INSTITUTE OF DEVELOPING ECONOMIES

IDE Discussion Papers are preliminary materials circulated
to stimulate discussions and critical comments

IDE DISCUSSION PAPER No. 388

Sources of Fluctuations in Parallel Exchange Rates and Policy Reform in Myanmar

Koji KUBO*

February 2013

Abstract

Myanmar maintained a multiple exchange rate system, and the parallel market exchange rate was left untamed. In the last two decades, the Myanmar kyat exchange rate of the parallel market has exhibited the sharpest fluctuations among Southeast Asian currencies in real terms. Since the move to a managed float regime in April 2012, the question arises of whether exchange rate policies will be effective in stabilizing the real exchange rate. This paper investigates the sources of fluctuations in the real effective exchange rate using Blanchard and Quah's (1989) structural vector autoregression model. As nominal shocks can be created by exchange rate policies, a persistent impact of a nominal shock implies more room for exchange rate policies. Decomposition of the fluctuations into nominal and real shocks indicates that the impact of nominal shocks is small and quickly diminishes, implying that complementary sterilization is necessary for effective foreign exchange market interventions.

Keywords: real and nominal effective exchange rates, structural VAR, Myanmar
JEL classification: F31, F41, O53

* Research Fellow, Bangkok Research Center, Institute of Developing Economies (IDE-JETRO) (kubokoji@ide.go.jp)

The Institute of Developing Economies (IDE) is a semigovernmental, nonpartisan, nonprofit research institute, founded in 1958. The Institute merged with the Japan External Trade Organization (JETRO) on July 1, 1998. The Institute conducts basic and comprehensive studies on economic and related affairs in all developing countries and regions, including Asia, the Middle East, Africa, Latin America, Oceania, and Eastern Europe.

INSTITUTE OF DEVELOPING ECONOMIES (IDE), JETRO
3-2-2, WAKABA, MIHAMA-KU, CHIBA-SHI
CHIBA 261-8545, JAPAN

Sources of Fluctuations in Parallel Exchange Rates and Policy Reform in Myanmar[1]

1. Introduction

Until April 2012, Myanmar maintained a multiple exchange rate regime. Since 1977, the official exchange rate was pegged to the special drawing right (SDR) of the International Monetary Fund (IMF) and had been fixed at 8.50847 kyat per SDR for more than three decades. Because the official exchange rate was applied only for public sector transactions, the parallel market developed in the private sector. Thus, the foreign exchange market was segmented between the public and private sectors (Hori and Wong, 2008; IMF, 2012). The parallel market exchange rate steadily depreciated from around 30 kyat per US dollar in 1987 to around 1,300 kyat per US dollar in 2006. At its peak, the gap between the official and parallel exchange rates exceeded 200 times.

This parallel market exchange rate fluctuated notably in real terms. For the four ASEAN latecomers (Cambodia, Lao PRD, Myanmar, and Vietnam) and Singapore and Thailand, trends in the real exchange rates of the local currencies vis-à-vis the US dollar are summarized in Figure 1. Here, the real exchange rates are defined in local currency terms. A rise in the real exchange rate signifies that the home currency depreciates against the US dollar. The figure shows that fluctuations in Myanmar's real exchange rate are volatile compared to those in the other countries. One reason for the pronounced real exchange rate fluctuations could be the absence of central bank intervention in the parallel foreign exchange market.

Figure 1

Furthermore, the appreciation of the real exchange rate since 2007 has been

[1] An earlier version of this paper was presented at the East Asian Economic Association Conference 2012 in Singapore, and at seminars at the Institute of Developing Economies and Kobe University. The author acknowledges comments and suggestions from Vatthanamixay Chansomphou, Kiyotaka Sato, Shigeyuki Hamori, Takuji Kinkyo, and participants of the conference and seminars. All remaining errors and omissions are the responsibility of the author.

pronounced in Myanmar.[2] While all currencies in this figure demonstrate appreciationary trends against the US dollar, the extent of appreciation is the sharpest in the Myanmar kyat. This indicates that the Myanmar kyat appreciated against other ASEAN currencies as well.

The new government, inaugurated in March 2011, abolished the fixed exchange rate and announced the move to a managed float regime. This reform aims to unify the segmented foreign exchange market, which in turn will allow the central bank to intervene in the market. Consequently, questions arise as to whether exchange rate policies will be effective in stabilizing the real exchange rate and to what extent complementary sterilization of the money supply will be necessary to sustain the effect of foreign exchange market intervention.

For Myanmar, exchange rate policies consist of foreign exchange market interventions and complementary sterilization. The central bank can produce nominal exchange rate depreciation by interventions to purchase foreign exchange from the market. However, such foreign exchange market interventions have a side effect of monetary expansion which drives inflation. As inflation cancels out nominal exchange rate depreciation, it negates the effects of foreign exchange market interventions on the real exchange rate. Sterilization is to absorb the excess local currency released in interventions by open market operations. The faster prices adjust to changes in money supply, the more crucial the complementary sterilization is for effective exchange rate policies.

To examine the effectiveness of policies for stabilizing the real exchange rate, the present paper analyzes the sources of fluctuations in exchange rates in Myanmar. Existing literature on fluctuations in exchange rates includes two branches. One explains the fluctuations by related economic variables. As for Myanmar, Kubo (2007) confirmed the cointegration relationship among the nominal exchange rate of the Myanmar kyat vis-à-vis the US dollar, the consumer price index (CPI), and the money supply for the sample period (January 1996 through August 2006). While this result implies that the real exchange rate was stable in the medium run, the sample did not cover the period of the recent appreciation.

[2] Dapice et al. (2011) and Myint (2011) provide descriptive accounts of this currency appreciation problem.

The other branch of the related exchange rate literature is the application of Blanchard and Quah's (1989) structural vector autoregression (SVAR) method. This approach decomposes fluctuations in exchange rates into various components and measures the weight of each component. It includes related work by Lastrapes (1992), Enders and Lee (1997), and Dibooglu and Kutan (2001). They decomposed the fluctuations in exchange rates into nominal and real shocks and examined the relative contribution of these shocks to the variation in exchange rates. When the contribution of nominal shocks to the variations in real exchange rates is high and persistent, it is considered that foreign exchange market interventions may sustain the effect without sterilization. The present study is the first to apply this methodology to the analysis of the Myanmar kyat.

On the basis of decomposition of the fluctuations in the real effective exchange rate into nominal and real shocks, this paper examines the ability of the monetary authorities to manage the real exchange rate, particularly the necessity of sterilization as part of foreign exchange market interventions, under the new floating exchange rate regime. The rest of the paper is structured as follows. Section 2 provides an overview of Myanmar's foreign exchange market structure before the reforms. Section 3 presents the methodology and results of the empirical analysis. In addition, this section discusses the interpretation of nominal and real shocks on exchange rates in the context of Myanmar. Section 4 illustrates the foreign exchange policy reforms and the remaining challenges for the central bank to manage exchange rates. Section 5 offers concluding remarks.

2. Foreign Exchange Market Before the Reforms

2.1 Market Structure

Until April 2012, Myanmar maintained a multiple exchange rate regime.[3] The official exchange rate was applied only in the public sector. Public entities with foreign exchange revenues, including ministerial departments and state economic enterprises (SEEs), were compelled to surrender all their foreign exchange revenues to the state

[3] Turnell (2011) and IMF (2012) describe the macroeconomic conditions prior to the reform.

budget. Any foreign exchange expenditure of public entities was to be approved by the central government and allocated from the state budget. These public entities were not permitted to substitute their foreign exchange budget with a local currency budget; therefore, the kyat was not convertible to foreign currencies even in the public sector.

In contrast, since 1990, the private sector has had neither allocation of foreign exchange from the government at the official exchange rate nor a surrender requirement on their foreign exchange revenues to the government. Exporters were required to deposit export earnings in foreign currency deposit (FCDs) accounts in state banks. Nevertheless, domestic account transfers of FCDs were tolerated so that exporters and importers could trade FCDs through domestic account transfers between their accounts and competitively negotiate the price of FCDs. The negotiated price of FCDs formed one of the parallel exchange rates.

The central bank had a marginal role in this segmented foreign exchange market. In the public sector, it was the central government that administered and allocated foreign exchange at the official exchange rate. In the private sector, sellers and buyers priced and transacted FCDs outside the banking sector. Therefore, there was no central bank intervention in the foreign exchange market.

