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BSP Vision

The BSP aims to be a world-class monetary authority and a catalyst for a globally competitive economy and financial system that delivers a high quality of life for all Filipinos.

Mission Statement

The BSP is committed to promote and maintain price stability and provide proactive leadership in bringing about a strong financial system conducive to a balanced and sustainable growth of the economy. Towards this end, it shall conduct sound monetary policy and effective supervision over financial institutions under its jurisdiction.

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Foreword

In celebration of the 20th anniversary of the Bangko Sentral ng Pilipinas in 2013, the *Bangko Sentral Review* invited BSP officers and staff to submit articles that looked back on the Philippine experience in central banking as well as forward to key issues that it may encounter in the decades ahead and beyond. The Bangko Sentral Review welcomed article submissions on the future of central banking in the Philippines in the aftermath of the global financial crisis, as well as the future organizational challenges facing the BSP in terms of monetary policy, financial stability or the payments and settlement system. Articles assessing the progress of central banking in the past 20 years since the establishment of the BSP were also encouraged.

BSPers responded with a good number of interesting submissions on varied topics. The list of articles was eventually pared down, partly due to space considerations, to the four in the current issue. The article by Dennis Bautista, Eloisa Glindro, and Faith Cacnio presents a macroeconomic model for the Philippines incorporating new elements, including an endogenous monetary policy interest rate path, that are not present in the BSP's existing suite of forecasting models. A second article, by Faith Cacnio, examines the issue of the effectiveness of anticipated and unanticipated monetary policy in the Philippine context. Thaddeus Leuterio's contribution looks at the BSP's efforts to engage with counterparts in the Asian region in terms of improving regional economic and financial surveillance. Meanwhile, the article by Monetary Board Member Felipe Medalla and Laura Fermo looks at key changes in Philippine inflation dynamics from a univariate perspective during the shift to an inflation targeting framework. Lastly, the regular column by Washington DC-based Alphew Cheng talks about his work as BSP secondee to the International Monetary Fund.

The *Bangko Sentral Review* wishes to thank the BSP staff who sent in their contributions and looks forward to more article submissions on central banking topics, including those on monetary policy, financial stability and banking supervision, payments and settlement system issues, currency management, and BSP advocacies. A number of accepted articles that could not be accommodated in this issue have been earmarked for a future volume.

Zeno Ronald R. Abenoja
Editor-in-Chief

A Monetary Policy Model for the Philippines[1]

AUTHORS



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Ms. Cacnio currently serves as Bank Officer V at the Department of Economic Research (DER) of the Bangko Sentral ng Pilipinas (BSP). She joined the BSP in 2004 as part of the Real and External Sectors Research Group of the DER. Presently, she is assigned to the DER Economic and Forecasting Research Group where she is involved in the implementation and development of forecasting models for the BSP. She specializes on issues related to fiscal sustainability, macroeconomic and financial stability, labor markets and economic surveillance. Ms. Cacnio holds a Ph.D. in Economics from the University of the Philippines, where she also obtained her Bachelor of Science degree in Economics (cum laude).

This article principally seeks to acquaint the readers with the features and basic structure of the Macroeconomic Model for the Philippines (MMPH),[2] which is the latest addition to the suite of models that comprise the BSP's forecasting and policy analysis system. The MMPH is a small-scale semi-structural policy model that aims to provide an organizing framework for producing coherent forecast scenarios and policy analysis.[3] It is an organizing framework because it incorporates the forecast iterations that will come out from the process of consultations with sector specialists and between staff and management. The goal of the model is to generate the consensus view on how macroeconomic developments are evolving and how they can better inform the forecast.

I. The MMPH Framework

The basic principle of the MMPH's modelling framework is to lay the building blocks that reflect key relationships for understanding the monetary transmission mechanism based on forward-looking agents and a central bank that reacts to the output gap as well as the deviation of inflation forecast from target (Berg et al., 2006; Benes, Hledik, and Vavra (2005); Coats, Laxton, and Rose (2003)). Instead of estimating large models that seek to mimic the detailed features of the economy to understand the various transmission mechanisms, the MMPH focuses only on key macroeconomic relationships that are most relevant to monetary policy. It does not, however, diminish the role of other models in helping inform policy decision-making in central banks because there are recognizably other policy concerns that cannot be addressed by a monetary policy model such as the MMPH.

Aside from a parsimonious set-up, the model imposes a theoretically-consistent structure that ensures correct signs for the parameters of the model and hence, a reasonable dynamic path of the response of the key macroeconomic variables to shocks (as measured through impulse response functions) over the BSP's two-year policy horizon. The focus of the forecast is not on the precision of the point forecast but, more importantly, on the projection path over the policy horizon that is consistent with the consensus assessment of staff and management on the emerging outlook, given the available information set. The projection path can be extended to the medium term with reasonable assumptions or scenarios on key external variables.

The simplicity in design and theoretically-imposed parameter signs are preferred due to a number of uncertainties that complicate monetary policy, namely: (i) uncertainty about the transmission channels of monetary policy, which are not invariant over time; (ii) uncertainty about identifying the effects of the shocks because of multiple shocks that hit the economy at any time; and (iii) uncertainty about the measurement of unobservables in the transmission mechanism. The more elaborate the structure is, the less tractable the model becomes.

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[1] The views expressed herein are those of the authors and should not be construed to represent the views of the Bangko Sentral ng Pilipinas (BSP). This article is a synthesis of the model development work undertaken during the authors' participation in the Advanced Applied Macroeconomic Modeling Program (AAMMP) of the Modeling Unit of the Economic Research Department of the IMF in Q42011 and Q22012. The authors are grateful to Deputy Governor Diwa C. Guinigundo, Assistant Governor Ma. Cyd N. Tuaño-Amador, Director Zeno R. Abenoja, and Director Francisco G. Dakila, Jr. for their full support for the authors' participation in the AAMMP; to Douglas Laxton for spearheading the program; to Jaromir Benes, Michal Andrle, Patrick Blagrave and Peter Elliott for sharing their knowledge and expertise. All errors, misinterpretations, and omissions are the responsibility of the authors.

[2] The technical details on parameterization and policy experiments will be discussed in a forthcoming working paper.

[3] See Berg, A., Karam, P., Laxton, D. (2006) for more detailed exposition.

What do we get from MMPH? How is it different from econometric models?

The structure of the MMPH has the advantage of being able to flexibly implement informed judgment within a theoretically-consistent framework. Where applicable, it can incorporate forecasts generated either from econometric (structural) or time series (non-structural) models. The general equilibrium framework and forward-looking feature allow for the assessment of the dynamic path of key macroeconomic variables in a theoretically-consistent manner.

Model maintenance is relatively simple because of parsimonious data requirements and model structure. While parsimony is a key tenet in model development and forecasting, adherence to it is often lost in practice as modellers seek to address many policy issues through ad-hoc model extensions. In such attempts, theoretical grounding and stock-flow inconsistencies in the data are often overlooked as replicating the data generating process becomes the overriding concern. As the model becomes bigger and more complex, data updating becomes a tedious process and model tractability is compromised. With theoretical restrictions imposed, there is less need to re-estimate and re-specify the model with every new data update.

The emphasis on simplicity in design recognizes that model development is a time- and resource-intensive undertaking. An institution like a central bank is always confronted with three real constraints: institutional, individual, and resource constraints. Too many complexities can confound the learning process with the worst possible scenario of having a complex model relegated to the backburner despite efforts and resources expended on it.

What are the model-development challenges with MMPH?

The model does not purport to have the nowcasting[4] or short-term forecasting power of time series models because all the current-quarter indicators of even the simple model are not available at the time monetary policy is determined. For example, one of its core variables – the output gap – depends on GDP series that has a one-to-two-quarter lag. Thus, for current quarter monetary policy setting, nowcasts from statistical models and expert judgment are needed to tune the current and the next-quarter output gap estimate.

Similar to other model development efforts, the learning curve is steep – learning the subject and techniques could take a long time given the skill set that needs to be developed. While the model is not explicitly derived from choice-theoretic foundations, additional explanatory indicators cannot just be mechanically added to the equation. A battery of tests will have to be undertaken with each additional parameterization[5] to ensure that the historical narrative that underpins the specification and parameterization is not compromised.

II. The MMPH in Close View

The MMPH is designed for a small open-economy like the Philippines. It shares the dynamic, stochastic, and general equilibrium features of a DSGE model. However, while its key behavioral equations are similar to those that arise from the underlying choice problems of firms and households, they are not presented in a form that is explicitly derived from choice theory as one would see in a DSGE model.

Overview of the MMPH Structure

Central to the inter-linkages of these behavioral equations are expectations about the future. As elucidated in the discussion of specific equations, the aggregate demand equation relates expected output to the real interest rate. The model articulates the role of the real interest rate as an inter-temporal price, i.e., an inflation targeting central bank must raise

[4] Nowcasting is a method that tracks real-time flow of high frequency datasets monitored by central banks and how such affect current-quarter forecasts (nowcasts). Each time new data are released, the nowcasts are updated on the basis of progressively larger data sets (Giannone, D., Reichlin, L., and Small, D. (2008)).

[5] Policy tests, historical shock decomposition, and ex post recursive filtering and forecasting.

the nominal interest rate when potential output growth is expected to increase and lower it when potential output growth is expected to decline. This is because expectations of higher output in the future induce higher current aggregate demand – consumers spend more and firms invest more because of higher potential earnings from higher potential growth.

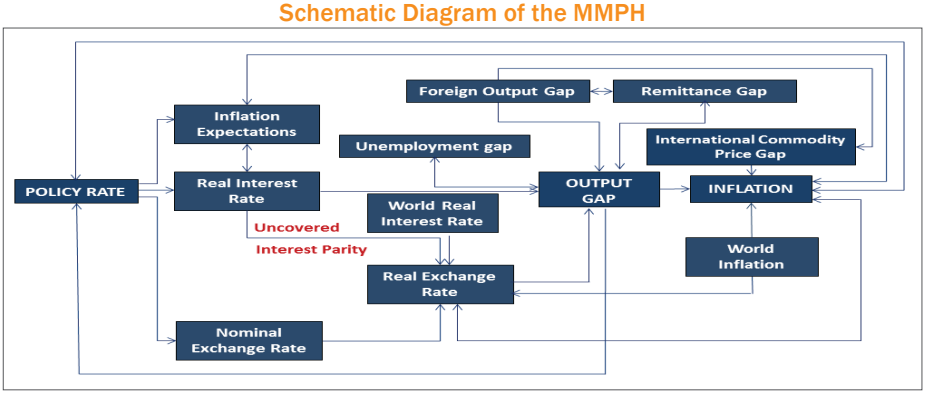
Figure 1 provides a simplified schematic diagram that depicts key relationships in the model. For simplicity, the diagram starts with the policy rate. The determination of the path of nominal policy rate is endogenous as it responds to the deviation of actual output from potential output (output gap) and the deviation of inflation forecast from target (inflation gap). This is shown by the feedback loops from output gap and inflation. Any policy rate adjustment rate affects inflation expectations and the real interest rate, with the latter feeding into the output gap and subsequently, inflation. Aside from output gap, inflation is also affected by international commodity prices, exchange rate, and world inflation through its impact on import prices. Output gap, on the other hand, is influenced by foreign output gap, remittance gap, real exchange rate gap, and unemployment gap.

Policy rate movement also affects expectations about the exchange rate. For a given level of nominal exchange rate, domestic inflation, and foreign inflation, the real exchange rate is determined. Real exchange rate, in turn, affects aggregate demand, and hence, output gap. Depending on the extent of the exchange rate pass-through, inflationary pressures arising from excess demand conditions can either be tempered or magnified.

The link to the rest of the world is provided through three key endogenous variables for the US economy: external demand captured by the foreign aggregate demand equation (foreign output gap), aggregate supply equation (US inflation), and US policy rule. The rationale for the use of US as a proxy for world demand is premised on the observed synchronicity in the Philippine and US business cycles as well as on the vertical production networks within the Asia-US region.[6]

Figure 1

Schematic Diagram of the MMPH



Model parameterization[7]

Model parameterization was undertaken by testing various combinations of parameter values that reflect the characteristics of the macro economy and theoretical consistency of monetary policy response to shocks. Preliminary parameterization was based on the results of partial equilibrium analyses using ordinary least squares method and generalized method of moments as well as simple ratios and proportions in the data. It is understood clearly that parameterization goes beyond the initial assignment of parameter values but entails several parameter adjustments. This approach recognizes that estimation is not a sine qua non in model development for the reason that not all important economic relationships can be reasonably estimated even with extensive data.

[6] This is known as the tripolar trade through China. In this structure, (i) East Asian economies produce sophisticated components and export them to China; (ii) China assembles them into final products; and exports them to the United States for consumption (page 78 of IDE-JETRO WTO Trade Patterns and Global Value Chains in East Asia, 2011).

[7] See Appendix 1 for the current model parameterization.

Data transformation and filtering[8]

Where appropriate, data series are deseasonalized and log-transformed. For ease of presentation, the time subscript in the variables is suppressed except for the forward-looking and backward-looking components. Variables that end in t refer to trends whereas those that end in g refer to gaps. Variables that begin with g refer to growth rates. For historical analysis, a multivariate filter[9] is used to generate mean forecasts of the future target variables, conditional on the current information set.

The Core Behavioral Equations

The MMPH is a structural gap model considering that as an aggregate demand management tool, monetary policy can only influence the business cycle. The model is not about structural policies and growth reforms that the government must pursue.

Potential Output. Potential output growth (Yt) corresponds to trend GDP growth that is compatible with the inflation target and is not strictly interpreted as the full employment output growth. This is a choice for simplicity because of the fact that much richer dynamics may be obtained from more complicated models, provided reliable data on employment and capital stock exist.

Only permanent shocks such as technological change and sustained inflow of foreign direct investment that affect the productivity of capital and labor can affect the long-run development of the supply side of the economy. They can also move the contemporaneous cyclical part of output as expectations of higher potential output in the future also brings about an impetus to current period aggregate demand.

Current growth of trend GDP is a weighted sum of its own lag, a constant steady state output growth *(dyss)* that characterizes the underlying economic growth momentum, given initial conditions, and a shock.

$$gYt = rho\_gYt * dyss + (rho\_gYt) * gYt_{t-1} + RES\_gYt;\ where\ RES\_gYt \sim N(0,\sigma_{RES\_gYt}) \qquad \text{(eq1)}$$

where:

gYt	Growth rate of trend GDP
$dyss$	Steady-state GDP growth rate
RES_gYt	Shock to trend GDP growth with zero mean and constant variance

The level of potential GDP equals previous period's level and quarterly growth rate with some shocks:

$$Yt = Yt_{t-1} + \frac{gYt}{4} + RES\_Yt; \qquad RES\_Yt \sim N(0,\sigma_{\overline{lgdp}}) \qquad \text{(eq2)}$$

where:

Yt	Trend GDP (level)
gYt	Growth rate of trend GDP
RES_Yt	Shock to trend GDP with zero mean and constant variance

The steady-state GDP growth rate *(dyss)* is set at 5.0 percent,[10] which also approximates the average trend growth of the economy during the inflation targeting period. It can be seen from the right graph in Figure 2 that annual GDP growth and potential output growth have moderated after the global financial crisis (GFC). This trend is consistent with weakening global demand that dented net export trend growth as well as with the softening trend growth in domestic demand components (Figure 3). Potential output growth has reverted to its pre-GFC average and has been slowly rising since then.

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[8] See Appendix 2 for description of measurement (observables) variables used in the model.

[9] The Multivariate (MV) filter uses additional information to inform the estimate of a state variable (unobservable). The MV methodology treats the filtering problem as a system, where estimates of potential output, NAIRU, inflation and other parameters of a dynamic model are determined simultaneously. The filtering device used is Kalman filter, which is a recursive data processing algorithm employed to generate an optimal estimate of the unobserved state given the set of measurements. It is optimal in the sense that all noise is Gaussian. The Kalman filter minimizes the mean square error for the estimated parameters. The process of finding the "best estimate" from noisy data leads to "filtering out" the noise (Harvey and Shephard, 1993; Kleeman, 1996).

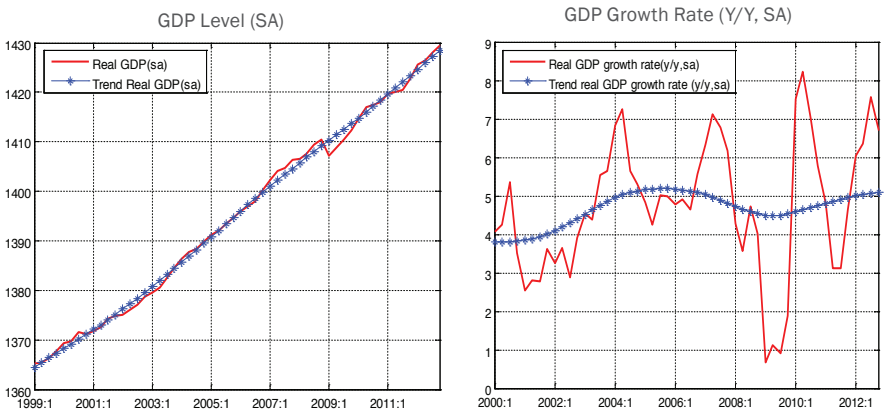
[10] Southeast Asian Economic Outlook 2011/12 puts 2012-2016 real GDP growth at 4.9 percent.

It is recognized, however, that there is still much scope for raising potential GDP growth if there will be major productivity gains in human and physical capital, particularly in the industrial sector in the next three years. The noteworthy growth performance in 2012 bodes well for better and more sustained growth prospects going forward provided the foundations for this growth are further reinforced at a much faster pace in the medium-term.

Usui [2011] noted that the Philippines' slow process of industrialization has greatly impinged on its capacity for accelerated productivity gains. The lack of sustained improvement in physical and human capital infrastructure and a supportive regulatory environment over a long period undermined industrial deepening and diversification, notwithstanding initial success in electronics. The Southeast Asian Economic Outlook 2012/2013 identified three critical policy areas for the Philippines' sustained growth in the post international financial crisis era, i.e., human capital development, infrastructure development, and tax collection and administration reforms. Significant strides in fiscal management and debt management have been achieved. It is therefore highly imperative to build on these gains to disengage from the boom-and-bust cycles that characterized the Philippine economic growth history.

Figure 2.

GDP, Trend GDP, and Trend GDP Growth Rate[11]



Output Gap. Output gap *(Yg)* is defined as the difference between actual GDP and potential output. It can be interpreted as a notional measure of excess demand or excess supply that affects the overall inflationary outlook vis-à-vis the inflation target.

Output gap is specified to be positively related to its own lead and lag, real exchange rate gap, foreign output gap, real remittance gap, and unemployment rate gap; and negatively with real interest rate gap.

$$Yg = alpha1 * Yg_{t+1} + alpha2 * Yg_{t-1} - alpha3 * (Rg + cc) + alpha4 * RMTg + alpha5 * Zg + alpha6 * YFg + alpha7 * URg + RES\_YG \quad \text{(eq3)}$$

where:

Yg	Output gap
Yg_{t+1}	Lead output gap
Yg_{t-1}	Lagged output gap
Rg	Real policy rate gap (real reverse repurchase rate gap)
cc	Credit condition
$RMTg$	Remittance gap (in domestic currency)
Zg	Real exchange rate gap
YFg	Foreign output gap
URg	Unemployment rate gap
RES_YG	Shock to output gap

[11] GDP series is log transformed (i.e., LOG(GDP)*100) and seasonally adjusted.

A negative coefficient for the real interest rate gap means that higher real interest rate relative to trend real interest rate translates into higher opportunity cost of money for households and investors. Higher opportunity cost of money induces households to consume less and investors to curtail or postpone new investment plans.

Credit condition (cc) is a broad measure of an exogenous factor that can affect the cost of fund for borrowers such as the reserve requirement.[12] Reserve requirement represents an opportunity cost for the money that could have been lent out by the banks. Given unchanged credit demand, a higher reserve requirement can reduce available credit through higher intermediation cost.

A positive real exchange rate gap[13] means real exchange depreciation pressures, which provide a boost to aggregate demand. The use of the real exchange rate gap instead of real exchange rate level is intended to account only for the cyclical component of the real exchange rate that moves with the business cycle. This is because the trend component of the real exchange rate is defined by structural factors such as productivity growth and persistent global imbalances that cannot affect the short-run business cycle and are beyond the purview of monetary policy as a short-run aggregate management tool.

Other factors affecting the output gap are the foreign output gap, remittance gap, and unemployment rate gap. YFg captures the effect of foreign demand on domestic output gap. $RMTg$ enters the output gap equation with a positive sign because of its generally procyclical nature, except during periods of economic slowdown such as the aftermath of the technology bubble collapse in 2001 and the 2008 global financial crisis.[14] The URg in the model also has a positive sign because it is defined in the model as $URg = URt - UR$, where URt is the trend unemployment rate and UR is the actual unemployment rate. In this case, higher-than-actual trend unemployment rate means more employed workers and hence, higher aggregate demand.

Phillips curve. The determination of inflation in the model takes after the assumption of monopolistic competition and sticky prices. The inflation expectations formation is introduced as the weighted average of forward-looking inflation expectations (dP_{t+1}) and adaptive expectations (dP_{t-1}), in which the latter captures the rule-of-thumb price setting behavior (there are costs to changing prices) that imparts some intrinsic persistence to inflation.

$$dPe = delta * dP_{t+1} + (1 - delta) * dP_{t-1} \quad \text{(eq4)}$$

The specification of typical Phillips curve only considers long-lived (permanent) cost-push shock. Thus, to capture the short-lived nature of most of the cost-push shocks that hit the economy during the inflation targeting period (e.g., weather-related disturbances, global commodity price shocks), a measurement equation for the short-run shock is introduced in the Phillips curve (PC). This is defined by $PP\_DP2 - beta6 * PP\_DP2_{t-1}$, where $PP\_DP2 = RES\_DP2$.

$$dP = beta1 * (dPM - dZt) + (1 - beta1) * [beta2 * dP_{t-1} + (1 - beta2) * dPe] + beta3 * Yg + beta4 * Zg + beta5 * LRPCOMGAP + RES\_DP + PP\_DP2 - beta6 * PP\_DP2_{t-1} \quad \text{(eq5)}$$

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[12] Reserve requirements refer to the percentage of bank deposits and deposit substitute liabilities that banks must keep on hand or in deposits with the BSP, which may not be lent out. Currently, it is 18% of the bank deposit liabilities. Another candidate variable for cc is a measure of the degree of financial stress in the Philippine financial system, similar to the St. Louis Financial Stress Index of the Federal Reserve Bank of St. Louis. A higher index means weakening of financial condition that raises the external finance premium of all funds. Given the inherent endogeneity of the index, it is essential to extract only the component that does not move with the business cycle and can thus, be interpreted as the pure cost of fund effect. Alternatively, the impact of the financial stress index can be a separate explanatory variable in the output gap equation, similar to the way the bank lending tightening index was included in the Global Projection Model for the US, EU, and Japan.

