



IMF Working Paper

Dollarization in Cambodia: Causes and Policy Implications

Nombulelo Duma

IMF Working Paper

Asia and Pacific Department

Dollarization in Cambodia: Causes and Policy Implications

Prepared by Nombulelo Duma¹

Authorized for distribution by Masato Miyazaki

March 2011

Abstract

This Working Paper should not be reported as representing the views of the IMF.

The views expressed in this Working Paper are those of the author(s) and do not necessarily represent those of the IMF or IMF policy. Working Papers describe research in progress by the author(s) and are published to elicit comments and to further debate.

Over the past decade, Cambodia has become Asia's most dollarized economy. In contrast, dollarization in neighboring Lao P.D.R., Mongolia, and Vietnam has been either declining or broadly stable. Somewhat paradoxically, growing dollarization in Cambodia has occurred against the backdrop of greater macroeconomic and political stability. The usual motive, currency substitution, does not appear to have been a factor. As the volume of dollars increased over the years, so has the volume of riel. A strong inward flow of dollars related to garments sector exports, tourism receipts, foreign direct investment, and aid, has benefitted the dollar based urban economy. The riel based rural economy has, however, lagged behind. Given international experience in de-dollarization, a carefully managed market based strategy, supported by a continued stable macroeconomic environment is essential for Cambodia's de-dollarization.

JEL Classification Numbers: E5

Keywords: Dollarization, Cambodia, seigniorage, vector autoregression

Author's E-Mail Address: nduma@imf.org

¹ Comments from and discussions with Olaf Unteroberdoerster, Masahiko Takeda, and Kenneth Kang are gratefully acknowledged. The paper has also benefitted from discussions at the National Bank of Cambodia.

I. Introduction	3
II. Dollarization in General	5
III. The Cambodian Experience with Dollarization	5
A. Costs and Risks of Dollarization	7
B. Monetary Policy in Dollarized Cambodia	10
C. Structural Challenges that Instill Dollarization	11
IV. Lessons from International Experience	13
V. Policy Options for Cambodia	14
A. The Macroeconomic Environment	14
B. The Domestic Financial Market	15
C. Financial Policy and Prudential Regulation	15
VI. Conclusions	16
Figures	
1. Macroeconomic and Social Indicators	4
2. Riel and Foreign Currency Deposits, 2006–10	6
3. Sources of Growth and Financing Flows	7
4. Gross Official Reserves and Foreign Currency Deposits, 2006–10	10
5. Governance Indicators Relative to the Region	12
6. Interest Rate Spreads	12
Table	
1. Seigniorage Loss for Cambodia based on Currency in Circulation in Neighboring LICs	9
Appendix: Effects of Changes in the U.S. Federal Funds Rate on Macroeconomic Variables	17
Appendix Figures	
1. Residuals	20
2. Impulse Responses	21
3. Cumulative Pass-Through Coefficients of the Federal Funds Rate	22
4. Variance Decompositions	23
References	24

I. INTRODUCTION

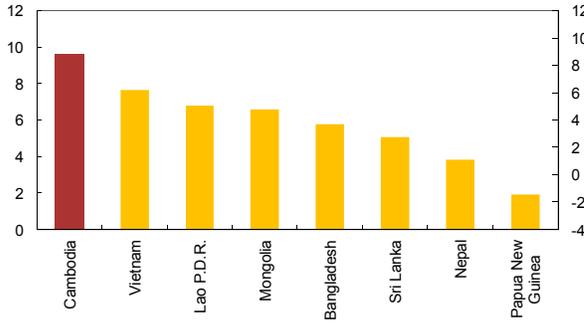
Cambodia has made great strides toward macroeconomic and political stability over the past decade. Cambodia's economic growth has risen from an average 7 percent in the mid-to-late 1990s to over 9 percent in the 2000s, surpassing that of other low-income countries (LICs) in Asia (Figure 1). This growth was partly possible through major reconstruction efforts following decades of civil war and the Khmer Rouge Regime and significant dollar inflows. The establishment of peace in the early 1990s was followed by sizable foreign donor aid and rebuilding of human capital, physical infrastructure, and institutions (Coe, et.al, 2006). Several economic and social indicators have since improved. Cambodia's per capita income has doubled over the past 10 years; inflation has on average been maintained in the single digits in the 2000s, except in 2008 when the rise in food and oil prices—as in other LICs—contributed to double digit inflation. The incidence of poverty and the level of malnutrition have also fallen. Reforms in public finance through both tax policy—including the introduction of the value added tax (VAT)—and revenue administration have resulted in a significant increase in revenues (from about 8½ percent of GDP in the 1990s to about 12 percent of GDP in the late 2000s). The budget deficit has been maintained at less than 3 percent of GDP in the four years prior to the recent global crisis.

However, dollarization has continued to rise. Measured as the ratio of foreign currency deposits to broad money, dollarization has risen—from about 60 percent in the late 1990s to about 80 percent recently (Figure 1). In contrast, dollarization in comparable partially dollarized LICs in Asia has either declined or remained much lower. Cambodia is classified as partially dollarized, given that in such economies the U.S. dollar circulates in conjunction with an official national currency—the riel in this case—as opposed to fully dollarized economies where the dollar is the only legal tender. In Lao P.D.R., dollarization has declined from around 80 percent in early 2000s to less than 50 percent in recent years. Dollarization has remained around 30 and 20 percent in Mongolia and Vietnam, respectively. The increase in dollarization in Cambodia has been contrary to the general belief that macroeconomic and political stability help reduce dollarization.

This paper explores the factors that have contributed to dollarization in Cambodia and reviews lessons from international experience to help devise strategies for de-dollarization. The paper is organized as follows: Section II discusses the general causes of dollarization. Section III discusses the Cambodian experience with dollarization, including an econometric analysis of the extent to which changes in the U.S. federal funds rate affect Cambodia's macroeconomic aggregates. Section III provides lessons from successful dollarization cases. Section V provides recommendations.

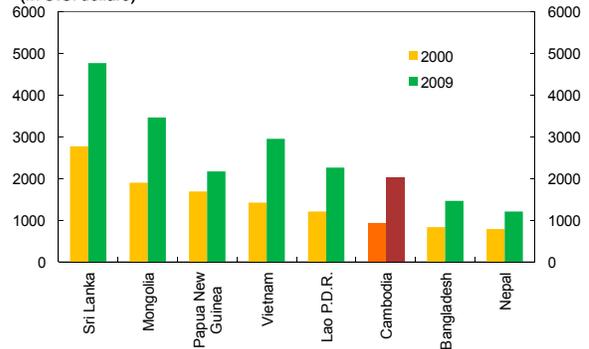
Figure 1. Macroeconomic and Social Indicators

GDP Growth, 2000–07
(Percent change)



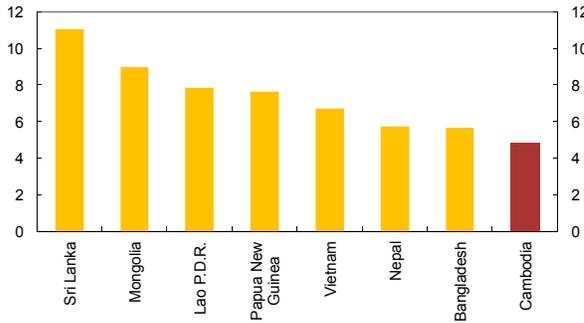
Sources: Data provided by authorities; and IMF staff estimates.

Per Capita GDP (PPP)
(In U.S. dollars)



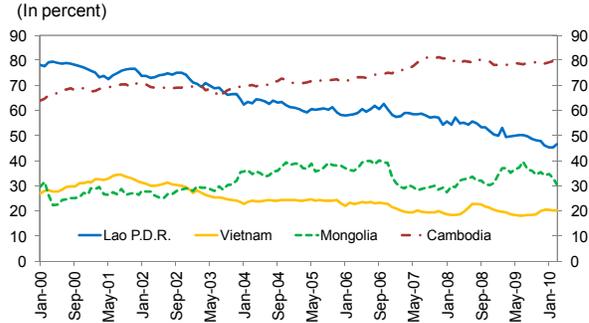
Source: *World Economic Outlook*.

Average Annual Inflation, 2000–09
(Percent change)



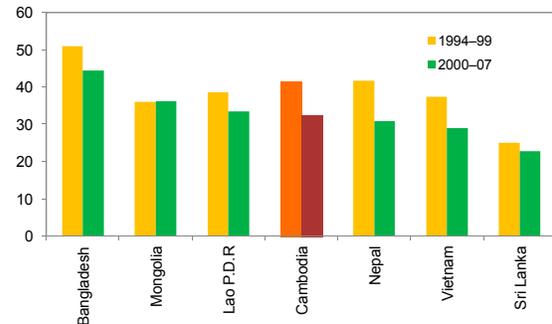
Sources: Data provided by authorities; and IMF staff estimates.

