Some Perspectives on the Monetary Policy Transmission Mechanisms in the Philippines

AUTHORS

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The emergence of more globally integrated financial systems, reduced volatility of output growth and inflation, greater exchange rate flexibility, enhanced central bank autonomy and the attendant changes in monetary policy regimes have had important implications on how monetary policy affects the real economy. This paper attempts to provide some insights on how changes in the Philippine monetary policy regime interact with changes in economic and financial conditions and how these developments could have affected the transmission of monetary policy.

The paper is organized as follows: Section 1 gives a brief overview of the different transmission channels. Section II discusses the monetary policy framework of the Bangko Sentral ng Pilipinas (BSP). Section III analyzes how current economic and financial developments have affected the relative strength of the transmission channels. Section IV concludes and provides some policy perspectives.

1. Transmission Mechanisms of Monetary Policy

Monetary policy decisions affect two broad welfare indicators, output and inflation through the monetary transmission process that conventionally operates through five channels. These channels are the interest rate channel, the exchange rate channel, the credit channel, the asset price channel, and the expectations channel (Mishkin, 1996; Kamin, et al., 1998; Norrbin, 2000; Kuttner and Mosser, 2007). These channels are not mutually exclusive as the effect of one channel could amplify or moderate the effect of another channel. These channels are also not invariant over time. They evolve alongside changes in the overall economic and financial conditions.

\(^1\) The views and opinions expressed are those of the authors and do not necessarily reflect those of the BSP.
The traditional channel of monetary policy is the **interest rate channel**. This is basically associated with changes in real money supply. Contractionary monetary policy either through open-market sales of securities or an increase in the policy rate raises short-term nominal interest rates. With some degree of price stickiness, the rise in the nominal interest rate correspondingly increases the real interest rate, which alters the consumption and investment decisions of economic agents, leading to a reduction in aggregate demand. Empirical studies have found, however, that the macroeconomic impact of a policy-induced rise in interest rates is much larger than the implied interest elasticities of consumption and investment, suggesting that there are other broader mechanisms at work (Bernanke and Gertler, 1995).

Another channel that is particularly relevant to small, open economies is the **exchange rate channel**. This channel has become more important given the greater integration of commodities, services and financial markets alongside greater exchange rate flexibility. The chain of transmission operates through the uncovered interest rate parity condition, wherein an increase in domestic interest rates–ceteris paribus–renders holdings of domestic assets more attractive relative to foreign currency-denominated assets. This encourages foreign exchange inflows and therefore leads to an increase in the value of the domestic currency relative to other currencies, hence, an appreciation. The higher value of the domestic currency makes domestic goods more expensive than foreign goods, causing a reduction in net exports, and therefore, in aggregate output.

The **credit channel** assigns an active role to the supply of loans in the monetary policy transmission process. It captures the bank lending and balance sheet effects (broad credit channel) of a policy-induced change in short-term nominal interest rates. In this channel, the traditional cost-of-capital channel (i.e., interest rate channel) is amplified and propagated by how changes in policy rates affect the availability and cost of credit. Research on the credit channel picked up considerably starting the 1990s when concerns about credit crunch were widespread.

The bank lending channel is premised on the fact that banks play a special and central role in the financial system because they are well suited to solve asymmetric information problems in credit markets. Some borrowers (including small- and medium-sized enterprises and households) are very dependent on bank financing and can only access credit markets through bank borrowings. The broad credit channel focuses on all forms of external finance that firms can tap but at a cost premium. This external finance premium compensates lenders for the monitoring and evaluation of loans and is affected by the stance of monetary policy. Monetary tightening raises the external finance premium of all funds. This affects a borrower’s balance sheet in at least two ways. One, higher interest rates raise interest expense, reducing the borrower’s net cash flow and weakening its financing position. Two, higher interest rates shrink the value of the borrower’s collateral since these are typically associated with declining asset prices. In both cases, the decline in the borrower’s net worth leads to a fall in investment and aggregate demand. (Oliner and Rudebusch, 1996; Gertler and Gilchrist, 1993; Bernanke and Blinder, 1988; 1992).

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2 An important feature of this effect is that it is the **nominal** interest rate that affects the firm’s cash flow. This differs from the traditional interest rate mechanism in which it is the real rather than the nominal interest rate that affects investment.
Another transmission channel is the asset price channel. For existing bondholders, a higher interest rate means a lower value of existing assets. This implies lower wealth holdings, which discourage current consumption and investment, and therefore dampen aggregate demand. Apart from the wealth effect, changes in asset prices also affect aggregate demand through the valuation of equities (or the Tobin's q theory of investment). Tobin defines q as the ratio of the market value of firms to the replacement cost of capital. If q is high, the market price of firms is high relative to the replacement cost of capital. If new plant equipment is cheap relative to the market value of business firms, investment spending will rise. By contrast, with contractionary monetary policy, interest rates rise, bonds become more attractive than equities causing the price of equities to drop. This leads to a lower q and therefore, lower investment spending.

Lastly, the expectations channel has a considerable impact on the significance of the other channels of transmission. To the extent that wage and price expectations are forward-looking, expectations can speed up the adjustment of demand to a change in central bank policy, thus affecting the transmission lag to inflation.

2. The BSP’s Monetary Policy Framework

The 1990s marked a watershed in the BSP’s commitment to price stability as it was accorded greater autonomy in carrying out its mandate. It was against this backdrop that the appeal of inflation targeting (IT) began to take root. The BSP had adopted some form of quasi-inflation targeting since the mid-1990s when it modified its monetary targeting approach to exercise greater flexibility in attaining monetary targets to promote price stability. Between 1995 and 2002, the BSP was effectively under a transition phase toward inflation targeting. Being a forward-looking framework, the success of IT depended largely on the anchoring of the public’s expectations on inflation. As the public needed to understand the different facets of the IT framework for monetary policy, the BSP had to devote resources for institutional capacity building and for information programs aimed at educating the public about the rationale behind the BSP’s mandate to promote price stability and the supporting framework that would help it meet its objectives.

The shift in the monetary policy framework carried over to the realm of exchange rate policy. As financial sector reforms took root, the BSP has become more tolerant of swings in the exchange rate, especially after the painful lessons of the 1997 Asian crisis (Figure 2). The Philippines is a small, open economy and the degree of openness is relatively high for both current and capital flows. Foreign investor presence in the peso bond market has been rising and the interdependencies of the Philippine

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2 Republic Act No. 7653 or the New Central Bank Act, which created the independent Bangko Sentral ng Pilipinas, came into force in 1993.
financial markets with those of advanced and emerging economies have risen. As such, exchange rate movements can have important effects on households and corporate balance sheets and inflation expectations. The BSP therefore pays careful attention to conditions in the foreign exchange market.