[13] The effective real exchange rate variable in the equation is defined as $Z = S + PF - P$, where S is the nominal exchange rate; PF is All-Urban US consumer price index from the US Bureau of Labor Statistics; and P is the domestic CPI headline inflation.

[14] The countercyclical behavior during economic downturns confirms Yang and Choi's finding [2007] of the role of remittances in mitigating the negative shocks in the Philippines. Yang [2008] also shows that positive shocks affecting the exchange rate in countries with concentration of Filipino workers can result in higher remittances to assist liquidity constrained recipient households.

where:

dP	Quarter-on-quarter inflation
dPM	Quarter-on-quarter import price inflation
dZt	Rate of change in the real exchange rate trend
dP_{t-1}	Lagged inflation
dPe	Inflation expectations
Yg	Output gap
Zg	Real exchange rate gap
$LRPCOMGAP$	Real international commodity price gap
PP_DP2	Short-lived supply shock
RES_DP	Cost-push shock

The adjustment of the import price inflation for the trend real exchange rate appreciation or depreciation removes the effects of changing productivity levels or imbalances that are structural in nature, and hence, cannot be influenced by monetary policy. Real marginal costs (rmc) are not explicitly modelled due to data constraints in estimating unit labor cost and user cost of capital. Instead, the home part of the rmc in the Phillips curve is proxied by the output gap. This is based on the premise that wage pressures are embodied in the estimate of output gap such that for a given trend output, the prices of final goods already reflects any excess or deficiency in demand. On the other hand, for the imported component, rmc is represented by the real exchange rate gap, real international commodity price gap, and foreign output gap.

An essential feature of the Phillips curve is that backward and forward-looking components must sum up to one or what is known as the homogeneity restrictions on the parameters. The implications are two-fold: One is the super-neutrality feature, i.e., there is no long-run trade-off between output and inflation (i.e., Phillips curve is vertical in the long-run). The other important implication is that while the equation defines the dynamic path of inflation, it does not say anything about what the equilibrium inflation should be.[15] In equilibrium when all gaps are zero, inflation simply reverts to target. This specification points to the fact that it is the prerogative of monetary policy to determine the inflation target and anchor expectations towards it, underscoring the instrument independence of an inflation-targeting central bank.[16]

International real commodity price gap also enters the Phillips curve to account for the impact of imported commodity prices (such as oil and food) on domestic inflation. It is simply modelled as a function of its own lag and foreign output gap.

$$LRPCOMGAP = psi1 * LRPCOMGAP_{t-1} + (1 - psi1) * psi2 * YFg_{t-1} + RES\_LRPCOMGAP \qquad \text{(eq6)}$$

Monetary policy reaction function. The reaction function embodies the trade-offs that the BSP needs to balance such that it does not become an unintended source of volatility in the economy. The rule also cannot sidestep stabilization issues by putting large weight on the near-term inflation forecast. Output gap plays a central role in the model notwithstanding the uncertainty about its precise level. However, it is also equally costly to put too large weight on it or other measures of excess demand.

The monetary policy rule is a forward-looking reaction function. In this rule, the policy rate is a function of inflation gap (measured in year-on-year terms),[17] output gap, as well as lagged policy rate that reflects inertia in actual policy setting due to uncertainty. It states that excess demand conditions and higher-than-target inflation expectations would require an upward adjustment in the policy rate.

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[15] Benes, J., Hledik, T. and Vavra, D. (2005). An Economy in Transition and DSGE: What the Czech National Bank's New Projection Model Needs. Czech National Bank (CNB).

[16] See Chapter 4 of Coats, W., Laxton, D. and Rose, D. (Eds) (2003). The Czech National Bank's Forecasting and Policy Analysis System.CNB, Prague, Czech Republic (February 2003).

[17] Inflation target is expressed on a year-on-year basis.

$$RS = gamma1 * RS_{t-1} + (1 - gamma1) * \{(RRt + PIETARGET_{t+1}) + gamma2 * (dP_{t+3} - PIETARGET_{t+3}) + gamma3 * Yg\} + RES\_RS \quad \text{(eq7)}$$ [18]

In real terms, $RR = RS - dP_{t+1}$

where:

RS	Nominal reverse repurchase rate (policy rate)
RR	Real policy rate
RRt	Trend real policy rate
$PIETARGET$	Inflation target
dP	Quarter-on-quarter inflation
Yg	Output gap
RES_RS	Monetary policy shock

The equation also implies that even if inflation forecast may be below target, conditions of strong excess demand condition could also prompt the central bank to adjust the short-term rate as a pre-emptive measure to temper inflationary pressures going forward. The monetary policy rule is characterized by inertia, reflecting inherent uncertainty in the economic environment when the policy rate is determined. Given that there is inertia in the way output gap affects inflation, the short-term rate can only be, at best, set in a way that would project inflation to go back to target within a reasonable period, without new shocks.

Exchange rate gap (Zg) is deliberately not included in the monetary policy rule because of the role it plays in the determination of the BSP's monetary policy stance.[19] The BSP resorts to occasional intervention in the foreign exchange market when the exchange rate movement is deemed too volatile and inconsistent with the country's fundamentals. This occasional intervention motive is instead embedded in the UIRP equation, as discussed in the following section. Furthermore, there may be no significant information value from its inclusion in the monetary reaction function. This is because the exchange rate in the UIRP is already a function of expected future interest rates, which, in turn, are also determined by other macroeconomic variables.

Uncovered Interest Rate Parity (UIRP). The uncovered interest rate parity is an arbitrage condition that reflects how international investors seek to equalize the **effective** rates of return on different currencies, allowing for some country-specific risk premium. Interest rate differential is estimated vis-à-vis the US since Philippine foreign assets and liabilities are predominantly denominated in US dollars.

$$RS - RS\_US = 4 * (S^e - S) + PREM - omega4 * RMTFg + omega5 * dFXRES + RES\_UIP \quad \text{(eq8)}$$ [20]

where:

RS	Nominal reverse repurchase rate
RS_US	Nominal US Federal Funds rate
S^e	Expected nominal exchange rate (see eq 9)
S	Nominal exchange rate
$PREM$	Risk premium
$RMTFg$	Remittance gap in US$
$dFXRES$	Quarter-on-quarter change in foreign exchange reserves
RES_UIP	Shock on exchange rate

[18] Policy rate is in annual terms, hence, the deviation of inflation forecast from target is also expressed in annual terms.

[19] Peiris' (2011) specification includes real exchange rate in the monetary reaction function, citing finding of Stone et al, 2009) that real exchange rate is "observed to be quite significant in emerging markets. Peiris noted that the coefficient of real rate gap was less than many other emerging markets.

[20] The term $4*(S^e - S)$ is just the annualized rate of change in nominal exchange rate to make it compatible with policy rate expressed in annual terms.

Expected exchange rate is the weighted sum of forward-looking and backward-looking components. The drift corresponds to the adjustment for trend nominal exchange rate as defined by $2 * (dZt + PIETARGET - PIETARGET\_US)/4$ in equation 9.[21]

$$S^e = xi\_s * S_{t+1} + (1 - xi\_s) * S_{t-1} + 2 * (dZt + PIETARGET - PIETARGET\_US)/4 \quad \text{(eq9)}$$

where:

S_{t+1}	Lead nominal exchange rate
S_{t-1}	Lagged nominal exchange rate
dZt	Annual trend real exchange rate depreciation/appreciation
$PIETARGET$	Annual Philippine inflation target
$PIETARGET\_US$	Annual US inflation target

The premium ($PREM$) in the UIP (eq 8) is derived from the trend-consistent $UIRP$, *i.e.*, $PREM = RRt - RRFt - dZt$, where RRt is the domestic trend real policy rate, $RRFt$ is the trend US real Federal Funds rate and dZt is the trend real exchange rate. This should not be interpreted as the measure of premium used in many reports such as the Credit Default Swaps (CDS) or EMBI-Philippine indices, which do not lend themselves easily to replication, given different methodologies for constructing the indices. Instead, $PREM$ in the model simply represents the excess over the trend exchange rate depreciation/appreciation rate implied by the arbitrage condition. It captures the adjustment in returns demanded by foreign investors for country-specific risk.

The inclusion of change in foreign exchange reserves ($dFXRES$) and remittance gap in foreign currency ($RMTFg$) is meant to capture the impact on exchange rate of higher foreign exchange inflows, proxied by remittances,[22] and the BSP's foreign exchange intervention during times of excessive volatility.

Okun's Law. Wage pressures are embodied in the measure of output gap, which feeds into unemployment and inflation.

$$URg = chi1 * URg_{t-1} + chi2 * Yg_{t-1} + RES\_URG \quad \text{(eq10)}$$

$$URt = chi3 * urss + (1 - chi3) * URt_{t-1} + gURt + RES\_URT \quad \text{(eq11)}$$

$$gURt = chi4 * gURt_{t-1} + gURt + RES\_gUR \quad \text{(eq12)}$$

$$UR = URt - URg \quad \text{(eq13)}$$

where:

UR	Unemployment rate
URg	Unemployment rate gap
URt	Trend unemployment rate
$gURt$	Growth rate of trend unemployment
$urss$	Steady-state unemployment rate
RES_URG	Shock to unemployment gap
RES_URT	Shock to trend unemployment rate
RES_gUR	Shock to growth rate of trend unemployment rate

The condition of surplus labor together with the institutional feature of minimum wage setting would imply that wage pressures do not make a significant dent on output gap or on inflation. Only about 3 million workers are covered by the minimum wage law, representing roughly 8 percent of the total labor force. There is a cap on the frequency of minimum wage adjustment per year,[23] relatively small magnitude of wage adjustments when implemented, and reported under reporting of compliance with minimum wage law. Real wage growth (mean

[21] $PIETARGET$, $PIETARGET\_US$ and dZt are all expressed in annual terms. Thus, the factor 4 converts these variables into quarter-on-quarter terms. The factor 2 corresponds to 2 adjacent quarters, i.e., t-1 and t+1 quarters to make the exchange rate less erratic.

[22] Remittances account for a substantial portion of foreign exchange inflows into the Philippines, outpacing inflows arising from foreign direct investments and portfolio inflows.

[23] No petition for regional wage adjustment is allowed 12 months after the effectivity of a wage order, unless there are supervening conditions.

differential between annual nominal wage growth and annual inflation rate) for the period 1998-2012 is just about 0.9 ppt. Thus, in real terms, it can be inferred that variability in real wages accounts for a very small portion of the variability in real marginal cost, at least, historically. This is also supported by the fact that the number of underemployed (hence, lower wages) are much greater than the unemployed.

Foreign Block.[24] The foreign block, represented by the US economy, consists of three major equations, namely, output gap, Phillips curve, and monetary policy rule. The equations of the foreign block are patterned after the 2008 Small Quarterly Projection Model for the US economy.[25] The foreign block in the MMPH should not be taken as a forecasting model for the US but merely a tool for conditioning some other forecasts from satellite trade models or even the IMF Global Projection Model (GPM) forecast.

$$YFg = alpha\_f1 * YFg_{t-1} + alpha\_f2 * YFg_{t+1} - alpha\_f3 * RRFg_{t-1} + RES\_YFG \quad \text{(eq14)}$$

$$dPF = beta\_f1 * dPF_{t-1} + (1 - beta\_f1) * dPF_{t+1} + beta\_f2 * YFg_{t-1} + RES\_DPF \quad \text{(eq15)}$$

$$RS\_US = gamma\_f1 * RS\_US_{t-1} + (1 - 0.65) * \{(RRFt + PIETARGET\_US_{t+1}) + gamma\_f2 * (d4PF_{t+3} - PIETARGET\_US_{t+3}) + gamma\_f3 * YFg\} + RES\_RS\_US \quad \text{(eq16)}$$

$$RRF = RS\_US - dPF_{t+1} \quad \text{(eq17)}$$

where:

YFg	US output gap
dPF	US inflation rate
PIETARGET_US	US inflation target
RS_US	US Federal Funds rate
RRF	US real Federal Funds rate
RRFt	US real trend Federal Funds rate
RRFg	US real interest rate gap
RES_YFG	Shock to US output gap
RES_DPF	Shock to US inflation
RES_RS_US	US monetary policy shock

There are several reasons for using the US economy as the proxy for the world economy. First, the use of US parameter values is deemed justifiable since the Philippine business cycle closely tracks the US business cycle. Hence, the magnitude of the parameters is expectedly within the same range of values. Second, the use of US as a proxy for foreign demand is also premised on the vertical production networks within the Asia-US region, with China as the center of the network. In this set-up, China is the core market for intermediate products, from which final consumption goods were produced for exports predominantly to the US. While Emerging Asian economies account for the largest share in trade balance with the Philippines, the US remains the final destination market for final goods (WTO and IDE-JETRO, 2011).[26] Lastly, from a cost-efficiency perspective, a simple foreign bloc that captures key dynamics would suffice in the initial phase of model-building. Building a detailed regional foreign bloc for a small open economy like the Philippines is a very resource-intensive and time-consuming endeavor. It would be akin to having a full-scale Global Projection Model (GPM) of the IMF. Eventually, either the MMPH will link to the GPM or a smaller-scale external satellite model will be developed.

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[24] The foreign block should not be interpreted as the model for the US economy. External assumptions over the forecast horizon are taken from the US block of the IMF Global Projection Model (GPM) and plugged into MMPH forecast path as given. Thus, the foreign block is a means to incorporate the impact of external demand on the Philippine economy but does not do real forecasting for the US economy.

[25] Carabenciov, I, Ermolaev, I., Freedman, C., Julliard, M., Kamenik, O., Korshunov, D., and Laxton, D. (2008). A Small Quarterly Projection Model of the US Economy. IMF WP/08/278

[26] This is known as the tripolar trade through China. In this structure, (i) East Asian economies produce sophisticated components and export then to China; (ii) China assembles them into final products; and exports them to the United States for consumption (page 78 of IDE-JETRO WTO Trade Patterns and Global Value Chains in East Asia, 2011).

III. Policy Tests

To illustrate the transmission of aggregate demand and aggregate supply shocks in the model, four policy tests were undertaken with the current version of the model.[27]

(a) Positive aggregate demand shock (Figure 4)

When a demand shock occurs (e.g., via fiscal stimulus, across-the-board wage pressures), inflation goes up. Monetary policy reacts to temper the build-up of domestic inflationary pressures. On impact, this action of the central bank brings about nominal exchange rate appreciation. With nominal exchange rate appreciation and rise in domestic inflation, real exchange rate appreciates, dampening the rate of growth of the domestic price of imports (i.e., imported inflation).

Notwithstanding the immediate monetary policy response to the shock, inflation still goes up and peaks in the 3rd – 4th quarter due to inertia in demand. Inflation goes back to target approximately twelve quarters after the initial shock. The challenge for monetary policy, therefore, is to bring inflation back to target over the two-year policy horizon set by the central bank. This feature of the monetary policy horizon acknowledges that optimal monetary policy is one that does not try to bring inflation back to target every period, otherwise such policy behavior will be inducing undue volatility in the market.

(b) Positive aggregate demand shock with unchanged monetary policy stance for four quarters (Figure 5)

This exercise is intended to demonstrate the cost of delay in monetary policy response in the face of demand shock. Without the exchange rate appreciation, the impact on inflation is immediate. Because the unchanged monetary policy stance is anticipated by the market, the inaction will feed into higher inflation expectations, thus, inducing greater inflation volatility that would require a stronger policy response the longer the duration of unchanged policy stance is.

(c) Aggregate Supply Shock (Figure 6)

A positive supply shock leads to an immediate, sharp rise in inflation. Monetary policy counteracts the inflation hike with higher policy rate. The higher interest rate initially triggers an exchange rate appreciation, which reverses itself afterwards. This pulls down the output gap in subsequent periods that leads to a gradual decline in domestic inflation.

As can be seen in the chart, inflation peaks earlier with a cost-push shock compared to an aggregate demand shock. The cost-push shock raises domestic inflation by a bigger magnitude than the aggregate demand shock because of its direct impact on real marginal cost.

(d) Short-lived aggregate supply shock (Figure 7)

A temporary supply shock results in much subdued inflation and moderate output loss. With unchanged US inflation, the higher inflation ensuing from the temporary cost-push shock triggers a nominal exchange rate depreciation that immediately reverses itself in the succeeding quarter. A shock that is expected to be temporary (e.g., supply disruptions due to typhoons, short-term geo-political turbulence) will expectedly affect investment and consumption plans by a lesser magnitude than a persistent shock.

[27] Additional policy tests will be included in the working paper version of this article.

Concluding Remarks

This article provides only a snapshot of the core behavioral equations and the basic simulation results of the MMPH. As in any economic modelling work, the MMPH is a work-in-progress. Nonetheless, the preliminary results are theory-consistent with impulse response functions that reasonably reflect the dynamic path of key variables in response to shocks.

Figure 3

Actual Growth Rates vis-à-vis Trend Growth Rates of GDP Components

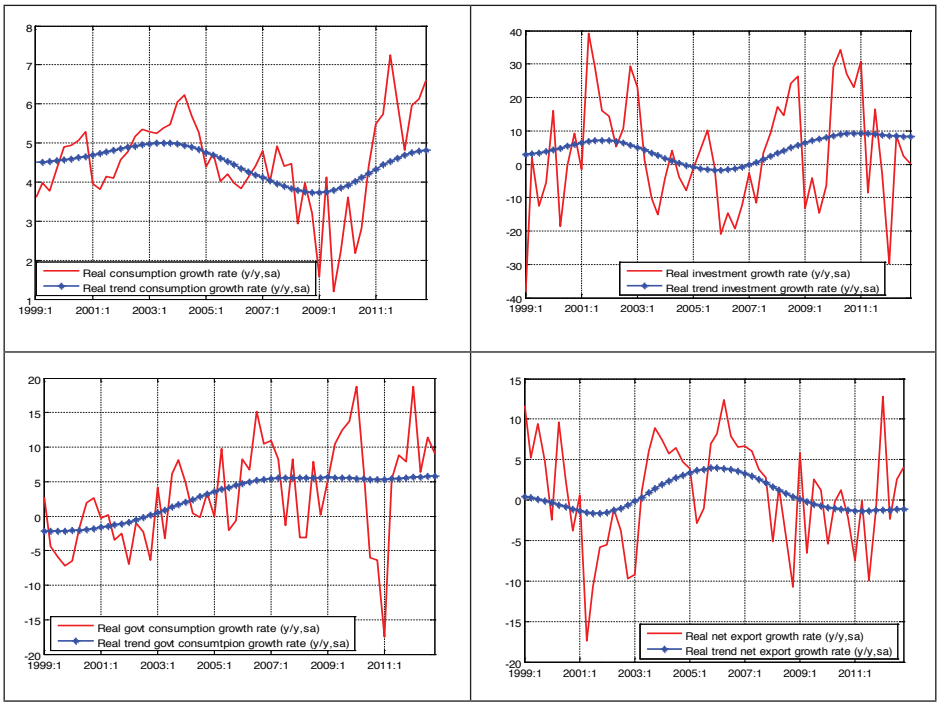


Figure 4

Positive Aggregate Demand Shock

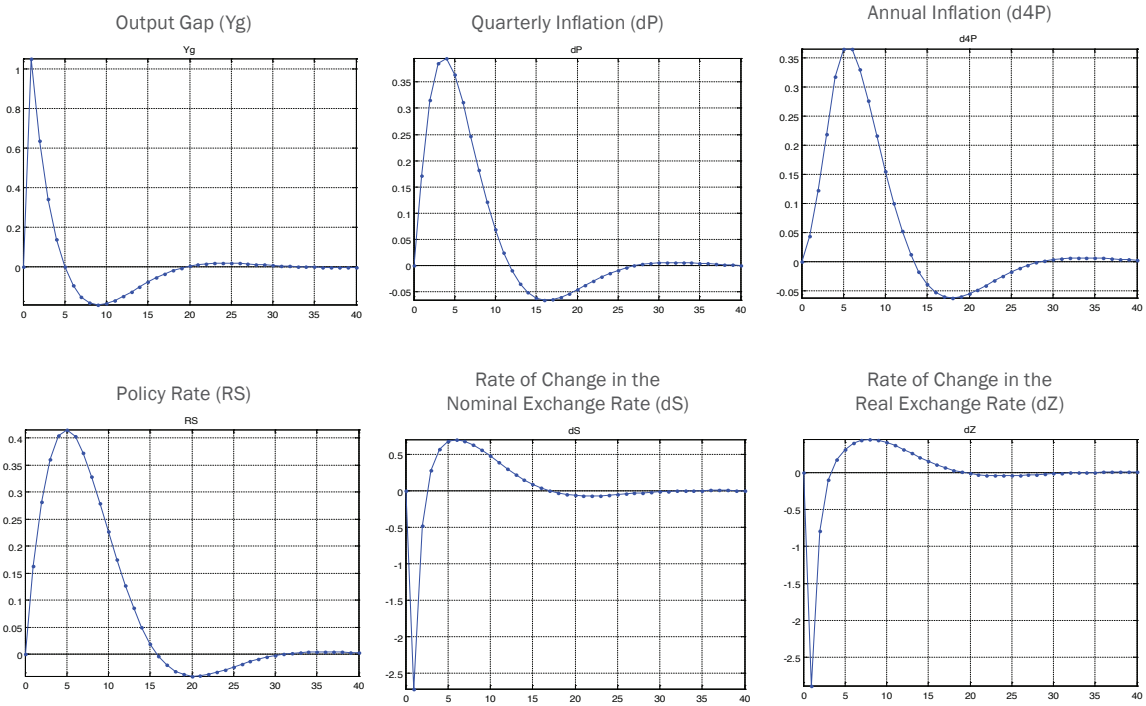
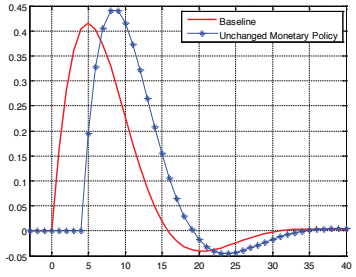


