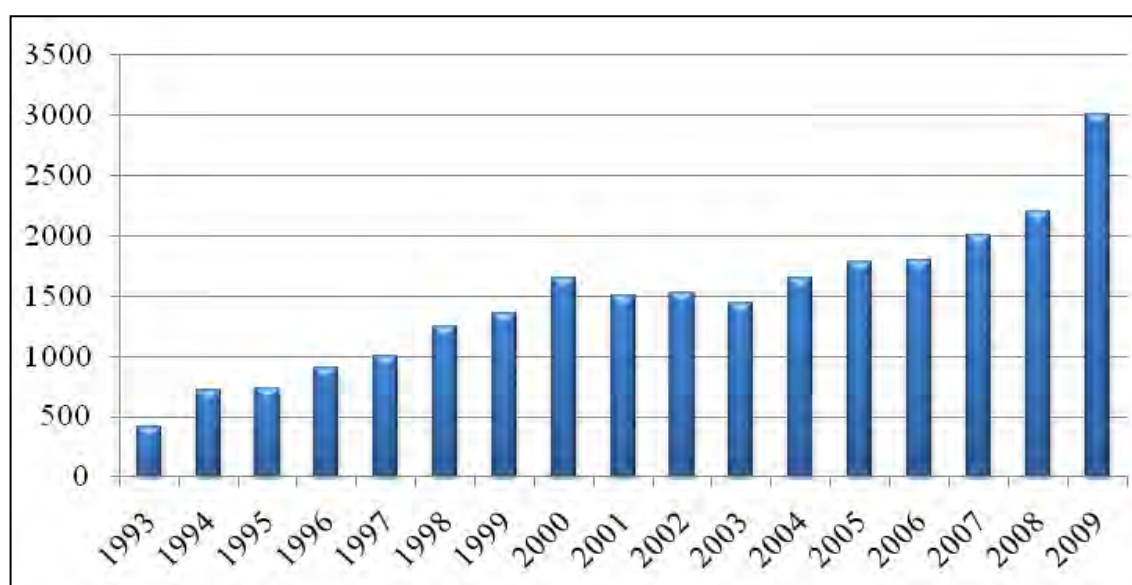


Source: GSO, 2010.

3. Official Development Assistance

Official development assistance (ODA) was resumed in 1993 and has also significantly contributed to investment and GDP growth in Viet Nam. From 1993–2009, total committed ODA for Viet Nam reached \$US 50 billion, of which \$US 41 billion was signed, and \$US 19.7 billion was disbursed.

Figure 3.6: Disbursed ODA (\$US Million)



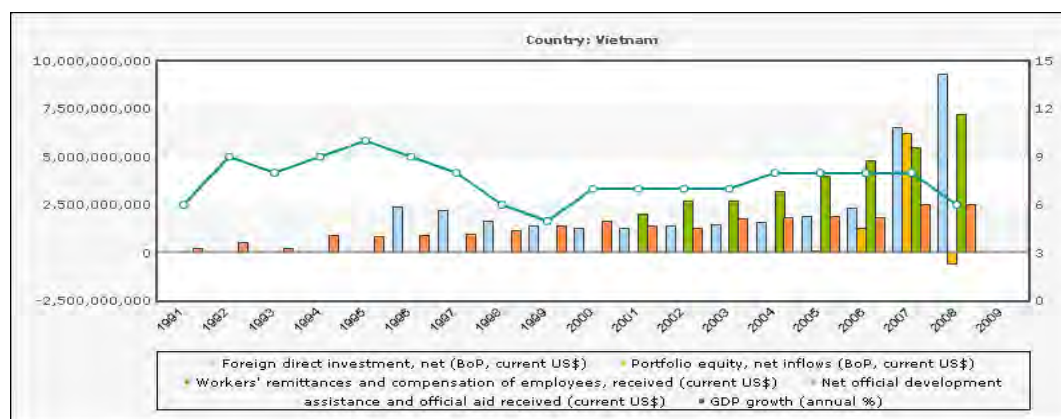
Source: GSO, 2010

ODA to Vietnam has focused on infrastructure development, poverty reduction (particularly in isolated areas), human resources development and institutional improvement. Besides, ODA has supported the enhancement and formulation of various important laws such as the Enterprise Law, the Land Law, the Investment Law, the Competition Law and the Anti-Corruption Law. ODA-financed projects also helped strengthen the managerial capacity of officials and the personnel of ministries, branches and local agencies, and improve their professionalism and English language substantially. However, the mobilization and utilization of ODA has been exposed to a typical weaknesses and limitations such as limited awareness and understanding on the nature of ODA, slow disbursement rates, weak institutional arrangement and human capacity for ODA management, limited monitoring and evaluation with regard to ODA projects and programs.

4. Impact of Capital Flows and Policy Responses

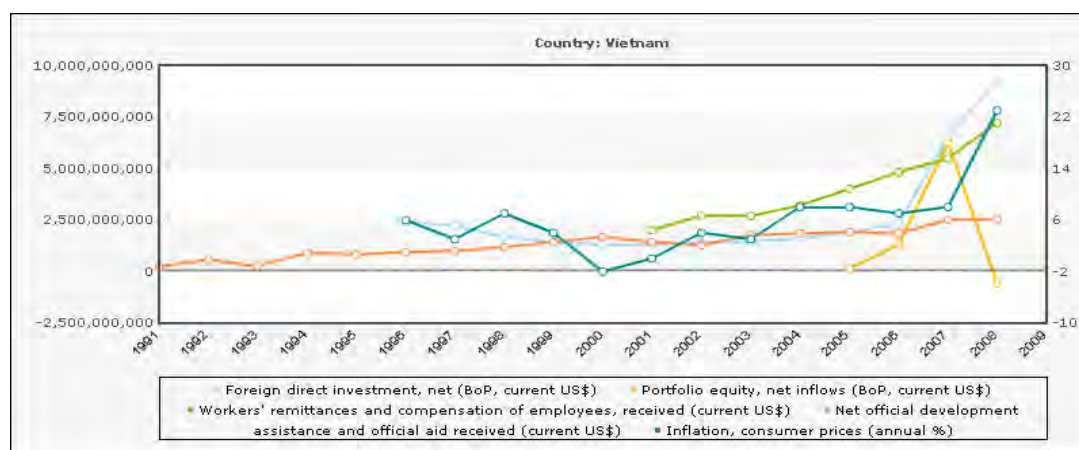
Available data showed that capital flow becomes more correlated with the movement of macroeconomic indicator such as GDP growth, inflation and current account (Figure 3.7, 3.8, 3.9). The past years also experienced so-called mini-crisis and risk which were caused by improper policies to manage capital flows in Vietnam (i.e. the L/C crisis in the 1990s and high dollarization risk). Moreover, capital inflows have a strong impact on the movement of foreign exchange rates that forced the Vietnamese government to implement strong measures on capital control and stabilize the foreign exchange market.

Figure 3.7: Capital Inflows and GDP



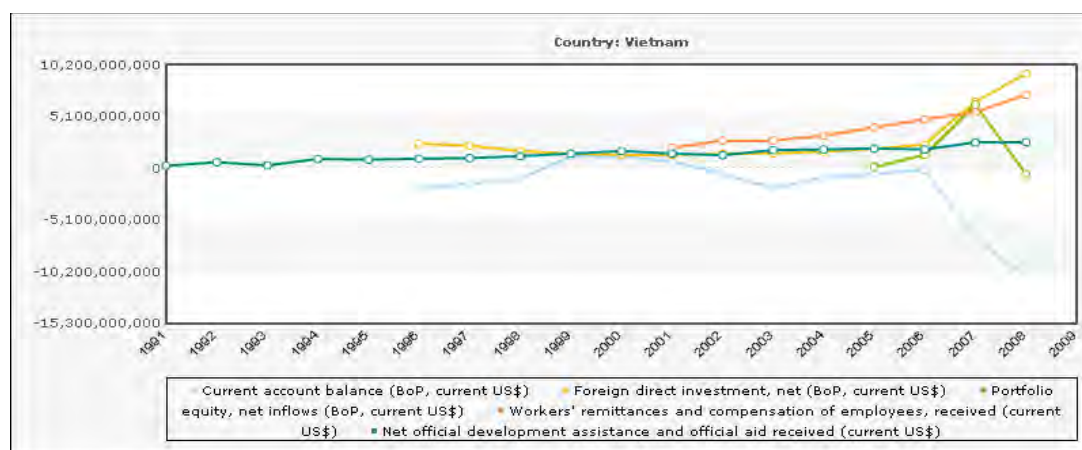
Source: World Development Indicator, 2010

Figure 3.8: Capital Inflows and Inflation



Source: World Development Indicator, 2010

Figure 3.9: Capital Inflows and Current Account



Source: World Development Indicator, 2010

Letter of Credit Crisis, 1996-1997: From 1992 to 1996, that VND savings interest rate was higher than the USD savings interest rate led the return on VND in terms of USD to become very high. Many citizens banked their money to the commercial banks. This led to a substantial increase in bank deposits, while credits were hardly expanded due to high lending rates and tight regulations on credit ceilings. Many banks had excessive reserves even some banks refused to receive more deposits in VND. Letter of credit (L/C) was one important channel that helped banks to avoid credit ceilings which were set up by the State Bank of Vietnam because up to that time L/C was excluded from credit ceiling, and only importers could obtain loans in foreign currencies. Besides, during this period, the exchange rate was very rigid, and hedging tools were not available then both banks and firms wanted to lend and borrowed thought L/C.

Table 3.1: Annual Saving Interest Rates of VND and USD, 1992-1997

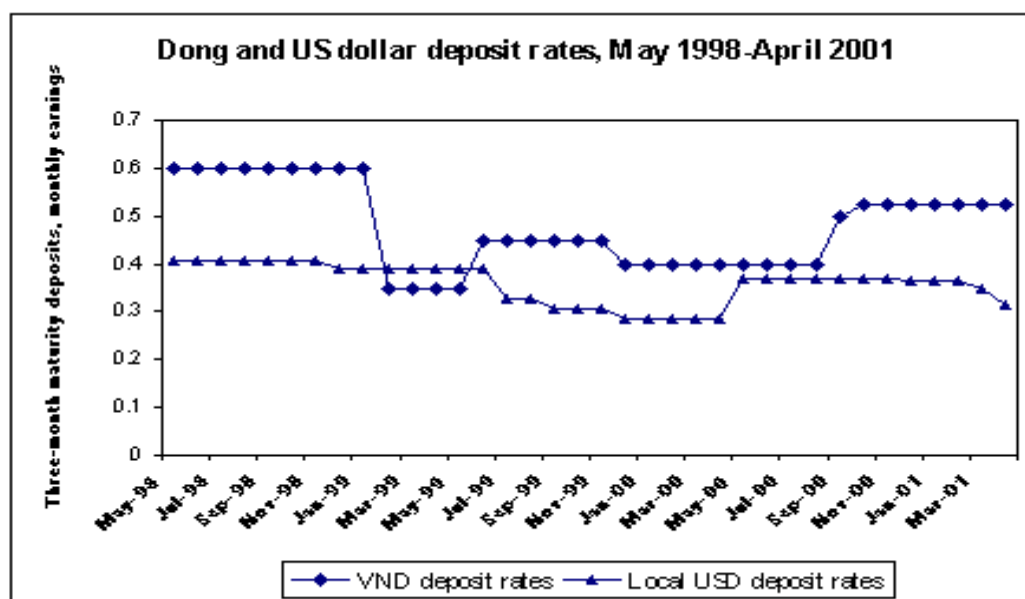
Year	CPI-based inflation	VND nominal depreciation rate	VND savings interest rate	Real VND saving rate	Return on VND in terms of USD	USD savings interest rate	Different rates
	0	1	2	(3)=(2)-(0)	(4)=(2)-(1)	5	(6)=(4)-(5)
1992	17.5	-8.13	34.10	16.60	42.23	4.05	38.18
1993	5.2	2.62	20.40	15.20	17.78	3.20	14.58
1994	14.5	1.92	16.80	2.30	14.88	3.50	11.38
1995	12.7	-0.33	16.80	4.10	17.13	4.50	12.63
1996	4.5	0.33	9.60	5.10	9.27	4.80	4.47
1997	3.6	11.57	9.60	6.00	-1.97	5.00	-6.97

Source: Vo, 2010

As a result, the increase in short-term loans dominated in US dollars borrowed by enterprises (both SOEs and private ones) pushed the stock of letters of credit to \$US 1.5 billion (accumulated) by the early 1997 (Diep, 2001). The costs of this type of external borrowing were high. The current account deficit was widened, reaching 9.2% of the GDP in 1996 (Vo 2010). Capital flows into speculative real estate market increased rapidly. Some banks had to declared default on the guaranteed short-term debts. Approximate 40% of L/C (equal 3% of the GDP) became bad debts. In this situation, the State Bank of Vietnam (SBV) had to use the foreign reserves to bail out these banks. Foreign reserves fell by 5 week of imports equivalently. Vietnam's sovereign credit rating was lowered from Ba3 to C (Vo, 2010). The imposing of lending rates in 1996 without proper consideration of domestic inflation and international interest rates in the context of rigid pegged exchange rates thus generated severe impacts on both microeconomic and macroeconomic management in Vietnam.

Dollarization risk: Dollarization occurs when residents of a country extensively use the U.S. dollar or another foreign currency alongside or instead of the domestic currency. The amount of foreign currency deposits (FCDs) in Vietnam increased rapidly from 2.1 trillion VND in Dec 1989 to 91.1 trillion VND in Dec 2002 (Tuyet, 2003). It was a result of Vietnam integration into the world economy. At the end of 1990s, the interest rate of VND was very low (negative sign in 2000) led the VND deposits become less attractive than USD. Thus, economic agents and particularly individual converted VND deposits to USD deposit and raised the volume of FCDs significantly. According to IMF's standard, Vietnam almost reached the threshold of highly dollarized economy.

Figure 3.10: VND and USD Deposit Rates



Source: SBV, quoted by Vo, 2010.

The degree of dollarization in Vietnam is always above 20% in comparison with 7-10% in other countries in Southeast Asia such as Thailand, Malaysia and Indonesia due to massive flow of remittance and foreign investment and increased export earnings over the past years.¹ It is expected that dollarization may rise further in the recent context of high inflation and volatility of the VND.

The phenomenon of dollarization as the consequence of capital inflows in Vietnam is suggestive for both Cambodia and Lao PDR. De Zamaroczy and Sa (2003) estimate that 96% of total money supply of Cambodia was U.S. dollar cash and deposits during period 1995-2000, the remaining 4% being riel cash and deposits. The survey implemented by National Economic Research Institute in 2001 shows that the currencies used for daily transactions (including cross border trades) in Cambodia consisted of Thai baht (26%), U.S. dollar (26%), Lao kip (21%), Vietnamese dong (16%) and Chinese Yuan (5%). The survey implemented by SBV and Japanese International Cooperation Agency (JICA) also found that unofficial foreign exchange markets in Vietnam were quite liquid and could handle a large amount of purchases and sales of cash in U.S. dollar.

Foreign exchange market: Before *Doi Moi*, Vietnam had a mono-banking system in which there was an enmeshment between central banking and commercial banking activities. There existed a three – tier ER system: official ER for foreign trading, non-trading ER and internal ER used in business relations among banks and other domestic business entities. Those ERs were set by the government at fixed levels based on economic and granting agreements between the government of Vietnam and other related countries. However, there was a paralleled informal/free foreign exchange market with higher ERs than those set by the government.

¹ <http://www.saga.vn/Cohoigiaothuong/Thitruong1/forex/9470.saga>; accessed on December 10th, 2008

In March 1989, the multi-tier ER system was unified into a single official ER (OER) set by the State Bank of Vietnam (SBV). The OER was adjustable in principle, based on inflation rate, interest rates, balance of payment (BOP) stance and the ER in the paralleled free foreign exchange market. Based on the OER announced by the SBV, commercial banks were allowed to set ERs for their own transactions within a band of (+/-) 5% around the OER. Almost at the same time, the effort to reform the banking system began. In May 1990, the State Council passed two banking ordinances² to transform the old mono-banking system to a new two-tier banking system with SBV serving as the Central Bank, and a system of commercial banks.

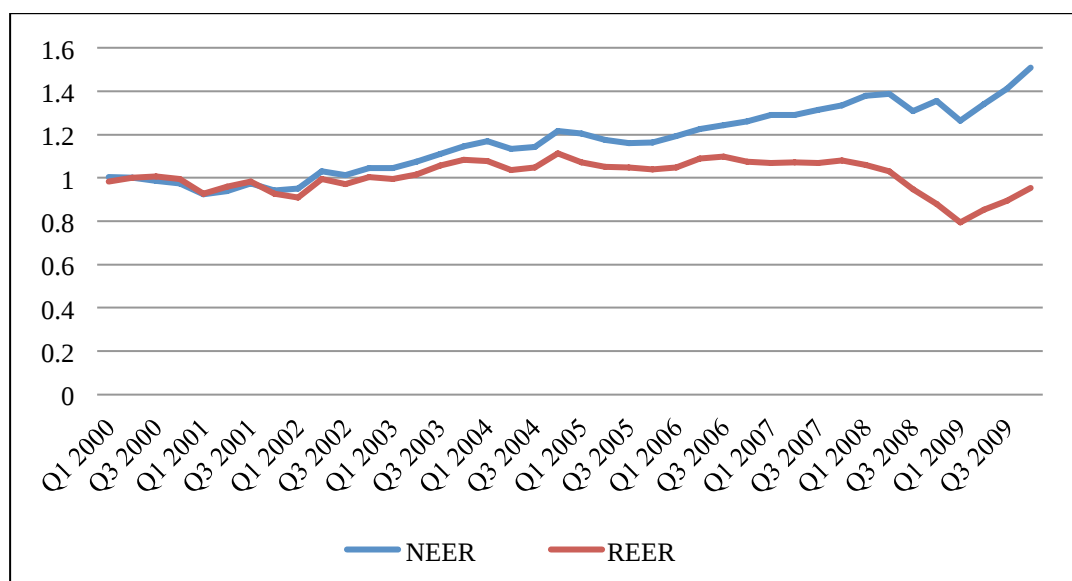
In 1991, OERs were set by auction – based on rates at two foreign exchange floors (in Ho Chi Minh city and Hanoi) where the SBV played a dominant role, by buying or selling large amounts of foreign exchange. However, since September 1994, the two foreign exchange floors were replaced with an inter-bank foreign exchange market in which the SBV still remained influential as the “last lender and last buyer” of foreign exchange. Although the SBV has made big attempts to stabilize the exchange rates, under the market pressure, since the mid-1990s, the ER band has been widened continuously.

Until the early 2000s, most popular measure to manage capital flow has been the interest rates. Since January 1991, domestic residents have been allowed to hold foreign currency deposits. In 1993, the SBV began to apply ceiling on lending interest rates. Control on the ceiling on lending interest rates in foreign currencies also implemented. In 1998, the fixed spread between deposit and lending interest rates was eliminated. However, three categories of ceilings on lending rates were still in place: short-term, long and medium-term loans and loans provided to the Credit Funds’ members. In 1999, three types of ceilings were merged into one type of ceilings on lending rate. In 2000, ceiling on interest rates was replaced by the basic monthly rate. In the same year, together with the change in the management of VND interest rates, the SBV allowed credit institutions to determine the foreign currency lending rates by the Singapore Inter-bank market rates (SIBOR). Since June 2002, the interest rate has been liberalized.

Massive inflows of capital into Vietnam over the past years have loaded mounting pressure on the ER of VND against the U.S dollar, and consequently on the exchange rate policy to stabilize the foreign exchange market. As showed in figure 3.11, the gap between nominal exchange rate (NEER) and real effective exchange rate (REER) has been widened since the mid-2000s, especially, during the 2007-2009 period.

² Ordinance on State Bank of Vietnam, and Ordinance on Banks, Credit Cooperative and Financial Enterprises

Figure 3.11: Nominal Exchange Rate and Real Effective Exchange Rate (mil VND)



Source: IFS, Vietcombank and calculation by authors

More market-oriented instruments (e.g. sterilization, gradual adjustment of ER band) have been employed by the SBV in combination with administrative measures (Table 3.2). However, the instability of the exchange rates is rooted in chronic macro-economic weaknesses (e.g. trade deficit, fiscal deficit) which cannot be addressed within a few days.

Table 3.2: Policy Responses to Capital Inflows in the period of 2007 – 2009

Policy measures	Policy Responses
Sterilization:	- In 2007, foreign exchange reserves were quickly built up (from USD 11.5 billion in 2006 to USD 23 billion by the end of 2007). SBV attempted to sterilize the excess liquidity through the OMO and the increased reserve requirements in the second half of 2007. Sterilization was costly and ineffective. - Since June 2007, the SBV has raised the reserve requirement ratio. For VND deposits under 12 months, the compulsory reserve rate increased from 5% to 10%; for VND deposits between 12 and under 24 months, from 2% to 4%. Correspondingly, rates for foreign currency deposits are from 8% to 10% and from 2% to 4%. - Since 1 February 2008, the ratio of compulsory reserve requirements have been raised to 11% (from 10%) for VND and foreign currency deposits under 12 months. All official interest rates have been increased (from 8.25% to 8.75% for the basic rate) - On 17 March 2008, the SBV issued 365-day-bills worth VND 20,300 billion with a coupon of 7.8% and requested a compulsory purchase by 41 commercial banks. - July 2008, the reserve requirement level was lowered by 1 percentage point for VND and 2 percentage points for foreign currencies.
Greater ER flexibility	- January 2007, the trading band of the VND/USD was widened from $\pm 0.25\%$ to only $\pm 0.5\%$

Policy measures	Policy Responses
	- December 2007, the trading band was widened to $\pm 0.75\%$ - 2008: the exchange rate management was relaxed by widening the trading band for USD/VND from $\pm 0.75\%$ to $\pm 1\%$ on March 10 and further to $\pm 2\%$ on June 27. The exchange rate trading band of USD/VND has been widened from $\pm 2\%$ to $\pm 3\%$ since November 7.
Fiscal tightening:	- By 2008, Viet Nam has had no serious intention of using fiscal policy as a policy complement to monetary and ER policies in response to capital inflows. Fiscal policy has followed the “golden rule,” meaning the budget should have savings, But budget deficit continued to be about 5% of GDP in 2007 and 2008 and the budget deficit cannot be financed by seigniorage. - On April 17, 2008, the Government released <i>Resolution No.10/2008/NQ-CP</i> detailing measures to restrain inflation, stabilize macro economy and ensure social security and sustainable growth. The government carried out a tight fiscal policy with different measures such as (i) cutting down public expenditure to further reduce budget deficit; (ii) reducing public investment, especially investments of state-owned groups and enterprises; and (iii) giving priority to investment in economic sectors. Inefficient public investment projects have been cancelled while new projects were postponed. - On December 11, 2008, the Vietnamese government released <i>Resolution 30/2008/NQ-CP</i> on urgent measures to deal with the economic recession, maintain economic growth and ensure social security. On fiscal policy, the government announced several measures to support SMEs in Vietnam. For example, SMEs may benefit from (i) 30% Corporate Income Tax (CIT) payable deduction; (ii) an extension of up to 9 months for the deadline of submission of the tax payables of 2009; and (iii) a temporary refund of 90% input Value Added Tax (VAT) for exported goods without justifiable payment documents. - December 2008, the government has announced a fiscal stimulus package to compensate for the effects of the global economic recession.
Administrative measure:	- February, 2008, the SBV issued directive requested that all commercial banks not raise annual deposit interest rates more than 12% and promise to meet the liquidity of the banking system. The administrative measures, though temporary and necessary, can be seen as a step backward in the process of improving monetary instruments.

III. Review of Literature

1. Capital Inflows: Effects and Management Measures

An increasing foreign capital inflow has helped the host countries to achieve high economic growth but at the same time it has created problems such as inflation pressures, pushing up real exchange rate (with adverse effects on exports), loss of control over monetary policy, high dollarization (Greenville and Stephen, 2008 and Kwan, 1998), lower domestic saving, and fall in the domestic interest rate or the cost of capital (World Bank, 1996). The impact depends on the volume of flows, the macroeconomic policy framework, the microstructure of the flows and incentives in the financial sector (World Bank, 1996).

Some empirical studies proved that dollarization brought economic stability and higher economic growth to Ecuador. However, there is much less agreement on the effects of dollarization on real economic variables, such as growth, employment and volatility. Countries with a hard peg mechanism -- including dollarized countries -- will have difficulties accommodating external shocks (Meade, 1951). This, in turn, will be translated into greater volatility, and may even lead to lower economic growth (Parrado and Velasco, 2002 and Broda, 2001).

Besides macro problems, capital inflows can create financial stability risk (Kawai and Takagi, 2008). Capital inflows could affect the financial system by pushing up equity and other asset prices (the asset price inflation), reducing the quality of assets and negatively affect the balance sheets of the banks or finance companies (the capital inflow often comes through financial sector). Recent experience suggests that the impact of capital inflows on asset prices has been particularly significant (Greenville, 2008; Schadler, 2008).

Foreign interest rates have been the “push” factor driving capital inflows and determining their magnitude but country creditworthiness has influenced the timing and geographic destination of the new capital flows (Fernandez-Arias and Montiel, 1995). However, capital inflows could reverse or stop suddenly, with a potential for the depletion of reserves or sharp currency depreciation. Schadler (2008) notes that about 15% of the capital inflow episodes over the past 20 years ended in crisis.

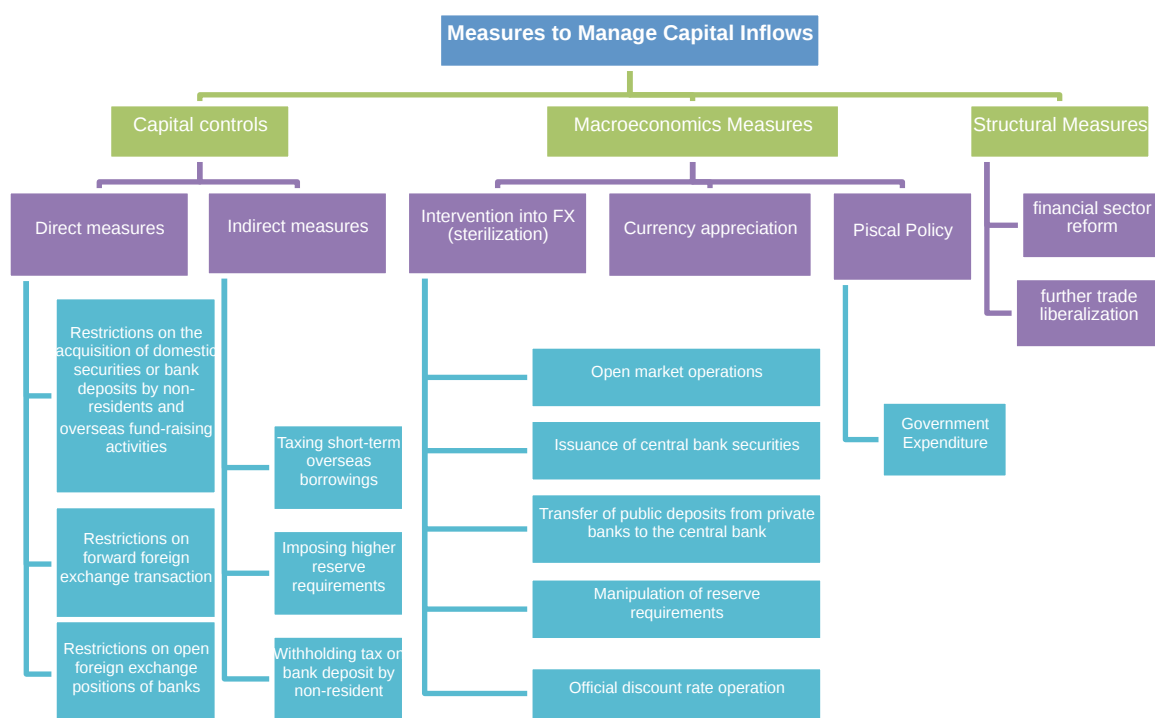
Measures to manage capital inflows are often examined in different ways and different dimensions. Some authors have looked at direct and indirect measures (Kwan, 1998) while others concentrated in macroeconomic and structural measures (Kawai, Fernandez-Arias and Montiel, 1995; Grenville, 2008 and Schadler, 2008).

According to C.H. Kwan (1998), direct measures include restriction on the acquisition of domestic securities or bank deposit by non-residents and overseas fund-raising activities, forward foreign exchange transaction, and open foreign exchange positions of bank. Indirect measures comprise taxing short-term overseas borrowings, imposing high reserve requirements and withholding taxes on bank deposits by non-residents.

Macroeconomic measures to manage capital inflows are sterilized intervention (sterilization), greater exchange rate flexibility and fiscal tightening preferably through expenditure cut (Kawai, 2008, Schadler et al., 1993; Fernandez-Arias and Montiel, 1995; IMF, 2007, Greenville, 2008; and Schadler, 2008). Structural measures include financial sector reform and further trade liberalization (Schadler et al., 1993; IEO, 2005).

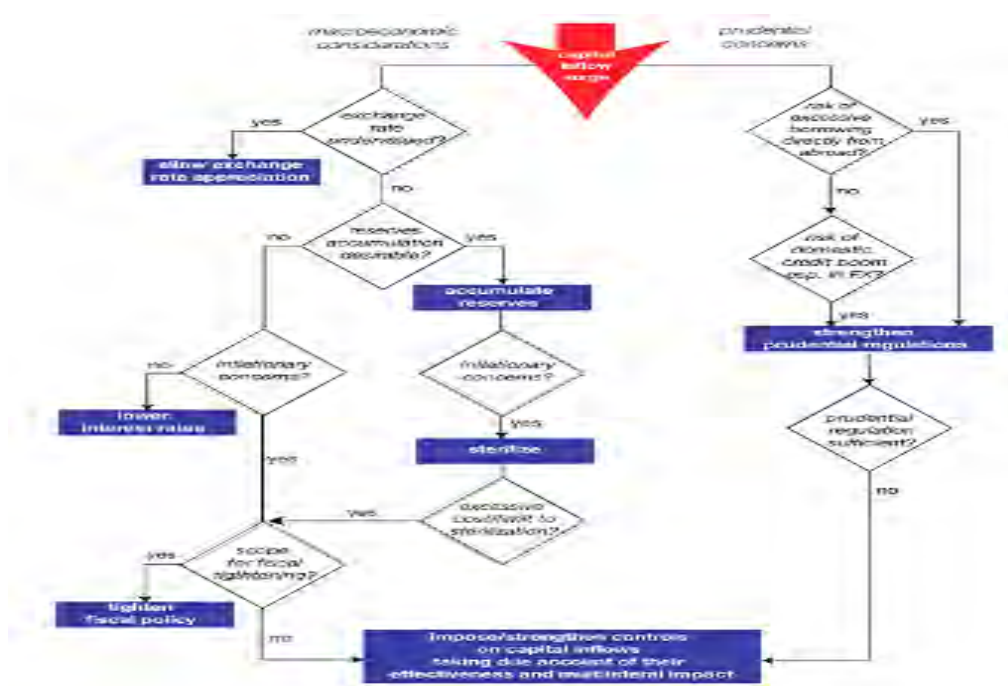
According to Jonathan D. Ostry (2010), although capital flows to developing and emerging market countries are generally welcomed, sudden surges can complicate macroeconomic management and create financial risks. Then, the appropriate policy response is likely to be multifaceted, according to the circumstances facing the country (Figure 3.12).

Figure 3.12: Measures to Manage Capital Inflows



Source: Nomura Research Institute. Coping with capital flow in East Asia

Figure 3.13: Coping with Surge in Capital Inflows: Macroeconomic and Prudential Consideration



Source: Jonathan D. Ostry (2010)

According to Asian Capital Markets Monitor 2010, to manage capital flows effectively an array of policy measures can be used as the following: *i)* Sound macroeconomic management: It is fundamental and provides an important backdrop for stable and beneficial capital flows; *ii)* Flexible foreign exchange regimes: This policy can help economies minimize shock consequences by a broader range of exchange rate; and *iii)* Temporary and targeted capital controls: It may be appropriate when transitory capital inflows add undue pressure on exchange rates, and pose risks to financial stability, and where macroeconomic policies are ineffective. The third option can have two types of measures:

- Direct (administrative) controls on the volume of inflows: The simplest measure would be an outright prohibition of cross-border capital movements. But, in practice, most controls would involve discretionary approval of certain types and amounts of flows. Moreover, the imposition of administrative controls can be costly and prone to longer-term distortionary effects, particularly if the entrenched administrative apparatus makes it difficult to dismantle the controls later.
- Market-based instruments to change the composition of inflows: There are controls aimed at limiting particular types of capital flows by making such flows more costly. The most common instrument to do this is unremunerated reserve requirements (URR), which mandate that a certain percentage of inflow be deposited with the central bank. The cost of the deposit to the investor is related to the length of time the funds remain in the host country. The longer the funds remain in country, the lower the cost. Effectively, this is a type of tax that discourages short-term flows, altering the maturity composition of inflows, rather than preventing them.

2. Relationship between capital inflows and the real exchange rate

The link between capital inflows and the real exchange rate instability has been examined in a number of papers (Calvo, Leiderman, and Reinhart, 1993; 1996; Agénor and Hofmaister, 1996; Kwan, 1998; Edwards, 1998; Athukorala and Rajapatirana, 2003; Nwachkwu, 2007; Lartey, 2007; Sy and Tabarraei, 2009; Saborowski, 2009). These studies examined what types of capital inflows determined the instability of exchange rate and how to cushion the negative effects of capital inflows on exchange rate both theoretically and empirically. They mentioned the Dutch disease effects, which caused an appreciation of the real exchange rate in response to an increase in capital inflows.

The studies during the early 1990s were particularly interesting in the Latin American financial crisis which was caused by massive capital inflows. The focal point shied away from Latin America with the occurrence of the Asian financial crisis in 1997-1998. However, some studies in the early 2000s focused on managing capital inflows in Asia and tried to compare the effects of capital inflows on exchange rate in Asia and Latin America (Athukorala and Rajapatirana, 2003; Kawai, 2008; Grenville, 2008; Schadler, 2008). Recent paper expanded the geographical area to Sub-Saharan Africa (Nwachkwu, 2007; Lartey, 2007).

Unfortunately, in Vietnam, current studies on the relationship between capital management and the real exchange rate have been so far rare. To our knowledge, there are only a few researches that look at capital flows and capital flow management (Vo and Pham, 2008; Vo,

2010; To, 2009; Nguyen, 2005) whereas most of the existing studies deal with the individual component of capital inflow such as FDI, ODA, and portfolio investments in the security market. For example, Vo (2008, 2010) confirmed that capital inflow could have both benefits and risks for Vietnam, and policy responses to a surge in capital inflows were always constrained by the “impossible trinity.” He also blamed the capital inflows for some crises in Vietnam such as L/C crisis in 1996, and macroeconomic instability crisis in 2008. His paper, however, did not focus on the effects of capital inflows to the real exchange rate. To (2008) described the situation of capital inflows and outflows in Vietnam. Given this picture of capital flows in Vietnam, she however did not tell much about capital flow management. Similarly, exchange rate was also examined in the current researches in a very limited extent (i.e. by tracing its movement). Some short articles have tried to analyze the link between exchange rate movement and some specific components of capital inflows (e.g. FDI, FPI) but only for a short period of time and based on qualitative assumption.

Popular quantitative methods to examine the relationship between capital management and the real exchange rate are developed based on the Salter-Swan-Corden-Dornbush model (Corden, 1994). For example, Athukorala and Rajapatirana (2003) used it to explain the behavior of real exchange rate by capital inflows (FDI and other components) and a set of macroeconomic indicators chosen to represent policies implemented to compensate for the real exchange rate effect of capital flows, such as: i) government expenditure (represented for fiscal contraction), ii) excess growth in money supply (represented for sterilizing foreign exchange market interventions) and change in nominal exchange rate. Their model aimed to compare the effects of capital inflows on exchange rate and policy response between Asia and Latin America over the period 1985 to 2000. They found that the composition of capital inflows mattered in determining the impact on real exchange rate. The latter appreciated with rising levels of “other capital inflows” whereas FDI seemed to have a salutary effect on the real exchange rate.

Also based on Salter-Swan-Corden-Dornbush model, Lartey E.K. (2007) used a generalized method of moments (GMM) estimator to examine the link between capital inflows and the real exchange rate in Sub-Saharan Africa. The author classified the capital inflows into FDI, other private capital inflows and ODA (added one variables comparing with the model of Athukorala and Rajapatirana). To estimate the effectiveness of policy response of the recipient countries, Lartey (2007) also used such variables as government expenditure, excess money growth and openness of the economy. His results showed that an increase in FDI inflow led to a real appreciation in exchange rate whereas changes in “other capital inflows” did not affect the real exchange rate. The results also showed that an increase in ODA caused a real appreciation, the effect being greater than that associated with an increase in FDI. Hence, increase in the inflow of FDI and ODA caused Dutch disease effects in Sub-Saharan Africa.

Nwachkwu J., (2007) looked at the relationship between foreign capital inflows and the real exchange rate in Sub-Saharan Africa, using a pool of annual time series data for twenty-four primary exporting Sub-Saharan African (SSA) countries over the 1978 to 2001 period. His studies adopted the following functional baseline regression model proposed by Edwards (1988). In Nwachkwu model, real exchange rate was a variable that depended on aggregate net international capital inflows, the index of the external terms of trade, the ratio of gross domestic investment to GDP, the sum of imports and exports as a proportion of GDP, real GDP per capita, government consumption expenditure, total net domestic credit as a proportion of previous year's GDP and the nominal or official exchange rate. His results

show that external inflows had a negative impact on the real exchange rate with a further implication that the domestic production of tradable goods need not be adversely affected by the anticipated inflow of the large additional capital.

IV. Model Specification

Based on Salter-Swan-Corden-Dornbush model and the above studies, we develop an econometric model to examine the relationship between capital management and the real exchange rate during the 2000-2009 period. The dependent variable is real effective exchange rate (REER). The independent variables include: implemented foreign direct investment (FDI), capital inflow excluding FDI (OCFW), government expenditure (GEXP), openness (OPEN), excess money supply (EXMG), and nominal effective exchange rate (NEER).

The model can be put a time series functional form originally below:

$$REER_t = \alpha_{1t} + \alpha_2 FDI_t + \alpha_3 OCFW_t + \alpha_4 EXMG_t + \alpha_5 GEXP_t + \alpha_6 DNER_t + \alpha_7 OPEN_t + \mu_t$$

in which, (with the signs expected for the regression coefficients in parentheses)

FDI (-): Implementation FDI (%GDP)

OCFW (-): Capital Inflows excluding FDI (%GDP) =

ODA + current transfer + Portfolio Investment + Other Investment

EXMG (-): Excess Money Supply (%) = M2 growth (%) – GDP growth (%)

GEXP (-): Government Expenditure (%GDP)

NEER (+): Nominal exchange rate (VND/USD)

OPEN (+): Openness = Exports of goods and services + Import of goods and services /GDP

REER (real effective exchange rate) = $\sum E_i w_i * P_i / P$ (VND/USD) of which:

- i: Vietnam trade partners
- E: exchange rate (VND/trade partner currency) = E(VND/USD) x E(USD/Vietnam trade partner currency)
- w: trade weight between Vietnam and partner (%) = (export + import)_{Vietnam-partner} / total (export + import) of Vietnam
- P: the price index.

An increase (decrease) in *REER* indicates real depreciation (appreciation).

The rationale for the expected signs can be explained below:

First, the law of supply and demand in the foreign exchange market indicates that an increase in foreign currency flows produces an increase in foreign currency supply. The domestic currency will appreciate against the foreign currency (or the exchange rate between domestic and foreign currency decreases). Hence, if capital flows into Vietnam then the value of Vietnam dong will increase.

Second, according to the Dutch Disease Model (Corden, 1982), appreciation of the real exchange rate following capital inflows can be avoided by reducing demand through the fiscal contraction. In addition to this general demand contraction effect, reduction in government expenditure can have a favorable switching effect because government expenditure tends to be spent more on non-tradable goods (Athukorala, 2003).

Third, foreign capital flows will increase the supply of foreign currency and the domestic currency appreciates against the foreign currency. To reduce this impact, the central bank needs to buy excessive flows (it makes its foreign exchange reserves increase). This will increase domestic money base (of which foreign reserves are a part). There will be a stimulation of domestic inflation, followed by appreciation of the real exchange rate. The central bank offsets this effect by using the open market operations (for example: sale of bonds) or other monetary action to reduce domestic credit expansion. To test the effectiveness of such sterilized intervention in averting real exchange rate appreciation, we could use the variable of excess money growth, measured as the difference between the growth in M2 and real GDP growth.

Fourth, other things remaining unchanged, greater openness to trade tends to avert undue pressure for the appreciation of the real exchange rate; and if the nominal exchange rate increases, ceteris paribus, then the real exchange rate will increase too.

All variables are quarterly collected from Q1 of 2000 to Q4 of 2009. We choose the year of 2000 as the beginning year of the time series to maintain the consistency and continuity of data collected. Because data on ODA is only available by annum, we use the cubic spline function to interpolate the corresponding quarters from 2000 to 2009. Data for foreign portfolio investment is not available until Q1 2005 but until that time the amount of FPI is negligible. Data sources used for calculation are provided in the table below.

Table 3.3: Data Sources

Variable Name	Data Sources
REER	Vietcombank and calculation by researchers
FDI	IFS
OCFW	IFS
EXMG	IFS
GEXP	Vietnam GSO
NEER	IFS and Vietcombank
OPEN	IFS and Vietnam GSO

Three main following hypotheses are tested in the model:

- Increased FDI flow leads to real appreciation of VND against the USD
- Increased nominal exchange rate tends to raise the real VND/USD exchange rate
- Increased openness leads to real depreciation VND against the USD

V. Results and Discussions

In close examination of the above-mentioned variables to fit into a robust time series regression, several variables (REER, FDI, NEER, OPEN, GEXP) are non-stationary, thus they are differenced in order to become stationary ones in their first-difference form (see Appendix 3 for the unit root test results). Based on the original model, in the following regression equation, we lag variable OPEN one period to take into account its longer-term impact on real effective exchange rate (REER):

$$\Delta \text{REER}_t = \alpha_{1t} + \alpha_2 \Delta \text{FDI}_t + \alpha_3 \text{OCFW}_t + \alpha_4 \text{EXMG}_t + \alpha_5 \Delta \text{GEXP}_t + \alpha_6 \Delta \text{NEER}_t + \alpha_7 \Delta \text{OPEN}_t + \alpha_8 \Delta \text{OPEN}_{t-1} + \mu_t$$

Following are the results of the regression:

Table 3.4: Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.023	0.013606	1.697376	0.100
D(FDI)	-0.001	0.001527	-0.697765	0.490
OCFW	-0.003	0.001124	-2.611187	0.0140
EXMG	-0.0006	0.000322	-2.032365	0.051
D(GEXP)	-0.0004	0.000179	-2.433996	0.021
D(NEER)	0.88	0.085194	10.33019	0.000
D(OPEN)	0.00072	0.000256	2.799899	0.009
D(OPEN(-1))	3.61E-05	0.000202	0.178935	0.859
R-squared				0.84
Adjusted R-squared				0.80
Sum squared resid				0.01
F-statistic				22.64
Prob(F-statistic)				0.000
Akaike info criterion				-5.01
Schwarz criterion				-4.67
Durbin-Watson stat				1.398

As showed in the table above, all estimated coefficients have signs as expected.

First, although the increase in FDI flow leads to real appreciation, the impact of FDI on REER is not statistically significant. Our first hypothesis is thus rejected. The main contributor to real appreciation of the effective exchange rate during the studied period is indeed non-FDI capital inflow.

Second, one-period-lagged OPEN results in real depreciation, but its impact is not statistically significant. Nonetheless, the impact of differenced variable OPEN is statistically significant at 1% level. This provides the evidence to confirm our third hypothesis.

Third, EXMG and differenced GEXP both have statistically significant impact on real effective exchange rate. Increase in these two variables can lead to the real appreciation of the VND against the USD. However, their individual impact is very small and much lesser than the one cause by OCFW. Thus, money supply and government expenditure may not be effective policy responses to compensate the impact of non-FDI capital inflow on real effective exchange rate.

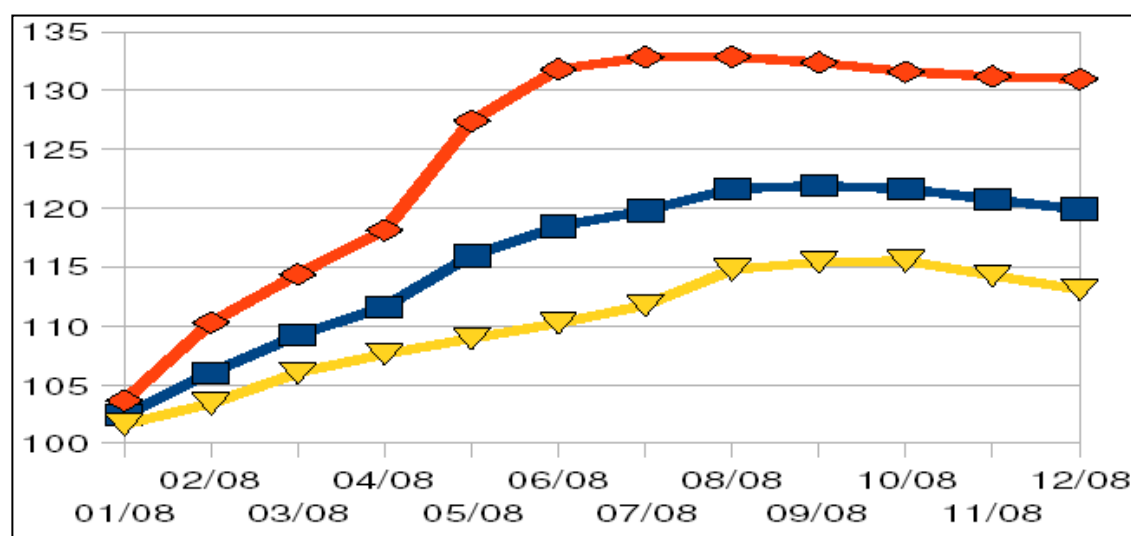
Fourth, the impact of nominal effective exchange rate on real effective exchange rate impacts is statistically significant. Its estimated coefficient is big and much higher than the ones of other variables in the function. The evidence suggests that compared to all others, nominal exchange rate has been a very effective instrument to influence the real effective exchange rate. This is suggestive for Vietnam when its trade balance is in serious deficit.

Case study: Manipulating nominal exchange rate during the time of macroeconomic instability

After its WTO accession in 2007, Vietnam experienced a surge in foreign investment, together with a boom of the stock exchange (for FPI) and real estate sector (for FFDI). Rapid economic growth became overheated, peaking in Q4 of 2007 at the cost of high inflation. Contraction phase began in Q1 and Q2 of 2008. Soft landing of the economy did not happen in 2008 with the growth rate falling to 6.2% from 8.6% in 2007, and its prospect was gloomed by the global economic recession. The economy faced with surging inflation and twin deficits (fiscal and trade deficit).

Inflation, which averaged 12.63% in 2007, increased dramatically in the first half of 2008, reaching above 20% for the whole year. Rising food commodity prices (20% in 2007 and 30% in 2008) contributed the increase of inflation. Besides, increasing capital inflows in this period generated asset price inflation, especially in real estate and land prices.

Figure 3.14: Monthly Inflation Rates in 2008

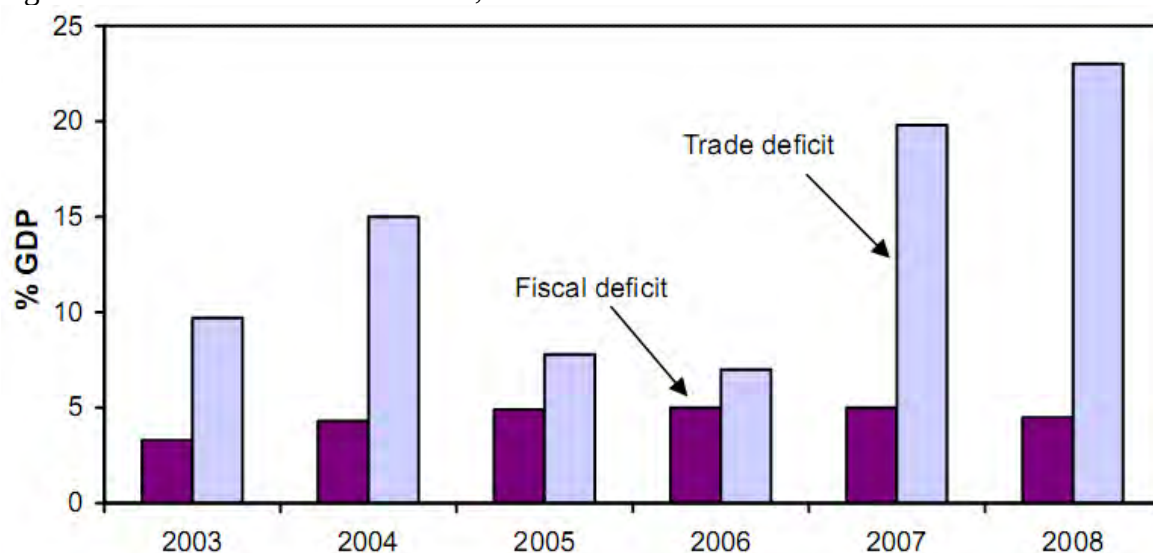


CPI: —■—
 CPI taking into account salary increase: —◆—
 CPI without taking into account salary increase: —▼—

Source: GSO. 2008. Quoted by Pham Van Ha, 2009.

The fiscal deficit accounted for 4.5-5% GDP while trade deficit reached US\$17.5 billion (or over 20% of GDP) in 2008, a signal of vulnerability to the economy (Le, 2009).

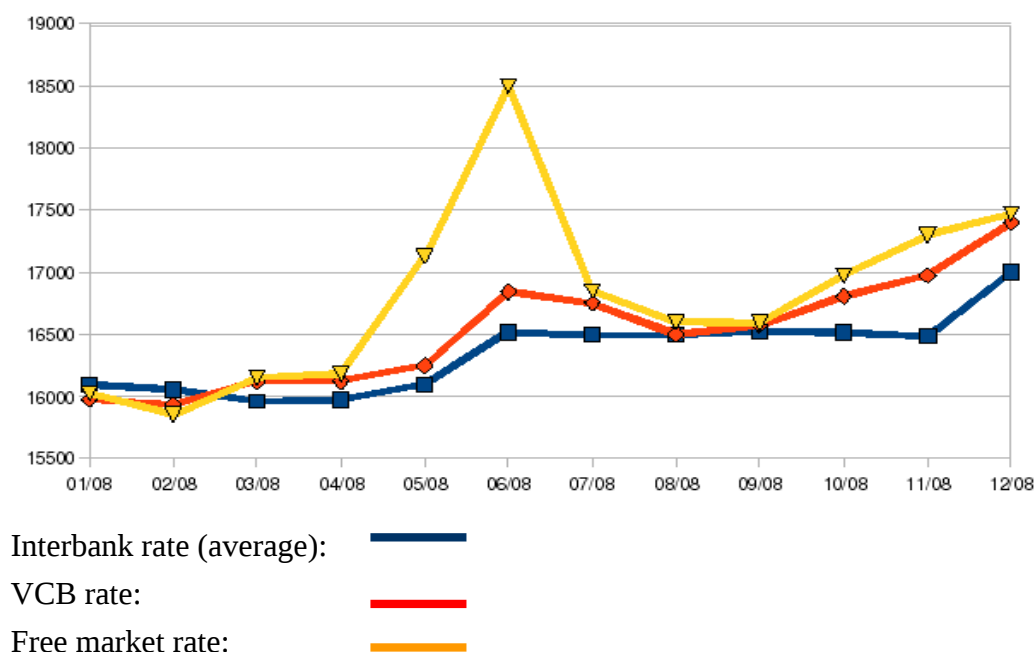
Figure 3.15: Vietnam's Twin Deficits, 2003-2008



Source: IMF, General Statistics Office of Vietnam

During the difficult time, the VND/USD exchange rate increased from 16,600 in Q3 of 2008 to 18,479 in Q4 of 2009 (GSO, 2009), making the VND lose almost 11% of its value against the US dollar. However, these official figures were still below the ones in the free market, which already passed the 19,000 VND threshold.

Figure 3.16: Movement of Exchange Rate in 2008



Source: Ha, 2009. Quoted from SBV, 2009; VCB, 2009.

Exchange rate policy: Although the VND has long been pegged to the US dollar, since the mid-2008, to relieve the pressure on the VND, the State Bank of Vietnam (SBV) took continuous adjustment toward a more flexible exchange rate mechanism:

- 27 June 2008: the band of exchange rate increased to 2% from 1%.
- 7 November 2008: the band increased to 3 percent from 2%.
- 24 March 2009: the band was extended to 5% from 3%.
- 26 November 2009: the interbank exchange rate band increased by 5.44% (at the same time, the US/VND exchange band was narrowed to 3% from 5%), thus increasing the ceiling of the exchange rate by 3.44% (at 18,500 VND per USD).

Although tension in the market was mitigated, the fluctuation of exchange rates continued to last with a narrower band until now. That the imbalance between demand and supply of foreign currency leads to waves of speculation has showed that exchange rate is still the Achilles' heel of Vietnamese economy and a big risk to traders.

Interest rate policies: Exchange rate policy alone is not sufficed at the time of high inflation. To combat the latter, the SBV was forced to raise the interest rates, and this work on par with the exchange rate policy. The interest rates were quickly adjusted in tandem with the rapid movement of the market. Following is the brief chronology of some relevant events:

- February – June 2008: base interest rate was brought up from 8.25% to 14% to cope with the inflation, pushing the deposit rates and lending rates of commercial banks up to their peaks at 17-18% and 20-21% respectively in August-early September.
- September 2008: at the ease of inflation, SBV increased the interest rate of required reserve capital by commercial banks from 3.6% to 5% to provide the room for reducing lending rates.