Cambodia: Foreign Currency Deposits to Broad Money, 2000–10
(In percent)



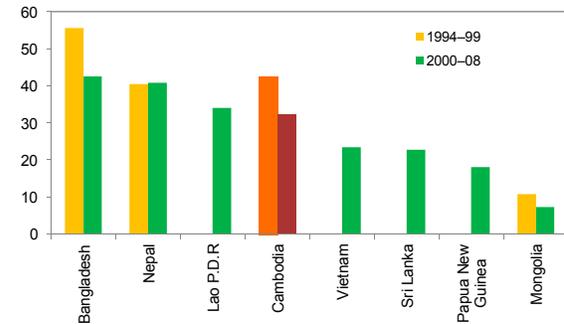
Sources: Data provided by the authorities; and IMF staff estimates.

Poverty Headcount Ratio at National Poverty Line
(Percent of population)



Sources: World Bank database, *World Development Indicators*, and IMF staff estimates.

Malnutrition Prevalence, Weight for Age, 2000–2008
(Percent of children under 5)



Sources: World Bank database, *World Development Indicators*, and IMF staff estimates.

II. DOLLARIZATION IN GENERAL

The macroeconomic literature identifies several possible causes of dollarization:

- Large macroeconomic imbalances and hyperinflation: Chile, Colombia, and Peru, for example, became dollarized following periods of macroeconomic instability and high inflation that resulted in the substitution of the domestic currency for U.S. dollars (Galindo and Leiderman, 2005; Herrera and Valdés, 2005; Kokenyne, Ley, and Veyrune, 2010; Reinhart, Rogoff, and Savastano, 2003).
- Financial repression and capital controls: Nigeria, República Bolivariana de Venezuela, and many sub-saharan African countries became dollarized following the introduction of policies that repressed financial transactions and imposed capital controls (Reinhart, Rogoff, and Savastano, 2003).
- The appeal of the U.S. dollar as an anchor of macroeconomic stability: Argentina and Ecuador, for example, adopted the U.S. dollar as a legal tender in order to help deal with a long history of problems with monetary and exchange rate policy; and following a deep economic and political crisis, respectively (Berg and Borensztein, 2000).

Further, the literature has identified two main motives for the demand for foreign currency assets. The first is currency substitution, which is the use of foreign assets as means of payment and unit of account. Currency substitution tends to follow periods of hyperinflation, prompting the public to seek alternative currencies to use as money. The second is asset substitution, which results from risk and return considerations between domestic and foreign assets. Price instability and prolonged depressions have prompted the use of foreign-denominated assets as a store of value.

Once entrenched, dollarization is difficult to eliminate. Public memory of macroeconomic instability and hyperinflation tend to remain for a long time, resulting in the maintenance of foreign currency denominated assets even during periods of macroeconomic stability. Literature indicates that dollarization remains even when macroeconomic stability and credibility of government policies has been achieved (Kokenyne, Ley, and Veyrune, 2010).

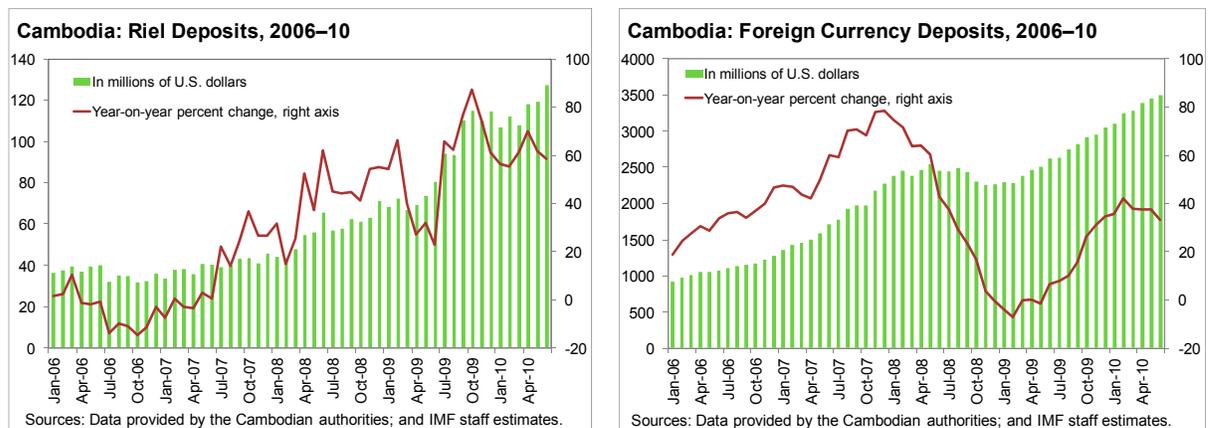
III. THE CAMBODIAN EXPERIENCE WITH DOLLARIZATION

The use of dollars in Cambodia has come a long way. During the Khmer Rouge (1975–79), all barter, private commercial activity, private ownership, means of exchange, and stores of value were prohibited and punishable by death (Prasso, 2001). Savings and property were lost, and cash holdings were made worthless. During 1975–80, Cambodia was without a monetary system and without money. When the riel was reintroduced in 1980, the experience during the Khmer Rouge contributed to its low acceptance by the public. The public, instead, preferred other stores of value and means of payment such as the U.S. dollar, gold, and even rice.

Earlier, even the Vietnam dong and Thai baht were highly used, but their use has declined over time and become limited to the border areas with respective countries.

With the passage of time, the use of the riel increased. While the Cambodia riel has increased in volume over the years (Figure 2), dollar inflows have, however, been larger. Banking system riel deposits have grown fourfold since the mid-2000s. This indicates that the rise in dollarization over the past decade has not necessarily come about through a substitution of riel for dollars, but through a strong inflow of dollars as also noted by Menon (2008). The riel is widely accepted in the rural areas. One of the commercial banks engaged in microfinance has the majority of its loan portfolio denominated in riel in rural areas. However, while the ratio of riel deposits to GDP has risen over time, it remains around 1 percent of GDP. This compares with about 83 percent of GDP in Vietnam for dong deposits and about 8½ percent of GDP in Lao P.D.R. for kip deposits. Financial intermediation in riels remains low, partly reflecting constraints on access to finance in rural areas.

Figure 2. Cambodia: Riel and Foreign Currency Deposits, 2006–10



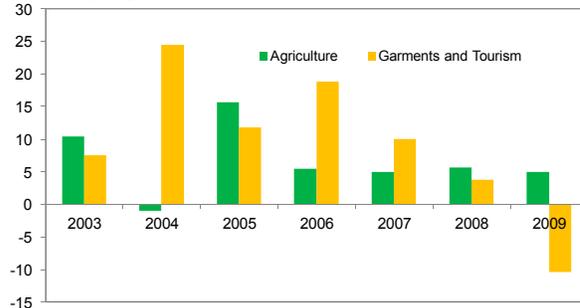
Growth in Cambodia’s dollar economy has far surpassed that in the riel economy.

Cambodia has two parallel worlds: (i) the urban economy that is mostly dollar based, and has benefited a lot from the buoyant garments sector, tourism, foreign direct investment, and aid; and (ii) the rural economy that is largely agricultural and riel based. The contribution of the garments and tourism sectors has surpassed that of the agricultural sector (Figure 3).

Significant inflows of aid, foreign direct investment, tourism receipts, and growth of the garment export sector that transacts in dollars—since the mid-1990s—all contributed to the large amount of dollars.

Figure 3. Cambodia: Sources of Growth and Financing Flows**Cambodia: Growth in Agriculture and Garments and Tourism, 2000–09**

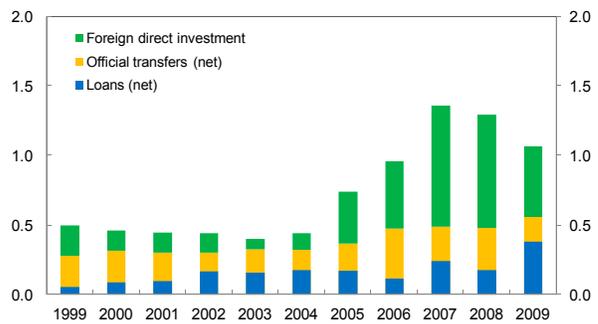
(Year-on-year growth, in percent)



Sources: Data provided by the Cambodian authorities; and IMF staff estimates.

Cambodia: Financing Flows, 1998–09

(In billions of U.S. dollars)



Sources: Data provided by the Cambodian authorities; and IMF staff estimates.