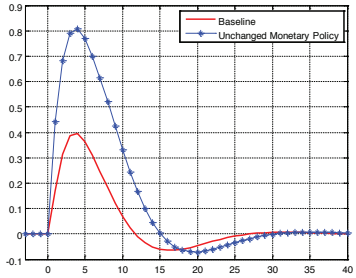
Figure 5

Positive Aggregate Demand Shock with Unchanged Monetary Policy Stance for Four Quarters

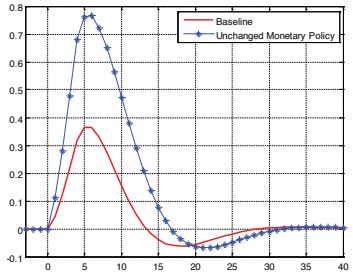
Policy Rate (RS)



Quarterly Inflation (dP)



Annual Inflation (d4P)



Output Gap (Yg)

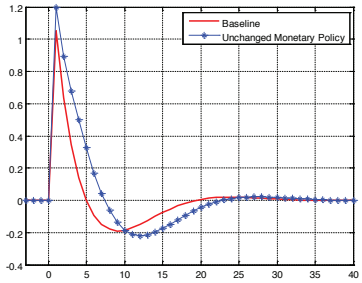
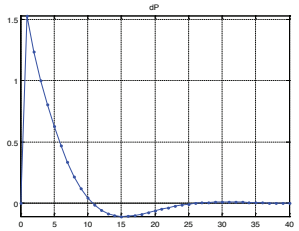


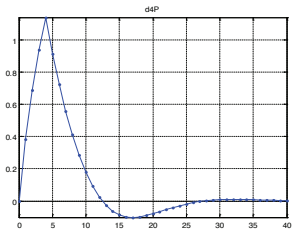
Figure 6

Aggregate Supply Shock

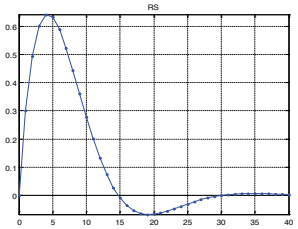
Quarterly Inflation Rate (dP)



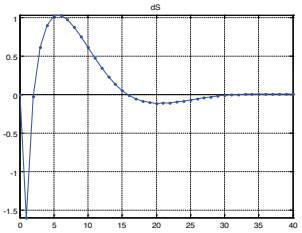
Annual Inflation Rate (d4P)



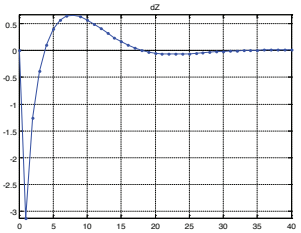
Policy Rate (RS)



Rate of Change in Nominal Exchange Rate (dS)



Rate of Change in Real Exchange Rate (dZ)



Output Gap (Yg)

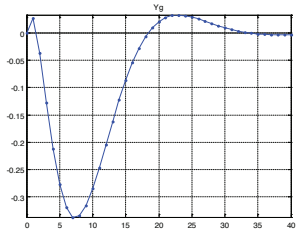
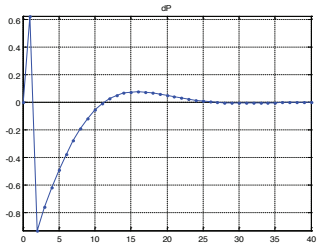


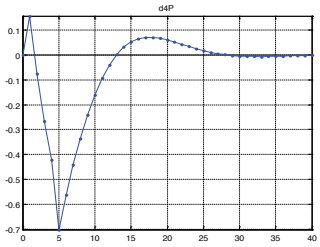
Figure 7

Short-Lived Aggregate Supply Shock

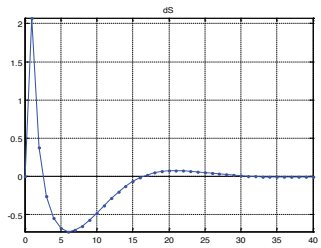
Quarterly Inflation Rate (dP)



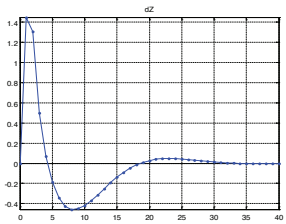
Annual Inflation Rate (d4P)



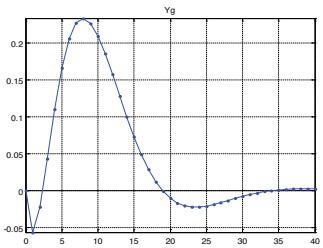
Rate of Change in Nominal Exchange Rate (dS)



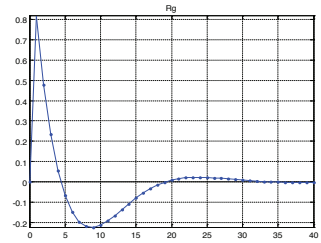
Rate of Change in Real Exchange Rate (dZ)



Output Gap (Yg)



Real Interest Rate Gap (Rg)



Appendix 1

Summary of Parameter Values

Parameter	Value	Parameter	Value
alpha1	0.60	rho_prem	0.60
alpha2	0.15	rho_fxprem	0.00
alpha3	0.10	rho_fxres	0.90
alpha4	0.06	rho_pietar	0.90
alpha5	0.03	rho_gyt	0.90
alpha6	0.20	rho_rmtfg	0.30
alpha7	1.00	rho_RFt	0.90
alpha8	0.004		
		omega1	0.10
beta1	0.03	omega2	0.20
beta2	0.40	omega3	0.80
beta3	0.10	omega4	0.20
beta4	0.0001	omega5	0.40
beta5	0.03		
beta6	0.90	alpha_f1	0.55
		alpha_f2	0.30
chi1	0.85	alpha_f3	0.20
chi2	0.06		
chi3	0.90	beta_f1	0.40
chi4	0.80	beta_f2	0.04
gamma1	0.85	gammaf1	0.65
gamma2	1.75	gamma_f2	1.95
gamma3	0.50	gamma_f3	0.20
delta	0.80	dpss	4.00
		dpfss	2.00
psi1	0.20	dzss	-1.50
psi2	0.05	rfss	0.50
		premss	2.00
xi_s	0.80	dyss	5.00
		urss	7.20

Appendix 2

Measurement Variables Used in the Model

Variable Name	Variable Description
Y	Real Gross Domestic Product (2000 based)
UR	Unemployment Rate
RS	BSP's Reverse Repurchase Policy (RRP) Rate
LRPCOM	IMF International Commodity Prices, weighted sum of fuel (POILDUB) and non-fuel commodities (PNFUEL)
PIETARGET	Inflation Target
P	Philippine Consumer Price Index (2006 = 100)
RMTF	Overseas Filipino Workers' Remittances (in US dollars)
S	Nominal Exchange Rate
YF	US Real Gross Domestic Product (chained, 2000-based) from the US Bureau of Economic Analysis (BEA)
PF	All-Urban US Consumer Price Index from the US Bureau of Labor Statistics (BLS)
RS_US	US Federal Funds Rate

All variables are in logs and seasonally-adjusted where applicable.

References

Benes, J. (2011, March 03). Forecasts how we like them. Retrieved from http://iris-toolbox.blogspot.com

Benes, J., Hledik, T. & Vavra, D. (2005). An Economy in Transition and DSGE: What the Czech National Bank's New Projection Model Needs (Czech National Bank [CNB] Working Paper No. 12/2005). Retrieved from CNB website: http://www.cnb.cz/en/research/ research_publications/cnb_wp/2005/cnbwp_2005_12.html

Berg, A., Karam, P., & Laxton, D. (2006). Practical Model-Based Monetary Policy Analysis – a How-to-Guide (IMF Working Paper 06/81).

Carabenciov, I., Ermolaev, I., Freedman, C., Julliard, M., Kamenik, O., Korshunov, D., & Laxton, D. (2008). A Small Quarterly Projection Model of the US Economy (IMF Working Paper/08/278).

Coats, W., Laxton, D. & Rose, D. (eds.) (February 2003). The Czech National Bank's Forecasting and Policy Analysis System.CNB, Prague, Czech Republic.

Giannone, D., Reichlin, L., & Small, D. (May 2008). Nowcasting: The real-time informational content of macroeconomic data. Journal of Monetary Economics, 55(4), 665-676.

Harvey, A. & Shephard, N. (1993).Structural Time Series Models. Handbook of Statistics, Volume 11. Maddala,G., Rao, C., & Vinod, H.(eds.). Elsevier Science Publishers B.V.

King, R. (2000). The New IS-LM Model: Language, Logic, and Limits. Federal Reserve Bank of Richmond Economic Quarterly, 86(3). Summer 2000.

Kleeman, L. (1996, January 25-26). Understanding and Applying Kalman Filtering. Proceedings of the Second Workshop on Perceptive Systems, Curtin University of Technology, Perth Western Australia

Peiris, S. (2011). Forecasting and Monetary Policy Analysis System for the Philippines. Internal report.

Sheedy, K. (2010). Intrinsic Inflation Persistence. Department of Economics, London School of Economics. Draft as of October 7, 2010.

Southeast Asian Economic Outlook 2012/13: With Perspectives on China and India. OECD Development Centre's Southeast Asia Unit.

Usui, N. (March 2011). Transforming the Philippine Economy: "Walking on Two Legs" (Asian Development Bank [ADB] Economic Working Paper Series N0.252). Retrieved from ADB website: http://www.adb.org/publications/transforming-philippine-economy-walking-two-legs.

World Trade Organization (WTO) and IDE-JETRO (2011). Trade Patterns and Global Value Chains in East Asia: From Trade in Goods to Trade in Tasks. WTO ISBN 978-92-870-3767-1. Retrieved from WTO website: http://onlinebookshop.wto.org/shop/article_details.asp? _Article=783&lang=ENGeneva, Switzerland.

Yang, D. (2008). International Migration, Remittances and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks. The Economic Journal, 118, 591-630.

Yang, D. & Hwajung, C. (2007). Are Remittances Insurance? Evidence from Rainfall Shocks in the Philippines. World Bank Economic Review, 21(2), 219–248.

A Univariate Time Series Analysis of Philippine Inflation During the Inflation Targeting Period

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Introduction

This paper examines the behavior of month-on-month (m-o-m) inflation and finds empirical evidence that the BSP's inflation targeting (IT) policy regime over the past ten years was indeed successful in anchoring inflation expectations compared to the decade before, during its early years as an independent monetary authority, prior to its adoption of IT. Inflation expectations are said to be well anchored if the public expects the inflation rate to converge back to the central bank's inflation target, in spite of the occurrence of a short spell when the inflation rate is outside the central banks' officially announced target range.[1] One indicator of this is when the m-o-m inflation rate becomes an autoregressive mean-stationary process, where the variations (i.e., the *change* in the m-o-m inflation rate) are generally white noise.

Consequently, if only unanticipated shocks move m-o-m inflation, it is important to ask which movements in the inflation rate monetary authorities should react to and which it should not react to. Our recommendation is that monetary authorities need not respond to short-run, and likely to be temporary, deviations in the m-o-m inflation rate from the mean.[2] This holds true unless the changes, whether for a single month or a string of months, are large enough to dislodge inflation expectations, which could possibly lead to permanent changes in the long-run inflation trend. Such would be the case, for example, if there is a large random shock (or a string of smaller shocks, which taken together is large) and administered (or politically-set) wages are adjusted as a reaction to the large shock. If this happens, a wage-price spiral could be triggered which could, in turn, result in inflation that would be persistently higher than the central bank's target band.

This study relies on a univariate time series analysis of Philippine m-o-m inflation before and during IT to show that inflation expectations were better anchored during the IT period than before IT. This is consistent with the fact that m-o-m inflation was not stationary during the pre-IT period but became stationary during the IT period. The study also looks at the behavior of m-o-m inflation before the BSP became an independent monetary authority and finds that it was also mean stationary, but with a much higher mean and variance. We proceed as well with several empirical tests on the characteristics of the *change* in the m-o-m inflation rate series to check if it is a white noise process, and proceed with the development of an applicable autoregressive-moving average (ARMA) model for the series.

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[1] Ball and Cecchetti (1990, p.215) noted than inflation "[...] would not be particularly costly if it were constant and dully anticipated but that a rise in the level of inflation raises uncertainty about future inflation."

[2] As Ball and Cecchetti (1990, p. 216) pointed out, "Permanent shocks are shifts in trend inflation, and temporary shocks are fluctuations around the trend. Uncertainty about [short-term or] next quarter's inflation depends mainly on the variance of temporary shocks [...]." Inflation uncertainty, they add, refers to the variance of *unanticipated* changes.

Theoretical Framework and Literature Review

In order to guide the framework of analysis for this study, it is relevant to look into the basic concepts on the optimal conduct of monetary policy that have been widely developed in the literature. We use what is now the usual textbook model as in Froyen and Guender (2007). The model starts with a Lucas-type aggregate supply function, wherein output deviates from potential output only to the extent that inflation is higher or lower than expected or because of supply shocks. The aggregate demand function is derived from standard IS and LM equations. Lastly, as is now almost standard in most advanced macroeconomic textbooks, the model is completed by specifying objectives and constraints faced by policymakers and their effects on the formation of inflation expectations.

Thus, we have:

a Lucas-type aggregate supply equation:

$$y = y^* + c\,(p - p^e) + u, \tag{1.1}$$

an IS curve:

$$y = f(r - \pi^e, z_{IS}) + v, \tag{1.2}$$

an LM curve:

$$m/p = f(y, r, z_{LM},) + \eta \tag{1.3}$$

and inflation expectations are formed as:

$$\pi^e = f(\pi^*, \pi_{-k}, z^e). \tag{1.4}$$

The rest of the variables are defined as:

y	=	real output,
y^*	=	potential output
$\pi^e = ((p^e\text{-}p_{-1})/\, p_{-1})$	=	expected inflation
π^* *and* π_{-k}	=	long-run inflation target, vector of past inflation rates that are relevant for expectations formation, respectively,
p	=	aggregate price level,
r	=	nominal interest rate,
z_{IS} *and* z_{LM}	=	vector of exogenous variables affecting the IS and LM curves, respectively
z^e	=	are other variables that economic agents use to forecast inflation
g	=	central bank instruments other than the interest rate and fiscal policies by the national government that could affect expectations
m	=	nominal money supply,
p^e	=	expectation of the aggregate price level for the current period, formed on the basis of information at period $(t-1)$,
u,v,η	=	white noise disturbances with variances, σ^2_u, σ^2_v, σ^2_η and zero covariances.

From equation 1.1, it follows that supply or output is equal to potential output but deviates from it depending on the current period price forecast error and random supply shocks represented by the stochastic term u_t. Equation 1.2, the IS equation, states that demand is a decreasing function of the real interest rate—defined as the nominal interest rate (r) minus the expected inflation rate from period $t\text{-}1$, a vector of other variables z_{IS} (which the monetary authorities cannot directly influence but can either observe or predict with some level of confidence), and a stochastic term v_t to measure shocks which affect demand in the goods market. Equation 1.3 is the LM curve which describes portfolio balance (e.g., between

bonds and money in the simplest textbook model). The left-hand side of the LM equation is real money supply and the right-hand side is demand for money which is assumed to be positively related to real income (y), and negatively related to nominal interest rate on bonds (r). The demand for money is also affected by a vector of variables z_{LM} which the central bank cannot control but can either measure or predict with some level of confidence and the stochastic term η which represents shocks to money demand.

There are several permutations of policymaker behavior and expectations formation behavior that can be used to close the model. The simplest case is when expectations are well-anchored and there is an independent central bank which minimizes a generalized loss function such as equation 1.5 below.[3]

$$L_{(i,h)} = E_i \left[\Sigma^{h}_{i=1} \beta_i \{ \mu_1 [\pi_i - \pi^*]^2 + \mu_2 [y_i - y^*]^2 \} \right] \quad (1.5)$$

where:

π_i	=	the actual inflation rate at period i,
y_i	=	the growth rate of actual output at period i,
π^* and y^*	=	the desired levels for π and y,
β	=	the discount factor for period i
h	=	the horizon
μ_1 and μ_2	=	the relative weight given to squared price and output deviations from their desired paths
E_i	=	expectation conditional on information available at period i

If we define expectations as being well anchored at π^*, such that the public is expecting inflation to be π^* except for random forecast errors, all terms except π^* drop out from the right-hand side of equation 1.4, which becomes simply $\pi^e = \pi^*$. It follows from the loss function 1.5 and from the supply function equation 1.1 that it is optimal for the central bank to calibrate its policy variables such that $Ey = y^*$ (except when monetary policy is at a "zero-bound", which means that the values of z_{IS} and the parameters in the IS curve are such that output would be less than y^* even when the nominal interest rate is zero). In other words, the central bank will disregard the stochastic terms of equations 1.1 and 1.2 and solve for the optimal values of y and r.[4] Then given that $y = y^*$ and $\pi = \pi^*$, r can be solved for in equation 1.2. Note that given y and r, and setting $p = p_{-1}(1+ \pi^*)$, m can be solved for using the expected value of equation 1.3, but the money supply that will result is a conditional mean value, not an actual realized value.[5] In other words, to the extent that demand for money is volatile, monetary policy will be operationalized through interest rate setting, not through the direct determination of money supply.[6]

Equation 1.5 is clearly minimized if actual π equals π^* plus a random error term and actual y equals y^* plus a random error term, since the random errors are themselves just a linear combination of the error terms u, v, η in equations 1.1, 1.2 and 1.3. Note that in this scenario, it is useful to distinguish between changes in y and p that are due to random shocks u, v, and η and those that emanate from changes in z_{IS} and z_{LM}. The first set of changes is essentially

[3] Borrowing from papers such as Turnovsky (1980, 1983) and Benavie & Froyen (1983) as cited in Froyen & Guender (2007).

[4] The assumption that the interest rate that the monetary policymaker controls is the same rate that is relevant for the IS schedule. In practice, it is a short-term rate, such as the Reverse Repurchase overnight rate in the case of the BSP, which is the monetary policy instrument. But the interest rate that has the most significant impact on aggregate demand and the IS schedule is, in fact, a long-term rate (Froyen and Guender, 2007, p. 45).

[5] The same results are arrived at by the algebraic solution from Froyen and Guender (2007).

[6] In the absence of uncertainty, the policymaker can achieve its goals for output and the price level equally well with either the money supply or the interest rate as its instrument. Policy is expressed here in terms of an interest rate setting, but within the information variable approach, the choice of which instrument is used to represent the policy setting is arbitrary. The optimal policy can therefore be expressed as a deterministic relationship between the money supply and the interest rate, similar to Poole's (1970) (Froyen and Guender, 2007, p. 36). In practice, the BSP actually sets the policy interest rate, but closely monitors what happens to monetary aggregates.

unpredictable and it is therefore unwise for forward-looking policies to react to them. On the other hand, to the extent that the z variables can be predicted (e.g., that there are leading indicators that help predict whether the economy will be either weaker or stronger, or in the case of an open economy, that global economic conditions will reduce or increase net exports), then changes in monetary policy (e.g., the main policy interest rate in the case of the BSP) could be called for. The discussion of optimal policy under a target rule such as the inflation targeting framework of the BSP emphasizes the point that the policymaker can observe p and y in setting policy. In the real world, policymakers can observe some prices contemporaneously such as spot and futures commodity prices, but an index such as the GDP deflator is available only with considerable lag (Froyen and Guender, 2007). At any rate, it is clear in this case that the inflation rate can be described as a mean-stationary series, with a variance that would be difficult to reduce further because the changes in the inflation rate emanate from unpredictable random shocks in equations 1.1., 1.2 and 1.3.

If the central bank is not independent from the government but the latter cares as well about keeping the inflation rate stable and output as close as possible to potential output, equation 1.5 would need to also include the policy objectives of the national government and reflect its budget constraints. In effect, the non-independent inflation target π^{**} will be higher than the independent central bank inflation target π^{*} and non-independent preferences μ^{**} will be higher than μ because politicians will have seignorage objectives since an inflation tax may be more palatable than additional explicit taxes. In general, the desired inflation targets of independent central bankers would be much lower than what maximizes seignorage since the independent central bank will not take into account the political benefits that arise from replacing explicit taxes by implicit ones (which, in this case, is in the form of higher inflation).[7]

If the political and macroeconomic governance scenario as described above has been the normal state for quite some time, people will be able to predict inflation, albeit with bigger prediction errors. The reason being is that as seen from equation 1.3, there would be shocks coming not just from the right-hand side of the equation but also from the left-hand side.[8] Thus the LM curve will have an additional error term ζ that would be an additional source of variation for p and y, in addition to the error terms u,v,η. If π^{NI} (actual inflation during the non-independent central bank period) is stable, inflation will still be mean-stationary but with a bigger mean and variance. On the other hand, if the tolerance for inflation varies with the electoral cycle, stationarity may or may not be ruled out depending on the stability of the tolerance for inflation as the economy goes through the political or election-related cycle. At any rate, neither stationarity nor non-stationarity can be ruled out but it is expected that inflation will be more volatile under non-independence than in the scenario where the central bank is independent and has had enough time to gain its credibility.

The transition between the two scenarios just described is bound to result in inflationary expectations that may become well anchored at the lower level only after a considerable period of time. It is probably worthwhile to attempt to explain why this transition period will not be very short or why a newly independent central bank may take some time before it can achieve its goal of significantly lower and well-anchored inflation expectations. Initially, the public will give little or no weight to the newly independent central bank's long-run inflation target. Thus, equation 1.4 becomes:

$$\pi^{e} = k(\pi_{-k}, z^{e}) \qquad (1.4')$$

Where z^{e} are indicators other than past inflation rates which are used to forecast inflation (e.g., the size of budget deficits).

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[7] Politicians may have a higher tolerance for inflation but they would not want to maximize seignorage either because the politically tolerable inflation rate is likely to be lower than what maximizes seignorage income because excessively higher inflation (i.e., beyond a certain threshold) may be more undesirable than new taxes.

[8] This would be the case, for instance, in an open economy if the ability to finance the maturing portion of the public debt is disrupted by surprises in global capital markets, which would force the government to rely more on seigniorage than initially intended.

Given 1.1, 1.2, 1.3, 1.4' and 1.5, policymakers must find the optimal values of r, m, and g. Unless expected inflation is already firmly set at π^* (in which case, as previously discussed, r, m and g will be chosen to set $Ey = y^* \; and \; E\pi = \pi^*$) equations 1.1 to 1.5 are not sufficient to determine optimal r, m, and g. This optimal policy can be viewed as a solution to a problem in which the policymaker uses an instrument or instruments to stabilize the variability of output and prices to achieve a certain target or move toward a certain direction.