However, the achievement of the inflation target within the policy horizon plays the principal role in policy discussions and is not compromised in the desire to maintain orderly conditions in the foreign exchange market. The weight that the BSP places on exchange rate developments in policy deliberations is determined by careful consideration of its impact—alongside other factors—on inflation and inflation expectations. The exchange rate, therefore, is just one of the many variables that the BSP tracks and examines to generate information on the inflation outlook. The prominence accorded to exchange rate developments has diminished when compared to its role prior to inflation targeting. Moreover, the greater policy space provided by the recent strengthening of macroeconomic fundamentals means that the burden of the adjustment is not shouldered by the exchange rate alone.

Since the adoption of inflation targeting in 2002, there has been greater allowance for movements in the exchange rate in any direction and greater discipline to intervene only under well-defined circumstances, i.e., when exchange rate movements threaten the price stability objective. The BSP occasionally participates in the foreign exchange market when it views that the shocks to the exchange rate are not supported by fundamentals. During such times, the BSP intervenes to temper exchange rate volatility and maintain orderly market conditions.

3. Some Findings on the Transmission Mechanisms of Monetary Policy

This section looks into three channels, namely the interest rate channel, the exchange rate channel and the bank lending channel. The asset price channel and inflation expectations channel are the subject of separate research efforts.

3.1 Interest rate channel

3.1.1 The transmission of policy rates to the market interest rates and the real economy

Policy interest rates, the main indicators of the monetary policy stance, consist of the BSP’s overnight reverse repurchase (RRP) or borrowing rate and the overnight repurchase (RP) or lending rate. The RRP rate is the BSP’s key policy lever to manage aggregate demand with the end-goal of keeping inflation in check. Broadly, the BSP raises the RRP rate when inflation outlook shows a likely breach in the inflation target over the policy horizon. The RRP rate is reduced or kept steady when the inflation outlook is below or within the target range, respectively, i.e., when there is absence of generalized inflationary pressures. This, however, is not a mechanical rule that BSP applies. Instead,

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These studies are: (i) Quantifying the Inflation Expectations Channel in the Philippines by Veronica Bayangos, Joselito Basilio, Danvee Floro, and Eloisa T. Glindro (BSP WP Series forthcoming, 2010) and (ii) Identifying and Measuring Asset Price Bubbles in the Philippines by Eloisa T. Glindro and Vic K. Delloro (BSP WP Series 2010-02).
it is a framework for policy within which ‘constrained discretion’ is exercised by monetary policymakers (Bernanke, Laubach, Mishkin and Posen, 1999).

Monetary policy, in general, can influence only the short end of the yield curve. The long end of the yield curve is typically more difficult to control as the impact can go either way since it is influenced as well by a host of factors, including expectations about inflation and the economic outlook.

Partial equilibrium analysis using the primary market’s 91-day T-bill equation in the BSP Multi-Equation Model (MEM)\(^5\) indicates that the BSP has the capability to influence market rates as the one-month lagged RRP rate remains a significant determinant of the 91-day T-bill rate in the primary market;\(^6\) the magnitude of the impact is, however, relatively small (Table 1).\(^7\)

In addition, the results of the vector autoregression (VAR) using the same set of variables as in the T-bill rate equation in the MEM\(^8\) indicate that there has been a reduction in the responsiveness of T-bill rates across all tenors to shocks on the policy rate during the IT period (Appendix 1) compared to the 1998-2001 period for which Treasury bill rates in the secondary market are available.

Meanwhile, domestic interest rates represented by secondary market Treasury bill rates respond relatively more strongly to changes in foreign interest rate (LIBOR 90) in the IT period compared to the period 1998-2001. Greater capital mobility and exchange rate flexibility in the IT period could have contributed to the increased responsiveness of domestic rates to foreign rates. Additionally, the reduced external financing requirements and lower roll-over risks and

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**Table 1**

<table>
<thead>
<tr>
<th>Impact of Policy Rate on 91-day Treasury Bill Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dependent Variable: 91-day T-bill rate</td>
</tr>
<tr>
<td>Sample (adjusted): 1986M04-2008M12</td>
</tr>
<tr>
<td>Adjusted R-squared = 0.96</td>
</tr>
<tr>
<td>Durbin Watson = 1.99</td>
</tr>
<tr>
<td>Output gap refers to the difference between actual output – trend output (HP filter).</td>
</tr>
<tr>
<td>Except for policy rate and 90-day LIBOR rate, all variables are in logs and real terms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>57.11</td>
</tr>
<tr>
<td>Output gap(_{t-1})</td>
<td>2.83</td>
</tr>
<tr>
<td>Exchange rate depreciation(_{t-1})</td>
<td>7.17</td>
</tr>
<tr>
<td>Policy rate (RRP rate)(_{t-1})</td>
<td>0.08</td>
</tr>
<tr>
<td>90-day LIBOR(_{t-1})</td>
<td>0.51</td>
</tr>
<tr>
<td>Real money supply(_{t-1})</td>
<td>-5.39</td>
</tr>
<tr>
<td>AR(1)</td>
<td>0.92</td>
</tr>
<tr>
<td>MA(1)</td>
<td>0.21</td>
</tr>
</tbody>
</table>

**Dependent Variable:** 91-day T-bill rate

**Sample (adjusted): 1986M04-2008M12**

**Adjusted R-squared = 0.96**

**Durbin Watson = 1.99**

Output gap refers to the difference between actual output – trend output (HP filter).

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\(^5\) The BSP MEM is one of the two forecasting models used by the BSP. The other is the Single Equation Model (SEM). These various models are used for generating monthly forecasts and are intended to complement existing economic surveillance activities of the BSP in aid of policy evaluation and decision-making.

\(^6\) The MEM regressors become insignificant when the secondary 91-day Treasury bill rate is used as the dependent variable. The results, however, would be incomparable because the secondary rates are available only as far back as October 1998. As such, the pre-crisis period would only encompass the period 1998-2001, which has been characterized by major contagion shocks such as the 1997 Asian crisis and the technology bubble collapse and September 2001 terror attacks in 2001.


\(^8\) Sims (1980) argued that if there is true simultaneity among variables, then there should not be any a priori distinction between endogenous and exogenous variables. Since VAR is an atheoretic approach, empirical application normally involves using Cholesky decomposition, which imposes a restriction that ensures a strict causal ordering in the contemporaneous relationship between the endogenous variables, with the one affected most by the other variables ordered last in the model.