A. Costs and Risks of Dollarization

Loss of the lender of last resort

The National Bank of Cambodia (NBC) lacks instruments to influence monetary aggregates and anchor private sector expectations of inflation. Movements in private sector credit tend to be outside the control of the NBC. The extent of dollarization forces the NBC to delegate its monetary policy to the United States. Appendix 1 illustrates that macroeconomic variables in Cambodia respond significantly to changes in U.S. monetary policy. While the NBC uses from time to time the dollar reserve requirement ratio (RRR) as a monetary policy tool to control liquidity, its effectiveness has proven limited.² When the RRR was reduced in early 2009 to provide liquidity to banks and help boost economic activity in the wake of the global crisis, banks instead accumulated more reserves at the NBC. Excess reserves rose to their highest levels in history and credit to the private sector contracted.

Loss of seigniorage

Dollarization has resulted in loss of seigniorage revenue. Seigniorage revenue is the difference between the value of money and the cost to produce it. When the cost of producing money exceeds (is below) its value, seigniorage is negative (positive). The cost of seigniorage can be estimated as a one-time stock cost from the amount of new foreign currency that is being acquired, or as a continuing flow cost in terms of seigniorage revenue foregone (Bogetić, 2000). Given the nature of dollarization in Cambodia and the way it was acquired—that it was not a conscious choice to adopt the dollar—calculation of seigniorage loss using the continuing flow method is more appropriate. Through the creation of base

² Banks are required to hold reserves in U.S. dollars (for foreign currency deposits) and in riel (for riel deposits). As of end-November 2010, the required reserve ratio on foreign currency is 12 percent, while that on riel is 8 percent. Required reserves are remunerated at one-half the Singapore Interbank Offered Rate (SIBOR).

money, the NBC buys real resources for nothing in return—considering the cost of printing money and any remuneration of bank reserves by the monetary authorities. The high level of dollarization diverts this flow of revenue from the NBC to the United States.

Given that there is no measure of dollars in circulation in Cambodia, estimates of currency in circulation in comparator LICs in Asia (Mongolia, Nepal, and Vietnam)³ are used as a proxy for currency in circulation in Cambodia. The measure of the cost of dollarization is the outstanding amount of dollar cash in circulation multiplied by the dollar market interest rates in annual percent quoted in the United States. The interest rates considered are the federal funds rate, the prime lending rate, and the three-month and results derived from using these interest rates are similar. The methodology helps determine lost income that can be recovered if Cambodia's dollar cash is replaced with the riel to the level of neighboring LICs. Based on this proxy method, the seigniorage loss for Cambodia ranges from 0.1 to 0.5 percent of GDP (Table 1). While this estimate is much lower than the estimates from the change in reserve money method, it is still significant when compared with Cambodia's small public revenue base (only some 11 percent of GDP).

Estimates of seigniorage loss for Cambodia are broadly comparable with those of other countries. Bogetic (2000) estimated seigniorage loss for Latin American countries to range from ½ percent of GDP for Argentina to about 7½ percent of GDP in Ecuador for the period 1991–97. Similarly, Humpage (2002) estimated seigniorage loss for Latin American countries to range from 0.1 percent of GDP in Ecuador to about 5½ percent of GDP in Chile for the period 1990–2000.

Estimates of seigniorage loss should be interpreted with caution. The costs of dollarization in terms of seigniorage loss are very relevant when the government in question has or would have implemented optimal macroeconomic policies. Chang (2002) argues that in cases where policy credibility has been a problem, interpreting seigniorage loss becomes delicate. In countries where dollarization has increased, credibility of policies had been an issue. In these cases, the increase in dollarization could in fact have been associated with an increase in social welfare provided, which would otherwise not have been realized if dollarization had not taken place. Chang (2002) further argues that purely considering computed seigniorage loss can only be unambiguously interpreted as "real losses" to the economy if policy credibility problems are assumed away. There are benefits to dollarization, which have been evident in the stability of the Cambodian macroeconomy and containment of inflation and these benefits—while not necessarily quantifiable—have to be weighed against the costs.

³ Lao P.D.R. and Bangladesh were also assessed, but produced insignificant results given that they have low currency in circulation.

Table 1. Cambodia: Seigniorage Loss for Cambodia based on Currency in Circulation in Neighboring LICs

		2005	2006	2007	2008	2009	Average 2005 to 2009 1/
(1)	Currency in circulation in Asia LICs						
				(In percent of GDP)			
	Mongolia	6.9	6.6	7.9	6.8	6.1	6.9
	Nepal					12.0	12.0
	Vietnam	16.4	17.2	20.6	17.1	19.0	18.1
(2) = ((1)*(8))/100	Proxy for Cambodia, given its GDP						
	Mongolia	433.5	479.2	687.9	762.8	667.2	606.1
	Nepal					1,304.0	1,304.0
	Vietnam	1,030.9	1,249.4	1,790.3	1,928.4	2,064.6	1,612.7
(3) = (2)-(9)	Deduct riel in circulation in Cambodia 2/						
	Mongolia	120.6	90.0	194.4	195.1	...	150.0
	Nepal					576.3	576.3
	Vietnam	718.0	860.1	1,296.9	1,360.7	1,337.0	1,114.5
(4) = (((3)*((10)/100))/(8))*100	Seigniorage using U.S. federal funds rate						
	Mongolia	0.1	0.1	0.1	0.0	...	0.1
	Nepal					0.0	0.3
	Vietnam	0.4	0.6	0.7	0.2	0.0	0.5
(5) = (((3)*((11)/100))/(8))*100	U.S. bank prime lending rate						
	Mongolia	0.1	0.1	0.2	0.1	...	0.1
	Nepal					0.0	0.5
	Vietnam	0.7	0.9	1.2	0.6	0.0	0.9
(6) = (((3)*((12)/100))/(8))*100	U.S. 3-month treasury bills rate 3/						
	Mongolia	0.1	0.1	0.1	0.0	...	0.1
	Nepal					0.0	0.3
	Vietnam	0.4	0.6	0.6	0.2	0.0	0.5
(7) = average((4),(5),(6))	Seigniorage loss estimate						
	Mongolia	0.1	0.1	0.1	0.0	...	0.1
	Nepal					0.0	0.3
	Vietnam	0.5	0.7	0.9	0.3	0.0	0.6
	Memorandum items						
(8)	Nominal GDP (in millions of U.S. dollars)	6,286.1	7,263.8	8,691.0	11,277.3	10,866.5	8,877.0
(9)	Cambodia riel in circulation (in millions of U.S. dollars)	312.9	389.3	493.5	567.7	727.7	498.2
	(In percent of GDP)	5.0	5.4	5.7	5.0	6.7	5.6
(10)	U.S.: federal funds rate	3.2	5.0	5.0	1.9	0.2	4.3
(11)	U.S.: bank prime lending rate	6.2	8.0	8.1	5.1	0.2	7.2
(12)	U.S.: 3 month treasury bills rate	3.2	4.7	4.4	1.4	0.2	4.0

Sources: Data collected from IMF desks, U.S. Federal Reserve, and author's calculations.

1/ The average for interest rates is over a longer period of 1989–2009 to make it less biased toward the more recent low interest rates.

2/ Cambodia's riel in circulation is higher than currency in circulation in Bangladesh in 2007 and 2009, and in Mongolia in 2009.

3/ A 6-month treasury bills rate produced similar results.

Liquidity risk

Sudden changes in investor and depositor perceptions about the health of the banking system, resulting in a deposit run, could compromise the NBC's international reserves in a time when these are needed to mitigate the impact of financial crisis. This risk highlights the importance of maintaining a strong level of reserve coverage. The recent decline in international reserves coverage of foreign currency deposits in the banking system is worrying, given the important role that such reserves serve in a dollarized economy.

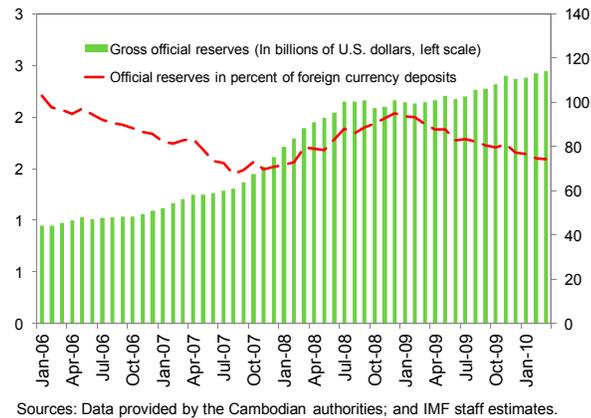
Bank balance sheet risks

Balance sheet risks tend to arise in cases of partial dollarization. Banking sector vulnerabilities may be heightened because of direct exchange rate risks that result from currency mismatches in banks' balance sheets. Also, indirect credit risk may arise in case of

devaluations in the presence of substantial dollar lending to nonhedged borrowers (Kokenyne, Ley, and Veyrune, 2010). To the extent that currency mismatches exist in banks' balance sheet such as where, balance sheet risk remains.

The extent of dollarization has consequences for financial stability. High dollarization requires that the NBC maintains an adequate level of dollar liquidity both at the macro level (Figure 4) and at the individual financial institution level.