2.2 Trends in Parallel Exchange Rates

The nominal and real effective exchange rates of the Myanmar kyat are calculated with the prevalent parallel exchange rate and depicted in Figure 2. The availability of monthly data on the prevalent parallel exchange rate is limited for the period since January 1997. For calculation of effective exchange rates, the currency basket of 25 countries and regions[4] is employed. These 25 trade partners as a whole account for at least 92% of Myanmar's foreign trade each year. Each currency is weighted by the trade share. The trade weights are calculated for every calendar year, and the values of effective exchange rates are chain-linked. For both the nominal and real effective exchange rates, the value as of January 1997 is normalized to unity, and they are defined

[4] They include six ASEAN member countries (Indonesia, Malaysia, the Philippines, Singapore, Thailand, and Vietnam), eight other Asian countries and regions (Bangladesh, China, Hong Kong, India, Japan, Republic of Korea, Pakistan, and Taiwan), six eurozone countries (Belgium, France, Germany, Italy, the Netherlands, and Spain), and five other countries (Australia, Canada, Russian Federation, the United Kingdom, and the United States).

in foreign currency terms. A rise in effective exchange rates indicates the appreciation of the Myanmar kyat against foreign currencies. The CPIs are used for the calculation of the real effective exchange rate. Trade data is compiled from the *Direction of Trade Statistics* of the IMF, while exchange rates and CPI are collected from the *International Financial Statistics* of the IMF.[5]

Figure 2

Figure 2 shows that until around mid-2006, the nominal effective exchange rate steadily depreciated, whereas the real effective exchange rate was more or less mean reverting. These trends changed in 2006, and since then, there has been nominal and real effective exchange rate appreciation.

To examine a structural break in the kyat exchange rate, the trends of the Myanmar CPI and the nominal exchange rate of the kyat vis-à-vis the US dollar are summarized in Table 1. In addition, the table includes trends in the money supply and representative rice price. An average of year-on-year change is calculated for each time series. Rice is one of the most important crops in Myanmar in terms of cultivation areas and the most important staple food, whose weight in the CPI has been above 10%. The instability in rice price comes from fluctuations in harvest, which is reflected in the CPI. Thus, the stable relationship, if any, among money supply, CPI, and nominal exchange rate is possibly disturbed in the short run by the fluctuations in the rice price.

Table 1

The medium-term relationships among money supply, CPI, and nominal exchange rate are observable in this table. For the period from January 1998 through December 2006, the average growth rate of base money is 31.3% per annum, which was accompanied by rises in the rice price by 31.1% and in CPI by 24.7%. Furthermore, the average growth rate of the CPI and the average depreciation of the nominal exchange rate were very closely correlated. However, the above relationships changed by the

[5] For Taiwan, data are collected from the National Statistics of Taiwan website (http://stat.go.tw).

end of 2006. For the period from January 2007 through April 2012, the average growth rate of base money was still high at 20.2%. As before, the excess money supply led to rises in the rice price and the CPI. Nonetheless, the nominal exchange rate appreciated at the rate of 8.1% per annum, resulting in appreciation of the real exchange rate. The change in the relationships among variables implies a structural break in 2006.

2.3 Background of Exchange Rate Fluctuations

Numerous notable features of the Myanmar economy may account for the fluctuations in the parallel market exchange rates. These include the monetization of the fiscal deficit and the shallowness of the parallel foreign exchange market.

First is the monetization of the fiscal deficit. The government of Myanmar was in a chronic fiscal deficit amounting to approximately 3%–6% of Gross Domestic Product (GDP) annually, which was largely financed by printing money. The excess money supply brought about inflation, which in turn led to the depreciation of the kyat in nominal terms. Thus, the excess money supply partially accounts for the unstable nominal exchange rate.

Second is the small size of the foreign exchange market relative to the recent rapid growth in exports. To begin with, trade volume offers a rough estimate of the size of the foreign exchange market. Table 2 summarizes the trend in exports and imports. For example, Myanmar's average exports for the period of 2007–2011 were USD 6.6 billion per annum, whereas those of Thailand and Vietnam for 2011 were USD 226.4 billion and USD 87.9 billion, respectively. In terms of per capita exports in 2011, the value for Myanmar was USD 133, and it was USD 424 for Cambodia, USD 464 for Lao PDR, USD 1,001 for Vietnam, and USD 3,349 for Thailand. These figures imply the small size of Myanmar's foreign exchange market.

Table 2

As the parallel market is only a part of the segmented foreign exchange market, the private sector exports, rather than those of the entire economy, are a more relevant yardstick to estimate the size of the parallel market. Myanmar trade statistics report the values of trade by sectors (Table 2). As smuggling was supposedly pervasive under the

restrictive trade policies, the official statistics may not accurately capture trade in the private sector. The discrepancies between the Myanmar trade statistics and the IMF's *Direction of Trade Statistics* implies such smuggling. Nonetheless, including smuggling would at most double the size of private sector exports. It might not be inappropriate to still judge the parallel foreign exchange market as small.

Given the small size of the market, a minor change in supply and demand of foreign exchange can easily translate into fluctuations in the exchange rate. On the supply side of the foreign exchange market, resource exports have rapidly grown in recent years. Figure 3 shows the trend of Myanmar's exports by commodities. Major export items include natural gas, agricultural products, and precious minerals. Natural gas alone accounted for 38% of total exports in 2011. However, as the public sector monopolizes natural gas exports, its effect on the parallel market exchange rate is uncertain. At the same time, precious mineral exports are experiencing remarkable growth. This growth is mostly driven by exports of gem and jade by the private sector. The exports of gem and jade jumped from USD 0.38 billion in 2006 to USD 2 billion in 2010. The rise in gem and jade exports is considered one of the drivers of the appreciation of the kyat in the late 2000s.

Figure 3

On the demand side, import controls may possibly affect the exchange rate. Tightening import controls would reduce the demand for foreign exchange, which in turn leads to appreciation of the kyat. However, when the smuggling of imports is pervasive, the appreciationary effect of tighter import controls would be moderated. Furthermore, import controls are supposedly tightened when there is depreciationary pressure on the kyat, so that the relationship between import controls and the exchange rate would be blurred by the endogeneity of import controls.

In addition to trade-originated demand and supply of foreign exchange, there are those that are portfolio oriented. Because the inflation rate was mostly in double-digit highs in Myanmar, there was a sizable demand for foreign currency for value storage. Rebalancing of the asset portfolio from foreign currency to the Myanmar kyat would lead to appreciation of the kyat.

There are two noteworthy events in this regard. One is the banking crisis in February 2003, when contagious bank runs among six major local private banks provoked the outflow of nearly half of the total deposits of the entire banking sector. When the withdrawal of kyat deposits was suspended as a countermeasure to the bank runs, people attempted to sell their foreign exchange, both FCDs and illicit currency, to obtain kyat liquidity; this caused appreciation of the kyat in the parallel market (Turnell, 2003).

The other is the fire sale of state assets in February 2011, just before the change of the government from the military junta. As the settlements of asset purchases had to be done in the kyat, the kyat appreciated vis-à-vis the US dollar in the parallel market when the deadline for asset purchase installments approached in August 2011.

3. Empirical Analysis

3.1 Methodology

Following existing studies on the sources of exchange rate fluctuations (Lastrapes, 1992; Enders and Lee, 1997), this paper employs Blanchard and Quah's (1989) SVAR method to investigate fluctuations in the real effective exchange rate.[6] Drawing on Enders (1995: 331–342), the estimation strategy is illustrated as follows.

The analysis employs two time series—the nominal effective exchange rate (NEER) and the real effective exchange rate (REER)—both in the first difference. For the validity of the analysis with SVAR, the data have to be stationary. Once the first differenced variables are confirmed to be stationary, the first-differenced series of the NEER and REER can be represented in the vector moving average series of two innovations (shocks) as below:

$$\begin{bmatrix}\Delta nex_t\\ \Delta rex_t\end{bmatrix} = \begin{bmatrix}c_{11}(L) & c_{12}(L)\\ c_{21}(L) & c_{22}(L)\end{bmatrix}\begin{bmatrix}\epsilon_{n,t}\\ \epsilon_{r,t}\end{bmatrix}, \qquad (1)$$

where $x_t \equiv [\Delta nex_t, \Delta rex_t]'$ is a vector of the NEER and REER in their first difference,

[6] This paper uses a bivariate model of the nominal and real exchange rates. There are studies of a trivariate model of a production indicator in addition to the nominal and real exchange rates, including Clarida and Gali (1994) and Inoue and Hamori (2009).

and $\epsilon_t \equiv [\epsilon_{n,t}, \epsilon_{r,t}]'$is a vector of the two types of innovations (shocks). $C(L) \equiv \begin{bmatrix} c_{11}(L) & c_{12}(L) \\ c_{21}(L) & c_{22}(L) \end{bmatrix}$ is a 2 × 2 matrix of the polynomials of the lag operator. It is assumed that both innovations have the variance of 1 and are not correlated with each other. From these assumptions, the variance–covariance matrix of two innovations, Σ_ϵ, can be expressed as the 2 × 2 identity matrix, $\sum_\epsilon = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$.