- 1 February 2009: base interest rate was cut down to 7%.
- 1 March 2009: SBV reduced the required reserve ratio with respect to VND deposits (demand deposits and savings deposits) from 5% to 3%. Ratio for above-12-months deposits was 1%.
- 1 December 2009: base interest rate increased from 7% to 8% (recapitalization interest rate from 7% to 8%, and discount rate from 5% to 6%). The aim was to control the quality of credits by commercial banks and match with the exchange rate policy.

VI. Conclusion

In short, although targeting at nominal exchange rate policy has been so far an effective tool to intervene into the foreign exchange market, it may not solve all problems in the long run under the impact of capital inflows. As it has been showed during the 2008 crisis, policy adjustment to cure the VND and stabilize the market tended to move toward freer exchange rate mechanism and unavoidable depreciation of VND. Letting VND depreciate may be good when Vietnam is facing with high trade deficit. Moreover, given the multifaceted impacts of capital inflow, exchange rate policy alone is not enough:

One, further depreciation of VND may have negative impact on other exporting economies, especially those in the regions (e.g. Laos, Cambodia, Thailand,...), thus triggering a “*race to the bottom*” of currency devaluation.

Two, the gap between nominal exchange rate and real exchange rate tells more than the effectiveness of the existing exchange rate policy. Rather, it indicates the macroeconomic weaknesses that are rooted in the twin deficits: high trade deficit and high fiscal deficit, which cannot be easily addressed. In the current context, there is a need for more appropriate export strategy, which should be targeted at generating high added values and reducing imported-input ratio. When the macroeconomic condition is stabilized, the wave of speculation on foreign currency will be dissipated.

VII. References

ADB, *Asia Capital Markets Monitor* May 2010

Athukorala, P. and Rajapatirana S. (2003). “Capital Inflows and the Real Exchange Rate: A Comparative Study of Asia and Latin America.” *The World Economy* Vol.26 (4), 613-37.

Atish Ghosh, Manuela Goretti, Bikas Joshi, Uma Ramakrishnan, Alun Thomas, and Juan Zalduendo (2008), “Capital Inflows and Balance of Payments Pressures—Tailoring Policy Responses in EMEs” *IMF Policy Discussion Paper*.

Atish R. Ghosh, Marcos Chamon, Christopher Crowe, Jun I. Kim, and Jonathan D. Ostry (2009), “Coping with the Crisis: Policy Options for Emerging Market Countries”, *IMF STAFF POSITION NOTE*

Calvo, G., Leiderman, L. and Reinhart, C. (1996). “Inflows of Capital to Developing Countries in the 1990s.” *Journal of Economic Perspectives* Vol.10 (2), 123-39

Calvo, G., Leiderman, L. and Reinhart, C.(1993b) “Capital Inflows and Real Exchange rate Appreciation in Latin America: The role of External Factors”, *IMF Staff Papers* 40.

Calvo, G., Leiderman, L. and Reinhart, C. (1993a) “The Capital Inflows Problem: Concepts and Issues”, *IMF Paper on Policy Analysis and Assessment*, PPAA/93/10.

Christian Saborowski (2009), “Capital Inflows and the Real Exchange Rate: Can Financial Development Cure the Dutch Disease?” *IMF Working Paper*

Coden, W.M. (1982), “Exchange rate policy and resource boom”, *Economic Record* 58

Dubravko Mihaljek (2008), “The financial stability implications of increased capital flows for emerging market economies”, *BIS Papers* No 44

Eduardo Levy Yeyati, Sergio, L. Schmukler, and Neeltje, Van Horen (2008), “Crises, Capital Controls, and Financial Integration”, *ADB Institute Working Paper* No. 121

Edwards and Savastano, (1999), *Exchange Rate in Emerging Economies: What Do we know? What do we need to know*, in Anne O Kruger (ed), *Economic Policy Reforms: The Second Stage*

Edwards, S.(1998) “Capital Flows, Real Exchange Rates, and Capital Controls: Some Latin American Experiences”, *NBER Working Paper* 6800.

Eswar Prasad, Thomas Rumbaugh, and Qing Wang (2005), “Putting the Cart Before the Horse? Capital Account Liberalization and Exchange Rate Flexibility in China”, *IMF Policy Discussion Paper*

Goh Soo Khoon, Universiti Tunku Abdul Rahman, Perak Darul Ridzuan (2008), “The Composition of Capital Flows to Malaysia: Forecasting the Effects of Removing the Ringgit Peg”, *Journal of Economics, Banking and Finance – Malaysia*, Volume 2, Issue 1, 2008

Guonan Ma and Robert N McCauley, (2007), “Do China’s capital controls still bind? Implications for monetary autonomy and capital liberalization”, *BIS Working Papers*, No 233 International Monetary Fund. *International Financial Statistics*.

Jonathan D. Ostry, Atish R. Ghosh, Karl Habermeier, Marcos Chamon, Mahvash S. Qureshi, and Dennis B.S. Reinhart (2010), “Capital Inflows: The Role of Controls”, *IMF Staff Position Note*

José Darío Uribe¹, (2005), “Capital controls and foreign exchange market intervention in Colombia”, *BIS Papers No 23*, part 9

Jurgen von Hagen and Jizhong Zhou, (2002), *The Determination of Capital controls in transition economies: which role do exchange rate regimes play?*

Kenu Kohli, (2001), “Capital Flows and Their Macroeconomics Effects in India”, *IMF Working Paper*

Kinga Z.Elo, *The effect of Capital Controls on FDI decision under country risk with intangible assets*

Lartey. E.K., (2007) “Capital inflows and the Real Exchange Rate: An Empirical Study of Sub-saharan Africa”, *Journal of International Trade and Economic Development*, Vol.16, No2,pp.337-357.

Leonardo Leiderman and Carmen Reinhart. *Capital Inflows to Latin America*

Mahir Binici, Michael Hutchison, and Martin Schindler (2009), “Controlling Capital? Legal Restrictions and the Asset Composition of International Financial Flows”, *IMF Working Paper*

Már Gudmundsson¹ (2008), “Financial globalization: key trends and implications for the transmission mechanism of monetary policy”, *BIS Papers No 39*

Michael Frenkel, Christiane Nickel, Gunter Schmidt, and Georg Stadmann (2001), “The Effects of Capital Controls on Exchange Rate Volatility and Output”, *IMF Working Paper*

Mouhamadou Sy and Hamidreza Tabarraei, (2009), *Capital Inflows and Exchange Rate in LDC: The Dutch Disease Problem Revisited*,

Natalia T. Tamirisa (1998), “Exchange and Capital Controls as Barriers to Trade”, *IMF Working Paper*

Nguyen Hong Son, 2005, *Managing the foreign private capital flows*, Public House: National Politics.

Nomura Research Institute, *Coping with capital flow in East Asia*, Edited by C.H.Kwan, Donna Vanderbrink, Chiasiow Yue

Nwachkwu. J., (2007), *Foreign Capital Inflows and the Real Exchange Rate in Sub-Saharan Africa*, University of Manchester, Institute for Development Policy and Management (IDPM).

Pierre-Richard Agénor and Alexander W. Hoficmaister (1996), “Capital inflows and the real exchange rate: Analytical framework and econometric evidence”. *IMF Working Paper*

Pham Van Ha. 2009. “Overview of Macroeconomic indices of Vietnam in 2008,” in *Vietnamese Economy 2008: Recession and Challenge for the Reforms*, Nguyen Duc Thanh e.d. CEPR. Hanoi, April, 2009.

To Thi Anh Duong (2009) *Managing capital inflows and outflows in Vietnam and solutions to manage these in current state*. Research Project of Vietnam State Bank, code KNH 2008-09

Vo Tri Thanh, 2010, *Managing Capital Inflows And Attracting FDI: Viet Nam Experiences And Lessons*, High level workshop on “Strengthening the response to the global financial crisis in Asia-Pacific: the role of macroeconomic policies” 22-24 June 2010, Phnom Penh, Cambodia

Vo Tri Thanh, Pham Chi Quang, 2008, “Managing Capital Flows: The Case of Viet Nam”, *ADB Institute Discussion Paper No. 105*

World Bank, *Managing Capital Flows in East Asia*, 1996

Yasuyuki Swada and Pan A. Yotopoulos (2005), “Crises, and Capital Controls: A Theory and an Empirical Analysis on the Optimal Exchange Rate Regime in Emerging Economies”, *Stanford Institute for Economic Policy Research Discussion Paper No. 04-37*

Appendix 1: Exchange rate policy chronology 1989-2009

1989 - 1990:

- October 1989: Government issued Regulation on foreign exchange management.
- 15 March 1990: Circular 33 – NT/TT giving guidance to Regulation implementation,
- 13 September 1990: Direction 330 – CT expediting control over the use of foreign exchange
- 5 November 1990: Decision 96 – NH/QD to regulate Nostro Account

1991:

- 14 January 1991: Decision 08-NH/QD allowed domestic residents to hold foreign currency deposits
- April 1991: establishment of an official fund for streamlining foreign exchange flows to enable the SBV to stabilize the ER
- 25 October 1991: Decision 337/HDBT to tighten control over the use of foreign exchange
- August and November 1991: Establishment of foreign exchange transaction floors in Ho Chi Minh City and Hanoi. OERs were set based on auction in foreign exchange floors where the SBV played a dominant role, by buying or selling large amounts of foreign exchange.
- At the end of 1991: commercial banks were allowed to set their own ERs within a range which was 0.5% higher or lower than the announced OERs.

1992:

- 7 September 1992: Decision 192 192/NH/QD restricted foreign exchange in borrowing from abroad and lending to domestic businesses (followed by Direction 08/CT-NH, 9 October, 1992)
- 9 September 1992: Decision 175 –QD – NH restricted foreign exchange transfer through border entrance and exit controls

1994:

- 20 September, 1994: Decision 203/QD-NH to replace two foreign exchange floors with an inter-bank foreign exchange market in which the SBV still remained influential as the “last lender and last buyer” of foreign exchange
- October, 1994: Decision 396/QD-TTg to limit foreign exchange transactions by domestic sectors (OERs were set by the SBV based on interbank rates. The ER band within which commercial banks set their own ERs remained narrow at (+/-) 0.5% around the OER)
- Since February 1995: Decision No 48-QD/NH7 by the SBV to allow the overseas Vietnamese’s remittances to be kept in foreign currency bank accounts or in the form of foreign currency savings and to be withdrawn in foreign currencies or exchanged into VND.

1996:

- November, 1996: tax on overseas Vietnamese’ remittances was abolished. Interest rates on Vietnam dong were gradually lowered to reduce conversion of US dollars into VND. The ER band was widened, from 0.5% to 1%.

1997:

- February 1997: The ER band was widened continuously, from 1% to 5%
- Mid 1997, the SBV set strict limit on the amount of deferred L/C and tightened the controls over commercial banks’ LC guaranteeing. To import restricted goods, deposit equivalent to 80 percent of each L/C was required instead of 0-30 percent previously
- 13 October, 1997: The ER band was widened from 5% to 10% ()

1998:

- 16 February 1998: Devaluation of VND under pressure of falling foreign exchange reserves and increases in BOP deficit, from VND 11,175/USD to VND 11,800/USD
- 7 August 1998: Devaluation of VND 12,998/USD (band was narrowed to 7%)

1999:

- 26 February 1999: Decision 65/1999/QD-NHNN to require ER be based on announced average interbank ERs of the previous working day, but the band has been tightened remarkably to 0.1%
- August 1999: Decision 170/1999/QD-TTg to (officially) encourage private foreign exchange transfer from abroad.
- 19 August 1999: Decision No.170/1999/QD-TTg to encourage and create favorable conditions for overseas Vietnamese to remit their money to Vietnam.
- Since 1999: the government has undertaken the demand-stimulus policy by expanding the public investment (mainly through the SOEs to offset a decrease in FDI) and easing monetary

policy. The SBV loosened the monetary policy through lowering the lending ceiling rates five times, the refinancing rate four times and the discount rate three times during 1999 and the first half of 2000.

2006:

All official interest rates (basic, refinancing, and discount rates) were kept unchanged since the early 2006 until recently.

2007:

- January 2007: the trading band of the VND/USD was widened from $\pm 0.25\%$ to only $\pm 0.5\%$
- In 2007: foreign exchange reserves were quickly built up (from USD 11.5 billion in 2006 to USD 23 billion by the end of 2007). SBV only attempted to sterilize the excess liquidity through the OMO and the increased reserve requirements in the second half of 2007. Sterilization was costly and ineffective.
- Since June 2007: the SBV has raised its reserve requirements. For VND deposits under 12 months, the compulsory reserve rate increased from 5% to 10%; for VND deposits between 12 and under 24 months, from 2% to 4%. Correspondingly, rates for foreign currency deposits are from 8% to 10% and from 2% to 4%.
- Dec 2007: the trading band was widened to $\pm 0.75\%$

2008:

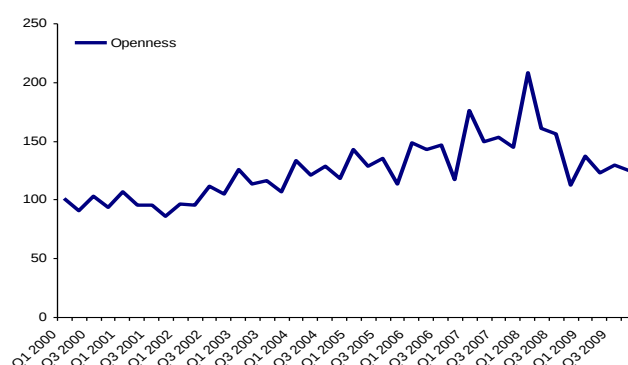
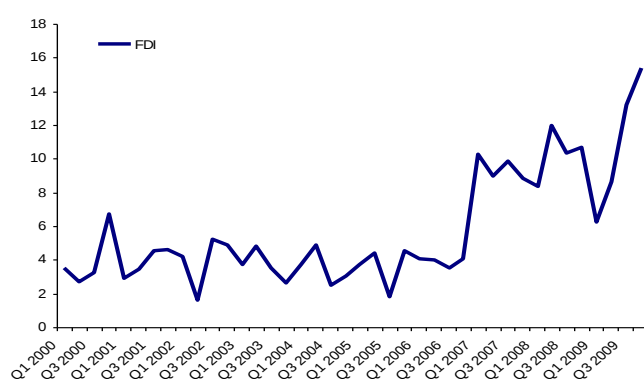
- January 2008: lending restrictions for stock investment changed from 3% of total loans outstanding to 20% of charter capital
- Since 1 February 2008: the rates of compulsory reserve requirements have been raised to 11% (from 10%) for VND and foreign currency deposits under 12 months. All official interest rates were increased (from 8.25% to 8.75% for the basic rate). All official interest rates have been increased, from 6.5% to 7.5% for the refinancing rate, from 4.5% to 6.0% for the discount rate, and from 8.25% to 8.75% for the basic rate
- In the second week of February 2008: the SBV decided to issue by 17 March 2008 365-day-bills worth VND 20,300 billion with a coupon of 7.8% and requested a compulsory purchase by 41 commercial banks.
- February – June 2008: base interest rate was brought up from 8.25% to 14% to cope with the inflation, pushing the deposit rates and lending rates of commercial banks up to their peaks at 17-18% and 20-21% respectively in August-early September.
- March 2008: the exchange rate management was relaxed by widening the trading band for USD/VND from $\pm 0.75\%$ to $\pm 1\%$
- April 17, 2008: Resolution No.10/2008/NQ-CP detailing measures to restrain inflation, stabilize macro economy and ensure social security and sustainable growth. The government carried out a tight fiscal policy with different measures such as (i) cutting down public expenditure to further reduce budget deficit; (ii) reducing public investment, especially investments of state-owned groups and enterprises; and (iii) giving priority to investment in economic sectors. Inefficient public investment projects have been cancelled while new projects were postponed.
- 27 June 2008: the band of exchange rate increased to 2% from 1%.
- July 2008: the reserve requirement level was lowered by 1 percentage point for VND and 2 percentage points for foreign currencies.

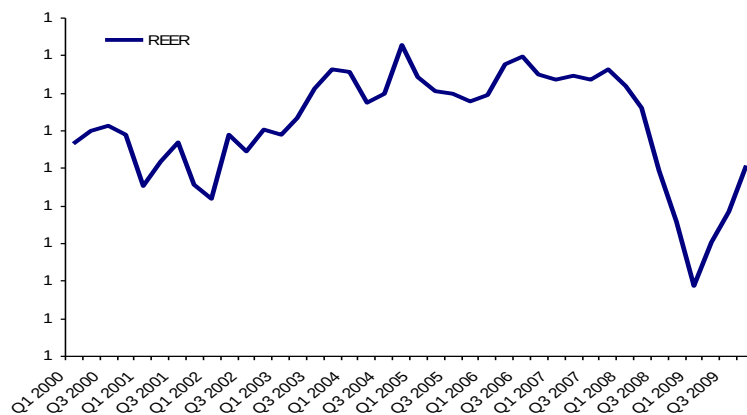
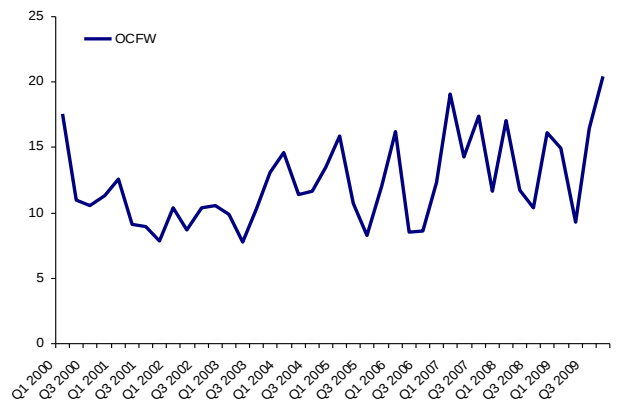
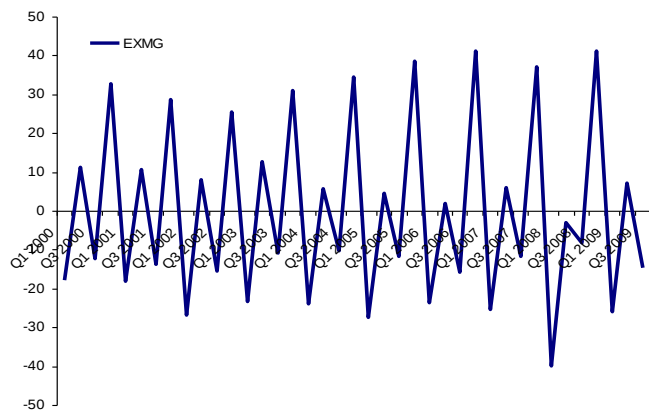
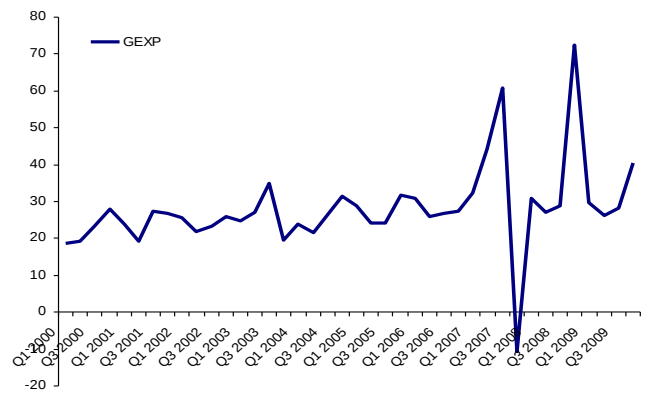
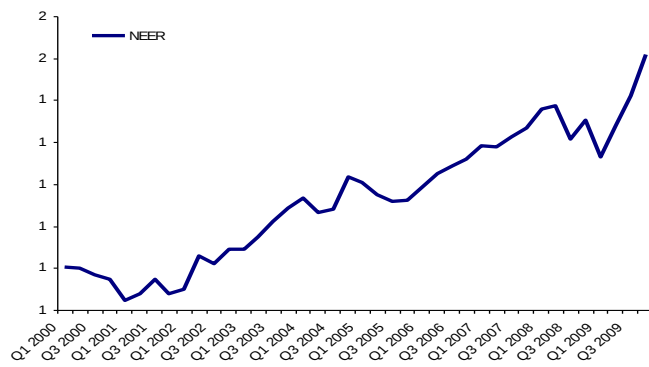
- September 2008: at the ease of inflation, SBV increased the interest rate of required reserve capital by commercial banks from 3.6% to 5% to provide the room for reducing lending rates.
- November 2008: the band increased to 3 percent from 2%.
- 11 December 2008: Resolution 30/2008/NQ-CP on urgent measures to deal with the economic recession, maintain economic growth and ensure social security. On fiscal policy, the government announced several measures to support SMEs in Vietnam. For example, SMEs may benefit from (i) 30% Corporate Income Tax (CIT) payable deduction; (ii) an extension of up to 9 months for the deadline of submission of the tax payables of 2009; and (iii) a temporary refund of 90% input Value Added Tax (VAT) for exported goods without justifiable payment documents.
- December 2008: the Vietnamese government has announced a fiscal stimulus package to compensate for the effects of the global economic recession. The total value of the stimulus package is about US\$6 billion (VND 100 trillion), accounting for 6.8% of the GDP.

2009

- 1 February 2009: base interest rate was cut down to 7%.
- 1 March 2009: SBV reduced the required reserve ratio with respect to VND deposits (demand deposits and savings deposits) from 5% to 3%. Ratio for above-12-months deposits was 1%.
- 24 March 2009: the band was extended to 5% from 3%.
- 26 November 2009: the interbank exchange rate band increased by 5.44% (at the same time, the US/VND exchange band was narrowed to 3% from 5%), thus increasing the ceiling of the exchange rate by 3.44% (at 18,500 VND per USD).
- 1 December 2009: base interest rate increased from 7% to 8% (recapitalization interest rate from 7% to 8%, and discount rate from 5% to 6%). The aim was to control the quality of credits by commercial banks and match with the exchange rate policy.

Appendix 2: Fluctuation in variables





Appendix 3: Unit Root Test (Augmented Dickey Fuller Test) Results

Variables	Level		First Difference	
	ADF statistics	P-values	ADF statistics	P-values
REER	-1.65	0.72	-4.82	0.01 [*]
FDI	-2.72	0.29	-7.82	0.01 [*]
OCFW	-3.78	0.03		
EXMG	-14.81	0.01 [*]		
GEXP	-2.00	0.57	-5.87	0.01 [*]
NEER	-3.14	0.13	-6.22	0.01 [*]
OPEN	-2.02	0.56	-12.23	0.01 [*]
OPEN(-1)	-1.99	0.57	-4.95	0.01 [*]

Note (^{*}): real p-value < 0.01

Appendix 4: Other diagnostic tests

We carry out several diagnostic examinations:

- 1) The Breush-Godfrey LM-test is used, and we conclude that the null hypothesis is not rejected at statistical significance level of 1%.

F-statistic	1.807094	Prob. F(2,28)	0.1828
Obs*R-squared	4.344224	Prob. Chi-Square(2)	0.1139

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 11/02/10 Time: 22:48

Sample: 2000Q3 2009Q4

Included observations: 38

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.001143	0.013296	0.085954	0.9321
D(FDI)	-0.000233	0.001492	-0.155838	0.8773
OCFW	-7.03E-05	0.001099	-0.064012	0.9494
EXMG	0.000154	0.000333	0.461413	0.6481
D(GEXP)	-3.76E-05	0.000180	-0.208372	0.8364
D(NER)	-0.034800	0.084991	-0.409452	0.6853
D(OPEN)	4.43E-05	0.000250	0.176687	0.8610
D(OPEN(-1))	0.000142	0.000216	0.660190	0.5145
RESID(-1)	0.364658	0.200924	1.814908	0.0803
RESID(-2)	-0.282862	0.230439	-1.227495	0.2299
R-squared	0.114322	Mean dependent var	-1.73E-18	
Adjusted R-squared	-0.170361	S.D. dependent var	0.016216	
S.E. of regression	0.017543	Akaike info criterion	-5.027336	
Sum squared resid	0.008618	Schwarz criterion	-4.596392	
Log likelihood	105.5194	Hannan-Quinn criter.	-4.874010	
F-statistic	0.401576	Durbin-Watson stat	1.889237	
Prob(F-statistic)	0.923623			

2) The Breusch-Pagan test is used, and we conclude that the null hypothesis is not rejected at statistical significance level of 1%.

F-statistic	1.153042	Prob. F(7,30)	0.3581
Obs*R-squared	8.056178	Prob. Chi-Square(7)	0.3277
Scaled explained SS	5.729943	Prob. Chi-Square(7)	0.5716

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

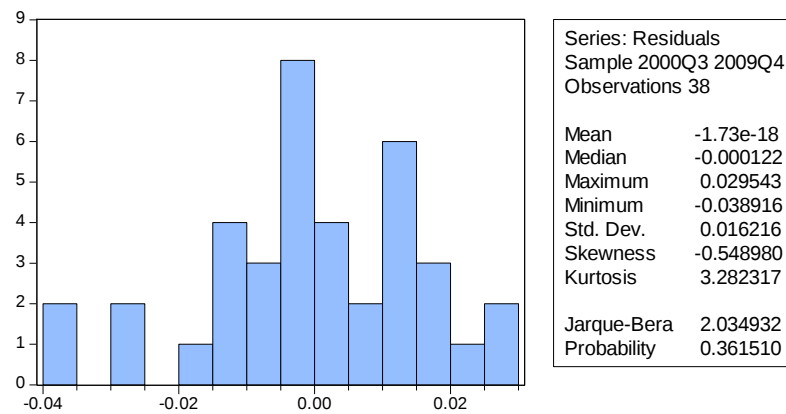
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Sample: 2000Q3 2009Q4

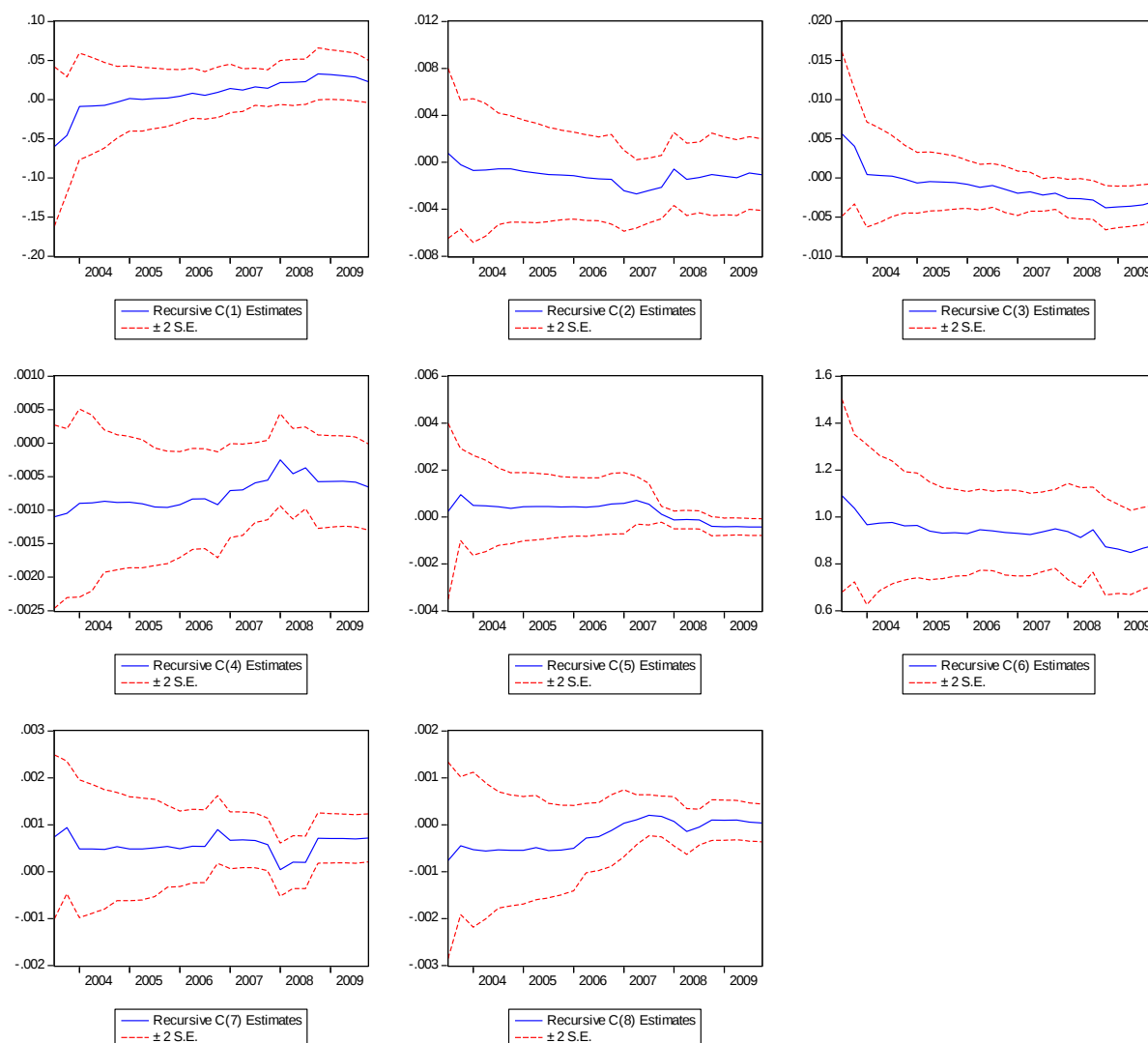
Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.63E-05	0.000292	-0.227054	0.8219
D(FDI)	-4.47E-05	3.28E-05	-1.363106	0.1830
OCFW	2.69E-05	2.41E-05	1.115469	0.2735
EXMG	1.26E-06	6.91E-06	0.183034	0.8560
D(GEXP)	7.62E-06	3.85E-06	1.980186	0.0569
D(NER)	0.000344	0.001828	0.188425	0.8518
D(OPEN)	-3.08E-06	5.49E-06	-0.560458	0.5793
D(OPEN(-1))	2.44E-06	4.33E-06	0.563596	0.5772
R-squared	0.212005	Mean dependent var	0.000256	
Adjusted R-squared	0.028139	S.D. dependent var	0.000392	
S.E. of regression	0.000386	Akaike info criterion	-12.69440	
Sum squared resid	4.48E-06	Schwarz criterion	-12.34964	
Log likelihood	249.1936	Hannan-Quinn criter.	-12.57174	
F-statistic	1.153042	Durbin-Watson stat	1.576279	
Prob(F-statistic)	0.358119			

3) The null hypothesis of normality is not rejected at statistical significance level of 1%.



4) Because the Vietnamese economy has been changing during the 2000-2009 period, we test stability of the estimated coefficients. All the estimated coefficients are stable.



Chapter 4

Dollarization and the Effectiveness of Monetary Policy in Cambodia

Siphat Lim¹

National Bank of Cambodia

The level of dollarization in Cambodia is very high, but it remains stable bounded in the range between 94 and 95 percent from 1995 to 2010, as measured by DR4. However, the Granger-causality test between dollarization and inflation revealed that both variables do not explain each other. Then, inflation is not the problem of dollarization in the last economic stage of Cambodia. Moreover, the USD circulation as measured by Kalman filter was large, 2.1 billion USD in 1995 and has increased to 13.64 billion USD in 2010. Therefore, increased public confidence toward banking system would help reduce cash USD in circulation. Moreover, highly degree of dollarization with macroeconomic complexity in Cambodia has put a lot pressure on monetary authority in implementing monetary policy since exchange rate stability is believed to achieve price stability. The impact of exchange rate change on price level exhibits cyclical pattern while money supply growth has a positive shock on price level. Indeed, the impact of money supply growth on exchange rate also exhibits cyclical pattern as indicated by SVAR. Thus, exchange rate stability does not clearly lead to price stability, but changing in money supply would significantly affect price.

Keywords: Dollarization, Monetary Policy, Granger Causality, Kalman Filter and SVAR.

¹ I would like to express my sincere thank to Dr. Bhanupong Nidhiprabha, Dr. Kulpatra Sirodorn and Dr. Phongthorn Wrasai for their valuable comments on my paper. My special thanks go to Thailand Research Fund (TRF) for funding support on this research.

I. Introduction

1. Background

Cambodia firstly experienced a massive capital inflow of 1.7 billion of U.S. dollar in the early 1990s by the United Nations Transitional Authority in Cambodia (UNTAC) in order to prepare for national election which had never happened since a long history of civil strife. Because of the fragile banking system and regulation, the U.S. dollar became the de facto legal tender in Cambodia.

During the 1990s, due to the ineffectiveness of tax collection system, the revenue of the government was relied mainly on the state-owned enterprises. Large portion of the government revenue was spent on the payroll to the civil servants, especially the military forces. The imbalances between expenditures and incomes and the consequence of government deficit took place. The best and easiest way for the government to fulfill the deficit at that time was to print more money, seigniorage. The money supply growth was 240.9 percent in 1990, 28.6 percent in 1991, 214 percent in 1992, and 34.4 percent in 1993, whereas the exchange rate depreciated against U.S. dollar nearly 500 percent in the period of three years by increasing from 426.25 Riels per U.S. dollar in 1990 to 2,689 Riels per U.S. dollar in 1993. The expansionary monetary policy implemented by the government heightened inflation. The change of consumer price index was 57 percent in 1990, 121 percent in 1991, and 177 percent in 1992; and for the first six months of 1993 prices further increased by 80 percent (Ward, 1995).

After the first election in 1993, moving from a planned to a free market economy along with the shift from a socialist to a democracy regime, the Royal Government of Cambodia (RGC) started to restore macroeconomic stability as a mechanism to facilitate economic growth and alleviate poverty. With the assisting from the foreign donor countries and the restructuring of government system by reducing the large amount of employments of the government into the real term (mostly the military sectors), establishing legal frameworks, improving tax collection system and budget management, creating and improving banking system and regulation, and increasing the quality of human resource development; in 1994, as a starting point, Cambodia had a macroeconomic stability with the inflation rate not more than 6 percent.

Since 1990, a lot of capitals have flowed in Cambodia by foreign investors who were the main source of economic growth. As estimated by the World Investment Report from the United Nations Conference on Trade and Development (UNCTAD), the foreign direct investment (FDI) in Cambodia has increased from 38 million of U.S. dollar in 1990 to 1.6 billion of U.S. dollar in 2000, and has increased to 3.5 billion of U.S. dollar in 2007 (ADB, 2008). During that period, the GDP growth rate was 6.5 percent in 1995, but declined to 5 percent in 1998 because of political turmoil.

After the second election in 1998, the coalition government was created which came up with a political stability as a key factor to increase the investors' confident. The economic growth was 12.6 percent in 1999 and reached 13.3 percent in 2005. These high growths reflected the remunerations of economic and political stability after the third election in 2003. Because of the

impact of the Global Financial Crisis (GFC), the economic growth rate declined to 6.7 percent after the fourth election in 2008.

1.2. Objective of the Project

The main purposes of this study are reviewing the level of dollarization, the financial sectors in Cambodia, constructing econometric method for estimating cash U.S. dollar in circulation outside banks and evaluating the effective of monetary policy in Cambodia

1.3. Significance of the Research Question

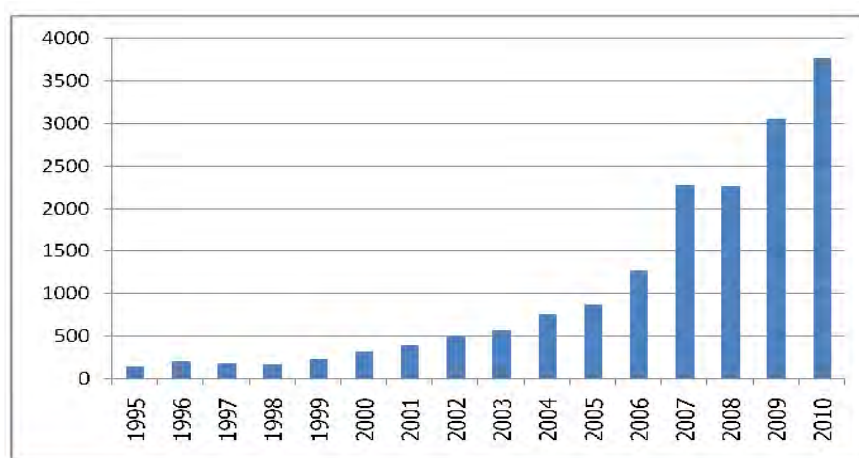
What policies are suitable for the National Bank of Cambodia (NBC) and Royal Government of Cambodia to implement in order to achieve a sustainable economic growth and stability?

II. Literature Reviews

1. Dollarization in Cambodia

Cambodia has become partially dollarize since the mid 1993 owing to the lacked of public confidence toward domestic currency due to high inflation and the unprepared of the National Bank of Cambodia (NBC) to cope with the flooded of 1.7 billion of U.S. dollar by the UNTAC. From the next one and haft decade because of the large inflow of capital from investors and foreign donors, the foreign currency deposits increased from 144.72 millions of U.S. dollar in 1995 to 3,771 million of U.S. dollar in 2010. Substantial increased of foreign currency deposits in the banking system indicated that the confident level of public to the banking sector in Cambodia has increased.

Figure 4.1: Foreign Currency Deposits in Cambodia: 1995-2010 (Million of U.S. dollar)



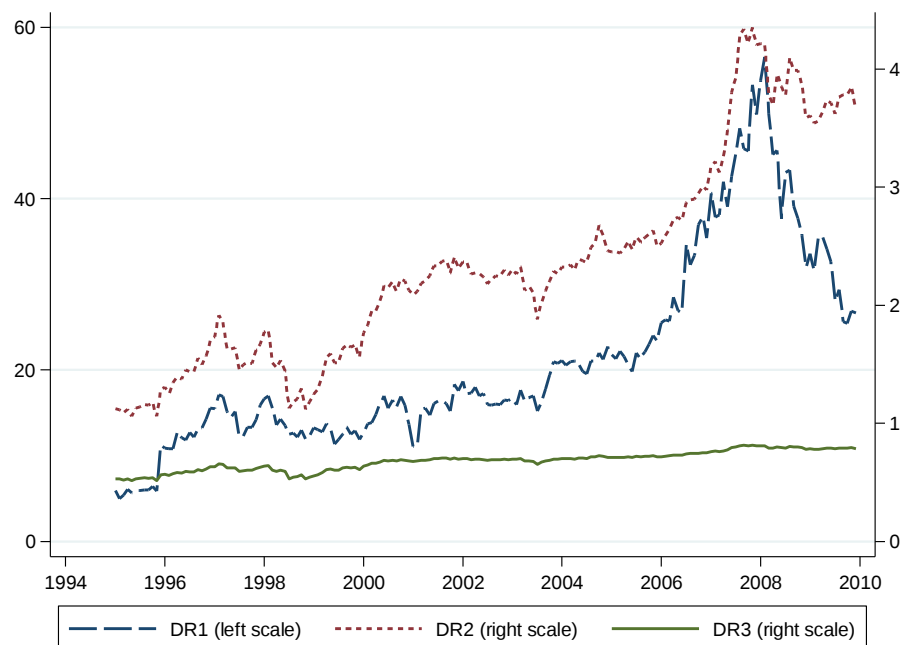
Source: National Bank of Cambodia.

The level of dollarization can be measured by three common dollarization ratios (DR) which is found by Vetlov (2001):

- DR₁: residents' foreign currency deposits to domestic currency deposits;
- DR₂: residents' foreign currency deposits to the sum of residents' domestic currency deposits and domestic currency in circulation; and
- DR₃: residents' foreign currency deposits to broad money (M2).

As measure by DR₃ the degree of dollarization in Cambodia rose from 52.86 percent in January 1995 to 69.38 percent in December 2003. From 2004 to 2006, the degree of dollarization remained stable fluctuated between 70 percent and 74 percent. But in January 2008, the degree of dollarization rose up to 80.84 percent in 2010. The majority of the broad money consists mainly of foreign currency deposits which sometime reach up to 80 percent.

Figure 4.2: Dollarization Ratios in Cambodia: 1995-2010



Source: National Bank of Cambodia.

Cambodia has experienced dollarization for almost two decades. The costs and benefits of dollarization need to be considered. The main cost of dollarization is forgone seignorage which means that the National Bank of Cambodia as the monetary authority loses revenue from the right to issue a legal tender currency. Another importance cost is the ineffectiveness of the implementation of the monetary policy which the National Bank of Cambodia cannot play a role as lender of a last resort owing to most of the bank holds cash U.S. dollar. However, the interest rate in the financial market cannot be effectively controlled by the monetary authority. The

interest rates on deposits and loans in the banking system are determined freely by the market mechanism.

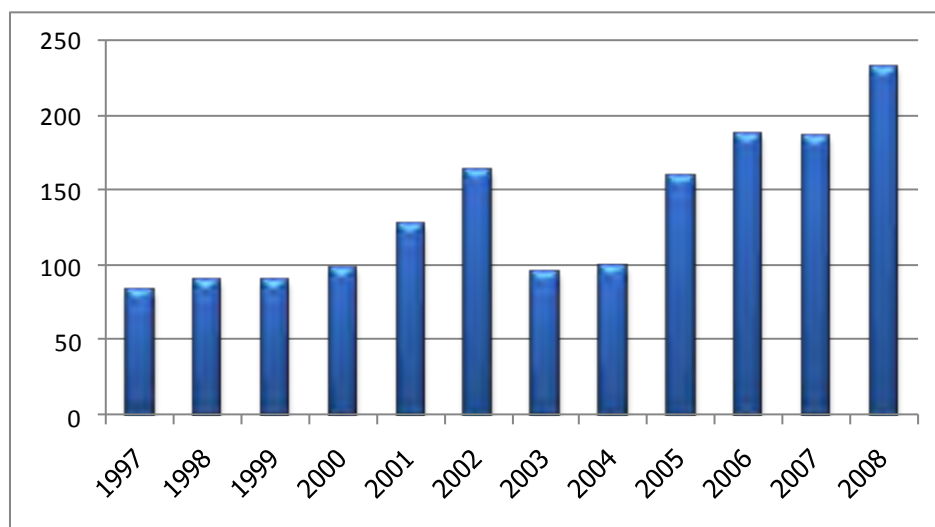
The dollarization is also providing some benefits to Cambodia. Firstly, protecting the investor from the exchange rate risk and economic spillover due to the bulk of trade transactions are payment in the U.S. dollars. Secondly, as the assets substitution, the dollarization offers another choice to the Cambodian people to switch from holding precious metal to the U.S. dollar. Thirdly, encouraging deposits and lending in U.S. dollar in the banking system.

De-dollarization is one of the policy strategies of the RGC. Cambodia became partially dollarized because of experience of hyperinflation which caused the people preferred to hold foreign currency more than domestic currency. To reduce the level of dollarization, the first thing that the central banks need to do is price stability. Currently, the price level in Cambodia is stable which reflected that holding Riel is not difference from holding foreign currency.

Of course, the dollarization limited the National Bank of Cambodia in the implementation of the monetary policy; therefore, the RGC relies mainly on the fiscal policy which is conducted by the Ministry of Economics and Finance (MEF) in order to fight with dollarization. To achieve this goal, the MEF and the NBC work closely together. After the restructuring of the government budget system in the mid 2005 the National Treasury of Cambodia and the MEF are responsible for the government budget planning, but the cash flow transactions are managed by the National Bank of Cambodia. This process is counted as one of the de-dollarization strategy of the royal government of Cambodia as the cash bills collected from the government revenue, for example taxes, the National Bank of Cambodia can control both bad and good quality banknotes. The bad quality banknotes were destroyed and replaced by reprinting the new one. The new printed banknotes and the good quality banknotes will flow out to the public when the government expenditures take place. As a result, when the domestic banknotes are nice and clean all the time, the Cambodian people should prefer to hold more domestic currency than foreign currencies.

As a developing country, since 1997, the government of Cambodia has received grants from the foreign donor countries in order to develop and reduce the level of poverty in the country. The amounts of the grants have been included in the government budgets which are stored at the National Bank of Cambodia. Thus, the international reserve of the NBC increased substantially.

Figure 4.3: Grants from Foreign Donors to Cambodia (Million of U.S. dollar): 1997-2008



Source: Asian Development Bank.

Even though most of the government revenues are in U.S. dollar, to de-dollarize as well as to encourage the people in using domestic currency, most of the government budgets were executed in domestic currency which is Riels. The government expenditures in U.S. dollar were used mostly for the international transactions. At the same time, the independent institutions such as Water Department of Cambodia and Electricity of Cambodia are also encouraged the people to pay the bills in Riels instead of U.S. dollar.

2. Financial Sectors in Cambodia

In early 1981, the Cambodia banking system was classified as a monobank. The People's Bank of Kampuchea played a role as the monetary authority as well as the commercial bank. There were provincial and municipal branches of the People's Bank of Kampuchea all over the country which functioned as the treasurer of the government and provided credit to the public. In 1991, the first commercial bank, Cambodia Commercial Bank, was created in the form of Joint Venture Bank for attracting investors and serving the activity of the UNTAC.

On January 30th, 1992, the National Assembly approved the Law on the Change of Organization's name and duty of the central bank of Cambodia, from the People's Bank of Kampuchea to the National Bank of Cambodia. According to the Law on the organization and Conduct of the National Bank of Cambodia which was approved by the National Assembly on January 26th, 1996, "the principle mission of the Central Bank is to determine and direct the monetary policy aimed at maintaining price stability in order to facilitate economic development within the framework of the Kingdom's economic and financial policy." One year after the approval of the Law on the organization and Conduct of the National Bank of Cambodia, on

August 22nd, 1997, the National Assembly approved another law which was the Law on Foreign Exchange.

Since 1993, Cambodia has adopted managed floating exchange rate system which consisted of two rates, official exchange rate and market exchange rate. The market exchange rate is determined by the market mechanism. The National Bank of Cambodia accepts the market forces as a catalyst, thus a parallel market exchange rate existence of a privately based foreign exchange market. However, the National Bank of Cambodia quotes daily official exchange rates which apply mainly to the external transactions conducted by the government and state-owned enterprises. In addition, the official exchange rate is generally used by the banks and government institutions to record transactions in foreign currency for accounting purposes while the parallel market exchange rate is used for external transaction by the public.

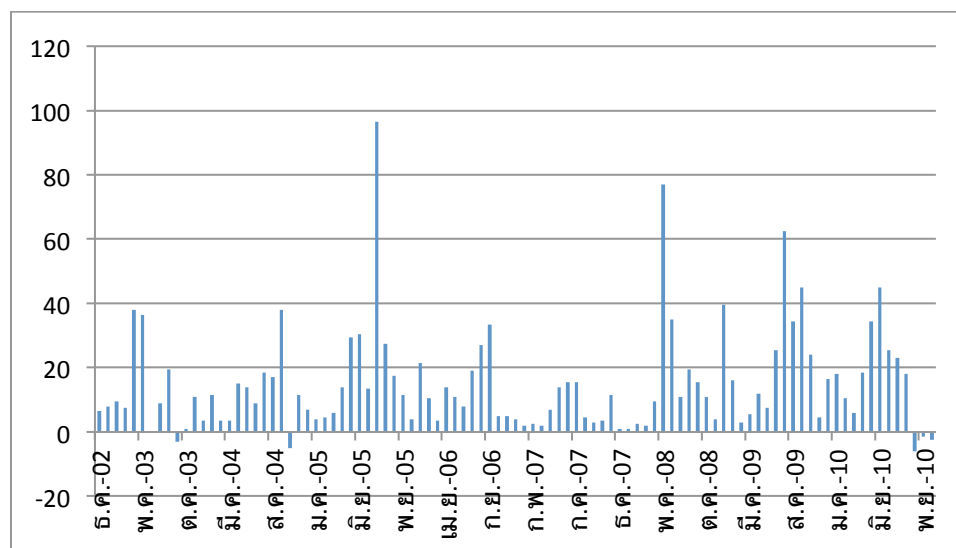
Figure 4.4: Cambodia's Exchange Rates (Riels/U.S. Dollar): 2002-2010



Source: National Bank of Cambodia.

In earlier periods, the spread between the two exchange rates was initially relatively wide (sometime the parallel rate exceed 30%). With the commitment of the National Bank of Cambodia, the spread between the official exchange rate and the market exchange rate has been narrowed down to not more than plus or minus one percent.

Figure 4.5: Spread Between Market and Official Rate: 2002-2010



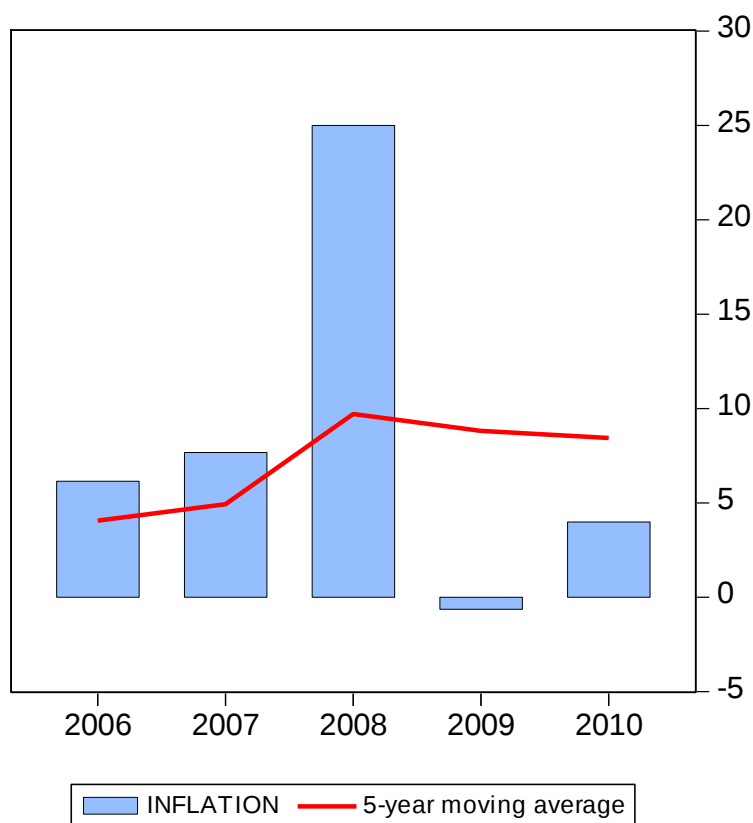
Source: National Bank of Cambodia.

Since 1989, the banking system in Cambodia has switched from a monobank to a two-tiered banking system—the National Bank of Cambodia and the private banks. The private banks are classified as Commercial Banks, Specialized Banks, and Micro Finance Institutions (MFIs).

The National Bank of Cambodia is functioned as the monetary authority of the country which plays a very important role in conducting the monetary policy in order to achieve price stability and facilitate the economic growth. In general, three main monetary policy tools are used by most of the central bank in the world which are Open Market Operation (OMO), Reserve Requirement, and Discount Rate.

With the absence of government security and as a dollarized economy, the NBC mainly controls the amount of money supply directly by buying and selling U.S. dollar in the domestic foreign exchange market. This instrument is called “U.S. dollar auction” which is similar to the OMO. If the NBC know that the exchange rate in the domestic foreign exchange market, Riels per US dollar highly fluctuate from the target which mean depreciated too much, the NBC would sell the US dollars to the money changers in order to absorb Khmer Riels into the central bank so that the exchange rate should appreciate back to the previous level.

Figure 4.6: Inflation in Cambodia: 2006-2010



Source: National Institute of Statistics.

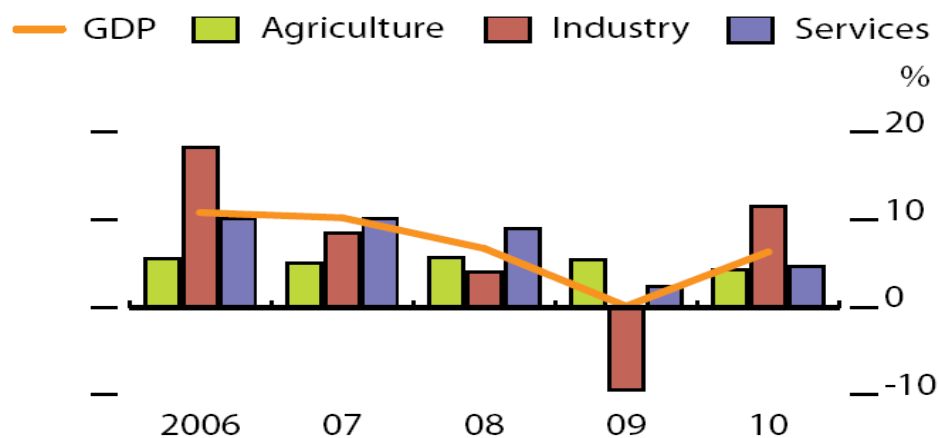
This process is proceeded backward if the exchange rate in the domestic foreign exchange market is highly appreciate. It is so-called unsterilized foreign exchange intervention because both international reserve and money supply circulated are affected (Mishkin, 2007).

The implementation of monetary by the National Bank of Cambodia aims to achieve price stability which could capture a sustainable economic growth. Currently, there are three sectors—industry, tourism and agriculture—which were the main contributor to GDP growth in Cambodia. The core part of industry sector is garment production. The Cambodian garment export relied mainly on the United States (US) and European Union (EU) markets which had a hard hit during the crisis in 2008 because of the declined demand of garment in the region. After the recovery of both US and EU economies, the Cambodian industry sector was expanding by 11.6 percent in 2010.