As the policymaker operates under uncertainty, his objective is to minimize the expected value of the loss function specified by equation 1.6. This loss function may be termed as an 'intertemporal' loss function. The time horizon for policy objectives extends from the current period to a finite period h which is the period relevant for the impact of monetary policy on the real economy. The size of β indicates to what extent losses in the future are discounted. A value of $\beta=1$ means that future losses are just as important as the losses in the current period. If equation 1.6 is determined solely by the central bank, then it has goal independence. If equation 1.6 comes from the central bank's assessment of what the government wants but the latter does not interfere in the former's choice of the policy variables that are under its control, the former is said to have instrument independence.[9]

Given the presence of stochastic terms, uncertainty is central to the question of the optimal conduct of monetary policy. The central bank will choose the instrument, whether m or r or a combination of the two which will result in the lowest expected value for the loss function. This optimization problem facing the policymaker has two characteristics: the objective function (1.4) is quadratic and the stochastic terms enter (1.1) to (1.3) additively. Problems of this form have a property called *certainty equivalence*.[10] Certainty equivalence means that the solution to the stochastic optimization problem is the same as the solution to the problem ignoring uncertainty. This implies that the optimal setting for whichever instrument will be chosen is the same with what will be found under perfect certainty (Froyen and Guender, 2007, p.13). In other words, the central bank will use the expected values of equations 1.1 to 1.3. Note that when inflation expectations are firmly set equal to π^*, setting $Ey = y^*$ minimizes equation 1.5, which makes it very straightforward to find the optimal m and r.

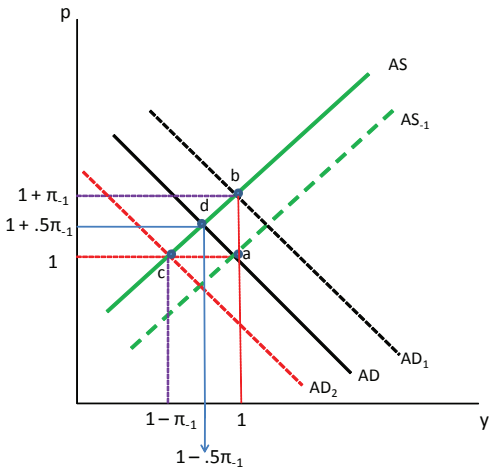
As already stated, expected inflation could initially be much higher than π^*, the long-run inflation target that a newly independent central bank would prefer. A new independent central bank would need to time to gain credibility, especially if economic agents have not, for a very long time, had any first-hand experience with an inflation-targeting central bank. Indeed, fiscal dominance was observed for a long time before the independent BSP was established in 1993. For instance, the only reason that the losses of the old Central Bank of the Philippines (CBP) did not result in loss of control over money aggregates was that the government was borrowing more than what was needed to finance its deficit and was depositing the excess borrowing with the old CBP to help control liquidity. (In turn, the large accumulated losses of the CBP were incurred because it was performing fiscal functions.) If, due to historical reasons, expected inflation is adaptive and is much higher than π^*, it is not feasible to achieve $E\pi = \pi^*$ and $Ey = y^*$ immediately and at the same time. If $E\pi = \pi^*$, then $Ey < y^*$, or if $Ey = y^*$ then $E\pi > \pi^*$. This means that there is a trade-off between achieving output and inflation targets during the period of disinflation. Given the quadratic

[9] The BSP has instrument independence but not full goal independence. Although the BSP participates in the formulation of macroeconomic targets including inflation rates in the medium term, the National Economic and Development Authority (NEDA) is the lead agency in formulating the Medium-Term Philippine Development Plan. As the Plan is prepared only once during an administration's term, the Development Budget Coordination Committee (DBCC) is the interagency body which periodically reviews the inflation targets and, if new conditions arise, the BSP may recommend any revision to the target, subject to DBCC approval. The DBCC is composed of the Department of Budget and Management (DBM), the Department of Finance (DOF), NEDA, the Office of the President, and the BSP. In practice, however, the BSP's proposed inflation targets have always been approved by the DBCC (Lamberte, 2002).

[10] The model solution has a certainty equivalence property if the optimization problem can be separated into two stages: first, getting the minimum mean squared error forecasts of the exogenous variables, which are the conditional expectations; second, at time t, solving the non-stochastic optimization problem, using the mean in place of the random variable. This separation of forecasting from optimization is computationally very convenient and explains why quadratic objective functions are assumed in much applied work. For general functions, however, the certainty equivalence principle does not hold, so that the forecasting and optimization problems cannot be separated (Sargent, 1979). Retrieved from http://economics.about.com/library/glossary/bldef-certainty-equivalence-principle.htm

form of the loss function, we posit that the adjustment process toward the inflation target will be a gradual one. In practical terms, a speedy adjustment towards the inflation target from a point where inflation was higher at $Ey = y^*$, will be too costly in terms of the level of unemployment or output loss that would have to be accommodated so that policymakers would prefer a gradual response. We can illustrate this transition period using a simple case where expected inflation, $E\pi$, is equal to π_{-1}, the inflation rate in the previous period plus a random error.[11] $E\pi$ in this case is much higher than π^*, the central bank's long-run inflation target (which, for simplicity and to reduce notational clutter, is assumed to be zero). We assume further that the AS curve has a slope of 1 (where potential output and the initial log aggregate price level are normalized to be equal to 1 at the beginning, and the discount rate β and preferences coefficients μ_1 and μ_2 are assumed to be all equal to 1). It can be shown using Figure 1 below that the expected loss is greater the shorter the period of disinflation.

Figure 1



Our example begins with the simplifying assumption that the economy's output is initially at y^*. At the initial period, units of output and the price level are normalized so that the initial values are both equal to unity point **a** during period $t\text{-}1$, where the relevant AS and AD curves are AS_{-1} and AD. If the central bank decides to accommodate the expected inflation in the current period, the economy will be at a point **b**, abstracting from random shocks. A drastic option is for the central bank to try to reduce inflation immediately in the current period. This corresponds to point **c** in the chart, where output and inflation are $1 - \pi_{-1} + e_{1,1}$ and $e_{2,1}$, respectively, in the first period. In the second period, expected output will be equal to potential and expected inflation will be equal to zero, the long-term target. The value of equation 5 in this case is equal to $\pi_{-1}^2 + 2\sigma_1^2 + 2\sigma_2^2$ if β and μ are both equal to 1.

However, this drastic inflation reduction program will result in a bigger loss compared to the case where the central bank aims to cut inflation by half in the first period, and totally eliminate it by the second period. In this case, the loss is equal to $0.75\pi_{-1}^2 + 2\sigma_1^2 + 2\sigma_2^2$ which is lower than the case where expected inflation is eliminated within one period.

By induction, a three-period disinflation program would entail an even lower loss, and so on and so forth. This means that during the disinflation period, m-o-m inflation will not be a mean-stationary process since it would have a downward trend as was the case during the transition of the BSP towards its present inflation targeting framework. In actual practice, the speed at which $E\pi$ approaches π^* depends on the monetary authorities' preferences μ and the discount rate β in equation 1.5.

The case for gradualism is even stronger if inflation expectations are adaptive using past experience with longer lags. It would take a longer time to convince the public that the new

[11] In the literature, it has been argued that the error terms may not be normally distributed. These assumptions may not hold outside our equations 1.1 to 1.6. For our purposes, however, we are using the standard assumption of normality if we assume that the model describes reality except for random errors then the assumption of normality holds. However, to the extent that models are not perfect, it cannot be ruled out that inflation rates may actually be more than 2 standard deviations from the mean.

central bank will do its best to break away from the past. This is the case when the newly created independent central bank has yet to establish its credibility in achieving the inflation target it has set, so that the public uses information from past inflation as a basis for expected inflation. The most recent literature has turned to the concept of persistence in the inflation rate and the output gap[12], which denotes backward-looking behavior. However, the focus of this study is on the forward-looking case, consistent with the framework implemented by the BSP. Another characteristic common to recent literature worth noting is the interest in the properties of monetary policy rules. Efforts have been made across a wide variety of specifications and empirical studies to examine the properties and applicability of simple, tractable rules such as the Taylor Rule (Taylor, 1999). Nonetheless, we believe that at the heart of these policy evaluations is still the policymakers' objective function or loss function. This involves an optimization problem which requires the minimization of the present value of losses, where any given period's loss is a quadratic sum of deviations of output from potential output and inflation from the inflation target.

We have seen from the discussion above that, even under uncertainty, as long as monetary authorities are credible and inflation expectations are well anchored, and inasmuch as there are enough instruments at the central bank's arsenal—e.g., the policy interest rate, the gap between the Special Deposit Account interest rate and the policy rate, the reserve requirement (RR) and open market operations (OMO) that expand or contract money supply—monetary authorities will seek to minimize the central bank's intertemporal loss function and hence achieve $E[y_t] = y^*$ and $E[\pi_t] = \pi^*$. The simple AS-AD closed economy model as discussed in this section is far from exhaustive and is not in any way being presented as a comprehensive representation of how the BSP conducts monetary policy in the Philippines. In actual practice, it is clearly more complex. The Philippine economy is an open economy, and the BSP utilizes more policy tools in the conduct of its monetary policy.[13] The basic framework hence would be expected to have a number of shortcomings; nonetheless, this is a workhorse model in the literature where other more complex models have been built upon. In addition, we limit the framework utilized for this study to one that is simple enough to be able to focus on how an inflation targeting policy framework within an environment of well-anchored expectations will impact short-run inflation dynamics and the long-run inflation trend. The approach utilized in this paper is to emphasize simplicity over complexity (Froyen and Guender, 2007, p.135) given that more complicated models building on from the simple one generally do not change and remain consistent with the main results.[14] The theoretical framework presented herewith serves as a guide to the empirical analysis that follows.

In summary, given the model considered in this section, we therefore expect the empirical analysis to show that the behavior of m-o-m inflation would fit the following pattern: Phase (1), prior to central bank independence, m-o-m inflation will be stationary but with a higher mean and a higher variance than during the inflation targeting period; Phase (2), the early years of the BSP's central bank independence prior to IT, m-o-m inflation would show nonstationarity and a declining trend converging toward the long-term inflation target as inflation expectations are still "maturing" while the BSP is still establishing its credibili ty and undergoing a disinflation process; and Phase (3), during the IT period of the independent central bank, we expect the m-o-m inflation series to be a mean-stationary process where the error terms are white noise. By this time, the BSP has already established its credibility with the public; the public now believes that it is a central bank with a clear long-term inflation target in mind so that inflation expectations have become well-entrenched to that target.

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[12] The output gap is defined as the deviation of actual real output from potential real output.

[13] Most inflation targeting central banks in Asia, including the Philippines, are currently equipped with a moderately rich policy tool kit including the policy interest rate, the monetary aggregate using its open monetary operations, the reserve requirement ratio, and, even perhaps a certain degree of de facto exchange rate management. Micro- and Macroprudential regulations and various creative forms of capital controls have also become more important given the environment that central banks are faced with in the aftermath of the global economic and financial crisis (Eichengreen, Barry et al., 2011).

[14] Froyen and Guender (2007) provide a survey of the more complex models used in the analysis of optimal monetary policy under uncertainty, and found that relaxing the restrictive assumptions of the basic IS - LM approach do not digress in any large way from the main findings of the simple model. Chapter 5 extends the basic closed model to the open economy, Chapters 9-11 consider optimal monetary policy with a "forward-looking" Phillips curve specification of the Aggregate Supply curve, and Chapter 12 discusses the backward-looking specification considered by Ball (1999) and others.

Empirical Analysis

The Data: Key features of Philippine inflation before and during IT

Using CPI 2000=100 data, Philippine inflation from the 1970s to the 1980s was generally characterized as high and volatile, wrought with sharp peaks and troughs. The specter of the Philippines' monthly year-on-year (y-o-y) headline inflation rate was predominantly associated with either supply-side shocks, such as world oil crises, commodity price hikes, or weather disturbances; regime-changing political events or civil unrest, such as the First Quarter Storm, the assassination of Benigno Aquino, Jr., the snap elections, and the People Power declaring Corazon Aquino as the President; or domestic macroeconomic crises often rooted in either balance of payments, foreign exchange, or fiscal crises, or a combination of these occurring simultaneously.

The economic literature in the 1990s brought forward theoretical and empirical evidence supporting the notion that in order to ensure the success of an independent monetary authority both in managing inflation and in establishing its credibility in being able to do so, the BSP needed to adopt a nominal anchor. The nominal anchor adopted by central banks usually took the form of a monetary policy rule. The BSP at this time began with a monetary targeting approach up to May 1995, and in June of the same year, monetary authorities decided on a "modified" monetary targeting framework, where monetary aggregate targeting was combined with some form of inflation targeting. It is apparent from descriptive statistics on the data that beginning 1993, there was a marked improvement in year-on-year headline inflation rate compared to the period 1970 to 1992, both in terms of its long-term average (from 14.8 percent in 1970 to 1992 to 6.0 percent in 1993 to 2011) and in terms of volatility (with standard deviation from 11.1 to 2.6 in the same subperiods, respectively).

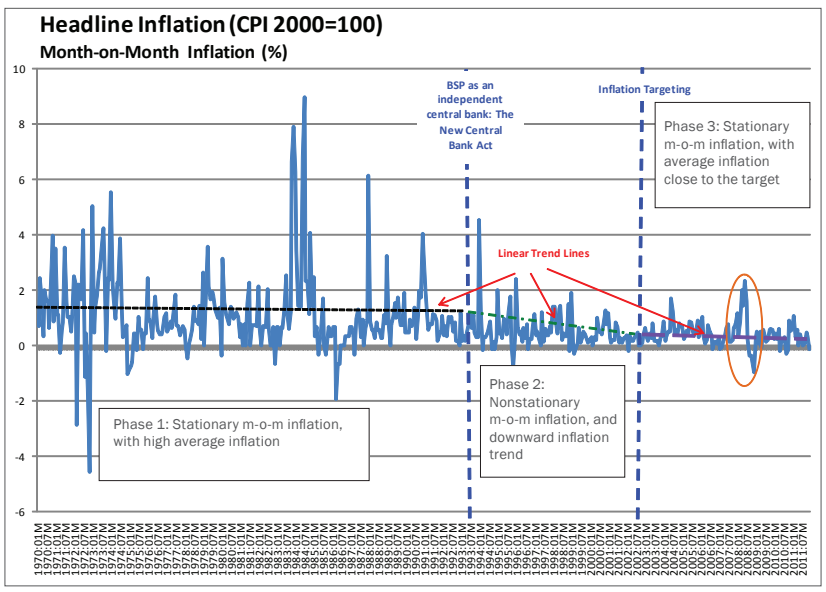
By 2002, the BSP decided to shift fully to a forward-looking inflation targeting framework for monetary policy. Based on the last column in Table 1, the average monthly year-on-year rate of inflation particularly for the IT period January 2002 to October 2011 declined further to about 5.0 percent, and the standard deviation, the measure for the variability in the inflation rates or how spread out the inflation outturns were, has been reduced further to 2.5.

A Closer Look at M-O-M Inflation (Using CPI 2000=100)

While y-o-y headline inflation tends to get the most attention in the general public and media, the trend in m-o-m inflation may be considered the more valuable metric to analyze the variability in headline inflation rate over a year. Large amounts of volatility m-o-m is not captured by, or reflected in, the y-o-y headline inflation rate data. We need a measure that extracts the signal from the noise, getting at the core of the inflation story.

Trend and Cycles

Chart 1



Stationarity

We conduct tests to see if m-o-m inflation is a weakly stationary or second-order stationary process. Deseasonalizing m-o-m inflation, we find that the result of a unit root test using Augmented Dickey-Fuller criterion was that the series for the full period 1970 to 2011 does not have a unit root, that is, it is stationary at the 1 percent significance level.

Table 3

Unit Root Tests for Seasonally-adjusted m-o-m inflation rate

		t-statistic	Probability	LagLength
Full Sample	1970-2011	-3.030456	0.0025	6
Subperiod	1970-1992	-2.200945	0.0270	6
Subperiod	1993-2001	-1.267533	0.1878	5
Subperiod	2002-2011	-2.336667	0.0194	2

For the subperiod 1970 to 1992, the same unit root test was conducted and results showed that the m-o-m inflation series was **stationary**, up to the 5 percent significance level. During the subperiod 1993 to 2001, the period after central bank independence but prior to IT, the same unit root test results showed that m-o-m deseasonalized inflation for this period was **nonstationary**. Using the same unit root test during the IT period 2002 to 2011, however, the result was that the m-o-m inflation series has become stationary once more, up to the 5 percent significance level.

In time series analysis, however, we are interested in the conditional mean and variance of the stochastic process. This would imply that what is more relevant to the analysis is the **change** in the m-o-m inflation rate during the period we are testing, which is the IT period 2002-2011.

Let $r_t = log\ (Pt) - log\ (P_{t-1})$ which is equivalent to the dlog of infl_m-o-m or the ***change in the m-o-m inflation rate.***

The ARMA Model for the mean of the change in m-o-m inflation series

Based on correlogram results in Annex (1), Basic Statistical Tests, the autocorrelation and partial autocorrelation functions indicate that the DINFSA (the change in the m-o-m inflation rate) series from 2002 to 2011 is, in general, temporally independent, except for a spike in t-1 for both the ACF and PACF. This indicates that movements in the series may be characterized by a stationary series rather than a random walk, with MA(1) and AR(1) as additional variables, respectively, with the error terms as "white noise" with mean zero and constant variance, where r_t (change in m-o-m inflation rate) is a stationary series and ε_t is a white noise process with mean zero and constant variance. Thus, a white noise process has autocovariance and autocorrelation functions that are all equal to zero.

The univariate analysis proceeded by testing for the autoregressive moving average (ARMA) model that best fits the data series on m-o-m changes in the inflation rate, starting with the preliminary AR(1) and MA(1) specification as in (1), based on the Box-Jenkins model building approach. The preliminary and identification stages of the ARIMA model have been conducted earlier. After identifying a tentative model (see Annex (2), Regression Results), the residual terms (the proxy for the error terms) are analyzed in order to verify whether the errors in the change in the m-o-m inflation rate for the Philippines is indeed a white noise process, that is, whether the earlier assumptions are satisfied.

Test for White Noise

1. Portmanteau lack of fit

$H_0 : \rho_{\varepsilon 1} = \rho_{\varepsilon 2} = \ldots = \rho_{\varepsilon K} = 0$ vs. H_a : at least one ρ is not zero

Based on this test, the error terms appear to be a white noise process. Other alternative approaches also indicate that the residuals of the ARMA model for m-o-m inflation exhibit white noise properties (see Annex [1]).

2. Alternative approach by Bollerslev

Another test can be performed by looking at the correlogram of squared residuals. A Portmanteau type of test is conducted (similar to the Ljung-Box statistic) is applied to the square of the residuals and test results in Annex (1) show that the residuals remain within the band and do exhibit white noise properties.

3. Normality of the error terms

The null hypothesis is that the error terms, as measured by the residuals, are normally distributed. Histogram statistics indicate that skewness of the residuals is relatively small, indicating that the distribution of the errors has a slightly longer right tail. In terms of kurtosis, the kurtosis of a normal distribution is 3, but results indicate a value higher than 3 indicating that the distribution is leptokurtic. Based on the Jarque-Bera test for normality, we see that we need to reject the null hypothesis of a normal distribution. However, looking at the histogram, the error terms appear to behave relatively close to a normal distribution.[15]

Test for Serial Correlation

Using the Breusch-Godfrey Serial Correlation LM Test on the residuals, no serial correlation was exhibited (see Annex [1]).

Test for Non-Constancy of the Variance

The test used for the constancy of variance is the AutoRegressive Conditional Heteroskedasticity (ARCH) test (see Annex [2]). The null hypothesis in this test is constant variance, against the alternative of non-constant variance. The conditional variance, h_t, to differentiate it from the unconditional variance σ^2, depends nontrivially on the past innovations or error term, ε_t, and perhaps together with some other latent variables. Based on this test, the null hypothesis of constant variance is rejected. Based on the lagged residuals from the preliminary ARMA model, we have seen that the squared residuals from two periods back are significant, that is, the square of the residual two periods in the past affects the change in the m-o-m inflation rate in the current period. This also indicates that the variance in the change in m-o-m inflation is not constant over time, even during the IT period. It is probable that m-o-m inflation exhibits volatility clustering, that is, large changes tend to be followed by large changes, of either sign, and small changes tend to be followed by small changes. In other words, volatility shocks today could influence the expectation of volatility several periods in the future: A high value of ε_t^2 increases h_{t+1}, which, in turn, increases the expectation of ε_{t+1}^2. The GARCH (1,1) process, $h_t = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \beta_1 h_{t-1}$, was found sufficient enough to explain the characteristics of the time series. The conditional variance is a linear function of the square of the error terms (ε_{t+1}^2), or the ARCH term (also referred to as the "news from the past"), and the lag of the past values of the conditional variance h_{t-1}, or the GARCH term, and a constant α_0.

[15] The standard assumption in linear regression is that the theoretical residuals are independent and normally distributed. The histogram and the normal probability plot are used to check whether or not it is reasonable to assume that the random errors inherent in the process have been drawn from a normal distribution. The normality assumption is needed for the error rates we are willing to accept when making decisions about the process. If the random errors are not from a normal distribution, incorrect decisions will be made more or less frequently than the stated confidence levels for our inferences indicate. The observed residuals are an estimate of the theoretical residuals, but are not independent. If the theoretical residuals are not exactly normally distributed, but the sample size is large enough then the Central Limit Theorem says that the usual inference (tests and confidence intervals, but not necessarily prediction intervals) based on the assumption of normality will still be approximately correct. Retrieved from http://stats.stackexchange.com/questions/12053/what-should-i-check-for-normality-raw-data-or-residuals and http://www.itl.nist.gov/div898/handbook/pmd/section4/pmd445.htm.

Results of the GARCH Model for the variance – ARMA (1,1)-Garch (2,1)

A natural extension of our empirical findings above is to develop an appropriate ARMA or ARMA-Garch model for the change in the m-o-m inflation series (see Annex, [2]) that would best represent or approximate the evolution of the m-o-m inflation rate series, with a view to developing a simple but effective and efficient short-term forecasting model for the series in the future. This exercise would be a good precursor to such an extension paper.