Figure 4. Cambodia: Gross Official Reserves and Foreign Currency Deposits, 2006–10



B. Monetary Policy in Dollarized Cambodia

The extent of dollarization makes Cambodia susceptible to changes in U.S. monetary policy. This poses constraints on the tools available domestically with which to respond to external shocks. Monetary expansion in the United States tends to result in economic booms in other countries (Kim, 2001), including in dollarized economies (Goux and Cordahi, 2007). During late 2007 and early 2008, Cambodia experienced an increase in inflation pressures as commodity prices and foreign inflows rose. Coincidentally, U.S. monetary policy had become loose following the Federal Reserve's attempt to increase liquidity as the subprime crises hit. The federal funds rate had declined from about 5.26 percent in July 2007 to 1.98 percent by May 2008.

The high degree of dollarization raises the question of the extent to which Cambodia imports U.S. monetary policy. The fact that about 60 percent of Cambodia's garments exports go to the United States indicates strong real linkages between the Cambodian economy and the U.S. economy in addition to the financial linkages caused by dollarization. Appendix 1 discusses the extent to which changes in the federal funds rate influences macroeconomic variables in Cambodia. It shows that financial sector variables (including domestic interest rates) and real economy variables (including trade) respond greatly to changes in the federal funds rate within the first few months. A standard deviation shock to the federal funds rate (an increase of about 0.3 percent) results in an increase in the lending

rates of about 0.4 percent and a 0.46 percent increase in deposit rates as local banks attempt to minimize the spread between domestic and foreign interest rates. This illustrates the extent to which monetary conditions are beyond the control of the Cambodian monetary authorities.

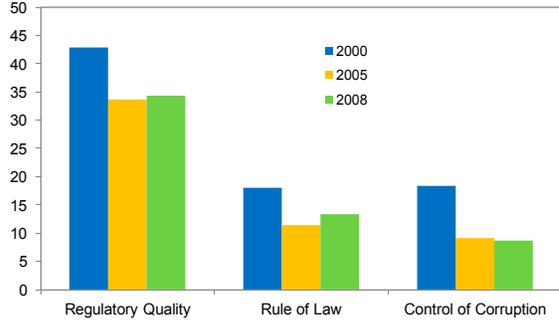
C. Structural Challenges that Instill Dollarization

While Cambodia’s economic growth track record has been impressive, several structural weaknesses inhibit faster economic development and private sector performance. Rennhack and Nozaki (2006) argue that weak institutions undermine policy credibility as they create doubt about enforceability of contracts, thereby inducing residents to hold foreign currency as security. The institutional environment remains a challenge to private sector and rural development, which are critical for economic sectors that use the riel (Figure 5). The recent adoption of the Anti-Corruption law by the Cambodian government is a step toward improving the institutional environment. However, the country still lags behind other LICs in enforcement of regulation and the rule of law. There is also a need to build the infrastructure—especially electricity, telecommunications, and access to land—in order to support private sector and rural development that are important sectors using the riel.

Partly reflecting these structural weaknesses, the interest rate differential between Cambodian and U.S. interest rates has remained high (Figure 6). The spread between deposit and lending rates in Cambodia and the United States has been wide, with rates in Cambodia significantly higher. The high interest rate spread reflects several things including high country risk, the high cost of banking (including legal uncertainty, litigation costs, and default rates), and low financial intermediation (de Zamaróczy and Sopenha, 2002). The high interest rate spread is also consistent with findings by Powell and Sturzenegger (2000), who argue that the abolishment of currency risk is offset by an increased default (country) risk premium and interest rate levels stay significantly higher than in the United States (usually the benchmark).

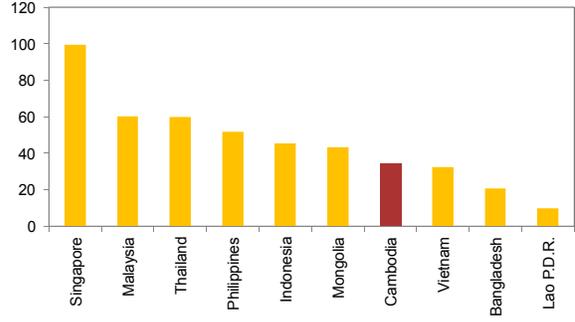
Figure 5. Cambodia: Governance Indicators Relative to the Region

Cambodia: Governance Indicators, 2000–08 1/



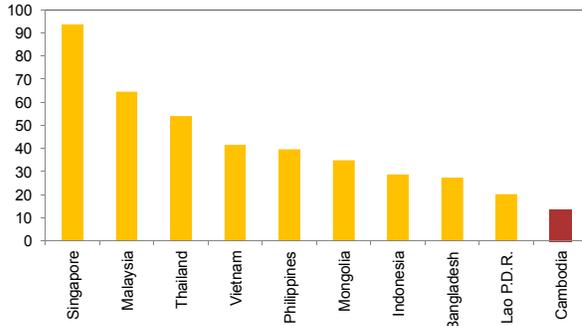
Source: World Bank, *World Governance Indicators*.
1/ Percentile rank indicates the percentage of countries worldwide that rate below the selected country. Higher values indicate better governance ratings.

Regulatory Quality, 2008 1/



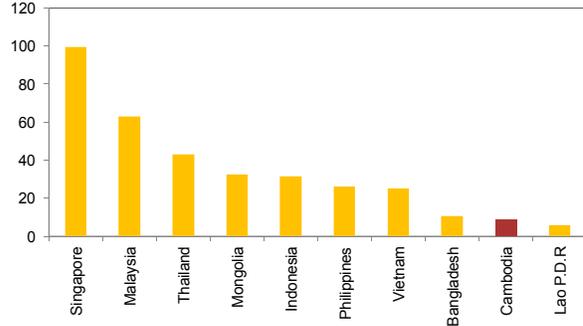
Source: World Bank, *World Governance Indicators*.
1/ Percentile rank indicates the percentage of countries worldwide that rate below the selected country. Higher values indicate better governance ratings.

Rule of Law, 2008 1/



Source: World Bank, *World Governance Indicators*.
1/ Percentile rank indicates the percentage of countries worldwide that rate below the selected country. Higher values indicate better governance ratings.

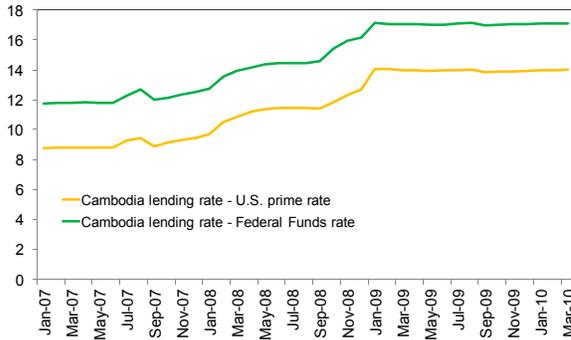
Control of Corruption, 2008 1/



Source: World Bank, *World Governance Indicators*.
1/ Percentile rank indicates the percentage of countries worldwide that rate below the selected country. Higher values indicate better governance ratings.

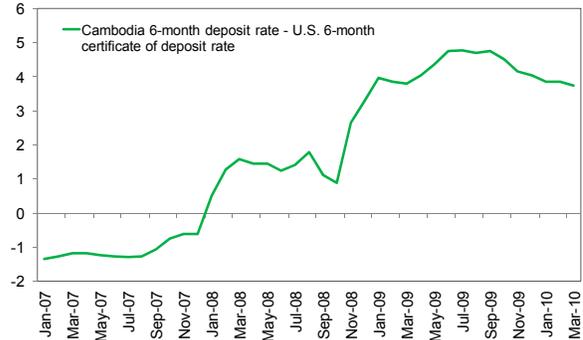
Figure 6. Cambodia: Interest Rate Spreads

Cambodia: Lending Rate Spread, 2007–10



Sources: Data provided by the Cambodian authorities; the Federal Reserve Economic Data, and IMF staff estimates.

Cambodia: Deposit Rate Spread, 2007–10



Sources: Data provided by the Cambodian authorities; the Federal Reserve Economic Data, and IMF staff estimates.

IV. LESSONS FROM INTERNATIONAL EXPERIENCE

Several countries have been identified as having successfully de-dollarized. Reinhart, Rogoff, and Savastano (2003) separate countries into two categories: (i) those that de-dollarized their locally issued foreign currency obligations (examples are Mexico and Argentina); and (ii) those that reduced the share of foreign currency deposits to broad money (examples are Israel, Poland, Mexico, and Pakistan). The latter category is more relevant for Cambodia, given that the country has a high share of foreign currency deposits in broad money, and that there are currently no locally issued government securities in foreign currency. In the cases of Israel, Poland, Mexico, and Pakistan, the share of foreign currency deposits in broad money fell by at least 20 percent and settled at a level below 20 percent.