However, the tourism which is classified as service sector has also bounced back by about 16 percent to 2.5 million and tourism receipts by 14.5 percent to USD 1.78 billion. The sharpest gains were in arrival from Asia (Viet Nam, Republic of Korea and People's Republic of China). This rebound in tourism contributes to estimated growth of 4.3 percent of services.

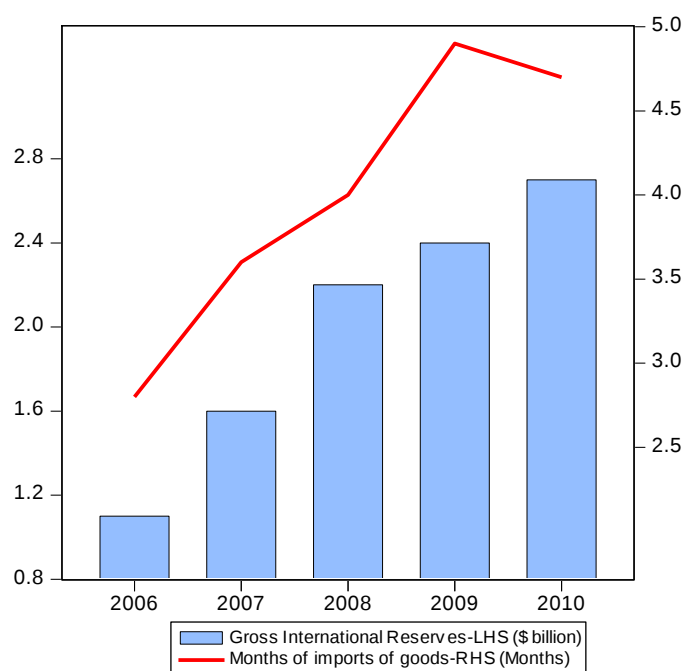
The recently launching of rice plan by Royal Government of Cambodia, including better access by farmers to fertilizers and high quality of seeds have provided a lot of benefit to the farmers (80 percent of Cambodian population are farmers) and poor people in the rural area. In 2010, the paddy rice output rose by about 5 percent to 7.9 million tons. However, Cambodian milled rice exports also received preferential access to the EU market. Consequently, milled rice exports to that market rose by 228% to 10,495 tons in the first 2 months of 2011 from the prior-year period. With the great potential growth of rice exports, the transportation and processing fees of rice export need to be reduced through improving infrastructure and land management, reducing production cost and implementing anti corruption law strictly which could reduce unofficial fees and cost of doing business, ADB Report (2010).

Figure 4.7: Cambodia: GDP Growth, 2006-2010



Source: Asian Development Bank.

Figure 4.8: Cambodia: Gross International Reserve, 2006-2010



Source: National Bank of Cambodia.

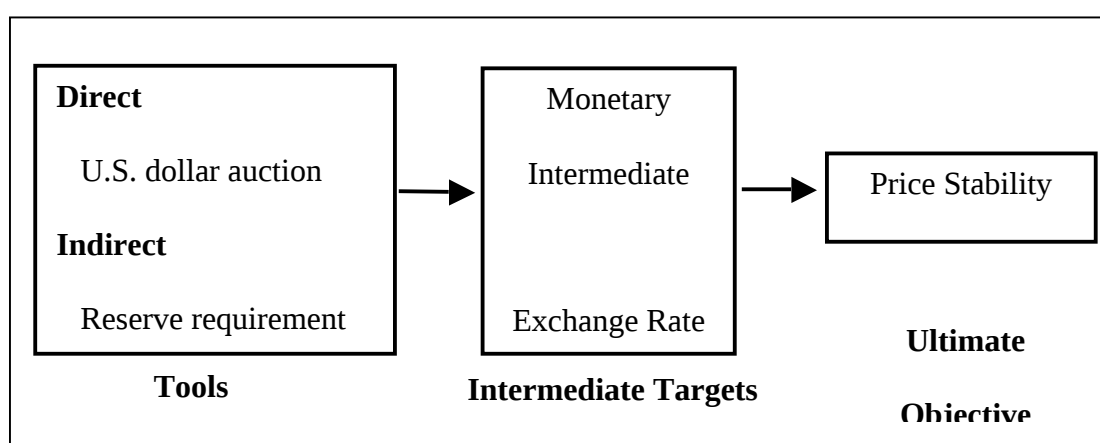
The National Bank of Cambodia can control the amount of money supply in the market indirectly through reserve requirement, and refinancing rate which is generally known as discount rate. The reserve requirement is the rate of total deposits, both Riels and foreign currencies, which banks need to keep as a reserve ratio after providing credits to customers, whereas the refinancing rate is the rate which the NBC lend to the banks as the last resort. Both rates are not fixed; it is flexible under the economic situation.

The financial institutions, banks and MFIs, subject to reserve requirements are required to hold sufficient eligible assets, over the maintenance period, with the National Bank of Cambodia, to effectively support safe and sound operational liquidity management. Assets eligible for maintenance of reserves required are limited to daily balances held at the National Bank of Cambodia on the Institution's reserve requirement and clearing accounts, for Riel and foreign currencies (U.S. dollar, EURO, Thai Baht, etc.) required average reserve holdings. The minimum reserved requirement rates are 8 percent for Riel and 12 percent for foreign currencies on deposits and other borrowings base of banks and MFIs which are required to maintaining for the period of 14 calendar days at the National Bank of Cambodia. Cash on hand is not considered an

eligible reserve asset to ensure compliance with minimum reserve requirement holdings (Prakas² of the NBC, 2009).

When the NBC applies reserve requirement and refinancing rate instruments, it should achieve the intermediate targets which are monetary and exchange rate targets. In practice, the National Bank of Cambodia losses one position as a lender of a last resort to the banking system owing to the resistance to dollarize, hence the refinancing rate is rarely used or completely useless under the current economic situation in Cambodia.

Figure 4.9: Monetary Policy Strategies of the National Bank of Cambodia



Source: Constructed by author.

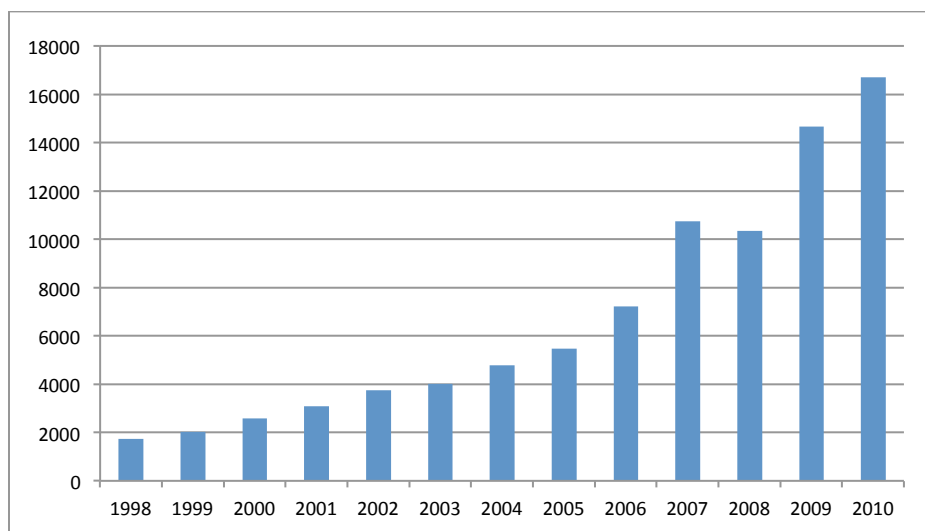
The conduct of the monetary policy in Cambodia is weak due to a strongly impact of the dollarization. As the monetary authority, the National Bank of Cambodia tries to strengthen banking system in order to increase the credit and public confidence.

To strengthen banking system, the National Bank of Cambodia is strictly control banks and MFIs activities. On-site and off-site supervision of the Supervision Department of the National Bank of Cambodia are applied to all banks and financial institutions. Furthermore, in order to minimize liquidity risk in the banking system, the National Bank of Cambodia offers some facilities, which benefit to all banks and financial institutions; such as fixed deposits facility, overdraft facility, and currency swap facility. For liquidity management, the National Bank of Cambodia offers fixed deposits to financial institutions for the maturities of three, six, and twelve months. However, in case of liquidity shortage, the NBC also grants overdraft to banks and financial institutions (Prakas, 2009). In addition, to encourage agricultural loan in the rural area by micro finance institutions, the NBC offers currency swap by exchange Riel for U.S. dollar deposits.

² Regulation announcement.

Currently, there are 29 commercial banks, 7 specialized banks, and 25 micro finance institutions. In the last fifteen years, however, the net foreign assets (NFA) of the banking system increased substantially.

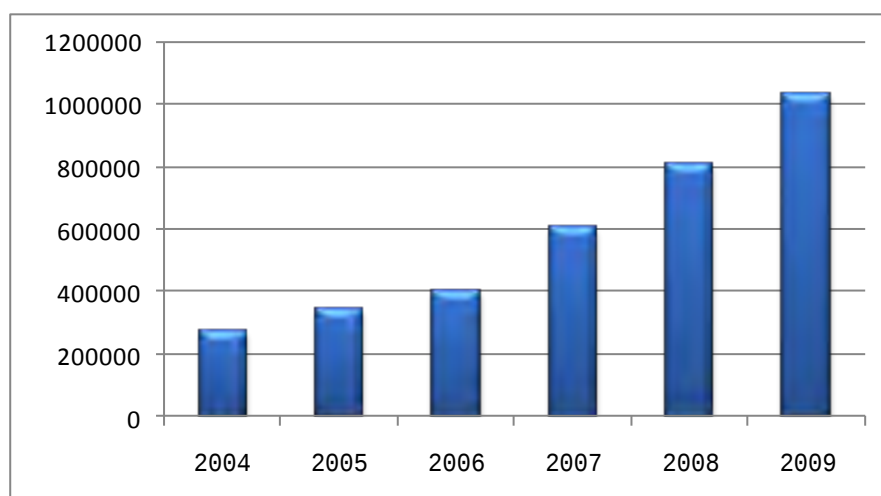
Figure 4.10: NFAs of Banking System (Million of Riels): 1998-2010



Source: National Bank of Cambodia.

Financial sectors in Cambodia consists generally banks business. With the strengthening of banking system and regulation, the public confidence on financial services has increased. There were large increase of number of depositors in banks and MFIs in the last five years. In 2004, number of depositors was 272,406 which categorized as 122,984 MFIs depositors and 149,422 banks depositors. In 2008, number of depositors in MFIs decreased to 108,788 while number of banks depositors increased to 699,987. Totally, number of depositors reached 808,775 in 2008. Moreover, the total number of depositors increased to 1,030,956 in 2009, of which 927,997 bank's depositors and 102,959 MFIs' depositors.

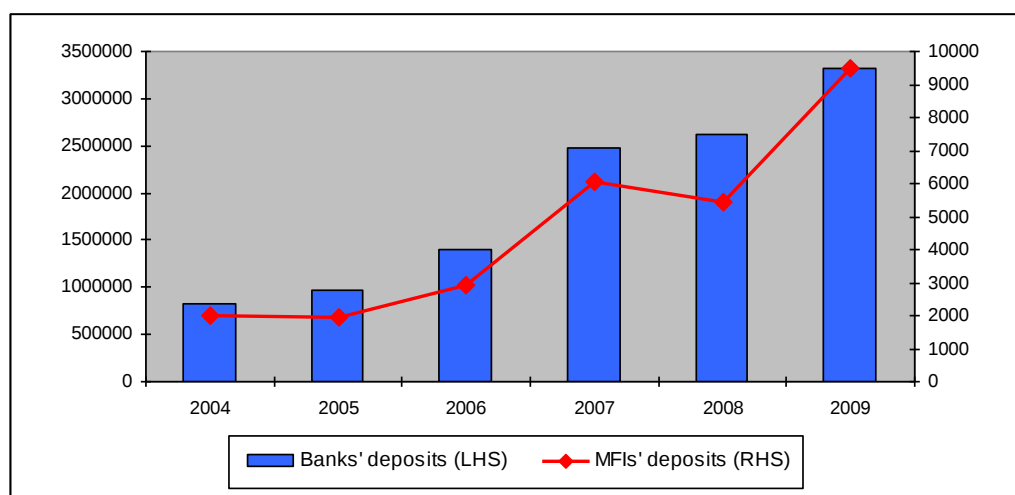
Figure 4.11: Number of Depositors in Banks and MFIs: 2004-2009



Source: National Bank of Cambodia.

Large increased of number of depositors in banks and MFIs has captured a lot of funds as a source of banks loan for investment in the country. The amounts of deposited funds critically increased particularly in banks from 2004 to 2007, but remain constant in 2008 as a result of GFC. However, the amounts of deposit started to increase again in 2009.

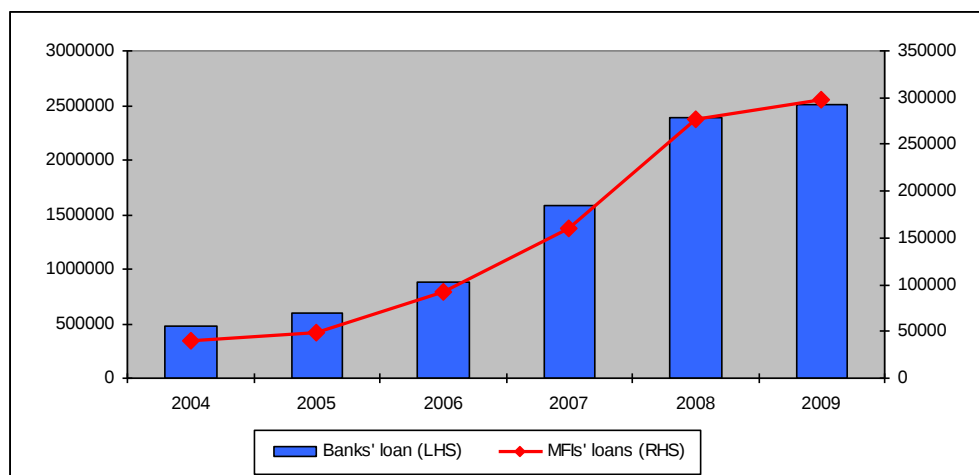
Figure 4.12: Deposit with Banks and MFIs (in thousand USD): 2004-2009



Source: National Bank of Cambodia.

To facilitate economic growth, the royal government of Cambodia relies mainly on the micro finance institutions (MFIs) which can provide credit and financial services to the people all over the country especially to the poor people in rural area.

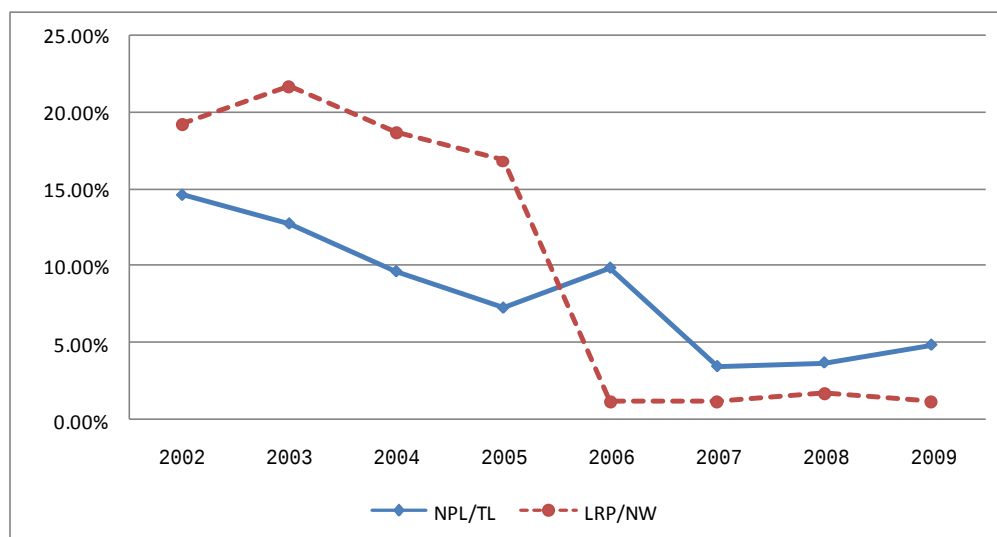
Figure 4.13: Banks and MFIs Loans (in thousands of USD): 2004-2009



Source: National Bank of Cambodia.

As response to the growth of banks and MFIs activities, non-performing loans (NPL) to total liabilities (TL) declined from 14.63 percent in 2002 to 7.26 percent in 2005, but increased to 9.87 percent in 2006 then declined to 3.44 percent in 2007 and slightly increased to 3.68 percent in 2008. At the same time, the ratio of loans to related parties (LRP) to net worth (NW) has declined from 21.68 percent in 2003 to 1.17 percent in 2006, and then increased to 1.71 percent in 2008. Nevertheless, the loans to related parties to net worth decreased to 1.20% while the non-performing loans to total liabilities increased to 4.84%, in 2009.

Figure 4.14: NPL and LRP of Banks and MFIs: 2002-2009



Source: National Bank of Cambodia.

Currently, there is no securities market in Cambodia. Cambodia accepted the International Monetary Funds (IMF) obligations of Article VIII, Sections 2, 3, and 4 on January 1, 2002, and maintains an exchange system that is free of restrictions on the making of payments and transfers for current international transactions. Exports and imports of foreign banknotes are not limited but are subject to prior notification beyond \$10,000. There are no limits on resident's balances of foreign currency accounts held in domestic banks, and the deposits may be used to settle all types of domestic obligations. Exporters and importers of goods and services must make payments for their commercial transactions with the rest of the world through authorized intermediaries (IMF, 2008).

The Cambodian people expected that the interbank/money and capital markets will be opened soon in Cambodia. The establishing of financial market, interbank/money and capital markets; is counted as one of the strategic plan of the royal government of Cambodia. With the funds supported by the Asian Development Bank (ADB) and the jointed group working between the Ministry of Economics and Finance, National Bank of Cambodia, Ministry of Commerce, and other related ministries or institutions; the Financial Sector Blueprint for 2001-2011 which was known as the Financial Sector Development Strategy (FSDS) was created in 2001 as a long-term government plan in order to build and enhance financial sector in Cambodia. The long-term mission and vision of the FSDS is the government reforms. Those include legal and judiciary reform, public administration reform, and public finance reform.

The improving of liquidity in banking sector is considered as a core strategy plan of FSDS in order to diversify liquidity risk. The establishing of interbank/money market should response to the minimizing/diversifying liquidity risk. The strategic plan in constructing interbank/money markets are separated into three phases. The first phase is to create the unsecured interbank lending which is subsequently used as a foundation of money market. The second phase is to enhance the use of financial instrument such as negotiable certificate of deposit (CD), repurchase agreement, and Treasury bills. The last phase is to broaden money markets with a regulatory framework for nonfinancial issuers of money market instruments such as commercial paper. Similarly to interbank/money market, the establishing of capital market is also separated into three phases. The first phase is to create an enabling environment of capital market. The second phase is to develop the foundation and procedure related to securities trading. The last phase is to build the preparatory work (FSDS, 2001).

As a key source in implementing and achieving the strategies and goals, which are stated earlier, financial market infrastructure needs to be developed by the royal government of Cambodia. According to FSDS (2001), four main parts must be taken into consideration such as accounting and auditing system, financial information infrastructure, and financial sector safety nets.

Since created the FSDS, the royal government of Cambodia has achieved a lot of things which complied with the determined plan of FSDS. All necessary laws and regulations which related to the establishment of financial market in Cambodia have already approved by the National Assembly of Cambodia. With the achieving some progress of the long-term plan, the FSDS was updated in 2007 and came up with new version which was Financial Sector Development Strategy 2006-2015.

Table 4.1: Laws Related to Financial Sector Development in Cambodia

Law	Approval Date by NA
Anti-corruption Law	
Law on Financial Leases	May 27, 2009
Laws on Insolvency	December 08, 2007
Law on the Issuance and Trading of Non-Government Securities	September 12, 2007
Law on Anti-Money Laundering and Combating the Financial of Terrorism	April 30, 2007
Laws on Secured Transaction	April 06, 2007
Law on Government Securities	November 30, 2006
Laws on Commercial Arbitration	May 12, 2006
Law on Negotiable Instruments and Payment Transactions	October 24, 2005
Law on Commercial Enterprises	June 19, 2005
Law on Corporate Accounts, Their Audit and the Accounting Profession	May 24, 2002
Law on Insurance	June 20, 2000
Law on Banking and Financial Institution	November 18, 1999
Law on Foreign Exchange	August 22, 1997
Law on the Organization and conduct of the National Bank of Cambodia	January 26, 1996
Law on the Investment of the Kingdom of Cambodia	August 04, 1994

Source: National Assembly (NA) of Cambodia

Recently, the Security and Exchange Commission of Cambodia (SECC) has just provided provisional approvals for underwriters' licenses to at least three companies such as OSK Indochina Bank, Seoul-based Tong Yang Securities Company, and Canadia Bank, which allow them not only to buy and sell stock, but also to organize initial public offerings (IPOs). Each license for the underwriter needs to have \$9.5 million as a capital requirement, which would have restricted profitability. However, "Acleda Bank also received a stock brokerage license, which required \$1.5 million in capital and does not allow the organizing of public offerings." (The Cambodia Daily Press, August 2010). With the full set of laws and regulations and under the commitment of SECC, the Cambodia Security Exchange (CSX) is expected to open soon.

3. Dollarize and De-dollarize in Cross Countries Experiences

Dollarization mainly take place in the country which has political and economic instability especially hyperinflation such as in Liberia, Chile, Argentina, Brazil, Israel, Peru, Vietnam, and Laos. Liberia has had a dollarized economy since it was established in 1847. The Liberian people loss confident on local currency owing to poor macroeconomic management which means that the credibility of macroeconomic policies was performed weak. After a very

long period of dollarization, the Liberia government attempts to de-dollarize through market-driven dedollarization. The very power strategy to de-dollarize is the development of domestic financial market which introducing domestic currency denominated securities and reducing U.S. dollar denominated assets especially in the banking system. However, getting Liberian people to be familiar with the use of domestic currency by increasing the use of the Liberian dollar as a unit of account is also one of the crucial strategies of de-dollarize. The law requires that prices in Liberia be denominated in Liberian dollars and the Liberian dollar should be used for all accounting and financial reporting and official purposes in Liberia. The government also used some administrative force such as placing limits on U.S. dollar deposits or loans, and imposing a tax on U.S. dollar intermediation. Moreover, the improving of macroeconomic policy and prudential regulation have served Liberia well on the process of de-dollarize (Escribano, 2010).

Similar case also took place in Chile. Indexed instrument such as CPI-indexation was working well by the Chilean government to attract investor interest, but such an instrument was not working well in Argentina, Brazil, and Uruguay because of weak legal support for the indexation unit, and the difficulties in agreeing on a common indexation measure. While a clear orientation of monetary policy of the Chilean government toward price stability-through the introduction of inflation targeting but also with a clearer mandate helped reduce investor uncertainty as well as macroeconomic volatility. However, the CPI-indexation had also work well in the case of Israel. In addition, the Israeli government also had a successful experience with de-dollarize through the establishing of local currency-denominated government bonds, Plata (2010).

The market-based driving force is also working well as a policy option to de-dollarize in Vietnam because the foreign currency was function as a medium of exchange, a store of value, and a unit of account alongside the local currencies which is similar to Cambodia. In Vietnam, de-dollarization has been associated with a successful disinflation strategy. Two steps taken by Vietnam's policy makers during the 1990s were decisive. The adaptation of managed-floating exchange rate regime which allowed for exchange rate stability and the introduced a restrictive monetary policy based on targeting M2, which include foreign currency deposit (FCD), Goujon (2006).

The pass through effects from exchange rate changes to domestic prices is quite high under dollarization. The conservative fiscal and monetary policies, and active foreign direct investment (FDI) flows seem to have contributed to the solid economic performance of most dollarized economy countries. However, the insufficient data for macroeconomic analysis hamper policy operation. The Lao PDR has no quarterly data on gross domestic product (GDP), a monthly index of industrial production, monthly unemployment rates, and other important economic indicators which is similar to Cambodia except the quarterly data of GDP. In general, high frequency data on the real economy are in very short supply. On the other hand, in the absence of full control over in interest rate in Cambodia, the central bank have to employ other policy instruments such credit controls, reserve requirement ratios, and the other instruments, Jinushi (2010)

It has also been found that price increase has a positive and statistically significant response to an exchange rate shock in Argentina, the Lao PDR, and Peru. This indicated that price stability can be achieved through exchange rate stability, Plata (2010)

In Peru the dollarization started with the inflationary process of the mid-70s and peaked during the hyperinflation of 1988-90 despite efforts to de-dollarize in 1985. With high inflation, the U.S. dollar started to be the preferred means of payments and store of value. Lending institutions also saw that dollars minimize the risk of capital losses. In 1985, while inflation was high, the government forced the conversion of foreign currency deposits to local currency resulting in capital flight and financial disintermediation. When the restriction on foreign currency deposits was lifted, re-dollarization was quick, and by the end-1990s, about 80 percent of deposits and credit were denominated in foreign currency. Since the introduction of the inflation targeting (IT) regime in early 2000s, Peru has experienced a gradual and sustained market-driven financial de-dollarization. The successful attempts to de-dollarize have been market-based and combined a track record of macroeconomic stability with other policies to enhance the attractiveness of the local currency. Moreover, Macroeconomic stability, proxied by inflation, different measures of exchange rate changes, and sovereign credit risk, had a significant impact on de-dollarization in Peru. Taking advantage of buoyant economic conditions in recent years, the Peruvian government has pursued large fiscal surpluses (of about 2 to 3.3 percent of GDP per year) during 2006 and 2008. As a result, public debt has been reduced below 30 percent of GDP, one of the lowest levels in the region. Last, thanks to stringent prudential regulations, Peru's financial sector is sound, as shown by its resilience during the recent global financial crisis. Several prudential measures introduced during the last decade have helped the de-dollarization process by lowering banks' incentives to borrow and lend in foreign currency. In Peru, banks are required to hold liquid assets equivalent to at least 8 percent in domestic currency and 20 percent in foreign currency of all their liabilities maturing during the next 12 months. In 2003, Peru launched a market-making program with the objective of developing a market for domestic public debt, consisting mainly of fixed-rate instruments in domestic currency. In line with this objective, Peru's public debt management strategy has been focused on developing a yield curve of government bonds in Soles and reducing the share of public debt denominated in foreign currency. As a result, government bonds in Soles have gained liquidity and the yield curve has been extended considerably. The inflation targeting framework and consolidated policy credibility of Peruvian government, reflecting strengthened institutions and a track record of prudent policies, have been key to keep inflation expectations well anchored, which are essential to the de-dollarization process. Moreover, the successful policy response during the global financial crisis has further increased currency credibility, Escibano (2010).

III. Research Methodology

The section describes the research methodology of this study which is classified into three parts. The first part is described about the Granger causality test between inflation and dollarization which determine the interrelationship between the two variables. The second part describes the Kalman filter approach which is used to calculate cash U.S. dollar circulation outside banks. Finally, the Structural Vector Autoregressive (SVAR) is applied in order to evaluate the effectiveness of monetary policy.

Granger Causality Test

The Granger causality tests between inflation and dollarization are performed. The period of the study is from January 1995 to December 2010. The log of consumer price index (*CPI*) is used to reflect the inflation, while the dollarization is the ratio of foreign currency deposits to broad money which is known as *DR*₃. To check whether the series of *CPI* and *DR*₃ are stationary or not, the Augmented Dickey-Fuller test and the Phillip-Perron test are applied.

Kalman Filter—Econometric Method for Estimating Cash U.S. Dollar circulation outside Banks

This part indicates the Kalman filter method which can be used to estimate cash U.S. dollar circulation outside banks in Cambodia.

The State Space Representative, Kalman filter, with one observes equation or signal equation and two state space equations are constructed (see Appendix). The proportionality coefficient *k* and velocity *V* are called state space variables and Gross Domestic Product (*GDP*), broad money *M2* plus Khmer Riel checks, Consumer Price Index (*CPI*), and Nominal Exchange Rate (*NEX*), between January 1995 and December 2010, are called observed variables. The parameters of the State Space Representative can be determined by maximum likelihood estimation method. The unobserved variables, *k* and *V*, can be generated from the estimated parameter of the Kalman filter. Based on *k* and *V*, cash U.S. dollar circulations outside bank are also revealed.

Structural Vector Autoregressive (SVAR)

This study also uses Structural Vector Autoregressive in order to find the interrelationship between four variables money supply (*M2*), nominal exchange (*NEX*), gross domestic product (*GDP*), and consumer price level. The SVAR has the form as follows:

$$AY_t = c + \sum_{i=1}^T \Gamma_i Y_{t-i} + \varepsilon_t$$

Y_t is a vector of *M2*, *NEX*, *GDP*, and *CPI*. All variables are express in the form of logarithm. So, the first different represents growth. The Choleski decomposition has been imposed as follows:

$$e_{1t} = \varepsilon_{1t}$$

$$e_{2t} = a_{21}\varepsilon_{1t} + \varepsilon_{2t} + a_{23}\varepsilon_{3t}$$

$$e_{3t} = a_{31}\varepsilon_{1t}$$

$$e_{4t} = a_{41}\varepsilon_{1t} + a_{42}\varepsilon_{2t} + \varepsilon_{4t}$$

The Choleski decomposition of VAR will generate impulse responded and forecast error variance decomposition which include also the structural shock as mention in the above matrix. The stability condition of the estimated VAR is also performed in order to check the stationary of the system. The period of the study is from 1998:Q1 to 2010:Q4. All data series are collected from International Financial Statistics (IFS) of International Monetary Fund (IMF), Ministry of Planning (MoP), and National Bank of Cambodia. However, the Augmented Dickey-Fuller test has been applied to all the series in order to check about the stationarity.

IV. Empirical Result

Granger Causality Test

Firstly, the Augmented Dickey Fuller (ADF) tests for both series are employed. The null hypotheses of the unit roots are failed to reject with significant level of 5 percent. The series are non stationary.

Table 4.2: ADF Tests for Inflation and Dollarization

Variable	t-value					
	Level			First difference		
	Intercept	Trend and intercept	None	Intercept	Trend and intercept	None
Inflation	-0.4954	-1.5896	3.5297	-10.9231***	-10.894***	-6.5809***
Dollarization	-1.3557	-2.8965	1.9724	-15.2759***	-15.2638***	-14.9035***

Note *** and ** are significant 1% and 5%, respectively.

The null hypotheses of the unit roots are rejected with significant level of 1 percent for the first different of each series³. The series are stationary.

Table 4.3: Granger Causality Tests

Sample: 1995M01 2010M12

Lags: 12

Null Hypothesis:	F-Statistic	Prob.
Dollarization does not Granger Cause Inflation	0.43186	0.9487
Inflation does not Granger Cause Dollarization	1.36017	0.1908

³ The Phillip-Perron test is also applied and the result is the same.

As can be seen from the result of the Granger causality tests, the dollarization does not Granger cause inflation, and inflation also does not Granger cause dollarization with significant level of 5 percent.

Estimated Cash U.S. Dollar Circulation

The parameter of the State-Space Representation can be estimated by applying maximum likelihood estimation. The estimated result of the Kalman Filter is presented below which can be used for predicting the state space variables, V and k . However, using different initial values is also applied to the maximum likelihood estimates, but the result is consistence.

Table 4.4: Maximum Likelihood Estimate of the Kalman Filter

Method: Maximum likelihood (Marquardt)
Sample: 1995M01 2010M12
Included observations: 192

Parameter	Coefficient	Std. Error	z-Statistic	Prob.
ϕ_1	-0.437781	0.39884	-1.097615	0.2724
ϕ_2	-3.22014	10.38158	-0.310178	0.7564
ϕ_3	4.212137	8.451997	0.498360	0.6182
ϕ_4	-0.437784	0.410592	-1.066228	0.2863
ϕ_5	0.331629	0.094315	3.516198	0.0004
Log likelihood	-278.5529	Akaike info criterion		2.953676
		Schwarz criterion		3.038507
		Hannan-Quinn criter.		2.988033

Source: Author's estimation.

According to the above result, the unobserved variable, V , can be generated as show in Table 4.5. Between 1995 and 2010, the average velocity of money is 1.03.

Table 4.5: Cambodia: Velocity of Broad Money II, 1995-2010

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average 1995-2010
V_t	1.94	1.38	1.33	1.27	1.21	1.09	1.07	0.97	0.95	0.90	0.89	0.84	0.74	0.70	0.67	0.60	1.03

Source: Author's estimation.

Note: Yearly averages of monthly estimates.

As can be seen from Table 4.5, the estimated result of velocity of broad money is low. The result consistence with what Mario and Sopanha had found in the previous study. The value of the velocity revealed that people hold a lot of money as a proportion to their income, money changes

hand infrequently, so V is small. “A velocity close to, or below, unity reflects limited financial intermediation and the absence of financial assets [stock, bond, derivative, etc.], as we assume cash balances are held by households as unproductive saving, and dollar are used largely as a store of value,” Mario and Sopanha. The explanation reflected the current situation in Cambodia even though the used of financial intermediary, banks and MFIs, are increasing substantially in the last few year, but Cambodia still be a cash based economy because most of transaction for daily living is settlement by cash.

The situation can be explained more clearly concerning on the estimated result of the proportionality coefficient, k , which is presented in Table 4.6.

Table 4.6: Cambodia: Value of the Proportionality Coefficient, 1995-2010

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	Average 1995-2010
k_t	9.59	7.44	7.08	7.33	7.14	6.25	6.19	5.57	5.42	5.03	5.08	4.78	4.20	3.86	3.59	3.12	5.73

Source: Author's estimation.

Note: Yearly averages of monthly estimates.

The proportionality of cash U.S. dollar circulation to broad money is large, 9.59 in 1995, but started to decrease every year and remained 3.12 in 2010. The series of proportionality coefficient can be used to generate cash U.S. dollar circulation (see Table 4.7).

Table 4.7: Cambodia: Cash U.S. Dollar (Billion) Circulation, 1995-2010

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Cash USD	2.10	2.24	2.29	2.18	2.55	2.90	3.22	3.74	4.14	4.95	5.93	7.18	9.39	11.79	12.10	13.64

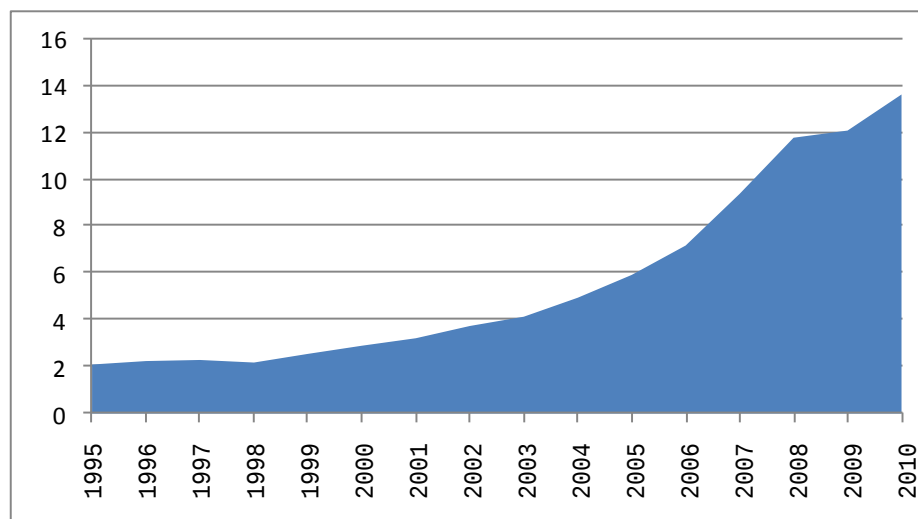
Source: Author's estimation.

Note: Yearly averages of monthly estimates.

The estimated result of cash U.S. dollar circulation is slightly different to the estimated result which was found by Mario and Sopanha in 2000, owing to the different value of GDP between the current and the previous researchers.

In 1995, the cash U.S. dollar was estimated to be 2.1 billion of USD, but it increased to 2.29 billion of USD in 1997 because of the fighting. After the second election in 1998 with the establishing of a new coalition government, the cash U.S. dollar had a slightly decreased to 2.18 billion of USD. However, because of a long period of political date lock after the third election in 2003, the cash U.S. dollar increased to 4.14 billion of USD. Moreover, the cash U.S. dollar circulation increased to 11.79 billion of USD in 2008 because of the fear of political turmoil after the fourth election as well as the global financial crisis which might have hit the banking system in Cambodia. At last, it has a slightly increased to 13.64 billion of USD in 2010.

Figure 4.15: Cambodia: Dollars in Circulation outside Banks, 1995-2010 (In billions of U.S. dollars)



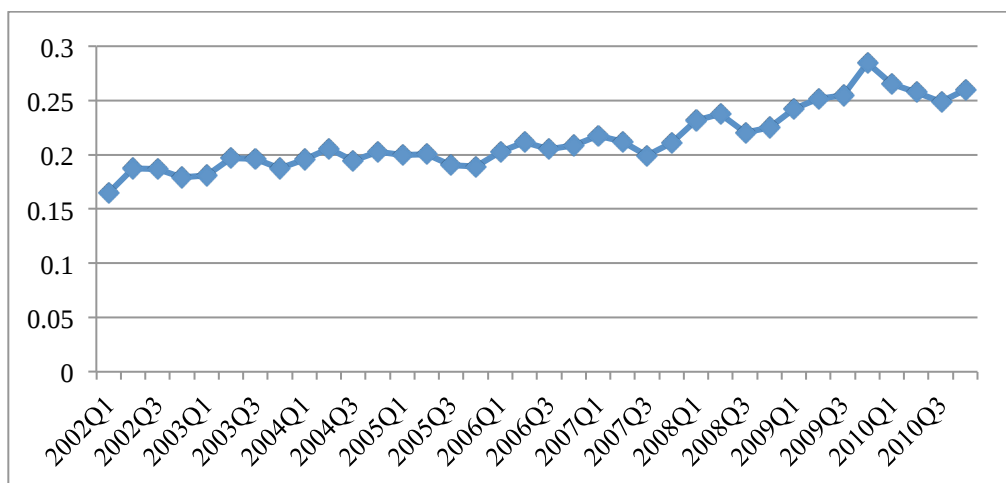
Source: Author's estimation.

Note: Yearly averages of monthly estimates.

However, the number of people using banking services has increased substantially in this last three or four year. According to the estimated result of the cash U.S. dollar, we might have some question concerning on the large amount of cash U.S. dollar circulated outside banks.

Of course, most of the people have just opened new bank accounts in both banks and MFIs, but it does not mean that the confident of the people on the banking system increase. Some of them just bring the money to put in the bank for a short period of time in order to get the interest and then they bring it back and keep on hand. In addition, Cambodia still be a cash based economy. It can be seen more clearly in Figure 4.16, the ratio of monetary aggregate to GDP, from quarter one of 2002 to quarter four of 2010, fluctuated every quarter from one year to another year. However, the confident of the public toward banking system in Cambodia might increase in the future after the National Bank of Cambodia has announced new regulation which requires banks to increase their capital from about 11 million of U.S. dollar to around 37 million of U.S. dollar (Prakas of the NBC, 2008).

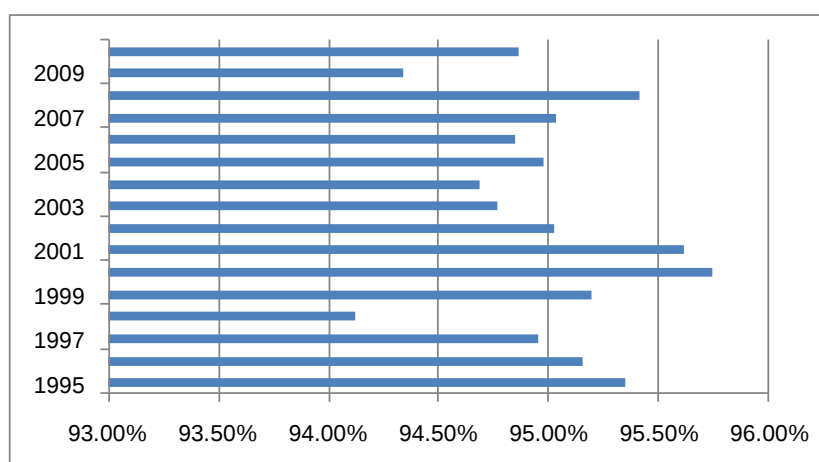
Figure 4.16: Monetary Aggregate to GDP in Cambodia: 2002Q1-2010Q4



Source: NBC, IMF, and MOP.

In addition, the average of currency substitution in Cambodia is around 95 percent which is derived from the ratio of cash USD circulated outside bank to domestic and foreign currencies circulation outside banks. Concerning on the currency substitution in Cambodia, Mario and Sopanha found an average of 96 percent of total currency in circulation. Moreover, Liang; Hong, Thomas (2000) and Marciniak and Philippe et al. (2002) revealed that the currency substitution in Cambodia was bounded in the range between 85 and 95 percent of total currency in circulation. So, the result of the current researcher is consistent with the result of the previous researchers.

Figure 4.17: Cambodia: Estimated Currency Substitution, 1995-2010 (In percent of total money circulation)



Source: Author's estimation.

Even though some of the electronic payments such as Automatic Teller Money (ATM) card, debit card, and credit card are popularly used among the Cambodian people, but most it is generally used only in the city, while in the country sides the majority of the people do not clearly know about these kind of payments yet. Currently, thus, cash settlement is preferable comparing to electronic payment. Higher ratio of cash U.S. dollar circulation in the economy to GDP (see Table 4.8) is answering to the current economics condition in Cambodia.

Table 4.8: Cambodia: Ratios of Dollars Circulating in the Economy, 1995-2010

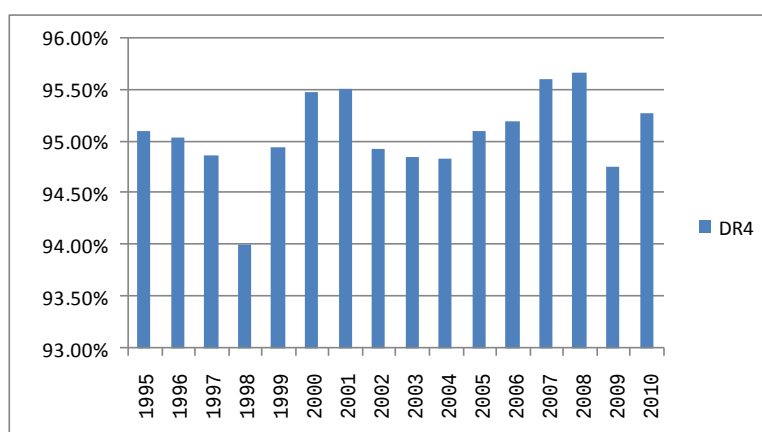
Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Dollar/GDP	0.61	0.64	0.66	0.7	0.73	0.79	0.81	0.87	0.89	0.93	0.94	0.99	1.09	1.14	1.16	1.26
Dollar/FCD	14.1	10.2	10.1	12.2	11.1	8.95	8.2	7.32	7.12	6.46	6.76	5.67	4.17	5.15	3.93	3.61

Source: Author's estimation.

Mario and Sopanha generated a new measurement of dollarization which is known as DR_4 which is similar to DR_3 , but it is defined as the ratio of residents' foreign currency deposits plus cash U.S. dollars in circulation to total broad money which also include cash U.S. dollar in circulation. From 1995 to 2001, they found that the degree of dollarization as measure by DR_4 moving in the range between 93 and 95 percent. However, Cambodia has become very highly dollarization during the period 1991 and 1995.

The current estimated result of DR_4 (see Figure 4.18) is also consistent with what Mario and Sopanha found. From 1995 to 2009, the degree of dollarization is bounded in the range between 94 percent and 95.50 percent. Thus, it revealed that the degree of dollarization in Cambodia is stable.

Figure 4.18: Cambodia: Estimated Dollarization, 1995-2010 (In percent of broad money)



Source: Author's estimation.

SVAR

Firstly, the Augmented Dickey Fuller (ADF) tests for all the series are employed. The null hypotheses of the unit roots are failed to reject with significant level of 5 percent. The series are non stationary.

Table 4.9: Augmented Dickey-Fuller Test

Variables	t-value	
	Level	First Difference
M2	0.498	-4.75***
NEX	-1.994	-5.544***
GDP	-0.605	-6.449***
CPI	0.991	-5.918***

Note *** and ** are significant 1% and 5% level, respectively.

The null hypotheses of the unit roots are rejected with significant level of 5 percent for the first different of each series⁴. The series are stationary, $I(1)$. So, the VAR on the first difference can be run. The information criteria are used to determine the optimal lag of the VAR model.

Table 4.10: VAR Lag Order Selection Criteria

Endogenous variables: DLOGM2 DLOGNEX DLOGGDP DLOGCPI

Exogenous variables: C

Sample: 1998Q1 2010Q4

Included observations: 47

Lag	LogL	LR	FPE	AIC	SC	HQ
0	431.5159	NA	1.48e-13	-18.19216	-18.03470*	-18.13291
1	460.1576	51.18946	8.65e-14	-18.73011	-17.94281	-18.43384
2	487.1001	43.56655*	5.52e-14*	-19.19575*	-17.77861	-18.66247*
3	492.2912	7.510547	9.10e-14	-18.73579	-16.68882	-17.96551
4	507.9352	19.97113	9.99e-14	-18.72065	-16.04384	-17.71335

* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

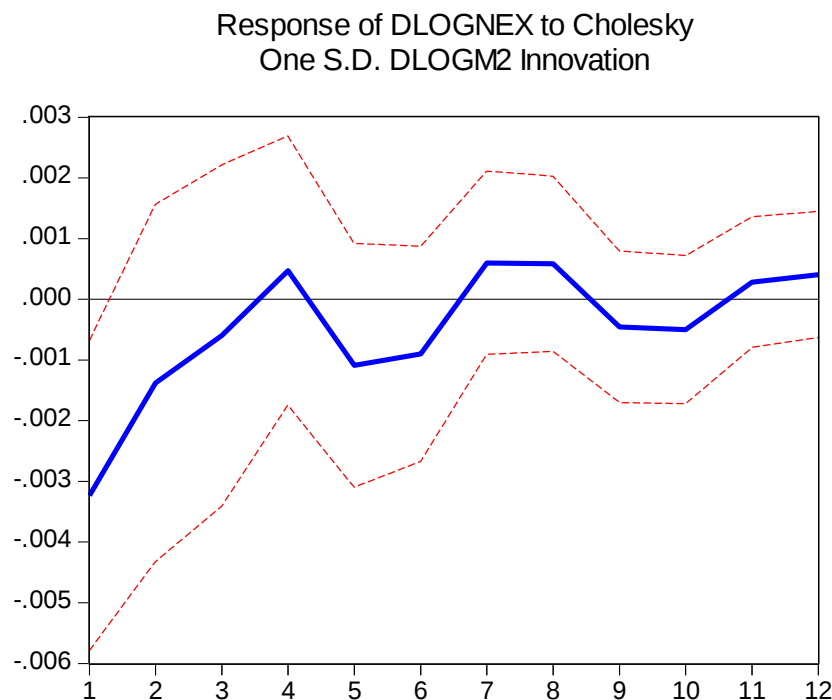
AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

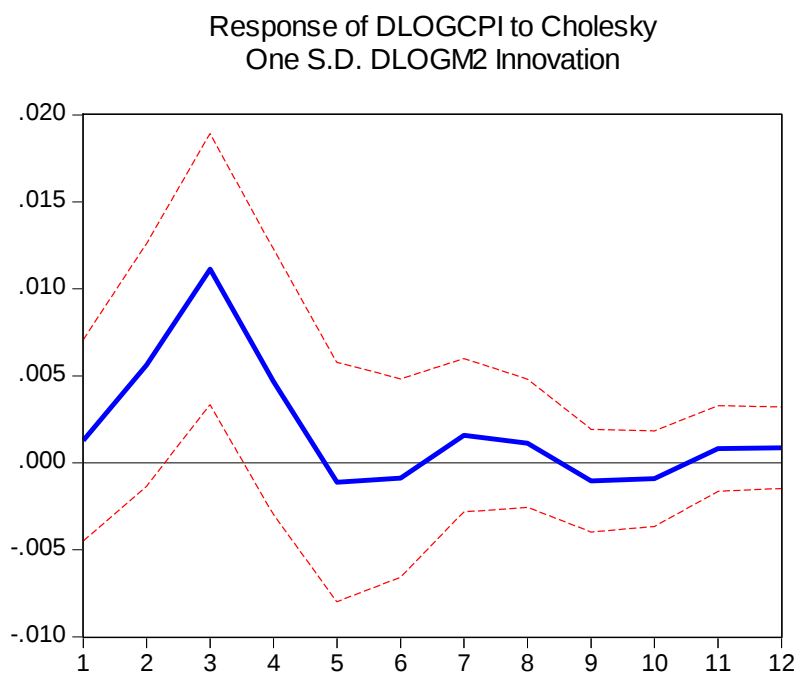
⁴ The Phillip-Perron test is also applied and the result is the same.

According Akiake Information, the optimal lag of the variable is two. After imposed the Choleski decomposition⁵, the impulse response which also include the structural shock can be generated as follows:

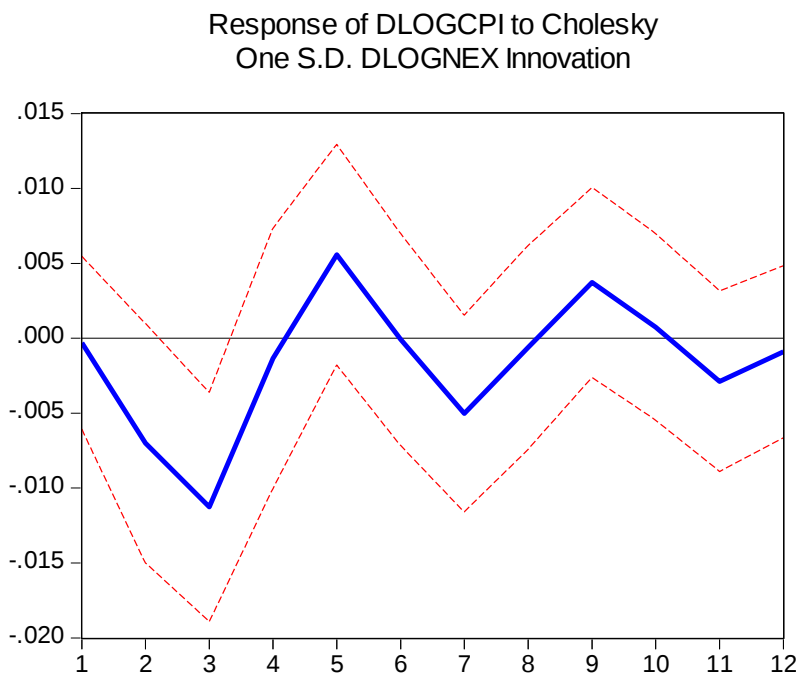


As can be seen from this figure, the response of exchange to broad money exhibits a cyclical pattern. The broad money growth has no strong impact on the exchange rate depreciation. Actually, the exchange rate fluctuates in Cambodia in general happen by seasonality. In that period, the demand for Riel is increase in the market such as in the period of festivals (Chinese new year, Khmer new year, Ancestor festivals), farmer crop collection period (rice production collection) and tax paying period; the Riel would tend to appreciate, but when each of the period ended the demand for Riel will decline which could lead to strong negative shock on exchange rate in the domestic exchange market. This means that Riel might depreciate a lot. The National Bank of Cambodia always has a closer look on the movement of the exchange rate in the market, if the fluctuation of the exchange rate is high, U.S. dollar action will be applied.

⁵ The stability condition revealed that the system is stationary.



Broad money growth has a strong positive impact on inflation in the short run while in the long run it also exhibits a cyclical pattern as the impact of broad money growth on exchange rate. So, changing in the amount of money supply would be effectively impact on the price level in the market.



The response of inflation to the exchange rate shock has similar sharp to the response of inflation to the broad money growth. According to forecast error variance decomposition of inflation, in the first fourth quarters, the variation of inflation is explained almost equally of the three variables—broad money, exchange rate, and GDP—but after the fifth quarter, the variation of inflation is explained mostly by the variation of exchange rate (about 22 percent for every quarter).

Table 4.11: Variance Decomposition of DLOGCPI

Period	S.E.	DLOGM2	DLOGNEX	DLOGGDP	DLOGCPI
1	0.020255	0.402117	0.021270	24.27387	75.30274
2	0.023869	5.837806	8.606125	18.92048	66.63558
3	0.029833	17.65400	19.76858	16.26736	46.31006
4	0.031220	18.35452	18.23829	15.54665	47.86054
5	0.032127	17.45222	20.23187	16.91716	45.39875
6	0.032786	16.83030	19.42754	18.34568	45.39648
7	0.033243	16.59524	21.18097	17.92952	44.29428
8	0.033592	16.36349	20.77513	18.34877	44.51260
9	0.033825	16.23324	21.70474	18.11209	43.94994
10	0.034047	16.09429	21.47027	18.31212	44.12331
11	0.034181	16.02689	22.01393	18.17214	43.78704
12	0.034330	15.95151	21.89189	18.28374	43.87285

Cholesky Ordering: DLOGM2 DLOGNEX DLOGGDP DLOGCPI

V. Conclusion and Policy Implication

The degree of dollarization in Cambodia as measured by DR_4 is very high; but it remains stable bounded in the range between 94 percent and 95.5 percent from 1995 to 2010. Subsequently increase of the level of dollarization has put a lot of pressure on the National Bank of Cambodia in the implementation of monetary policy. Currently, the monetary authority relies mainly on exchange rate stabilization in order to control inflation, but because of macroeconomic complexity with highly level of dollarization; the monetary policy instrument was not working well in controlling the fluctuation of the exchange rate in the market.