Innovations in the form of Equation (1) are not observable from the data, and they have to be computed through the estimation of a reduced form vector autoregression (VAR) process as below;

$$x_t = A(L)x_{t-1} + e_t, \tag{2}$$

where $A(L)$ is a 2 × 2 matrix of the polynomial of lag operators. $e_t \equiv [e_{1,t}, e_{2,t}]'$ is the two residual series, and they are not necessarily uncorrelated with each other by definition.

For Equations (1) and (2) to be identical, the forecast errors $x_t - E_{t-1}(x_t)$ should be identical for the two equations, where E is the expectation operator. This yields the following equation:

$$\begin{bmatrix} e_{n,t} \\ e_{r,t} \end{bmatrix} = \begin{bmatrix} c_{11}(0) & c_{12}(0) \\ c_{21}(0) & c_{22}(0) \end{bmatrix} \begin{bmatrix} \epsilon_{n,t} \\ \epsilon_{r,t} \end{bmatrix}. \tag{3}$$

In the matrix $C(0) \equiv \begin{bmatrix} c_{11}(0) & c_{12}(0) \\ c_{21}(0) & c_{22}(0) \end{bmatrix}$, there are four unknown variables. Denote the estimated variance–covariance matrix of e_t as Σ_e. It holds that $\Sigma_e = C(0)\Sigma_\epsilon C(0)' = C(0)C(0)'$. This equality yields three equations against four unknown parameters of C(0).[7]

To identify all four unknown parameters, and thus compute two independently distributed innovations, an additional restriction is required. The long-run restriction provides such an identification restriction. First, Equation (2) can be expressed in the vector moving average (VMA) process as follows:

[7] These are two equations on variances and one equation on covariance.

$$x_t = [I - A(L)L]^{-1} e_t. \quad (4)$$

Furthermore, with the notation $B(L) \equiv [I - A(L)L]^{-1}$, substituting Equation (3) into Equation (4) yields the following VMA representation:

$$x_t = B(L)[C(0)\epsilon_t]. \quad (5)$$

The assumption of long-run neutrality of $\epsilon_{n,t}$ on Δrex_t is equivalent to that the accumulated responses of Δrex_t to $\epsilon_{n,t}$ are zero. This assumption provides the following identification restriction:

$$c_{11}(0) \sum_{k=0}^{\infty} b_{21}(k) + c_{21}(0) \sum_{k=0}^{\infty} b_{22}(k) = 0, \quad (6)$$

where $b_{ij}(k)$ is a factor of a matrix of lag polynomial, B(L). By adding this identification restriction, there are four equations against four unknown parameters of C(0). Thus, it is possible to identify C(0). This allows us to compute two time series of innovations and the VMA of Equation (1).

The restriction of Equation (6) means that $\epsilon_{n,t}$ does not affect the REER in the long run. On the basis of this property, $\epsilon_{n,t}$ is denoted as a "nominal" shock, whereas the unrestricted innovation $\epsilon_{r,t}$ is denoted as a "real" shock.

With the VMA of Equation (1), impulse response functions and forecast error variance decomposition are computed to evaluate the size and persistence of the effects of each shock. Regarding the impulse response of the REER to a nominal shock, accumulated responses are zero in the long run by definition. On the other hand, for the forecast error variance decomposition, the weight of nominal shocks in the forecast error variance of the REER does not necessarily converge to zero even in the long run, and while the sum of $b_{21}(k)$ and $b_{22}(k)$ in terms of Equation (6) is zero by definition, the numerator of the forecast error variance decomposition is the sum of the squares of $b_{21}(k)$ and $b_{22}(k)$. The matter in question for both the impulse response function and the variance decomposition is the dynamics of the response of the REER to the shocks, particularly the speed of the decay of shocks.

3.2 Nominal and Real Shocks

This paper identifies and classifies shocks on the parallel exchange rate into either

'nominal' or 'real' shocks. 'Nominal' shocks include changes in money supply and foreign exchange market interventions. Liquidity shocks, including the February 2003 bank run and the fire sales of state assets in 2011, are also considered as nominal shocks. As nominal shocks can be created by monetary and exchange rate policies, a persistent impact, if any, of a nominal shock on the REER implies more room for exchange rate policies.

'Real' shocks include changes in endowments, terms of trade shocks and productivity growth, and changes in government expenditures. As for a change in endowment, an export boom brings in extra income and expands consumption of both non-tradable and tradable goods. While the increased demand in tradable goods is met with imports,[8] the increased demand in non-tradable goods raises the relative price of non-tradable goods because their supply cannot be adjusted immediately. The real exchange rate appreciation resulting from a resource boom often erodes the competitiveness of exports, which is called the Dutch disease (Corden, 1984). In the context of Myanmar, the rise of gem exports in the late 2000s, which had already shrunk in 2010, is considered to be an appreciationary real shock.

Regarding productivity growth, the existing studies often focused on the Balassa–Samuelson effect.[9] This refers to the phenomenon in which the home currency appreciates when the tradable goods sector in the home country experiences faster productivity growth than the non-tradable sector. Such productivity growth induces a rise in the labor wage and relative price of non-tradable goods to tradable goods, which would in turn cause real exchange rate appreciation. As for Myanmar, since primary goods are predominant in its tradable sector, it is unlikely that its tradable sector experienced rapid productivity change in the 2000s.

Regarding government expenditure, since the government tends to spend more on non-tradable goods than the private sector, an expansion of government expenditure would result in real exchange rate appreciation. Similar to the productivity change, an expansion of government expenditure raises the relative price of non-tradable goods to tradable goods. Furthermore, when expansionary government expenditure is financed by printing money, it comprises both real and nominal shocks.

---

[8] While import restrictions hamper such an adjustment, smuggling imports facilitate it.
[9] An example is Ok et al. (2010).

A limitation of the present paper is that the sources of fluctuations are only classified into either 'nominal' or 'real' shocks. As far as the empirical methodology is concerned, the number of identifiable shocks is constrained to the number of time series employed in the analysis. As the present paper employs NEER and REER, the number of identifiable shocks is two.

It is true that 'real' shocks in the context of Myanmar would include various types of shocks such as changes in factor endowments and government expenditures. However, the methodology of this paper implicitly assumes that either these varieties of 'real' shocks exert influence in the same way or that there is one type of 'real' shock that dominates the fluctuations in exchange rates (Enders, 1995:341–342).

Before proceeding to the results of the empirical analysis, the results of the forecast error variance decomposition of the real exchange rate in existing studies are summarized in Table 3. The table shows the 1- and 12- month(s) ahead forecast error variance decomposition. As shown in the table, nominal shocks account for a relatively large fluctuation in the real exchange rate in Taiwan and the Philippines (Chen and Wu, 1997), Poland (Dibooglu and Kutan, 2001), and the Republic of Korea (Ha et al., 2007). In these cases, it can be judged that sterilization is to some extent less crucial for exchange rate policies.

Table 3

3.3 Empirical Results and Interpretation

This study employs two variables, NEER and REER. The sample period spans from January 1997 through March 2012. First, stationarity of the two time series is examined with the Augmented Dickey–Fuller (1979) test. The test results indicate that both NEER and REER are non-stationary in their levels but stationary in their first difference at a 1% significance level. Thus, both NEER and REER are judged to be I(1) variables.[10]

On the basis of these results, it would be appropriate to estimate a reduced form VAR of the two exchange rates in their first difference. As shown in Table 1 in Section 2, there is potentially a structural break in the movement of exchange rates. To capture the

[10] Furthermore, it is confirmed that these two variables are not cointegrated at the conventional significance level.

structural break, an intercept dummy is included for the period after May 2006.[11] As to the lag length of VAR, the Schwarz information criterion indicates that it can be pared down to one lag from a maximum of 12 lags. Regarding the specification of the model, the null hypotheses of no serial correlation up to the lag order of 12 cannot be rejected at least at the 4% significance level by the Lagrange multiplier tests.

From the estimated VAR, two types of shocks and the VMA of Equation (2) are derived. Once the VMA is identified, the impulse response functions and the forecast error variance decomposition are computed. As for the impulse response function, Figure 4 depicts the accumulated responses of the NEER and the REER to one standard deviation for nominal and real shocks. By definition, the accumulated responses of the REER to a nominal shock are zero in the long run.

Figure 4

This figure leads us to a number of conjectures. First, the accumulated responses of the REER to a nominal shock converge to the vicinity of zero within three months from the shock. This implies that both the NEER and the CPI react to a nominal shock in opposite directions to each other more or less simultaneously. As a result, a depreciationary nominal shock produces real depreciation only for a short period.

Second, comparing the impulse responses of the NEER and REER to one standard deviation real shock, while the REER appreciates 5%, the NEER appreciates only 2%. Given that the gap between the responses of the REER and the NEER is covered by a change in the CPI,[12] the appreciationary real shock pushes up the Myanmar CPI by 3%. This is in contrast to the case of Lao PDR in Ok et al. (2010), where real shocks are mostly absorbed in changes in the nominal exchange rate and accompany negligible effects on the domestic price level. The result that a positive real shock produces both nominal appreciation and a rise in the CPI can be interpreted as the Dutch disease phenomenon.