In consideration of nonconstancy in the variance and a GARCH term up to the second month, the out-of-sample (for 2011) static forecast for the change in m-o-m inflation fluctuate very closely to the zero value during the inflation targeting period. Looking at the conditional variance forecasts, it can be seen that the most volatile values were evident during the global financial and economic crises of 2008-2009, followed by another bout of volatility at the end of 2010. There was also some sharp swings in the variance during 2004 and then early 2006. Nonetheless, the variance terms fluctuate very close to the 0.1 value over the entire period.

For forecasting purposes, however, there is a need to improve on the model's goodness-of-fit or R^2 of 17 percent (see Annex [2]). We do this by including dummy variables to represent those periods marked with spikes in variability as noted earlier. The extreme values were particularly evident for November 2010, January 2009, April 2008, March 2002, and June 2004 (positive spikes) as well as for March 2006, March 2011, and August 2008 (negative spikes). Understandably, these periods were characterized by extremely volatile oil and other commodity prices, such as that in 2008, 2006 and 2004, as well as the significant increase in the level of uncertainty during the global financial crisis in 2008 and 2009, and the renewed bout of pessimism over Europe and the stability of the global economic recovery in late 2010 and early 2011. We included these dummy variables as additional regressors in the mean equation. As a result of the various iterations of the estimation including the dummy variables, the R-squared has improved to 49 percent in the final model below, with the AR(1) term becoming insignificant and replaced with the MA(12) term.

Results of the ARMA(0,12)-GARCH (2,1) Model with Dummy Variables

In consideration of the various dummy variables representing periods characterized by sharp volatilities in oil and other commodity prices, the global financial crisis and the ensuing global economic uncertainties thereafter, the change in the m-o-m inflation rate for the Philippines may be estimated using a univariate model with an MA term for the first month and the 12th month, and GARCH terms up to the second month of each year during the inflation targeting period 2002 to 2011. It can also be observed that the out-of-sample (for 2011) static forecast for the change in m-o-m inflation rate continued to fluctuate very closely toward the zero value during the inflation targeting period. Residual tests on the error terms from the ARMA(0,12) - GARCH(2,1) model showed that the remaining residuals in the rightmost figure above is stationary, and does not show any spikes in the ACF and PACF under both the correlogram-Q statistics and the correlogram squared residuals tests.[16] This would mean that while about 50 percent of the variability in the change in the m-o-m inflation series for the Philippines during the IT period may be represented or modeled using an ARMA(0,12) (for the mean) and GARCH (2,1) (for the variance) univariate model, the rest of the movements, or about 50 percent, are purely random shocks, as can be deemed from the residual series above.

[16] The ARMA-GARCH model results indicated that 50 percent of the movements in the change in the month-on-month inflation rate series may be represented by a univariate autoregressive moving average model (of order 1 and 12) including dummy variables associated with months of either unanticipated developments in the global economy, or volatile global commodity prices and the minimum wage adjustments that were implemented in response to them. These ARMA terms denote that the shocks or innovations to month-on-month inflation for the first and the twelfth month of the year affect the current month-on month inflation rate. In addition, the GARCH terms for the first and the second month were also seen as relevant for the variance equation, denoting that "news from the past" first and second months affect current movements. Meanwhile, the rest of the changes in the series (the residual terms) are random shocks or white noise. These results may be interpreted to mean that unanticipated shocks move inflation month-on-month 50 percent of the time, whereas 50 percent of the movements in the change in month-on-month inflation are affected by the error terms or shocks during the first and the twelfth month of the year, as well as inflation "news" from 1 to 2 months back.

Conclusion and Policy Implications

In Section B of the paper, we presented a simple intertemporal loss function and an AS-AD framework from existing literature and illustrated a stylized representation of an inflation targeting central bank's optimal decision-making when inflation expectations are well anchored and, conversely, when the monetary authority is credible. This model provided an intuitive explanation on why changes in the short-run inflation rate, as measured by the first difference of deseasonalized m-o-m inflation, is a mean-stationary process whose variations, save for some degree of autoregressive features, are white noise when an inflation targeting central bank is indeed operating within this environment.

Our univariate time series analysis on Philippine inflation (using CPI 2000=100) before and during the IT period confirmed this hypothesis. Indeed, changes in Philippine m-o-m inflation rate was characterized as a mean-stationary process during the IT period 2002-2011, but nonstationary during the period 1993-2001 before the implementation of the IT framework. It became an interesting result as well that m-o-m inflation changes were stationary during the period 1970 to 1992.

We were able to offer an intuitive explanation on the existence of these three phases in the evolution of the BSP's IT monetary policy framework: Phase (1) – Prior to central bank independence, m-o-m inflation was stationary but had a higher mean inflation rate and higher variance than during the inflation targeting period. Prior to being an independent monetary authority, the central bank's monetary policies were subservient to political or fiscal objectives. If firms and households can easily anticipate the actions of fiscal authorities, and the objectives and constraints faced by fiscal authorities are fairly stable, then the resulting m-o-m inflation series would be stationary, albeit at a higher average inflation rate level since a great weight is assigned to seignorage objectives. When money creation is used to finance the deficit, it is likely to result in inflation much higher and more volatile than what is preferred by the central bank. Phase (2) – In the early years of the BSP's central bank independence, prior to IT, m-o-m inflation showed nonstationarity as the BSP is still establishing its credibility and undergoing a disinflation process while at the same time inflation expectations were still "maturing"—the m-o-m inflation series showed a declining trend, converging toward the long-term inflation target. Here the public uses information from past inflation as a basis for expected inflation. Lastly, Phase (3) – During the IT period of the independent BSP, the m-o-m inflation rate series was indeed found to follow a mean-stationary process where the error terms are white noise. As proposed earlier, the BSP has already established its credibility with the public by this time so that inflation expectations have become well entrenched.

Another intuitive finding we have established in the study is that a more gradual, longer disinflation process will incur the central bank a lower loss compared to an abrupt movement toward the inflation target. That non-stationarity occurred only during the transition from the old central bank to the independent and inflation targeting central bank is consistent with the view that disinflation programs under adaptive expectations will result in considerable output losses if the inflation reduction is carried out too drastically. This is because the public still has a wait-and-see attitude regarding the newly created central bank's ability to resist pressures upon it to pursue fiscal objectives. In other words, if the public would have a strong tendency to under-forecast the decline in inflation (and therefore over-forecast inflation) during the transition from a government-controlled to an independent central bank, more drastic inflation reduction programs will result in greater output losses than a more gradual one. To the extent that the central bank's optimization problem is minimizing a quadratic loss function that is the sum of the squared deviations of inflation from the long-run target and of output from potential, a longer transition period towards inflation targeting may be preferred to a very short one.

Meanwhile, based on the ARMA(0,12)-GARCH(2,1) model we developed in the Empirical Analysis section of the paper, the *change* in the m-o-m inflation for one period ahead is affected by the moving average term denoting the errors or shocks in the current month and twelve months back, as well as the "news" or volatility in the change in the m-o-m inflation

in the current month and one month ago—at most 50 percent of the time—whereas at least 50 percent of the time the *change* in m-o-m inflation is driven purely by random shocks. The implication of the results is that indeed, monetary policy need not respond to the short-run temporary deviations or small shocks in m-o-m changes in inflation but only to large enough factors which may dislodge inflation expectations, and hence possibly lead to permanent changes in the long-run inflation trend. However, we should be aware of the fact that these results are based on the assumption that inflationary expectations once well entrenched will not be disanchored. If the central bank decides, however, to react in the face of small enough shocks or not to react even in the face of large shocks, the BSP then needs to put particular emphasis on its effective communication to the public particularly in its monetary policy statements to explain effectively why it has decided to do so.[17]

So what are these large enough factors? Looking back at the significant dummy variables representing specific periods that showed sharp spikes or extreme movements in the m-o-m inflation, what stood out were the months during 2008 and 2009 which were the height of the global financial crisis, and most recently, the surge in risk aversion during late 2010 when the global economic recovery began to falter given the weaknesses in the US and several debt-ridden countries in Europe, and more importantly the months during 2008 as well as the months in 2004 and 2006, when there were sharp movements in global commodity prices, particularly for oil and rice. While the former were driven by factors which are external in nature, and hence outside of the influence of the domestic economy and its agents and players, the latter periods were associated with periods when administered or "politically-sensitive" prices, particularly minimum wages and transport fares, were raised by government authorities in response to the clamor of laborers and public transport workers for such increases as a knee-jerk reaction to the commodity price hikes at that time.

The uncertainties and implications of global financial and economic crises are demand-side factors which definitely warrant extreme caution on the part of monetary authorities. Their forward-looking framework requires that the direct implications or the ensuing outlook on these factors need to be taken into account early in the policy decision-making process. However, save for a few economists who claim to have foreseen the recent crisis way before August 2008, forecasting the occurrence of global financial or economic crises with accuracy remains a daunting task.

In contrast, the volatility in global oil and commodity prices, although equally difficult to forecast, is a supply-side phenomenon, and so debate arises on whether such movements warrant policy response from monetary authorities such as the BSP. It is interesting to note that the political dimension associated with the setting of administered prices such as minimum wages and transport fares usually lead to adjustments in response to oil price and rice price hikes without regard for the possibility that the associated commodity price increases may or may not be permanent. In other words, the adjustments in the prices may not necessarily be based on a well-informed view on the nature and persistence of the commodity price shocks. But as these items affect production costs and disposable income directly, when large enough they could almost always be expected to dislodge inflation expectations.

It is therefore important to distinguish when significant movements in m-o-m inflation are driven by permanent changes, or driven by purely temporary shocks which will correct themselves later on, or whether they are in fact temporary shocks which could translate into permanent changes because they are affecting politically-sensitive administrative prices such as wages and fares and hence can potentially dislodge inflation expectations in the future. The best example during the inflation targeting period to illustrate this point was the m-o-m inflation outturns and the resulting monetary policy response in 2008. It may be recalled that prices jumped during the second and third quarter of 2008, largely due

[17] As discussed in Fermo (2012), the BSP provides guidance to the markets so that expectations are anchored as they can be formed more efficiently and accurately. This guidance helps the markets understand how monetary policy responds to economic developments and shocks and thus helps them anticipate the broad direction of monetary policy over the longer term. Blinder, et al. (2008, p. 1) more importantly noted that based on their survey, "…evidence suggests that communication can be an important and powerful part of the central bank's toolkit since it has the ability to move financial markets, to enhance the predictability of monetary policy decisions, and potentially to help achieve central banks' macroeconomic objectives."

to the big surge in the international prices of oil and food, particularly rice. A confluence of global and supply-side factors resulted in the unprecedented movements in the domestic prices of rice and fuel that year.

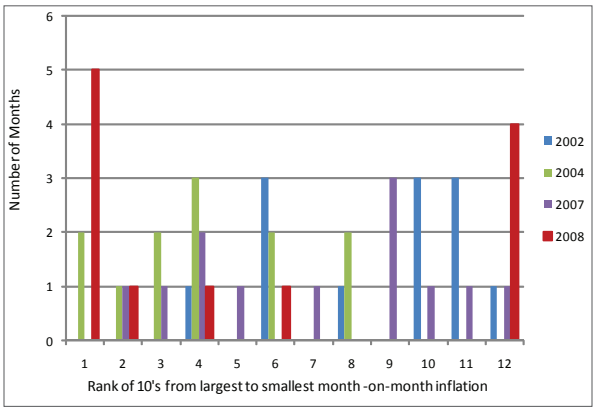
Apart from the rise in global commodity prices during the period, adverse weather conditions and speculative activities in global commodity markets aggravated the situation. Then, toward the end of the year, international commodity price pressures receded, so that domestic inflation fell quickly as well. We can see this clearly in Chart 2 below, which shows that the top five highest m-o-m inflation rates from 2002-2011 occurred in 2008, but at the same time, the lowest four m-o-m inflation rates were also registered in 2008. This illustrates not only that large shocks come in sequence in Philippine m-o-m inflation, but also that large positive shocks in the m-o-m inflation rate can be followed by large negative m-o-m inflation later on. This correction is very much consistent with the temporary nature of commodity shocks. At first glance, therefore, the 2008 experience was an argument why monetary policy should not react to price increases which are caused mainly by supply-side factors.

Abstracting from the weaknesses in Philippine institutions, textbook macroeconomics would dictate that because the abrupt and significant changes in the inflation rate in 2008 were driven mainly by factors which no amount or form of monetary policy can influence, then the BSP should have accommodated the sharp price increases at that time and maintained the policy rate. A further examination, however, would reveal that institutions like the wage and fare board have contributed in making these temporary, supply-side driven shocks transform into permanent disturbances in the inflation path via their impact on inflation expectations, justifying the need for monetary policy response.

The BSP was aware that the initial rise in prices was primarily supply side in origin and that commodity shocks are generally transitory in nature, so that the BSP accommodated the initial price increases during the first four to five months. However, as rising food and energy prices continued over a longer period, these contributed to second-round effects, affecting inflation expectations by the end of the second quarter.

Chart 2.

Number of Months Belonging to Top 10 to Lowest 10 Month-on-Month Inflation Rates in a Year from 2002-2011



Increases in rice and fuel prices are particularly virulent as these figure prominently in Filipino consumers' expectations and could lead to clamor for upward adjustments in wage and transport fares.[18] True enough, a rise in inflation expectations became evident from surveys and financial market data at that time, so that the BSP decided to raise key policy rates by a total of 100 basis points from June to August 2008. The inflation outturn, however, started to improve in September with the sharp decline in international commodity prices. Given the significant fall in November inflation and the significant slowdown in global economic growth with the effects of the Lehman collapse reverberating across all economies around the world, the BSP reduced key policy rates by 50 basis points during its last policy meeting for the year in December 2008.

[18] BSP Open Letter to the President (2009).

The BSP's policy reaction in 2008 was hence justifiable given the present weaknesses in Philippine institutions governing administered prices. The first-best solution is to change the way institutions for wage-setting and fare adjustments are handling political pressures from lobby groups such as labor groups and the transport sector and even the media and how they make an assessment if and when wage increases or fare hikes are indeed warranted—what is defined by the government as valid "supervening events"[19]. In the meantime, while these weaknesses still persist, the second-best alternative for the BSP is monetary policy action. It appears to be beneficial, therefore, to develop institutional arrangements that would foster even closer and more direct coordination between the NWPC and the Land Transportation Franchising and Regulatory Board (LTFRB) and the BSP in order to ensure that any wage and transport fare increases are indeed warranted by developments in the domestic economy and not just a result of political pressures or lobbying forces. In fact, what would be most ideal is perhaps for the BSP to help "educate" labor unions and the members governing the RTWPB and the NWPC that any justifiable wage adjustments at any particular point in time be set within the medium-term inflation target of the BSP. It is, of course, maybe impractical to expect full rationality on the part of all labor unions. Holden (2000, p. 22) said that ..."It is true that in the real world, unions that compete for members, or union leaders that are pushed by a militant membership, may have limited scope for wage moderation." Nonetheless, it will prove beneficial for the BSP to help unions develop a certain level of understanding of the central bank's objectives and policy framework and take this into account in nominal wage setting. The impact of the minimum wage and transport fare changes in Philippine m-o-m inflation may be examined empirically using the ARMA model estimated earlier. The significant dummy variables representing the spikes or the extremely volatile episodes for the change in m-o-m inflation, which are also reflected in the forecasts for the conditional variance, more or less coincide with the minimum wage adjustments.[20] Only minimum wage adjustments became a significant factor in the ARMA model.

Based on these estimation results, in the case of the Philippines, it is not the unanticipated supply-side shocks coming from global commodity prices which had moved the changes in m-o-m inflation permanently away from the long-term trend, and hence are not the factors which monetary authorities should respond to. It was, in fact, the higher increases in administered prices, particularly minimum wages, which were implemented in response to the higher commodity prices that appeared to consistently affect inflation expectations significantly, and hence should signal the need for future monetary policy action. For a country with a specific inflation target such as the BSP, the central bank will, to some extent, discipline wage-setters even when they do not coordinate their wage-setting, as higher wages will be met with a rise in the policy rate.[21] However, international comparisons show that countries with coordinated wage setting generally have lower unemployment than countries with less-coordinated wage setting. Going forward, closer coordination of the central bank with the wage board and the education of the labor unions could help anchor inflation expectations even more firmly with the BSP's long-run inflation target.

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[19] Section 3, Rule IV of National Wages and Productivity Commission (NWPC) Guidelines No. 01 Series of 2007, Amended Rules of Procedures on Minimum Wage Fixing, provide: "Any Wage Order issued by the Regional Tripartite Wages and Productivity Board (RTWPB) may not be disturbed for a period of twelve (12) months from its effectivity, and no petition for wage increase shall be entertained within the said period. In the event, however, that supervening conditions, such as extraordinary increase in prices of petroleum products and basic goods/services, demand a review of the minimum wage rates as determined by the RTWPB and confirmed by the NWPC, the RTWPB shall proceed to exercise its wage-fixing function even before the expiration of the said period. Retrieved from http://www.nwpc.dole.gov.ph/legal.html#guide1_2007.html.

[20] See the NWPC and LTFRB websites for minimum wage adjustments and the transport fare hikes implemented from 1989 to 2011.

[21] For example, Germany restricted growth in its public wage bill much more successfully than all the other countries, in the dimension of both employment and wages per employee. As cited in Holden (2000), Soskice & Iversen (1998) use Germany as their leading example how a strict central bank may induce coordinated wage restraint. Holden (2000, p. 25) added that: "A strict monetary regime disciplines wage setters by increasing the wage elasticity of employment, thus dampening the negative consequences of uncoordinated wage setting."

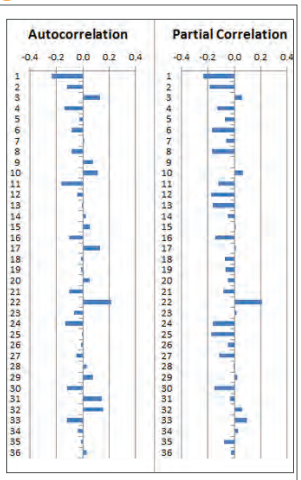
Annex A

1. Statistical Results

Correlogram of DINFSA

1. Basic Statistical Tests
Correlogram of DINFSA
Sample: 2002M01 to 2011 M12
Included Observations: 118
Date: 11/15/11

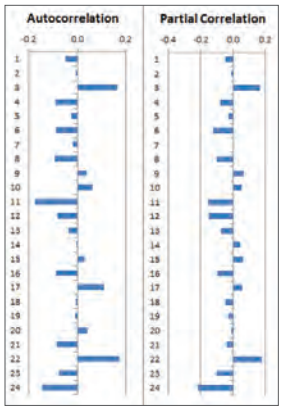
	AC	PAC	Q-Stat	Prob.
1	-0.233	-0.233	6.582	0.010
2	-0.121	-0.185	8.367	0.015
3	0.128	0.056	10.379	0.016
4	-0.140	-0.125	12.813	0.012
5	-0.027	-0.073	12.904	0.024
6	-0.085	-0.172	13.807	0.032
7	0.008	-0.060	13.816	0.055
8	-0.085	-0.169	14.741	0.064
9	0.077	0.005	15.516	0.078
10	0.112	0.067	17.158	0.071
11	-0.162	-0.123	20.627	0.037
12	-0.044	-0.178	20.884	0.052
13	-0.005	-0.162	20.888	0.075
14	0.021	-0.052	20.947	0.103
15	0.051	0.012	21.308	0.127
16	-0.101	-0.144	22.710	0.122
17	0.132	0.011	25.156	0.091
18	-0.014	-0.073	25.185	0.120
19	-0.016	-0.068	25.221	0.153
20	0.050	-0.049	25.575	0.180
21	-0.101	-0.085	27.061	0.169
22	0.217	0.208	33.986	0.049
23	-0.067	0.015	34.647	0.056
24	-0.134	-0.164	37.349	0.040
25	-0.001	-0.178	37.349	0.053
26	-0.013	-0.048	37.376	0.069
27	-0.049	-0.118	37.743	0.082
28	0.031	-0.006	37.892	0.100
29	0.074	0.021	38.769	0.106
30	-0.123	-0.149	41.209	0.083
31	0.142	-0.033	44.492	0.055
32	0.157	0.061	48.562	0.031
33	-0.119	0.095	50.916	0.024
34	-0.039	0.031	51.178	0.030
35	-0.013	-0.082	51.209	0.038
36	0.028	-0.026	51.343	0.047



Correlogram of Residuals

Correlogram of Residuals
Sample: 2002M1 to 2011M10
Included Observation: 118
Q-statistic probabilities adjusted for 2 ARMA terms
Date: 11/17/11

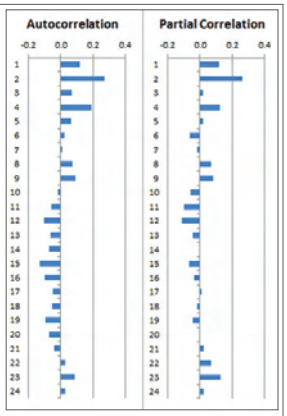
	AC	PAC	Q-Stat	Prob.
1	-0.048	-0.048	0.2777	
2	-0.007	-0.01	0.2841	
3	0.165	0.164	3.6203	0.057
4	-0.091	-0.078	4.6539	0.098
5	-0.025	-0.031	4.7317	0.193
6	-0.089	-0.123	5.7387	0.22
7	-0.02	0	5.7873	0.327
8	-0.095	-0.099	6.949	0.326
9	0.038	0.065	7.139	0.415
10	0.061	0.05	7.6225	0.471
11	-0.176	-0.154	11.708	0.23
12	-0.081	-0.151	12.592	0.247
13	-0.038	-0.076	12.79	0.307
14	-0.004	0.042	12.793	0.384
15	0.029	0.06	12.905	0.455
16	-0.089	-0.098	13.999	0.45
17	0.111	0.057	15.723	0.401
18	-0.007	-0.048	15.73	0.472
19	-0.011	-0.03	15.749	0.542
20	0.041	-0.009	15.99	0.593
21	-0.085	-0.037	17.036	0.587
22	0.173	0.176	21.447	0.371
23	-0.075	-0.103	22.289	0.383
24	-0.145	-0.218	25.443	0.276



Correlogram of Residuals Squared

Correlogram of Residuals Squared
Sample: 2002M01 to 2011M10
Included Observations: 118
Q-Statistic probabilities adjusted to 2 ARMA terms
Date: 11/17/11

	AC	PAC	Q-Stat	Prob.
1	0.117	0.117	1.6556	
2	0.269	0.259	10.506	
3	0.069	0.017	11.095	0.001
4	0.19	0.123	15.575	0
5	0.062	0.016	16.053	0.001
6	0.024	-0.065	16.124	0.003
7	0.008	-0.018	16.133	0.006
8	0.074	0.066	16.846	0.01
9	0.089	0.081	17.875	0.013
10	-0.016	-0.058	17.909	0.022
11	-0.057	-0.099	18.34	0.031
12	-0.104	-0.112	19.783	0.031
13	-0.061	-0.043	20.289	0.042
14	-0.074	-0.002	21.044	0.05
15	-0.129	-0.066	23.323	0.038
16	-0.101	-0.038	24.742	0.037
17	-0.049	0.011	25.084	0.049
18	-0.055	-0.017	25.506	0.061
19	-0.093	-0.045	26.739	0.062
20	-0.07	0	27.455	0.071
21	-0.04	0.023	27.691	0.09
22	0.029	0.066	27.811	0.114
23	0.086	0.127	28.903	0.116
24	0.029	0.021	29.026	0.144



Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.135912	Prob. F(12,104)	0.3398
Obs*R-squared	13.63391	Prob. Chi Square(12)	0.3247

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 11/17/11 Time: 11:42
Sample: 2002M01 2011M10
Included observations: 118
Presample missing value lagged residuals set to zero.