Dollarization mostly found in the country experienced hyperinflation. Of course, Cambodia used to experience hyperinflation in the early 1990s, but after gained macroeconomic stability, since 1995 to present, the inflation rate remains low for more than a decade. The Cambodia's inflation rate, on average is about 4.6% from 2000 to 2009, has low by regional standards for low-income countries. This indicated that inflation is nothing involve with dollarization in Cambodia in this last economic stage. More precisely, the Granger-causality test between dollarization and inflation in the period between 1995 and 2010 revealed that both variables do not explain each other. However, the demand for Riel in the economy keeps increasing year by year, on average is

20 percent, which can be stated that the confidence of the public toward domestic currency has increased and inflation is not the problem of dollarization, then why dollarization in Cambodia remains high?

Actually, the indicators, DR_3 as well as DR_4 , which are used to measure the level of dollarization might not truly capture the true degree of dollarization in Cambodia because it mainly captures the level of dollarization in the banking system, but the cash transaction being flow outside bank not only in the city, but also in the countryside and not only U.S. dollar, but also Riel have not been included in the measurement yet. This is maybe because of the lack of measurement techniques. However, it is not an easy task to measure the transaction being process outside bank (how many percent is settlement in U.S. dollar and many percent is settlement in Riel). The level of dollarization might be low for the country as a whole if we could measure cash transaction outside banks because the Riel is generally used in rural area more than in the city.

As revealed by Kalman filter, the cash U.S. dollar circulation outside banks is large. So, increasing public confidence toward banking system would be a good strategic in order to absorb that amount of cash U.S. dollar into banking system. Successful implementation of this strategy would reduce the cost of capital which could boost domestic investment. However, the establishing of capital market is another strategy that could capture the cash U.S. dollar outside banks into the system since buying and selling securities will be settlement through banks.

Development of an interbank money market (in both U.S. dollar and Riel) is also important for reducing the vulnerabilities induced by a dollarized financial system, and for a more effective implementation of monetary policy. Successfully develop an interbank money market would create a space for moving away from exchange rate-based stabilization. However, many experiences from many dollarized countries revealed that de-dollarization through market driving based were working well. So, with the future establishment of capital market, the financial instruments must be issued in Riels.

Human resource development at the central bank plays very crucial roles in economic development in Cambodia since the financial market structure get more complicated after establishing of Cambodia Security Exchange. Banking operation will have strongly connected to CSX which means that the risk exposure to banks will increase. Better implementation of banking supervision by National Bank of Cambodia on banking system would require better professional expertise in order to guarantee a sound and safe banking system. Poor supervision implementation might lead to banking crisis in the future since banking exposure has increased after the creation of CSX. Thus, human resource development not only in Supervision Department, but also in other departments of the National Bank of Cambodia needs to be significantly improved. Moreover, assigning work which fit to staff's education background is also necessary. Better job assignment and fit to education background could produce effective and reliable working result for policy making.

Of course, de-dollarization is not an easy task for both the National Bank of Cambodia and the RGC. As mention earlier, the Cambodia economic growth heavily relies on garment sector which is easily to absorb external shock as experienced by GFC when the consumptions in US

and EU slumped. This can be said that all eggs are put into one basket which is very risky and easily to go burst. Learning to diversify to other sectors would be a good tactic for long term sustainable economic growth and stability in Cambodia.

Agricultural development is a priority thing to be considered by RGC since 80 percent of Cambodian populations are farmers. The new government strategies on rice production and rural area development and with a good offering from EU market on Cambodia's rice export would help Cambodia to alleviate poverty as well as dollarization owing to the Riel is preferable more in the rural area. This tactic could be called one stone kill two birds—reducing poverty and at the same time dollarization. Furthermore, promoting tourism sector is also another part of economic diversification since Cambodia has fully wealth of civilization which is known as “Kingdom of Wonder”. Fully utilization of this wealth mixed up with natural view such as nice beach, good service and with the World Heritage Angkor-Wat Temple would help Cambodia generate large amount of revenues for the service sector.

VI. References

Asian Development Bank (2008), Key Indicators of Cambodia. Retrieve 2009, from <http://www.adb.org/statistics>.

Asian Development Bank (2010). “Dealing with Multiple Currencies in Transitional Economies.” Philippines: Author.

Asian Development Bank (2010), Cambodia Economics Outlook. Retrieve 2010, from <http://www.adb.org>.

Calvo, Guillermo A. and Carmen M. Reinhart (September 1999), “Capital Flow Reversals, the Exchange Rate Debate, and Dollarization,” *Finance & Development*, Volume 36, No. 3, (Washington: International Monetary Fund).

Enders, W. (2010). Applied Econometric Time Series. New York: John Wiley and Sons Inc.
Erasmus, Leichter, and Menkulasi (2009), “Dedollarization in Liberia-Lessons from Cross-country Experience,” Washington: International Monetary Fund.

Escribano (2010). “Peru: Drivers of De-dollarization”, *IMF Working Paper*, International Monetary Fund.

Huot, P. (2009). “Cambodia: Coping with Dollarization”, Phnom Penh, Cambodia.
Herrera and Valdes (2003). “De-dollarization, Indexation and Nominalization: the Chilean Experience”, Chile.

Jayant, M. (2008). “Cambodia's Persistent Dollarization: Causes and Policy Options.” Asian Development Bank, Working Paper Series on Regional Economic Integration No. 19.

International Monetary Fund (2005). International Financial Statistics. Washington, DC: Author.

International Monetary Fund (2009). *International Financial Statistics*. Washington, DC: Author.

International Monetary Fund (2009). “Cambodia: 2008 Article IV Consultation—Staff Report; Staff Supplement; and Public Information Notice on the Executive Board Discussion”, IMF Country Report No. 09/47.

Liang, Hong, Thomas Rumbaugh, Kotaro Ishi, and Atsushi Masuda, (August 2000), “Cambodia: Selected Issues” (Washington: International Monetary Fund).

Marciniak, Phillippe et al., “An Integrated Framework for Cambodia,” Chapter II—Macroeconomic Assessment, (Washington: International Monetary Fund), forthcoming.
Ministry of Commerce Cambodia (2001). “Macro Assessment, trade policy, trade facilitation, and poverty assessment”, A Pilot Study.

Mishkin, Frederic S. (2007). *The Economics of Money Banking and Financial Market*. Boston: Pearson Education, Inc.

National Bank of Cambodia. (1996), *Law on the Organization and Conduct of the National Bank of Cambodia*. Phnom Penh: NBC.

National Bank of Cambodia (2008). *Annual Report*. Phnom Penh: Author.

National Bank of Cambodia (2009). *Annual Report of Bank Supervision Department*. Phnom Penh: Author.

National Bank of Cambodia (2009). *Economic & Monetary Statistics*. Phnom Penh: Author.

National Bank of Cambodia (2009). *Prakas on Overdraft Facilities Made Available by the NBC to Banks and Financial Institutions Facing Temporary Liquidity Shortages*. Phnom Penh: Author.

National Bank of Cambodia (2009). *Prakas on the Maintenance of Minimum Reserve Requirement in Banks and Financial Institutions*. Phnom Penh: Author.

Plata and Herrero (2010). “Dollarization and Monetary Stability.” Asian Development Bank, Philippines.

Prema-chandra Athukorala. *Crisis, Capital Controls and Recovery in Malaysia*, Research School of Pacific and Asian Studies. ANU, Australia.

Tam Bang Yu (2005). *Capital Controls: The Case of Malaysia and Lessons for Vietnam*. East-West Center Working Papers, Hawaii USA.

Jinushi (2010). “CLV Countries: Common Ground in Policy Formulation.” Asian Development Bank, Philippines.

Sannisith (2005). Monetary Policy. Unpublished, National Bank of Cambodia, Phnom Penh.

Siphath Lim (2007), “The Impact of Exchange Rate Change on the Balance of Trade in Cambodia,” Master Thesis, Pannasastra University, Cambodia.

Siphath Lim (2010), “Money, Exchange Rate and Price Level in Cambodia: a Vector Autoregressive Analysis,” Master Independent Study, Thammasat University, Thailand.

Tal Nay, I. and Michel, D. (2007). “Dollarization in Cambodia”, Phnom Penh, Cambodia.

Zamaroczy, M.D. and Sa, S. (2002). “Macroeconomic Adjustment in a Highly Dollarized Economy: The case of Cambodia”, *IMF Working Paper*, WP/02/92.

Appendix

Econometric Method for Estimating Cash U.S. Dollar outside Banks

The quantity theory of money is applied as the main idea in the estimation of the amount of cash U.S. dollar circulated outside banks in Cambodia. This can be seen as follow:

$$M_t V_t = P_t Q_t \quad (1)$$

M_t : money circulated in the economy
 V_t : velocity of money
 P_t : price level
 Q_t : number of transactions.

Due to the existence of the currency substitute, the money circulated in the economy consists of two components which are:

${}^R M_{R,t}$: domestic currency Riels in circulation (cash and checks) and

${}^D M_{R,t}$: dollars in circulation (cash only) which is converted into Riels.

Then,

$$M_t = {}^R M_{R,t} + {}^D M_{R,t} = (1 + k_t) {}^R M_{R,t}, \text{ with } k_t > 0 \quad (2)$$

k_t : proportionality coefficient between Riels and U.S. dollars in circulation.

Thereafter, the equation (1) can be written as:

$$(1 + k_t) {}^R M_{R,t} V_t = P_t Q_t \quad (3)$$

$P_t Q_t$ is proxied by nominal GDP and the velocity of U.S. dollars and Riels are assumed to be the same. We can derive new equation:

$$(1 + k_t)^R M_{R,t} V_t = GDP_t \quad (4)$$

Taking logs of this equation, we obtain:

$$\log({}^R M_{R,t}) = \log(GDP_t) - \log(V_t) - \log(1 + k_t) \quad (5)$$

This equation can be called the observation or signal equation. There are two unknown parameters, V_t and k_t . The main purpose of this equation is to determine k_t which can be used to estimate ${}^D M_{R,t}$.

The following assumptions are developed for the two unobserved variables, V_t and k_t .

The velocity of money, V_t , evolves over time according to three factors:

- o changes in inflation, as measured by the consumer price index;
- o changes in the level of the exchange rate and
- o disturbance term.

Base on these assumptions, we can generate following equation:

$$\log(V_{t+1}) = \phi_1 \log(V_t) + \phi_2 \Delta \log(CPI_{t+1}) + \phi_3 \Delta \log(NEX_{t+1}) + \mu_{t+1} \quad (6)$$

The proportionality coefficient between Riels and U.S. dollars circulated outside banks, k_t , evolves over time according to two factors:

- o the level of the exchange rate; and
- o disturbance term.

We can generate another equation:

$$\log(1 + k_{t+1}) = \phi_4 \log(1 + k_t) + \phi_5 \log(NEX_{t+1}) + v_{t+1} \quad (7)$$

CPI : consumer price index, including all items

NEX : nominal exchange rate, Riels per U.S. dollar

Δ : difference term

$\phi_1, \phi_2, \phi_3, \phi_4, \phi_5$: parameters to be estimated

μ, v : disturbance terms or stochastic shocks.

Equation (6) and (7) are called state space equations. Now, there are three equations: one observation or signal equation, and two state space equations. The parameters can be estimated by the Kalman filter. The log likelihood function of a smoothed estimate is employed in order to get the estimated parameters (see Hamilton, 1994).

For simplicity the equation (5), (6), and (7) can be written in the matrices form as follows:

$$\begin{pmatrix} \log V_{t+1} \\ \log(1+k_{t+1}) \end{pmatrix} = \begin{pmatrix} \phi_1 \\ \phi_4 \end{pmatrix} \begin{pmatrix} \log V_t \\ \log(1+k_t) \end{pmatrix} + \begin{pmatrix} \phi_2 & \phi_3 & 0 \\ 0 & 0 & \phi_5 \end{pmatrix} \begin{pmatrix} \Delta \log CPI_{t+1} \\ \Delta \log NEX_{t+1} \\ \log NEX_{t+1} \end{pmatrix} + \begin{pmatrix} u_{t+1} \\ v_{t+1} \end{pmatrix} \quad (8)$$

$$\log^R M_{R,t} = \log GDP_t + \begin{pmatrix} -1 & -1 \end{pmatrix} \begin{pmatrix} \log V_t \\ \log(1+k_t) \end{pmatrix} \quad (9)$$

Changing notation, we get

$$\xi_{t+1} = F\xi_t + A'x_{t+1} + v_{t+1} \quad (10)$$

$$(11)$$

$$y_t = a'z_t + H'\xi_t$$

where

$$\begin{aligned} \xi_{t+1} &= \begin{pmatrix} \log V_{t+1} \\ \log(1+k_{t+1}) \end{pmatrix}, F = \begin{pmatrix} \phi_1 \\ \phi_4 \end{pmatrix}, \xi_t = \begin{pmatrix} \log V_t \\ \log(1+k_t) \end{pmatrix}, A' = \begin{pmatrix} \phi_2 & \phi_3 & 0 \\ 0 & 0 & \phi_5 \end{pmatrix}, \\ x_{t+1} &= \begin{pmatrix} \Delta \log CPI_{t+1} \\ \Delta \log NEX_{t+1} \\ \log NEX_{t+1} \end{pmatrix}, v_{t+1} = \begin{pmatrix} u_{t+1} \\ v_{t+1} \end{pmatrix}, y_t = \log^R M_{R,t}, a' = 1, z_t = \log GDP_t, \text{ and} \\ H' &= \begin{pmatrix} -1 & -1 \end{pmatrix}. \end{aligned}$$

The (r x 1) vector v_t

$$E(v_t v'_\tau) = \begin{cases} Q & \text{for } t = \tau \\ 0 & \text{otherwise} \end{cases}$$

where Q is (r x r) matrix.

The initial value of the state vector ξ_1 is needed. We assume that ξ_1 is uncorrelated with any realizations of v_t

$$E(v_t \xi_1') = 0 \quad \text{for } t = 1, 2, \dots, T$$

The analyst is presumed to have observed $y_1, y_2, \dots, y_T, x_1, x_2, \dots, x_T, z_1, z_2, \dots, z_T$.

The Kalman filter is motivated here as an algorithm for calculating linear least squares forecasts of the state vector on the basis of data observed through date t ,

$$\hat{\xi}_{t+1|t} \equiv \hat{E}(\xi_{t+1} | \Psi_t)$$

where

$$\Psi_t = (y_t', y_{t-1}', \dots, y_1', x_t', x_{t-1}', \dots, x_1', z_t', z_{t-1}', \dots, z_1')' \quad (12)$$

and $\hat{E}(\xi_{t+1} | \Psi_t)$ denotes the linear project of $\hat{\xi}_{t+1}$ on Ψ_t and a constant. The Kalman filter calculates these forecasts recursively, generating $\hat{\xi}_{1|0}, \hat{\xi}_{2|1}, \dots, \hat{\xi}_{T|T-1}$ in succession. Associated with each of these forecasts is a mean squared error (*MSE*) matrix, represented by the following ($r \times r$) matrix:

$$P_{t+1|t} \equiv E\left[(\xi_{t+1} - \hat{\xi}_{t+1|t})(\xi_{t+1} - \hat{\xi}_{t+1|t})'\right] \quad (13)$$

The recursive begin with $\hat{\xi}_{1|0}$ which denotes a forecast of ξ_1 based on no observations of y , x , or z . This is just the unconditional mean of ξ_1 ,

$$\hat{\xi}_{1|0} \equiv E(\xi_1),$$

with associated *MSE*

$$P_{1|0} = E\{[\xi_1 - E(\xi_1)][\xi_1 - E(\xi_1)]'\}. \quad (14)$$

The unconditional mean of ξ_t can be found by taking expectation of both side of equation (10), producing

$$E(\xi_{t+1}) = FE(\xi_t) + A'E(x_{t+1}) \quad (15)$$

Forecasting y_t

Noted that we assume that x_t contains no information about ξ_t beyond that contained in Ψ_{t-1} ,

$$\hat{E}(\xi_t | x_t, \Psi_{t-1}) = \hat{E}(\xi_t | \Psi_{t-1}) = \hat{\xi}_{t|t-1} \quad (16)$$

Next consider forecasting the value of y_t :

$$\hat{y}_{t|t-1} \equiv \hat{E}(y_t | z_t, \Psi_{t-1})$$

Notice from (11) that

$$\hat{E}(y_t | z_t, \xi_t) = A' z_t + H' \xi_t,$$

from the law of iterated projections,

$$\hat{y}_{t|t-1} = A' z_t + H' E(\xi_t | z_t, \Psi_{t-1}) = A' z_t + H' \hat{\xi}_{t|t-1} \quad (17)$$

from (11) the error of this forecast is

$$y_t - \hat{y}_{t|t-1} = A' z_t + H' \xi_t - A' z_t - H' \hat{\xi}_{t|t-1} = H' (\xi_t - \hat{\xi}_{t|t-1}) \quad (18)$$

with MSE

$$E[(y_t - \hat{y}_{t|t-1})(y_t - \hat{y}_{t|t-1})'] = E[H' (\xi_t - \hat{\xi}_{t|t-1})(\xi_t - \hat{\xi}_{t|t-1})' H] = H' P_{t|t-1} H \quad (19)$$

Using the Kalman Filter to evaluate the log likelihood function

$$y_t | z_t, \Psi_{t-1} \sim N\left((A' z_t + H' \hat{\xi}_{t|t-1}), (H' P_{t|t-1} H)\right), \quad (20)$$

That is

$$\begin{aligned} L = & -\frac{T}{2} \log 2\pi - \frac{1}{2} \sum_{t=1}^T \log |H' P_{t|t-1} H| - \frac{1}{2} \sum_{t=1}^T \left(y_t - A' z_t - H' \hat{\xi}_{t|t-1} \right) \\ & \times \left(H' P_{t|t-1} H \right)^{-1} \cdot \left(y_t - A' z_t - H' \hat{\xi}_{t|t-1} \right)' \end{aligned} \quad (21)$$

for $t = 1, 2, \dots, T$.

Forecasting State Space Vector

The Kalman filter is motivated as an algorithm for calculating a forecast of the state vector ξ_t as a linear function of previous observations. Based on a full set of observed data, the value of ξ_t can be forecasted. Such a procedure is called the smoothed estimates of ξ_t , denoted

$$\hat{\xi}_{t|T} = \hat{E}(\xi_t | \Psi_t)$$

The *MSE* of this smoothed estimate is denoted

$$P_{t|\tau} = E\left[\left(\xi_t - \hat{\xi}_{t|\tau}\right)\left(\xi_t - \hat{\xi}_{t|\tau}\right)'\right]$$

In general, $P_{t|\tau}$ denote the *MSE* of an estimate of ξ_t that is based on observation of y , x , and z through date τ . We produce here the key equations for the Kalman filter:

$$\hat{\xi}_{t|t} = \hat{\xi}_{t|t-1} + P_{t|t-1}H(H'P_{t|t-1}H)^{-1}(y_t - A'z_t - H'\hat{\xi}_{t|t-1}) \quad (22)$$

$$\hat{\xi}_{t+1|t} = F\hat{\xi}_{t|t} + A'\hat{x}_{t+1|t} \quad (23)$$

$$P_{t|t} = P_{t|t-1} - P_{t|t-1}H(H'P_{t|t-1}H)^{-1}H'P_{t|t-1} \quad (24)$$

$$P_{t+1|t} = FP_{t|t}F' + Q \quad (25)$$

Consider the estimate of ξ_t based on observation through date t , $\hat{\xi}_{t|t}$. Suppose we were subsequently told the true value of ξ_{t+1} . From the formula for updating a linear projection, the new estimate of ξ_t could be expressed as

$$\begin{aligned} \hat{E}(\xi_t | \xi_{t+1}, \Psi_t) &= \hat{\xi}_{t|t} + \left\{ E\left[\left(\xi_t - \hat{\xi}_{t|t}\right)\left(\xi_{t+1} - \hat{\xi}_{t+1|t}\right)'\right] \right\} \left\{ E\left[\left(\xi_{t+1} - \hat{\xi}_{t+1|t}\right)\left(\xi_{t+1} - \hat{\xi}_{t+1|t}\right)'\right] \right\}^{-1} \\ &\quad \times \left(\xi_{t+1} - \hat{\xi}_{t+1|t}\right). \end{aligned} \quad (26)$$

The first term in the product on the right side of (26) can be written

$$E\left[\left(\xi_t - \hat{\xi}_{t|t}\right)\left(\xi_{t+1} - \hat{\xi}_{t+1|t}\right)'\right] = E\left[\left(\xi_t - \hat{\xi}_{t|t}\right)\left(F\xi_t + v_{t+1} - F\hat{\xi}_{t|t}\right)'\right]$$

Furthermore, v_{t+1} is uncorrelated with ξ_t and $\hat{\xi}_{t|t}$. Thus,

$$E\left[\left(\xi_t - \hat{\xi}_{t|t}\right)\left(\xi_{t+1} - \hat{\xi}_{t+1|t}\right)'\right] = E\left[\left(\xi_t - \hat{\xi}_{t|t}\right)\left(\xi_t - \hat{\xi}_{t|t}\right)' F'\right] = P_{t|t} F' \quad (27)$$

Substituting (27) and the definition of $P_{t+1|t}$ into (26) produce

$$\hat{E}(\xi_t | \xi_{t+1}, \Psi_t) = \hat{\xi}_{t|t} + P_{t|t} F' P_{t+1|t}^{-1} (\xi_{t+1} - \hat{\xi}_{t+1|t}), \text{ or} \quad (28)$$

$$\hat{\xi}_{t/T} = \hat{\xi}_{t|t} + P_{t|t} F' P_{t+1|t}^{-1} (\xi_{t+1} - \hat{\xi}_{t+1|t}). \quad (29)$$

This method used to be conducted in Cambodia by *Mario de Zamaroczy* and *Sopanha Sa* (2002). The period of the study was from 1995 to 2001, but the quality of the data especially GDP could not be reliable at that period, thus the estimated result might be biased.

We start from the same period of the previous authors in order to compare the estimated result with the new reliable data sets. The period of the study is covering from January 1995 to December 2010. The broad money and the check clearing dominated in Riels are collected from the National Bank of Cambodia. The consumer price indexes are collected from the International Financial Statistics of the International Monetary Funds (IMF). Yearly GDP data are extracted from the International Financial Statistics of the International Monetary Funds and the Ministry of Planning (MoP). Monthly data of GDP are derived from cubic interpolation by using SAS 9.0. The X12 procedure in *Eviews 6* is applied for seasonal adjustment for all data series.

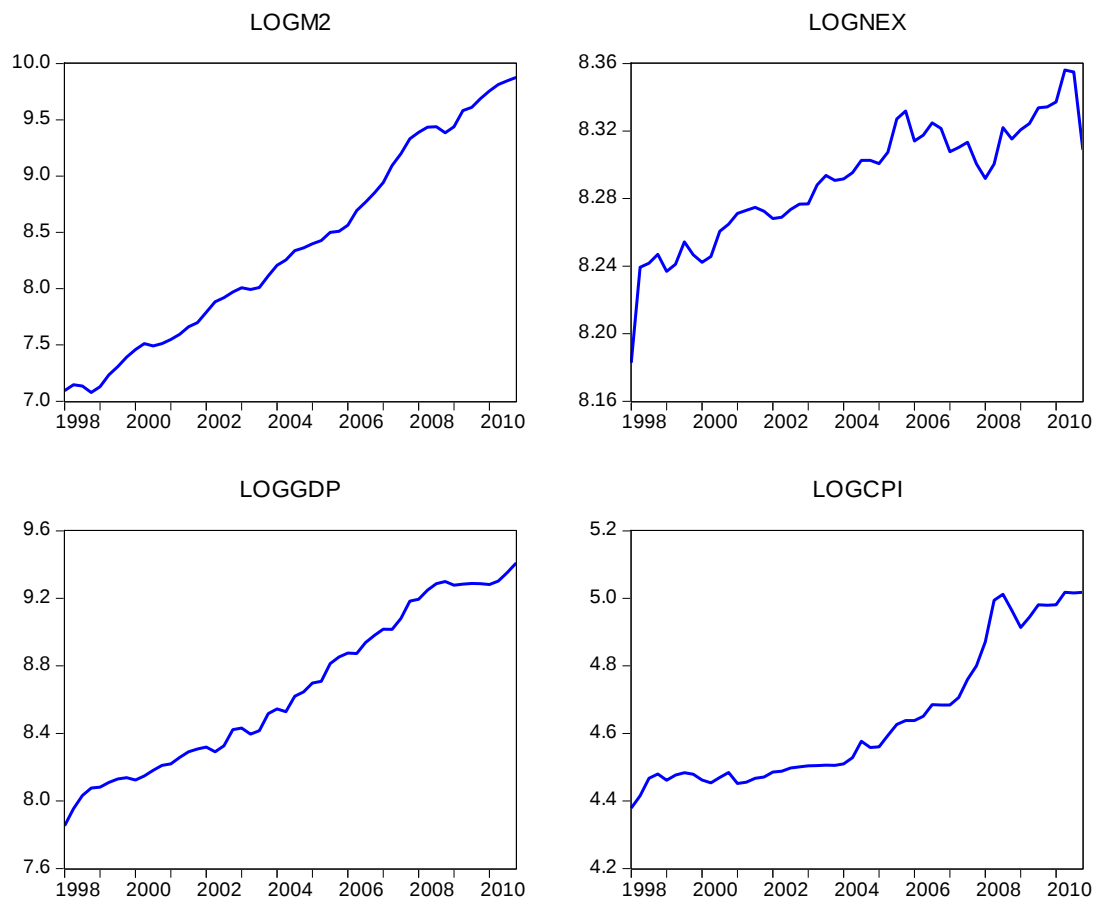
Of course, to estimate the parameters of the state space model, the initial value of the state variables are needed as the starting of the engine. Zamaroczy and Sa (2002) used upper bound of 6 for V_0 which derived from the velocity of the ratio of nominal GDP to broad money and 0 for k_0 . The new initial value of the state variables for the current study can be calculated as follows:

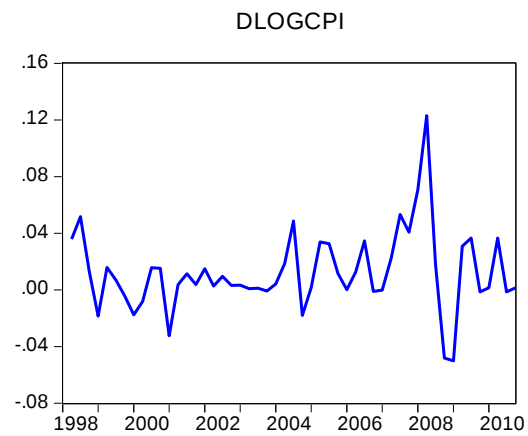
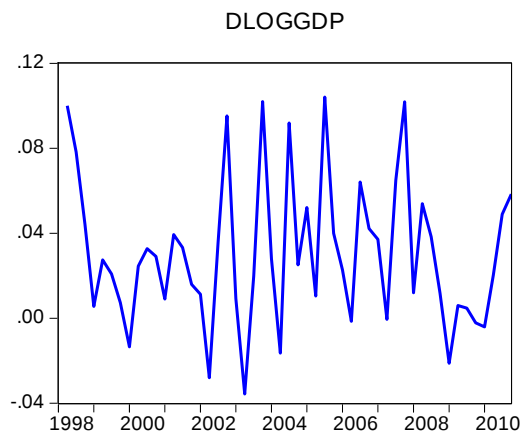
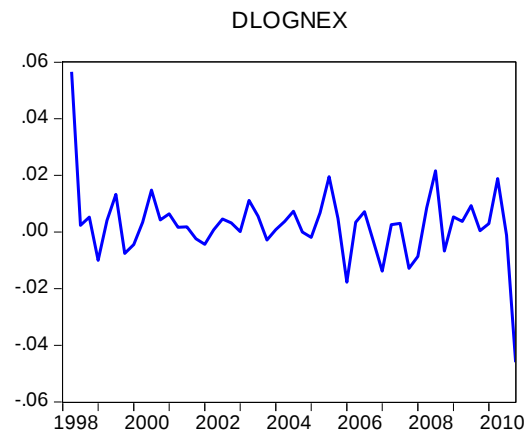
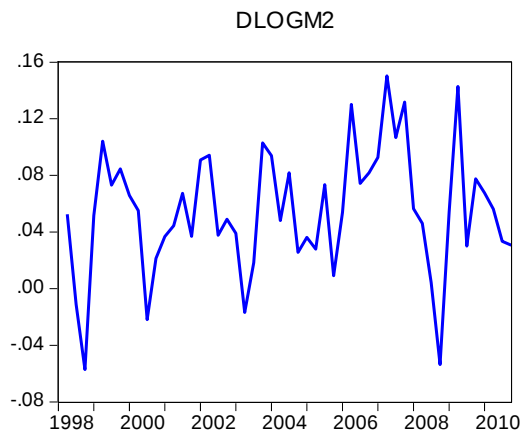
Table 4.12: The Cambodia's Velocity of Broad Money: 1995-2010 Year

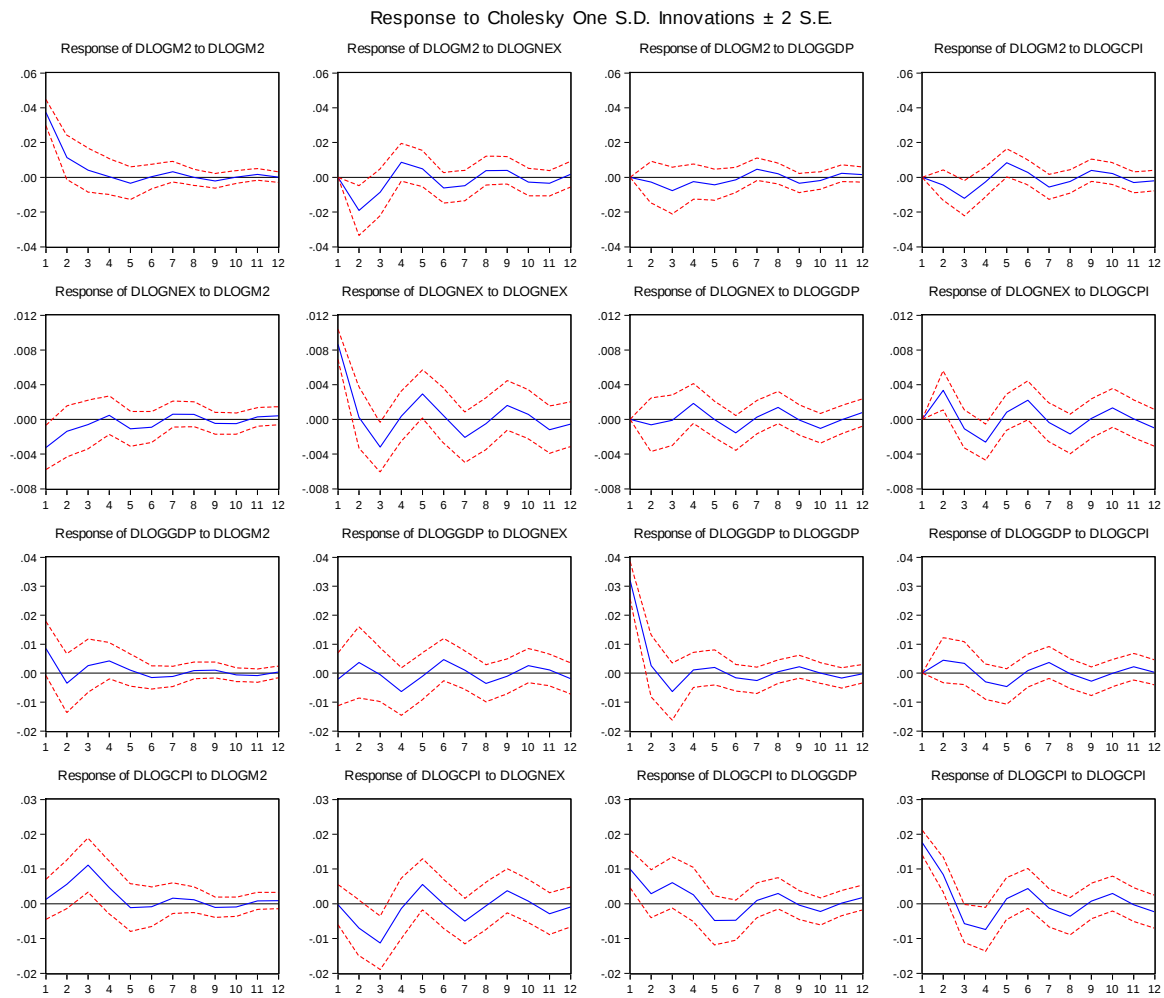
	Nominal GDP (in billions of Riels)	Broad Money (in billions of Riels)	Velocity (V_t)
1995	8,438	649	13.0
1996	9,191	912	10.1
1997	10,130	1,063	9.5
1998	11,719	1,230	9.5
1999	13,376	1,443	9.3
2000	14,083	1,831	7.7
2001	15,617	2,204	7.1
2002	16,768	2,888	5.8
2003	18,535	3,329	5.6
2004	21,437	4,329	5.0
2005	25,756	5,025	5.1
2006	29,849	6,942	4.3
2007	35,002	11,311	3.1
2008	41,968	11,859	3.5
2009	43,057	16,228	2.7
2010	45,424	19,477	2.3
		Average	6.5

Source: IMF, NBC, and MOP.

The average value of velocity which is $V_0 = 6.5$, and $k_0 = 0$ are selected to be an initial values of the state space variables. The parameter estimation of the state space model can be derived from the *Eviews 6*.







Chapter 5

Vietnam's Exchange Rate and Monetary Policy

Nguyen Ngoc Thanh

College of Economics, Vietnam National University, Hanoi

Vietnam has undergone an enormous change since it adopted a economic reform policy in the mid-80s of the last century. The first decade of the new millennium has seen an unprecedented change in the socio-economic landscape of the country. The economy has grown rapidly and it has deeply engaged into economic integration. Since 2006, Vietnam has become a member of WTO, a step seen by many as a country's turning point in its economic policy towards a more market-oriented economy. Yet, this opening and economic reform has also posed a lot of challenges to the country. Increased trade and investment flows to the world and increasing exposure to external shocks require a new skills and approach to macroeconomic management. Managing this fast-growing and deeply integrating into the world economy represent a major challenge for the country in its future of economic development. Recent macroeconomic turbulences and the global financial crisis show the need to have better understand of macroeconomic policies, particularly monetary policy, exchange rate policies, and their links.

I. Significance of the research questions

Research Questions

- What are the relationship between Money supply (M2) and output (GDP), and relationship between inflation and unemployment?
- What are impacts of exchange rate on imports and exports? or whether or not exchange rate policy stimulates exports and restrains imports?
- What are the links between money supply, inflation and exchange rate?

Objectives of the project

This study will evaluate the effectiveness and limitations of monetary policy and exchange rate policies in maintaining high growth and price stability since 1991 up to now in order to draw policy lessons to Vietnam and as well as experiences to Cambodia, Lao and Thailand.

Review literature

There were many materials, articles relating the topic of monetary and exchange rates policies. In this paper, we will review only some article concerning directly to the effect of exchange rates on trade flows and the links between money supply, inflation, and exchange rates in the world and in Vietnam.

- The procedure to calculate nominal and real effective exchange rate suggested by Bahmani-Oskooee (1995) has been applied in many developing countries. It procedure includes three steps and weighted with import share of trading partners.
- To analyze the effects of exchange rates and prices on trade flows, this is necessary to mentioned some authors such as:
 - + Bahmani-Oskooee (1986) estimated the magnitude and time path of the trade flows to changes in the exchange rates and prices for seven countries (Brazil, Greece, India, Israel, Korea, South Africa and Thailand) in the period (1973-1980). His export and import demand functions included relative prices and effective exchange rates, and the Almond lag procedure was imposed. He found that “imports and exports reactions were quicker and the total response time was shorter when an exchange rate, rather than relative prices, caused a change in international prices” (Bahmani-Oskooee, 1986: 122).
 - + Tegene (1991) used two three variable VAR models to examine the response of exports and imports to small changes in relative prices and effective exchange rates. This study showed that the responses of both imports and exports to changes in

relative prices are larger than to changes in exchange rates and the effect of exchange rate shocks to be shorter than for relative price shocks.

+ Deyak et al (1993) analyzed the adjustments of Canadian import demand to changes in income, prices and exchange rates. Their model specification used a polynomial lag structure, which allows them to examine long run elasticities and short run adjustments of imports to change in these variables. Quarterly data from 1958 to 1989 were used in this study. The results showed that the long run effects of exchange rate changes are similar in magnitude to those of domestic and foreign price effects. In the short run, imports react more quickly to change in both prices than to change in exchange rates.

+ Chua and Sharma (1998) investigated the dynamic response of imports and exports to changes in domestic prices, foreign prices and real effective exchange rate for Korea, the Philippines, Singapore and Thailand. These authors used VAR models and cointegration analysis to examine the long run relationship and short run dynamic of these variable. Quarterly data from 1974 to 1995 were used. The result showed that domestic and foreign prices have a larger impact on trade flows than the real effective exchange rates in all cases. There was no evidence for significant differences in the response time of import demand to shock in prices and exchange rates... and in the countries where trade is highly restricted, the response of imports and exports to changes in prices is larger than in countries where trade is freer, etc

+ Deravi et al (1995) used a three vector autoregressive model of exchange rates, price level, and money supply (M2) to trace the link between these variables. There are only three of the above variables used in this model because: "In modeling the monetary approach to exchange rates, we purposely have chosen not to expand the system to include short and long term interest rates and other monetary or financial variables that might impact the behavior of exchange rates" (Deravi et al. 1995:43). In this model, Granger Causality tests, variable decomposition and impulse response were analyzed and their results showed that exchange rates and price level were monetary phenomena and money supply Granger causes both these variables. The variance decomposition results suggested that the money supply and exchange rates contributed to around 10% of inflation rate variation for order 1 and impulse response analysis also indicated that a depreciated dollar leads to a higher rate of inflation over a two-year period.

+ Thanh and Kalirajan (2005) also estimated the effects of prices and exchange rates on the trade flows in Vietnam based on the model of Bahmani-Oskooee (1986). Quarterly data had been used from 1992 to 1998. The result showed that exchange rates and world income had larger effect on exports than prices in the long run in Vietnam in 1990s; this means that the devaluation could stimulate exports over the long run, but in the short term, price effect on exports were larger than the exchange rate effects. Responses of import demand to change in relative import prices were definitely larger than to change in the exchange rates. In fact, devaluation would not

have any significant effect on the imports. Marshall-Lerner condition for the successful use of devaluation to improve exports and trade balance in Vietnam held for the 1990s.

+ Thanh and Kalirajian (2006), had used VAR model of three variables: money supply (M2), Inflation (CPI), and Exchange rates with quarterly data from 1992 to 1998 in Vietnam. The empirical results of this paper show that there has been two-way causality between money supply growth and inflation, exchange rate and inflation, and money supply growth and exchange rate in Vietnam in the 1990s. Both the long run and short run results of this paper suggest that devaluation can be implemented to encourage exports and to improve current account balance and BOP, and also to reduce the real exchange rate appreciation in the short run.

Scope of the study

This study will focus on effectiveness and limitations of monetary and exchange rate policies in maintaining high growth and price stability in Vietnam since 1991 up to now.

Methodology

1. Standard desk study is applied to most part of the study. Data will be collected from official sources such as IMF, GSO (General Statistical Office) and State Bank of Vietnam (SBV). Using secondary data and information from 1991 to 2009.
2. Econometric models such as cointegration tests, export and import demand equations, VAR models will be applied for assessing the impact of monetary and exchange rate policy.

Expected result

- Overview of monetary policy and exchange rate policy in Vietnam in the period 1991-2009.
- Knowing impact of these policies on some key macroeconomic variables such as the link between Money supply with GDP, inflation with employment; impacts of exchange rates on trade flows which were compared with the period 1992-1998,
- Answering a question of the link between M2, inflation and exchange rates and it was compared with period 1992-1998.
- Policy implications will be made.

II. Result of the finding (up to September 2010)

The main findings of this paper up to September include 3 parts, each part contains model specifications, data, unit root tests and estimated results.

1. EXPORT DEMAND MODEL:

1.1 Model specification:

Long run export demand model

The export demand of the world for a country's export depends on the relative prices of the country's export, the exchange rate and the world income. In log linear form, the export demand can be expressed as of the following;

$$\ln X = \alpha + \beta \ln YW + \gamma \ln \left(\frac{PVNX}{PWXT} \right) + \delta \ln E + \theta S_4 + \varepsilon \quad (1)$$

where:

$\ln$ is the natural log operator

X is the index volume of the country's export to its trading partners

YW is weighted average of real GDP of the country's trading partners

$PVNX$ is the country's export price index

$PWXT$ is the world's export price index

E is the exchange rate. Its is defined as the number of units of domestic currency per unit of foreign currency.

The parameters of export equation are:

β is the income elasticity. We expect $\beta > 0$, since an increase in world income should increase demand for export.

γ is the price elasticity of the export demand. γ is expected to be negative as lower export price should boost the export demand.

δ is the exchange rate elasticity of the export demand. As the exchange rate is defined as the units of domestic currency per unit of foreign currency, δ is expected to be positive. An increase in the exchange rate (depreciation) should promote export.

In the case of Vietnam, we use the relative price index ($PVNX/PWXT$) instead of $PVNX$ per se to take into account the relative price of Vietnamese export in comparison of the world export price. Here we assume some product differentials, so that the Vietnamese export can deviate from the world export price. Furthermore, in constructing $PWXT$ we consider only the primary export price index to reflexes the composition of the Vietnamese export (mostly primary goods, less manufactured goods).

We also add a seasonal factor ($S_4=1$ in the fourth quarter, zero otherwise) to take into account for the surge in the demand in the importing countries on the occasion of Christmas and New Year.

As all the variables in Equation (1) are expected to be non-stationary, Equation (1) is the long run relationship between export demand, income, prices and the exchange rate. The long run relationship will be verified if the residuals of the regression results from Equation (1) are stationary, and the short-run ECM model can also be estimated.

Error-Correction Model for export demand:

$$DLnX_t = \rho \varepsilon_{t-1} + \sum_{i=1}^n X_{t-i} + \sum_{i=0}^n DLnYW_{t-i} + \sum_{i=0}^n DLn\left(\frac{PVNX_{t-i}}{PXWXT_{t-i}}\right) + \sum_{i=0}^n DLnE_{t-i} + \omega_t \quad (2)$$

Where

D is the first difference operator.

ε_{t-1} is the residuals from the long run relationship equation estimation and represents the error-correction term

ω_t is the disturbance term.

If the residual term ε_t is stationary, we expect $-1 < \rho < 0$.

1.2 Data description.

The data are quarterly collected for the period from 1992Q4 to 2009Q4.

1.3 Empirical results and interpretations

1.3.1 Unit root tests

As variables in the export demand function are expected to be non-stationary, the unit root tests are applied to all variables. It shows the tests' results. Augmented Dickey-Fuller tests confirm that all variables are integrated of order 1. With the results the 2-steps co-integration estimation of the export demand function can be carried out.

1.3.2 Estimation results

2 variants of the long-run relationship of the export demand function are estimated: one with the nominal real effective exchange rate and the other with the Vietcombank rate. The nominal effective exchange rate version of the export demand function shows a better results

than the Vietcombank rate version, with the exchange rate coefficient (δ) is significant when NEER is used instead of VCB. The fitness coefficient (R^2) is also slightly better in the case when NEER is being used.

The income elasticities are significant and have correct (positive) signs in both equations. The magnitudes of the income elasticity in both equation are nearly the same at 6.7, that means keeping everything else unchanged, 1 percent increase in world income will lead to 6.7% increase in Vietnamese export to the 12 partners countries.

The export demand relative price elasticities are not significant in both equations. The export demand relative price elasticity even has a incorrect sign in the case when the Vietcombank rate is being used. The fact that both price elasticities is insignificant maybe due to the use of world commodity prices instead of the Vietnamese export price index. Unfortunately, the Vietnamese export price index is not published quarterly, therefore it is desirable for the Vietnamese Statistical Office to collect and public the export price index on quarterly, even monthly basic to improve trade policy analysis in Vietnam.

The nominal real effective exchange rate is important in the determination of export demand of Vietnamese goods with the exchange rate elasticity of export demand is significant at 5%. The elasticity is valued at 0.64, that means keeping other things constant, 1% increase in the nominal effective exchange rate will lead to 0.64% increase in the demand of Vietnamese goods in the 12 partners countries.

The seasonal factors coefficient are not significant in both equation suggests that the surge in the Vietnamese export demand has already be captured by the increase in the world income in quarter 4.

Residuals co-integration test

The above inference of long run estimation results can only be valid if the residuals from the estimation are stationary. In that case, we can say that the above variables are co-integrated and the long run equations represent long run relationship between the export demand of Vietnamese goods, the world income, the relative export prices, and the exchange rate. The long-run relationship can be confirmed. The Augmented Dickey-Fuller test statistics show that the residuals from the estimation equation with nominal effective exchange rate are stationary at 5% significance level and the residuals from the estimation equation with Vietcombank rate are stationary at 10% significance level.

Short-run Error-Correction Model

With the favorable results in residuals unit roots testing, we can go ahead with the short-run error-correction estimation.

It (in our paper) shows the results from the short-run co-integration estimation. The adjustment coefficient is slightly higher in the case of the nominal effective exchange rate. Nevertheless, both coefficients have a correct sign and magnitude (negative and greater than -1) and are significant at 1% significant level.

The change in the world income in current quarter (over the last quarter) is the only factor that has a short-run significant impact (at 5% level) on the export demand of the Vietnamese goods and services in the case when nominal effective exchange rate is being used. The change in the world income in current quarter also has a significant short-run impact (at 5% level) on the export demand of Vietnamese goods and services in the case of Vietcombank rate. In both cases, the coefficients of the change in the world income have an expected positive sign. That means, in the short-run the export demand of Vietnamese goods and services will increase (toward its long run equilibrium level) as the world income increases.

Interestingly, the change in relative price in the last quarter will have a significant short-run impact (at 10% significance level) when the Vietcombank rate is being used despite the fact that the relative price has no significant long-run impact. Nevertheless, the coefficient has a wrong sign (an increase in relative price in the last quarter will have a positive short-run impact on the export demand of Vietnamese goods and services). The fact supports the previous observation that the model with nominal effective exchange rate maybe preferable to the model with Vietcombank rate in the case of the export demand model.

The estimation of the export demand model suggests that the nominal real effective rate is preferred to the bilateral USD/VND exchange rate as a tool of trade policy. The world income is the most important factor that defines the world's demand of Vietnamese goods and services. An increase in the world's income will have a positive impact both in the long and short-run on Vietnamese export. On the other hand, a recession in the world economy will impose many difficulties on the Vietnamese export.

2. IMPORT DEMAND FUNCTION:

2.1. Model specification:

Long run import demand model

The import demand for a country is, first of all, a function of domestic real income. Secondly, the import demand is expected to be negatively related to the difference between the price of domestically produced good and the price of imported good. In the model, we also consider the effect of trade openness by adding the import penetration ratio. And finally, we also examine the effect of the exchange rate on the import demand (the relationship is expected to be negative). Accordingly, the long run import demand function for Vietnam is followed:

$$\ln M = \alpha + \beta \ln IND + \gamma \ln \left(\frac{PVNM}{PD} \right) + \delta RIPR + \lambda \ln E + \theta S4 + \varepsilon \quad (3)$$

Where

M is the index of the volume of Vietnamese imports from 12 trading partners.

IND is the volume of industrial production. The industrial production is used to proxy the income as the quarterly GDP was not available during 1990s. The share of industry in GDP has risen from 30 to approximately 40% now a day.

PVNM is the import price index

PD is the domestic price index proxies by *CPI*

RIPR is the import-penetration rate

E is the exchange rate

S4 is the seasonal factor (*S4*=1 in the fourth quarter and zero otherwise). The seasonal factor is to reflex the increase in import on the occasion of the New Year event and end of the financial year.

And ε is the error term.

β is the income elasticity (or industrial production elasticity), which is expected to be positive as an increase in income will lead to more import.

γ Is the relative price elasticity. γ is expected to be negative as higher relative price of the imported goods will reduce the demand on imported goods.

δ is the coefficient of penetration rate and is expected to be positive as more trade openness will lead to higher import demand.

The elasticity of import demand to the exchange rate (λ) is expected to be negative to reflect the fact that devaluation of the domestic currency will have a negative impact on the import.

With the results from estimation of long run equation we can construct the short-run error correction model:

$$D\ln M_t = \varphi_0 + \rho \varepsilon_{t-1} + \sum_{i=1}^n \varphi_{1i} D\ln M_{t-i} + \sum_{i=0}^n \varphi_{2i} D\ln IND_{t-i} + \sum_{i=0}^n \varphi_{3i} D\ln \left(\frac{PVNM_{t-i}}{PD_{t-i}} \right) + \sum_{i=0}^n \varphi_{4i} DRIPR_{t-i} + \sum_{i=0}^n \varphi_{5i} D\ln E_{t-i} + v_t \quad (4)$$

Where

D is the differential operator.

ε_t is the residuals from long run equation estimation

v_t is the residuals of the short-run co-integration equation

The adjustment coefficient ρ is also expected to be in $[-1,0]$.

2.2. Data description

IND is the index of industrial production. Data is taken from GSO, Vietnam.

PVNM Vietnam import price index calculated from the world commodities' indices with Vietnamese import composition as weights.

PD is the Vietnam's CPI also from GSO.

RIPR is the Vietnam's real import-penetration ratio and is defined in the following formula:

$$RIPR = \frac{IMPORT}{(IND + IMPORT - EXPORT)} \quad (5)$$

To avoid the correlation between RIPR and the residuals from long run model (ε) problem we do not use the total country's export and import, not the import and export from the above 12 partner countries. The IMPORT and EXPORT statistics is from the IMF's DOT database.

The exchange rate (both VCB and NEER) is as of the above (export demand model section).

2.3 Empirical results and interpretations

2.3.1 Unit root tests

Augmented Dickey-Fuller Tests show that all variable of the import demand equation are integrated of order one. It shows that the null hypothesis of non-stationary can be rejected at 1% significance level with the first differenced data, while such a hypothesis cannot be ruled out for the level data.

2.3.2 Estimation results

Long-run Model

With the unit root test results, we can go ahead with the estimation of long-run import model. Unlike the case of export demand model, in the import demand function the version with Vietcombank rate is preferred to the case where nominal effective exchange rate is being used. Nearly all coefficients (except the coefficient for S_4) are significant at least at 5% level in the case where the Vietcombank rate is being used. Meanwhile, there is only 3 coefficients in the case of nominal effective exchange rate are significant. Other statistics, for example R^2 , DW, F-statistic are also better in the model with the Vietcombank rate.

The estimation result is no surprise because of the dollarization of the Vietnamese economy. Nearly all Vietnamese import from the world is being paid in USD, therefore the exchange rate between USD/VND is much more important to the import demand rather than the nominal effective exchange rate.

The income elasticity (or industrial production elasticity) of the import demand is significant (at 1% level) and has correct sign in both equations. The coefficient is greater in the Vietcombank rate equation. 1% increase in domestic income (or industrial production) will lead to 1.16% increase in import in the Vietcombank rate equation, while the same increase in income will only generate 0.78% increase in import when the nominal effective exchange rate is being used.

The relative price elasticity (between imported and domestically produced good $PVNM/PD$) of import demand is significant (at 5% level) and has the correct sign only in the case when the Vietcombank rate is being used. 1% increase in the relative price will reduce the import demand by 0.22%.

The coefficient of trade openness is significant (at 1% level) and has the correct sign in both cases. The magnitude is also approximately equal: 0.66 in the case of nominal effective exchange rate and 0.62 in the case of Vietcombank rate.

The exchange rate elasticity of import demand is only significant (at 1% level) and has a correct sign in the Vietcombank rate equation. The results show that import is very sensible with the USD/VND exchange rate, 1% increase in the exchange rate will reduce import by 1.45%.

Finally, the coefficients of the seasonal variable (S_4) are insignificant in both equation.

Residuals co-integration test

The above results of long-run estimation equation are only valid when the residuals from estimation of that equation are stationary. This confirms the hypothesis (residuals are stationary) for both equation (with VCB or NEER) at 1% significant level.

Short-run model

The favorable unit root testing of the residuals allows us to estimate the short-run error-correction version of the import demand function. It reports the results of the short-run equation estimation.

The coefficients of the lag residuals are both significant at 1% and have appropriate value. The adjustment coefficient is -0.38 in the case of nominal effective rate, while the deviation from long-run equilibrium value of the import demand is adjust quicker in the case of the Vietcombank rate, which equal to -0.66.

The past change in import demand has a short-run significant impact (at 10% level) only in the case of NEER equation. Nevertheless, the sign of the coefficient is arguable, as an increase in past import will reduce the current import.

Current income has a short-run significant impact (at 1% level) on the import demand. The coefficients also have a correct sign in both cases: an increase in current income will lead to a short-run increase in import demand. The magnitudes of the coefficients in both equations are also much closed to each other.

In the case of VCB equation, the past relative price (between imported and domestically produced goods) has a significant (at 10%) short-run impact on the import demand. The sign of the coefficient is positive indicate that the import demand-price dynamics maybe complicated and oscillates around the steady state value.

Finally the current trade openness will have a significant impact on the adjustment process of the import demand. In both cases, the coefficients are significant at 1% level. The sign of the coefficients is also having a correct positive sign, indicates that an increase in trade openness in the current quarter will temporarily increase the import demand.

In conclusion, the nominal USD/VND rate is more important in determination of the import demand than the nominal effective exchange rate. If we use the USD/VND rate from Vietcombank (the largest bank in Vietnam), the estimation results show that the income, relative price (between imported and domestically produced goods), trade openness, and the exchange rate all have significant impact in import demand determination.