The following lessons can be drawn from international experiences with de-dollarization:

- *Gradual and market-driven policies have been more successful.* Countries where supportive policies aimed at lowering inflation and deepening financial markets helped reduce dollarization include Israel, Poland, Chile, and Egypt. In these cases, a combination of policies were implemented including: (i) creating markets for local currency denominated bonds; (ii) introducing differential remuneration rates on reserve requirements on foreign currency deposits to introduce a wedge in bank intermediation spreads; and (iii) active bank supervision to ensure that banks fully covered their foreign currency loans positions (Erasmus, Leichter, and Menkulasi, 2009). Further, in the cases of Israel and Chile, indexation was also used successfully to promote local currencies.
- *Forced de-dollarization has had macroeconomic costs.* Forced conversion of dollar deposits into domestic currency was imposed in 1982 and 1998 in Mexico and Pakistan, respectively. Conversion was done using an exchange rate that was substantially lower than the prevailing market rate (Reinhart, Rogoff, and Savastano, 2003). While Mexico and Pakistan successfully de-dollarized, there were costs. In the case of Mexico, there was substantial capital flight and private sector bank credit almost halved in two years. Growth suffered significantly and inflation shot up (Reinhart, Rogoff, and Savastano, 2003). In the case of Bolivia and Peru, forced conversion of dollar deposits was subsequently followed by macroeconomic instability that resulted in hyperinflation and led these countries to later allow foreign currency deposits (Reinhart, Rogoff, and Savastano, 2003). A similar restriction was introduced in Israel; however, this was gradual and market oriented. In the case of Israel, a mandatory one-year holding period for all foreign currency deposits was introduced in 1985, which made those deposits less attractive than other indexed financial instruments.
- *Reversing dollarization is not easy and is mainly a gradual process.* According to Baliño, Bennett, and Borensztein (1999), de-dollarization tends to be difficult, since it

depends on institutional changes and occurs when significant benefits can be gained by switching currencies. De-dollarization requires persistence in reducing inflation and stabilizing macroeconomic policy (Erasmus, Leichter, and Menkulasi, 2009). Establishing the credibility of macroeconomic policy is essential.

Cambodia could also draw experiences from its neighbors. In an attempt to de-dollarize, Lao P.D.R. tried to enforce the increased use of the local currency (the kip) by passing a decree (in June 1997) that stipulates that only the kip could be used as a medium of exchange in all domestic transactions. This was followed by a depreciation of the kip against the U.S. dollar and the Thai baht (both significant foreign currencies used) as a result of loss of confidence in the kip following the announcement of the measure (Menon, 2008). The share of the kip in the money stock fell from about 50 percent to 30 percent, partly due to the valuation effect. Lao P.D.R. is, therefore, another example of how forced de-dollarization could have unintended consequences and thus should be avoided.

V. POLICY OPTIONS FOR CAMBODIA

In pursuing the ultimate goal of promoting greater use of the local currency, the Cambodian authorities should consider market-based policies. There is no silver bullet in encouraging the use of local currency over foreign currency. A combination of supportive and market-oriented policies is needed. Forced and rapid de-dollarization should be avoided, given that it has been unsuccessful elsewhere. Recommended policies for Cambodia are discussed below.

A. The Macroeconomic Environment

A stable macroeconomic environment is critical. Cambodia has achieved macroeconomic stability over the past decade with low inflation, high growth, and a credible fiscal position. The authorities should aim to build upon this achievement. Given the limited tools on monetary policy, continuous buy-in by the fiscal authorities through a prudent fiscal stance is essential. In parallel, establishing credibility of monetary policy is necessary. Since attaining such credibility takes time, monetary policy authorities should constantly be seen as taking appropriate policy decisions given economic developments, be accountable, and be independent.

A strategy to reduce dollarization should be aligned with an appropriate exchange rate policy. Once dollarization has taken hold, maintaining an independent monetary policy is difficult and therefore exchange rate stabilization becomes a viable option. The NBC has maintained a relatively fixed exchange rate vis-à-vis the U.S. dollar, which has been the effective nominal anchor for three decades in the absence of a formal monetary framework. However, the achievement of low inflation has not halted or reversed the trend increase in

dollarization.⁴ Ize and Yeyati (2005) find that dollarization hysteresis (the persistence of dollarization after years of subdued inflation rates) can be the result of exchange rate-based stabilization efforts. Monetary policy that closely targets the real exchange rate stimulates dollarization. They further find that if the real exchange rate is stable relative to inflation, the dollar becomes the preferred currency. Therefore, exchange rate based stabilization can enforce dollarization and not be well aligned with a de-dollarization strategy. Ize and Yeyati (2005) further argue that allowing the exchange rate to be more flexible alters relative risks in favor of the local currency. Kokenyne, Ley, and Veyrune (2010) also find that maintaining trends in the exchange rate could enforce dollarization by entrenching the expectation of a continuous appreciation or depreciation. They argue that a move in the currency in either direction, with less bias toward currency depreciation, helps make foreign exchange risk more apparent and could provide a disincentive to financial dollarization. Given the endogeneity of exchange rate policy, the policy alone is not sufficient for de-dollarizing and needs to be put into context with other measures aimed at promoting the use of the local currency.

B. The Domestic Financial Market

The money market needs to be further developed in Cambodia to help reduce risks associated with the dollarization of credit to nontradable sectors, and strengthen the interest rate channel of monetary policy transmission. Developing the money market's ability to forecast and target short-term liquidity is one of the main priorities. There is currently no interbank market in Cambodia and its development should be a priority for the monetary transmission mechanism and for liquidity management. Several steps are needed in creating the interbank market including: (i) establishing the NBC's Monetary Policy Committee's ability to define a corridor of interest rates for standing facilities. The facility of a collateralized rediscount facility could establish a ceiling for the interbank money market while an overnight deposit in the central bank could provide a floor to the interbank rate; (ii) developing the NBC's expertise to forecast daily outstanding balances on current accounts of banks that will be used to introduce open market operations; (iii) introducing auctions of NBC certificates to help regulate excess liquidity.

C. Financial Policy and Prudential Regulation

Several measures could help raise intermediation in the domestic currency and help build a liquidity line of defense. First, through the *reserve requirement*. Having a higher reserve requirement on foreign currency liabilities helps make such liabilities more costly. At the same time, this helps mitigate liquidity risk of dollarization (such as deposit runs) that is related to such deposits. A lower reserve requirement on local currency, simultaneously, creates an incentive to intermediate in Cambodian riel. The NBC currently maintains a higher reserve requirement on foreign currency than on riel, helping to promote use of the riel.

⁴ Moreover, the relatively fixed exchange rate conflicts with the need to facilitate adjustment to asymmetric shocks as well as to protect official reserves, given the limited lender-of-last resort capability under dollarization.

However, this on its own is not enough to ensure a significant shift toward riel use. Second, introducing a *deposit insurance system* could foster confidence in the financial system. Insurance coverage for the domestic currency should be made higher than that of the foreign currency. Third, *maintaining a sufficient level of international reserves*. International reserves play an important role in a dollarized economy as they serve the purpose of liquidity support to banks in case of bank-runs. High coverage of international reserves helps reduce the perception of a weak currency.

Regulation to encourage the use of the riel as a unit of account could help. This could include requiring that all prices in the market to be denominated in riels, and that the riel is used for all accounting, financial reporting, and official purposes. The riel is already being used for tax purposes, which is a step in the right direction. Further, riel use can be promoted by circulating bills of larger denomination and introducing a clearance tax for checks denominated in foreign currency.

Policies that promote use of the riel for payments through convenient and lower-cost services than for foreign currency could be pursued. Peru, for example, introduced a 2 percent tax on checks denominated in foreign currency to discourage the use of foreign currency for payments (Erasmus, Leichter, and Menkulasi, 2009). Also, the riel could be promoted by making it continuously available in denominations that are convenient for the public.

Moving toward risk-based supervision could help better monitor risks taken by banks in extending credit. Dollarization adds to banking sector vulnerabilities arising from currency mismatches, exchange rate and credit risks, and dollar nonperforming loans (Unteroberdoerster, 2001). Strict controls on risks related to foreign currency loans should be made and maintained on banks, supported by risk disclosure to borrowers (Kokenyne, Ley, and Veyrune, 2010). Rapid growth of credit between late 2007 and early 2008, which fueled inflation, highlights the need for enforcement of prudential regulations and for risk-based banking supervision.

VI. CONCLUSIONS

Dollarization in Cambodia has risen in the presence of a stable macroeconomic and political environment. Dollarization appears not to be a problem of currency substitution given that the volume of riel being used has risen significantly over time. There are several costs associated with dollarization, including loss of monetary policy and loss of seigniorage. Also, liquidity and balance sheet risks become heightened. A strategy to reduce dollarization will require making the dollar less attractive compared to the riel. There is no silver bullet, but a comprehensive set of market-driven measures, supported by the continuation of a stable macroeconomic environment are essential.