The rationale for the ordering of the MEM variables in the VAR system used is as follows: over the last decade all exchange rate regimes have exhibited a high sensitivity of local interest rates to international interest rates (Frankel, et al., 2002). Hence, foreign interest rate, being determined in the world market, is treated as the most exogenous variable in the VAR system and therefore is treated first in the ordering of variables. Because of the concomitant increase in country and/or currency risks arising from higher foreign interest rates, local policy rates and market rates (represented by T-bill rates) likewise adjust. The ensuing rise in the domestic interest rate induces exchange rate appreciation. As a result, the output gap shrinks (as actual output declines due to contraction in consumption, investment and net exports) and the demand for money subsequently goes down. Inflation moderates in the process.
risk premium that marked the IT period could explain the higher responsiveness of domestic interest rates to foreign interest rates. Previous to this, the historically large Philippine external indebtedness and rising risk premium could have prevented the low foreign interest rates from being translated into low domestic interest rates.

To better gauge the economy-wide impact of policy rate adjustments, policy simulation was conducted using the BSP’s (preliminary) Long-Term Macroeconometric Model (LTMM). The results (Table 2) show that on average, a sustained 100-basis-point (bps) increase in the policy rate for the period 1995-2007, when monetary policy shifted emphasis towards the control of inflation, resulted in improved transmission to market interest rates. The pass-through to market interest rates (lending, deposit and 91-day Treasury bill rates) has risen from 1988-1994 to 1995-2007, although this was still relatively small. However, the impact of an RRP rate adjustment on money supply via the open market operations of the BSP seems to outweigh its effects on the lending and deposit rates, which respectively affect the consumption and investment decisions of households and firms. This suggests that monetary aggregates play the role of secondary instrument, a view that is closely related to the zonal view by Borio and Filardo (2007), which found robust correlation between the monetary aggregates and macroeconomic developments, even when controlling for real interest rates.

The global economic crisis of 2008 tested the adroitness of monetary policy. The advanced economies witnessed how the conventional transmission channels of monetary policy become impaired as a result of the crisis. The global economic crisis that started to be manifest as a US subprime mortgage market problem evolved into a seizing up of liquidity in major financial centers, rapid and significant deleveraging by banks and other financial institutions, marked decline in asset values, massive wealth destruction, and as a result, a significant decline in consumption and contraction in global trade. The turmoil in the financial markets translated into a slowdown in the global growth and in virtually all economies, leaving no advanced, emerging and developing economies unscathed. This, in turn, subsequently constrained the availability of domestic and international credit, leading to the negative feedback loop between the financial and real sectors.

### Table 2

<table>
<thead>
<tr>
<th>Simulation Results: 100 bps Increase in Policy Rate</th>
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<tbody>
<tr>
<td>Inflation</td>
</tr>
<tr>
<td>Consumer Price Index</td>
</tr>
<tr>
<td>Lending Rate</td>
</tr>
<tr>
<td>Deposit Rate</td>
</tr>
<tr>
<td>91-day Treasury Bill Rate</td>
</tr>
<tr>
<td>Consumption</td>
</tr>
<tr>
<td>Investment</td>
</tr>
<tr>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>Real Money Supply</td>
</tr>
<tr>
<td>Real Credit to the Private Sector</td>
</tr>
</tbody>
</table>

Deviation from baseline (in percentage points). Baseline refers to simulation without shocks. Based on July 2009 version of the LTMM.
Mindful of the possibility of the impairment of the monetary transmission channels in the Philippine economy, the BSP moved preemptively to ensure that the Philippines avert the freezing of credit markets and drying up of liquidity in the domestic financial system that characterized the international financial markets at the height of the crisis in September 2008. The BSP’s crisis intervention measures consisted mainly of significant policy rate reductions coupled with liquidity-enhancing measures and regulatory forbearance (Appendix 3). The substantial easing of policy rates was implemented to bring down the cost of borrowing, reduce the financial burdens on firms and households and shore up business and consumer confidence to support economic expansion. Such moves were also envisioned to avoid or at least mitigate the negative feedback loop from weakening economic conditions to the functioning of the financial sector. In addition to policy rate cuts, liquidity support measures were put in place to ensure that there is ample liquidity to keep the financial markets functioning smoothly and able to fund the growth requirements of the economy, amidst the global credit strains. Moreover, to safeguard the confidence in the banking system, the BSP approved the temporary reclassification of financial assets from being measured at fair value to being measured at amortized cost. Banks were also granted the flexibility not to deduct unrealized mark-to-market losses in computing for 100 percent asset cover of their foreign currency deposit units. The BSP likewise stepped up its communication about the relative insulation of the Philippine economy and the BSP’s policy responses. This has helped stabilize the markets, thus contributing to well-anchored expectations, especially regarding price stability and financial stability. Consistent with the BSP’s baseline inflation forecast, the Asia Pacific consensus forecast and the BSP’s survey of private sector economists for December 2009 showed within target inflation forecast for 2010. Results of the Q4 2009 Consumer Expectations Survey indicated that a smaller proportion of respondents expect price increases in 2010 while the Q4 2009 Business Expectations Survey showed more respondents expect inflation to increase in Q4 2009 until Q1 2010.\textsuperscript{11}

The crisis intervention measures of the BSP have served the economy in good stead. The 200-basis-point reduction in policy rate translated into lower cost of capital as banks passed on to their borrowers the BSP rate cuts. A recent finding of the International Monetary Fund (IMF) noted that the transmission mechanism from BSP policy rates to various market rates and maturities has remained robust even in pre- and post-crisis periods.\textsuperscript{12} As a result, domestic liquidity growth has remained strong while credit has continued to grow, without fanning inflationary pressures.\textsuperscript{13}

The improved yet still relatively small impact of policy rate adjustments on the market interest rates amidst structural changes may partly explain the policy stance of ‘gradualism and reversal aversion’ of most central banks, including the Philippines (Remolona and Garcia-Herrero, 2008). Given incomplete knowledge about the factors affecting the policy environment, central banks may have deemed it more prudent to resort to small, gradual rate adjustments.


\textsuperscript{13}Simulations in the MEM indicate that the policy and liquidity-easing measures carried out by the BSP during the global economic crisis have exerted only a modest impact on inflation in 2008 and 2009.
as they endeavor to strengthen their credibility in fighting inflation. The BSP’s communication strategy and credibility (i.e., to act in accordance with its policy pronouncements and to be successful in doing so) will have a strong impact on the formation of inflation expectations, complementing direct monetary policy action and reducing the need for aggressive interest rate changes.

Furthermore, the finding of the limited impact of policy rate adjustments on the market interest rates also needs to be put in a broader historical context, considering the stage of development in the Philippine Treasury bond market and the corporate bond market. The bond market remains dominated by government debt securities (Figure 3) and trading in the longer maturities is thin and, therefore, illiquid. The private corporate bond market is considerably less developed in terms of activity, product range, and issuer and investor base. This market structure has fiscal origins given the country’s long history of fiscal imbalances and debt problems. At the same time, instances of rejections of bids in Treasury bill auctions mean that policy rate changes are not reflected in interest rates of even the shorter-dated maturities in the primary market for government securities.