Coefficient		Std. Error	t-Statistic	Prob.
AR(1)	0.761869	1.786212	0.426528	0.6706
MA(1)	0.003496	0.011392	0.306852	0.7596
RESID(-1)	-0.820046	1.799202	-0.455783	0.6495
RESID(-2)	-0.478661	1.136826	-0.421051	0.6746
RESID(-3)	-0.121467	0.722541	-0.168110	0.8668
RESID(-4)	-0.289183	0.464717	-0.622276	0.5351
RESID(-5)	-0.157473	0.304052	-0.517913	0.6056
RESID(-6)	-0.231897	0.207792	-1.116003	0.2670
RESID(-7)	-0.078706	0.152132	-0.517355	0.6060
RESID(-8)	-0.111652	0.123686	-0.902703	0.3688
RESID(-9)	0.069613	0.109949	0.633145	0.5280
RESID(-10)	0.037167	0.103858	0.357865	0.7212
RESID(-11)	-0.174575	0.101364	-1.722266	0.0880
RESID(-12)	-0.170559	0.105727	-1.613201	0.1097

R-squared	0.115542	Mean dependent var	-0.006151
Adjusted R-squared	0.004984	S.D. dependent var	0.316250
S.E. of regression	0.315461	Akaike info criterion	0.641433
Sum squared resid	10.34965	Schwarz criterion	0.970159
Log likelihood	-23.84456	Hannan-Quinn criter.	0.774905
Durbin-Watson stat	2.012189		

2. Regression Results

Dependent Variable: DINFSA
Sample (adjusted): 2002M01 2011M10
Included observations: 118 after adjustments
Convergence achieved after 16 iterations; MA Backcast: 2001M12

	Coefficient	Std. Error	t-Statistic	Prob.
AR(1)	0.630234	0.081360	7.746270	0.0000
MA(1)	-0.996933	0.034040	-29.28690	0.0000

R-squared	0.189534	Mean dependent var	0.001654
Adjusted R-squared	0.182547	S.D. dependent var	0.351355
Durbin-Watson stat	2.086762		

Inverted AR Roots	.63
Inverted MA Roots	1.00

Heteroskedasticity Test: ARCH

F-statistic	1.331737	Prob. F(12,93)	0.2142
Obs*R-squared	15.54374	Prob. Chi-Square(12)	0.2130

Test Equation:
Dependent Variable: RESID^2,
Method: Least Squares
Date: 11/17/11 Time: 10:53
Sample (adjusted): 2003M01 2011M10
Included observations: 106 after adjustments

	Coefficient	Std. Error	t-Statistic	Prob.
C	0.066334	0.028933	2.292665	0.0241
RESID^2(-1)	0.076146	0.102836	0.740465	0.4609
RESID^2(-2)	0.250942	0.103202	2.431553	0.0170
RESID^2(-3)	0.004650	0.106542	0.043643	0.9653
RESID^2(-4)	0.145233	0.105975	1.370440	0.1738
RESID^2(-5)	0.008805	0.105966	0.083091	0.9340
RESID^2(-6)	-0.091096	0.105764	-0.861312	0.3913
RESID^2(-7)	-0.013542	0.105578	-0.128262	0.8982
RESID^2(-8)	0.087760	0.105362	0.832932	0.4070
RESID^2(-9)	0.105959	0.105515	1.004209	0.3179
RESID^2(-10)	-0.011037	0.107374	-0.102787	0.9184
RESID^2(-11)	-0.089071	0.101956	-0.873624	0.3846
RESID^2(-12)	-0.148534	0.120040	-1.237376	0.2191

R-squared	0.146639	Mean dependent var	0.099626
Adjusted R-squared	0.036528	S.D. dependent var	0.190069
S.E. of regression	0.186565	Akaike info criterion	-0.405632
Sum squared resid	3.237001	Schwarz criterion	-0.078984
Log likelihood	34.49848	Hannan-Quinn criter.	-0.273239
F-statistic	1.331737	Durbin-Watson stat	2.013680
Prob. (F-statistic)	0.214213		

Dependent Variable: DINFSA
Method: ML - ARCH (Marquardt) - Normal distribution, Sample: 2002M01 2010M12;
GARCH = 0.125606121047*(1 - C(3) - C(4) - C(5)) + C(3)*RESID(-1)^2 +
C(4)*GARCH(-1) + C(5)*GARCH(-2)

	Coefficient	Std. Error	z-Statistic	Prob.
AR(1)	0.633218	0.059967	10.55937	0.0000
MA(1)	-0.981662	0.008665	-113.2967	0.0000
Variance Equation				
C	0.028829	--	--	--
RESID(-1)^2	0.257980	0.057120	4.516455	0.0000
GARCH(-1)	1.093077	0.132242	8.265725	0.0000
GARCH(-2)	-0.580575	0.111536	-5.205255	0.0000

R-squared	0.174195	Mean dependent var	0.002427
Adjusted R-squared	0.142125	S.D. dependent var	0.356053
Durbin-Watson stat	2.073670		

Heteroskedasticity Test: ARCH

Dependent Variable: DINFSA
Sample: 2001M01 2010M12, Included observations: 120
Presample variance: backcast (parameter = 0.7)
GARCH = C(8) + C(9)*RESID(-1)^2 + C(10)*GARCH(-1) + C(11)*GARCH(-2)

	Coefficient	Std. Error	z-Statistic	Prob.
DUM10	0.886009	0.150745	5.877528	0.0000
7DUM08	0.724596	0.223411	3.243334	0.0012
DUM04	0.392604	0.158256	2.480811	0.0131
DUM08N	-1.240735	0.239180	-5.187449	0.0000
DUM09	0.402802	0.244376	1.648291	0.0993
MA(1)	-0.611621	0.062321	-9.814055	0.0000
MA(12)	-0.332792	0.057358	-5.802026	0.0000
Variance Equation				
C	0.051707	0.018649	2.772660	0.0056
RESID(-1)^2	0.277746	0.166755	1.665595	0.0958
GARCH(-1)	0.484362	0.202234	2.395055	0.0166
GARCH(-2)	-0.404905	0.163852	-2.471159	0.0135

R-squared	0.490435	Mean dependent var	-0.002467
Adjusted R-squared	0.443686	S.D. dependent var	0.344316
Durbin-Watson stat	1.965372		

Dependent Variable: INFLSA_MOM, Method: Least Squares
Sample (adjusted): 2002M01 2011M10, Included observations: 118 after adjustments
White Heteroskedasticity-Consistent Standard Errors & Covariance
MA Backcast: 2001M01 2001M12

	Coefficient	Std. Error	t-Statistic	Prob.
DUM10	0.850339	0.111067	7.656093	0.0000
DUM09	0.407798	0.278135	1.466188	0.1456
DUM08	0.727027	0.315409	2.305030	0.0231
DUM04	0.516247	0.124487	4.147006	0.0001
DUM08N	-0.537672	0.299575	-1.794781	0.0755
DUM06	0.493553	0.116638	4.231488	0.0000
DUMWAG	0.140635	0.070488	1.995151	0.0486
AR(1)	0.849784	0.080366	10.57390	0.0000
AR(11)	0.143190	0.077906	1.837983	0.0689
MA(11)	-0.291149	0.077641	-3.749955	0.0003
MA(1)	-0.212415	0.094525	-2.247178	0.0267
MA(12)	-0.472595	0.105740	-4.469403	0.0000

R-squared	0.615568	Mean dependent var	0.406778
Adjusted R-squared	0.575674	S.D. dependent var	0.400424
Durbin-Watson stat	1.986942		

2. Unit Root Tests

Null Hypothesis: INFLSA_MOM has a unit root
Exogenous: None
Lag Length: 6 (Automatic based on Modified HQ, MAXLAG=17)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.030456	0.0025
Test critical values:	1% level	-2.569652	
	5% level	-1.941466	
	10% level	-1.616269	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFLSA_MOM)
Method: Least Squares
Date: 11/14/11 Time: 11:32
Sample (adjusted): 1970M09 2011M10

Null Hypothesis: INFLSA_MOM has a unit root
Exogenous: None
Lag Length: 5 (Automatic based on Modified HQ, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.267533	0.1878
Test critical values:	1% level	-2.586550	
	5% level	-1.943824	
	10% level	-1.614767	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFLSA_MOM)
Method: Least Squares
Date: 11/14/11 Time: 11:37
Sample: 1993M01 2001M12
Included observations: 108

Null Hypothesis: INFLSA_MOM has a unit root
Exogenous: None
Lag Length: 6 (Automatic based on Modified HQ, MAXLAG=15)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.200945	0.0270
Test critical values:	1% level	-2.573619	
	5% level	-1.942013	
	10% level	-1.615909	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFLSA_MOM)
Method: Least Squares
Date: 11/24/11 Time: 10:24
Sample (adjusted): 1970M09 1992M12
Included observations: 268 after adjustments

Null Hypothesis: INFLSA_MOM has a unit root
Exogenous: None
Lag Length: 2 (Automatic based on Modified HQ, MAXLAG=12)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.336667	0.0194
Test critical values:	1% level	-2.584707	
	5% level	-1.943563	
	10% level	-1.614927	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFLSA_MOM)
Method: Least Squares
Date: 11/14/11 Time: 11:40
Sample (adjusted): 2002M01 2011M10
Included observations: 118 after adjustments

References

Ball, L. (1999). Efficient Rules for Monetary Policy. International Finance, 2(1), 63-83. Retrieved from http://onlinelibrary.wiley.com/doi/10.1111/1468-2362.00019/pdf

Ball, L. & Cecchetti, S. G. (1990). Inflation and Uncertainty at Short and Long Horizons. Brookings Paper on Economic Activity, 1:1990, 215-254. Retrieved from http://www.brookings.edu/~/media/Projects/BPEA/1990%201/1990a_bpea_ball_cecchetti_gordon.PDF

Blinder, A., Ehrmann, M., Fratzscher, M., de Haan, J., & Jansen, D. (2008, December). Central Bank Communication and Monetary Policy: A Survey of Theory and Evidence (NBER Working Paper Series 13932). Journal of Economic Literature, 46(4), 910-945. American Economic Association.

Bangko Sentral ng Pilipinas (2009, January). BSP Open Letter to the President. Retrieved from http://www.bsp.gov.ph/monetary/ open_2008.asp.

Cecchetti, S. G. (1998, June). Policy Rules and Targets: Framing the Central Banker's Problem. FRBNY Economic Policy Review.

Clive, B. & Roman, F. (1983). The Derivation and Interpretation of the Lucas Supply Function. Journal of Money, Credit, and Banking, 15(1), Ohio State University Press.

Edge, R. M. & Gurkaynak, R. S. (2011). How Useful Are Estimated DSGE Model Forecasts. Finance and Economics Discussion Series, 209-223. Federal Reserve Board, Washington D.C.

Eichengreen, B., El-Erian, M., Fraga, A., Ito, T., Pisani-Ferry, J., Prasad, E., Rajan, R....& Yu, Y. (2011, September). Rethinking Central Banking, Committee on International Policy and Reform.

Fermo, L. (2012). Central Bank Communication and the BSP's Monetary Policy Statements, BSP Newsletter Series (September - October 2012).

Franses, P. H. (1991). Seasonality, Non-Stationarity and the Forecasting of Monthly Time Series. International Journal of Forecasting 7, 199-208. North Holland: Elsevier Science Publishers.

Froyen, R. & Guender, A. (2007). Optimal Monetary Policy Under Uncertainty. Cheltenham: Edward Elgar.

Hassel, A. (2006). Wage Setting, Social Pacts and the Euro: A New Role for the State. Amsterdam University Press.

Holden, S. (2000). Monetary Regime and the Coordination of Wage Setting. Department of Economics University of Oslo and Norges Bank.

International Monetary Fund (IMF) (2009). A Model of Full-fledged Inflation Targeting and Application to Ghana (IMF Working Paper, WP/10/25).

Lamberte, M. (2002). Central Banking in the Philippines: Then, Now and the Future. Philippine Institute of Development Studies (PIDS).

National Wages and Productivity Commission (NWPC) (2007). Section 3, Rule IV of Guidelines No. 01 Series of 2007, Amended Rules of Procedures on Minimum Wage Fixing. Retrieved from http://www.nwpc.dole.gov.ph/legal.html#guide1_2007.html.

Reis, R., (2010). Brookings Papers on Economic Activity, Fall 2010, 245-259.

Sargent, T. (1979). Macroeconomic Theory. Academic Press, New York. Retrieved from http://economics.about.com/library/glossary/bldef-certainty-equivalence-principle.htm.

Taylor, J. (1999). Monetary Policy Rules. Chicago, IL: University of Chicago Press.

Revisiting the Issue of Anticipated and Unanticipated Monetary Policy Shocks

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Overview

One of the key features of the new classical approach to macroeconomics that emerged in the 1970s is the distinction between the real effects of anticipated and unanticipated changes in nominal variables (e.g. money growth). Authors such as Lucas [1972], Phelps [1967, 1968] and Friedman [1968] argued that only unexpected monetary policy shocks or money surprises will affect output and employment. On the other hand, some economists (e.g. Cochrane [1997]; Romer & Romer [1994]; Taylor [1980]), particularly those of the Keynesian tradition, asserted that anticipated monetary policy shocks also have real effects on the economy.

The discussion on the real effects of anticipated and unanticipated monetary policy shocks is one of the enduring issues in the study of macroeconomics. The extensive literature on this topics attests to the relative importance given to it. Over time, developments in both theoretical and empirical fronts allowed for a richer analysis of the impact of anticipated and unanticipated policy shocks on the real sector of the economy.

The significant changes in the conduct of monetary policy likewise have important implications on the discussion on anticipated and unanticipated monetary policy. A number of central banks have adopted inflation targeting as their framework for monetary policy beginning in the 1990s. Inflation targeting entails that central banks announce inflation targets that they commit to achieve over a period of time. Hence, under this framework, economic agents are able to anticipate monetary policy actions. Consequently, this led to better managed expectations that resulted in substantial decline in both the level and variability of inflation.

This article revisits the discussion on the real effects of anticipated and unanticipated policy shocks. The objective is to provide a firm understanding of this issue that concerns central banks. This, in turn, will hopefully lead to a better perspective of the path that central banks are taking towards a more responsive and effective conduct of monetary policy.

The article is organized as follows: the next section provides a short survey of the literature on business cycle models and the discussion on anticipated and unanticipated monetary policy shocks; the third section gives a brief discussion of inflation targeting in the Philippines; the fourth section presents an empirical validation of the real effects of anticipated and unanticipated money shocks using the Philippines case; and the fifth section concludes.

Survey of related literature

This section provides a short survey of the literature on anticipated and unanticipated monetary policy shocks. It also looks into the policy prescription that emerges from monetary business cycle models that favors the use of rule-based monetary policy over discretionary monetary policy.

Monetary business cycle models and anticipated and unanticipated monetary policy shocks

Classical economists believe in a dichotomy between nominal and real variables.[1] Changes in nominal variables (i.e. money supply) do not affect real variables like output and

[1] Real variables are economic variables that can be measured in physical units, such as quantities and relatives prices (e.g. real GDP, capital stock, employment) while nominal variables are variables expressed in terms of money (e.g. inflation rate, price level).

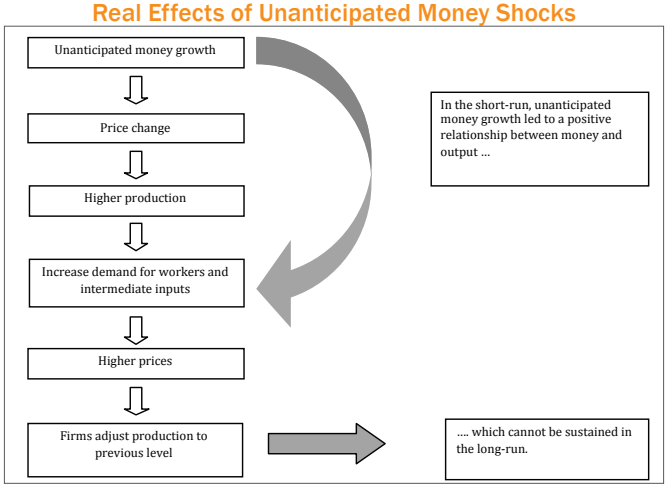
employment in the long run. Thus, money is considered neutral because it only affects the price level and not the real variables of the economy. Keynesians, on the other hand, reject the notion of classical dichotomy between nominal and real variables. Their argument rests on the assumption of rigidities in the economy. According to them, prices and wages adjust sluggishly in the short-run so that changes in the money supply raises aggregate demand and affect other real macroeconomic variables.

The purported dichotomy between nominal and real variables raises the question on whether monetary policy has real effects. In 1972, Lucas' treatise on rational expectations and the neutrality of money paved the way for the development of micro-founded monetary business cycle models that analyze the relationship between money growth and economic growth.[2] Rational expectations imply that workers and firms utilize all available information in coming up with forecasts of the price and wage levels that would prevail in the economy.[3] It is assumed that there are no systematic errors when predicting the future and that any deviations from perfect foresight are random. Lucas argued that, with rational expectations, anticipated monetary policy cannot change real GDP in a regular or predictable way. Similar to Phelps [1967, 1968] and Friedman [1968], Lucas implied that movements of output away from the natural level require a surprise. Monetary authorities can only affect output by creating a surprise and not through a predictable change in monetary policy.

In Lucas' model, market agents cannot immediately distinguish whether the price changes from unanticipated money growth are general or relative. If firms view the price changes as a relative-price change, they would expand their production in the belief that there has been an increase in demand for their product. This, in turn, would entail the hiring of additional workers. However, higher demand for workers put pressure on wages to increase which raises production costs. The increase in demand for intermediate inputs used for production will likewise result in an increase in their prices. In time, with rising wages and prices, market agents begin to realize that the price change is a general price change and production is adjusted to its former level. Thus, in the short-run, the unanticipated money change resulted in higher output growth, which cannot, however, be sustained in the long-run.

Figure 1

Real Effects of Unanticipated Money Shocks



Under the case of anticipated money growth (e.g. monetary authorities adhere to a money growth rule), market agents expect the resulting general price change. Firms, having no money illusion, will not adjust their production levels. Thus, the increase in money supply leads to no real effects – money is neutral.

[2] Monetary business cycle models posit that money growth shocks trigger business fluctuations. While money shocks have been observed to cause output fluctuations (i.e. at least in the short-run), they cannot account for the propagation of these fluctuations. Moreover, as Nelson and Plosser [1982] pointed out, output fluctuations tend to be permanent rather than transitory. Shocks, other than those affecting aggregate demand, must therefore be contributing to the permanent changes in output. This resulted in the development of real business cycle (RBC) models. In RBC models, permanent output fluctuations are explained by shocks to production technology (Kydland and Prescott [1982]; Long, Jr. and Plosser [1983]).

[3] John Muth [1961] was the one who originally proposed the concept of rational expectations.

Earlier empirical work in support of the claim that only unanticipated changes in monetary policy have real effects in the short-run include those of Barrow [1977, 1978]; Lederman [1978], Small [1978]; Grossman [1979]; Barrow & Rush [1980] and Cooley and Hansen [1997]. Unanticipated money growth is measured as a residual from a money growth equation. The residual is then used as a regressor in an aggregate demand or unemployment equation. Canlas [1986, 1997] applied the same tests using Philippine time-series data and found similar results. Unanticipated money growth has positive effects on output, but anticipated money growth is neutral. Moreover, he concluded that only a money surprise can reduce the unemployment rate. It is worth noting that most of the empirical work done to assess the impact of monetary policy shocks on output assumes an exogenous shock to monetary policy that is unanticipated by market agents.

Some empiricists, however, provide counter arguments to the notion that only unanticipated policy shocks matter. Monetary theorists have constructed models such as the overlapping contract models (e.g. Taylor [1979]), sticky price models (e.g. Rotenberg [1982, 1994]) and limited participation models (e.g. Grossman & Weiss [1983]; Rotenberg [1984]; Alvarez & Atkinson [1996]) to show that anticipated monetary shocks have real effects. Cash-in-advance models with adjustment costs such as those developed by Forest [1992] and Christiano & Eichenbaum [1992, 1995] generate conventional real effects of anticipated and unanticipated money shocks. Cochrane [1997] estimated the effects of money on output using vectorautoregression- or VAR-based measures with varying assumptions on the relative effects of anticipated and unanticipated money shocks. He observed that anticipated money and systematic monetary policy produce short and small output responses. Following Cochrane's empirical methodology, other authors (e.g. Hoover and Jordan [2001] and Gottschalk and Hopper [2001]) arrived at a similar conclusion that anticipated policy has real effects though more moderate compared to the impact of unanticipated policy.