**APPENDIX. CAMBODIA: EFFECTS OF CHANGES IN THE U.S. FEDERAL FUNDS RATE ON
MACROECONOMIC VARIABLES**

Macroeconomic literature identifies two main channels through which monetary policy shocks could be transmitted between countries. The first channel is the *Trade channel*. In this channel, monetary policy tightening in a trading partner country (country A) can result in dampened economic activity in that country leading to lower demand for imports that translates to lower exports in the trading partner country (country B). The second channel is the *Financial channel*. When capital is mobile between two countries, the financial channel tends to be important. Monetary policy tightening in country A relative to country B can attract capital to country A given the higher rate of return due to higher interest rates. The importance of these channels on Cambodia is explored below using a vector autoregression model (VAR).

Vector autoregression model

The VAR approach has gained popularity in the economic literature since its introduction by Sims (1980) as a tool to assess the transmission mechanism. In a general form, the VAR(p) model is as follows:

$$y_t = c + \beta_1 y_{t-1} + \beta_2 y_{t-2} + \dots + \beta_p y_{t-p} + \mu_t$$

Where c is an $n \times 1$ vector of constants, β_i is an n by n matrix of betas for $i=1,2,\dots,p$ and ε_t is an n by 1 vector of error terms. The error terms are serially uncorrelated and the mean of each error vector is the zero vector, the covariance matrix between the error terms for a given point in time is positive definite and the correlation between the error vectors is zero across time (i.e., there is no serial correlation among the error vectors).

The VAR model is estimated on quarterly data for Cambodia for the period Q1 1995 to Q2 2009. The choice of variables in the model is motivated by various theories of the transmission mechanism. While the traditional Mundell-Fleming-Dornbusch model (see Dornbusch, 1980,) establishes macroeconomic aspects of transmission in small open economies providing the basis for the trade channel, the model itself has been found in empirical work to be insufficient to explain the full transmission. Therefore, there have been extensions in the literature including that by Obstfeld and Rogoff (1995) by incorporating the microeconomic aspects of transmission, especially the incorporation of monetary shocks and therefore the important role of interest rates, which help provide the basis for the financial channel. The variables incorporated in the VAR model are: the federal funds rate (for U.S. monetary policy shock); the bilateral nominal exchange rate; the trade balance helps to capture the impact on and significance of the trade channel, broad money, domestic lending and deposit interest rates (to help test the significance of the financial channel); inflation; and the output gap (for real economy impact). The output gap is measured as the deviation of real GDP from the historical trend (measured through the Hodrick-Prescott filter). A positive

output gap implies that real GDP is above its potential and therefore can have inflationary effects and would warrant tightening domestically.

Tests on variables and the model

All variables were found to be integrated of order 1 (I(1)) except the output gap variable, which was found to be integrated of order 0. This means that I(1) variables need to be differenced once to make them stationary. The residuals from the VAR are found to be stationary (Appendix 1). The VAR was estimated with 2 lags given that this number of lags minimizes the Akaike information criterion, which helps measure the goodness of fit of the model.

Impulse response functions

The response of variables to the shock in the federal funds rate are identified in the VAR using the Cholesky decomposition. The Cholesky method requires identifying the chain of reaction (or the ordering of variables) starting from the exogenous variable to the most endogenous. The ordering used is from the federal funds rate (dfedfunds_r), to the exchange rate (dlexchr), to the trade balance (dtradeb), to broad money (dlbm), to deposit rates (drdepr), to lending rates (drlendr), to the output gap (ygap), and lastly inflation (dlcpi). Oil prices enter exogenously in the model to help capture the effect of commodity prices. In the acronyms of the variables, d stands for the differencing and l means that the variable has been logged.

It appears that financial sector variables (specifically the lending and deposit rates) have a stronger reaction to shocks in the federal funds rate compared to the trade balance. The results can be summarized as follows:

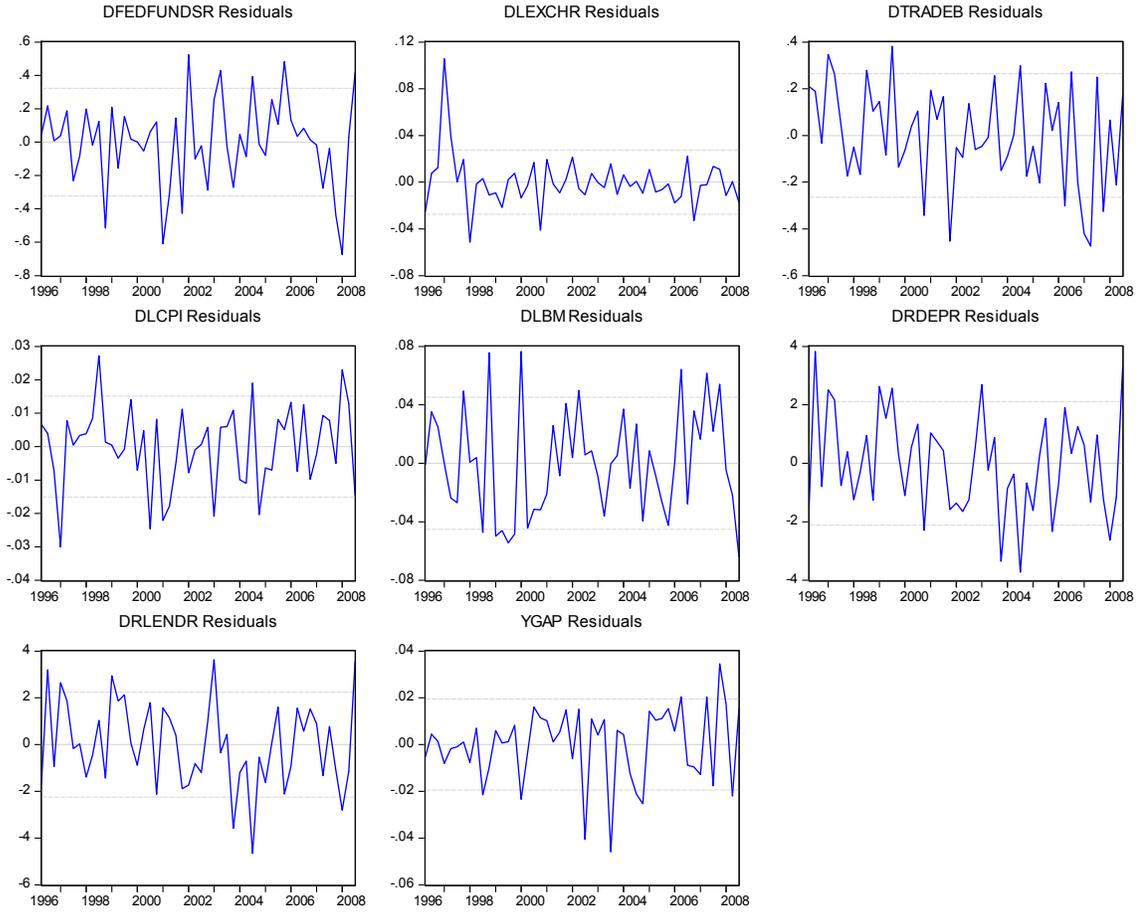
- A standard deviation shock to the federal funds rate (an increase of about 0.3 percent) results in an increase in the lending rates of about 0.4 percent and a 0.46 percent increase in deposit rates as local banks attempt to minimize the spread between domestic and foreign interest rates. The impact on domestic interest rates occurs within the first quarter of the shock to the federal funds rate, with a larger impact occurring in the second quarter. However, as the lag of the impact increases, domestic interest rates decline (between five to seven months) probably reacting at this point to lower demand for loans as the Cambodian economy contracts.
- A shock to the federal funds rate appears to result in an increase in the Cambodian trade balance (by about 0.1 percent following a 0.3 percent shock in the federal funds rate) within a quarter and a negative effect in two quarters. The immediate positive impact may be reflecting a stronger contractionary impact on imports in Cambodia, since as domestic interest rates also respond with an increase, they contribute to an overall contraction. However, the trade balance worsens somewhat in the third quarter, indicating the contractionary effect on exports as external U.S. demand has had time to respond to the initial federal funds rate shock.

- Response of the exchange rate is rather small with the riel depreciating against the U.S. dollar. This is not surprising due to high dollarization in Cambodia, which implies loss of flexibility in exchange rate policy. It has been contended in the literature that highly dollarized economies tend to adjust through goods and factor markets as well as financial markets and not necessarily through the exchange rate (de Zamaróczy and Sopenha, 2003).
- A shock to the federal funds rate results in a decline in output and inflation in Cambodia reflecting a contractionary effect of U.S. monetary policy (and therefore lower liquidity into Cambodia) as well as the contractionary effect of domestic rates within the first quarter. However, as domestic interest rates decline in the following months, domestic output picks up and inflation rises a quarter later.