3.2 Exchange Rate Channel

The IT period is also characterized by the changing nature of foreign exchange inflows, with overseas Filipino remittances accounting for the bulk of current account receipts. With remittances expected to be a powerful force in driving foreign exchange inflows, some trend appreciation of the peso can be expected. While capital inflows have been driven in part by surges in direct and portfolio investment, current account surpluses tend to endure and have more persistent effects on the exchange rate (Mohanty and Turner, 2006). If these shifts are long-lasting and persistent, it would be inefficient and unproductive to offset them through monetary policy.

The structural forces behind the changing nature of flows would render intervention ineffectual, except perhaps for a very limited period. The BSP has, therefore, hewed to its policy of allowing exchange rate flexibility while smoothing exchange rate fluctuations. This is consistent with the findings

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14 As of September 2009, government bond issuances comprised an average of 90 percent of outstanding domestic debt securities. This feature has consistently characterized the debt securities market, with the share going to as high as 99.1 percent in 2003.
of the IMF covering selected emerging Asian economies, including the Philippines, that there is limited evidence of systematic links between sterilized intervention and exchange rate (either in level terms or in terms of changes in the exchange rate).\textsuperscript{15} Meanwhile, the same IMF study found that there is a significant relationship between intervention and exchange rate volatility in the Philippines. This is consistent with the BSP’s stated objective in conducting intervention, i.e., to moderate the volatility instead of influencing the level of the exchange rate.

Under circumstances of sharp exchange rate volatility, the BSP intervenes by buying foreign currency, mostly US dollars. The efficacy of intervention cannot be sustained for a long period of time because it could create problems for monetary policy. If the BSP continues to buy large amounts of dollars, it will have to siphon off the equivalent amount of pesos it has released in the market to keep inflation stable. This cannot be done without incurring massive costs. On the other hand, not siphoning off the pesos used to buy the dollars would lead to excessive money in circulation and fuel inflation.

What has been the extent of sterilization? To see how the sterilization coefficient has changed over the years, ordinary least squares (OLS) regression using monthly data was undertaken for three periods\textsuperscript{16} with the following specification:

$$\frac{\Delta NDA}{RM_{t-12}} = \alpha + \beta \frac{\Delta NFA}{RM_{t-12}} + \epsilon,$$

where $\Delta NDA$ is the change in net domestic assets and $\Delta NFA$ is the change in net foreign assets between current and year-ago (12-month lag) levels where change is measured over 12 months,\textsuperscript{17} and scaled by the level of the reserve money (RM) stock twelve months ago.

The coefficient $\beta$ is a measure of the extent of sterilization where $\beta=-1$ represents full monetary sterilization of reserve changes and $\beta=0$ implies no sterilization. A value of the sterilization coefficient between these levels, $-1 < \beta < 0$, indicates partial sterilization. There has been a decline in the sterilization activity of the BSP beginning the modified monetary aggregate targeting period of 1995-2001 until the IT period of 2002-2008.

The BSP recognizes that active intervention and a strategy of full sterilization could result in higher interest rates, which would have the perverse result of

\textsuperscript{15}IMF Regional Economic Outlook (REO) for Asia and the Pacific. October 2007, pp. 31-40.

\textsuperscript{16}The periods correspond to 1990-1994, 1995-2001, and 2002-2008. The specification follows the benchmark equation used by Aizenman and Glick (2008): $\frac{\Delta NDA}{RM_{t-12}} = \alpha + \beta \frac{\Delta NFA}{RM_{t-12}} + \gamma Z_t + \epsilon$. The version reported in this paper, however, did not anymore control for other explanatory variables ($Z$) since the intent is simply to see how the sterilization coefficient in the Philippines has changed. The specification passed all the residual tests at one percent level of significance. The null of a unit root on the residuals of the equation was rejected. The null of equal means across the three sub-periods was also rejected. A more in-depth empirical analysis of the factors that explain changes in the sterilization coefficient is an interesting topic for future research.

\textsuperscript{17}Using the 12-month changes helps smooth the data by eliminating much of the month-on-month noise.
encouraging even more inflows of interest rate-sensitive foreign exchange flows. This could have significant implications on the financial position of the central bank, and could be difficult to sustain over a prolonged period. The BSP, in moderating the movements of the exchange rate instead utilized a package of policy measures, which included reserve build-up, exchange rate flexibility, liberalization of the foreign exchange regulatory framework, prepayment of foreign exchange liabilities and support for changes in the fiscal borrowing mix. This approach to foreign exchange flows may help explain why despite no full sterilization during the IT period, inflation was not severely affected.

The impact of policy rates on the exchange rate depends on expectations about local and foreign interest rates as well as inflation, which are also affected by monetary policy change. However, a policy rate hike is typically associated with an appreciation of the exchange rate, ceteris paribus. This follows from the uncovered interest rate parity (UIRP) condition which predicts that with a given foreign interest rate and expected level of exchange rate, an increase in local interest rates leads to an actual appreciation of the exchange rate as it makes peso assets more attractive to investors (portfolio substitution effect). Exchange rate changes, in turn, lead to changes in relative prices of domestic and foreign goods and services, and in inflation.

To test whether the exchange rate pass through (ERPT) has declined after the BSP’s shift to inflation targeting, the approach used is similar to that employed by Siregar and Woo (2008) in estimating the ERPT for Indonesia and Thailand prior to and during the IT period. Such approach utilized the following empirical model based on Edwards (2006):

$$\Delta \log P_t = \beta_0 + \sum \beta_1 \Delta \log E_{t-1} + \sum \beta_2 \log \Delta P^*_{t-1} + \sum \beta_3 \log \Delta P_t + \sum \beta_4 (\Delta \log E_{t-1} \times DUMIT) + \sum \beta_5 (\Delta \log P^*_{t-1} \times DUMIT) + \epsilon_t$$

where

- $P_t$ - consumer price index
- $E_t$ - nominal exchange rate (domestic currency/foreign currency)
- $P^*_t$ - world price index
- $DUMIT$ - dummy for the IT regime; one during the IT period, zero otherwise

The regression coefficients can be interpreted as follows:

- $\sum \beta_1$ pertains to the short-run ERPT in the pre-IT period. It is expected to be greater than or equal to zero, i.e. an increase in the nominal exchange rate leads to a rise in inflation.

- $\left(\sum \beta_1 + \sum \beta_2\right)$ provides a measure of short-run ERPT in the IT period. If $\sum \beta_1 < 0$, post-IT ERPT is lower than that of the pre-IT period.

- $\left(\frac{\sum \beta_1}{1 - \sum \beta_2}\right)$ estimates the pre-IT long-run ERPT. As with the short-run pre-IT pass-through, the long-run ERPT is also expected to be positive.
relates to the long-run ERPT during the IT period.