Recent literature on business cycle models categorize anticipated policy shocks as "news" about future policies and unanticipated shocks as "surprise" shocks (i.e. shocks that market agents did not expect). Most of the research work done in this area, however, considers the effect of news about future technological changes on labor, investment and consumption (e.g. Beaudry and Portier [2004], Beaudry, Collard, and Portier [2006], Jaimovich and Rebelo [2006], Fujiwara, Hirose and Shintani [2008] andSchmitt-Grohe and Uribe [2008]). The impact of news about future monetary policy actions and surprise policy shocks are analyzed in the papers such as those of Haldane and Read [2000], Hirose and Kurozumi [2011] and Milani and Treadwell [2011]. In their paper, Milani and Treadwell [2011] focused on news about future monetary policy shocks. They estimated a new Keynesian model that incorporates news about future policies to separate the anticipated and unanticipated components of policy shocks. They observed that unanticipated policy shocks or "surprise" shocks have a very small but immediate effect on the economy while the anticipated or news shock has a much larger and more persistent effect on the economy.

Rules versus Discretion

Some of the empirical work on monetary business cycle models has shown that unanticipated monetary policy shocks result in output and employment gains in the short-run. Monetary authorities, however, are restricted from using money surprises or unanticipated money growth counter-cyclically to address economic downturns or periods of high unemployment rate. This approach yields temporary output or employment gains but results in inflationary effects that are permanent. Hence, monetary business cycle models favor the use of a rule-based monetary policy (e.g. money growth rule) over a discretionary monetary policy.

The critique of Lucas [1976] on the use of reduced-form models in drawing policy conclusions provided the intellectual impetus for the use of rules in the conduct of monetary policy. Lucas argued that since the parameters of reduced-form models are not structural—not policy-invariant—they would be affected by changes in the policies implemented in the economy. It would then be difficult to tell whether the results generated from reduced-form models represent changes in the fundamental relationship of the variables being observed or if they capture the effects of policy changes in the other sectors of the economy. Lucas suggests

the modeling of "deep parameters" that govern individual behavior (e.g. preferences) of market agents to address this issue. According to Lucas [1976], policy changes affect the behavioral parameters of the model. The manner in which policy changes modify the behavioral parameters of the model depends on whether authorities implement policy through rules or discretion. Moreover, Lucas concludes that the resulting structural changes can be better understood and empirically validated if authorities followed rules rather than discretion in implementing policy changes. Kydland and Prescott [1977] echoed the same policy prescription as Lucas' in their article. They pointed out the time inconsistency of optimal plans such that agents who optimize each period (i.e. select the best decision given the current situation) may deviate from previously set plans. Such behavior either leads to consistent but suboptimal planning or in economic instability.

Inflation Targeting in the Philippines

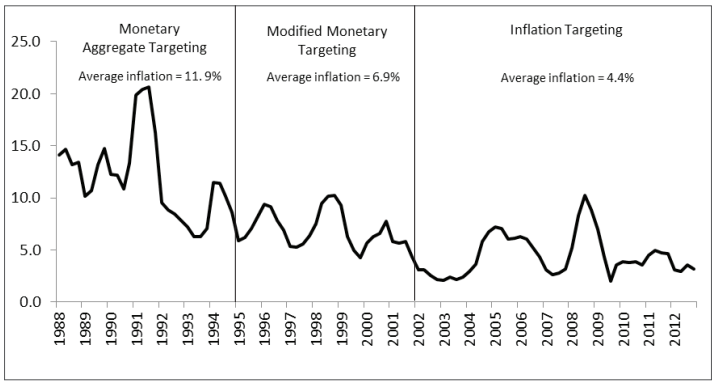
Research on the conduct of monetary policy underscored the constraints that central banks face in achieving multiple targets (e.g. high output, low unemployment, stable exchange rate). The limited policy tools available to central banks are better suited to achieve price stability rather than pursue development goals like high output growth or employment.

In 2002, the BSP adopted inflation targeting as its framework for monetary policy. The Philippines joined a long list of inflation targeters like Australia, Canada, Finland, Sweden, New Zealand, the United Kingdom, Israel, Brazil, Chile and Thailand. Inflation targeting puts price stability as the main goal of monetary policy. This approach entails the announcement of an explicit inflation target that the central bank commits to achieve over a given period of time. The substantial decline in both the level and variability of inflation in recent years was traced to better managed inflation expectations of market agents.

Figure 1 plots inflation from 1988 to 2012. Between 1988 and 1994, the year-on-year headline inflation rate in the Philippines averaged at 11.9 percent and declined to 6.9 percent during the period when the BSP adopted the modified monetary targeting framework in 1995-2001. This further declined to 4.4 percent after the BSP adopted inflation targeting. Moreover, the standard deviations of inflation between the pre-inflation targeting (i.e. 1988–2001) and the inflation targeting periods show that the volatility of inflation declined from 3.9 percent to 2.0 percent (Table 1). The decline in the inflation rate was traced to the ability of the BSP to rein in inflation to within target levels with the better anchoring of inflation expectations. Table 1 also shows the declining volatilities in GDP growth, unemployment rate and nominal exchange rate between the two sample periods.[4]

Figure 2

Domestic Inflation: 1988 – 2012



[4] The significant decline in the variability of output and inflation has often been referred to as the "Great Moderation" (Stock & Watson [2003]). Several studies have documented this phenomenon (Cecchetti, Flores-Lagunes & Krause [2006]; Blanchard & Simon [2001]; McConnell & Perez-Quiros [2000]; Kim & Nelson[1999]).

Table 1

Volatility of Output, Inflation and Unemployment

(Standard Deviations, Percentage Points)

	GDP Growth	Inflation	Unemployment Rate[1]	Nominal Exchange Rate
1990Q1- 2001Q4	2.4	3.9	1.6	8.9
2002Q1 – 2012Q4	1.9	2.0	0.9	5.0

[1] Starting in the April 2005 round of the LFS, the definition of unemployment was revised to include the availability criterion and to impose a cut-off period for the job search of the discouraged workers. The series used to derive the standard deviation of unemployment was adjusted to make the unemployment rates comparable across the survey periods from 1990 – 2012.

Woodford [2005] noted that inflation targeting safeguards central banks against the trap of discretionary policy making and helps private sector to more accurately anticipate future policy which increases the effectiveness of policy. Inflation targeting central banks often employ a policy rule (i.e. Taylor rule) to guide its interest rate setting process.[5] Such adherence to a rule-based monetary policy limits the use of unanticipated money shocks to address economic downturns. Unanticipated shocks (if they are large enough) can unanchor inflation expectations which could lead to permanent changes in the long-run inflation trend. Medalla and Fermo [2013], in their analysis of the behavior of month-on-month inflation in the Philippines, observed that if inflation expectations are dislodged (e.g. due to a large random shock or administered wages), inflation would be persistently higher than the BSP's target band.

If central banks find the need to depart from systematic monetary policy, the current literature on news (i.e. anticipated policy shocks) and surprises (i.e. unanticipated) underscore the crucial role of a central bank's communication strategy to manage expectations and to generate larger economic gains. Greater central banks transparency is one of the requirements for the successful implementation of inflation targeting. Central banks promote transparency by communicating clearly to the public their policy actions and the rationale behind them. Hirose and Kurozumi [2011] notes that the increasing emphasis placed by central banks on good communication strategies to convey their policy decisions and actions reflects the rise of the academic views on central banking as management of expectations. These authors looked into the communication strategy of the US Federal Reserve based on the anticipated and unanticipated components of monetary policy disturbances. Based on their estimation results, the Fed used unanticipated monetary policy actions until the mid-1990s and thereafter tried to coordinate market expectations about future policy actions. Milani and Treadwell [2011] noted that communication by central banks (e.g. hinting at future deviations from systematic policy) is vital in achieving a larger economic impact. Transparency and good communication, in turn, help central banks build credibility. Market agents are more likely to anchor their inflation expectations on the inflation target if the central bank has high credibility.

Empirical Validation for the Philippines

Although inflation targeting restricts central banks from using unanticipated monetary shocks to address low output or employment, it would still be a useful exercise to look into the real effects of anticipated and unanticipated monetary policy shocks in the Philippines. This section presents the results of the simulations done to validate the impact of anticipated

[5] There is a debate on the proper definition of inflation targeting (IT) – is it a monetary policy rule or a framework? From a policy standpoint, Bernanke et.al., [1999] characterized IT as a framework rather than a rule. Similarly, Gavin [2004] described IT as "management by objective" rather than a policy rule. Svensson [1999] offers a diverging view by defining IT as a monetary policy rule derived from an explicit optimization problem. Kuttner [2004] observed that the difficulty in defining IT is due to its origins in central banking practice and policy authorities' search for a suitable nominal anchor

and unanticipated monetary policy shocks in the Philippines. Simulations are done using the BSP's Macroeconomic Model for the Philippines (MMPH).[6]

The quarterly BSP MMPH is a semi-structural macro model that resembles standard new Keynesian open economy models (Svensson [2000] and Gali & Monacelli [2005]). The MMPH is based on the key relationships underlying the monetary policy transmission mechanism. It consists of four core behavioral equations: i) an aggregate demand equation (output gap equation); ii) inflation equation (expectations-augmented Phillips curve); ii) an exchange rate equation (uncovered interest rate parity); and a forecast-based monetary policy rule (i.e. Taylor rule). The model likewise has a foreign sector block which represents the external factors that may affect the domestic economy. Appendix 1 lists the key equations of the MMPH and Appendix 2 gives some of the parameter values of the model. For a more detailed discussion of the MMPH, please see the article of Bautista, Glindro and Cacnio [2013].

In the MMPH, monetary policy shocks being implemented can be specified as either anticipated or unanticipated. However, by default, the MMPH assumes that all shocks are unanticipated. This is to generate short-run real effects in the economy. The simulations assume a -1.0 percent monetary policy shock (i.e. anticipated and unanticipated) sustained over a period of four quarters.[7]

Figure 3 presents the impulse responses of the output gap, inflation rate, policy rate and nominal exchange rate to a -1.0 percent monetary policy shock. In the short-run, unanticipated money shocks led to higher output gap and lower paths of inflation and policy rate compared to the anticipated case. Nominal exchange rate likewise adjusts more slowly under the unanticipated case. The real effects of unanticipated money shocks, however, cannot be sustained in the long-run. Output starts to decline to its previous level with inflation on a higher path. These findings are in keeping with the conclusion found in the literature that real gains from using unanticipated shocks are only in the short-run but the resulting inflationary effects persist in the long-run.

Simulation results likewise showed that anticipated policy shocks can generate real effects in the immediate horizon. Output gap is higher during the period of declining policy rates (i.e. first four quarters). This could be reflective of the ability of the BSP to effectively communicate to the public its policy actions and the forward-looking behavior of market agents. Future research can further look into this finding and validate the real effects of anticipated policy shocks under inflation targeting.

Conclusion

The distinction between the real effects of anticipated and unanticipated changes in nominal variables is one of the continuing issues in the study of macroeconomics. Some economists argue that only unexpected monetary policy shocks or money surprises will affect output and employment while others, particularly those of the Keynesian tradition, asserted that anticipated monetary policy shocks also have real effects on the economy. This issue is of relative importance to central banks since it has significant consequences for the conduct of monetary policy.

The adoption of inflation targeting by many central banks starting in the early 1990s bore important implications for the discussion on anticipated and unanticipated monetary policy shocks (e.g. money shocks are better anticipated, the use of rule-base monetary policy under IT). Inflation targeting safeguards central banks against the trap of discretionary policy making and helps private sector to more accurately anticipate future policy which increases the effectiveness of policy. Such adherence to a rule-based monetary policy limits the use of unanticipated money shocks to address economic downturns. Unanticipated shocks (if

[6] The MMPH has been calibrated for the IT period. While it may be useful to consider the pre-IT period, doing so entails a re-calibration of the model to account for possible structural changes that occurred between the pre-IT period and the IT period (e.g. changes in the way expectations are formed). Nonetheless, this limitation does not invalidate the results generated in the simulation exercises.

[7] In generating the simulation results, a -1.0 percent monetary policy shocks sustained over a period of 2, 3 and 4 quarters were considered. The three scenarios exhibited the same trend but some difference in the magnitude. For ease of presentation and clarity, a monetary policy shock sustained over 4 quarters was used.

they are large enough) can unanchor inflation expectations that could lead to permanent changes in the long-run inflation trend.

An important aspect of central banking that is highlighted in the recent research work on anticipated and unanticipated policy shocks is the crucial role of a central bank's communication strategy. The effectiveness of a central bank in conveying its policy actions to the public (i.e. open and transparent communication) largely affects its ability to manage expectations and to generate larger economic gains.

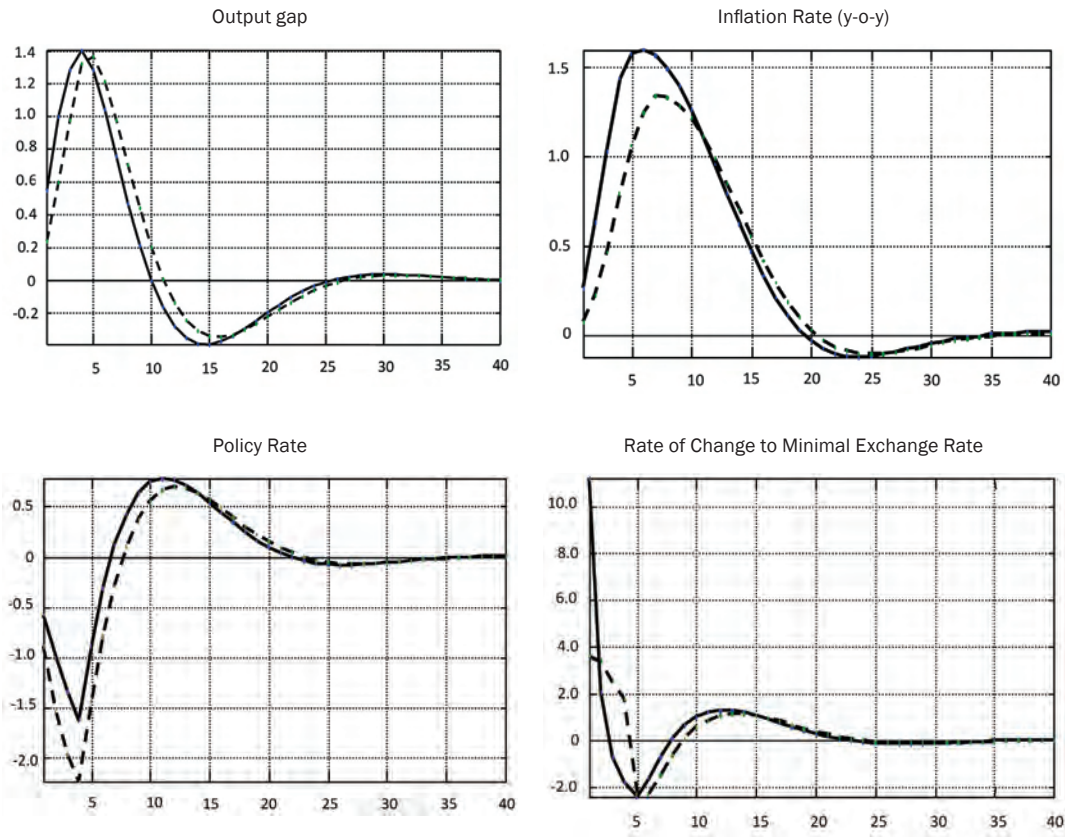
Using the BSP's MMPH, the impact of a -1.0 percent monetary policy shock (i.e. anticipated and unanticipated) sustained over a period of four quarters is explored. Unanticipated money shocks led to higher output gap and lower paths of inflation and policy rate compared to the anticipated case in the short-run. Nominal exchange rate likewise adjusts more slowly under the unanticipated case. These findings are consistent with the observation found in the literature that unanticipated money shocks result to real gains in the short-run. However, the real effects of unanticipated money shocks cannot be sustained in the long-run. Output starts to decline to its previous level and inflation is on a higher path. These findings are in keeping with the conclusion found in the literature that real gains from using unanticipated shocks are felt only in the short-run but the resulting inflationary effects persist in the long-run.

The results of the simulation also showed that anticipated policy shocks can generate real effects in the immediate period. Output gap is higher during the quarters of declining policy rates (i.e. first four quarters). This finding could be reflective of the ability of the BSP to effectively communicate to the public its policy decisions and the forward-looking behavior of market agents. Future research can consider looking further into this observation and validate the real effects of anticipated policy shocks under inflation targeting.

Figure 3

Impulse Response to a -100 bps Policy Rate Shock

(percentage point deviation from baseline)



Appendix 1

Basic Structure of the MMPH

Output gap equation (Aggregate demand)

$$Yg = alpha1 * Yg_{t+1} + alpha\ 2 * Yg_{t-1} - alpha3 * (Rg + cc) + alpha4 * RMTg + alpha * Zg + alpha6 * YFg + alpha7 * URg + RES\_YG$$

where:

Yg	Output gap
Yg_{t+1}	Lead output gap
Yg_{t-1}	Lagged output gap
Rg	Real policy rate gap (real reverse repurchase rate gap)
cc	Credit condition
$RMTg$	Remittance gap (in domestic currency)
Zg	Real exchange rate gap

Expectations-augmented Phillips Curve (Aggregate supply)

$$dP = beta1 * (dPM - dZt) + (1 - beta1) * [beta2 * dP_{t-1} + (1 - beta2) * dP^e] + beta3 * Yg + beta4 * Zg + beta5 * LRPCOMGAP + RES_{DP} + PP_{DP2} - beta6 * PP\_DP2_{t-1}$$

where:

dP	Quarter-on-quarter inflation
dPM	Quarter-on-quarter import price inflation
dZt	Rate of change in the real exchange rate trend
$dPt\text{-}1$	Lagged inflation
dPe	Inflation expectations
Yg	Output gap
Zg	Real exchange rate gap
$LRPCOMGAP$	Real international commodity price gap
PP_DP2	Short-lived supply shock
RES_DP	Cost-push shock

Monetary policy rule (Taylor rule)

$$RS = gamma1 * RS_{t-1} + (1-gamma1) * \{(RRt + PIETARGET_{t+1}) + gamma2 * (dP_{t+3} - PIETARGET_{t+3}) + gamma3 * Yg\} + RES\_RS$$

where:

In real terms, $RR = RS - dP_{t+1}$

RS	Nominal reverse repurchase rate (policy rate)
RR	Real policy rate
RRt	Trend real policy rate
$PIETARGET$	Inflation target
dP	Quarter-on-quarter inflation
Yg	Output gap
RES_RS	Monetary policy shock

Exchange rate equation (Uncovered interest rate parity)

$$RS - RS\_US = 4 * (S^e - S) + PREM - omega4 * RMTFg + omega5 * dFXRES + RES\_UIP$$

where:

RS	Nominal reverse repurchase rate (policy rate)
RS_US	Nominal US Federal Funds rate
S^e	Expected nominal exchange rate
S	Nominal exchange rate
$PREM$	Risk premium
$RMTFg$	Remittance gap in US$
$dFXRES$	Quarter-on-quarter change in foreign exchange reserves
RES_UIP	Shock on exchange rate

Foreign block

$$YFg = alpha\_f1 * YFg_{t-1} + alpha\_f2 * YFg_{t+1} - alpha\_f3 * RRFg_{t-1} + RES\_YFG$$

$$dPF = beta\_f1 * dPF_{t-1} + (1 - beta\_f1) * dPF_{t+1} + beta\_f2 * YFg_{t-1} + RES\_DPF$$

$$RS\_US = gamma\_f1 * RS\_US_{t-1} + (1 - 0.65) * \{(RRFt + PIETARGET\_US_{t+1}) + gamma\_f2 * (d4PF_{t+3} - PIETARGET\_US_{t+3}) + gamma\_f3 * YFg\} + RES\_RS\_US$$

$$RRF = RS\_US - dPF_{t+1}$$

where:

YFg	US output gap
dPF	US inflation rate
$PIETARGET\_US$	US inflation target
RS_US	US Federal funds rate
RRF	US real Federal funds rate
$RRFt$	US real trend Federal funds rate
$RRFg$	US real interest rate gap
RES_YFG	Shock to US output gap
RES_DPF	Shock to US inflation
RES_RS_US	US monetary policy shock

Appendix 2

Summary of Parameter Values

Parameter	Value
alpha1	0.60
alpha2	0.15
alpha3	0.10
alpha4	0.06
alpha5	0.03
alpha6	0.20
alpha7	1.00
alpha8	0.004
beta1	0.03
beta2	0.40
beta3	0.10
beta4	0.0001
beta5	0.03
beta6	0.90
gamma1	0.85
gamma2	1.75
gamma3	0.50
omega4	0.20
omega5	0.40
alpha_f1	0.55
alpha_f2	0.30
alpha_f3	0.20
beta_f1	0.40
beta_f2	0.04
gammaf1	0.65
gamma_f2	1.95
gamma_f3	0.20

References

Barro, R. & Rush, M. (1980). Unanticipated money' and economic activity. In Fischer, S. (Ed.), Rational Expectations and Economic Policy, 23-73. Illinois: University of Chicago Press.

Bautista, D., Glindro, E., & Cacnio, F. (Forthcoming 2013). A monetary policy model for the Philippines. 2013 Bangko Sentral Review.

Beaudry, P., Collard, F., & Portier, F. (2006). Gold rush fever in business cycles (National Bureau of Economic Research [NBER] Working Paper 12710). Retrieved from NBER website: http://www.nber.org/papers/w12710.

Beaudry, P., & Portier, F. (2004). An exploration into Pigou's theory of cycles. Journal of Monetary Economics, 51(6), 1183—1216.

Canlas, D. (1986). Monetary policy and economic activity in a low-income country: an empirical investigation. Philippine Review of Economics and Business, 83-99.

Canlas, D. (1997). Unemployment and monetary policy in the Philippines. In Esguerra, E. & Ito, K. (eds.), Employment, Human Capital and Job Security: Recent Perspectives on the Philippine Labor Market. Tokyo: Institute of Developing Economies.

Canlas, D. (2012). Business fluctuations and monetary policy rules in the Philippines: with lessons from the 1984 – 1985 contraction (University of the Philippines School of Economics [UPSE] Discussion Paper No. 2012-10). Retrieved from UPSE website: http://www.econ.upd.edu.ph/dp/index.php/dp/article/view/693.

Cochrane, J. (1997). What do the VARs mean? Measuring the output effects of monetary policy, (NBER Working Paper No. 5154). Retrieved from NBER website: http://www.nber.org/ papers/w5154.

Cooley, T. & Hansen, G. (1997). Unanticipated money growth and the business cycle reconsidered. Journal of Money, Credit and Banking, 29(4).

Friedman, M. (1968). The role of monetary policy. American Economic Review, 58, 1-17.