Regarding the forecast error variance decomposition, Table 4 summarizes the results

[11] A similar procedure is adopted by Enders and Lee (1997) and Dibooglu and Kutan (2001).

[12] The real exchange rate in logarithm, q, can be defined as $q = p + e - p^*$, where e is the nominal exchange rate defined in terms of foreign currency per kyat, and p and p^* stand for the CPI of Myanmar and a foreign country, respectively.

of the computation. It indicates that nominal shocks play important roles in explaining the variation in the NEER, but not that in the REER.

Table 4

Finally, a historical decomposition of the time path of the REER into accumulated responses to nominal and real shocks is presented in Figure 5. The VMA of Equation (1) allows us to depict the path of the REER in terms of its accumulated responses to nominal and real shocks. The period for this computation is from January 1998 through March 2012 because of the technical requirement to alleviate discrepancies between the actual and simulated data. By construction of the model, it is implicitly assumed that $\epsilon_{n,t} = \epsilon_{r,t} = 0$ for the period prior to March 1997.[13] This assumption produces relatively large discrepancies between the simulated series and the actual data when the simulation period is set from March 1997. As the impulse responses of the REER to both nominal and real shocks nearly converge to zero in a 12-month period, the discrepancies are alleviated by setting the start of the simulation period to January 1998.

Figure 5

In this figure, the 'Actual' exchange rate refers to the series of the REER from which the value as of December 1997 is subtracted. 'Nominal shocks' refer to the cumulative effects of nominal shocks in the absence of real shocks.[14] 'Real shocks' refer to the sum of the cumulative effects of real shocks and the deterministic trend.[15] This figure indicates that nominal shocks exerted negligible influences on the time path of the REER. This is also consistent with the results of the forecast error variance decomposition.

To sum up the analysis so far, the empirical results indicate that nominal shocks

[13] This is because of the lag order of VAR(1) with the first-differenced variables.

[14] The cumulative nominal shocks are computed as $\sum_{m=1}^{t}\sum_{k=0}^{48}[c_{11}(0)b_{21}(k)\epsilon_{n,m-k} + c_{21}(0)b_{22}(k)\,\epsilon_{n,m-k}]$, whereas the cumulative real shocks are computed as $\sum_{m=1}^{t}\sum_{k=0}^{48}[c_{12}(0)b_{21}(k)\epsilon_{r,m-k} + c_{21}(0)b_{22}(k)\,\epsilon_{r,m-k}]$. December 1999 is set as t = 0. While the lag length of VMA theoretically is infinity, the 49th lag and onward are approximated to zero.

[15] This procedure is also applied in Enders and Lee (1997) and Dibooglu and Kutan (2001).

played minor roles in fluctuations in the REER. The impulse response functions and forecast error variance decomposition indicate that the effects of nominal shocks on the REER are small and diminish quickly, implying that the effects of foreign exchange market intervention on the REER are short-lived. For effective exchange rate policies, foreign exchange market interventions have to be complemented by sterilization. Furthermore, real shocks have dominated the time path of the REER. The recent appreciation of the REER can be regarded as a shift in the equilibrium exchange rate; canceling out the shift in the equilibrium exchange rate may call for structural policies such as import liberalization.

4. Foreign Exchange Policy Reform by the New Government

4.1 Outline of Foreign Exchange Policy Reform

The new government implemented reforms in rapid succession. In October 2011, the central bank authorized six private banks to run foreign exchange counters in Thein Phyu Road, Yangon, where retail customers could sell and buy foreign exchange with these banks at competitive exchange rates. However, since transactions at the foreign exchange counters involved cash in US dollars and kyats, the transaction amounts were inevitably constrained by the availability of cash at the counters. This was the initial step for the government to recognize the parallel exchange rates.

In April 2012, the central bank abolished the peg of the kyat to the SDR and moved to a managed float exchange rate regime; it began announcing the daily reference exchange rate to the public on the one hand, and the auction of foreign exchange with authorized dealer banks on the other. Prior to this, the foreign exchange dealer license was issued to 11 private banks in November 2011. The reference exchange rate is used to explicitly guide the selling and buying rates of the authorized dealer banks. At the authorized foreign exchange counters, the selling and buying rates have to be within ± 0.8% from the reference rate. Furthermore, authorized dealer banks are permitted to trade foreign currency with account holders at rates within ± 0.3% from the reference rate. The auction provides a channel for the central bank to trade foreign currency with authorized dealer banks.

Another important development was in August 2012 when the authorized dealer banks started to accept FCDs and conduct foreign exchange operations such as remittances and settlements of foreign trade. Previously, foreign exchange operations were monopolized by state banks. This policy change is expected to facilitate trade in the private sector.

As to regulations on trade, there have been significant reforms as well. The restrictions on imports of cars, which were strictly implemented, have been alleviated stepwise. The government controlled imports with a license for every shipment of goods. As a deregulation measure, import licenses for passenger vehicles were increased from September 2011 onward. Furthermore, the 'export-first policy' was abolished in April 2012; under this regulation, the issuance of import licenses had been conditional on the license applicants having sufficient FCDs to cover the import bills. Since the policy change in April 2012, import licenses have become obtainable with any foreign exchange of any source once deposited at the authorized dealer banks. More convenient foreign trade settlement services by the newly authorized private banks will also give impetus to imports and alleviate the appreciation of the kyat.

4.2 Remaining Challenges

While the foreign exchange market reforms are paving the way for the central bank to manage the REER, there are two remaining challenges. One is the segmentation of the foreign exchange market, and the other is limited market instruments to facilitate sterilization.

First, regardless of the abolition of the official exchange rate, the foreign exchange market is segmented into two dimensions: between the private and public sectors and within the private sector. As for the public sector, the allocation of the foreign currency budget is still separated from the local currency budget, and both budgets are centrally controlled. Thus, exporting SEEs do not sell their foreign currency revenues to the market, while importing SEEs do not raise foreign currency from the market. These SEEs are not integrated into the foreign exchange market.

Regarding the private sector, there are several parallel exchange rates. Figure 6 depicts the central bank reference rate and parallel market rates. Parallel market exchange rates include the prices of FCDs and greenbacks. FCDs are still traded freely

outside the banking system, using domestic account transfer. The central bank reference rate was higher than the FCDs exchange rate by approximately 2% in September 2012. This gap was wider than the margin prescribed by the regulation. Should the market be integrated, the suppliers of FCDs would cease selling them in the parallel market and switch to the authorized dealer banks to get a higher price. Such an arbitrage transaction would allow various prices to converge. The gaps in the parallel market rates imply that the parallel market is still segmented.

Figure 6

The gap indicates two possibilities: one is that the central bank purchase of foreign currency through the auction was too small; therefore, the marginal selling price of foreign currency in the market deviated from the central bank selling price. The other is that there were unwritten transaction costs for selling FCDs to the banks. If the latter is the case, the gap in exchange rates would persist.

Furthermore, narrower gaps between the central bank reference rate and parallel market rates do not necessarily mean that the market segmentation is resolved; it can be the case that the central bank reference rate just follows the parallel market rates rather than leading them.

Second, market instruments for sterilization are limited for the central bank. The financial sector is underdeveloped in terms of structure. There is no market for treasury bonds. The central bank introduced a deposit auction in September 2012 as a means to absorb kyat liquidity from the banks, though its total size of auction is as small as K 100 billion (equivalent to USD 120 million), or less than 1% of the broad money (M2).

The financial sector is underdeveloped in terms of size as well. Figure 7 summarizes the decomposition of money in selected ASEAN countries.[16] The M2/GDP ratio indicates the size of the financial market. Myanmar's M2/GDP ratio is the lowest. In addition, the currency in circulation is the predominant component of M2 in Myanmar,

[16] Two points should be noted for the interpretation of Figure 7. First, as for Myanmar, because of the use of the official exchange rate, foreign currency deposits are undervalued in terms of kyat. The use of the market exchange rate would have increased the amount of deposits and the proportion of deposits to M2. Second, as for Cambodia and Lao PRD, the dollarization is developed in these countries. The low ratio of currency in circulation to M2 in these countries implies that foreign currency cash is circulating.

and its proportion of currency in circulation to M2 is the highest among these countries. As the size of the assets of the banking sector is small in absolute terms and in terms of its proportion to M2, it is difficult for the central bank to sterilize the excess money supply from foreign exchange market interventions.