- If \( \left( \frac{\sum \beta_i + \sum \beta_i}{1 - (\sum \beta_i + \sum \beta_i)} \right) < \left( \frac{\sum \beta_i}{1 - \sum \beta_i} \right) \) or if the post-IT long-run ERPT is lower than the pre-IT long-run ERPT, then the shift to IT regime has led to lower ERPT.

\( \sum \beta_i \) measures inflation inertia, for which a positive value indicates that inflation inertia has risen in the domestic economy.

For the data, Consumer Price Index (CPI), nominal P/US$ and the world price index from International Financial Statistics of the International Monetary Fund for \( P_i, E, \) and \( P \), respectively, are used for the period January 1990-June 2009. The estimation methodology employs autoregressive distributed lag (ARDL) methodology, as utilized by Siregar and Goo, given the possible endogeneity of \( E_t \).

The unit-root test on the variables in log form indicates that all variables are stationary except for \( E_t \). The non-stationarity of \( E_t \) warrants testing for cointegration. The test indicated no cointegration at the 5 percent level of significance. Table 4 summarizes the coefficients derived from the ARDL estimation.\(^{18}\)

With exchange rate flexibility and disinflation, there has been an observed decline in the exchange rate pass-through (ERPT) compared to the pre-IT period.\(^{19}\)

Table 4

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Interpretation</th>
<th>Adjusted R2</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \sum \beta_i )</td>
<td>Pre-IT short-run ERPT</td>
<td>0.13</td>
</tr>
<tr>
<td>( \frac{\sum \beta_i + \sum \beta_i}{1 - (\sum \beta_i + \sum \beta_i)} )</td>
<td>IT short-run ERPT</td>
<td>0.04</td>
</tr>
<tr>
<td>( \frac{\sum \beta_i}{1 - \sum \beta_i} )</td>
<td>Pre-IT long-run ERPT</td>
<td>0.21</td>
</tr>
<tr>
<td>( \frac{\sum \beta_i + \sum \beta_i}{1 - (\sum \beta_i + \sum \beta_i)} )</td>
<td>IT long-run ERPT</td>
<td>0.17</td>
</tr>
</tbody>
</table>

Estimation results indicate that the ERPT has declined in both the short run and long run in the IT period. The decline in the short-run exchange rate pass-through could be the result of measures taken by the BSP to ensure stability in the foreign exchange market as it endeavors to achieve the inflation target. These measures could have led to greater exchange rate stability that has helped temper inflation and inflation expectations.

The development of the financial system and its deeper integration with global financial markets could have affected the benefits and costs of maintaining exchange rate stability and, in particular, the trade-offs between the interest rate and the exchange rate in promoting monetary stability. The response of the exchange rate to changes in policy actions has become more predictable with financial sector development, and the trade-off appears to have been reduced as a result of the following factors:

\(^{18}\)Complete estimation results are reported in Appendix 2. The choice for the order of the ARDL estimation was based on the Akaike information criterion and on the analysis of the residuals of the equation.

\(^{19}\)Based on the preliminary 2000 input-output (IO) table, staff simulations indicate that a one percent appreciation/depreciation of the peso would reduce/increase inflation by about 0.14 percentage point. The exchange rate pass-through on inflation computed from the IO table is higher than the sensitivity derived from the inflation forecasting models since the former incorporates the total price effects of the change in the value of the peso over time.
First, the adoption of the inflation targeting framework has helped enhance the BSP’s credibility in anchoring inflation expectations such that exchange rate shocks are perceived as more temporary. As confidence has grown in the monetary policy framework used in managing inflation, sharp exchange rate changes are likely to be viewed by firms as temporary, and this could have worked to weaken the exchange rate channel in the monetary policy transmission process.

Second, the development of the financial system has helped temper gyrations in the foreign exchange market. In particular, the increasing depth of the foreign exchange market has reduced the impact of threats of speculative attacks, leaving monetary policy with greater room to help stabilize the economy, in contrast to the past when the thinly traded market was highly susceptible to speculative activity. The implementation of an improved regulatory environment for derivative activities in late 2007 is expected to help build resilience in the face of the introduction of more sophisticated financial products.

Third, the use of a mix of policies in responding to foreign exchange movements (including the liberalization of the regulatory environment, shifts in the borrowing mix of the government, and changes in reserves) means that the adjustments to foreign exchange movements are not solely shouldered by the exchange rate. The broadening of the policy toolkit and the enhanced policy space have been made possible by recent advances in macroeconomic reforms.

Fourth, while the Philippines has large net foreign liabilities, of late there has been an appreciable reduction in external indebtedness and financing requirements. The reduced dependence on foreign debt has lowered the financial consequences of exchange rate movements, encouraging greater exchange rate flexibility.

Fifth, as previously discussed, remittances are a big part of the Philippine economic development story (they constitute more than 10 percent of GDP). Increasingly, more and more of these flows have been captured by the formal financial system, and this has contributed to a more robust and, at the same time, more stable external payments dynamics inasmuch as remittances exhibit countercyclical as well as procyclical tendencies.

3.3 Bank Lending Channel

The bank lending channel posits that aside from marginal costs and earning considerations, the availability of funds is an important factor in investment and funding decisions. Interest rate alone therefore could be an insufficient indicator of the effects of monetary policy. The strength of the bank lending channel depends on other factors like propensit

\[\text{Figure 5} \quad \text{Loan-to-Deposit Ratio of Universal/Commercial Banks} \quad 1999-2008\]

\[\text{For example, measures were put in place to strengthen risk management guidelines for derivatives activities. The level of outstanding derivatives (mainly foreign exchange forwards, with some financial options and interest rate swaps) is still low but there has been a discernible increase in recent years.}\]
to supply funds, degree of substitution among different forms of financing, and degree of substitution among different financial institutions (Worms, 2001). The bank lending channel is also based on the dual nature of banks as holders of reserve-backed deposits and as originators of loans. Under this sub-channel, a policy-induced reduction in excess reserves will affect banks’ supply of loans. Since not all firms can shift to other sources of funding without any costs, investment spending will be subsequently affected.

The condition of surplus funds amid a lackluster investment climate in the Philippines may reflect weak demand for loans. The asset profile of universal and commercial banks further supports this hypothesis. The loans-to-deposit ratio has been on a declining trend, except for the period from Q3 2007 until Q2 2008 (Figure 5). This has been accompanied by the increasing trend in private sector issuance of securities and shares of stocks until 2007 (Figure 6).21 The generally low interest rate environment implies a higher present value of the future stream of income from equity without having to shell out periodic interest payments, making equity issuance an attractive alternative source of financing.

The BSP’s flow of funds analysis for the period 2000-2007 helps explain the weak demand for loans. The non-financial corporate sector has been recording surpluses beginning 2004 and has used some of the funds to repay debts. Likewise, the household sector has been accumulating surpluses and placing these in currency holdings and deposits. In addition, non-financial corporations did not readily substitute securities for loans and only the financial sector invested heavily in securities.