Variance decompositions

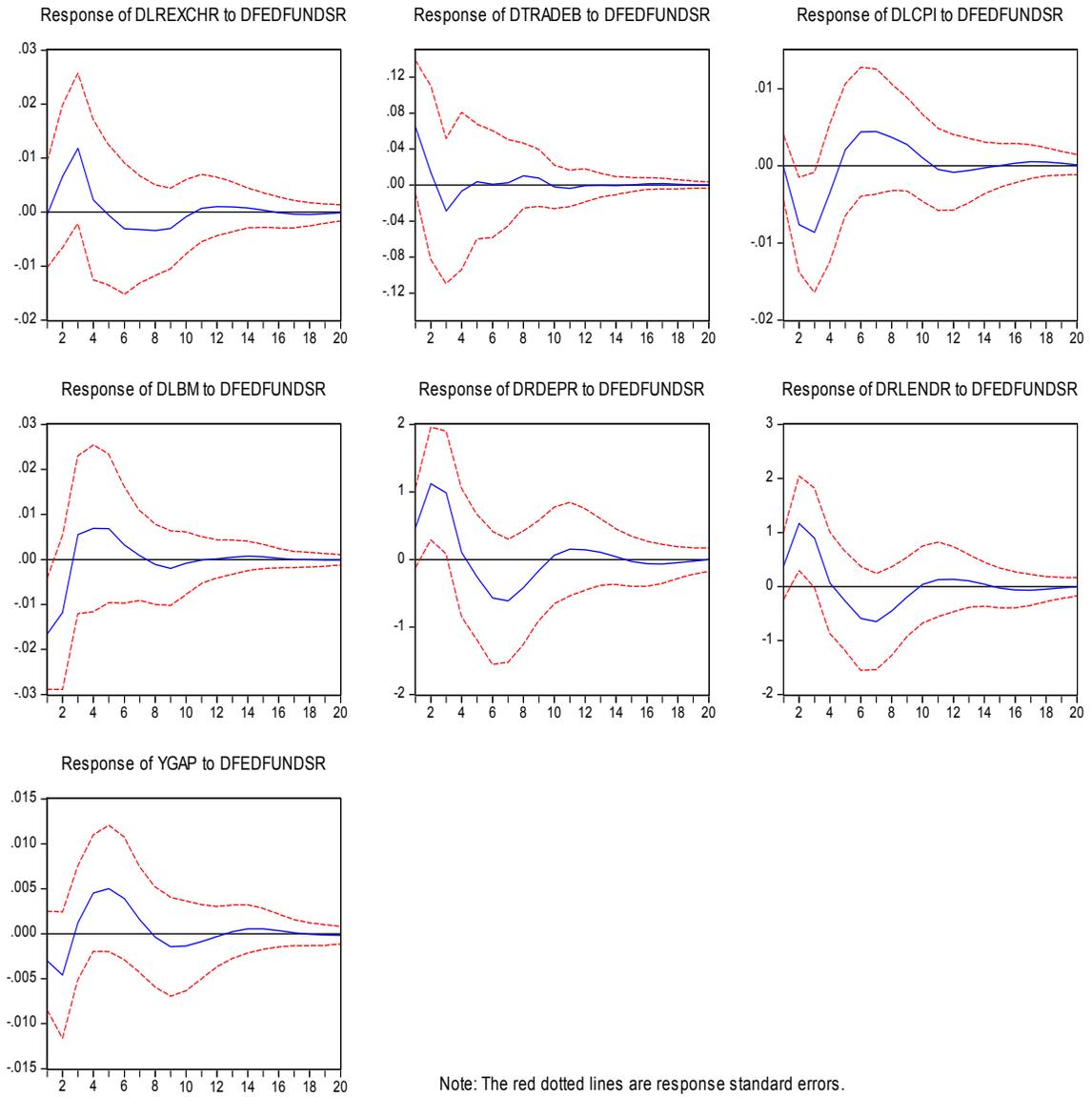
Another way to analyze the dynamics of the VAR is through forecast error variance decompositions. The variance decompositions help determine the relative importance of the shock variable to fluctuations in the response variables in the model. Shocks to the federal funds rate contribute about 25 percent of variation in the financial variables, whereas they contribute about 5 percent of the variation in the trade balance. On real economy variables, the federal funds rate contributes to about 15 percent of variation in the output gap and about 23 percent variation in Cambodian inflation. The higher impact on the real economy as compared to the trade channel likely reflects the double impact of the financial and the trade channels on overall economic activity.

Appendix Figure 1: Residuals



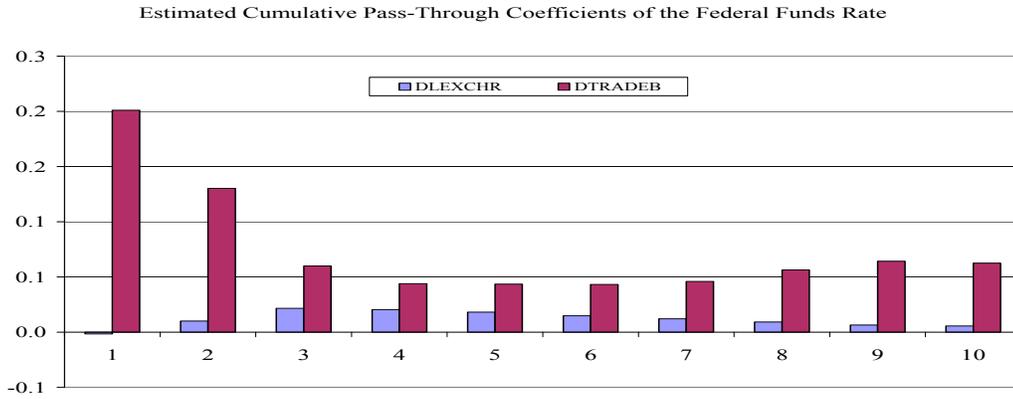
Appendix Figure 2: Impulse Responses

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

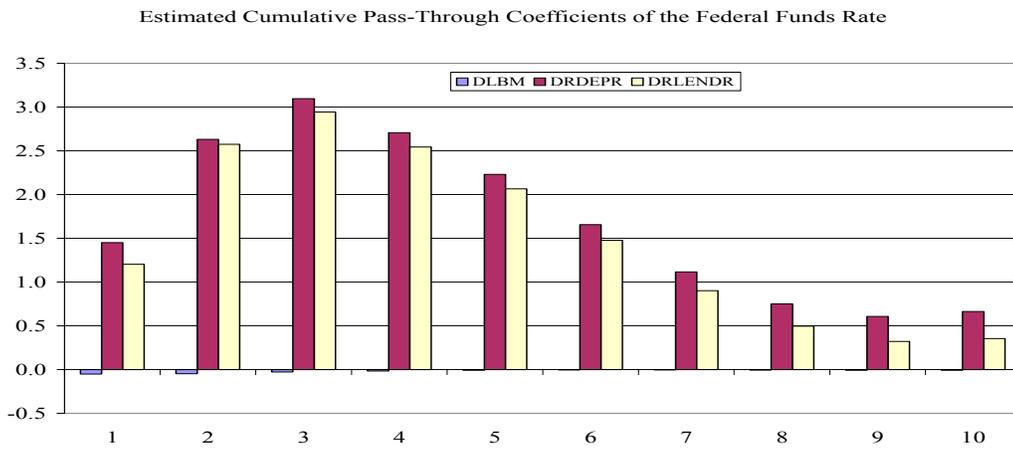


Appendix Figure 3: Cumulative Pass-Through Coefficients of the Federal Funds Rate