Figure 7

In addition, the stability of the exchange rate in a small financial market is vulnerable to relatively large inflows of foreign exchange. Table 5 compares the size of the balance of payments surplus to that of M2. The balance of payments surplus in 2010 was 1.9% of GDP, while M2 was 27.3%. Should the surplus be converted into the kyat, the money supply would increase by 7%. This implies that fluctuations in the balance of payments could either translate into changes in money supply when the central bank tries to maintain nominal exchange rate stability or produce fluctuations in the nominal exchange rate. Both will create fluctuations in the real exchange rate.

Table 5

5. Conclusion

This paper analyzed the sources of fluctuations in the parallel exchange rate with the SVAR model. First, the sources of fluctuations in the REER are decomposed into nominal and real shocks. Then, the relative weight and persistence of each shock are examined by the impulse response function and forecast error variance decomposition. Both the impulse response function and the variance decomposition indicate that nominal shocks exert negligible effects on the REER in terms of size and duration. This implies that sterilization is crucial to sustain the effects of foreign exchange market intervention.

Second, the historical decomposition indicates that real shocks dominated the time path of the REER. This implies that the recent appreciation of the REER is because of a shift in the equilibrium exchange rate. Structural policies such as import liberalization

are necessary to negate the effects of real shocks and maintain competitiveness of non-resource export industries.

Finally, it is further recognized that the capacity of the central bank to manage the exchange rate is constrained by the underdevelopment of the financial market. Although foreign exchange policy reforms under the new government are paving the way for the exchange rate policy, there are few market instruments for the central bank to sterilize the changes in money supply from foreign exchange market interventions. The development of foreign exchange market and financial markets is interrelated, and both remain a challenge in Myanmar.

References

Blanchard, O. J., and D. Quah (1989) The Dynamic Effects of Aggregate Demand and Supply Disturbances. *American Economic Review*, **79**(4), pp.655-673.

Chen, S. L., and J. L. Wu (1997) Sources of Real Exchange-Rate Fluctuations: Empirical Evidence from Four Pacific Basin Countries. *Southern Economic Journal*, **63**(3), pp.776-787.

Corden, W. M. (1984) Booming Sector and Dutch Disease Economics: Survey and Consolidation. *Oxford Economic Papers*, **36**(3), pp.359-380.

Clarida, R. H., and J. Gali (1994) Sources of Real Exchange Rate Fluctuations: How Important Are Nominal Shocks? *Carnegie Rochester Conference Series on Public Policy*, **41**(1), pp.1-56.

Dapice, D. O., T. J. Vallely, B. Wilkinson, M. McPherson, and M.J. Montesano (2011) The Myanmar Exchange Rate: A Barrier to National Strength. mimeograph, Harvard Kennedy School.

Dickey, D. A., and W. A. Fuller (1979) Distribution of the Estimators for Autoregressive Time Series with Unit Root. *Journal of the American Statistical Association*, **74**(366), pp.427-431.

Dibooglu, S., and A. M. Kutan (2001) Sources of Real Exchange Rate Fluctuations in Transition Economies: The Case of Poland and Hungary. *Journal of Comparative Economics*, **29**(2), pp.257-275.

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

Enders, W., and B. S. Lee (1997) Accounting for Real and Nominal Exchange Rate Movements in the Post-Bretton Woods Period. *Journal of International Money and Finance*, **16**(2), pp. 233-254.

Engle, R. F., and C. W. J. Granger (1987) Cointegration and Error Correction: Representation, Estimation and Testing. *Econometrica*, **55**(2), pp.233-254.

Ha, I. B., B. S. Lee, and C. Cheong (2007) What Caused the Korean Currency Crisis in 1997?: Weak Fundamentals or Self-fulfilling Expectations. *Asian Economic Journal*, **21**(2), pp.195-206.

Hori, M., and Y. C. Wong (2008) Efficiency Costs of Myanmar's Multiple Exchange

Rate. IMF Working Paper, WP/08/199. International Monetary Fund: Washington DC.

Inoue, T., and S. Hamori (2009) What Explains Real and Nominal Exchange Rate Fluctuations? Evidence from SVAR Analysis for India. *Economics Bulletin*, **29**(4), pp.2797-2809.

International Monetary Fund (2012) Myanmar: Staff Report for the 2011 Article IV Consultation. IMF Country Report No. 12/104. International Monetary Fund: Washington DC.

Kubo, K. (2007) Determinants of Parallel Exchange Rate in Myanmar. *ASEAN Economic Bulletin*, **24**(3), pp.289-304.

Lastrapes, W. D. (1992) Sources of Fluctuations in Real and Nominal Exchange Rates. *Review of Economics and Statistics*, **74**(3), pp.530-539.

Myat Thein (2004) *Economic Development of Myanmar*. Institute of Southeast Asian Studies: Singapore.

Myint, U (2011) Myanmar Kyat Exchange Rate Issue. Paper presented at National Workshop on Reforms for Economic Development of Myanmar, Nay Pyi Taw, 19-21 August, 2011.

Ok, S., M. Kakinaka, and H. Miyamoto (2010) Real Shock or Nominal Shock? Exchange Rate Movements in Cambodia and Lao PDR. *Singapore Economic Review*, **55**(4), pp.685-703.

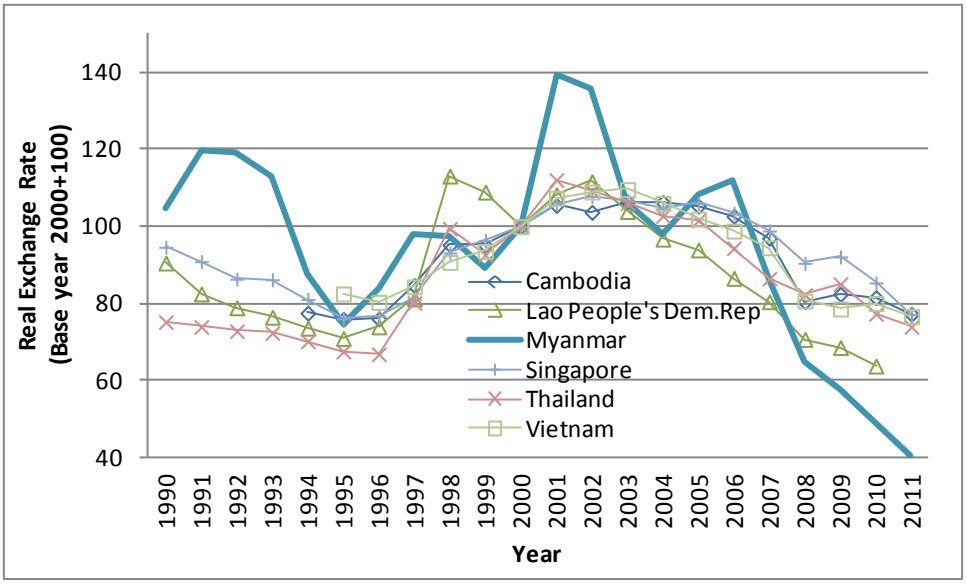
Saxena, S. C. (2002) Exchange Rate Dynamics in Indonesia: 1980-1998. *Journal of Asian Economics*, **13**(4), pp.545-563.

Turnell, S. (2011) Fundamentals of Myanmar's Macroeconomy: A Political Economy Perspective. *Asian Economic Policy Review*, **6**(1), pp.136-153.

Turnell, S. (2003) Myanmar's Banking Crisis. *ASEAN Economic Bulletin*, **20**(3), pp.272-282.

Figure 1

Real Exchange Rate of Selected ASEAN Countries; 1990–2011



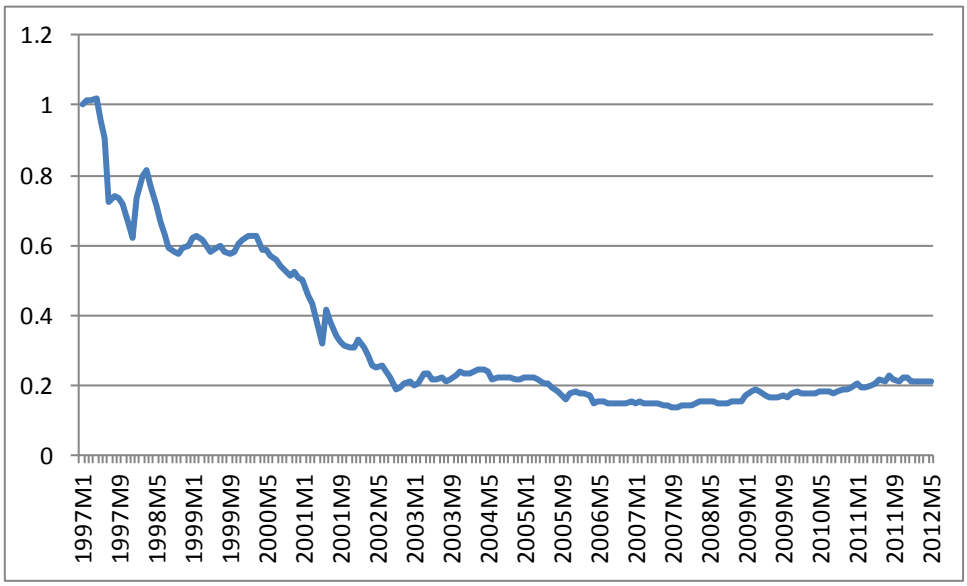
Sources: IMF, *International Financial Statistics* online, and various sources.