To have a broad indication of the importance of BSP’s policy instruments and the government’s financing conditions on real credit to the private sector, a simple multivariate regression was undertaken.22 In the equation specification, the policy rate is lagged by two quarters in view of the known lags in monetary policy. Open market operations (OMO) and additional financing requirements of the government, on the other hand, are seen to contemporaneously affect

22008 was marked by a high level of reversal aversion. Kim, Loretan, Remolona (2009) found out that contagion in Asian credit markets was driven largely by global repricing of risk rather than the deterioration in credit quality of firms.

22It is important to stress, however, that there is an identification problem in the use of macroeconomic time series, which could render it difficult to identify a credit channel from the money channel. The money channel works through banks’ liabilities whereas the credit channel works through their assets, accounting identities that are tightly linked (Favero, et al., 1999). Hence, the literature on the credit channel makes use of panel regression using bank-level data. In this manner, one can control for individual banks’ characteristics, the structure of the financial system and the different responses of the financial institutions to shocks in the system. A more rigorous examination of the credit channel of monetary policy in the Philippines can be the subject of future research.

The regression is run for the period Q1 1995 to Q2 2008. To compensate for the inherent limitations of single-equation models using macroeconomic time series, residual tests were undertaken. The properties of classical linear regression are satisfied (i.e., equation residuals are homoskedastic, not serially correlated and normally distributed). Tests on the stationarity of the residuals of the equation confirm the presence of a cointegrating relationship. The Johansen cointegration test also affirms the presence of cointegrating relationships among the identified regressors.
Flow-of-funds and savings-investment gap analyses help explain the limited strength of the interest rate channel. Using available data for 2000-2007, the economy became a net lender beginning 2003, the year when the financial sector began posting a net surplus position (Table 5). This surplus position is reflected in the substantial investment in securities and other receivables. It could be that banks, in adjusting to the new regulatory environment that emphasized prudent risk management, have focused on investing in risk-free assets to optimize returns as they consolidate their balance sheets.

Meanwhile, the recovery in corporate balance sheets facilitated prepayment of loans and enabled the non-financial corporate sector to post a surplus starting 2004. Primary issues raised in the equity market subsequently recovered. The household sector has also been consistently recording surpluses, with substantial currency holdings and deposits in 2005-2006. Lastly, while the government has been a consistent net borrower, it did so at much reduced volumes starting 2005 as government finances improved after the implementation of the reformed value-added tax (RVAT) law. The ensuing expansion in savings together with relatively low albeit rising investment (Figure 7) could explain a weak demand-driven bank lending channel that also limits the strength of the interest rate channel.

Table 5
Flow of Funds: Summary of Net Financing*
(in Billion Pesos)

<table>
<thead>
<tr>
<th>Year</th>
<th>Financial</th>
<th>Non-Financial</th>
<th>Gov't</th>
<th>Households</th>
<th>Domestic Economy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2000</td>
<td>-36.65</td>
<td>-36.65</td>
<td>-163.93</td>
<td>121.49</td>
<td>-88.44</td>
</tr>
<tr>
<td>2001</td>
<td>-13.27</td>
<td>-13.27</td>
<td>-140.56</td>
<td>125.60</td>
<td>-87.08</td>
</tr>
<tr>
<td>2002</td>
<td>-19.16</td>
<td>-19.16</td>
<td>-141.05</td>
<td>168.82</td>
<td>-15.68</td>
</tr>
<tr>
<td>2004</td>
<td>29.07</td>
<td>29.07</td>
<td>-332.16</td>
<td>95.21</td>
<td>92.42</td>
</tr>
<tr>
<td>2005</td>
<td>24.81</td>
<td>24.81</td>
<td>-101.17</td>
<td>36.06</td>
<td>111.05</td>
</tr>
<tr>
<td>2006r</td>
<td>43.50</td>
<td>43.50</td>
<td>-0.75</td>
<td>83.40</td>
<td>280.09</td>
</tr>
<tr>
<td>2007r</td>
<td>36.89</td>
<td>36.89</td>
<td>33.75</td>
<td>87.06</td>
<td>329.57</td>
</tr>
</tbody>
</table>

* Net Lender (+) / Net Borrower (-)
r - revised (as of January 30, 2009, http://www.bsp.gov.ph);
Source: Philippine Flow of Funds, Bangko Sentral ng Pilipinas

Figure 7
Loan-to-Deposit Ratio of Universal/Commercial Banks 1999-2008

Source: 2008 ADB Key Indicators for Asia and the Pacific
The significant rise in 1998 of national savings partly reflects the change in the data reporting system of remittances from overseas Filipinos.
Specifically, the latter variable is represented by the ratio of the National Government’s gross domestic borrowings to revenues. An increase in government borrowings relative to its revenue-generating capacity could crowd out credit that can be extended by banks to the private sector.

Partial equilibrium analysis indicates that the real policy rate has the expected negative but relatively small effect on real credit to the private sector. This finding is consistent with the estimated small interest rate pass-through of the BSP’s policy rate. On the other hand, registers stronger partial equilibrium effects, indicating that the policy rate affects private sector credit via its impact on the OMO.

The test for structural break indicates that there has been a change in the intercept and slope coefficient after the adoption of inflation targeting. The significant improvement in the National Government’s financial position could have lessened pressures to borrow from the market, thus increasing credit to the private sector during the inflation targeting period.

Notwithstanding the recognized limitations of the reduced-form specification used, there are two possible explanations for the finding of the weak effect of the real policy rate on real private sector credit. First, the historically high inflation experience of the Philippines implies significant volatility in the real interest rate, making it an inadequate basis for deciding whether to expand or curtail lending. The BSP therefore has needed to rely on a mix of policy tools in managing inflation. Second, in a bank-dominated financial system, the response of large, liquid and well-capitalized banks to monetary policy changes will be less significant (Stein (1998); Kashyap and Stein (2000); Kishan and Opiea (2000)). This is because they have greater capacity to sustain lending either through their access to other sources of funds, including retained earnings. Third, it took some time for the non-performing loan problem to be addressed as the government opted for a more market-based approach of promoting the establishment of private-sector special purpose vehicles (SPVs) to dispose of impaired assets. The lack of a well-functioning credit information system could have also constrained the access of the private sector to the banking system, whose lending behavior is heavily collateral-dependent.