3. INFLATION EXCHANGE RATE MONEY SUPPLY MODEL:

3.1 Model specification

To analyze the interaction between inflation, exchange rate and the money supply, we employ the three variable vector error correction model. The model can be represented in the vector form as followed:

$$D\ln Y_t = \psi_0 + A \otimes B D\ln Y_{t-1} + \sum_{i=1}^p \psi_{1i} D\ln Y_{t-i} + e_t \quad (6)$$

Where

D and $\ln$ are the differential operator and natural logarithm operator as the above.

Y_t is a three elements vector of inflation (proxies by CPI), money supply (M2) and the

exchange rate (Vietcombank rate VCB): $Y_t = \begin{pmatrix} CPI \\ M2 \\ VCB \end{pmatrix}$

A is the 3x3 matrix of adjustment coefficients.

B is also 3x3 matrix of coefficients of long run models.

ψ_{1i} is p 3x3 matrices of short-run coefficients

e_t is the 3 elements vector of residuals.

3.2 Data description

The quarterly money supply (M2) data comes from 2 sources. The data for the period from 1995 onward is taken from the IMF' IFS database. The data earlier than 1995Q1 is taken from the State Bank of Vietnam.

CPI is quarterly inflation rate from GSO website.

The exchange rate is the Vietcombank rate as defined in the above sections.

3.3 Empirical results and interpretations

3.3.1 Unit root & cointegration tests

Before the VECM analysis can be done, the data have to be checked by the unit root and cointegration test. This shows that, the Augmented Dickey-Fuller test confirms all the variables (CPI, M2, VCB) are integrated of order 1. Therefore the VECM analysis can be done for the variables to identify the short and long run dynamics of the three variables.

Co-integration test

These show the result of the co-integration rank test for the three variables. The test strongly rejects the hypothesis of no co-integration vector, but cannot reject the hypothesis that there is at most 1 co-integration vector. This suggests that there is one co-integration vector among three variables.

3.3.2 Estimation results

The long-run and short run coefficient of the VECM are estimated simultaneously.

The co-integration vectors

The estimation for long-run coefficients of VCB and M2 are both significant at 1% level. The coefficient of M2 has an opposite sign with the CPI and the exchange rate means that an increase in money supply can cause both CPI and the exchange rate to rise.

The short run model

This (in our paper) shows the results of the estimation for adjustments and short-run coefficients. The adjustment is significant only in the case of CPI equation. In the CPI equation, the past CPI has significant impacts on its short-run adjustment process with the coefficients of the first different in the past 1st and 4th period are significant at 1% level. The exchange rate (past 4th period) also has an effect on the short-run adjustment process with its coefficient is significant at 5% level. In the case of the exchange rate equation only past fourth quarter has a significant (at 5% level) positive impact on its short-run adjustment.

Meanwhile, in the case of M2, only CPI has significant impact on its short-run adjustment process (past first and fourth quarter).

Granger causality tests:

The Granger causality test is carried out to see what variable can predict other variables. This (in our paper) shows that M2 Granger causes CPI and the Vietcombank exchange rate at 5% significance level. That means past growth in the money supply can explain the current inflation and exchange rate movement. Meanwhile, CPI also Granger causes Vietcombank rate and M2 at 10 and 1% significance level respectively. The results show that the dynamics of money supply and inflation can help prediction of movements in the exchange rate. The relationship of the three variables can be explored more when we consider the variance decomposition and impulse response function bellowed.

Variance decomposition

This (in our paper) shows that at the forecast horizon of 5 quarters, 87% of variation in LnCPI is explained by its own shock, 5.4% by the shock in LnM2 and approximately 1% explained by LnVCB. These results are not contradictory with the findings of Granger causality tests. The results are reverse in the long run, with 93.8% of variation in LnCPI explained by LnVCB and less than 1% explained by LnM2.

On the other hand, at the forecast horizon of 5 quarters, 95.9% of variation in LnVCB is explained by its own shock, 3.6% by the shock in LnM2 and approximately 0.5% explained by LnCPI. The situation is similar in the long run. 90% of variation in LnVCB is explained by its own shock after 100 quarter, 9.3% by the shock in LnM2 and approximately 0.35% explained by LnCPI.

Impulse responses

In order to evaluate the response of CPI and exchange rate when we have a shock to LnM2. This shows the response of inflation, exchange rate, and M2 after One S.D. Innovations to LnM2.

VCB responses very quickly to the shock and rises in the next quarter. It fluctuates a bit after 8 quarters and stays permanently at a higher level.

CPI on the other hand responses to the rise in money supply only in the second quarter. Price level rises until 9th quarters (although fluctuate a bit) before descending to even a lower level than that at time zero.

Money supply (being affected by CPI and VCB) also fluctuates. With a slow response of CPI in the first quarter after the shock, money supply increases a bit more in the second quarter. Nevertheless, with the rise in both price level and exchange rate, money supply declines after the second quarter until the 8th quarter. As the price level falls after the 9th quarter, money supply rises again and stays at a bit lower than the initial one standard deviation shock.

In conclusion, the money supply seems to have big short run impact to price level and the exchange rate. Nevertheless, in the long run, 90% of variation in the exchange rate is explained by its own shock. The impulse response graph also shows that in the long run the exchange rate will likely stay at a higher level after a positive shock to money supply, while price level may not.

III. Analysis and summary of the first 6 months of research

Up to now, we have completed some main works relating our chapter in the project:

- Building appropriate models for our chapter
- Collecting materials, data from IMF' IFS, SBV, MOF, etc
- Attending the first workshop in Vientiane (Lao) and presented preliminary findings.
- Correct for the advices of the first workshop and finished data collection and estimation of 3 equations.
- Finished the model specification and interpretation of the estimation results for the export demand equation
- Finished the model specification and interpretation of the estimation results for the import demand equation
- Finished the model specification and interpretation of the estimation results for the VAR model of inflation, exchange rate, and money supply.
- Started to finalize al first draft of our paper.

IV. References

Abeyasinghe T., Rajaguru G., (2004). 'Quarterly Real GDP Estimates for China and ASEAN4 with a Forecast Evaluation', *Journal of Forecasting*. 23, 431–447.

Bahmani-Oskooee (1986). 'Determinants of international trade flows: the case of developing countries'. *Journal of Development Economics*, 20(1): 107-23

Bahmani-Oskooee, (1995). 'Real and nominal Effective Exchange rates for 22 LDCs: 1971:1-1990:4'. *Applied Economics*, 27(7):591

Chua, S.Y., and Sharma, S.C., (1998). 'An Investigation of the effects of prices and exchange rates on trade flows in East Asia'. *Asian Economic Journal*, 12(3): 253-271.

Deyak T.A., Sawyer, W.C., and Sprinkle, R.L., (1993). 'The adjustment of Canadian import Demand to changes in income, prices, and exchange rates?' *Canadian Journal of Economics*, 26(4): 890-900.

James G. MacKinnon, Alfred Haug, and Leo Michelis., (1999). 'Numerical Distribution Functions of Likelihood Ratio Tests for Cointegration', *Journal of Applied Econometrics*, Vol. 14, No. 5, pp. 563-577.

Nguyen Ngoc Thanh and Kaliappa Kalirajian, (2005). 'The Important of Exchange Rate Policy in Promoting Vietnam' Exports'. *Oxford Development Studies*, Vol. 33, No 3&4, September – December.

Nguyen Ngoc Thanh and Kaliappa Kalirajian, (2006). 'Can devaluation be effective in improving the balance of payments in Vietnam?' *Journal of Policy Modeling*, 28(2006):467–476.

Tegene, A., (1991). 'Trade flows, relative prices, and effective exchange rates: a VAR model on Ethiopian data'. *Applied Economics*, 23(8):1369-376.

Chapter 6

The Effects of Government Spending on Output in Vietnam

Vu Quoc Huy¹

University of Economics and Business, Viet Nam National University

The effects of fiscal policy have been a controversial topic with competing views and mixed empirical evidence. For a long time, using a VAR model to assess the effects of fiscal policy was not as popular as for monetary policy. In recent years, however, there has been a growing body of literature using a structural VAR model for fiscal policy effects assessment. Most of the literature on the effectiveness of fiscal policy has been written in an advanced economy context, although most of the theoretical discussions and arguments can carry over to a developing country setting. There is a view that developing country economic activity is more likely influenced by supply-shocks to it, which leaves fewer opportunities to use fiscal policy for demand management. Nevertheless, there has been also growing number of studies applying this SVAR method for economies in transitions as well as for developing countries and provide interesting results. This paper represents an attempt to make a quantitative assessment of the effects of the government spending in Viet Nam using a structural VAR model.

The paper is organized as follows. Section 1 provides a brief literature review, documenting recent development in using structural VAR for assessing the effects of fiscal policy. Section 2 presents a summary of key steps in identifying and constructing a SVAR model. Section 3 shows data sources and variable construction. Key time-series tests are presented in this Section. Section 4 shows preliminary results of applying this method to examining the effects of government spending in Viet Nam on output, using quarterly data from 2000Q1. These results show that the government spending has a rather limited and quickly fading effect on the industrial output. Moreover, the government spending has different effects on state-owned and the private sector. While the response of the state-owned sector to the government spending is far more positive and long-lasting, that of the private sector is rather limited and negative. The results also show that government spending composition matters as long as its effects on output and price concerned.

¹ I am grateful to the Thai Research Fund to support this study. My thanks also go to Iris Claus, Anwar Nasution and other participants of the Asian Economic Panel Conference in Tokyo, September 2010 for their valuable comments and suggestions. Discussions with participants of Siem Reap workshop in October 2010 and comments from an anonymous referee are extremely useful. All remaining errors are mine.

I. A brief literature review

There have been a growing number of studies on the effects of fiscal policy in recent years using structural VAR model. Based on Blanchard and Perotti (2002) work, a number of studies were taken to examine the effects of fiscal policy on the economy using more or less an uniform approach of a structural VAR. Table 6.1 summaries some these studies.

Heppke-Falk, Tenhofen and Wolff (2006), for example using a structural VAR model with 5 variables to study the effects of fiscal policy in Germany from 1974Q1-2004Q1 have found that a government expenditure shock triggers an output increase, boosts private consumption but not private investment. On the other hand, they found that government investment has stronger effects on macroeconomic activity than government personnel expenditure, while indirect tax shocks seem to have weaker effects than direct tax shocks. Fernández and Hernández de Cos, (2006) in a similar 5-variable SVAR study on Spain, using quarterly data from 1980Q1 to 2004Q4 have come to a conclusion that increases in government expenditure have a positive impact on economic growth in the short term, but the effect turns negative in the longer term. Both government expenditure and net tax increases generate public deficits in the medium term but they have opposite impact on the price level and output. The government expenditure shocks lead to increase in price level while net-tax increases trigger a negative short-term price response. Finally, these authors conclude that the responses of GDP or prices are found to differ significantly depending on the spending or tax component considered. In another study using similar approach to the case of Pakistan, Shaheen and Turner (2008) find similar conclusions for fiscal policy impact for Pakistan. These authors nevertheless show some weakness of the SVAR approach, arguing that the results obtained from a SVAR model may lose their accuracy over longer horizons and should be treated with caution. The structural VAR approach was also used to analyze fiscal policy effects in some middle-income and developing countries. Restrepo and Rincón (2006) for example apply this model to Chile and Columbia; Štiková (2006) uses this model for Czech Republic. The results obtained from these studies also sensible and these authors believe that the SVAR approach can be considered as a good tool for assessing fiscal policy effects.

Table 6.1: Summary of features of the fiscal SVAR literature.

Paper	Variables used	Identification method	Country	Sample period
Blanchard and Perotti (2002)	Taxation per capita, government spending per capita, output per capita	Variable order based on institutional events	US	1974Q1-1997Q4
Perotti (2002)	Taxation per capita, government spending per capita, output per capita, inflation, short term interest rate		US, UK, West Germany, Canada, Australia	vary
Claus et al (2006)	Taxation per capita, government spending per capita, output per capita	As Blanchard and Perotti (2002)	NZ	1982Q3-2004Q3
Favero and Giavazzi (2007)	GDP per capita, GDP deflator, government expenditure per capita, taxation per capita, debt		US	1960Q1-2006Q2
Chung and Leeper (2007)	Output, GDP deflator, short term interest rate, long term interest rate, money base, taxation, government spending, debt		US	1947Q2-2006Q2
Rezk, Avramovich and Basso (2006).	current public expenditure (PE), tax revenues (TR), gross domestic product (GDP), unemployment (UNE) and inflation (INFL) rates.		Argentina	1984Q1-2005Q2
Restrepo and Rincón, (2006).	net taxes, government spending on wages, goods and services and investment, and real GDP.		Chile and Colombia	1990Q1-2005Q2
Štiková (2006)	real GDP, government spending, government revenue, change in net CPI and three month PRIBOR		Czech Republic	1996Q1-2006Q1
Heppke-Falk, Tenhofen and Wolff, (2006)	real GDP, GDP-deflator, nominal short-term interest rate, real government direct expenditure and real government net revenue		Germany	1974Q1-2004Q4
Shaheen and Turner (2006)	public expenditure, net taxes, GDP in real terms, consumer price index and interest rate of government bonds		Pakistan	1973Q1-2008Q4
Fernández and Hernández de Cos, (2006).	Public expenditure, net taxes, GDP in real terms, GDP deflator and three-year interest rate of government bonds		Spain	1980Q1-2004Q4
Rarytska, O. (2003)	Government expenditures, government revenues, total output and price level		Ukraine	1998M8-2002M3

Source: Adapted from Mardi Dungey and Renée A. Fry (2007) and updated by the author

II. Model specification

Following Blanchard and Perotti (2002), Heppke-Falk, Tenhofen and Wolff (2006) and Fernández and Hernández de Cos (2006) and many others, I will use a four-variable structural VAR model to analyze the effects of government spending and taxes on output and price in Viet Nam during the last decade.

The standard reduced form VAR model is:

$$X_t = B(L)X_{t-1} + U_t$$

Where X_t is the vector of variables; $B(L)$ is an autoregressive lag polynomial and U_t is the reduced form innovation. Four variables which are used in this model are total industrial output, price index, government revenue and government total expenditures. The reason for using total industrial output instead of GDP is simply that the former is available while the latter is made published only from 2004:4 so the time span is not long enough for modeling. Attempt to interpolate to get quarterly GDP data from the annual ones proves to be undesirable as pointed by Shaheen and Turner (2008), for example.

Following Perotti *et al.* (2005), we identify the fiscal shocks by imposing contemporaneous restrictions on the vectors U_t , in order to derive a vector of ‘structural’ fiscal shocks, which are orthogonal to each other and to the variables of the model. The formal representation of this structural VAR is as follows:

$$AU_t = BE_t$$

where the shocks E_t are independent and identically distributed with covariance matrix equal to one.

In this four-variable model, only two fiscal shocks associated with two fiscal variables are considered. They are e_t^r : government revenues/taxes shock and e_t^g : government spending shocks.

$$u_t^r = \alpha_{ry}u_t^y + \alpha_{r\pi}u_t^\pi + \beta_g^r e_t^g + e_t^r$$

$$u_t^g = \alpha_{gy}u_t^y + \alpha_{g\pi}u_t^\pi + \beta_r^g e_t^r + e_t^g$$

According to Perotti (2005) these equations reflect three components: the structural policy shocks, which are uncorrelated with each other and with all other structural shocks in the economy; the automatic response of net taxes and government spending to innovations in output and price and finally the systematic discretionary response of policymakers to output and price.

We define cyclically-adjusted (CA) fiscal shocks as follows

$$u_t^{r,CA} \stackrel{\text{def}}{=} u_t^r - (\alpha_{ty}u_t^y + \alpha_{t\pi}u_t^\pi) = \beta_g^r e_t^g + e_t^r$$

$$u_t^{g,CA} \stackrel{\text{def}}{=} u_t^y - (\alpha_{gy}u_t^y + \alpha_{g\pi}u_t^\pi) = \beta_r^g e_t^g + e_t^r$$

In the next Section we will describe what data we use for this model

Identification Strategy and Estimation Procedure

Perotti (2002; 2005 and 2006) applied a four-step estimation procedure for structural VAR model. This four-step procedure is used by most studies that use the Blanchard and Perotti's approach to assess the effects of fiscal policy. The procedure can be briefly described as follows:

Step 1. Establishing a formal representation of the reduced form residuals from the standard VAR model to establish relationship between these residuals and structural shocks to government revenues/taxes and expenditure. Recall that the formal representation of the standard VAR model with 2 fiscal variables has the following form:

$$u_t^r = \alpha_{ry}u_t^y + \alpha_{r\pi}u_t^\pi + \beta_g^r e_t^g + e_t^r$$

$$u_t^g = \alpha_{gy}u_t^y + \alpha_{g\pi}u_t^\pi + \beta_r^g e_t^r + e_t^g$$

where e_t^t and e_t^g are the structural shocks to the government taxes and expenditures, respectively.

Since the reduced form residuals u are correlated with structural shocks e , it is not possible to estimate this formal representation. So it needs a new approach which is reflected in Step 2.

Step 2. Estimating cyclically adjusted (CA) reduced form of fiscal shocks using external/exogenous elasticities. The cyclically adjusted (CA) residuals $u_t^{r,CA}$ and $u_t^{g,CA}$ of government revenues and government expenditures are computed by the following formula:

$$u_t^{r,CA} \stackrel{\text{def}}{=} u_t^{rt} - (\alpha_{ry}u_t^y + \alpha_{r\pi}u_t^\pi) = \beta_g^r e_t^g + e_t^r$$

$$u_t^{g,CA} \stackrel{\text{def}}{=} u_t^y - (\alpha_{gy}u_t^y + \alpha_{g\pi}u_t^\pi) = \beta_r^g e_t^r + e_t^g$$

All coefficients $\alpha_{r\pi}$, α_{ry} , $\alpha_{g\pi}$ and α_{gy} are obtained from external sources or can be estimated outside from this VAR model, but using the same database. The computed cyclically adjusted (CA) residuals $u_t^{r,CA}$ and $u_t^{g,CA}$ are then considered as inputs to estimate two coefficients β_g^r and β_r^g in the next step

Step 3. Estimating structural shocks β_g^r and β_r^g .

It is not possible to estimate both β_g^r and β_r^g with limited information from computed $u_t^{r,CA}$ and $u_t^{g,CA}$ as obtained in Step 2. Here is a crucial assumption about the ordering of structural shocks of fiscal variables. Setting $\beta_g^r = 0$ means that tax decision comes first, where setting $\beta_r^g = 0$ means the spending decision prevails. We follow Perotti (2005, 2006) and many others to suggest

that spending decision comes first. A Granger causality test, presented later in this paper tends to support this decision. In this case, β_g^r can be estimated by OLS in the following equation:

$$u_t^{r,CA} = e_t^r$$

$$u_t^{g,CA} = \beta_g^r e_t^r + e_t^g$$

Step 4. Estimating the rest of the VAR model

In this step, the remaining equation for other macroeconomic variables is estimated using the previous information. In our four-variable model setting, there are two remaining equations with four coefficients to be estimated. They are as follows:

$$u_t^y = \alpha_{yr} u_t^r + \alpha_{yg} u_t^g + e_t^y$$

$$u_t^\pi = \alpha_{\pi y} u_t^y + \alpha_{\pi r} u_t^r + \alpha_{\pi g} u_t^g + e_t^\pi$$

As Perotti *et al.* (2005) these two equations can be estimated by OLS method using the previously estimated series of e_t^{r*} and e_t^{g*} as instruments for u_t^r and u_t^g

The result of this four-step estimation procedure allows construct the matrix A and matrix B of the structural VAR model and now we have the system as

$$Au = \begin{bmatrix} 1 & 0 & -\alpha_{yr} & -\alpha_{yg} \\ -\alpha_{\pi y} & 1 & -\alpha_{\pi r} & -\alpha_{\pi g} \\ -\alpha_{gy} & -\alpha_{g\pi} & 1 & 0 \\ -\alpha_{ry} & -\alpha_{r\pi} & 0 & 1 \end{bmatrix} \begin{pmatrix} u_t^y \\ u_t^\pi \\ u_t^g \\ u_t^r \end{pmatrix} = Bu = \begin{bmatrix} 1 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 \\ 0 & 0 & 1 & 0 \\ 0 & 0 & \beta_g^r & 1 \end{bmatrix} \begin{pmatrix} e_t^y \\ e_t^\pi \\ e_t^g \\ e_t^r \end{pmatrix}$$

When this structural VAR is estimated and identified, we can get impulse responses to evaluate dynamic effects of a structural shock.

Exogenous Elasticity Estimation

As studies show the results of structural VAR model depend on different assumptions on the system and its parameters. Estimation of core coefficients underlying the formal representation of the model therefore is crucial for the results. While a uniform method of estimation is generally applied for those coefficients that can be estimated within the system, , exogenous or external elasticities are derived from different sources and different methods are applied depending mostly on available information and some institutional knowledge (Perotti *et al.* (2006) and Heppke-Falk, Tenhofen and Wolff, (2006)). Table 6.2 summaries some of these approach. Most authors use a simple OLS regression with different lags when internal data are used. Very few used error-

correction model for this purpose. Robustness check and sensitivity analysis, however have been quite common to check the final results.

Table 6.2: Summary of features of the fiscal SVAR literature.

Paper	Variables used	Elasticity estimation	Country
R.Giordano, S. Momigliano, S. Neri and R. Perotti, (2005).		Using external estimates	Italy
Restrepo and Rincón, (2006).	net taxes, government spending on wages, goods and services and investment, and real GDP.	Using time-series regression for contemporaneous effects	Chile and Colombia
Štiková (2006)	real GDP, government spending, government revenue, change in net CPI and three month PRIBOR	Combine both time-series regression and external estimates	Czech Republic
Heppke-Falk, Tenhofen and Wolff, (2006)	real GDP, GDP-deflator, nominal short-term interest rate, real government direct expenditure and real government net revenue	Combine both time-series regression and external estimates	Germany
Shaheen and Turner (2006)	public expenditure, net taxes, GDP in real terms, consumer price index and interest rate of government bonds		Pakistan
Fernández and Hernández de Cos, (2006).	Public expenditure, net taxes, GDP in real terms, GDP deflator and three-year interest rate of government bonds	Combine both time-series regression and external estimates	Spain
Rarytska, O. (2003)	Government expenditures, government revenues, total output and price level	Using internal information for regression	Ukraine

Source: Author's summary.

In this paper, we apply a simple regression to derive these needed elasticities. In the future, these results need to be checked with other sources (which is, unfortunately very scarce) or different methods. Table 6.2 provides these estimates for different variables.

III. Source of data and variable construction

For the structural VAR model, the availability of quarter data of key variable, including fiscal is crucial. That explains a lot why most of studies on this area were mainly focused on developed countries (Perotti et al, 2004). Until recently, this area of research starts to penetrate to other

countries, including some developing economics thank to emerging of new data. In some cases, interpolation of lower-frequencies data is used to obtain needed quarterly data for model use, but this approach may cause some problems. In the case of Viet Nam, when traditionally data availability is really a scarce resource for research and economic decision-making, new improvement has been shown in recent years including that in the government finance area. From 1997, the Government committed to release publicly government budget data as a part of its financial transparency commitments. Since then, quarterly government finance data have been available for wider public. The data reliability and consistency are still in question but their availability is a good improvement and makes it possible to apply some modeling techniques to evaluate policy. The length of data is far from desirable but with 42 observations, something can be done for policy analysis.

The structure and development of government budget in Viet Nam

While there are many difference remained in the definition and operational applications of various terms in the government budget between Viet Nam and other countries, this paper will use the same definition for government spending and taxes as in these reference studies. Therefore, in this paper the government expenditure is defined as total purchases of goods and services. In the Vietnamese budget specification that would include two items: government capital expenditure and government current expenditure. As in other cases interest payment is excluded from government spending.

On the revenue side, two items are excluded from ‘government taxes’. These are receipts from oils (both as transfers from state-owned companies and as taxes, including corporate income tax and natural resources taxes. The reason of excluding these receipts from the government revenues is that they are not responsive to any domestic economic conditions. Viet Nam has no refine facility so it has to export all crude oil. Oil revenues depend solely on the external environment so including them into the government revenues would mislead some of impact on output and price that we are interested in. For a similar reason, official development assistance (ODA) is also excluded from the revenues because it is considered as transfer. For the fiscal policy analysis purposes, it may be more complicated because, some of ODA are considered as ‘budget-support items’ so they have the same role as other items. For a similar reason, official development assistance (ODA) is also excluded from the revenues because it is considered as transfer. For the fiscal policy analysis purposes, it may be more complicated because some of ODA are considered as ‘budget-support items’

Table 6.6-6.10 show data of government budget from 2000 to 2009 with breakdown for both revenues and expenditures. On the revenue side, taxes account for nearly 90 percent of total revenue, but income taxes, including both corporate income and personal income account for around 40 percent of total taxes. A sharp drop in the share of income tax in 2009 is due to tax-break initiated by the Government as a counter-measure to the economic slowdown as a result of the global recession. At the same time, personal income account for a negligible share in total tax collection. As Kojo Oduro (2007) rightly puts it ‘around 74 percent of Vietnamese pay no tax at all’. Import duties tax also lost its relevance in the total government revenues. This is partly because of tariff liberalization efforts, implemented intensively in recent years as Viet Nam engaged in many regional and bilateral trade and investment arrangements.

On the expenditure side, capital expenditure includes two key items: government spending on public investment on infrastructure and supporting state-owned enterprises. That explains why the share of capital expenditure still remains significant (almost one-third of total). It is also expected that the state sector can benefit a lot from the government spending. Concerning the current expenditure, most of it is in form of wage to the state employee, other targeted programs. It should be noted that under the current system of fiscal decentralization, part of central government budget is given to provinces for their own need of spending. Of total 64 provinces in Viet Nam, 48 provinces get net transfers from the central budget.

One of the prominent features of the Vietnamese fiscal system is that there is strong role of the government in providing budget resources for public investment and development finance and supporting state-owned enterprise.

Financing the budget deficit and macroeconomic stability issue

One of intensively debated issues in Viet Nam recently is the macroeconomic stability and related to this the issues of the effectiveness of government spending and its sustainability in particular. Using ICOR (Incremental Capital Output Ratio) as a measure of the effectiveness of investment and government spending, many argue that this ratio exhibits a continuing upward trend in the last two decades. Vuong Quan Hoang (2009) for example shows that the ICOR for the whole economy has increased from as low as 3.05 in the period of 1991-1995 to as high as 8.0 in 2009. More importantly, there is evidence that the state sector has much higher ICOR than the national average (Nguyen Phi Lan, 2010). Many relate this seemingly inefficient use of resources to ineffective government spending via public investment and other targeted programs. As a result, the government budget deficit tends to widen as shown in Table 6.9. In the last five years, especially during the global financial crisis, the government budget deficit tends to widen further, exceeding a 5-percent limit set by the National Assembly. Widening the government budget deficit has a profound implication to the macroeconomic stability for the Viet Nam economy for many reasons. Firstly, it increases the burden of national debt which may become a real issue in the near term (Vu Thanh Tu Anh, 2010). Secondly, both ways of financing the deficit, e.g. via domestic or foreign borrowing will have serious consequences for the economy in the context of Viet Nam. Domestic financing often leads to monetizing the deficit even in the case of initially selling the government treasury bonds to the public or to commercial banks. On the other hand, foreign borrowing will expose the economy to increasing risk of exchange rate fluctuation as evidenced in recent years. Both exchange rate and inflation induced by deficit financing represent a significant risk for the economy's macroeconomic stability.

Industrial output

In this paper, we don't use GDP as a variable in the model because of the absence of the data before 2004. Today the Government publishes quarterly data on GDP, but before 2004, only annual data on GDP is available. Interpolation of annual data to get quarterly data may cause some problems as pointed out by Shaheen and Turner (2008). Instead, data on industrial gross output has been published regularly with monthly frequency and with quite detailed breakdown to different sectors by ownership, for example. Therefore, in this model, we use industrial output not GDP data.

As previously mentioned, in Viet Nam, there is still strong presence of the state sector in the economy and with this a heavy budget support (directly or indirectly) to the sector. In this context, it is important to examine the effects of the government spending on each sector: the state and the private separately. Therefore, there is also a need to disaggregate the total industrial output into these components. Later on these disaggregated data will be used in different model options.

Data transformation and analysis

In this study we will use the following key variables

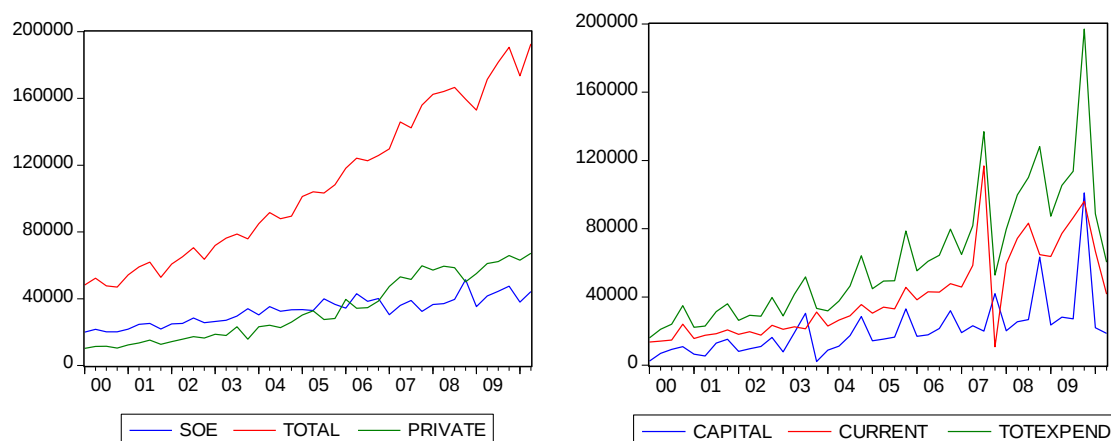
- *TOTAL*: total industrial output produced in a given quarter
- *SOE*: industrial output produced by the state sector
- *PRIVATE*: industrial output produced by the private sector as a whole
- *TOT_REV*: total budget revenues
- *TOTEXPEND*: total government spending
- *CAPITAL*: total government capital expenditures
- *CURRENT*: total government current expenditures, and
- *CPIINDEX*: price index

In total, there are seven variables divided into four groups of indicators in our model. These groups include output (includes *TOTAL*, *SOE* and *PRIVATE*); price (*CPIINDEX*); government revenues (*TOT_REV*) and government spending (*TOTEXPEND*, *CAPITAL* and *CURRENT*). Not all these variables will be used simultaneously in a model. Instead, in each option only four variables, one from each group will be included into the model. For example in the basic model, we use for variables *TOTAL*, *TOEXPEND*, *TO_REV* and *CPIINDEX* to analyze the effects of *total* government spending on *total* industrial output. In another case, only government *capital* spending *CAPITAL* is used to analyze the effects of this *particular kind* of government spending on the total output. Similarly, in another setting, when the effect on the state-sector output is in focus, variable *SOE* will be used instead of *TOTAL*.

Data transformation.

It is evident that data are heavily affected by seasonal fluctuations. These fluctuations are caused by both technical and institutional factors and applied to not only production and price data but to even greater extent to the government budget data. Under the current budget planning and implementation in Viet Nam, it is often the case that resources are quickly disbursed at the end of a financial year to fulfill target growth rate and become slowly channeled to designated users at the beginning of a planning period. Figure 6.1 shows this pattern for all components of the government spending. On the production side, seasonality is also highly visible as shown the left panel of Figure 6.1.

Figure 6.1 Seasonality of key variables



Therefore it is needed to adjust the original data to capture this time-series features of the data. A standard TRAMO/SEATS procedure has been used to all variables in the model. Figures show the original and seasonally adjusted data for CAPITAL, CURRENT, TOTAL and TOTAL_REV as an example. In each panel, three data sets: the original, seasonally adjusted and the trend-cycle data are shown for each corresponding variable. In our study, seasonally adjusted data will be used instead of the original one.

Figure 6.2: Seasonally adjusted data for CAPITAL and CURRENT

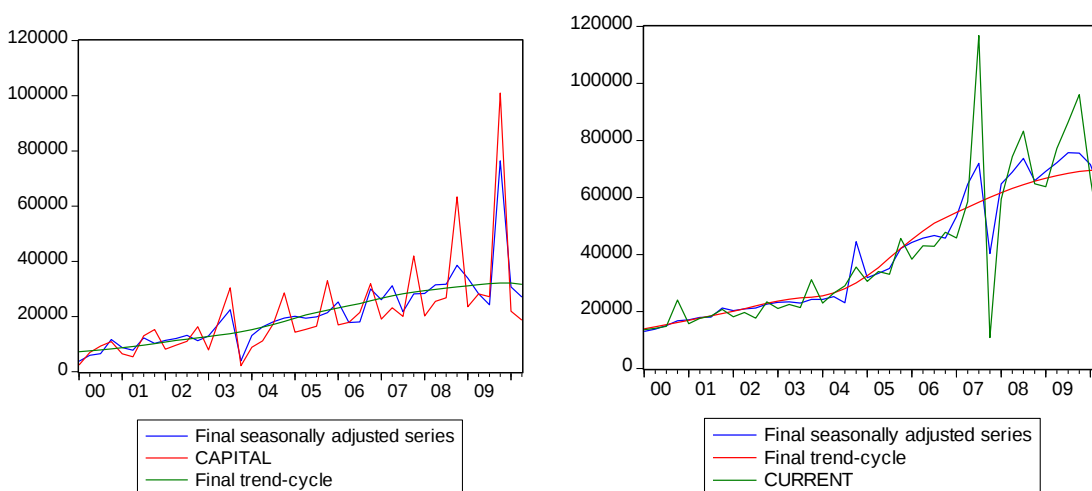
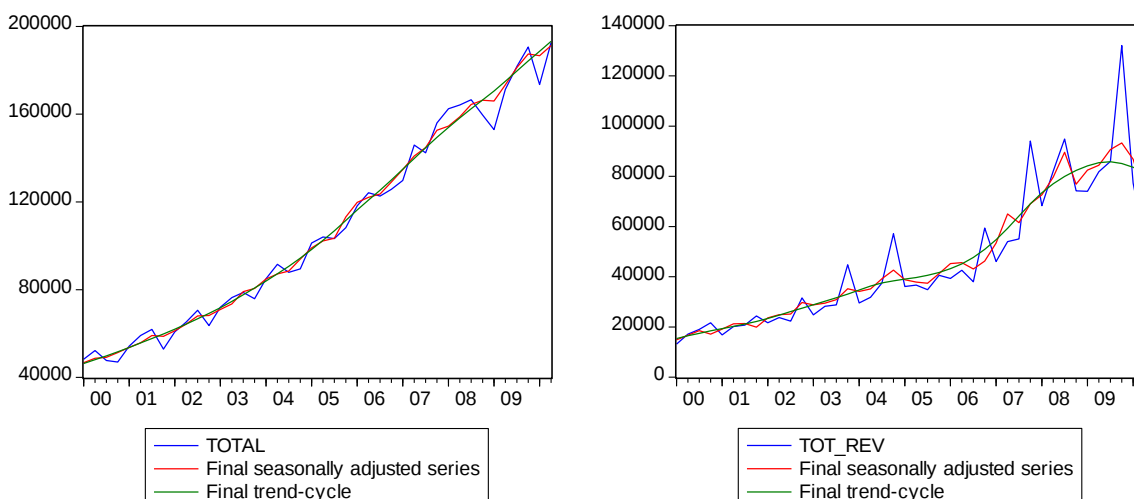


Figure 6.3: Seasonally adjusted data for TOTAL and TOTAL_REV



Unit Root and Stationarity Test.

We perform both unit root and Grange-causality test for all variables in the model. The results are given in Table 6.3 and 6.4. We consider four options for unit root test for each variable. These options are: (i) level without trend; (ii) level with trend; (iii) 1-st difference without trend and (iv) 1-st difference trend. It is shown that all variables, except the price level become stationary after de-trending. Some are $I(1)$ as Table 6.3 shows. The same pattern of stationarity is reserved after data transformation into seasonally adjusted data

Table 6.3: Unit root test for key variables: the original data

Variable	Level without trend		Level with trend		1-st difference without trend		1-st difference with trend	
	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value
TOTAL	1.680	0.999	-6.742	0.000	-3.394	0.066	-7.291	0.000
SOE	-1.191	0.669	-7.867	0.000	-6.446	0.000	-7.785	0.000
PRIVATE	-0.091	0.944	-8.312	0.000	-3.013	0.141	-8.329	0.000
TOT_REV	-2.220	0.202	-5.774	0.000	-4.560	0.004	-5.668	0.000
TOTEXPEND	3.111	1.000	-7.711	0.000	-0.469	0.980	-5.129	0.001
CAPITAL	0.762	0.992	-15.736	0.000	-1.434	0.834	-15.856	0.000
CURRENT	0.307	0.976	-6.589	0.000	-4.992	0.001	-5.463	0.000
CPIINDEX	2.356	1.000	-1.963	0.301	1.102	1.000	-3.629	0.043

Source: Author's calculation

Table 6.4: Unit root test for key variables: seasonally adjusted data

Variable	Level without trend		Level with trend		1-st difference without trend		1-st difference with trend	
	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value	T-statistics	P-value
TOTAL	2.093	1.000	-5.759	0.000	-2.158	0.500	-6.315	0.000
SOE	-0.988	0.748	-7.627	0.000	-4.531	0.004	-7.560	0.000
PRIVATE	0.109	0.963	-9.829	0.000	-3.290	0.082	-9.784	0.000
TOT_REV	-0.858	0.792	-5.317	0.000	-3.676	0.038	-5.191	0.001
TOTEXPEND	2.171	1.000	-6.263	0.000	-4.360	0.007	-4.355	0.008
CAPITAL	2.724	1.000	-8.527	0.000	-6.756	0.000	-4.913	0.002
CURRENT	0.002	0.953	-6.977	0.000	-4.352	0.007	-6.870	0.000
CPIINDEX	3.385	1.000	0.541	0.986	2.244	1.000	-4.940	0.002

Source: Author's calculation

Granger-Causality Test

So the tests show that the price level does Granger-cause the output but not the reserve. On the other hand, both government budget items (spending and revenues) *do* Granger-cause the price level. Finally, output and price do Grange cause the expenditure. Most of the tests which are given in table 6.5 are statistically significant at least at the 5% level. For example, Table 6.5 shows that the price level CPIINDEX does statistically Grange cause the total industrial output at 4% level of significance (chi-square equals to 10.272). Similarly, in its turns the price level is Granger caused by two government budget variables, TOT_REV and TOTEXPEND at 2.1 percent of significance. Both total industrial output TOTAL and the price level CPIINDEX do Grange cause the total spending (table 6.5). It can also be seen that spending does Grange cause revenues but not the opposite. These results remain robust with regards to number of lags included in the test.

Table 6.5: Granger Causality Test.

Variables	TOTAL		CPIINDEX		TOT_REV		TOTEXPEND	
	Chi-sq	P-value	Chi-sq	P-value	Chi-sq	P-value	Chi-sq	P-value
TOTAL			4.210	0.378	5.158	0.271	26.234	0.000
CPIINDEX	10.272	0.036			3.687	0.450	10.551	0.032
TOT_REV	3.831	0.429	48.509	0.000			1.297	0.862
TOTEXPEND	3.939	0.414	11.523	0.021	11.460	0.022		
All	21.908	0.039	90.288	0.000	25.288	0.014	38.043	0.000

Source: Author's calculation

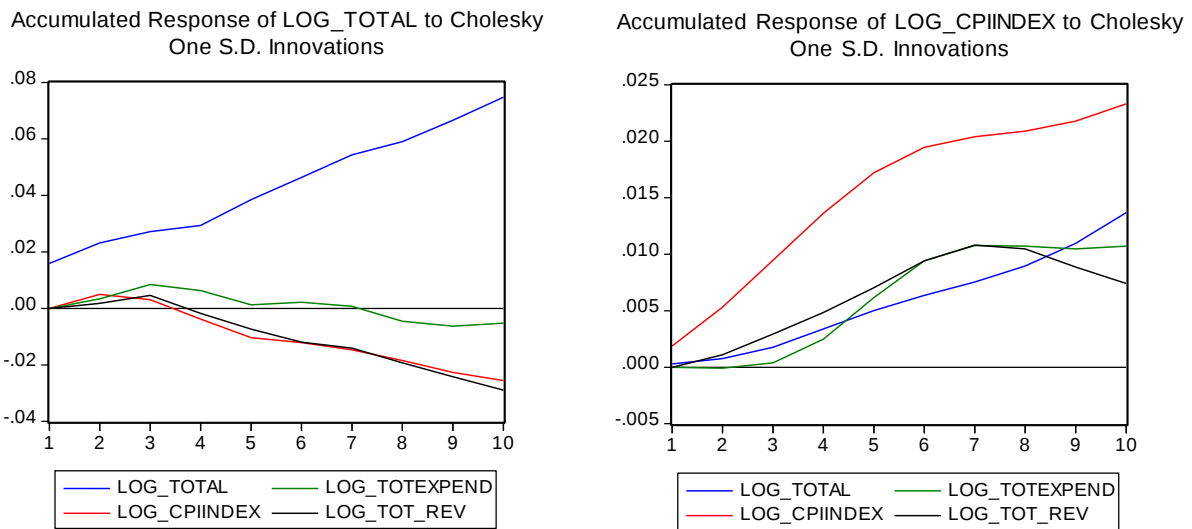
It should be noted that although this Granger causality test with respect to spending/taxation relationship seems to support our assumption on these Grange causality. Results should not be mixed up with our assumptions made on contemporaneous effects of stochastic shocks on a given macroeconomic variable in the structural VAR model. The Grange causality tests involve the effects of past values of a variable on another, so they deal with *delayed* effects rather than the contemporaneous effects as in the SVAR set-up.

IV. Preliminary findings and follow-up

The standard benchmark VAR model

Two panels in Figure 6.4 show the accumulated effects of the output (TOTAL) and price (CPIINDEX) to other government budget shocks. It can be seen that the total spending has a limited, short-lived long-term effects on the output. The accumulated effect reaches its peaks in 3 quarters and after that start to decline and eventually become negative. The same patterns are applied for the price and government revenues shocks albeit with shorter positive-accumulated reaches it peaks and eventually become negative in real terms in shorter time span.

Figure 6.4: The accumulated responses of output and price to the government spending and revenues



On the other hand, all other shocks, including output and government budget shocks have rather strong and permanent inflationary impact as shown in the right panel of Figure 6.4, although the impact of the government spending is diminishing over time.

Figure 6.5: The accumulated responses of output and price to the government capital spending and revenues

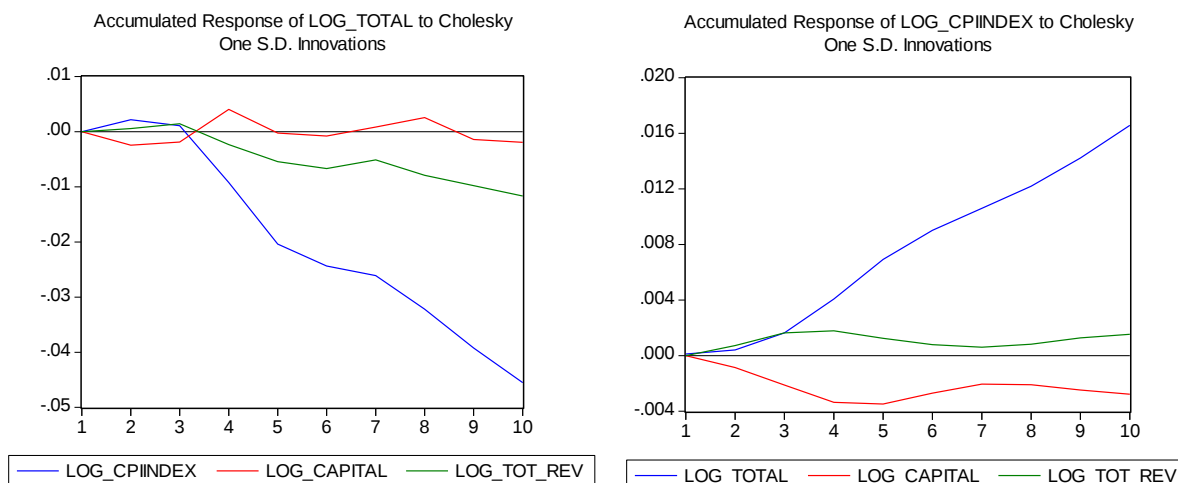
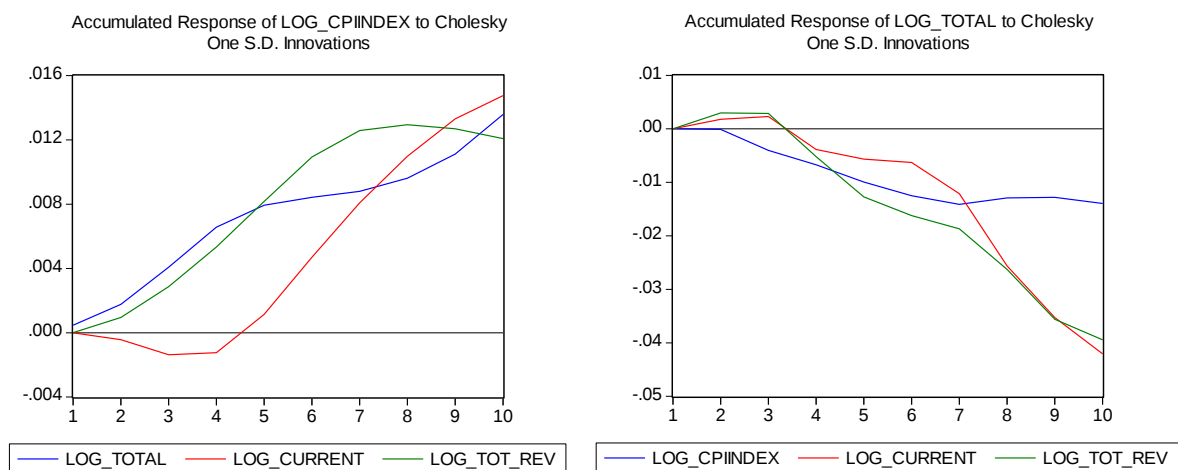


Figure 6.5 shows similar results of the effects of government capital spending on output and price. It is surprising to know that the accumulated effects of capital spending on the output exhibits a cyclical pattern: It has a negative effects on the first 3 quarters and become positive in the subsequent quarter before going back to the negative interval, albeit with lower magnitude again. On the other hand, capital spending has a negative inflationary impact which is difficult to explain.

The effects of the government current spending on output and price are shown in Figure 6.6. The patterns of effects of government current spending mirror the effects of the overall spending. Again, the current expenditure has short-lived positive effects at the beginning but quickly turn into negative effects over time. Furthermore, although the current spending has initial disinflationary effect, over time it has accelerated inflationary effect. (Figure 6.6).

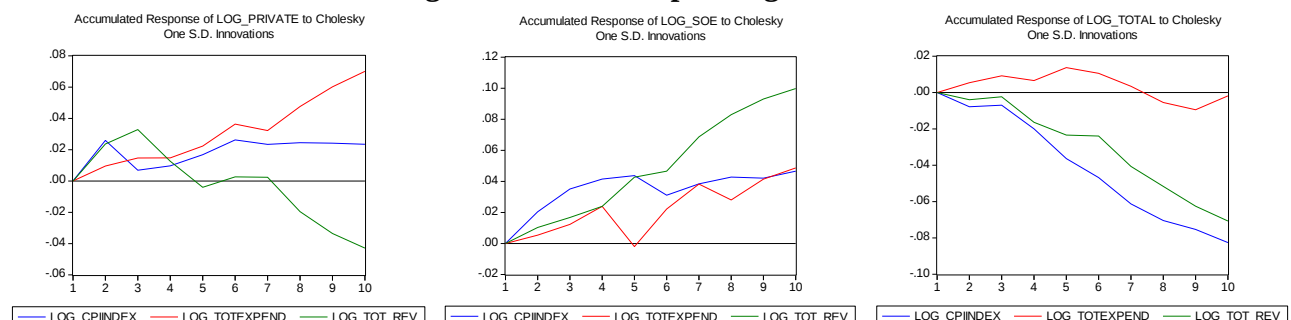
Figure 6.6: The accumulated responses of output and price to the government current and revenues



The effects of government spending on output in the private and state-owned sector.

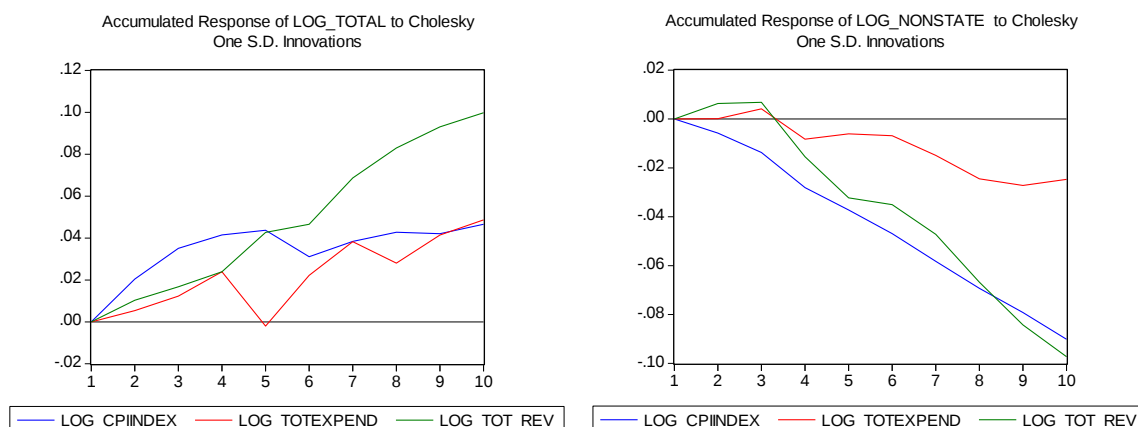
Although the private sector in Viet Nam has been experiencing an impressive growth in the last decade, the state sector still plays an important role in the economy. Support from the budget to the state sector no longer has its direct form as it was in the past. Nevertheless, the state sector still enjoys many forms of support from the government. Capital expenditure, for example often goes to the state-owned or –dominant companies and business groups. In this context, it is interesting to see how government budget has any distinguished effects on different ownership group, e.g. the state and the private sector. We undertake this test by replacing the total output by the state sector and the private sector output respectively in different options of the benchmark model. Figure 6.7 gives results of these model options

Figure 6.7: The accumulated responses of output by ownership to the government total spending and revenues



As can be seen from Figure 6.7 the effects on different sectors seem to be greatly different. The private sector seems to get positive effects of the government spending but bearing the cost of taxation, while the FDI sector tend to get all the burdens of the government spending

Figure 6.8: The accumulated response of output by the state and non-state sectors to the government total spending and revenues



The effects of government spending on industrial output breakdown by ownership become more visible when outputs of the private and foreign direct investment (FDI) are combined together to form the non-state sector input and put into comparison with the state sector. Figure 6.8-6.10 give the effects of government spending to the output of these two sectors. There is a great contrast between the state and non-state sector output responses to price and government total spending shocks as shown in Figure 6.8. The SOE sector responds highly positive to the government spending and revenue shocks while the private sector has rather negative effects. Decomposition of total government spending into capital and current expenditures give a better picture to the non-state sector as shown in Figure 6.10.

So we observe evidence of crowding-out effects when government spending tends to expand the state sector output but contracts the non-state sector at the same time. A similar result was found by Hemming et al (2008) and they explained that this crowding-out may take place because either government provision substitutes for private provision or fiscal expansion leads to an interest rates rise which in turn negatively affect the private investment. This explanation can be used to the case of total government spending but can hardly be used to explain a overall negative effects of capital expenditure shocks as shown in Figure 6.9. The crowding-out effect result therefore needs to be taken with caution and its robustness should be checked.

Figure 6.9: The accumulated responses of output by the state and non-state sectors to the government's capital spending and total revenue shocks

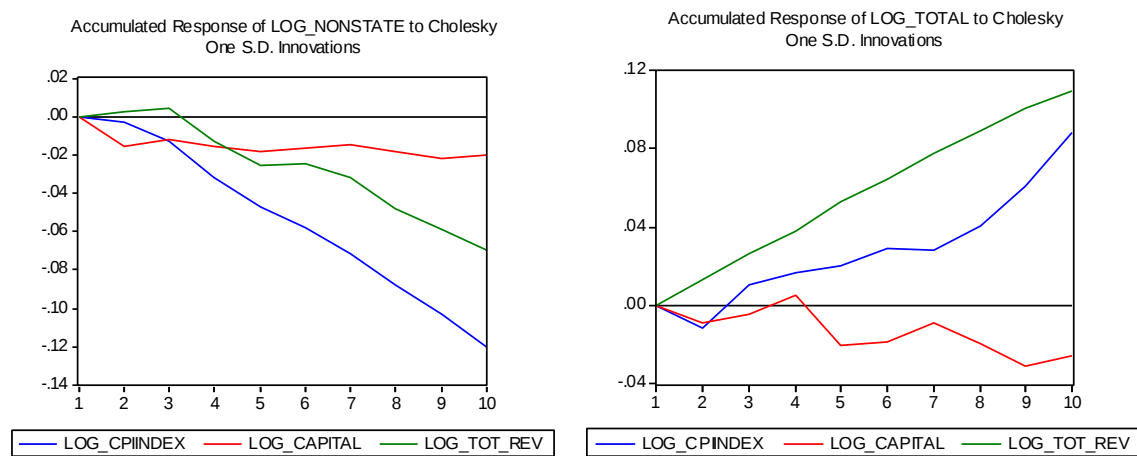
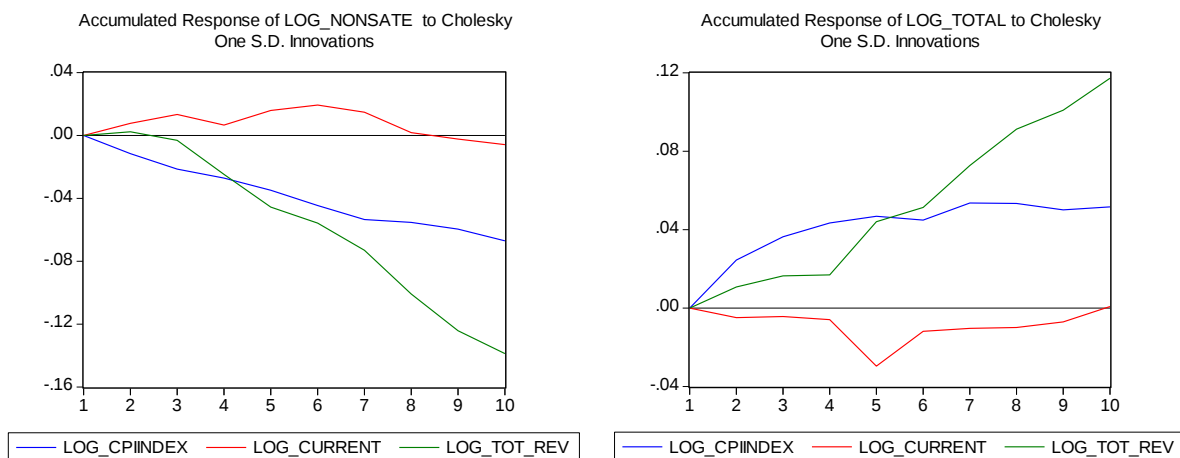


Figure 6.10: The accumulated responses of output by the state and non-state sectors to the government current spending and revenues



One possibility for the model robustness check is to use external data for exogenous elasticity estimation, for example. Including more variables, interest rate for instance into the model is another option but with this small sample it can hardly be a viable choice.