Notes: As for the Myanmar parallel market rate, data are compiled from Myat Thein (2004) for 1990 through 1996, and from 1997 onward, they are compiled from the survey of a foreign mission in Myanmar. The following are missing values: Cambodia for 1990 through 1993, Lao PDR for 2011, and Vietnam for 1990 through 1994.

Figure 2

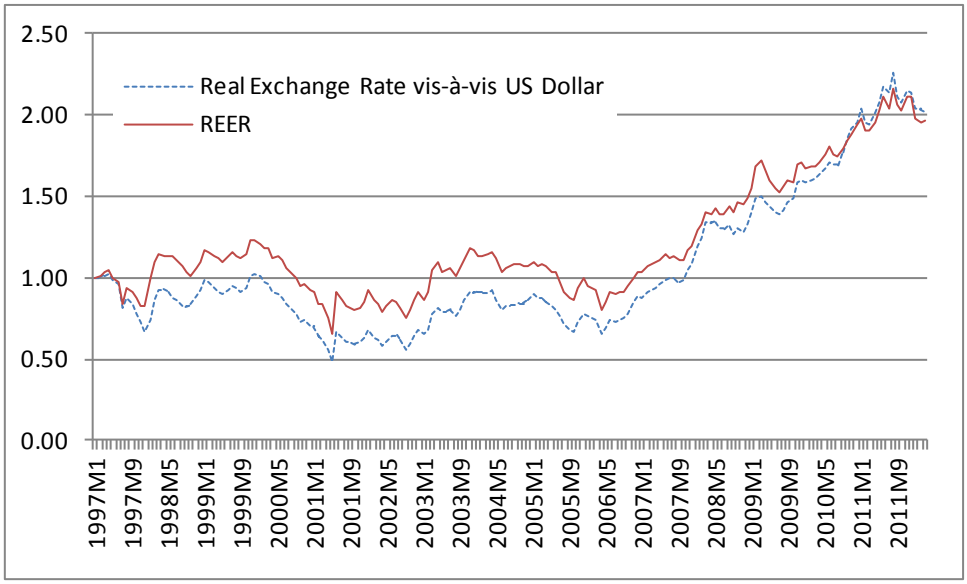
Nominal and Real Effective Exchange Rates

(A) Nominal Effective Exchange Rate: January 1997–May 2012



Sources: See the main text.

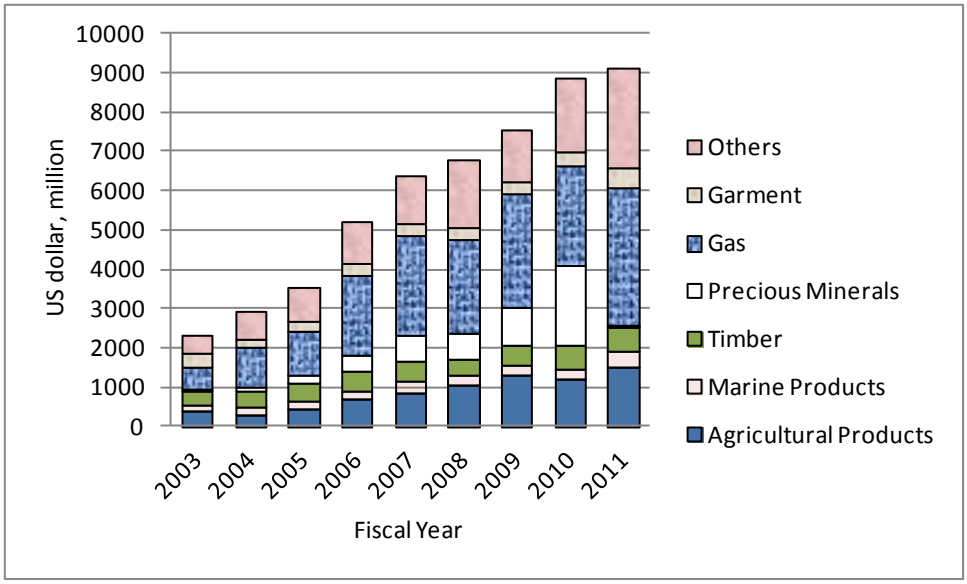
(B) Real Effective Exchange Rate and Real Exchange Rate vis-à-vis US Dollar: January 1997–March 2012



Sources: See the main text.

Figure 3

Exports by Commodities: 2003–2011

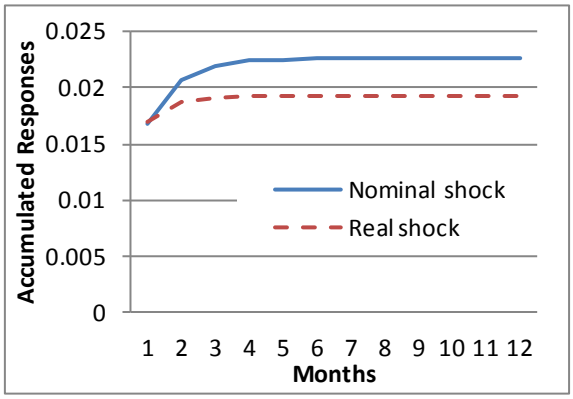


Source: Central Statistical Organization (CSO), *Selected Monthly Economic Indicators*.

Figure 4

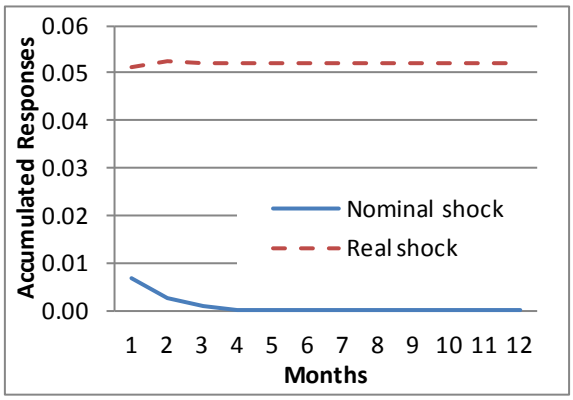
Impulse Response Functions

(A) Nominal Effective Exchange Rate



Source: Author's compilation.

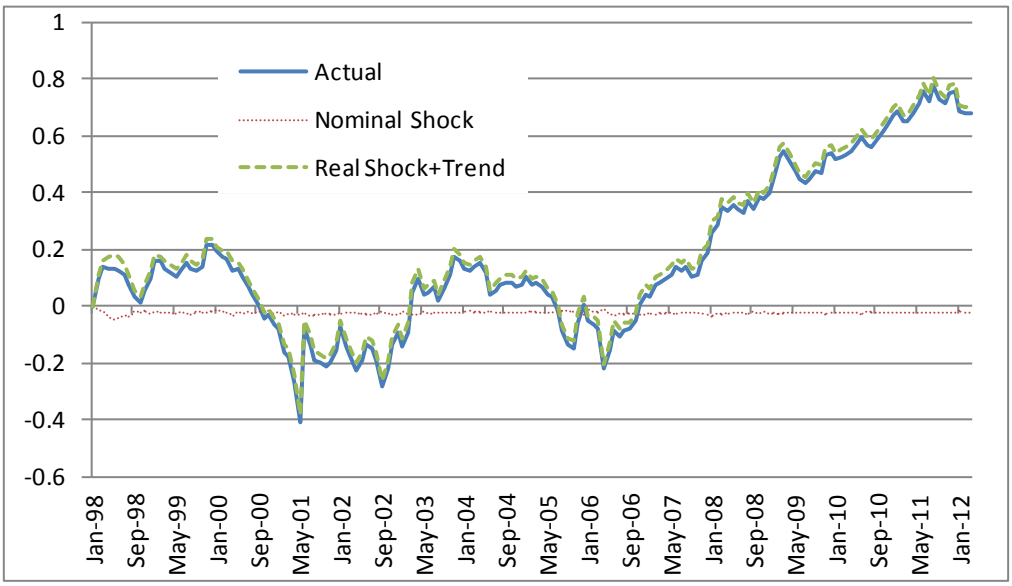
(B) Real Effective Exchange Rate



Source: Author's compilation.