While this remains to be tested, it could also be hypothesized that the relationship-based lending to big corporations that have access to other fund sources could have diluted the impact of interest rate on supply of credit. Firms that are not credit-constrained will be affected only by changes in the

<table>
<thead>
<tr>
<th>Determinants of Credit to the Private Sector</th>
<th>Coefficient</th>
<th>t-statistic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>8.291</td>
<td>134.963</td>
</tr>
<tr>
<td>Open market operation-to-M3 a/</td>
<td>-0.469</td>
<td>-5.713</td>
</tr>
<tr>
<td>Real policy rate t-2</td>
<td>-0.003</td>
<td>2.250</td>
</tr>
<tr>
<td>Gross domestic borrowings-to-revenues of the National Government,</td>
<td>-0.093</td>
<td>-5.296</td>
</tr>
<tr>
<td>DUMIT b/</td>
<td>0.155</td>
<td>6.842</td>
</tr>
<tr>
<td>DUMIT*Gross domestic borrowings-to-revenues of the National Government,</td>
<td>0.059</td>
<td>3.065</td>
</tr>
<tr>
<td>AR(1)</td>
<td>1.577</td>
<td>14.531</td>
</tr>
<tr>
<td>AR(2)</td>
<td>-0.638</td>
<td>-6.704</td>
</tr>
</tbody>
</table>

Adjusted $R^2 = 0.97$ Durbin Watson stat = 2.23 MAPE = 4.3

a/ OMO= BSP’s holdings of Treasury bills + BSP bills + Repurchase Transactions (RPs) + Reverse Repurchase Transactions (RRPs) + Special Deposit Account (SDA)
b/ Dummy for inflation targeting period (DUMIT), i.e., equals one for 2002-2008 and zero otherwise.

23 The IT period coincided with the implementation of landmark reforms such as the General Banking Law, the Special Purpose Vehicle Act, the shift towards consolidated and risk-based management, reforms in the foreign exchange regulatory framework and the fiscal consolidation program of the National Government.


25 By contrast, other countries (Thailand and Korea) set up publicly funded asset management companies (AMCs) to offload impaired/idle assets. Fiscal constraints in the Philippines held back the use of this approach.
cost of borrowing. [By contrast, credit-constrained firms will be affected by the availability of credit and changes in the cost of borrowing.] While still subject to empirical validation, the existence of relationship-based lending is not far-fetched considering the oft-cited problem of limited access to credit by small enterprises due to high transaction costs and the highly concentrated nature of equity and bond markets in an environment marked by excess savings over investment.

Aside from the higher interest rate pass-through reported during the crisis period, the Philippines did not suffer from the economically debilitating effects of credit strains. Preliminary results of the senior loan officers’ survey in the fourth quarter of 2009 indicate that there has been no significant tightening of lending standards. Moreover, post-crisis indicators point to the relative effectiveness and confidence-boosting effects of crisis intervention measures. The crisis intervention measures alongside relatively good fundamentals prior to the crisis were widely recognized as having helped stabilize the economy from the spillover effects of the international financial crisis. The IMF in its 2009 Article IV Consultation Report recognized that the “Philippine economy entered the crisis from a position of relative strength with limited direct exposure to strained global financial institutions, much improved bank soundness, and lower public debt due to fiscal consolidation in the preceding years. Moreover, resilient remittances and a timely response helped cushion the impact on the economy.”

Market conditions have normalized as equity prices returned to pre-crisis levels in early October 2009. Improved market sentiment has narrowed down credit spreads and boosted corporate and sovereign bond issuances. The peso also began to stabilize as early as April 2009. Despite the major backlash experienced by financial markets in the global market, the Philippine banking sector has remained fundamentally sound. Important banking reforms, particularly in the areas of corporate governance, risk management, and asset clean-up, have helped to further strengthen the banking system, boosting its overall performance in terms of higher asset growth, enhanced asset quality, improved profitability and better capitalization even after the financial crisis. A stress test suggests that the Philippine financial system is quite resilient to severe macroeconomic shocks.

Despite having withstood the 2008 international financial crisis, it is crucial to bear in mind the important but still largely unexplored channel of monetary policy is the risk-taking channel that links monetary policy with the perception and pricing of risks by economic agents. Asset prices and credit cycles can no longer be treated as exogenous forces because they are also affected by monetary policy. This suggests that the reaction function of monetary policy

27 Beginning 2010, the Monetary Board began unwinding some of the crisis intervention measures. First, the Monetary Board set the peso rediscount rate equal to the overnight RRP rate effective 1 February 2010. It will be recalled that on 2 March 2009, the peso rediscount rate was set at 50 basis points lower than the overnight RRP rate as part of a package to liberalize banks’ access to the BSP’s rediscounting facility and ensure the orderly operation of domestic financial markets should global financial conditions worsen (BSP Media Release, January 28, 2010). Second, the rediscounting budget was reduced from P60 billion to P40 billion effective March 15, 2010. The Board also agreed to restore the loan value of all eligible rediscounting papers from 90 percent to 80 percent of the borrowing bank’s credit instrument, as well as bring back the non-performing loan ratio requirement of two percentage points (from ten percentage points) above the latest available industry average NPL for banks wishing to avail of the rediscounting facility (BSP Media Release, 11 March 2010).
authorities should not be narrowly understood as aiming at controlling inflation over the short run. Rather, monetary policy must pay close attention to credit growth and asset information with the goal of promoting financial and macroeconomic stability over the medium term.

Conclusion

The paper offers some perspectives on the relative strength of the transmission channels of monetary policy. Specifically, it examines the changes in the extent to which monetary policy actions have worked through the interest rate channel, the exchange rate channel and the bank lending channel.

The paper finds an increase in the interest rate pass-through and in the bank lending channels beginning 1995 when monetary policy shifted emphasis towards the control and management of inflation. Nonetheless, there remains substantial scope for strengthening these two transmission channels. Moreover, the study also finds that the exchange rate pass-through has gone down during the inflation targeting period (2002-2009).

The impact of policy rate adjustments on the real economy appears to work quite strongly via its impact on open market operations, suggesting that monetary aggregate adjustments play an important role as secondary instruments of monetary policy in the Philippines.

Structural factors may have limited the strength of the monetary policy transmission channels during the estimation period. The relative shallowness of financial markets, particularly evident in the illiquidity of longer-dated bond papers, relatively high reserve requirements, and susceptibility to shifts in investor sentiment as reflected in high risk premium could have also hindered stronger monetary policy transmission through the interest rate channel.

Moreover, many of the milestone reforms in the financial system have only been implemented in recent years. Since it takes time for the gains from these reforms to be fully realized, the strength of the transmission channels could have been muted for most of the estimation period. Recent advances in improving the institutional and policy framework could help strengthen the transmission mechanisms of monetary policy. The BSP can gain better control over longer term rates with healthier, more stable banks operating under enhanced competitive conditions, with a more robust domestic capital market complementing the banking system in financial intermediation, and with a wider array of financial instruments that will encourage more savings, provide greater flexibility in managing and redistributing risks, and open up alternative financing opportunities. The recent reduction in non-performing loans has prompted brisker activity in the loan market that could make investment and spending behavior more responsive to interest rate changes. Banking consolidation may also increase the effectiveness of the interest rate channel if it results in increased efficiency and lower operational costs.