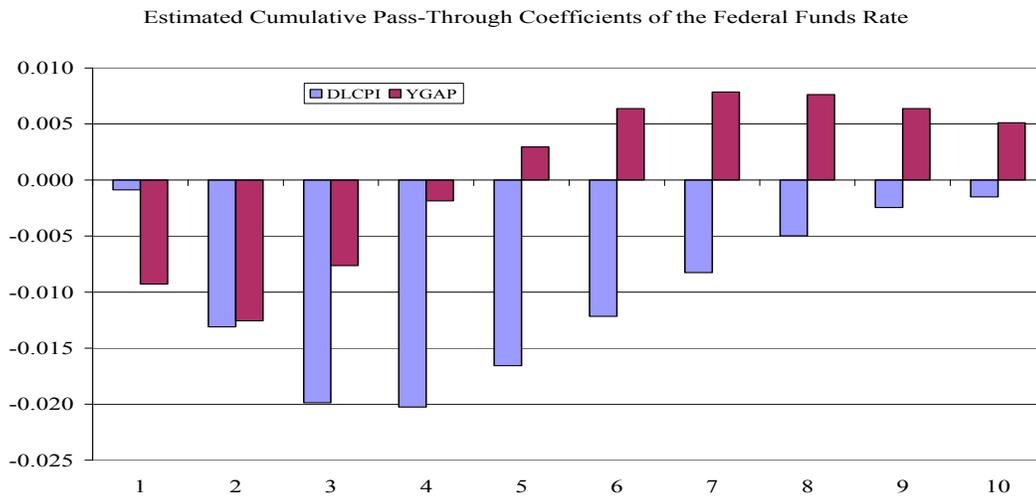
Trade channel



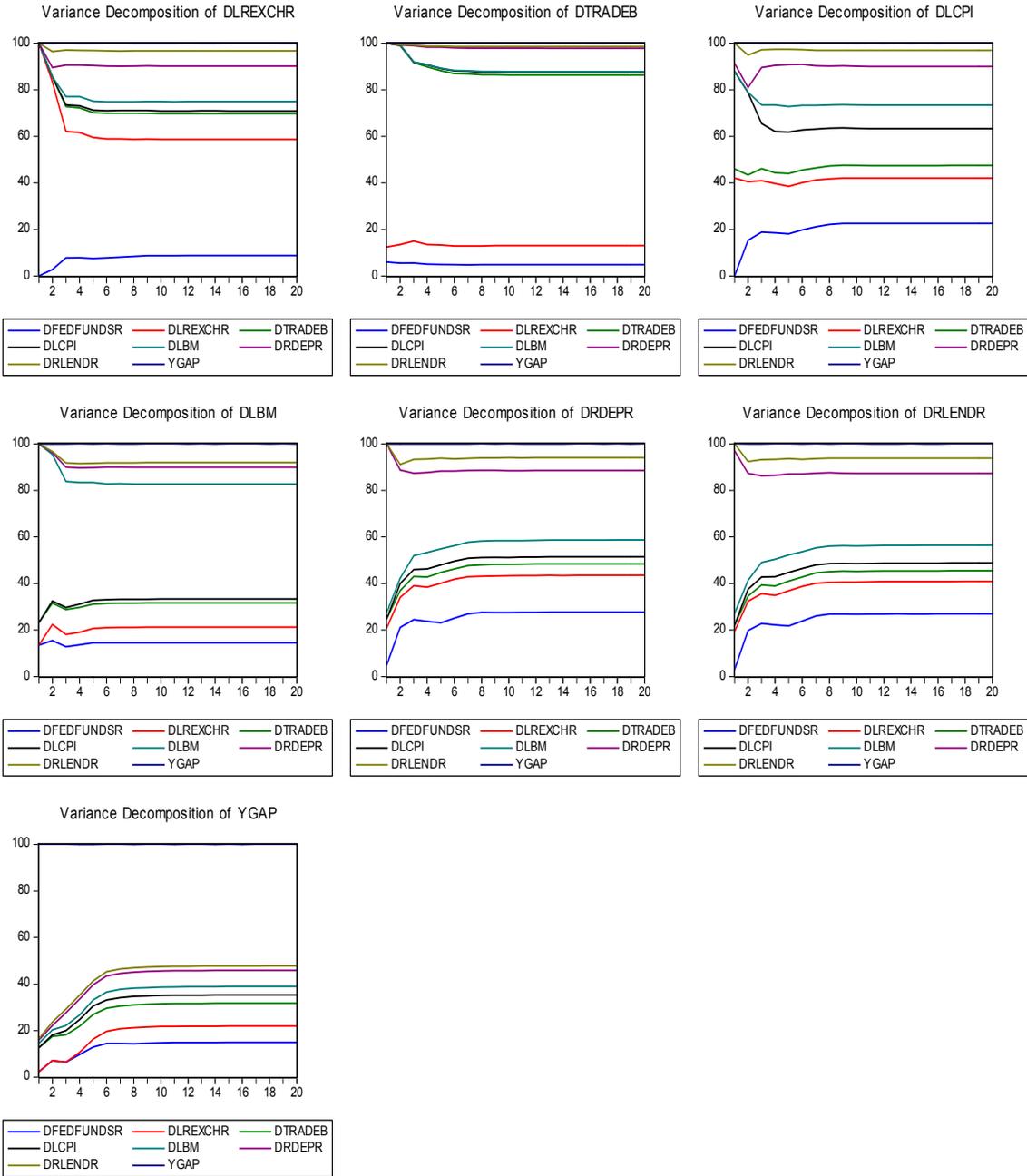
Financial channel



Real economy



Appendix Figure 4: Variance Decompositions



REFERENCES

- Baliño, T., A. Bennett, and E. Borensztein, 1999, *Monetary Policy in Dollarized Economies*, IMF Occasional Paper No. 171, (Washington: International Monetary Fund).
- Berg, A., and E. Borensztein, 2000, “Full Dollarization: The Pros and Cons,” IMF Economic Issues No. 24, (Washington: International Monetary Fund).
- Bogetić, Ž., 2000, The Calculus of Full Dollarization, *Central Banking*, Vol. XI, No. 2, November, pp. 45–57, (United Kingdom).
- Bufman, G., and L. Leiderman, 1993, Currency Substitution under Nonexpected Utility: Some Empirical Evidence, *Journal of Money Credit, and Banking*, Vol. 25, No. 3 (August 1993, Part I), The Ohio State University Press.
- Chang, R., 2000, Dollarization: A Scorecard, *Economic Review*, Federal Reserve Bank of Atlanta, issue Q3, pages 1–12.
- Coe, D. T., I. Lee, W. F. Abdelati, R. H. Eastman, S. Ishikawa, A. Lopez-Mejia, S. Mitra, S. Munoz, K. Nakamura, N. Rendak, and S. Yelten, 2006, *Cambodia: Rebuilding for a Challenging Future* (Washington: International Monetary Fund).
- de Zamaróczy, M., and S. Sapanha, 2002, “Macroeconomic Adjustment in a Highly Dollarized Economy,” IMF Working Paper No. 92, (Washington: International Monetary Fund).
- _____, 2003, *Economic Policy in a Highly Dollarized Economy: The Case of Cambodia*, IMF Occasional Paper No. 219, (Washington: International Monetary Fund).
- Dornbusch, R., (1980), *Open Economy Macroeconomics*, Basic Books (New York).
- Erasmus, L., J. Leichter, and J. Menkulasi, 2009, “Dedollarization in Liberia—Lessons from Cross-country Experience,” IMF Working Paper No. 09/37, (Washington: International Monetary Fund).
- Galindo, A., L. Leiderman, 2005, “Living with Dollarization and the Route to Dedollarization,” Inter-American Development Bank Working Paper No. 526, New York.
- Goux, J., and C. Cordahi, 2007, “The International Transmission of Monetary Shocks in a Dollarized Economy,” GATE Working Paper, Groupe d’Analyse et de Théorie Économique, France.
- Herrera, L., and R. Valdés, 2005, “De-dollarization, Indexation and Nominalization: the Chilean Experience,” *The Journal of Policy Reform*, Vol. 8, No. 4, 281–312, December.

- Humpage, O., 2002, "An Incentive-Compatible Suggestion for Seigniorage Sharing with Dollarizing Countries," Discussion Paper No. 4, June, (Cleveland Federal Reserve Bank).
- Ize, A., and E. Yeyati, 2005, "Financial De-dollarization: Is it for Real?" IMF Working Paper No. 187, (Washington: International Monetary Fund).
- Kokenyne, A., J. Ley, and R. Veyrune, 2010, "Dedollarization," IMF Working Paper No. 188, (Washington: International Monetary Fund).
- Menon, J., 2008, "Cambodia's Persistent Dollarization: Causes and Policy Options," Working Paper Series on Regional Economic Integration No. 19, Asian Development Bank.
- Obstfeld, M., and K. Rogoff (1995), "The Mirage of Fixed Exchange Rates," NBER Working Paper Series, No. 5191 (National Bureau of Economic Research).
- Powell, A., and F. Sturzenegger (2000), "Dollarization: The Link between Devaluation and Default Risk," Business School, Universidad Torcuato Di Tella.
- Prasso, S., 2001, "The Riel Value of Money: How the World's Only Attempt to Abolish Money Has Hindered Cambodia's Economic Development," Asia Pacific Issues No. 49, East-West Center.
- Reinhart, C., K. Rogoff, and M. Savastano, 2003, "Addicted to Dollars," NBER Working Paper 10015 (Cambridge, Massachusetts: National Bureau of Economic Research).
- Rennhack, R., and M. Nozaki, 2006, "Financial Dollarization in Latin America," IMF Working Paper No. 7, (Washington: International Monetary Fund).
- Sims, C. A., 1980, "Macroeconomics and Reality," *Econometrica*, Vol. 48, No. 1, January, pp. 1–48.
- Unteroberdoerster, O., 2002, "Foreign Currency Deposits in Vietnam—Trends and Policy Issues," *Vietnam: Selected Issues and Statistical Appendix*, IMF Staff Country Report No. 02/5 (Washington: International Monetary Fund).