Figure 5

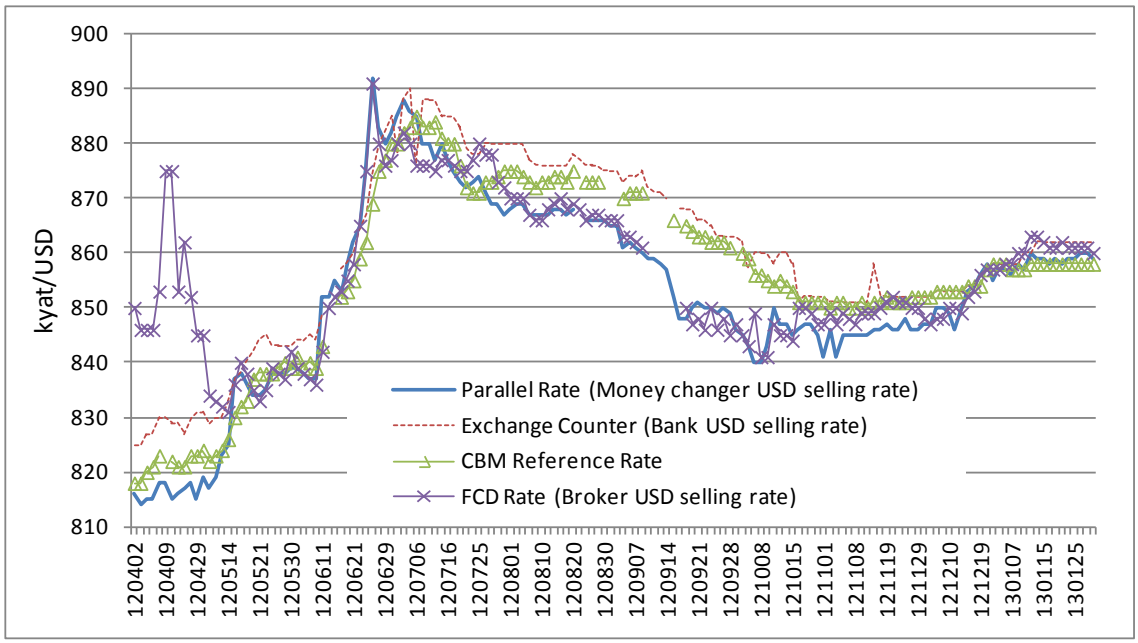
Historical Decomposition of Real Effective Exchange Rate into Cumulative Effects of Nominal and Real Shocks: January 1998–March 2012



Source: Author's compilation.

Figure 6

Trends in Daily Exchange Rates: April 2, 2012–January 30, 2013

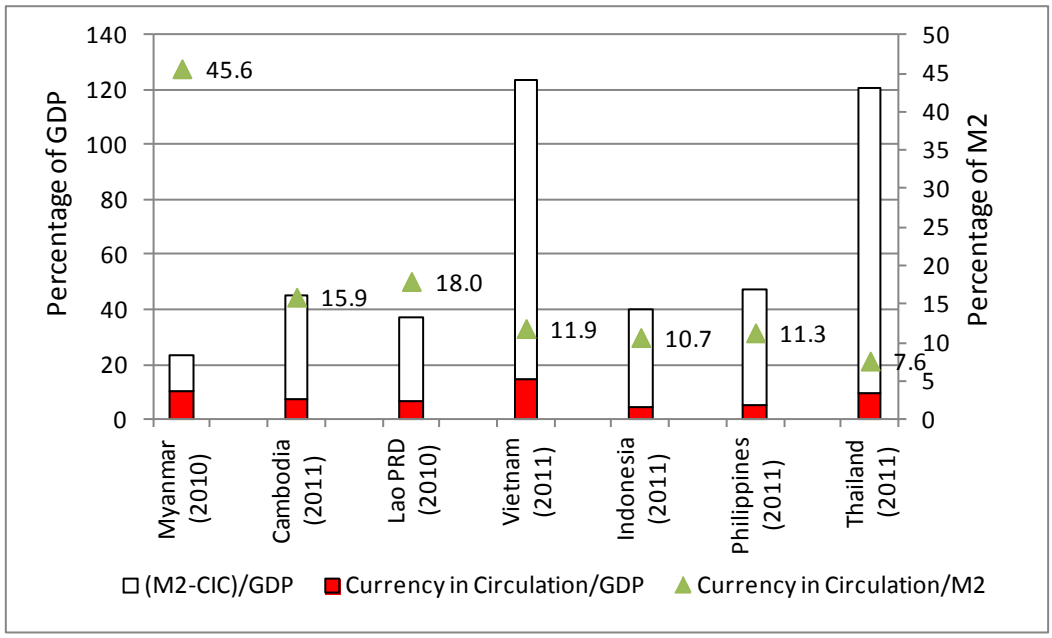


Source: Japan External Trade Organization, Yangon Office.

Note: The horizontal axis refers to dates. For example, 120402 stands for April 2, 2012. CBM Reference Rate refers to the daily reference rate announced by the Central Bank of Myanmar, and FCD Rate refers to the price of foreign currency deposits transacted in the parallel market.

Figure 7

Composition of Broad Money in Selected ASEAN Countries



Source: Asian Development Bank (ADB), *Key Indicators*.

Table 1

Changes in Exchange Rate, Prices, and Money Supply: January 1998–April 2012

	Jan 1998-Dec 2006	Jan 2007-Apr 2012	Jan 1998-Apr 2012
Nominal Exchange Rate	24.9%	-8.1%	12.6%
Consumer Price Index	24.7%	14.4%	20.8%
Rice Price	31.1%	15.6%	25.3%
Base Money	31.3%	20.2%	27.3%
Broad Money	29.8%	29.0%	29.5%

Sources: Same as Figure 1.

Notes: The rice price refers to the retail price of *Emata* (medium quality rice).

Table 2

Annual Average of Trade by Sectors: 1997–2011

Fiscal Year	Direction of Trade Statistics		Myanmar Government Statistics					
	Total		Total		Private Sector		Public Sector	
	Exports	Imports	Exports	Imports	Exports	Imports	Exports	Imports
			US dollar, millions					
1997-2001	1,754	2,684	1,612	2,534	1,067	1,786	545	748
2002-2006	3,476	3,528	3,424	2,284	1,579	1,759	1,846	716
2007-2011	6,583	9,186	7,753	5,507	3,102	3,815	4,651	1,692

Source: IMF, *Direction of Trade Statistics* CD-ROM; CSO, *Selected Monthly Economic Indicators.*

Table 3

Forecast Error Variance Decomposition of Real Exchange Rate in Existing Studies

Literature	Countries	Variables	One month ahead*		Twelve month ahead*	
			Nominal Shock	Real Shock	Nominal Shock	Real Shock
Lastrapes (1992)	Germany	RER and NER	36.6	63.4	27.5	72.5
	Japan		35.0	65.0	6.1	93.9
	Italy		28.1	71.9	11.3	88.7
	Canada		5.6	94.4	10.4	89.6
Chen and Wu (1997)	Japan	RER and NER	4.9	95.1	6.9	93.1
	Korea		5.3	94.7	5.0	95.0
	Taiwan		39.3	60.7	38.0	62.0
	Philippines		41.4	58.6	44.3	55.7
Enders and Lee (1997)	Canada	RER and NER	5.1	94.9	8.1	91.9
	Germany		0.1	99.9	3.0	97.0
	Japan		5.5	94.5	8.3	91.7
Dibooglu and Kutan (2001)	Poland	RER and Price	63.1	36.9	33.8	66.2
	Hungary		22.1	77.9	9.1	90.9
Saxena (2002)	Indonesia	RER and NER	50.2	49.8	5.5	94.5
Ha et al. (2007)	Korea	RER and NER	30.9	69.1	67.4	32.6
Ok et al. (2010)	Cambodia	RER and NER	8.0	92.0	12.6	87.4
	Lao PDR		9.7	90.3	10.2	89.8

Source: Author's compilation.

Notes; RER and NER stand for real and nominal exchange rates, respectively.

*/ Because Chen and Wu (1997) and Saxena (2002) employ quarterly data, the first and fourth quarter ahead predictions are used.

Table 4

Forecast Error Variance Decomposition

Period	Nominal Exchange Rate		Real Exchange Rate	
	Nominal Shocks	Real Shocks	Nominal Shocks	Real Shocks
1 month	49.2	50.8	1.7	98.3
2 months	50.3	49.7	2.3	97.7
3 months	50.4	49.6	2.4	97.6
4 months	50.4	49.6	2.4	97.6
5 months	50.4	49.6	2.4	97.6
6 months	50.4	49.6	2.4	97.6
7 months	50.4	49.6	2.4	97.6
8 months	50.4	49.6	2.4	97.6
9 months	50.4	49.6	2.4	97.6
10 months	50.4	49.6	2.4	97.6
11 months	50.4	49.6	2.4	97.6
12 months	50.4	49.6	2.4	97.6

Source: Author’s compilation.