Other institutional reforms aimed at broadening the development of capital markets as well as enhancing system integrity and market confidence will contribute to well-functioning financial markets and with these, the improved transmission of monetary policy. These include the issuance of a broader array of securities to satisfy specific investor preferences and the improvement in the infrastructure of the government securities market.
The improved yet still relatively small impact of policy rate adjustments on market interest rates amid structural changes and incomplete knowledge about the factors affecting the policy environment even as the BSP continues to endeavor to strengthen its credibility in fighting inflation may partly explain the policy stance of ‘gradualism.’

Selected References:


International Monetary Fund, Regional Economic Outlook: Asia and Pacific, April 2008 and October 2007


Appendix 1

Comparison of Impulse Response Functions (IRFs) of Market Interest Rates in the Pre-Inflation Targeting and Inflation Targeting Periods

1. 91-day Treasury bill rate (primary market)

**Pre-IT**

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

- Response of TBILL3MOPRIM to LIBOR90
- Response of TBILL3MOPRIM to ERRPO

**Post-IT**

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

- Response of TBILL6MO to LIBOR90
- Response of TBILL6MO to ERRPO
2. 91-day Treasury bill rate (secondary market)

Pre-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.

Post-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.

3. 6-month Treasury bill rate (secondary market)

Pre-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.

Post-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.
4. One-year Treasury bill rate (secondary market)

**Pre-IT**
Response to Cholesky One S.D. Innovations + 2 S.E.

Response of TBILL1YR to LIBOR90

Response of TBILL1YR to ERRPO

**Post-IT**
Response to Cholesky One S.D. Innovations + 2 S.E.

Response of TBILL1YR to LIBOR90

Response of TBILL1YR to ERRPO

5. Three-year Treasury bill rate (secondary market)

**Pre-IT**
Response to Cholesky One S.D. Innovations + 2 S.E.

Response of TBILL3YR to LIBOR90

Response of TBILL3YR to ERRPO

**Post-IT**
Response to Cholesky One S.D. Innovations + 2 S.E.

Response of TBILL3YR to LIBOR90

Response of TBILL3YR to ERRPO
6. Five-year Treasury bill rate (secondary market)

Pre-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.

Post-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.

7. Seven-year Treasury bill rate (secondary market)

Pre-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.

Post-IT
Response to Cholesky One S.D. Innovations ± 2 S.E.
8. Ten-year Treasury bill rate (secondary market)

Pre-IT

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

![Graph showing response of TBILL10YR to LIBOR90 and ERRPO](image)

Post-IT

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

![Graph showing response of TBILL10YR to LIBOR90 and ERRPO](image)

---

Appendix 2

Results of ARDL Estimation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>t-statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>2E-04</td>
<td>0.194</td>
</tr>
<tr>
<td>ΔlogE_{t-1}</td>
<td>0.189</td>
<td>2.756</td>
</tr>
<tr>
<td>ΔlogE_{t-3}</td>
<td>-0.033</td>
<td>-0.490</td>
</tr>
<tr>
<td>ΔlogE_{t-12}</td>
<td>0.202</td>
<td>3.222</td>
</tr>
<tr>
<td>ΔlogP*_{t-1}</td>
<td>0.048</td>
<td>2.702</td>
</tr>
<tr>
<td>ΔlogP*_{t-3}</td>
<td>0.051</td>
<td>2.877</td>
</tr>
<tr>
<td>ΔlogP*_{t-12}</td>
<td>0.031</td>
<td>1.728</td>
</tr>
<tr>
<td>ΔlogP_{t-1}</td>
<td>-0.006</td>
<td>-0.067</td>
</tr>
<tr>
<td>ΔlogP_{t-3}</td>
<td>0.111</td>
<td>0.119</td>
</tr>
<tr>
<td>ΔlogP_{t-12}</td>
<td>0.275</td>
<td>3.713</td>
</tr>
<tr>
<td>ΔlogE_{t-1}^*DuMIT</td>
<td>-0.067</td>
<td>-1.528</td>
</tr>
<tr>
<td>ΔlogE_{t-3}^*DuMIT</td>
<td>-0.090</td>
<td>-2.076</td>
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<tr>
<td>ΔlogE_{t-12}^*DuMIT</td>
<td>-0.026</td>
<td>-0.532</td>
</tr>
<tr>
<td>ΔlogP_{t-1}^*DuMIT</td>
<td>0.373</td>
<td>2.745</td>
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<tr>
<td>ΔlogP_{t-3}^*DuMIT</td>
<td>0.068</td>
<td>0.500</td>
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<tr>
<td>ΔlogP_{t-12}^*DuMIT</td>
<td>-0.051</td>
<td>-0.418</td>
</tr>
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</table>

R-squared 0.335
Adj. R-squared 0.289
S.E. equation 7.317
F-statistic 7.317

Appendix 3

Monetary Policy Measures Implemented by the BSP during the Global Financial Crisis

<table>
<thead>
<tr>
<th>Date</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 December 2008</td>
<td>50 bps reduction</td>
</tr>
<tr>
<td>29 January 2009</td>
<td>50 bps reduction</td>
</tr>
<tr>
<td>5 March 2009</td>
<td>25 bps reduction</td>
</tr>
<tr>
<td>16 April 2009</td>
<td>25 bps reduction</td>
</tr>
<tr>
<td>28 May 2009</td>
<td>25 bps reduction</td>
</tr>
<tr>
<td>7 July 2009</td>
<td>25 bps reduction</td>
</tr>
<tr>
<td>17 October 2008</td>
<td>Opening of US dollar repo facility</td>
</tr>
<tr>
<td>7 November 2008</td>
<td>Enhancement of the existing peso repo facility through relaxed valuation and broader acceptable collateral</td>
</tr>
<tr>
<td>14 November 2008</td>
<td>Increase in rediscounting budget (from P40B to P60B)</td>
</tr>
<tr>
<td>2 March 2009</td>
<td>Decrease in reserve requirement by two percentage points</td>
</tr>
<tr>
<td>31 October 2008</td>
<td>Opening of US dollar repo facility</td>
</tr>
<tr>
<td>31 October 2008</td>
<td>Reclassification of non-derivative financial assets from categories measured at fair value (held for trading) to those measured at amortized cost, but excluding those that are designated at fair value through profit or loss (available for sale/held to maturity or unquoted debt securities classified as loans)</td>
</tr>
</tbody>
</table>

---

25On 15 March 2010, the Monetary Board approved the reduction in the rediscounting budget from P60 billion to P40 billion. The Board also agreed to restore the loan value of all eligible rediscounting papers from 90 percent to 80 percent of the borrowing bank’s credit instrument, as well as bring back the non-performing loan ratio requirement of two percentage points (from ten percentage points) above the latest available industry average NPL for banks wishing to avail of the rediscounting facility.