V. Conclusion

A structural VAR model has been used to explore the effects of government spending on output and price in Viet Nam. The model has provided some sensible result. It shows, for example, government spending has rather limited effect on output while its inflationary impact is prominent. The results provide evidence on possible crowding out and different patterns of effects by different components of the government spending. While these results need careful interpretation, the model nevertheless has shown that it could be a good tool to be used for assessing the effects of fiscal policy.

Table 6.6: Government spending structure, 2000-2009 (billion VND)

Year	Total spending	Capital expenditures	Current exp (incl. interest payment)	Current exp (excl. interest payment)	Interest payment	Share of capital exp in total (%)
2000	99751	29624	70127	66613	3514	29.7
2001	117285	40236	77049	72564	4485	34.3
2002	129434	45218	84216	78886	5330	34.9
2003	162150	59629	102521	96126	6395	36.8
2004	187353	66115	121238	114021	7217	35.3
2005	229092	79199	149893	143272	6621	34.6
2006	268409	88341	180068	172103	7965	32.9
2007	336312	104302	276483	232010	12666	31.0
2008	433222	135911	297311	281834	15477	31.4
2009	527342	179961	347381	323501	23880	34.1

Source: Ministry of Finance, 2010

Table 6.7: Government revenues, 2000-2009 (billion VND)

	Total revenue	Annual growth rate	ODA and other transfer	excl. ODA	Permanent source of revenues	Taxes	Share of taxes in total (%)
2000	90749		2028	88721	87883	77779	85.7
2001	103888	14.8	2011	101877	100918	90498	87.1
2002	121717	17.3	2250	119467	118347	107896	88.6
2003	158057	29.8	2969	155088	153972	134280	85.0
2004	198614	26.2	2877	195737	194399	167174	84.2
2005	223899	12.5	3789	220110	218827	203102	90.7
2006	289169	27.8	7897	281272	279279	248383	85.9
2007	336273	17.4	6012	330261	327773	291635	86.7
2008	416783	24.0	7275	409508	408223	382484	91.8
2009	442340	6.4	6520	435820	434452	396650	89.7

Source: Ministry of Finance, 2010

Table 6.8: Government revenue from taxes, 2000-2009 (billion VND)

	Income and assets taxes	Land and resource taxes	Income tax	CIT	PIT	Import duty	Share of income taxes in total	Share of import duty taxes
2000	41639	10858	30781	28950	1831	13437	39.6	17.3
2001	47084	11728	35356	33298	2058	17458	39.1	19.3
2002	52386	13222	39164	36826	2338	21915	36.3	20.3
2003	69147	18786	50361	47410	2951	22374	37.5	16.7
2004	93316	32808	60508	56987	3521	21614	36.2	12.9
2005	117124	37043	80081	75847	4234	23660	39.4	11.6
2006	148966	43991	104975	99796	5179	26280	42.3	10.6
2007	165256	53289	111967	104552	7415	38309	38.4	13.1
2008	209773	61472	148301	135361	12940	59927	38.8	15.7
2009	182848	56447	126401	112072	14329	77040	31.9	19.4

Source: Ministry of Finance, 2010

Table 6.9: Financing the budget deficit, 2004-2010 (billion VND)

	2004	2005	2006	2007	2008	2009	2010
Total budget deficit (classified by GFS)	-7,881	-7,140	-8,964	-20,094	-26,746	-75,780	-59,110
Deficit/GDP (%) (byGFS)	1.10	0.90	0.90	1.76	1.81	4.51	-\3.03
Total financing	7,881	7,140	8,964	20,094	26,746	75,780	59,110
Domestic financing	4,671	4,525	3,160	13,315	11,710	58,518	39,060
<i>Issued</i>	27,450	32,420	35,864	51,572	48,009	88,520	82,100
<i>Repayed</i>	22,779	27,895	32,704	38,257	36,299	30,002	43,040
Financing abroad	3,210	2,615	5,804	6,779	15,037	17,262	20,050
<i>Issued</i>	7,253	8,326	12,749	12,995	19,668	27,380	31,000
<i>Repayed</i>	4,043	5,711	6,945	6,216	4,631	10,118	10,950
Total budget deficit (classified by VN)	-34,703	-40,746	-48,613	-64,567	-67,676	-115,900	-113,100
Deficit/GDP (%) (by VN)	4.90	4.86	4.99	5.65	4.58	6.90	5.80
Share of foreign borrowing in total financing	92.0	116.6	142.2	64.7	73.5	36.1	52.4

Source: Ministry of Finance, 2010

Table 6.10: Industrial output by ownership, 2000-2010 (billion VND)

Year	Total	State-owned	Private	Foreign	Foreign (excl. oil	Share of SOE in total (%)
2000	195,320	82,101	43,809	69,410	47,535	42.03
2001	228,182	93,608	53,899	80,675	57,010	41.02
2002	260,202	104,348	63,948	91,906	65,258	40.10
2003	302,990	117,289	75,906	109,795	84,968	38.71
2004	354,030	131,570	96,150	126,310	96,562	37.16
2005	416,863	143,074	118,858	154,931	127,859	34.32
2006	490,819	156,107	147,276	187,436	157,106	31.81
2007	574,046	137,889	211,871	224,286	195,521	24.02
2008	652,766	164,796	225,471	262,499	241,332	25.25
2009	696,577	169,102	244,376	283,099	251,070	24.28
2010 (*)	366,116	82,348	130,321	153,447	137,925	22.49

Source: General Statistical Office, <http://www.gso.gov.vn>

(*) for the first two quarters

VI. References

Andrew Mountford and Harald Uhlig (2005). What are the Effects of Fiscal Policy Shocks ?. SFB 649 Discussion Paper 2005-039. July 2005

António Afonso and Ricardo M. Sousa (2009). The Macroeconomic Effects of Fiscal Policy in Portugal: a Bayesian SVAR Analysis, January 2009

Dang Van Thanh (2007). Vietnam's Budget Revenue Structure: Status and Trend. Paper presented at the International Workshop on the Vietnam Budget Structure, 18 September 2007. Ha Noi, Viet Nam

Ernesto Rezk, Maria Cecilia Avramovich and Martín Basso (2006). Dynamic Effects of Fiscal Shocks upon Diverse Macroeconomic Variables: A Structural VAR Analysis for Argentina). Paper presented to the XLI Annual Reunion of the Argentine Association of Political Economy, National University of Salta, 15 – 17 November 2006

Francisco de Castro Fernández and Pablo Hernández de Cos, (2006). The Economic Effects of Exogenous Fiscal Shocks in Spain: A SVAR Approach. *European Central Bank Working Paper Series*, No 647 / June 2006

General Statistical Offices. <http://www.gso.gov.vn>

Hemmning R., Kell M. and Mahfouz S. (2008). The Effectiveness of Fiscal Policy in Stimulating Economic Activity – A Review of the Literature. *IMF Working Paper*. December 2002

Jorge E. Restrepo and Hernán Rincón, (2006). Identifying Fiscal Policy Shocks in Chile and Colombia

Kenneth N. Kuttner and Adam S. Posen (2002). Fiscal Policy Effectiveness in Japan. *Journal of the Japanese and International Economies* 16, 536–558 (2002)

Kirsten H. Heppke-Falk, Jörn Tenhofen Guntram B. Wolff, (2006). The macroeconomic effects of exogenous fiscal policy shocks in Germany: a disaggregated SVAR analysis. *Deutsche Bundesbank Discussion Paper*, Series 1: Economic Studies, No 41/2006

Kojo Oduro. (2007). Structure of Vietnam's Budget: An Assessment Evaluation from an International expert; Experience in England Budget structure reform. Paper presented at the International Workshop on the Vietnam Budget Structure, 18 September 2007. Ha Noi, Viet Nam

Mardi Dungey and Renée A. Fry (2007). Identifying Fiscal and Monetary Policy in a Small Open Economy VAR. The University of Cambridge and The Australian National University, August 2007

Ministry of Finance, Viet Nam <http://www.mofi.gov.vn>

Mohammed Nur Hussain¹, Albert Wijeweera, and Nam Hoang, (2008). Impacts of Monetary Policy and Fiscal Policy on Output: A Structural Cointegrating VAR Approach for selected ASEAN Economies

Nguyễn Phú Lâm (2010). Endogenous Growth Strategy in Restructuring the Vietnamese Economy. Paper presented to Conference “*Economic Theory and implications for Viet Nam*”, Quang Ninh, 2010.

Radka Štiková (2006). Effects of Fiscal Policy in the Czech Republic: a SVAR analysis. Alternative Approaches to Economic Modelling

Raffaella Giordano, Sandro Momigliano, Stefano Neri and Roberto Perotti, (2005). The effects of fiscal policy in Italy: Evidence from a VAR model, European Journal of Political Economy. volume 23, issue: September, 707-733

Rarytska, O. (2003). The dynamic effects of fiscal policy in Ukraine: A Structural VAR Approach. A MA's Thesis. National University of 'Kyiv-Mohyla Academy'.

Roberto Perotti (2004). Estimating the effects of fiscal policy in OECD countries. IGIER–Università Bocconi. *Working Paper No. 276*, December 2004

Roberto Perotti (2004). Public Investment: Another (Different) Look. IGIER– Università Bocconi. *Working Paper No. 277*, December 2004

Rozina Shaheen and Paul Turner (2008). Measuring the dynamic Effects of Fiscal Policy shocks in Pakistan. Economics Department, Loughborough University, UK

Vũ Thành Tự Anh (2010). Sustainability of Public Debts in Viet Nam. <http://tuoitre.vn/tuoi-tre-cuoi-tuan/378593/>.

Vương Quân Hoàng (2010) Viet Nam Economy 2009 and the need for change. *Communist Journal online* No 3 (195).

Chapter 7

Macroeconomic Consequences of Thailand's Exchange Rate Regimes

Bhanupong Nidhiprabha

Faculty of Economics, Thammasat University

The fixed exchange rate system contributed significantly to trade expansion and rapid output growth in the early stage of Thailand's economic development. With increasingly integrated world economy, the cost of maintaining a fixed exchange rate regime outweighed its benefit. Monetary authorities still envisage the virtue of maintaining exchange rate stability and competitive exchange rates through constant intervention in the foreign exchange markets; thereby reducing the effectiveness of macroeconomic policy.

Keywords: Exchange rate policy; Thailand; effectiveness of macroeconomic policy

I. Introduction

The fixed exchange rate regime contributed to growth and stability of the Thai economy in the past prior to the fateful day on July 2, 1997, when the Bank of Thailand gave up defending the fixed exchange rate regime. In fact adverse consequences of the fixed rate had become apparent until the day the confidence in the system was completely shattered. When a price of any commodity has been unrealistically fixed for so long, the cost of intervention would soon outweigh its benefit. There were devaluations in the 1980s, as a last resort, to correct the unsustainable current account deficit. But after the external disequilibrium was corrected by establishing a realistic exchange rate, the old habit died hard. The system of a basket of currencies of the Thai baht adopted after 1984 was supposed to give baht more flexibility. It turns out that the weight given to the dollar in the basket increased gradually up to July 1997. As a result, the baht had returned into the old regime of fixed exchange rate (Figure 7.1).

After the massive depreciation of the baht in 1998, when the baht plunged to a record low of 55 baht to the dollar in January 1998, the baht has continued to gain strength against the dollar, which began to fall to correct the US unsustainable current account deficit. The strength of the baht could have been more spectacular if there was no market intervention by the Bank of Thailand. The fear of floating can be thought of as a reason for such intervention (Calvo and Reinhart, 2002). As the level of international reserves keep on rising, the question arises whether the accumulated reserves can be put into good uses such as to finance budget deficit or to invest abroad. The principal reason for the intervention is the fear that strong baht would hurt Thai exports. Poor farmers would be worse off as they rely on income from agricultural exports. And exports is the main growth driver in Thailand, the central bank must keep the baht at a low level in order to compete with other developing countries.

This paper examines exchange rate system and macroeconomic policies in Thailand over the past decades. It analyzes the impacts of the global economic slowdown on Thailand and examines the performance of and lessons from Thailand's macroeconomic policy responses. The paper is organized as follows. Section 2 discusses the impact of the transition from the fixed to managed flexible systems. Section 3 explores the relationship between export competitiveness and the exchange rate systems. Section 4 investigates the impact of intervention in the foreign exchange markets and capital controls. Section 5 deals with macroeconomic policy responses to global recession under the current exchange rate system. Section 6 concludes.

II. Fixed vs. flexible exchange systems

There are theoretical arguments in favor of intervention in the foreign exchange market. There is a link between the variability of exchange rates and interest rates (Bilson, 1985). Since interest rate fluctuations are the causal factor to business cycle, as currency risk premiums increase, interest rates must increase to compensate for the risk. Thus the combination of real interest rate instability and real exchange rate instability must have an adverse effect on the economy. There are also internal factors such as domestic monetary shocks or political uncertainties that create currency volatilities¹.

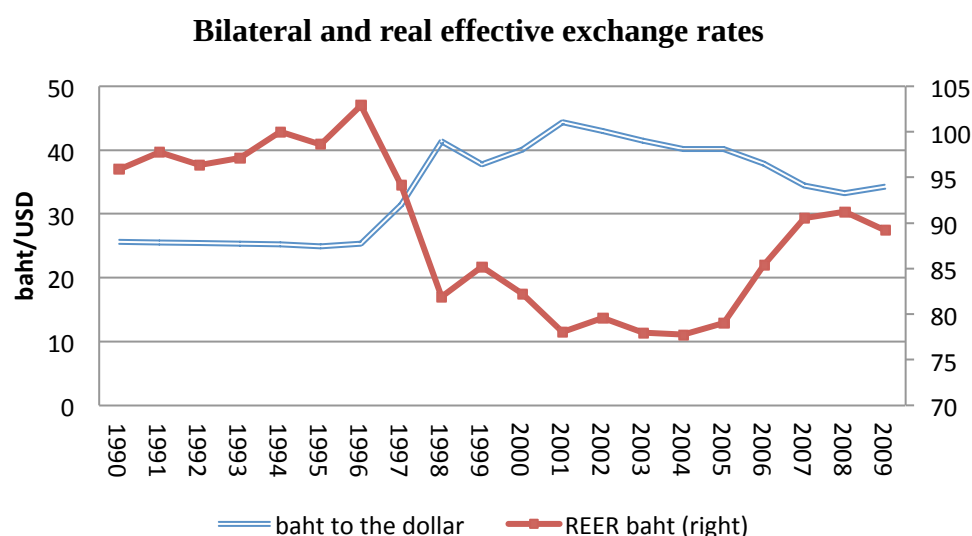
¹ Currency volatility depends on the choice of exchange rate regime, provided that prices are stickier than the exchange rate (Hasan and Wallace, 1996).

The cost of foreign exchange instability has created a painful transfer of wealth between debtors and creditors both domestically and internationally. Krugman (1989) further argued that the gains from international trade would be reduced since exchange rate instability blurs the price signals that are supposed to regulate international markets. When future exchange rates are uncertain, firms would be more cautious and delay investment, even when they face increases in demand for their exports. Here the case for the fixed exchange rate arises from the need to accumulate physical capital at the early stage of development; Thailand greatly benefited from the fixed exchange rate system between the 1960s and the early 1980s.

But as Milton Friedman (1953) reminded us, speculations are likely to be stabilizing as long as market participants are rational. As long as markets are efficient, there is no room for destabilizing speculation. As we have seen from the Asian financial crisis in 1997 and the US subprime loans crisis in 2008, speculators are not always rational. There is no concrete evidence of efficient asset markets. In the case of Thailand, there are periods of the departure from the uncovered parity, which correspond to high level of risk premiums. There exists a possibility that speculation might be destabilizing and the negative externality provides a reason for intervention.

What level of the exchange rate should be worth intervening? Substantial departures from the Purchasing Power Parity, even in a world of flexible exchange rate, can exist in the short run and even over decades (Obstfeld and Rogoff, 1995). With considerable differential between productivity growth in tradable-and nontradable-goods sectors, a country can experience rising relative price of nontraded goods and appreciation of the real exchange rate. It is therefore impossible to pinpoint the exact equilibrium value of the exchange rate from deviations from the PPP. Nor can the current account deficit indicate an exact degree of overvaluation of the exchange rate. Investment-saving relationship and the level of public deficit also determine the current account position. Indeed, intervention in foreign exchange markets to obtain an appropriate value of the exchange rate must be exceedingly difficult, not to mention complications arising from the fact that changes in the exchange rate will also have an impact on domestic absorption.

Figure 7.1: Thailand's exchange rate regimes



Source: International Financial Statistics

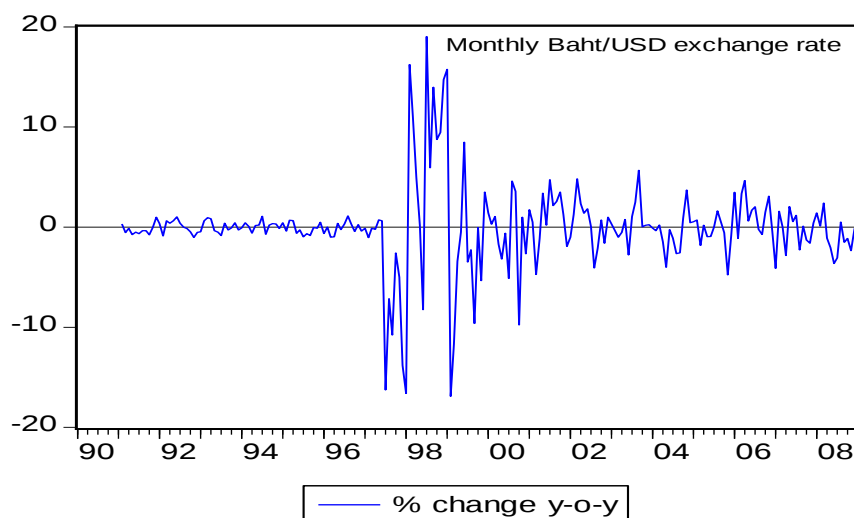
Thailand was able to grow rapidly between 1960 and in the early 1990s because of export growth, among other factors. Thus exports can grow without having to depend on export competitiveness created by weak baht against the dollar. From 1990 to 2008, the share of exports in GDP increased from 40 % to more than 70%. As such, changes in exports growth lead to a substantial change in GDP growth. After the collapse of financial institutions in 1998, investment ceased to be an important growth contributor. The share of investment in GDP declined from 40 % to 20 % in 2000. Exports remained as the last engine of growth up to the period of the 2008 global recession.

Investment in physical capital requires imported machinery. If imported capital goods are large parts of total imports, we would have observed a fall in imports as investment declined. But the share of imports to GDP did not fall as investment decelerated. Imports moved together with exports, implying that large parts of imports are raw materials used to manufacture exports products. If Thailand experiences export shortfalls, imports will also be curtailed. Thus the global slowdown that shrinks the demand for Thai exports would not lead to current account deficit.

The contribution to growth of exports must not be exaggerated, as exports simultaneously lead to imports of raw materials. The structure of Thailand exports has considerably changed from agricultural to manufactured products. Imported parts and components of electronic products are required to manufacture computer products like hard disks and computers. It is not surprising that these industries create lower valued than agricultural and processed food exports that mainly utilize domestic raw materials. This important realization would reduce the emphasis on maintaining baht unrealistically low in order to gain international competitiveness.

Before the 1997 float, the strength of the dollar against the yen implied that the baht appreciated against yen, since the dollar had the highest weight in the basket value of the baht. Recession in Japan and the strength of the baht against the yen led to a decline in exports from Thailand to Japan. The continued strength of the dollar caused overvaluation of the baht, which need to be corrected by a free fall of the baht against the dollar in the second half of 1997. Figure 7.2 illustrates the wide swings of the baht after the float in July 1997. Other Asian currencies also took competitive depreciations in the early 1998. Nonetheless, the baht had regained some strength in February 1998, while the dollar continued appreciating against the yen. As such, the dollar strength against the yen cannot totally explain the fall in the value of the baht.

Figure 7.2: Fluctuations of exchange rates: January 1990-December 2008



Source: The Bank of Thailand

A flexible exchange rate enables the baht to become more flexible in response to fluctuations in world trade volume. Broda (2004) provides evidence that short-run real output responses to real shocks are significantly smoother in floats than in pegs. Furthermore, Coudert and Couharde (2009) found that pegged currencies were significantly more overvalued than flexible currencies. Real exchange rate volatility had a negative impact on private investment (Bhandari and Rabindra, 2010).

III. Export competitiveness and exchange rate regimes

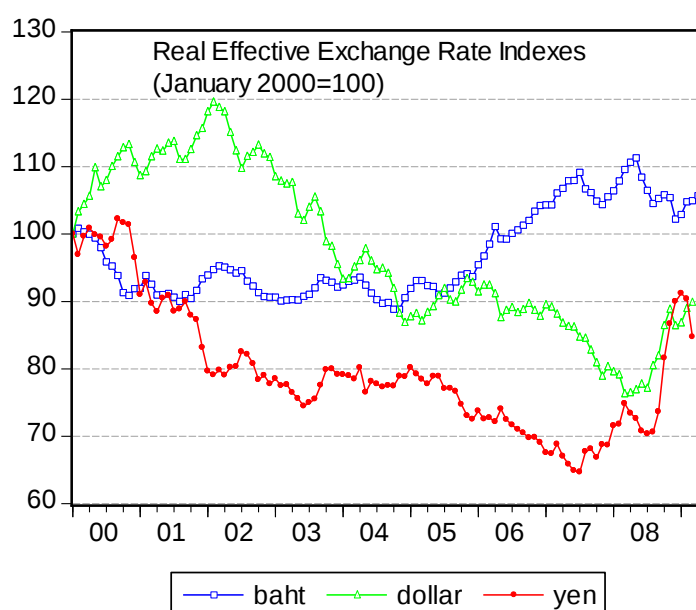
A country cannot simply export its way out recession by simply devaluing its currency. Aside from the possibility of retaliation by other competitors, devaluation does not ensure a long-lasting effect on international competitiveness, which depends on its productive labor force, saving, and technological progress. Exchange rate volatility has a significant negative impact on the export flows to the world market (Chit, Rizov and Willenbocked, 2010). It is possible that a strong currency is associated with export competitiveness of that country. A country with high rate of saving and rapid productivity growth will experience a real exchange rate appreciation, while commanding a considerable degree of international competitiveness. It has always been suggested that Thailand need a weak baht to help exporters to gain competitiveness. Since changes in the price of foreign currencies have a profound effect on prices of all commodities, the impact of changes in foreign exchange rates on the rest of the economy must be evaluated. Implication on income distributive issue must be examined at it involves income transfers between exporters and importers, tradable and non-tradable sectors, creditors and debtors of foreign currencies.

Flexibility in the real wage rate in Thailand could explain why Thailand was able to maintain the fixed exchange rate for so many years. Money illusion makes money wage rate increases slower than the general price level; thereby reducing the real wage rate after experiencing inflation caused by devaluation. According to Obstfeld (1998), before the crash in 1997, Thailand had been a puzzle since it was very rare for countries to observe the fixed exchange rate discipline longer than five years (see Figure 7.1). Flexibility of wages and prices in

Thailand would not necessitate Thailand to rely on flexible exchange rates as a means to correct macroeconomic imbalances. Furthermore, conservative fiscal policy (fiscal surplus) prior to the 1997 crisis helped mitigate monetary expansion caused by capital inflows. Monetary base growth was prevented from being explosive, threatening price stability under the fixed exchange rate system with open capital account. Nevertheless, this insulating mechanism broke down when monetary authorities attempted to bail out some financial institutions to prevent the 1997 system-wide financial instability. With many policy objectives, the fixed exchange rate system, previously worked so well as a domestic anchor, must be sacrificed.

An appreciation of the real effective exchange rate does not always imply a gain in price competitiveness. What is important is not only the direction of the movement but also its gap between the actual and equilibrium exchange rates. A real appreciation reflects an improvement of fundamental factors such as productivity gains. A real appreciation only compromises the competitiveness if the actual real effective rate is overvalued and substantially departs from its equilibrium level. On the other hand, a real depreciation would not improve competitiveness if the actual real effective rate is significantly undervalued.

Figure 7.3: Comparison of Real Effective Exchange Rates



Source: International Financial Statistics

Between 2001 and 2005, the real effective exchange rate of the baht depreciated by 10 percent from the level in 2000. The weakened baht helped the Thai economy to recover from the recession through strong export growth. This depreciation has a lot to do with the strength of the dollar in the early 2000s. While the real effective exchange rate of the yen depreciated from 2000 to 2007, the weakening of the dollar began only after 2003². The weaknesses of both the yen and the dollar gave rise to the baht real effective appreciation that began in 2005--an episode that led to the adoption of capital controls in Thailand in

² The impact of the dollar decline on the US current account deficit was not apparent until 2008, when the US economy entered the recession.

December 2006. By 2007 the yen started climbing and the dollar started appreciating in the following later, leading to depreciation of Thailand's real effective exchange rate, relieving the upward pressure on the baht.

Table 7.1: Correlation coefficients of the Real Effective Exchange Rate of the baht

	REER dollar	REER yen	Export to GDP	Import to GDP
1993-1996	-0.27	-0.55	0.03	0.23
1997-1999	-0.62	-0.07	-0.98	0.85
2000-2009 (March)	-0.66	-0.37	0.70	0.44

Note: REER baht employs 1994 base year

Data on exports and imports to GDP ratios are between 1993 and 2008.

Source: Author's calculation from the International Financial Statistics, NESDB and BOT

The negative relationship between the baht and the dollar has been intensified from the fixed exchange rate system and to the present. The negative correlation coefficient of the monthly real effect exchange rate increased from 0.27 during the period 1993-1996 to 0.62 and 0.66 during the period 1997-1999 and the period 2000-2009 respectively (Table 7.1). On the other hand the negative correlation coefficient from the corresponding period between the baht and the yen were 0.55 and 0.37 respectively.

When monetary authorities allow the baht to fluctuate more freely, it will be difficult to target a specific level of real effective exchange rate—let alone its direction³. The real effective exchange rate of the baht always moves in an opposite direction of the yen and the dollar, while the impact of the dollar movement has become increasingly more dominant. The implication of this long-term relationship is that the interest rate policy that the Bank of Thailand employed to target the real effective exchange rate may not be effective since the real effective exchange rate of the baht is determined by these two key currencies. When the real effective rates of the dollar and the yen depreciate, the real effective rate of the baht would appreciate accordingly. Liew, Baharumshah, and Pua (2009) also found that the influences of domestic and foreign monetary policy on exchange rate of Thailand can hardly be neglected.

IV. Market intervention and capital controls

A fixed exchange rate system and an open capital market are incompatible with independence monetary policy. This is a lesson Thailand has learned so well after the currency crisis in 1997. The fixed exchange rate functioned well with monetary autonomy and a certain degree of capital controls. When capital controls were relaxed in 1993 to liberalize capital account, monetary autonomy was sacrificed. Trade reform can improve efficiency and resource allocations. However, as Bhagwati (1998) points out, there is a big difference between trade liberalization and capital convertibility. Capital account liberalization does not always lead to welfare improving because financial infrastructure is not ready to cope with capital inflows. Lack of financial supervision and prudential rules and regulations on financial institution led to excessive lending and property bubbles.

³ For evidence on temporary movements of the real dollar rates and interest rate differentials, see Nakagawa (2002).

The exchange rate is determined by trade and capital flows, in addition to external factors and exchange rate expectations. Exchange rate movements can be thought of as an indicator of country risks. Thus politicians must behave themselves otherwise their misdeeds would cause losses of confidence and capital flight. A sharp plunge in the value of baht would signify the government's mismanagement of the economy. The sharp deterioration of the external value of baht in the last quarter of 1997, to some extent, reflected the loss in policy credibility of the ruling government during the turmoil period.

Since capital controls are costly to enforce and they may reduce welfare arising from intertemporal consumption, total capital control is out of the question. Nevertheless, to the extent that excessive short-term capital flows also raise the possibility to a financial crisis, limiting these hot money flows should be done through establishing prudential regulations on foreign borrowing of the private sector. The flexible exchange rate system also sends a signal to the private sector that borrowers of foreign capital must internalize some of the costs of failing to hedge against unanticipated movements of exchange rates. The need for strict capital controls is reduced as the incidence of capital flight subsides. Flexibility in foreign exchange rates guarantees that there is no serious misalignment of the exchange rate. As such the chance of experiencing capital flight would be reduced, provided that both economic fundamentals and political stability prevail. Recent evidence provided by Dubas (2009) indicates that an intermediate exchange rate regime between a pure float and a hard peg is most effective in preventing exchange rate misalignment. In addition, welfare level of a small country under a freely floating regime was in general higher than that under other regimes (Akiba, Iida, and Kitamura, 2009).

By 2004 the trend of the baht appreciation has become apparent (Figure 7.4). There are various factors contributing to the baht strength: widening current account surplus, weakening value of the dollar against major currencies, and increasing capital inflows to the stock market. The bilateral exchange rate between baht and the US dollar appreciated sharply during the period 2006-2007, 25 % higher than the 2004 level (Figure 7.4). However, the nominal effective exchange rate (NEER) appreciated less, reflecting that fact that the baht also depreciated against other major currencies. Since the inflation rate in Thailand was higher than its major trading partners, the real effective exchange rate (REER) appreciated more than the NEER. A crucial question is whether the exchange rate movements would bring about disequilibrium adjustments in the current account.

Exchange rate fluctuations constitute risks and uncertainties, which could disrupt international trade flows. Foreign exchange risks were contained during the period of 1990-1996. The fixed exchange rate system through basket of currencies seemed to work well until 1996. Nevertheless, its equilibrating role was denied in the pursuit of orderly exchange rate movements. After the crisis episode, the exchange rate was allowed to fluctuate under a system of managed float, which is intervened regularly by the Bank of Thailand.

During the period 1999-2005, the baht depreciated against the dollar on the average 0.32 percent per month, but the rates of depreciation in terms of real and nominal effective exchange rates were smaller. Thus export competitiveness of Thai products had increased around 0.2 % per month during this period. However, there were some degrees of volatility as it can be seen from the coefficients of variation or the ratio of standard deviation to mean values. The evidence suggests that the Bank of Thailand did not attempt to stem the weakening value of the baht, as it was deemed appropriate to stimulate export-led growth.

The intervention had been intensified as the baht appreciated against the dollar during the period 2006-2007, amounting to 0.48 percent per month. The coefficient of variation of the bilateral exchange rate substantially declined, when compared to the period 1999-2005. Although the Bank of Thailand succeeded in reducing the volatility of the baht-dollar rates, it created more volatility of the effective exchange rates. Intervening in the dollar markets alone propagates volatilities of the baht against other currencies. There was a big jump in the coefficient of variations between 2006 and 2007. There is a tradeoff between maintaining the stability of the baht and instability of the overall effective exchange rates, because the Bank of Thailand did not intervene in other currencies.

Foreign exchange market intervention by the Bank of Thailand did not reduce exchange rate volatility. According to Kenen and Rodrik (1986), volatilities of real exchange rates reduced the volume of international trade. The movement of the effective exchange rate is still determined by the dollar/baht rate because of the dominance of the dollar in international trade transactions. Depreciation of the baht against the yen slowed down the appreciation of the nominal effective exchange rate of the baht. As a result, the nominal effective rate did not appreciate as much as the baht dollar exchange rate. Market intervention cannot maintain the competitiveness of the baht (when using the effective rate measurement).

To investigate whether portfolio flows have exerted some effects of the rapid appreciation of the baht-dollar rates, we employ monthly data from 1999 to 2007. The monthly percentage change on the baht-dollar rate was regressed on the percentage change of the yen-dollar rate, the intensity of the BOT's intervention in the foreign exchange market, proxied by the ratio of the net forward position of the Bank of Thailand to total international reserves (NFP/RESERVE), and portfolio investment flows (PFI). The following results are obtained:

Table 7.2: Impacts of the foreign exchange market intervention

Dependent variables

	$\Delta \log(\text{baht}/\$)$	$\Delta \log(\text{nominal effective rate})$	$\Delta \log(\text{real effective rate})$
$\Delta \log(\text{yen}/\$)$	0.242 (3.714)***	0.051 (1.332)	0.047 (1.131)
Intervention (NFP/Reserves)	-0.015 (-1.477)	0.009 (0.776)	0.015 (1.357)
Portfolio investment	-1.40E-05 (-3.569)***	6.77E-06 (2.874)***	6.74E-06 (2.666)***
R-squared Adjusted	0.199	0.254	0.123
DW	1.89	1.84	1.89
1999-2007			
*** indicates significance level at 0.01 t-statistics in parenthesis			

The intervention cannot slowdown the appreciation, which was contributed by the weakness of the dollar itself. This impact is captured by the yen/dollar exchange rate on the baht/dollar exchange rate. Japan is the largest source of Thailand's imports and also the second largest market for Thai exports. Thus the movement of the yen has a strong impact of the bilateral

exchange rate. The Bank of Thailand cannot resist the trend of baht appreciation through intervening in the foreign exchange markets⁴.

By resisting the baht appreciation, the Bank of Thailand in effect denies the role of exchange rate adjustment to reduce the pressure of the oil price rise. As core inflation is related to headline inflation through inflationary expectations, a rise in the oil price affects core inflation through its impact on producer prices. The Bank of Thailand targets core rather than headline inflation. Welfare of consumers is affected by headline more than core inflation.

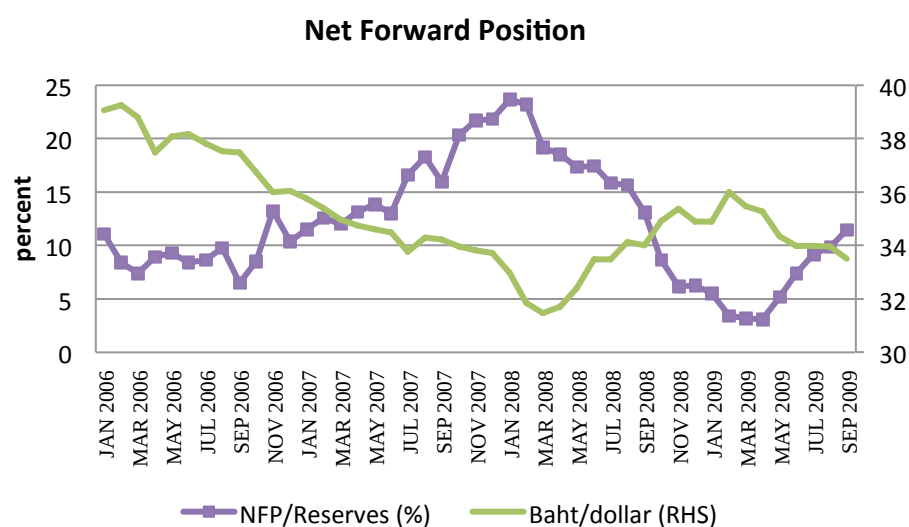
According to Taylor (2001), the appreciation of the exchange rate, through inertial effects of exchange-rate transmission and the existence of a policy rule, will result in a decline in interest rate today. Even though the exchange rate is not directly in the policy rule, because of the appreciation of the exchange rate today, the probability that the central bank will lower the interest rate in the future will increase as inflationary expectations would be revised downward. Monetary-policy rules that react indirectly to the exchange rate might work better than the rules that react directly to exchange rate changes. In this frame work, if the Bank of Thailand does not resist the baht appreciation, there would be less need for the Bank of Thailand to initiate interest hikes to curb inflation.

As the clear trend of baht appreciation has emerged, exporters do not want to hold dollars for long after receiving payments. Figure 7.4 shows that, as the weakening trend of dollar continued, the Bank of Thailand suffered enormous financial loss in buying the dollar forward in order to reduce the pressure on the baht strength. From January 2003, when the net forward position was a few percent of total reserves, the intervention was intensified as the baht appreciated in 2006 and 2007. By January 2008, the amount of net forward position of the Bank of Thailand reached almost 25 % of total reserves.

The international reserves have been accumulated higher every month; the Bank of Thailand would have to sterilize capital flows by issuing the Bank of Thailand bonds to mop up excess money supply. By doing so, it builds up pressure on the interest rates. As the federal funds rate is cut continuously to prevent recession, the Bank of Thailand cannot maintain high interest rates to fight inflation, because the widening uncovered interest differentials would further induce capital inflows and baht appreciation.

⁴ Cointegration analysis indicates that the ratio of net forward position to total reserves moves in line with the rate of change of the baht exchange rate.

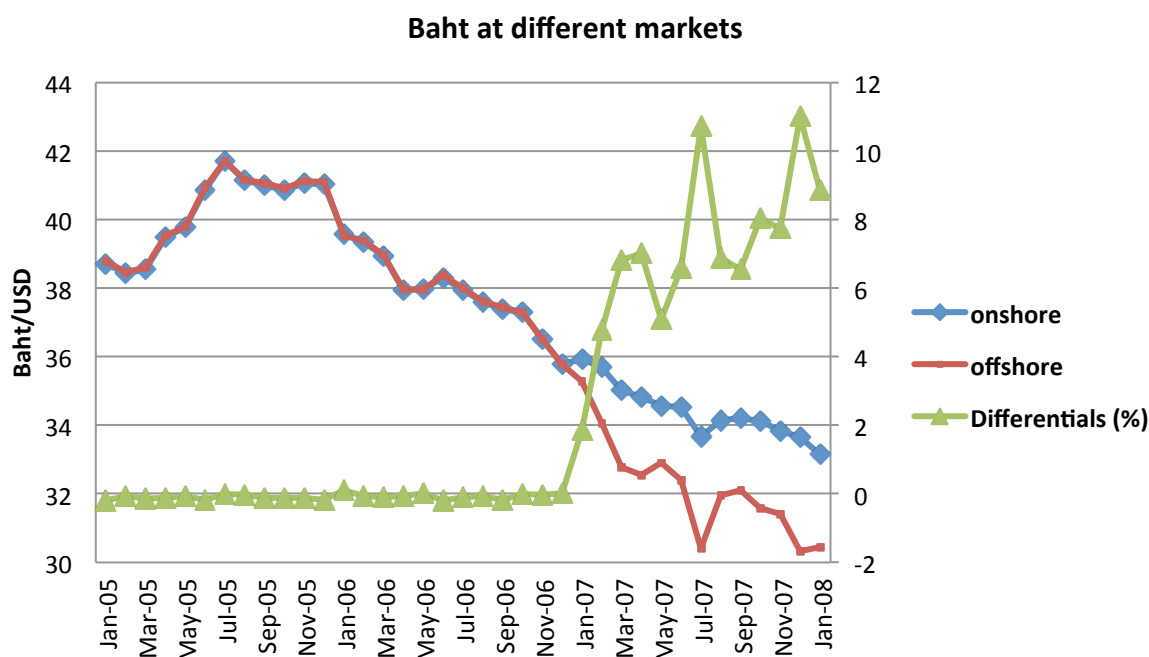
Figure 7.4: Forward market intervention by the Bank of Thailand



Source: Bank of Thailand

In a desperate attempt to prevent baht appreciation, a zero-interest reserve requirement of 30% on short terms flows was imposed in December 2006. Capital control is found to be sufficient backing in both economic theory and empirical evidence in order to address some of the macroeconomic problems associated with short-term capital flows, to enable certain development strategies, and to allow policy makers more flexibility with regard to crucial monetary and exchange rate policies (Montecino and Cordero, 2010). In effect, there was a separation between the onshore and offshore markets of the baht (Figure 7.5). The strength of the baht was caused by portfolio inflows into the stock market. It is not surprising that the Bank of Thailand attempted to stem the flows of portfolio investment by imposing Chilean style capital controls. Stock markets-related parties were against the capital controls because the control measure limited the capital inflows into the stock markets. The measure led to the collapse of the stock market and prompted the Bank of Thailand to exempt portfolio investment from the capital controls, just one day after the announcement of the measure. Consequently, the Bank of Thailand further relaxed and exempted the capital controls on transactions of debt instruments and those transactions with forward coverage.

Figure 7.5: Separation of foreign exchange markets



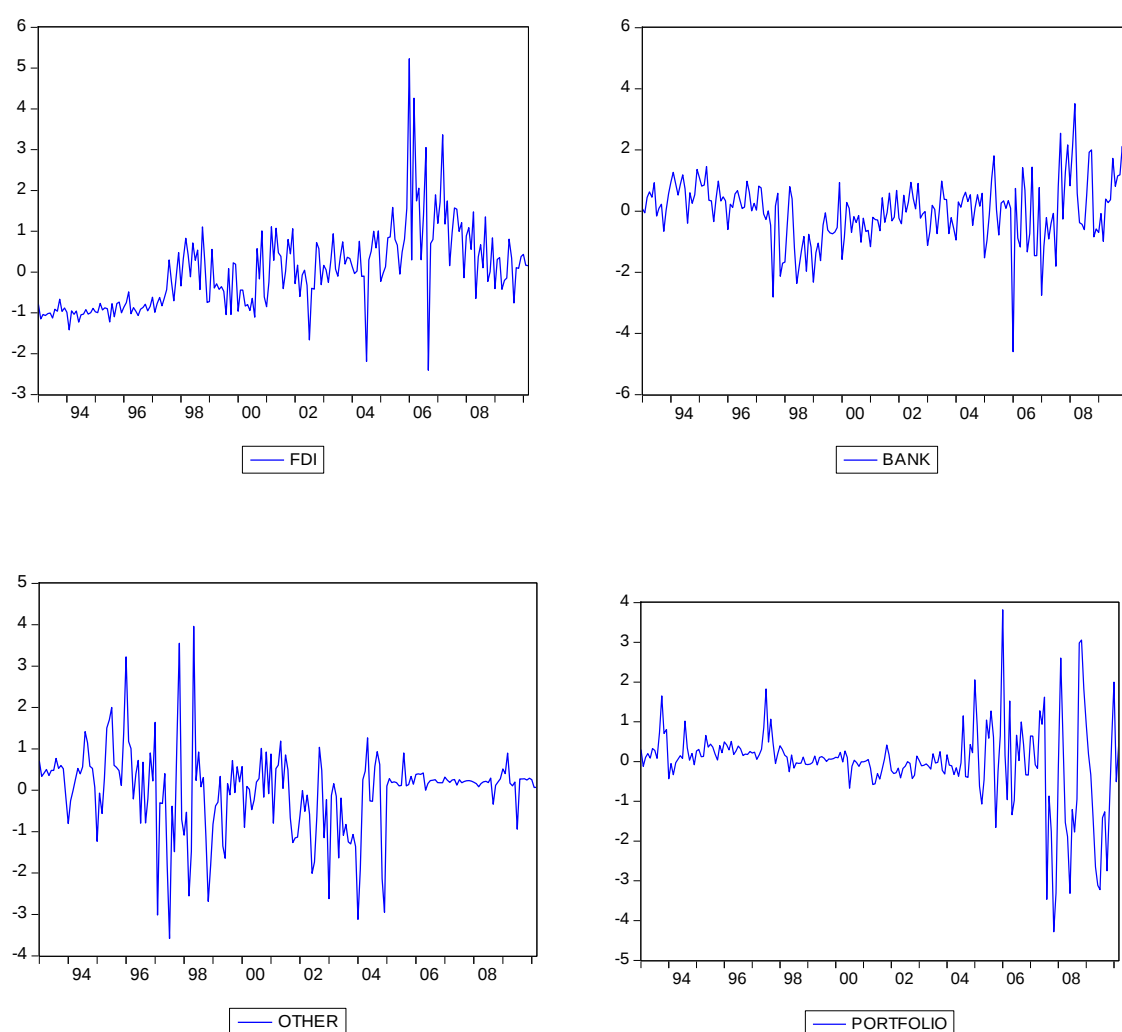
Source: Bank of Thailand

Eichengreen (2000) suggests that Chilean-style should be retained until banks' risk management practices and regulatory oversight have been upgraded. There is no conclusive evidence that Thailand capital controls had the effect on the slowdown of the appreciation as the Bank of Thailand envisioned. Asiedu and Lien (2004) found the evidence that capital controls deters foreign direct investment in East Asian countries. In 2007, although foreign investment in Thailand increased, the percentage increase is much lower than neighboring countries such as Malaysia and Vietnam. However, Coelho and Gallagher (2010) suggested that, by employing Columbia and Thailand as case study, there is still a role for capital control in the 21st century, but such controls should be more sophisticated than in years past. The fact that capital controls are envisaged as anti-globalization by investors, among other policies of the military-installed government, Chilean-style control measure became counterproductive and costly in terms of financial losses of the Bank of Thailand. In addition, exporters would have no incentives to improve their efficiency, relying on undervalued currencies. Moral hazard problems arise as exporters believe that the government would help them out by keeping competitive exchange rates.

Globalization can be measured in terms of international integration through foreign trade and capital flows. Some flows are more volatile than others. Portfolio investment and bank's short-term borrowing exhibit wilder fluctuations than foreign direct investment, which is considered as cold money and important source of long-term growth through technological transfer and spillover. Figure 7.6 shows deviations of different types of capital flows from its trend. Portfolio investment, bank flows, and foreign direct investment fluctuated wildly after the imposition of capital controls in December 2006. On the contrary, other types of capital flows (OTHER) experienced a significant decline in its volatility. These flows were related to speculation, as can be observed in their behavior prior to the 1998 crisis.

It is not surprising to see wider fluctuation of portfolio investment in the aftermath of capital controls. The striking finding is that foreign investment, which is not supposed to fluctuate widely, became more volatile. It suggests that foreign investors are affected by uncertainty and policy inconsistency of the Thai government after the restriction of capital flows. The capital control is a wrong policy applied for the wrong season. Thailand had maintained an open-door policy to foreign investors. The authorities believed that capital controls would have no impact on long-term investors as the policy was applied only to short-term flows and for a specific duration. Little did the authorities know is that the animal spirits of investors do not distinguish between short-term and long-term control measures. When policy becomes inconsistent with past expectations, risk premium was heightened resulting in massive capital flights from the stock market.

Figure 7.6: Volatility of capital flows (normalized values)



Source: Bank of Thailand

The stock market declined by 14.8 % within one day after the announcement of capital controls. The Stock Exchange of Thailand recorded the single biggest one-day lost by 820 billion baht in its history. On March 3, 2008 the Bank of Thailand abandoned the capital controls, reasoning that the economic situation had returned to normality and there was no

need for such controls. After the fear of global recession subsided in late 2009, capital inflows into the stock market resumed and the baht regained its strength. It is important to understand the macroeconomic policy consequences of the attempt to maintain the weak baht.

V. Macroeconomic policy responses to global recession

Despite the global slowdown that began in 2007, Thai exports maintained high growth until the first half of 2008 due to agricultural commodity booms. The collapse of the exports in 2009 led to a deeper cut in imports as the oil price also declined sharply in the first half of 2009. It is argued here that the demand for Thai exports depend more on foreign income effect than the substitution effect from relative price changes. When compared to changes in income level of importing countries, changes in exchange rates have lesser impact on Thailand's exports level. Since income elasticity of Thailand's exports is high, its economy is vulnerable to world demand shocks.

Under the current exchange rate system, can fiscal and monetary policy be utilized to stimulate the economy out of the recession? If the exchange rate is allowed to adjust to conditions in the balance of payments, and if trade volume responds to changes in the exchange rate, then monetary policy can play a vital role in stabilizing the economy. The baht would depreciate to stimulate net exports during the course of an expansionary monetary policy, which triggers capital outflows. Likewise, the baht would appreciate to curb rising aggregate demand during the period of tight monetary policy, which raises domestic interest rates and induces capital inflows. The surplus balance of payments would cause the appreciation of the baht and reduce net exports. A complete insulation may not be possible. As long as the dollar/yen exchange rate remains stable, the baht/dollar exchange rate would exhibit similar stability. But Thailand would not experience price stability as she did under the fixed exchange rate regime. Variations in exchange rates are associated with fluctuations in inflation. Since unanticipated inflation incurs welfare costs, greater variation in exchange rates also lead to higher social costs. Both inflation and exchange rate variations lead to risks and uncertainties. Exports can be adversely affected by excessive variations in exchange rate instability.

The adoption of flexible inflation targeting policy by the Bank of Thailand implies that the exchange rate is included in the monetary policy reaction function. The key policy rate does not only react to output and unemployment gap but also to the deviation of the exchange rate from its target. The discount rate of the Bank of Thailand moved in line with the federal funds rate. Only a few episodes can we find the situation when the Bank of Thailand discount rate was well below the federal funds rate. In the early 1990s, a positive interest gap induced large capital inflows and increased risk premiums in the aftermath of the 1998 crisis. In subsequent periods, interest rate differentials became smaller. Globalization and the open economy make it difficult for the Bank of Thailand to maintain an independent monetary policy in the long run.

As the world interest rate has considerably declined to a very low level, there is a limit for monetary easing to stimulate domestic demand to offset shrinking world trade. Expansionary fiscal policy is called upon in time of recession. Bond-financing budget deficit would be ineffective if the crowding-out effect is so strong that it induces capital inflows and causes currency appreciation. On the other hand, budget deficit spending financed through foreign

borrowings or pump-priming can be an effective means to stimulate the economy during economic recession.

According to the Mundell-Fleming model, compared to their effectiveness under the fixed exchange rate regime, fiscal policy is less effective under the flexible exchange rate system, while monetary policy is more powerful. This conclusion is based on the assumption that a country will experience balance of payments surplus after employing expansionary fiscal policy. Likewise, the country will experience balance of payments deficit after pursuing easy monetary policy. Therefore an exchange rate appreciation mitigates the expansionary effect of fiscal policy, while a depreciation of the exchange rate enhances the expansionary effect of the monetary policy.

However, fiscal policy under the flexible exchange rate regime can be effective under a certain circumstance. Imagine the case when expansionary fiscal policy leads to a deficit in the balance of payments. This is not unusual if the income elasticity of demand for imports is very high; while the responsiveness of capital flows to interest rate differentials is very low. The slow responses of capital flows to changes in interest rates can be attributed to high transaction costs, risk premiums, and capital controls. The exchange rate adjustment after fiscal expansion brings about currency depreciation instead of appreciation. The exchange rate effect would intensify the multiplier effect of fiscal policy through increased net exports. In sum, the effectiveness of fiscal expansion depends on its impact on the balance of payments and the resulted exchange rate changes that can intensify or nullify the first round effect of fiscal policy expansion.

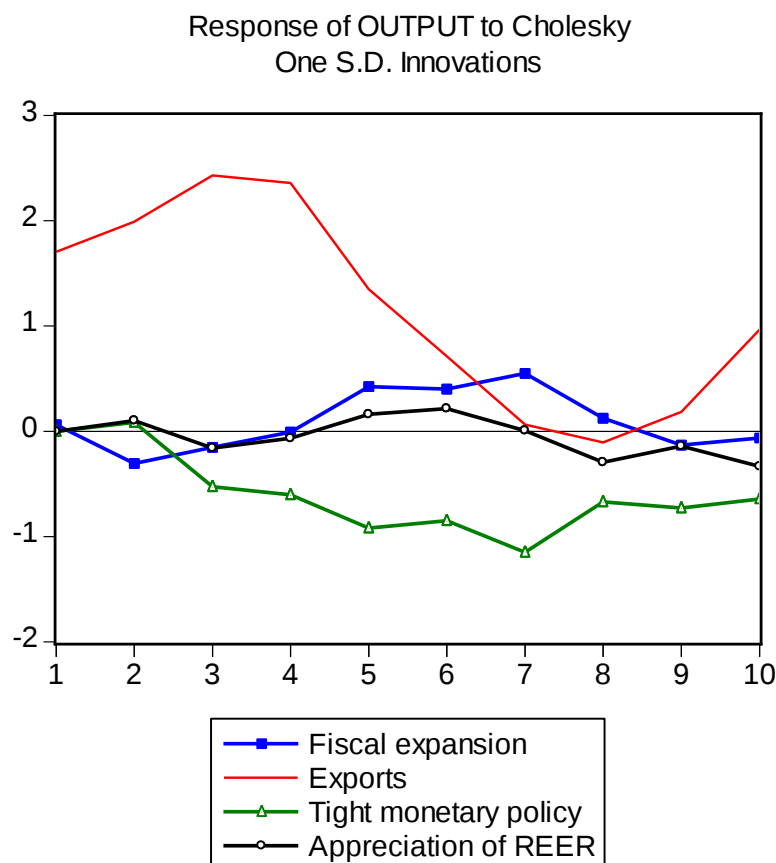
During fiscal contraction, output reduction leads to larger reduction in imports, while falling interest rates would not be able to create capital outflows to offset the fall in imports. The resulted surplus in the balance of payments would imply currency appreciation and magnify the output contraction effect of the fiscal austerity through reducing net exports. The bottom line of this analysis is that fiscal policy may not be totally ineffective under the situation in Thailand, where the income elasticity of demand for imports is high and capital flows are not so sensitive to changes in interest rate differentials.