Table 5

Selected Macroeconomic Indicators

	Kyat, billions	USD, millions	% of GDP
GDP (2010)	36,436	42,269	100.0
Exports (2010)		8,980	21.2
Balance of Payments Surplus (2010)		808	1.9
Currency in circulation (Mar 2011)	4,825	5,597	13.2
Broad money (Mar 2011)	9,957	11,552	27.3
Foreign Reserves (Jun 2007)		1,783	4.2

Sources: ADB, *Key Indicators*; IMF, *International Financial Statistics*.

～Previous IDE Discussion Papers～

No.	Author(s)	Title	
387	Masahiro KODAMA	Growth-Cycle Nexus	2013
386	Yutaka ARIMOTO, Seiro ITO, Yuya KUDO, Kazunari TSUKADA	Stigma, Social Relationship and HIV Testing in the Workplace: Evidence from South Africa	2013
385	Koichiro KIMURA	Outward FDI from Developing Countries: A Case of Chinese Firms in South Africa	2013
384	Chizuko SATO	Black Economic Empowerment in the South African Agricultural Sector: A Case Study of the Wine Industry	2013
383	Nudjarin RAMUNGUL, Etsuyo MICHIDA, Kaoru NABESHIMA	Impact of Product-related Environmental Regulations/Voluntary Requirements on Thai Firms	2013
382	Kazushi TAKAHASHI	Pro-poor Growth or Poverty Trap? : Estimating the Intergenerational Income Mobility in Rural Philippines	2013
381	Miwa TSUDA	Kenya after the 2007 “Post-Election Violence”: Constitutional Reform and the National Accord and Reconciliation Act	2013
380	Kazuhiko OYAMADA	Parameterization of Applied General Equilibrium Models with Flexible Trade Specifications Based on the Armington, Krugman, and Melitz Models	2013
379	Yoshihiro NAKANISHI	Post-1988 Civil-Military Relations in Myanmar	2013
378	Tadashi ITO	Export Platform Foreign Direct Investment: Theory and Evidence	2012
377	Muhamad Takiyuddin Ismail, Ahmad Fauzi Abdul Hamid	The Misconception of Political Lessons: How UMNO Perceives the Fall of LDP in Japan	2012
376	Koji KUBO	Myanmar’s Two Decades of Partial Transition to a Market Economy: A Negative Legacy for the New Government	2012
375	Bo MENG, Yaxiong ZHANG, Satoshi INOMATA	Compilation, Application and Challenge of IDE-JETRO’s International Input-Output Tables	2012
374	Momoe MAKINO	What Motivates Female Operators to Enter the Garment Industry in Pakistan in the Post-MFA Period?	2012
373	Kenta GOTO	Is the Vietnamese Garment Industry at a Turning Point?: Upgrading from the Export to the Domestic Market	2012
372	Kazunobu HAYAKAWA	Impact of Diagonal Cumulation Rule on FTA Utilization: Evidence from Bilateral and Multilateral FTAs between Japan and Thailand	2012
371	Toshihiro KUDO and Satoru KUMAGAI	Two-Polar Growth Strategy in Myanmar: Seeking "High" and "Balanced" Development	2012
370	Takeshi Inoue and Shigeyuki Hamori	Market Efficiency of Commodity Futures in India	2012
369	Satoru KUMAGAI, Kazunobu HAYAKAWA, Ikumo ISONO, Souknilanh KEOLA and Kenmei TSUBOTA	Geographical Simulation Analysis for Logistics Enhancement in Asia	2012
368	Yuya KUDO	Marriage as Women's Old Age Insurance: Evidence from Migration and Land Inheritance Practices in Rural Tanzania	2012
367	Bo MENG, Jinjun XUE, Kuishuang FENG, Dabao GUAN	China’s Inter-regional Spillover of Carbon Emissions and Domestic Supply Chains	2012
366	Kazunobu HAYAKAWA	Impacts of FTA Utilization on Firm Performance	2012
365	Kuo-I CHANG and Kazunobu HAYAKAWA	Selection and Utilization of the Early Harvest List: Evidence from the Free Trade Agreement between China and Taiwan	2012

No.	Author(s)	Title	
364	Kazunobu HAYAKAWA	Does the Use of Multiple FTAs Force Firms to Raise Local Input Share?: Evidence of the Spaghetti Bowl Phenomenon	2012
363	Kazunobu HAYAKAWA	Firms' Use of FTA Schemes in Exporting and Importing: IsThere a Two-way Relationship?	2012
362	Bo MENG, Yong FANG, Norihiko YAMANO	Measuring Global Value Chains and Regional Economic Integration: An International Input–Output Approach	2012
361	Tadashi ITO	New Aspects of Intra-industry Trade in EU Countries	2012
360	Ho Yeon Kim	Shrinking Population and the Urban Hierarchy	2012
359	Bo MENG, Yaxiong ZHANG, Jiemin GUO, Yong FANG	China's Regional Economies and Value Chains: An Interregional Input-Output Analysis	2012
358	Koji KUBO	Real Exchange Rate Appreciation, Resource Boom, and Policy Reform in Myanmar	2012
357	Maki AOKI-OKABE	Increasing Popular Participation in the Treaty-making Process : The Legislative Process of Section 190 of the 2007 Constitution of Thailand	2012
356	Tadashi ITO	Revisiting the Determinants of Unit Values	2012
355	Susumu (Shin) ABE, Ryo TAKAHASHI, Akiko HARUNA, Eiji YAMAJI, and Toshiyuki WAKATSUKI	Farming Strategy of African Smallholder Fermers in Transition from Traditional to Alternative Agriculture	2012
354	Kiyoyasu TANAKA and Yoshihiro HASHIGUCHI	Spatial Spillovers from FDI Agglomeration: Evidence from the Yangtze River Delta in China	2012
353	Takeshi INOUE	Central Bank Intervention and Exchange Rate Behaviour: Empirical Evidence for India	2012
352	Rajnish KUMAR, Arup MITRA and Mayumi MURAYAMA	Toiling Children: The Gender Dimension	2012
351	Chizuko SATO	Casting a Voice for Rural Struggles during Apartheid: The Case of AFRA	2012
350	Hisao YOSHINO	Backward-bending of Labor Supply Function and Free Riders	2012
349	Miwa YAMADA	Comparative Analysis of Bilateral Memoranda on Anti-human Trafficking Cooperation between Thailand and Three Neighboring Countries: What Do the Origin and the Destination States Agree Upon?	2012
348	Nobuhiro AIZAWA	The Inverted Chinese/China Problem in Indonesia: A Preliminary analysis on the 2011 Surabaya incident	2012
347	Manabu IWAMOTO and Kaoru NABESHIMA	Can FDI Promote Export Diversification and Sophistication of Host Countries? Dynamic Panel System GMM Analysis	2012
346	Kenmei TSUBOTA	Multiplant Strategy under core-periphery structure	2012
345	Wakana KUSAKA, Michikazu KOJIMA, Mariko WATANABE	Consciousness, Value and Consumer Choice of Energy Efficient Appliance: Case of Thailand, China and India	2012
344	Yuka KODAMA	Young Women's Economic Daily Lives in Rural Ethiopia	2012
343	Etsuyo MICHIDA and Kaoru NABESHIMA	Roles of Supply Chains in Adopting Product Related Environmental Regulations: Case of Vietnam	2012
342	Shunsuke MANAGI	Trade, Economic Growth and Environment	2012
341	Keiichiro HONDA	The Effect of EU Environmental Regulation on International Trade: Restriction of Hazardous Substances as a Trade Barrier	2012
340	Yasushi HAZAMA	Non-Economic Voting and Incumbent Strength in Turkey	2012
339	Yoshihiro HASHIGUCHI and Kuang-hui CHEN	Assessing Agglomeration Economies in the Yangzi River Delta, China: A Bayesian Spatial Econometric Approach	2012
338	Koichiro KIMURA	Diversified Boundaries of the Firm	2012
337	Mami YAMAGUCHI	Migration as a Rural Development Strategy and the Migrants Involved: An Account of a Migrants' Hometown in Sichuan, China	2012
336	Junko MIZUNO	Technology Network for Machine Tools in Vietnam	2012
335	Fernando GONZALEZ-VIGIL and Tatsuya SHIMIZU	The Japan-Peru FTA: Antecedents, Significance and Main Features	2012
334	Yuko TSUJITA and Hisaya ODA	Caste, Land, and Migration: A Preliminary Analysis of a Village Survey in an Underdeveloped State in India	2012
333	Hisaya ODA	Progress and Issues in Rural Electrification in Bihar: A Preliminary Analysis	2012

No.	Author(s)	Title	
332	Koichi FUJITA	Development Strategy in Bihar through Revitalizing the Agricultural Sector: A Preliminary Analysis	2012
331	Chirashree Das GUPTA	Growth and Public Finance in Bihar	2012
330	Zhe Ren	The Confucius Institutes and China’s Soft Power	2012