In order to examine the impact of policy changes on output, a vector autoregressive model of five macroeconomic variables is employed. It is imperative to understand the impact of various policy responses to recession. The VAR model can suggest the relative strength of monetary and fiscal policy when the real interest rate is allowed to adjust. Monthly data from January 1993 to May 2009 are utilized in the model which includes output (manufacturing production index), exports, fiscal spending, the Bank of Thailand's key policy rate, and the real effective exchange rate (REER). All data are obtained from the Bank of Thailand.

The impulse response function (Figure 7.7) indicates that export shocks exert the strongest impact on output. Both positive and negative shocks bring about massive changes in output level. It is not surprising that the Thai economy suffer from recession in 2009 as exports collapsed. Can exchange rate depreciation spur growth through exports? Currency shocks do not have a significant impact on output growth. Depreciation of the real effective exchange rate may not lead to a large gain in competitiveness to boost exports. Real exchange rate movements depend on domestic and foreign price levels. Exchange rate changes also affect the cost of imported raw materials and therefore would affect net exports and GDP relatively less than the shocks from policy variables. An important implication of this finding is that if we allow the real effective exchange rate to adjust to external disequilibrium, its impact on

real output will be gradual and smoother than in the fixed exchange rate regime. Indeed, a more flexible exchange rate can insulate the economy from external shocks.

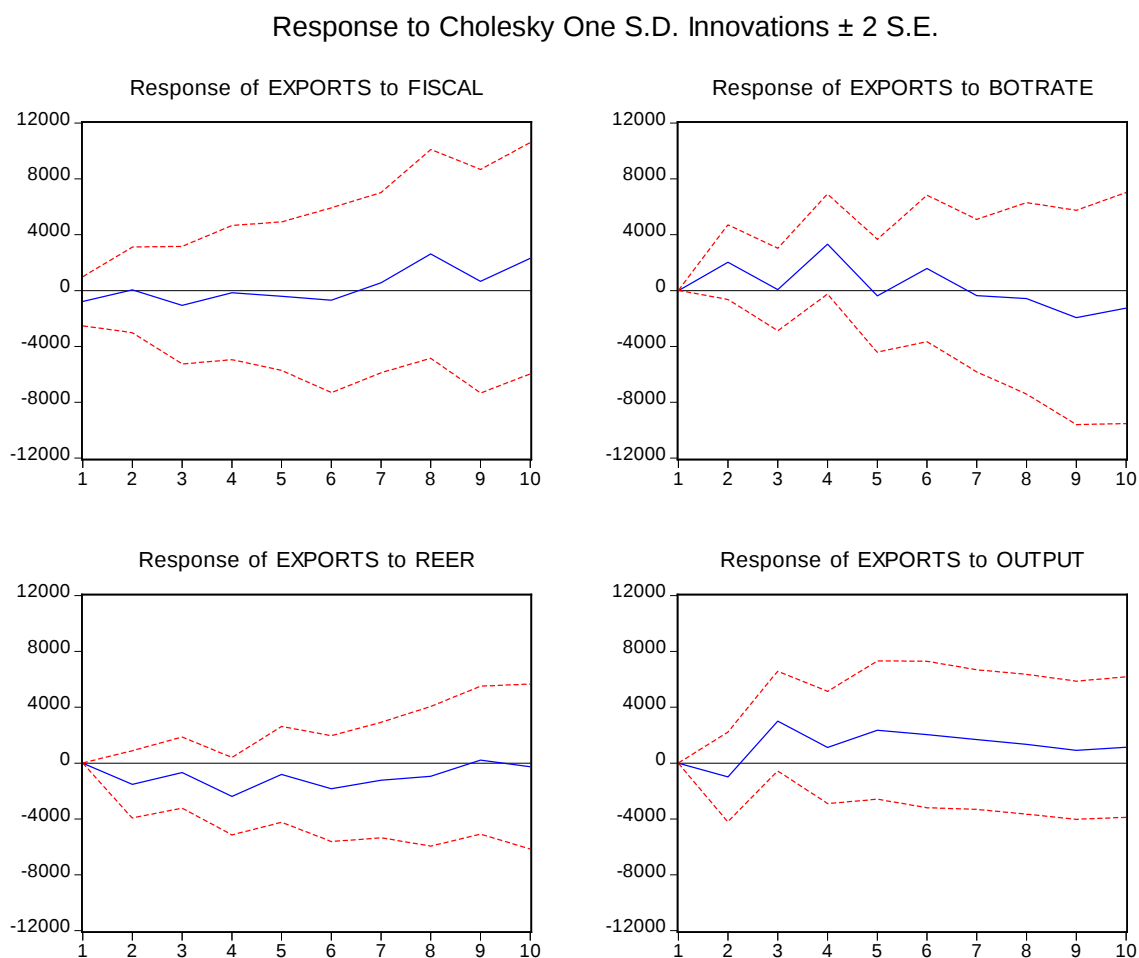
Figure 7.7: Impact on output from shocks and policy responses



The analysis of the impulse response function suggests that monetary policy is effective under the current exchange rate regime. A rise in the key interest rate can lead to contraction in output. Thus monetary policy is an effective policy instrument to stabilize the economy. Expansionary monetary policy can be employed to counteract the collapse in exports more effectively than fiscal stimulus (Figure 7.8). Fiscal policy is less effective in terms of stabilization objectives. The expansionary effect of fiscal stimulus will become apparent after five months lag and will die off after three quarters.

Since export shocks create the greatest impact on output, we must understand how exports are affected by fiscal and monetary policy instruments. Figure 8 reveals that fiscal stimulus has minimal impact on exports. Exports are not unfavorably affected by fiscal expansion. An appreciation of the real effective exchange rate indeed reduces the level of exports. If fiscal expansion gives rise to pressure on the price level, real exchange rate appreciation can thwart growth in exports. Figure 8 also illustrates that monetary tightening does not always lead to export slowdown, simply because the real effective exchange rate is not affected much by tight monetary policy. View in this light, given other factors remain constant, monetary policy can be a powerful tool for stabilizing the economy as the baht has become more flexible than in the past.

Figure 7.8: Export responses to various shocks



Exports are largely responsive to output growth. With expansion in capacity output and greater degree of capital utilization, exports can be raised. The implication of this finding is that instead of engineering a weak exchange rate, exports can be raised in the long run through promoting flows of capital into productive sectors. Any measures that hinder capital inflows and foreign direct investment can reduce export growth in the long run. Political unrest and uncertainty, capital controls, protectionism, policy inconsistency, nationalistic policy would entail the reduction of long-term capital flows and thereby reducing exports in the long run.

Thai monetary authorities are not willing to let the exchange rate adjust to equilibrate external imbalances. The burden of the adjustment falls on output. If the real exchange rate is allowed to appreciate in response to surplus in the balance of payments, export growth can slow down to prevent overheating economy. Likewise, if the real exchange rate depreciates in response to deficit in the balance of payments, exports can be enhanced to stimulate the economy. The exchange rate is such an important macro policy variable that we cannot deprive of its equilibrating role.

VI. Conclusions

Under certain circumstances when imports are highly responsive to changes in absorption and when capital flows do not respond significantly to changes in interest rate differentials, both fiscal and monetary policies can play an important stabilizing role. In addition, a more flexible exchange rate system can insulate the economy from shocks originated in the goods market. But it would be impossible for a flexible exchange rate system to cushion the financial shocks originated in the money market.

The real effective exchange rate of the baht has a negative long-run relationship with the real effective rate of the dollar and the yen. The interest rate policy cannot be used to target the value of the baht. Foreign exchange market intervention by the Bank of Thailand intensified as the baht appreciated against the dollar during the period 2006-2009. Although the Bank of Thailand succeeded in reducing the volatility of the baht-dollar rates, it created more volatility in the effective exchange rates. Intervention in foreign exchange markets is costly and ineffective, because the baht/dollar exchange rate is determined by movements of the dollar and short-term capital flows into the stock market. Accompanying sterilization is also costly and ineffective in the long run. When exchange rate adjustments are not allowed to work properly to equilibrate current account disequilibrium, adjustments have to take place through output growth. Capital controls are instruments usually employed during the period of currency crises. The capital control measured imposed for fourteen months that began in December 2006 was unnecessary, ineffective, and costly. Furthermore it has adverse consequences on foreign direct investment. As such the temporary control measures can be detrimental to long-term economic growth.

VII. References

- Akiba, H., Iida, Y., and Kitamura, Y. (2009). The Optimal Exchange Rate Regime for a Small Country. *International Economics and Economic Policy*, 315-343.
- Asiedu, E., and Lien, Donald (2004). Capital Controls and Foreign Direct Investment. *World Development* **32**, 479-491.
- Bhagwati, J. (1998). The Capital Myth. *Foreign Affairs* **77**, 7-12.
- Bhandari, R., and Upadhyaya, Kamal P. (2010). Panel Data Evidence of the Impact of Exchange Rate Uncertainty on Private Investment in South-East Asia. *Applied Economics* **42**, 57-61.
- Bilson, J. (1985). Macroeconomic Stability and Flexible Exchange Rates. *American Economic Review* **79**, 62-69.
- Broda, C. (2004). Terms of Trade and Exchange Rate Regimes in Developing Countries. *Journal of International Economics* **63**, 31-58.
- Calvo, G. A., and Carmen M. Reinhart (2002). Fear of Floating. *Quarterly Journal of Economics* **117**, 379-408.
- Chit M., R. M., and Willenbockel D. (2010). Exchange Rate Volatility and Exports: New Empirical Evidence from the Emerging East Asian Economies. *World Economy*, 239-263.
- Coelho B, a. G. K. (2010). Capital Controls and 21st Century Financial Crises: Evidence from Colombia and Thailand. *Working paper series number 213, Political Economy Research Institute*.
- Coudert, V., and Couharde, Cecile (2009). Currency Misalignment and Exchange Rate Regimes in Emerging and Developing Countries. *Review of International Economics* **17**, 121-136.
- Dubas, J. M. (2009). The Importance of the Exchange Rate Regime in Limiting Misalignment. *World Development* **37**, 1612-1622.
- Eichengreen, B. (2000). Taming Capital Inflows. *World Development* **28**, 1105-1116.
- Friedman, M. (1953) The Case for Flexible Exchange Rates. *Essay in Positive Economics*. (pp. 157-203). Chicago, University of Chicago Press.
- Hasan, S., and Myles Wallace (1996). Real Exchange Rate Volatility and Exchange Rate Regime: Evidence from Long-term Data. *Economic Letters* **52**, 67-73.
- Kenen, P. B., and Dani Rodrik (1986). Measuring and Analyzing the Effects of Short-term Volatility in Real Exchange Rates. *The Review of Economics and Statistics* **68**, 311-315.
- Krugman, P. (1989). The Case for Stabilizing Exchange Rates. *Oxford Review of Economic Policy* **5**.

Liew, V. K.-S., Baharumshah, Ahmad Zubaidi, and Puah, Chin-Hong (2009). Monetary Model of Exchange Rate for Thailand: Long-run Relationship and Monetary Restrictions. *Global Economic Review: Perspectives on East Asian Economies and Industries* **38**, 385-395.

Montecino J. & J., C. (2010) Capital Controls and Monetary Policy in Developing Countries. Center for Economic and Policy Research.

Nakagawa, H. (2002). Real Exchange Rates and Real Interest Differentials-implications of Nonlinear Adjustment in Real Exchange Rates. *Journal of Monetary Economics* **49**, 629-649.

Obstfeld, M. (1985). Floating Exchange Rates: Experience and Prospects. *Brooking Papers on Economic Activity* **2**, 369-450.

Obstfeld, M. (1998). The Global Capital Market: Benefactor or Menace? *Journal of Economics Perspectives* **12**, 9-30.

Obstfeld, M., and Kenneth Rogoff (1995). The Mirage of Fixed Exchange Rates. *Journal of Economic Perspectives* **9**, 73-96.

Taylor, J. B. (2001). The Role of the Exchange Rate in Monetary-Policy Rules. *American Economic Review* **91**, 263-267.

Yip, S.L. (2002). Singapore's Exchange Rate Policy: Empirical Foundations, Past Performance and Outlook. *The Singapore Economic Review*, 47 (1), 173-182.

Appendix

In this paper, a VAR model is implemented to examine the effects of certain shocks to macroeconomic variables. All the equations that contribute to figure 7.7 and 7.8 are listed below.

$$\begin{aligned}
 OUTPUT_t &= \sum_{i=1}^t \mu_{1i} OUTPUT_{t-i} + \sum_{i=1}^t \alpha_{1i} FISCAL_{t-i} + \sum_{i=1}^t \beta_{1i} EXPORT_{t-i} + \sum_{i=1}^t \gamma_{1i} BOTRATE_{t-i} + \sum_{i=1}^t \delta_{1i} REER_{t-i} + \varepsilon_{1t} \\
 FISCAL_t &= \sum_{i=1}^t \mu_{2i} OUTPUT_{t-i} + \sum_{i=1}^t \alpha_{2i} FISCAL_{t-i} + \sum_{i=1}^t \beta_{2i} EXPORT_{t-i} + \sum_{i=1}^t \gamma_{2i} BOTRATE_{t-i} + \sum_{i=1}^t \delta_{2i} REER_{t-i} + \varepsilon_{2t} \\
 EXPORT_t &= \sum_{i=1}^t \mu_{3i} OUTPUT_{t-i} + \sum_{i=1}^t \alpha_{3i} FISCAL_{t-i} + \sum_{i=1}^t \beta_{3i} EXPORT_{t-i} + \sum_{i=1}^t \gamma_{3i} BOTRATE_{t-i} + \sum_{i=1}^t \delta_{3i} REER_{t-i} + \varepsilon_{3t} \\
 BOTRATE_t &= \sum_{i=1}^t \mu_{4i} OUTPUT_{t-i} + \sum_{i=1}^t \alpha_{4i} FISCAL_{t-i} + \sum_{i=1}^t \beta_{4i} EXPORT_{t-i} + \sum_{i=1}^t \gamma_{4i} BOTRATE_{t-i} + \sum_{i=1}^t \delta_{4i} REER_{t-i} + \varepsilon_{4t} \\
 REER_t &= \sum_{i=1}^t \mu_{5i} OUTPUT_{t-i} + \sum_{i=1}^t \alpha_{5i} FISCAL_{t-i} + \sum_{i=1}^t \beta_{5i} EXPORT_{t-i} + \sum_{i=1}^t \gamma_{5i} BOTRATE_{t-i} + \sum_{i=1}^t \delta_{5i} REER_{t-i} + \varepsilon_{5t}
 \end{aligned}$$

Chapter 8

Fiscal policy for growth and stability: Lessons from Thailand

Bhanupong Nidhiprabha

Faculty of Economics, Thammasat University

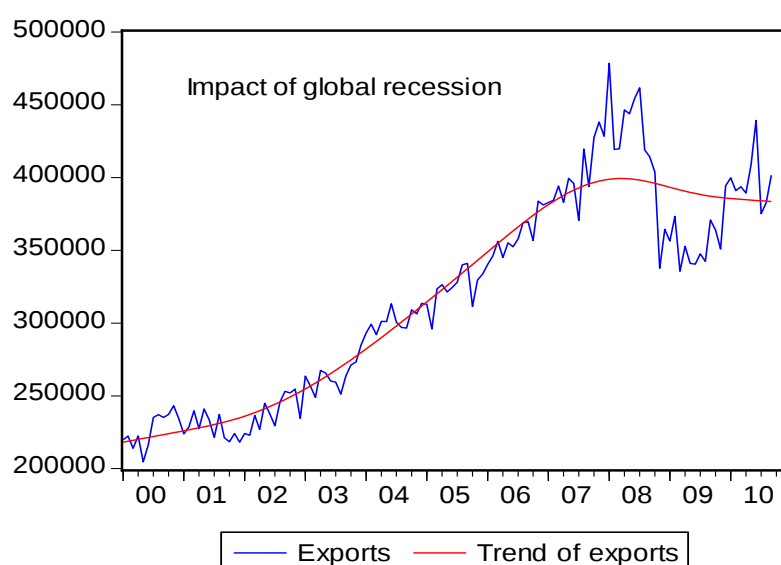
Fiscal policy can be employed to promote growth and stability. To stimulate growth in the aftermath of global recession, sufficient fiscal space is needed to carry out effective stimulus package. Fiscal burden must be considered in addition to its impact on price stability. The role of tax automatic stabilizer and the ability to restore budget balance must be seriously taken into account when formulating fiscal stimuli. Although expansionary fiscal policy can be utilized during recession, it would be more effective when conducting under condition that the government can maintain public confidence. The rules of fiscal sustainability must be strictly observed all the time to ensure price stability and long-term growth.

I. Introduction

Most countries that suffered from the global financial crisis between 2007 and 2009 employed expansionary fiscal policy to counteract the shortfall in exports. In developing countries where monetary policy instruments have some limitations, fiscal stimulus is the only policy measure available to compensate the declining export demand from advanced countries. Thailand's exports continued increasing in 2008 despite the impact of the global economic slowdown that began in 2007. The temporary commodity boom and the food price crisis gave rise to such impressive performance of Thai exports in 2008. From 2000 to 2008, the increasing trend of exports can be seen in Figure 8.1. However, when the global financial crisis finally hit the Thai economy, exports declined sharply in 2009. This was also the period when domestic investment and consumer spending were subdued. Thus the contraction of both external and internal demand caused real GDP to decrease by 2.3 % in 2009. It was the first time that the Thai economy experienced a recession since the massive output contraction of 10 % in the aftermath of the currency and financial crises in 1998. The recession was short-lived, although massive value of financial assets was destroyed during the meltdown of financial institutions. It was the rapid growth exports that restored growth. Since the Asian financial crisis did not spread to the rest of the world, Thailand was able to export its way out of recession through currency devaluation.

But it was different in 2009 as advanced economies could not import from Asia as they were trying to maintain their wealth through raising saving and subsequently reducing imports. Furthermore, appreciation of the baht made it difficult for Thai exporters to reap the benefit they once gained during the 1997 Asian financial crisis. During this time many Asian scholars started questioning the Asian traditional model of growth, arguing that Asian countries should depend less on exports and pay more attention to the role of domestic demand.

Figure 8.1: Booms and Busts in exports

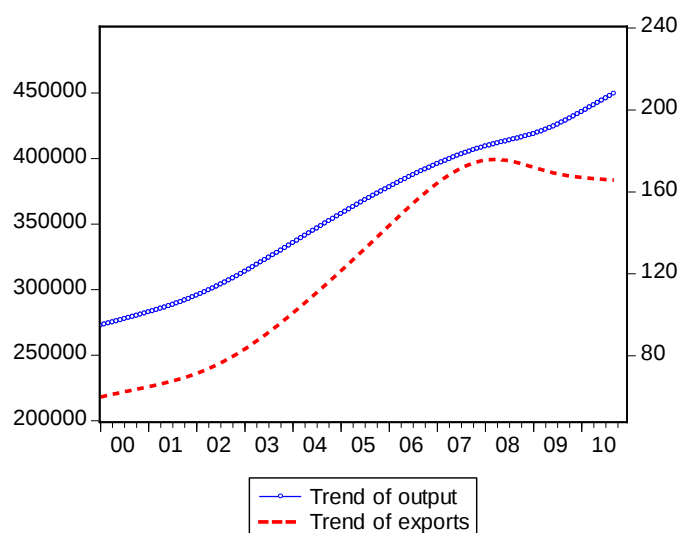


Source: The Bank of Thailand

By the first half of 2010, it became clear that manufactured exports rebounded sharply. It is reckoned that the impact of global financial crisis has previously been overestimated. The robust growth of India and China generated strong export demand for goods from Thailand. Whether the export recovery can be sustained depends to a large extent on economic recovery in advanced countries. If developed economies experience a double-dip recession in the near future, developing countries must brace for another round of export contraction and they must increase volume of trade among themselves. The possibility of having a market substitution from advanced economies to emerging countries in Asia is limited, because a large part of the final demand for manufactured goods is originated from developed areas.

Even if there is a remote possibility of having a double-dip recession in developed economies, the important role of domestic demand must be emphasized. In particular, if domestic investment and consumption are weak as a result of uncertainties and pessimism, the government must act and stimulate the economy appropriately and efficiently. When the world economy recovers, public spending must return to its normal pattern observed the pre-global financial crisis. The collapse of exports in 2009 can be thought of as a temporary shock, the long-term output level should not be affected once exports return to its normalcy. As Figure 8.2 shows, the trend of exports has not yet returned to its trend growth path. Nevertheless, the long-term output growth remained unaffected by the declining trend of reduced exports.

Figure 8.2: Long-term trend of output and exports



Source: Bank of Thailand

It should be noted that exports and imports move together in the long run. Increased exports generate income, which in turn lead to higher demand for imports. In addition, manufactured exports require imported parts and components. The emerging pattern of Infra-industry trade causes both imports and exports of manufactured goods move together. The reduction in exports gives rise to a fall in imports of raw materials; thus the impact of exports collapse on the current account is not severe. Even if exports collapse, the adverse impact on GDP will not be as much as the fall in exports because imports also decline. The implication is that governments should not take drastic fiscal measures to react to temporary export shortfalls,

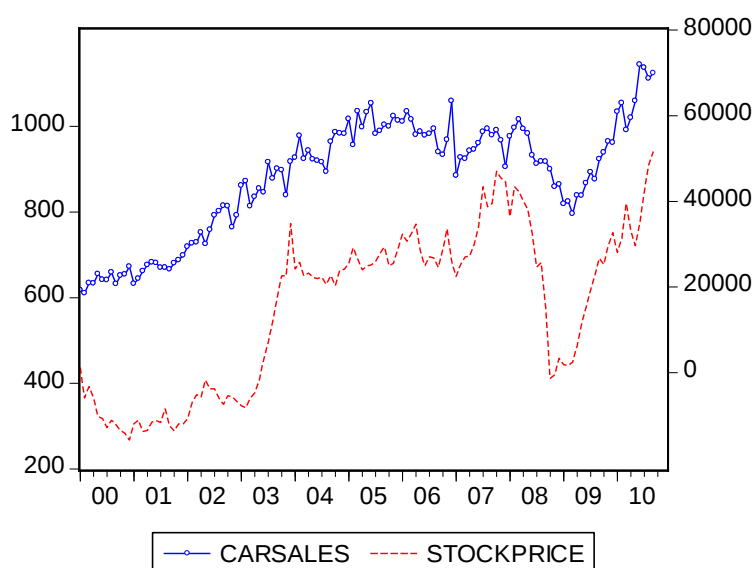
because the impact on GDP must be considered by the falling level of net exports rather than gross exports.

This paper addresses the role of fiscal policy whether it can be employed to stabilize the short-term fluctuations of output. It focuses on the relationship between fiscal and macroeconomic variables. Section 2 discusses the role of domestic demand and fiscal policy. Section 3 highlights the importance of fiscal automatic stabilizers. Section 4 examines the rules for fiscal sustainability. Section 5 analyzes the impact of fiscal expansion on growth and price stability. Concluding remarks are provided in the last section.

II. Domestic demand and fiscal measures

The movement of stock prices is a good indicator of investor confidence. It is obvious that the global financial crisis between 2007 and 2009 depressed market sentiment considerably. However, by the fourth quarter of 2010, the SET index has gained the lost ground since its peak in 2007. Confidence has returned and other stock markets in the region experienced the similar sharp rebound in the stock markets. Sales of automobiles reflect consumer confidence since the decision to buy durable goods is determined by similar factors that dictate the demand for physical investment. Expected or permanent income, the cost of capital, and fiscal incentives determine the desired level of capital stock. We can use the number of car sold domestically as a proxy for consumer confidence. Both proxies for investor and consumer confidence, shown in Figure 8.3, move together during the downturn and upturn. The sluggish movement of the SET index in the early 2000s reflected poor sentiment during the mild recession in the US, when the bubble burst in the Wall Streets due to the dot-com share prices and the 911 incidence. These were not the factors affecting domestic consumer demand in Thailand as much as they were for the stock markets. The number of cars sold in Thailand thus continued increasing from 2000 to 2005, reflecting rising consumer confidence. After the military coup in 2006, subsequent political turmoil led to erosion of consumer and investor confidence. The global financial crisis took the severe blow on business and consumer confidence in 2008.

Figure 8.3: Consumer durable goods and asset prices

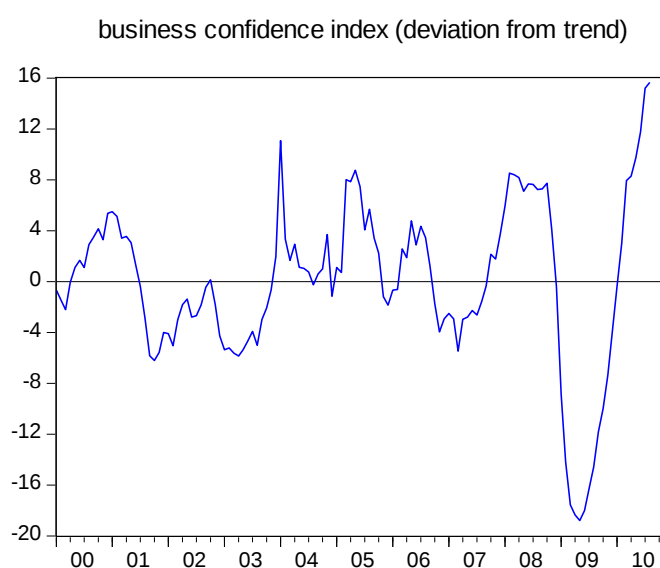


Source: Bank of Thailand

Because of excess liquidity in the banking system, the low interest rate and ample bank credit were available to consumers and investors. Fiscal expansionary measures that give rise to public deficit would not create crowding-out effect. Fiscal stimulus undertaken during this period will be effective without having to depend on coordination of expansionary monetary policy.

It is argued here that fiscal policy will be more effective during the time that consumer and investor confidence is strong. On the other hand, when business sentiment is low, expansionary impact of fiscal deficit will have minimal impact on the economy. The multiplier impact will be reduced if investors and consumer decide to postpone their investment until the period of uncertainty and risk has passed.

Figure 8.4: Regained confidence after the shock



Source: Bank of Thailand

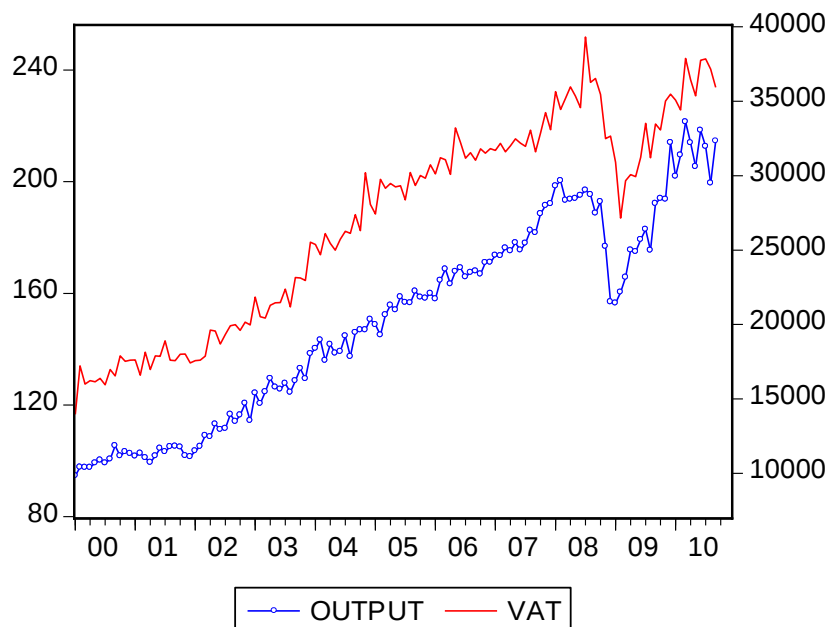
Akerlof and Shiller (2009) extend the concept of Keynes' animal spirits of investors to include confidence or self-fulfilling phenomenon, fairness, money illusions, criminal behavior, and stories that media tell them. With this extended definitions of animal spirits, the success of policy stimulus also depend on its psychological impact.

Fiscal stimulus at the period of the lowest level of confidence in 2008 would be relatively ineffective (Figure 8.4), compared to the period of normalcy. One might argue that budget deficit can help to improve the business confidence and therefore should be welcome during the recession. On the other hand, running a large budget deficit could lead to loss of confidence as the enlarging budget would further lead to huge public debt and the inevitability of a tax hike in the future. Whether running the budget deficit can lower and raise the business confidence depends on sustainability of public debt.

The Value Added Tax (VAT) is a type of consumption tax, which is a tax based on consumption rather than income. Unlike income taxation, it has no adverse impact on saving

incentives. In addition, it has a feature of automatic stabilizer. The VAT excludes food consumption therefore it reflects activity in the manufacturing sector.

Figure 8.5: Output and Value Added Tax



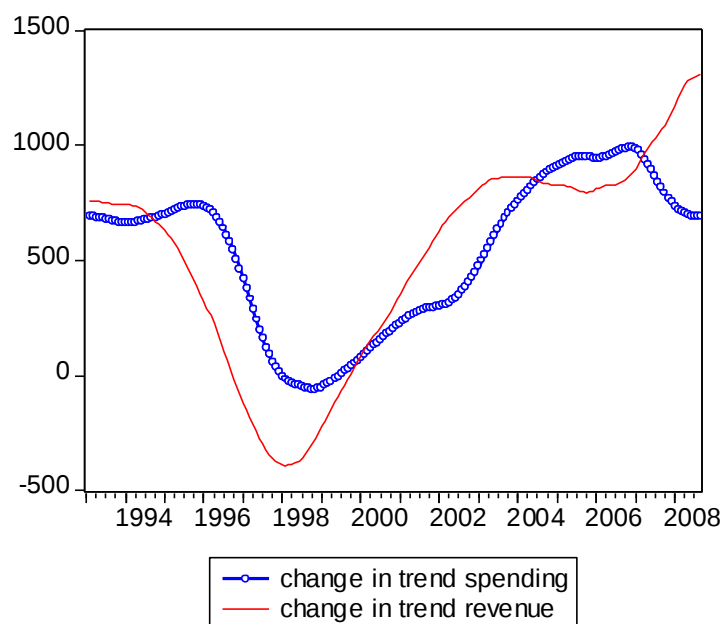
Source: Bank of Thailand

III. Automatic fiscal stabilizers

The primary budget (budget that excludes interest payments) is prone to be in surplus during the time when the economy is growing above its natural growth rate and tend to be deficit when it is declining below its natural level. Figure 8.5 illustrates the co-movement between the amount of value added tax and manufacturing output index. Thus budget deficit is a natural consequence of recession and so is the budget surplus during the boom. But the expenditure side of the budget must be counter-cyclical to make fiscal automatic stabilizer work.

By removing cyclical components from actual public spending and revenue, utilizing monthly data from January 1993 to December 2008, we can obtain the long-term trends of public expenditure and revenue. Using the first difference of these trend variables, we can find a pattern of fiscal stance which reflects the outcome from both discretionary fiscal policy and the automatic fiscal stabilizers (Figure 8.6).

Figure 8.6: Fiscal stance shown by structural budget



Source: Bank of Thailand

The positive difference between changes in trend spending and trend revenue suggests fiscal expansionary policy stance. The large budget deficit in the late 1990s turned around into surplus in the 2000s. The deficit was sustainable because of the rapid increase in tax revenues during the recovery and the ability to trim down public spending. Investment in infrastructure was postponed while tax capacity was enhanced. A sharp deterioration in fiscal position took place in 2009, but tax collection in 2010 was above the expected level. The automatic tax stabilizer is at work. In some countries, it is difficult to cut down budget deficit because of the inability to curtail public spending.

The structure of the spending matters for long-term growth. If a large part of government spending is on current rather than capital spending, it would be very difficult for the government to curtail total spending as it would affect social welfare of those who used to receive such benefits from the government. On the other hand, if the budget consists of a large portion of capital spending, it would be relatively easier for the government to cut down the deficit. Political economy involves here as current consumption includes military spending, health, education, and social welfare.

It is possible that high revenue leads to higher public spending and vice versa. If public goods are normal, rising GDP per capita would imply an increase in the demand for public goods. On the other hand, some governments may want to spend first by issuing bonds or printing money, but they have to raise taxes later. Thus the causation can run both ways between tax revenue and public spending.

Employing monthly data from 2000 to 2010 to examine whether taxation leads public spending or vice versa, we find that government spending does not Granger cause taxation, but higher tax revenue leads to higher spending (Table 8.1). The finding indicates that Thailand's fiscal policy was conservative because spending was constrained by tax capacity.

The reason behind this fiscal prudence is related to conservative budgetary laws of conservative fiscal policy.

Table 8.1: Spending-led taxation?

Null hypothesis	F-Statistic	Probability
$\Delta(G)$ does not Granger Cause $\Delta(TAX)$	2.23	0.11
$\Delta(TAX)$ does not Granger Cause $\Delta(G)$	3.97	0.02

Source: Calculation is based on 125 observations of data monthly data from January 2000 to August 2010. The test employed two lags.

The budgetary law states that the proposed amount of expenditure cannot exceed 20 % of anticipated revenue. One can argue that this rule would limit the size of fiscal stimulus during the period of economic depression, which requires very large fiscal stimulus. When all engine of growth are shut down, there is an urgent need to apply large fiscal deficit. However, relaxation of this rule would enable politicians to profligate the budget and employ populism policy for their own benefits. We have seen that the global economic recession is a temporary shock; therefore we should not amend fiscal rules for the benefit of the incumbent government.

It should be emphasized that fiscal stimulus can also be done through tax reduction in addition to increased spending. The impact on fiscal burden will be the same. In theory tax financed budget deficit is less expansionary than bond-financed budget deficit. If bonds are net wealth and wealth has a significant impact on private consumption, bond-financed budget deficit can lead to more expansionary impact when bonds holders start spending because they feel wealthier by holding more government bonds.

Discretionary policy can be delayed because of implementation lags caused by lengthy parliamentary process of budget approval. It is argued here that if a country has established fiscal automatic stabilizers, fiscal policy can be stabilizing and it does not have to depend on a long-delayed budgetary process. Let's examine the role of automatic stabilizers in both taxation and expenditure when they change in response to changes in output and prices.

Table 8.2: Estimated fiscal elasticities: Jan 2000-Dec 2005

	expenditure	Tax revenue
Output	0.22	0.55
Price level	1.27*	-1.1*

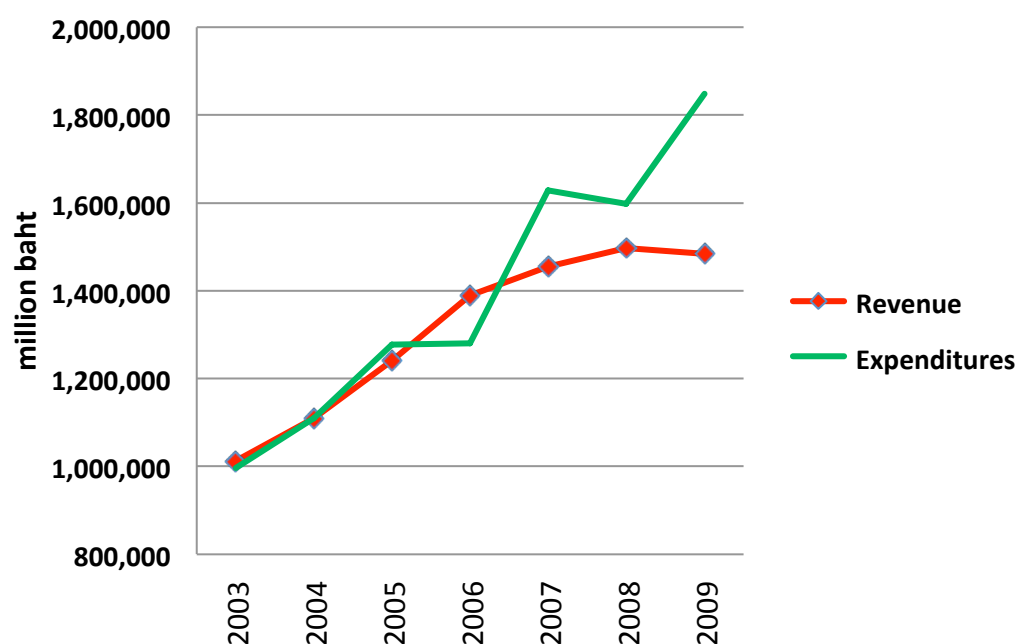
Table 8.3: Estimated fiscal elasticities: Jan 2006-Aug 2010

	expenditure	Tax revenue
Output	-0.35	1.19*
Price	1.82	-1.89*

If fiscal policy can be employed for growth and price stability, we must recognize the feedback effects from growth and inflation to tax revenue and spending. Elasticities of

expenditure and revenue can be calculated with respect to output and price levels. As reported in Table 8.2, between 2000 and 2005, there was no significant impact of changes in output on both public spending and revenue. But the price level caused a reduction in tax revenue and an increase in expenditure. Inflation caused an increase in budget deficit in real terms. Note the estimated values of the two elasticities in Table 8.2. They were greater than unity. Fortunately inflation rate was subdued during this period. A small budget surplus was observed in 2006 (Figure 8.7). This was due mainly to political upheavals relating to changing governments that slowed down budget utilization. It turns out to be a blessing in disguise since it provided ample fiscal space prior to experiencing the global recession in subsequent years.

Figure 8.7: Thailand's Fiscal Stimulus



Source: Bank of Thailand

Similar to the estimated coefficients in Table 8.2, a double-log regression functional form is employed for monthly data from January 2006 to August 2010. Public spending did not respond to output nor price levels (Table 8.3). On the revenue side, inflation led to lower tax revenue, while growth raised it. The output elasticity is greater than one, implying that revenue rose faster than output¹. This is a nice feature of automatic tax stabilizer during the course of economic expansion. However, inflation decreases tax revenue. The estimated coefficient is greater than unity. It suggests that real tax revenue would decline almost 3 % because of inflation. The policy implication is that automatic tax is destabilizing during high inflation. It is imperative that public spending must be controlled during high inflation to

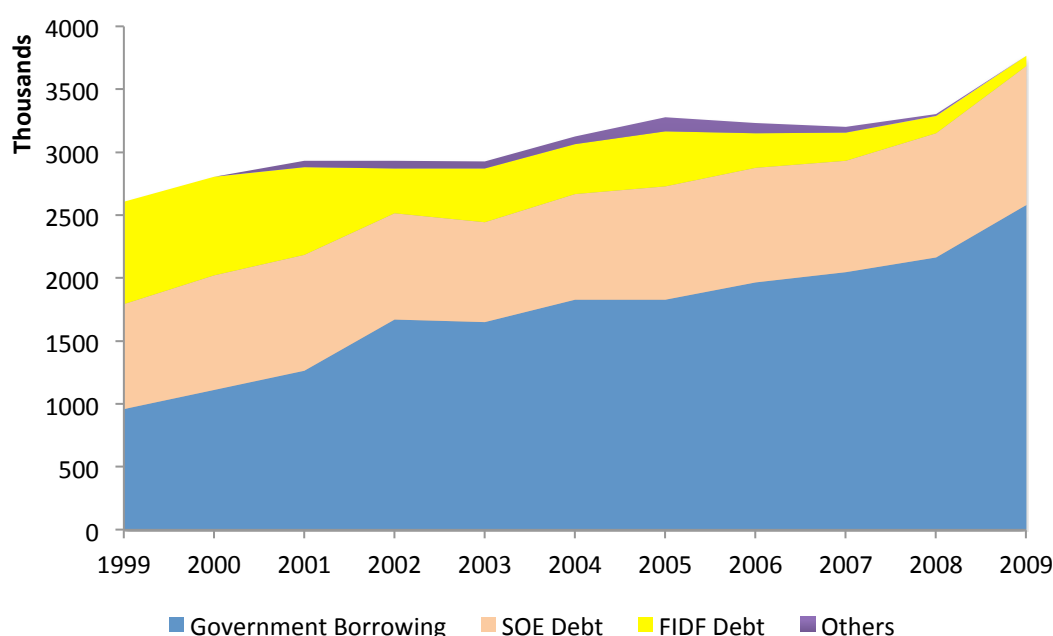
¹ Mourmouras and Rangazas (2009) views that the relative size of government spending and taxation increases as an economy develops because of the structural transformation from traditional to modern production, rising public infrastructure investment, and less democratic governments in many of today's developing economies.

avoid giving more inflationary pressure to the economy. Inflation can be spiraling if the government wants to maintain the level of real spending during the time of high inflation.

IV. Rules for fiscal sustainability

The budget deficit experienced after the financial meltdown in 1998 caused public debt on the rising trend (Figure 8.8). Economic contraction reduced tax revenue during the downturn. The continued budget deficit since 2007 raised the level of public debt. In addition, the government bailed out troubled financial institutions through Financial Institution Development Fund (FIDF), but this type of public debt has continued declining as financial institutions underwent structural changes and emerged stronger. They were not affected much by the global financial crisis of the period 2007 and 2009.

Figure 8.8: Public Debt by Type (Million Baht)

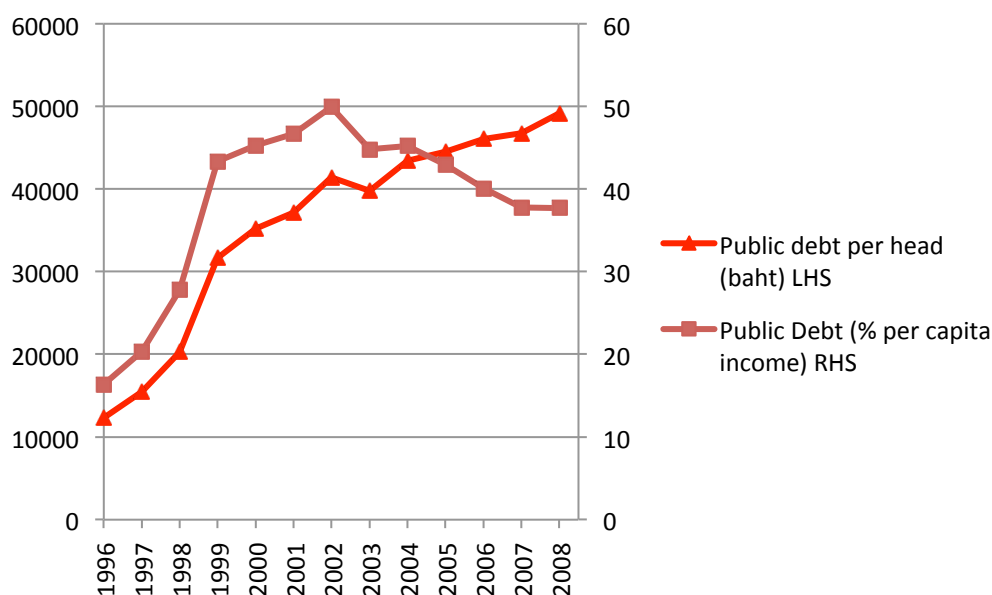


Source: Fiscal Policy Office

If the primary deficit cannot be contained, public debt will keep on rising and would threaten the sustainability of the fiscal system. To stabilize debt-to-GDP ratio, the primary deficit must be cut and GDP growth rate must exceed the real rate of interest. Thus during economic recovery, the government must ensure that fiscal stimulus can bring about economic growth rate that is higher than the real interest rate.

Figure 8.9 illustrates that public debt per head of the Thais in 2008 rose to 50,000 Baht --a fivefold increase from the level in 1996. Since per capita income increased faster than the amount of debt, the level of debt per head as a percentage of per capita income peaked in 2002 has declined steadily.

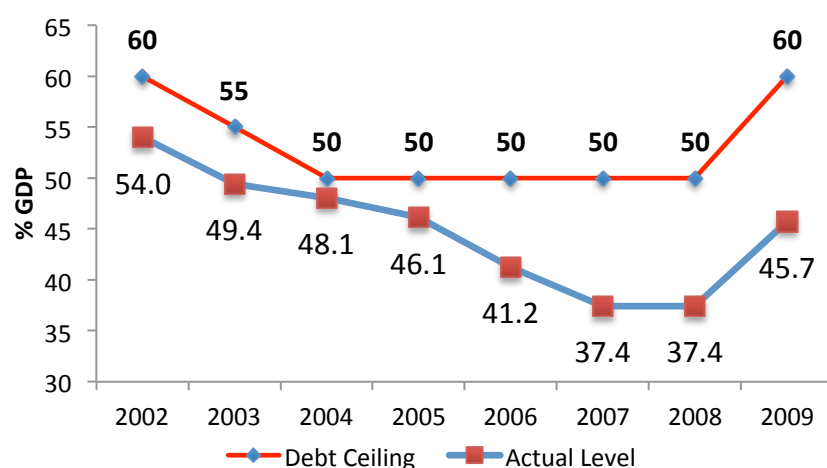
Figure 8.9: Public debt burden



Source: Fiscal Policy Office

Because the level of per capita debt has been declining, the Thai government still has room to employ fiscal stimulus to counteract future impact of the global recession. This ample fiscal space is basically the result of fiscal discipline. There are at least three rules of fiscal sustainability that the Thai government observed in the past. Some of the rules have been changed to make more room for fiscal expansion. For example, the rule that regulates the level of public debt to GDP level was altered. It was made less stringent from the maximum level of 60% in 2002 to 50 % in 2004 and it was maintained at that level until 2008. To accommodate fiscal expansionary policy, the maximum debt was raised to 60% in 2009. The actual debt-GDP ratio increased substantially to 45.7 % in 2009, which was still below the original 50% ceiling. With the rapid recovery, there is no need for the government to make the rule less stringent. There has never been a single incidence of breaching this rule in the past. There was a historical reason for this conservative policy which went back for many decades. Aversion to hyperinflation and fear of foreign invasion were the reason for such conservative fiscal policy

Figure 8.10: Regulation on Public Debt

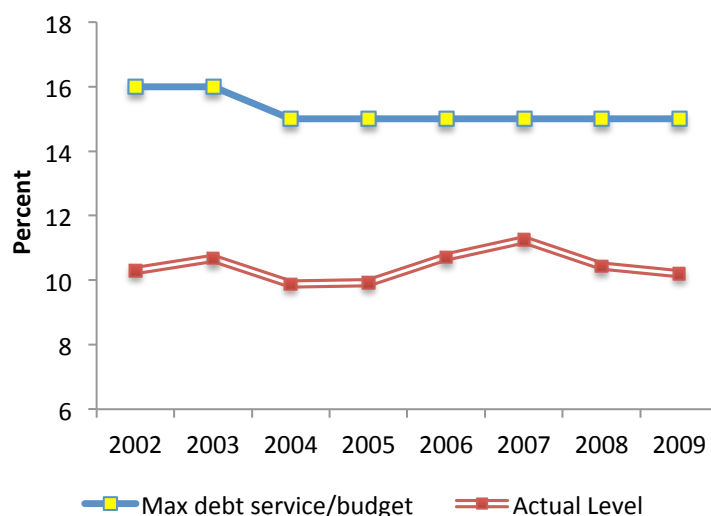


Source: Fiscal Policy Office

Since high debt causes a rapid rise in interest payments, another rule of fiscal sustainability was institutionalized by imposing ceiling on debt service as percentage of total planned expenditure. The ceiling was made more stringent after 2003 by lowering the maximum debt service from 16 % to 15% of total budget. Again the Thai government was able to control the debt service within the ceiling. The plentiful liquidity in the money market enabled the government to borrow at the very low rate of interests.

Another rule on foreign borrowing is worth mentioning. The debt-service ratio applies to foreign borrowing. In recent years, foreign borrowing declined while exports grew rapidly in the last decade. There is no problem in keeping the foreign debt-service to exports ratio within the permissible range.

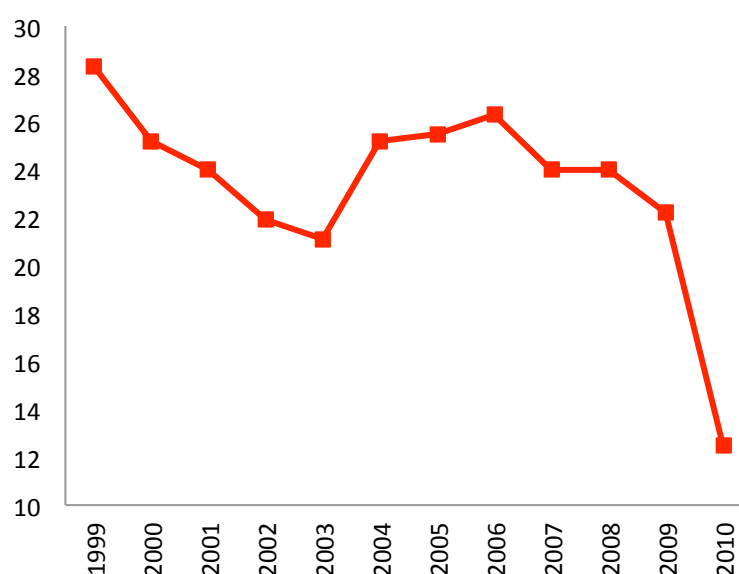
Figure 8.11: Debt Service to Total Proposed Spending



As mentioned earlier, fiscal spending structure matters for long-term growth. Public infrastructure can increase productivity in the private sector and enhance long-term growth. Public investment in transportation and communication has a super natural high rate of return to the economy. If public investment is complementary to private investment, increased public investment can lead to crowding-in-effect. In contrast, high public consumption relative to public investment can retard growth. Empirical evidence of cross-country investigation indicates that growth can be jeopardized if public consumption increases faster than public investment.

The rule of fiscal sustainability is concerned with this issue. It imposes a minimum level of public investment, requiring that it must not fall below 25 % of total budget. Since 2008 the budget allocated to public investment has fallen below the required level (Figure 8.12). If we take into account of depreciation of public capital stock, the net public investment would not be much higher than the break-even level of public investment. Consequently, the long-term growth of the Thai economy can be adversely affected².

Figure 8.12: Public Capital Expenditure (% total budget)



In the short-run, we will not see the impact of a slowdown in public investment. However, in the longer term, the tradeoff between present and future consumption will become apparent in terms of growth, efficiency, and international competitiveness. Fiscal sustainability is ensured if rules and regulations are strictly observed. The rules also give importance to long-term growth. Time inconsistency of fiscal policy is similar to the problem of monetary policy. In this case, both the government and people who are receiving the benefit of present consumption through populism programs of fiscal stimulus are happy, but in the long-run the

² Akitoby and Stratmann (2008) examine the effect of fiscal policy on sovereign risk spreads in emerging markets. Financial markets also react to the composition of spending. Cuts in current spending lower spreads more than cuts in investment.

fiscal policy that departs from the rule of adequate capital spending will retard growth³. Yakovlev (2007) provides empirical evidence that increased defense budget at the expense of budget for other development goals can be detrimental to economic growth.

V. Evaluation of the short-run impact of fiscal policy

Shocks by nature are random and temporary. Give it time; the economy can gravitate back to its natural output level. The speed of the adjustment back to the long-term growth path depends on the efficiency of the labor market as well as the flexibility of wage and price levels. In the short-run where rigidities exist, the economy achieves equilibrium but remain at the output which corresponds to lower than the full employment of labor. Usually monetary policy is employed for short-term stabilization, while fiscal policy is a tool for long-term growth. But when the policy interest rate is close to zero, there is no room for further cut in the cost of borrowing. In addition, if the economy is subjected to pessimism, the low cost of fund would not encourage firms to expand their plant sizes.

During the global recession, fiscal policy was called upon to stimulate domestic demand during the period of ineffective monetary policy measures. It is important to emphasize that expansionary fiscal policy employed to counteract short-term fluctuations must be withdrawn after the economy is on its recovery path. If not, it can be a burden to the government and result in adverse impact on the economy. The risk and adverse consequences of withdrawal of fiscal spending consequences must be considered before implementing fiscal expansion in response to insufficient aggregate demand.

If the short-term expansionary impact of fiscal policy is large, then it would be appropriate to stimulate the economy using tax or public spending measures. But we also need to consider other alternative means of enhancing aggregate demand to make sure that fiscal policy is the most efficient tool of stabilization.

A Vector Autoregression model is used to evaluate the short-term impact of Thailand's fiscal stimulus. The VAR model utilizes the monthly data from January 2000 to August 2010; it consists of seven variables: public spending (G), tax revenue (Tax), private investment (Invest), private consumption (Cons), Real Effective Exchange Rate (REER), Business Sentiment Index (BSI), and Core price index (CORE). All data are obtained from the Bank of Thailand. The BSI variable captures expectations of investors and consumers. As argued earlier, the effectiveness of fiscal and monetary policy depends on business and consumer confidence. The real exchange rate is included as it is affected by the domestic price level. The core consumer price index is used since it excludes exogenous factors such as prices of fresh food and energy. Private consumption is an index constructed by the Bank of Thailand. It includes spending activities involving imported consumer goods, households' electricity usage, value added tax revenue, car sales and fuel consumption. The private investment index constructed by the Bank of Thailand includes activities in construction and capital formation, i.e., construction area permitted in municipal zones, imported capital goods, and domestic sales of machinery, cement, and commercial cars. Both private and consumption indexes represent the domestic demand, which would be directly and indirectly affected by increased government spending.

³ Using data on 42 developing countries from 1975 to 2001, Vergne (2009) finds the evidence that election-year public spending shifts towards more visible current expenditures, in particular wages and subsidies, and away from capital expenditures.

The impulse response function of the impact on price stability is shown in Figure 8.13. The price level is positively related to output level as can be expected from the dynamic aggregate supply function. Price level increases in response to increased consumption more than an increase in public spending. A rise in investment does not cause inflationary pressure as much as other components of aggregate demand. Investment involves imported capital goods which is a leakage from the domestic economy. The fact that traded goods prices are exogenously determined by the world price level explains why an increase in domestic investment does not create inflationary pressure as much as domestic consumption and public spending. Furthermore, enlarged plant and equipment means higher output capacity which would by itself lower the upward pressure on the price level.

A tax hike initially raises the core inflation rate but the impact dissipates within two months when the contractionary impact takes effect. It is clear that taxation can lead to a slowdown in private consumption; thereby reducing the inflationary pressure. Therefore, fiscal policy can be used to stabilize the price level and it should be used to cool down inflationary pressure during the boom. An increase in public spending financed by tax increase has lower inflationary pressure than other methods of deficit financing. We now turn to analyze the impact of fiscal policy measures on output level.

The impulse response function reveals that the impact of fiscal policy stimulus has expected outcome: increased government spending leads to higher output, while increased tax revenues lead to output contraction (Figure 8.14). Fiscal stimulus through either reducing tax or increasing public spending can spur growth during the slowdown⁴. This expansionary impact dies off slowly within a year.

⁴ Libânio (2009) views that it is misleading to treat growth as entirely determined by supply-side variables, since aggregate demand and output growth influences the trajectory of labor supply and productivity in the long run.

Figure 8.13: Impacts on price stability of various shocks

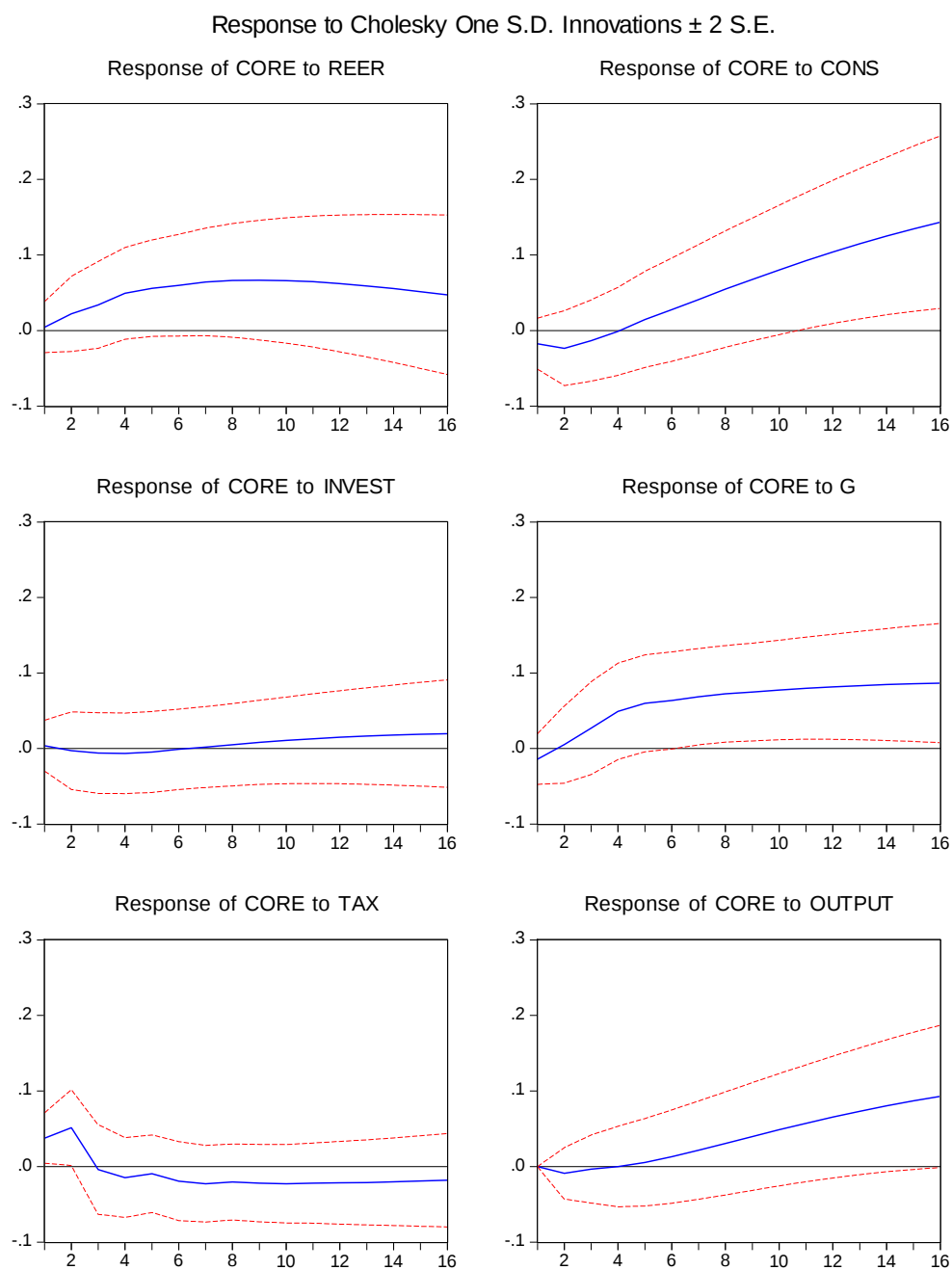
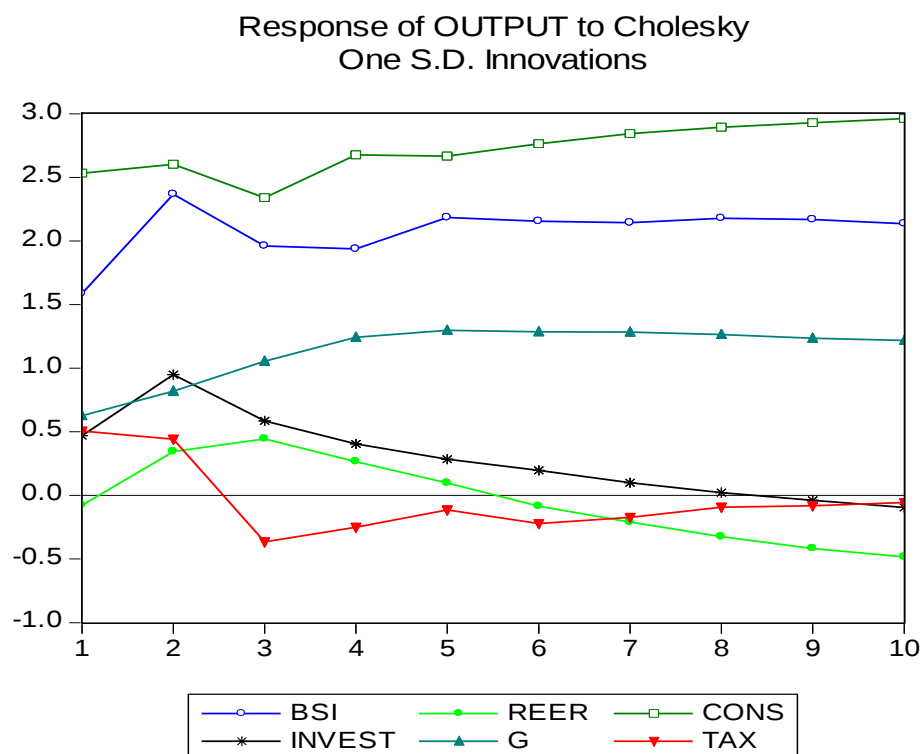


Figure 8.14: Expansionary impact of fiscal policy stimulus



Output is also affected by the real exchange rate appreciation, but the contractionary impact becomes apparent only after six months. The government has some time to compensate the output contraction as a result of the loss of international competitiveness. In the real world where other factors are also changing, the contractionary impact of currency appreciated can be mitigated by other policy measures.

Fiscal and monetary policy instruments can be coordinated to achieve an optimal policy mix that can address the problem of losing international competitiveness. Fiscal incentives for investors such as tax incentives for investment and a temporary reduction in consumption tax can boost domestic demand. These measures are temporary by nature and should be withdrawn after export demand returns to its normal growth path.

Figure 8.14 shows that consumption has the highest expansionary impact on output—much larger than public spending. Thus any measures that enhance private consumption can ensure a fast recovery. The main factor attributing to the 2009 recession in Thailand is the loss of consumer confidence. The political turmoil and uncertainties give rise to pessimism (Figure 8.4) and a sharp decline in private consumption. Figure 8.14 confirms this conjecture. An improvement in business confidence affects output trajectory. The expansionary impact of an optimistic view is even stronger than public spending. It is important therefore to nourish business sentiment, which can be obtained through establishing laws and order.

Good governance and the effective legal infrastructure are requirements for maintaining business sentiment. If the outcomes of legal disputes are envisaged as fair and logically justified, outcomes of judiciary process would not be unexpected. Thus the risks of

unexpected outcome from legal institutions can be minimized. In time of crisis, if the government cannot maintain confidence in the private sector, a mild recession caused by a fall in export demand can lead to a severe depression. When consumers and investors postpone their spending, output would contract and magnify the fall in exports. Similarly a pickup in export demand can lead to a V-shaped recovery provided that consumer confidence is strong.

The growth collapse episode in Thailand is consistent with the observation that good political institutions help prolong growth spells. Growth decelerations are found to be associated with macroeconomic instability, conflict, and export collapses (Hausmann, Rodriguez, and Wagner, 2006). The military coup in September 2006 has derailed growth process in Thailand, confirming the hypothesis that growth is affected by democracy (Tavares and Wacziarg, 2001). Existing literature on the role of institutions on growth duration points to the relationship between sustained growth episode and distributional conflict and weak domestic institutions that cannot handle shocks (Berg and Sachs, 1998; Rodrik, Subramanian and Trebbi, 2004). Poor institutions create economic and political turmoil which make countries more crisis-prone and growth more volatile. The success of fiscal policy undertaken to stimulate growth in the short-run and to promote long-term growth depends largely on the quality of institutions.

VI. Concluding remarks

Fiscal policy can become an effective means to spur growth during the time when consumer and investor confidence remains strong. When business sentiment is low, expansionary impact of fiscal deficit will have minimal impact on the economy. The ability of legal institutions to maintain peace and withhold the rule of law is crucial for political stability. Maintaining favorable business environment is important in preventing the propagation of global recession to severe economic contraction.

Thailand's fiscal policy was conservative because spending was constrained by tax capacity. The reason behind this fiscal prudence is related to conservative budgetary laws. Debt-to-GDP is low, providing fiscal space for the government to counteract the future external shocks. Thailand has established fiscal automatic stabilizers from the revenue side rather than from expenditure. The discretionary fiscal expansion has some limitation. Moreover, fiscal policy employed to counteract short-term fluctuations must be withdrawn after the economy is on its solid recovery path. Otherwise, it can be a burden to the government and result in long-term growth. The risk and adverse consequences of withdrawal of fiscal spending must be considered before implementing fiscal expansion in response to insufficient aggregate demand.

Public spending must be controlled during high inflation to avoid fueling inflationary pressure. Inflation can be spiraling if the government insists on maintaining the level of real expenditure during the time of high inflation. Furthermore, structure of public expenditure matters for long-term growth. Rising share of current spending is detrimental to growth in the long run.

Continued fiscal deficits enlarge fiscal burden and raise public debt. But this burden can be minimized if the government succeeds in restoring consumer confidence and improve business sentiment. The finding of the paper indicates that there can be a less costly means of fiscal stimulus to achieve the same impact on growth.

VII. References

- Akerlof, G. A., and Shiller, R.J. (2009). *Animal Spirits*. Princeton, NJ: Princeton University Press
- Akitoby, B. and T. Stratmann (2008) "Fiscal Policy and Financial Markets." *The Economic Journal* 118(533) 1971-1985.
- Alesina, A. and Perotti, R. (1996) "Fiscal discipline and the budget process," *American Economic Review*, 86(2), 401-406.
- Berg, A. and Sachs, J. D. (1988) "The debt crisis: Structural explanations of country performance," *Journal of Development Economics*, 29(3), 27-306.
- Hausmann, R., Rodriguez, F., and Wagner, R. (2006) "Growth Collapses," Working Paper No. 136, (April) Cambridge, Mass: Center for International Development.
- Libânio, Gilberto A. (2009) "Aggregate demand and the endogeneity of the natural rate of growth: evidence from Latin American economies, *Cambridge Journal of Economics* 33, 967-984
- Mourmouras, Alexandros and Rangazas, Peter (2009) "Fiscal Policy and Economic Development" *Macroeconomic Dynamics*, 13(4), 450-76
- Rodrik, D., Subramanian A., and Trebbi, F. (2004) "Institution rule: The primacy of institutions over geography and integration in economic development" *Journal of Economic Growth*, 9(2), 131-65.
- Tavares, J. and Wacziarg, R. (2001) "How democracy affects growth" *European Economic Review*, 45(8), 134-78.
- Vergne, Clemence (2009) "Democracy, Elections and Allocation of Public Expenditures in Developing Countries" *European Journal of Political Economy*, 25(1), 63-77
- Yakovlev, P. (2007) "Arms trade. Military spending and economic growth," *Defense and Peace Economics*, 18(4), August, 317-338.

Chapter 9

A Panel VAR Study on Macroeconomic Policies in CLTV Economies

Phongthorn Wrasai¹

Faculty of Economics, Thammasat University

The aim of this paper is twofold: first to examine impacts of macroeconomic policies on real economic activities among CLTV economies; and second, to identify plausible sources of variation in real economic activities resulting from the use of macroeconomic policy tools. Major findings are as follows. First, not surprisingly, it is confirmed that export is the main engine for growth. Second, it is evident that over time horizon, among CLTV economies, expansionary fiscal policy has a positive impact on real output but size of the impact is diminutive. Third, monetary and exchange rate policy play an insignificant role of enhancing growth. A policy implication is that to achieve long-term growth, export promotion policy focusing on capacity building and productivity enhancing is vital.

¹ I am grateful to Dr. Kulpatra Sirodom for her valuable comments. I thank Dr. Inessa Love of World Bank for her useful advice on Panel VAR. I also thank Dr. Bhumisuk Khananurak and Mr. Thanit Pattarasaengthai for research assistance. I am grateful to Thailand Research Fund for financial support. Corresponding address: Phongthorn Wrasai, Faculty of Economics, Thammasat University, Prachan Road, Bangkok 10200 Thailand. E-mail: pwrasai@econ.tu.ac.th

I. Introduction

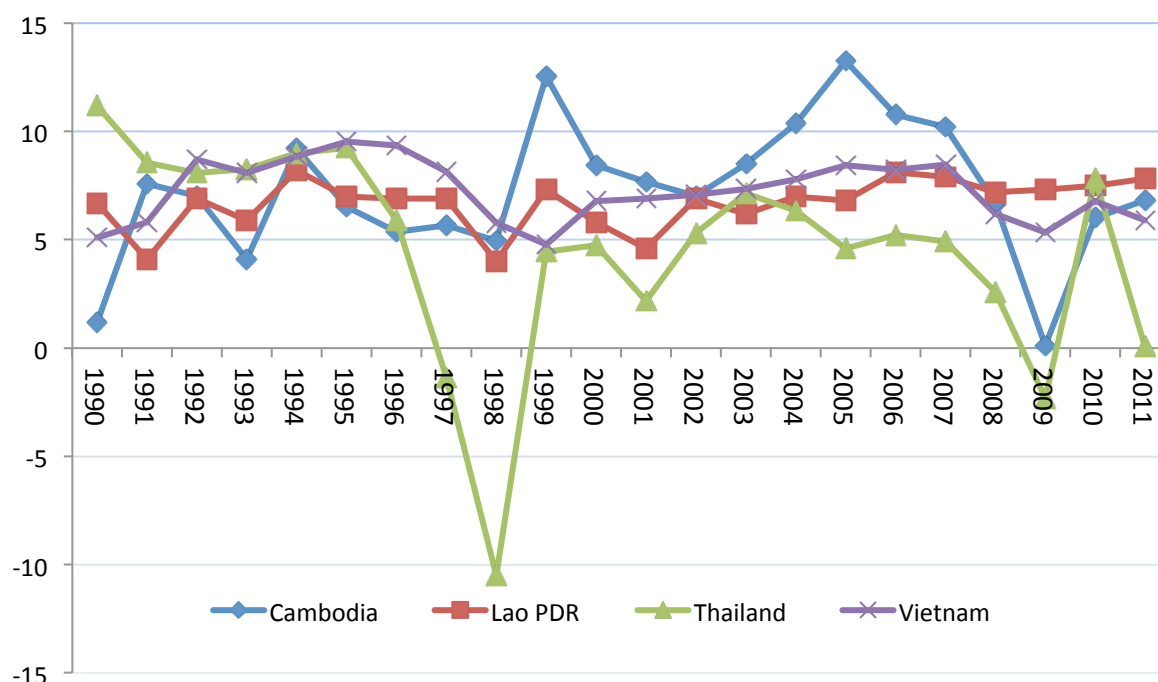
As trade and financial integration have become increasingly important among countries in Cambodia, Lao PDR, Thailand, and Vietnam, implementation of macroeconomic policies must take into account this new regional environment that may help or hinder social and economic development. Monetary and fiscal policies employed to curb inflation and stimulate growth must also take into account the impact of globalization.

Given institutional constraints and transitional economic structure, macroeconomic policy conducted in the CLTV economies faces challenging tasks. With current development state of money and capital markets, the transmission mechanisms from policy instruments to policy targets are inconsistent and unpredictable. As a result the monetary policy conducted would be different from those policies applied in advanced economies. On fiscal front, low tax base and increasing public debt due to economic slowdown make it more difficult to reallocate and mobilize financial resources for infrastructure development. Policy makers must acknowledge institutional rigidities and explore new macroeconomic strategies that can bring about growth and stability under these constraints

II. Background

Since the financial crisis in 1997, Thailand's economic growth has been lower than other three economies in the region. Factors that are responsible for such dismal performance are negative factors affecting private consumption, investment, and exports. The plunge in 2009 was due to global economic slowdown which in turn drags down Thai exports, the remaining engine for growth in 2008.

Figure 9.1: Comparative Output Growth



Source: Asian Development Bank (ADB)

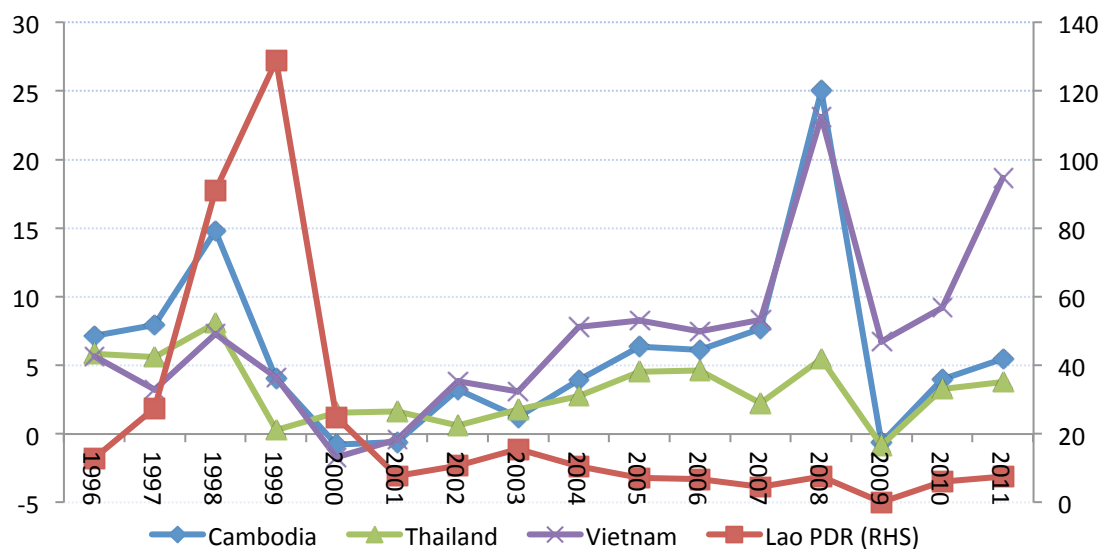
Thailand is the only country among the four countries under the study that experienced contraction of income during the Asian financial crisis between 1997 and 1998. Although not as detrimental to output as the Asian financial crisis, Thailand was also affected by the global financial crisis in 2009, when output fell by 3.5 percent. Nidhiprabha (2009) argues that monetary and fiscal policy stimulus may not sustain the recovery unless business sentiment and consumer confidence are restored to the level before the military coup in 2006.

The study would shed light on the output fluctuation of the CLTV countries and examine whether differential institutional setups and macroeconomic policy responses to shocks attribute to differences in macroeconomic performance in the region.

While Thailand has the worst performance in term of output growth, it has accomplished price stability (Figure 9.2). There are various hypotheses concerning the sources of inflation. For a country with a fixed exchange rate regime, imported inflation could be a potential cause. The degree of trade openness implies the speed of transmission of world inflation into the local economy. In addition, excessive monetary growth from capital inflows or money-financed budget deficit can lead to rising velocity of money and in turn inflation spiral. The comparative study will analyze conducted policy measures that brought down hyperinflation

in the three countries. The relevant research question is that the extent to which these countries can tradeoff between growth and price stability.

Figure 9.2: Price Stability, CPI (% Change)

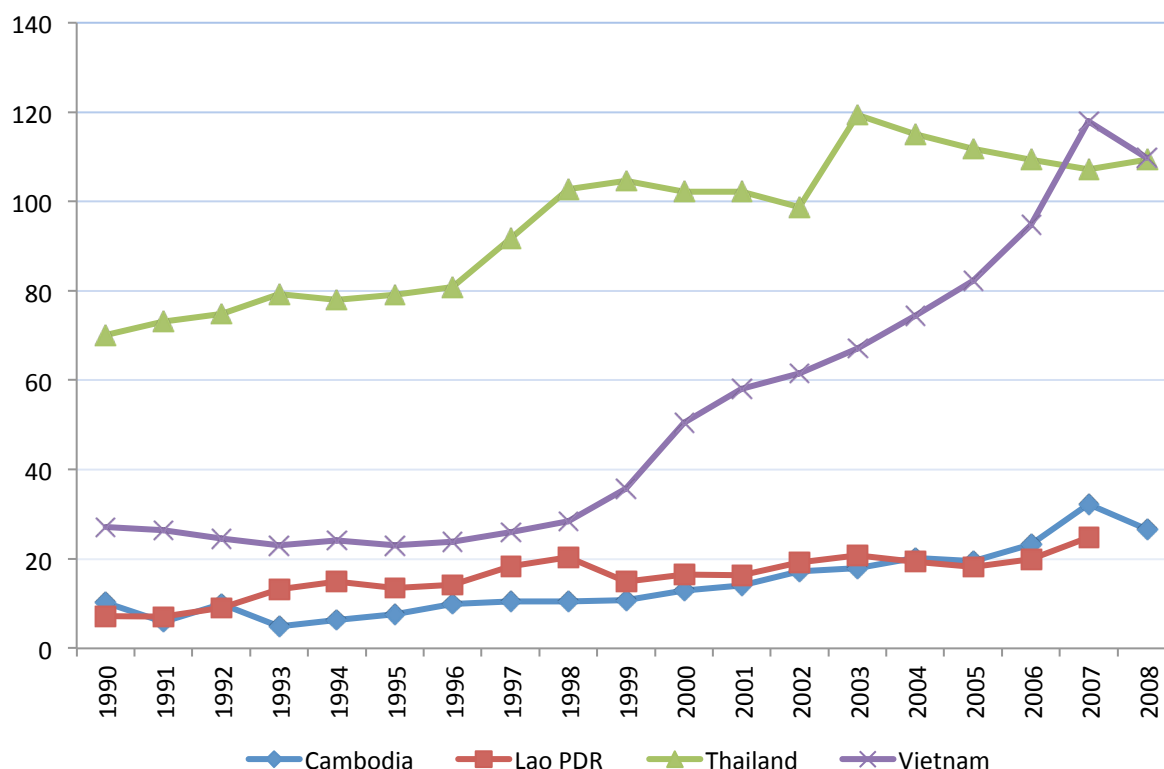


Source: Asian Development Bank (ADB)

According to Kyophilavong (2009), the Bank of Lao PDR's ability to control inflation is hampered by dollarization. The cost of dollarization is greater than its benefit and de-dollarization must be a long-term objective which can be gradually achieve through building the confidence in the Kip. When the government can maintain price stability, the problem of dollarization can be minimized.

When inflation rate remains high, expectations on devaluation would increase and consumers would be willing to hold dollar rather than domestic currency for speculative purpose. Leung, Thanh, and Viseth (2005) found the long-run relationship between the expected rate of depreciation and the holding of the dollar during 1993-2001. As a consequence the effectiveness of monetary policy is hampered by currency substitution in Cambodia.

Figure 9.3: Financial Deepening in CLTV Economies, M2/GDP (%)



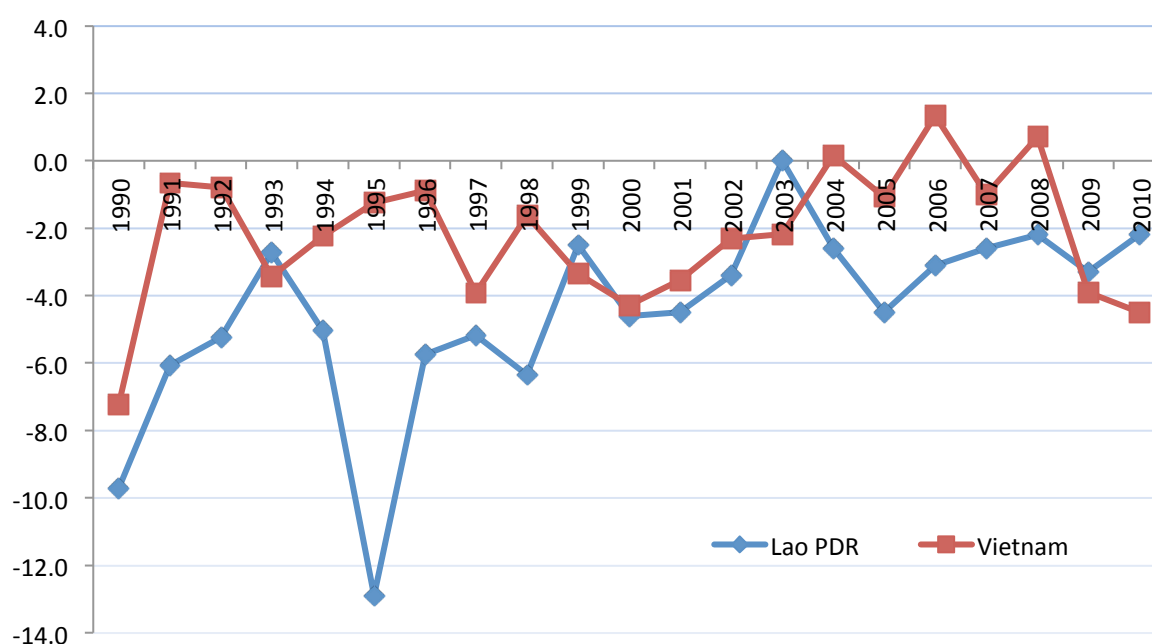
Source: Asian Development Bank (ADB)

Figure 9.3 reports financial development in CLTV economies as measured by the ratio of broad money supply to aggregate output, M2/GDP. Although financial development in Thailand has an increasing trend, it stumbled and stagnated from period to period as the ability to save and the incentives to save deteriorated during the downturn of economy. Lao's financial development has increased steadily since 1990, albeit at a slow growth rate. The fastest financial development is witnessed by Vietnam. Among the four economies, variation of financial development is highest in Cambodia. Heterogeneity of financial development has strong endurance on the effectiveness of monetary policy and ability of the banking sector to finance fiscal deficit. If domestic investors are constrained by credit availability from banks, capital inflows can mitigate the insufficient level of domestic savings. Whether capital inflows can compensate insufficient domestic saving largely depends on the openness of capital account.

Klein and Olivei (2008) argued that developed countries were able to benefit from open capital accounts in terms of greater financial depth and higher economic growth. Nevertheless, there was no evidence that capital account liberalization provides desirable

impact for developing countries. In this regard, there is an opportunity to use capital controls in order to achieve monetary policy independence and stable exchange rates for these countries. A critical issue is that under which conditions expected benefits from achieving the above goals outweigh their associated costs. Could the controls help managing volume and speed of capital inflows or could the measures prevent capital flight and help stabilizing the exchange rate?

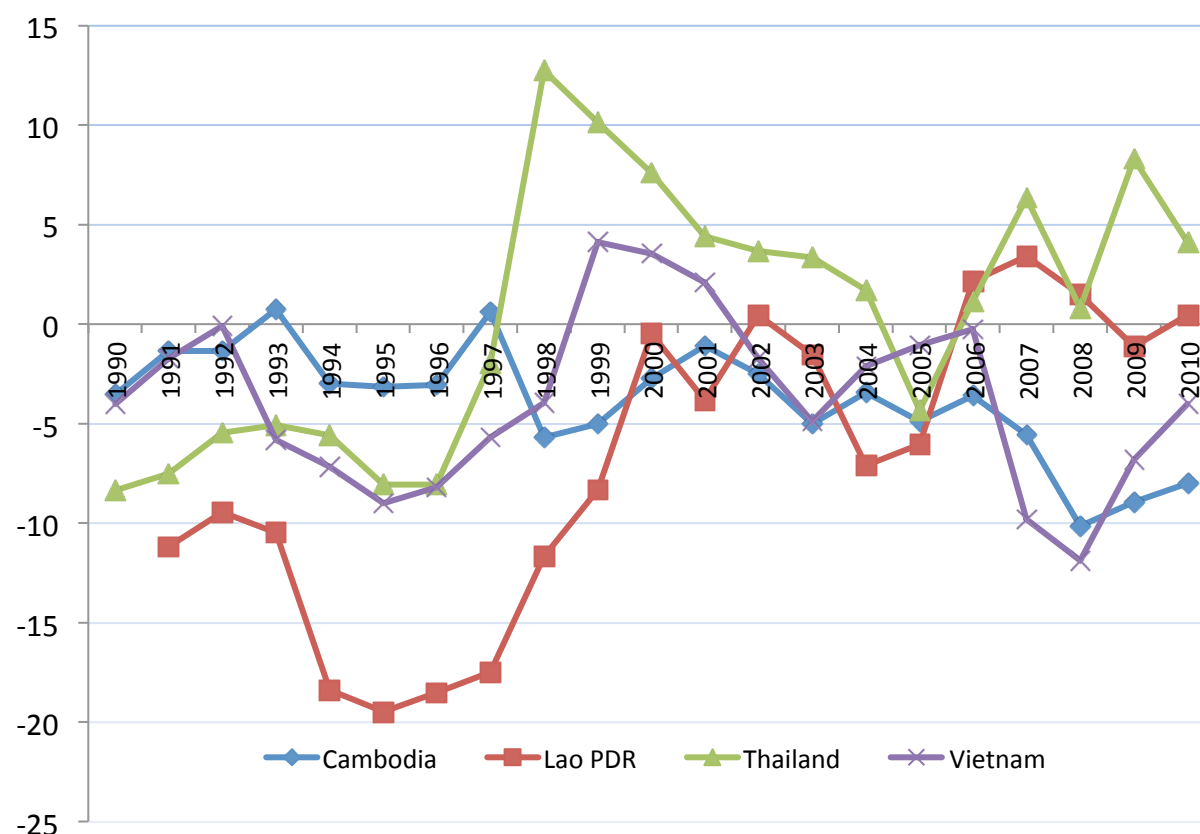
Figure 9.4: Fiscal Balances in Lao PDR and Vietnam (% GDP)



Source: Asian Development Bank (ADB)

On fiscal policy front, government spending and tax cut could be implemented so as to stimulate growth during period of economic recession with no inflationary pressure provided that resources are underutilized. The methods of fiscal deficit financing really matter if price stability is also taken into account. According to Figure 9.4, Fiscal deficit in Lao PDR is quite substantive and persistent for almost 20 years with the record low at 12% of GDP in 1995 while Vietnam encountered cyclical pattern of surpluses and deficits during the last two decades. It is important to note that one must carefully weigh short term and long term benefits when deficit is created as opportunity cost of doing so is forgone benefits of the resources that could be used in providing infrastructure investment for long-term development. Moreover public deficits imply public debt and burden to service the debt. An important question raised in this study is that under what economic institution an economy is not prone to money-financial budget deficit.

Figure 5: Current Account Deficits as Percentage of GDP



Source: Asian Development Bank (ADB)

Prior 1997 crisis Thailand had experienced unsustainable current account deficit due to real exchange rate appreciation and that significantly contribute to the arrival of currency crisis later on. The massive currency depreciation after the baht devaluation resulted in output contraction and subsequent improvement in trade balance. Empirical evidence in Vietnam strengthens the hypothesis that devaluation can be employed to stimulate trade balance and in turn improvement in the balance of payments (Thanh and Kalirajan, 2006). Cambodia has been experiencing current account deficits while Lao PDR, until recently, witnessed current account surplus.

In a nutshell, implementing macroeconomic policies to stimulate growth and stability with acknowledging institutional factors and initial conditions would greatly help understanding macroeconomic policy strategy in the context of increasing regional integration.

The study is aimed at identifying macroeconomic strategies for maintaining growth and stability in Cambodia, Lao PDR, Thailand, and Vietnam. It will compare and contrast fiscal

policy, monetary and exchange rate policy employed in Cambodia, Lao PDR, Thailand, and Vietnam.

The study will evaluate macroeconomic policy effectiveness and their limitations in maintaining sustainable growth and price stability. Even though there are institutional and social heterogeneity among country studies, policy lessons can still be drawn from various experiences in these CLTV countries. Furthermore, as capital markets among these economies have become increasingly important in the current stage of economic development, the study will touch upon the relationship between capital markets development and macroeconomic variables.

III. Empirical Methodology

Given the feature of the data sets which contains both time-series and cross-section data, panel data analysis will be employed. To capture the evolution and dynamic relationships among macroeconomic variables, Vector Autoregressions (VAR) will be used in the analysis. Time period of the study covers 1980-2009. Annual, quarterly, and monthly data will be employed in both qualitative and quantitative analysis. To achieve growth and stability, macroeconomic policy tools: fiscal policy, monetary and exchange rate policies employed in Cambodia, Lao PDR, Thailand, and Vietnam will be examined and evaluated. The paper focuses on dynamic impacts of the macroeconomic policy tools on two key macroeconomic variables: economic growth and price stability

Our data come from International Financial Statistics (IFS CD-September 2010) and DATASTREAM, UN databases, Asian Development Bank (ADB), etc. which contains standardized accounting information on large public macroeconomic data. The study uses annual data from 1990-2010 and quarterly data for 1990-2009 for the four countries that are Cambodia, Lao PDR, Thailand, and Vietnam. Some are not available. Thus, cubic spline and log-linear interpolation are used for capture all quarterly data to run in PVAR.

Table 9.1: Variable Definitions

Variables	Description
<i>RGDP</i>	Real GDP measured in million US Dollars
<i>GOVEXP</i>	Government expenditure measure in million US Dollars
<i>IR</i>	Short term interest rate or policy rate
<i>X</i>	Export in million US Dollars
<i>REER</i>	Real Effective Exchange Rate

Our analysis employs Panel Vector Auto-Regression (PVAR) methodology. This technique combines the traditional VAR approach, which treats all the variables in the system as endogenous, with a panel data approach, which allows for unobserved individual heterogeneity. The advantage of the VAR approach is that it does not require any a priori assumptions on the direction of the feedback between variables in the model. System is based on the following model incorporating fixed effects:

$$y_{it} = \beta_0 + \sum_{s=1}^n \beta_s y_{i,t-s} + f_i + e_t; y_t = \begin{bmatrix} GDP_{it}^j \\ IR \\ GOVEXP \\ X \\ REER \end{bmatrix}, i = 1, 2, 3, 4.$$

where y_{it} is a vector of the five endogenous variables $\{GDP, IR, GOVEXP, X, REER\}$ for country i and year t . The variable GDP is the real GDP (millions of US dollars) which represents output or economic growth, IR is the policy rate or discount rate of central bank of each country (%) represented as the monetary policy, $GOVEXP$ is the government expenditure (millions of US dollars) represented as the fiscal policy, X is the export trade volume (millions of US dollars) represent contribution of export towards output expansion, and also $REER$ is real effective exchange rate (index) which is a proxy of trade competitiveness.

This framework, which allows producing impulse response functions (hereafter, IRFs), will be useful to trace the direct effects and identify the indirect effects that may work through the

monetary policy, fiscal policy, and exchange rate policy. More specifically, IRFs describe the reaction of one variable to the innovations in another variable in the system, while holding all other shocks to zero (Love and Zicchino, 2006). In applying the VAR procedure to panel data, we need to impose the restriction that the underlying structure is the same for each cross-sectional unit. Since this constraint is likely to be violated in practice, one way to overcome the restriction on parameters is to allow for individual heterogeneity. The countries' specifics are captured in this framework in the fixed effect variable, denoted in the model of f_i to overcome the restriction.

The dynamic behavior of the model is assessed using orthogonalized impulse response functions, which describe the reaction of one variable in the system to innovations in another variable in the system while holding all other shocks at zero. The shocks in the VARs were orthogonalized using Cholesky decomposition, which implies that variables appearing earlier in the ordering are considered more exogenous, while those appearing later in the ordering are considered more endogenous.

The PVAR has clear practical advantages as an explicit dynamic system that is the most appropriate way for studying macroeconomic dynamics. First, PVAR imposes a statistical model on the contemporary movements of the variables rather than being driven by a particular macroeconomic concept can be distorting. Second, PVAR does not distinguish between exogenous and endogenous variables, but rather treats all variables as jointly endogenous. Each variable in PVAR depends on its past rationalization and treat on equal footing. Third, PVAR permits modeling both endogenous and exogenous shocks. Forth, PVAR is easy to estimate both in single country case and panel case. And Finally, PVAR has clear practical value as a handy tool for a comparative analysis of the macroeconomic performance of CLTV countries.

However, PVAR has some limitations. VARs is not and cannot be viewed as a growth accounting or findings determinants of growth exercise. Second, VARs inevitably suffer from overparametrisation, the interpretation of the restrictions is not obvious if an innovation to one variable does not affect any other variable, while the system is still simultaneous. And finally, the conclusions are sensitive to the choice of lag length and the number of included variables.

The second methodology used in this paper is panel data analysis. After completing panel data set and take into account unobserved heterogeneities (country specific factors) into the

panel model, there are two common assumptions made about the individual specific effect, the random effects assumption and the fixed effects assumption. The random effects assumption (made in a random effects model) is that the individual specific effects are uncorrelated with the independent variables.

The fixed effect assumption is that the individual specific effect is correlated with the independent variables. If the random effects assumption holds, the random effects model is more efficient than the fixed effects model. However, if this assumption does not hold, the random effects model is not consistent. In the result subsection, we find that the CLTV panel data is more appropriate for fixed effect model than random effect model tested by Hausman-Taylor test.

Fixed Effect Model

The model identification for Panel Data analysis of Fixed Effects Model can be illustrated as follows:

$$y_{it} = \beta_0 + X_{it}\beta + Z_i\gamma + \alpha_i + u_{it},$$

where y_{it} is the dependent variable observed for individual i at time t ,

X_{it} is the time-variant regressor,

Z_i is the time-invariant regressor,

α_i is the unobserved individual effect (Country specific factor)

u_{it} is the disturbance term.

The two main methods of dealing with α_i are to make the random effects or fixed effects assumption:

1. Random effects (RE): Assume α_i is independent of X_{it} , Z_i or $E(\alpha_i|X_{it}, Z_i)=0$.
2. Fixed effects (FE): Assume α_i is not independent of X_{it} , Z_i .

To get rid of individual effect α_i , a differencing or within transformation (time arranging) is applied to the data and then β is estimated via Ordinary Least Squares (OLS). The most common differencing methods are: 1) Fixed effects (FE) model, 2) First difference (FD) model, and 3) Long difference (LD) model

Another common approach to removing the individual effect is to add a dummy variable for each individual i . This is numerically, but not computationally, equivalent to the fixed effect model and only works if T , the number of time observations per individual, is much larger than the number of individuals in the panel.

We could not use OLS to estimate γ from this equation because Z_i is correlated with α_i (i.e. there is a problem with endogeneity from our FE assumption). If there are available instruments one can use IV estimation to estimate γ or use the Hausman-Taylor method.

Hausman-Taylor Method

The method requires the model to include more than one time-variant regressor (X) and time-invariant regressor (Z). Also, at least one X and one Z must be uncorrelated with α_i .

$$X = [X_{1it} : X_{lit}]$$

$$Z = [Z_{1it} : Z_{lit}].$$

Partition the X and Z variables such that where X_1 and Z_1 are uncorrelated with α_i . It is required that $K_1 > G_2$. Estimating γ via OLS on using X_1 and Z_1 as instruments yields a consistent estimate. To test whether a fixed or random effects model is appropriate using a Hausman test, the hypotheses are described as follows:

$$H_0: \alpha_i \perp X_{it}, Z_i$$

$$H_a: \alpha_i \not\perp X_{it}, Z_i.$$

If H_0 is true, both $\hat{\beta}_{RE}$ and $\hat{\beta}_{FE}$ are consistent, but only $\hat{\beta}_{RE}$ is efficient. If H_a is true, $\hat{\beta}_{FE}$ is consistent $\hat{\beta}_{RE}$ and is not. The Hausman test is a specification test so a large test statistic might be indication that there might be Errors in Variables (EIV) or our model is misspecified. If the FE assumption is true, we should find that $\hat{\beta}_{FE} \approx \hat{\beta}_{FE} \approx \hat{\beta}_{FE}$. A simple heuristic is that if $\hat{\beta}_{LD} > \hat{\beta}_{FE} > \hat{\beta}_{FD}$ there could be EIV.

IV. Results

We first consider the panel model with four economies and the estimated results are as follows. First it is evident that over time government spending has a positive impact on output growth. Nonetheless, magnitude of the impact is diminutive. Second, export is the main engine for growth for CLTV countries. Third, monetary policy and exchange rate policy plays insignificant role on growth enhancing aspect.

Table 9.2: Panel Estimation on Cambodia, Lao PDR, Thailand, and Vietnam

Fixed-effects (within) regression				Number of obs	=	304	
				Number of groups	=	4	
-----+-----							
rgdp	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]		
-----+-----							
govexp	.0406217	.0111077	3.66	0.000	.0187615	.0624818	
ir	12.08944	25.86285	0.47	0.641	-38.80893	62.9878	
reer	1.342286	1.718438	0.78	0.435	-2.039619	4.724191	
x	1.019356	.0288172	35.37	0.000	.9626432	1.076068	
_cons	5520.108	495.1123	11.15	0.000	4545.722	6494.495	
-----+-----							

As the group of four economies exhibits different stages of economic development and institutional constraints, effectiveness of macroeconomic policies should be examined by taking into account above heterogeneities. We next separate the data set into two main groups, i.e., group A: Cambodia and Lao PDR (Highly dollarized economies), group B: Thailand and Vietnam. Panel models of group A and group B are reported in Table 9.3 and 9.4, respectively. The result from Table 9.3 indicates that government spending has a positive impact on output even though magnitude of the impact is in a limited scope. The estimated results on the effect of interest rate and real effective exchange rate on output show unexpected sign; however they are statistically insignificant. Concerning group B of Thailand and Vietnam, the estimated result runs against what should be conventionally expected. Over time an appreciation in REER has a positive impact on output expansion. As argued by Nidhiprabha (2010), it is possible that a country with strong currency may retain its position on trade competitiveness as degree of competitiveness depends not only on price factor but

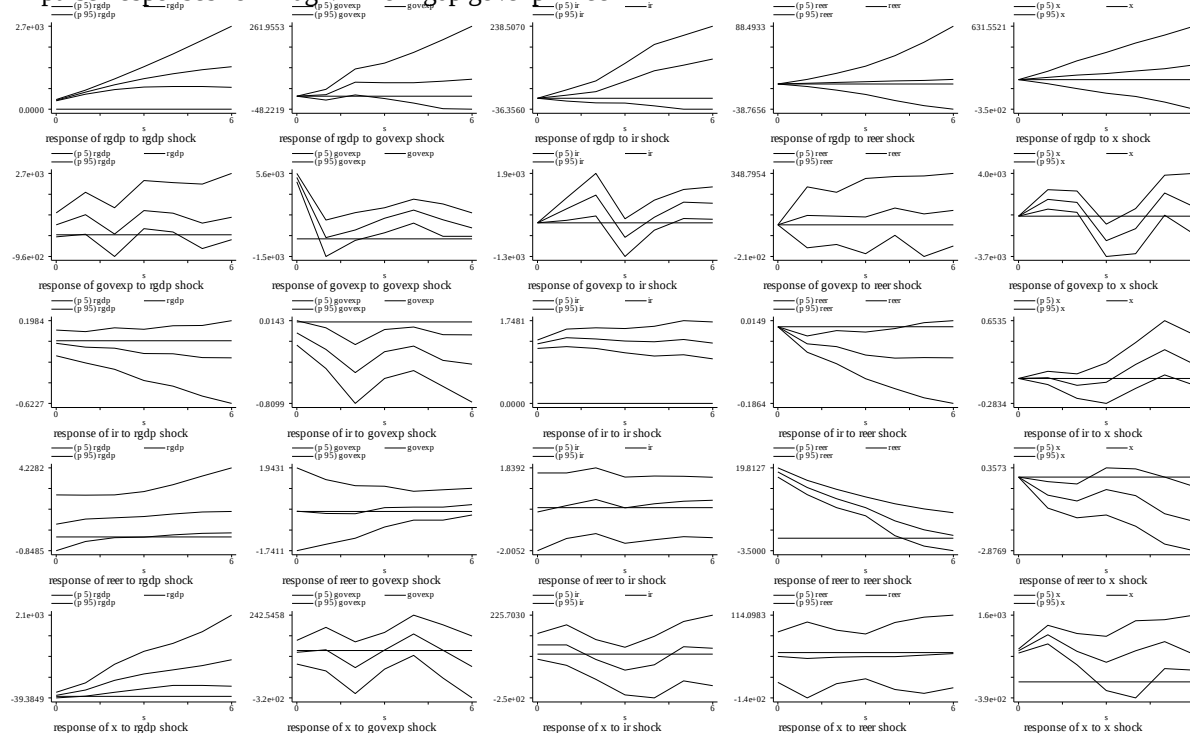
To answer the questions of what are the potential factors among variables of our interest that cause variation in output. We employ Variance Decomposition and Impulse Responses as reported in Table 9.5 and in Figure 9.6, respectively. Variance decomposition indicates the proportion of variance in a variable that is explained by different shocks across countries. Typically variation in a variable is well-explained by its own fluctuation in the first period and then subside. For instance nearly 97% of the variation in real output (*RGDP*) is explained by its own shock in the first period and the remainder explained by export shock. Over time the variance decomposition indicates that monetary policy shock, as represented by short term interest rate (*IR*), has a negligible impact on growth enhancing for CLTV economies. As for transitional economies with less-developed banking and finance system and instruments, transmission mechanism of employing short term interest rate to boost private consumption and investment and in turn aggregate demand is far from being effective. Monetary policy would keep its major role on price stabilization. Another question of interest is: could real depreciation of exchange rate influence growth? The result in Table 9.4 reveals that variation in real output is not significantly explained by variation in real effective exchange rate. The result is likely to run against a conventional belief that it is necessary to employ cheap currency strategy if a country were to pursue for real output expansion from international trade. Finally, considering all possible shocks (innovations), namely monetary shocks, fiscal expansionary shocks, exchange rate shocks, and export shocks towards real output, it is documented that export shocks (*X*) generate the greatest impact on real output. Therefore what need to be addressed further is about how monetary and fiscal policy shocks affect exports. Interestingly, exports are quite responsive to output expansion. So if a country pays more attention on enhancing capital utilization and increasing in productivity, exports would grow up. This finding sheds light on a policy implication. To promote long term growth policy makers should pay more attention towards capital adequacy and capital utilization in the country's productive sectors. For small open economies with limited capitals, attracting well-qualified inflows of foreign direct investments is essential and so necessary conditions to achieve the above mentioned issue must be carefully draw.

Table 9.5: Variance Decomposition

	s	rgdp	govexp	ir	reer	x
rgdp	1	.96620291	.00192785	.00804815	.00002941	.02379167
govexp	1	.08327162	.58559296	.04171883	.00075928	.28865731
ir	1	.0105067	.06155797	.90992968	.00218583	.01581983
reer	1	.02125232	.00061496	.00209362	.95961329	.01642581
x	1	.52589685	.00372248	.00274242	.0000808	.46755745
rgdp	2	.90170646	.00113844	.00663963	.00005047	.090465
govexp	2	.15507696	.50936748	.0525396	.00105153	.28196443
ir	2	.01641991	.07989192	.88639942	.0023579	.01493085
reer	2	.02640523	.0017996	.00601342	.94421573	.02156602
x	2	.72318076	.00302656	.00321868	.00003758	.27053642
rgdp	3	.85670918	.00073367	.00431632	.00004698	.13819383
govexp	3	.21677995	.48720566	.05502132	.00114168	.23985139
ir	3	.02382632	.09609618	.86383841	.0025133	.01372579
reer	3	.02635085	.00309736	.00736407	.94150134	.02168638
x	3	.75011368	.00343661	.00223573	.00002529	.24418869
rgdp	4	.83059182	.00130641	.00294491	.00003848	.16511838
govexp	4	.27644562	.45675892	.06123817	.00118204	.20437525
ir	4	.03624181	.11529408	.83307515	.00264086	.0127481
reer	4	.02627898	.00451723	.00849837	.93872186	.02198356
x	4	.74868675	.00605417	.00156059	.00001763	.24368085

Figure 9.6: Impulse Responses: CLTV economies

Impulse-responses for 4 lag VAR of rgdp govexp ir reer x



Errors are 5% on each side generated by Monte-Carlo with 1000 reps

Source: Author's calculation

V. Concluding Remarks

In the realm of globalization, small open economies confront not only with their internal shocks but external shocks. Taking into account the context of globalization, country's institutional constraints, and its stage of economic and social development, macroeconomic policy strategies needs to be appropriately designed so as to ensure long term growth path and price stability. Prior to policy design and implementation, policy makers and advisors must have a comprehensive knowledge and understanding on nature of economic growth and its determinants associated with sources of its variation. The paper attempts to shed light on above body of knowledge and the findings are as follows. First it is documented that over the time period of our study (1990-2009) exports were found to be the main engine for growth. Second it is shown that fiscal stimulus has a positive impact on real output but size of the impact is rather small. As the paper employs fiscal spending as a proxy of expansionary fiscal policy, it might be interesting to examine and compare between effectiveness of fiscal spending and tax cut on real output. Third result reveals that monetary and exchange rate

policies were found to have a negligible impact on enhancing growth and on explaining variation in economic growth. It is plausible that to have well-functioning and effectiveness of monetary and exchange rate policies, necessary conditions would require better-developed banking and financial architecture, more flexible exchange rate regime, and less degree of dollarization. Given our findings, a policy implication is that if export promotion policy will be employed as the main engine for long term growth, by not competing with price factors, attention must be put towards how to ensure adequacy of capital flows into productive sectors and how to improve labor and output productivity.

VI. References

- Bhattacharya R., Ila Patnaik, and Ajay Shah. (2010) "Monetary policy transmission in an emerging market setting," IMF Working Paper, WP/11/5, International Monetary Fund.
- Holtz Eakin, D., W. Newey, and H. Rosen (1988). "Estimating Vector Autoregression with panel data," *Econometrica*, 56, 1371-1395.
- Giovanni C. and J. Menon (2010) "Dealing with multiple currencies in transitional economies: the scope for regional cooperation in Cambodia, the Lao People's Democratic Republic, and Vietnam" Asian Development Bank.
- Jha, S., S. Mallick, and D. Park. Effectiveness of Countercyclical Fiscal Policy: Time-series evidence from developing Asia," ADB Economics Working Paper Series No. 211, Asian Development Bank.
- Klein, M.W. and Olivei, G.P. (2008) "Capital account liberalization, financial depth, and economic growth," *Journal of International Money and Finance*. 861-873.
- Kyophilavong P., and Toyoda T. (2005). "An Econometric Analysis of the Lao Economy: Simulations Using a Macroeconomic Model", in eds., Amakawa, N. and N. Yamada, *Towards a Market Economy under One Party System in the LaoPDR*, pp. 115-153.
- Leung, S, Thanh, V.T., Viset, K. (2005) *Integration and transition-Vietnam, Cambodia, and Lao PDR*, International Development Economics, APSEQ, Australian National University.
- Love, I., and L. Zicchino. (2006) Financial Development and Dynamic Investment Behavior: Evidence from Panel VAR, *The Quarterly Review of Economics and Finance*, 46 , 190-210.
- Nidhiprabha, B. (2009) "The hard road ahead for Thailand's economic recovery" *Asian Economic Papers*, 8(3).
- Ravin, C., and U. Luyna. (2011) *The Effectiveness of Macroeconomic Policies in Cambodia: VAR Approach (Draft)*

Sims C.A. (1980) "Macroeconomics and Reality", *Econometrica*, 48, 1-48.

Thanh, Nguyen Ngoc & Kalirajan, Kaliappa, (2006) "Can devaluation be effective in improving the balance of payments in Vietnam?," *Journal of Policy Modeling*, Elsevier, vol. 28(4), 467-476, May.

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