Fujiwara I., Hirose, Y., & Shintani, M. (2008). Can news be a major source of aggregate fluctuations? A Bayesian DSGE approach (Discussion Paper No. 2008-E-16). Retrieved from the Bank of Japan's Institute for Monetary and Economic Studies website: http//www.imes.boj.or.jp/research/papers/english/08-E-16.pdf.

Gottschalk, J. & Hoppner, J. (2001). Measuring the effects of monetary policy in the Euro area: The role of anticipated policy (Discussion Paper 21/2001). Retrieved from Bonn Econ Discussion Papers website: http://www.bgse.uni-bonn.de/BGSE/bonn-econ-papers-1/archive/2001/bgse21_2001.pdf

Grossman, S. & Weiss, L. (1983). A transactions-based model of the monetary transmission mechanism. American Economic Review, 73, 871-880.

Haldane, A. & Read, V. (2000). Monetary policy surprises and the yield curve (Bank of England Working Paper No. 106). Retrieved from the Bank of England website: http//www.bankofengland.co.uk/publications/Documents/workingpapers/wp106.pdf.

Hirose, Y. & Kurozumi, T. (2011). Changes in the Federal Reserve communication strategy (Bank of Japan Working Paper No. 11-E-2). Retrieved from the Bank of Japan website: http/www.boj.org.jp/en/research/wps_rev/wps_2011/data/wp11e02.pdf.

Hoover, K. & Jorda, O. (2001). Measuring systematic monetary policy. Federal Reserve Bank of St. Louis Review, 113-144.

Jaimovich, N. & Rebelo, S. (2006). Can news about the future drive the business cycle? (NBER Working Paper No. 12537). Retrieved from NBER website: http://www.nber.org/papers/w12537.pdf.

Kydland, F. & Prescott, E. (1977). Rules rather than discretion: the inconsistency of optimal plans. Journal of Political Economy, 473–491.

Laidler, D. (1993). The Demand for Money: Theories and Evidence (4th edition). New York: Harper Collins.

Leiderman, L. (1978). Macroeconometric testing of the rational expectations and structural neutrality hypothesis for the United States. Journal of Monetary Economics, 6, 69–82.

Lucas, R. Jr. (1972). Expectations and the neutrality of money. Journal of Economic Theory, 4, 103–124.

Lucas, R. Jr. (1976). Econometric policy evaluation: a critique. Journal of Monetary Economics, Supplementary Series, 19–46.

Lucas, R. Jr. & Stokey, N. (1983). Money and interest in a cash-in-advance economy. Econometrica, 55, 491–513.

Medalla, F. & Fermo, L. (Forthcoming 2013). A univariate time series analysis on Philippine inflation during the inflation targeting period. 2013 Bangko Sentral Review.

Milani, F. & Treadwell, J. (2011). The effects of monetary policy "news" and "surprises" (Working Paper). Retrieved from the University of California-Irvine, Department of Economics' website: http//www.economics.uci.edu/files/economics/docs/workingpapers/2010-11/milani-9.pdf.

Muth, J. (1961). Rational expectations and the theory of price movements. Econometrica, 29, 315-335.

Phelps, E. (1967). Phillips curve, expectations of inflation and optimal unemployment over time. Economica, 34, 254–281.

Romer, D. & Romer, C. (1994). What ends recessions? In Fischer, S. & Rotemberg, J. (Eds.). 1994 NBER Macroeconomics Annual, 13–57. Cambridge: MIT Press.

Rotemberg, J. (1994). Prices, output, and hours: an empirical analysis based on a sticky price model (NBER Working Paper No. 4948). Retrieved from NBER website: http://www.nber.org/papers/w4948.pdf.

Schmitt-Grohé, S. & Uribe, M. (2008). What's "news" in business cycles (NBER Working Paper No. 14215). Retrieved from NBER website: http://www.nber.org/papers/w14215.pdf.

Taylor, J. (1979). Estimation and control of a macroeconomic model with rational expectations. Econometrica, 47, 1267–1286.

Taylor, J. (1993). Discretion versus policy rules in practice. Carnegie-Rochester Conference Series on Public Policy, 39, 195–214.

Regional Surveillance Mechanisms in Asia: An Overview of the Participation of the Bangko Sentral ng Pilipinas

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Introduction

The recent spate of crises such as the 2008-2010 Global Financial Crisis which started in the United States, and the sovereign debt crisis in Europe have underscored the importance of global and regional surveillance mechanisms.

In the aftermath of these crises that hit the modern global economy, concerns were raised about the failure of surveillance mechanisms to foresee the build-up of risks and its costly unwinding. This is clearly expressed by the International Monetary Fund (IMF) itself in its 2011 evaluation report1:

> *".....the IMF fell short in delivering on this key (surveillance) objective in the run-up to the financial and economic crisis that began to manifest in mid-2007 and that reached systemic proportions in September 2008. During the period 2004–2007, the banner message of IMF surveillance was characterized by overconfidence in the soundness and resiliency of large financial institutions, and endorsement of financial practices in the main financial centers. The risks associated with housing booms and financial innovations were downplayed, as was the need for stronger regulation to address these risks" (IMF, 2011).*

The failure to capture the gravity and extent of emerging vulnerabilities in the US and Europe brought to the fore the critical role and the need to strengthen surveillance mechanisms. Essentially, surveillance serves as a warning tool in identifying emerging risks and addressing potential problems. Surveillance may also serve as basis in forming peer review systems, which allows for policy dialogue and exchange that provide scope for coordinated policy response and management of potential spillovers. A strong surveillance process is an essential tool in preventing and minimizing risks of future crises by providing early warning signs so that countries can take prompt corrective actions. In the Asian region, the importance of surveillance has been realized in the aftermath of the 1997 Asian financial crisis, such that concrete steps to institutionalize regional surveillance have been undertaken and gained substantial progress in recent years. Likewise, cooperation in surveillance in Asia also served as an impetus for regional finance cooperation and integration activities.

This article aims to discuss the participation of the Bangko Sentral ng Pilipinas (BSP) in regional surveillance mechanisms, beginning with the multilateral surveillance conducted by the IMF, formally known as the Article IV Consultations. This is followed by the ASEAN Surveillance Process (ASP) under the ASEAN[2] Finance Ministers' process, and the Economic Review and Policy Dialogue (ERPD) Process under the ASEAN+3[3] Finance Ministers' process, which are policy dialogue-based and peer review structured forms of surveillance. The article will also discuss the BSP's participation in the recently established ASEAN+3 Macroeconomic Research Office (AMRO), which is an evolving regional surveillance mechanism of the Chiang Mai Initiative Multilateralization (CMIM). The article will also briefly discuss the BSP's participation in selected policy exchange and information sharing activities under key central bank regional forums such as the Executives' Meeting of East Asia Pacific (EMEAP) Central Banks and the Bank for International Settlements (BIS).

Taking off from these discussions, the article will analyze the benefits of participation in these mechanisms, against the backdrop of increasing regional economic interdependence

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1 IMF Performance in the Run-up to the Financial and Economic Crisis from 2004-2007 prepared by the IMF's Independent Evaluation Office (IEO)

2 ASEAN member countries include Brunei, Cambodia, Indonesia, Lao People's Democratic Republic (PDR), Malaysia, Myanmar, Philippines, Singapore, Thailand and Vietnam.

3 ASEAN+3 is comprised of the ASEAN member countries plus the People's Republic of China (PRC), Japan and the Republic of Korea.

and integration, as well as a fast evolving global economic environment. Finally, the article concludes with a discussion of the future directions in regional surveillance mechanisms.

Definition of Surveillance[4]

In the sense of its current usage, the word "surveillance" appeared for the first time in the internal documents of the IMF in the early 1970s. Surveillance became part of the vocabulary of international economics when it was mentioned in the Second Amendment of the IMF Articles of Agreement, which came into force in 1978. Article IV of the amended Articles of Agreement provides that the IMF "oversee the international monetary system in order to ensure its effective operation and — oversee the compliance of each member with its obligations specified therein (Section 3[a]) as well as to — exercise firm surveillance over the exchange rate policies of its members." In accordance with The IMF Surveillance Decision of 1977, the surveillance of exchange rate policies covers all macroeconomic and macro-critical structural policies that may influence a member country's exchange rate, balance of payments or external stability.

In IMF usage, there are two categories of surveillance activities namely: (a) bilateral surveillance, or the evaluation of and advice given on the policies of individual member countries typically conducted under the periodic Article IV consultations; and (b) multilateral and regional surveillance which covers the oversight of the world economy and regional economic developments. Multilateral and regional surveillance complements bilateral surveillance by bringing into the analysis global and cross-country perspectives. Within the IMF, multilateral and regional surveillance are most visibly conducted under the semi-annual World Economic Outlook (WEO), Regional Economic Outlook (REO), and Global Financial Stability Report (GFSR) exercises. On the other hand, bilateral surveillance is carried out under the Article IV Consultations in which a Staff Report is published for the discussion of the IMF Executive Board.

Furthermore, Takagi (2010) argues that surveillance may be viewed in terms of a results chain consisting of three stages. The first stage involves producing a message, such as an assessment of a country's crisis vulnerability or the need to make a policy adjustment. The second stage involves the surveillance unit delivering the message to its audience by employing one or more of three available avenues namely: (i) peer pressure through the officials of other countries, (ii) public pressure through the markets or the general public, and (iii) quiet persuasion as confidential advisor to the government. Lastly, the third stage involves having an impact on policymaking in the country concerned, if the right message is delivered to its authorities in an appropriate manner.

Benefits of Regional Surveillance Mechanisms

The emergence of regional surveillance activities extends a number of positive benefits to participating member countries and addresses limitations on multilateral surveillance of the IMF. At the same time, regional surveillance activities pose positive externalities to other countries outside the region, in terms of contributing to regional stability and early detection of emerging risks and spillovers. Some of the benefits identified by Takagi (2010) include the following:

Regional surveillance adds another dimension of support to increasing regional economic integration. Given deepening economic integration, there is an increasing need for the East Asian region to have a cooperative mechanism to identify vulnerabilities and help prevent crises from occurring. The region also needs a more effective cooperative framework of regional policy dialogue and cooperation to address potential policy spillovers, mitigate political tensions and find scope for collective action. Such cooperative schemes can be built through regional surveillance.

[4] Discussions in this section are largely based on the review of literature of the paper "Regional Surveillance for East Asia: How Can It Be Designed to Complement Global Surveillance?". Shinji Takagi. ADB Working Paper on Regional Economic Integration. May 2010.

Regional surveillance mechanisms help fills in existing gaps from IMF surveillance. Albeit the IMF is also doing regional surveillance, its main focus remains on global and national perspectives. In this context, a regional surveillance mechanism can provide additional value through its evaluation mechanism by focusing on regional vulnerabilities and intra-regional linkages, as well as from shifting from the IMF's "top-down" approach to a "bottom-up" approach to regional surveillance (AEM, 2009). This renewed approach would ensure that recommended policy adjustments would run not just from "top-down", i.e., from lobal analysis to regional, then to national policymakers, but also from "bottom-up" i.e., by drawing from national to regional monitoring then to global surveillance and dialogue processes. This practice would help ensure regional policy ownership of member countries.

Regional surveillance helps complement IMF's crisis prevention mechanism. A regional mechanism set-up is distinct from the organizational structure of IMF surveillance, in which its Board of Executive Directors is the primary audience. The IMF Executive Board, where surveillance discussions take place, also does not possess direct political clout to serve as an effective peer pressure group (AEM, 2009). Although recently, the IMF has tried to project its influence by participating in global forums of senior policymakers, such as the G-7 and G-20 processes, its involvement has largely been limited to providing technical inputs (Takagi, 2010). Thus, regional surveillance mechanisms provides a potentially complementary "peer pressure" effect towards its members given that its surveillance reports are directly fed into the ministerial level policymakers themselves, thereby resulting to a more effective crisis prevention policy action.

Surveillance at the national, regional, and global levels contributes to effective economic governance. An increasingly globalized world demands that surveillance be conducted at three distinct levels namely: national, regional, and global. Global surveillance and dialogue forums can identify issues pertaining to systemic risks, while regional surveillance and dialogue can forge coordinated policies to address risks to contagion. On the other hand, national surveillance identifies specific vulnerabilities to individual economies. Over all, these three tiers may become an effective filtering mechanism for identifying emerging policy issues. Moreover, should an emerging vulnerability get past through one filter, there is a good chance it will be spotted and addressed at one of the remaining two surveillance levels (AEM, 2009).

BSP Participation in Regional Surveillance Activities

One of the key activities under the BSP's thrust of proactive participation in regional monetary and financial cooperation activities is its participation in various forms of surveillance activities. By geographical and topical area of coverage, the BSP participates in multilateral surveillance (as a member of the IMF) and regional surveillance (under the ASEAN and ASEAN+3 finance processes, as well as the newly established AMRO) activities. On the other hand, according to the type of activities undertaken, the surveillance activities participated in by the BSP may be classified into: (a) data and information sharing; (b) policy dialogue and peer review; and (c) due diligence type of review and assessment of economic conditions, policies, and risks with an end view of prescribing remedial policy actions to authorities. The following sections proceed to describe the BSP's participation in each of these surveillance activities.

Multilateral Surveillance

BSP Participation in the IMF Article IV Consultations

Under the Article IV consultation visits, an IMF mission conducts periodic visits, usually at an annual basis to member countries, to exchange views with the government and the central bank on whether there are risks to domestic and global stability that argue for adjustments in a members' economic or financial policies. Discussions mainly focus on exchange rate, monetary, fiscal, and financial policies. During their missions, IMF staff also meets with

other stakeholders, such as members of Congress, representatives of business, labor unions, and civil society to seek further perspectives as it evaluates the country's current and prospective economic policies. Upon return to the IMF Headquarters in Washington, D.C., the staff presents a report to the IMF's Executive Board for its discussion. The Board's views are subsequently transmitted to the country's authorities, concluding the Article IV consultation process. In recent years, surveillance has become increasingly transparent, with most members agreeing to publish a Public Information Notice (PIN) summarizing the views of the Board, as well as the staff report and accompanying analysis. Many countries also publish a statement by staff at the conclusion of an IMF mission (IMF, 2012).

Apart from providing data and information on monetary, banking and financial policies, the BSP facilitates the meeting of the IMF staff with technical personnel from various government agencies to discuss the country's latest macroeconomic data and developments, the influence of a member's policies on the external accounts,and potential vulnerabilities in the economy. This is followed by the Concluding Principals' Meeting where the visiting IMF Staff meet with high-level officials of the National Government which include the BSP Governor, the Secretary of Finance, the Socio-Economic Planning Secretary, the Secretary of Budget and Management, the Customs Commissioner, the Commissioner of Internal Revenue, the Treasurer of the Philippines, among others, to validate their preliminary findings and data gathered during the technical meetings. Subsequently, a press conference is held to announce the conclusion of the IMF Article IV Consultations and discuss the information that has been shared with the visiting team. Upon the team's return to the IMF headquarters, the staff prepares the Staff Report for discussion by the Executive Board before it is published as a PIN, subject to the consent of the Monetary Board of the BSP.

Regional Surveillance Activities

BSP Participation in the ASEAN Surveillance Process (ASP)

Prior to the ASP, its precursor the Manila Framework Group (MFG), was established in November 1997 by 14 Asia-Pacific economies which include ASEAN members plus Australia, Canada, New Zealand and the United States with an aim of serving as a forum for in-depth dialogue on regional economic surveillance and crisis management. However, as a framework for enhanced Asian regional cooperation to promote financial stability, the MFG involved the participation of the United States and reiterated the centrality of the IMF's role in the international monetary system, an arrangement which was not entirely well received, particularly for Asian countries badly hit by the Asian crisis. As a result, the MFG slowly faded by the end of 2000 until it was replaced by the ASP which was seen to be more responsive to the surveillance and policy exchange needs of ASEAN member countries. Developed in October 1998, the ASP is the primary mechanism for regional information sharing, policy dialogue, and economic surveillance among ASEAN member states in the areas of monetary, fiscal and financial policies. An important output from the process is the ASEAN Surveillance Report (ASR) that uses economic and financial data directly provided by ASEAN countries, similar to the data supplied to the IMF.

Produced annually, the ASR covers latest data and development on the real and external sector, monetary and fiscal policies, financial data and social indicators of member countries. The report of the ASR is then used as basis for the policy exchange discussions during the ASEAN Finance and Central Bank Deputies Meeting (AFDM), before they are elevated for similar discussions of Finance Ministers at the ASEAN Finance Ministers Meeting (AFMM). During the AFMM, the ASEAN Finance Ministers are joined by the troika of Central Bank Governors composed of the past, present and future country chairs of the ASEAN Finance Process. The AFMM also conducts annual policy dialogue with the IMF on global and regional economic developments and challenges for central banks and the role of the ASEAN in the global economy. In the same meeting, the Finance Ministers engage in discussions with each other on important developments and policy issues confronting each member country. This exercise allows the members to keep abreast of each other's internal economic developments which help them prepare for possible policy coordination and management of potential spillovers.

To strengthen the ASP, the ASEAN Integration Monitoring Office (AIMO) was established in 2010 with the primary task of assessing the state of financial integration in ASEAN, including periodic monitoring of various initiatives related to regional integration of financial markets. The work program of the AIMO also includes:(i) regular monitoring of developments in individual ASEAN, regional and global economies; (ii) maintaining a surveillance database; (iii) developing and implementing surveillance models and early warning systems; and (iv) preparation of policy and issue papers on regional macroeconomic and financial issues.The AIMO is also tasked to monitor and keep track of ASEAN economic and financial integration, in preparation for the achievement of an ASEAN Economic Community (AEC) by 2015.[5]

In support of the Philippines' commitment to the AEC, the BSP actively participates in the ASP by supplying data and information on monetary, external and banking sectors, and facilitating the supply of data from other government agencies such as the Department of Finance (DOF) and the Bureau of the Treasury (BTr). The BSP also participates in the policy dialogues during the AFDM and AFMM, which is usually represented by the BSP's Deputy Governor for Monetary Stability Sector and other officials from the DOF, to share with the other ASEAN member countries the recent economic and financial developments and policies in the Philippines.

BSP Participation in the ASEAN+3 Economic Review and Policy Dialogue Process (ERPD)

The ASEAN ERPD Process was introduced in May 2000. Under this process, the ASEAN+3 finance ministers meet annually during the bi-annual ASEAN+3 Finance and Central Bank Deputies Meeting (AFDM+3) and the ASEAN+3 Finance Ministers' Meeting (AFMM+3), in order to exchange information and discuss policy issues involving economic and financial developments in the respective ASEAN+3 member countries. Similar to the ASP, the goal of the ERPD is to strengthen policy dialogue and coordination among member countries on financial and macroeconomic policy issues of common interest. The ERPD Process focuses mainly on issues related to risk management, monitoring of regional capital flows, reform of the international financial architecture and enhancement of self-help mechanisms. Other objectives of the ERPD are to: (i) assess global, regional and national economic conditions; (ii) monitor regional capital flows and currency markets; (iii) analyze macroeconomic and financial risks; (iv) strengthen banking and financial system conditions; and (v) provide an Asian voice in the reform of the international financial system.

During the ERPD Process, the ASEAN+3 finance ministers also have an opportunity to engage with representatives from the IMF, World Bank (WB), the Asian Development Bank (ADB) and more recently, the newly established AMRO to discuss economic developments and outlook views of the multilateralsfor the ASEAN+3 region. In addition, since last May 2012, ASEAN+3 Central Bank Governors are also now included in the AFMM+3 meeting and is now collectively known as the ASEAN+3 Finance Ministers and Central Bank Governors Meeting (AFMGM+3). The first meeting of the AFMGM+3 was held in Manila last 3 May 2012 along the sidelines of the Asian Development Bank (ADB) Annual Meetings hosted by the Philippines.

The BSP's participation to the ERPD occurs during the AFDM+3, usually attended by the BSP Deputy Governor for Monetary Stability Sector, and the AFMGM+3 meetings which is attended by the Secretary of Finance and until recently, the BSP Governor. During the ERPD session, member countries report on the developments and progress in their respective economies, and proceed to exchange views on important issues in their economies. They also exchange views with representatives from multilateral agencies as previously mentioned.

[5] The ASEAN Economic Community (AEC) shall be the goal of regional economic integration in ASEAN by 2015. The AEC envisages the following: (a) a single market and production base, (b) a highly competitive economic region, (c) a region of equitable economic development, and (d) a region fully integrated into the global economy.

BSP Participation in the ASEAN+3 Macroeconomic Research Office (AMRO)

Apart from policy dialogue and exchange provided by the ERPD, the ASEAN+3 countries also set forth to intensify their cooperation in forming regional financial arrangements (RFAs). This initiative was brought forth by difficulties experienced by several IMF-assisted ASEAN+3 countries at the height of the Asian Financial Crisis, wherein strict lending conditionalities and policy adjustments prescribed by the IMF were believed to have resulted in economic contractions and financial meltdowns to several member countries (e.g., South Korea, Indonesia and Thailand). The dissatisfaction over the IMF's perceived failure contributed to the motivations of ASEAN+3 countries to establish the then Chiang Mai Initiative (CMI), until its recent strengthening towards the Chiang Mai Initiative Multilateralization or the CMIM.[6]

To support the surveillance needs of CMIM and supplement the ERPD, the ASEAN+3 Macroeconomic Research Office (AMRO) was established as an independent regional surveillance unit in 2011. In particular, the CMIM was established to monitor and analyze regional economies, and to contribute to early detection of risks, swift implementation of remedial actions, and support the effective decision-making process under the CMIM.[7] Headquartered in Singapore, the AMRO functions as a surveillance unit that will prepare quarterly consolidated reports to ASEAN+3 Finance and Central Bank Deputies on the overall macroeconomic assessment of the ASEAN+3 region, as well as individual member country reports. In preparing these assessments, the AMRO takes into account other reports from the ASEAN Secretariat (ASEC), the ADB, the IMF and the members' respective private sector.

Similar to the IMF Staff Visits, AMRO is also tasked to carry out annual consultations individually with its member countries, and develop and maintain an Early Warning System (EWS) for advanced detection of emerging vulnerabilities. Moreover, should a member country tap into or activate the CMIM, the AMRO is tasked to conduct macroeconomic monitoring of the swap requesting member country, as well as monitor the use of the borrowed funds and its compliance to lending conditions imposed pursuant to the CMIM Agreement.

In AMRO's first consultation mission in the Philippines last July 2012, the BSP provided data on monetary, financial and banking statistics, as well as information on its monetary policy. The BSP also facilitated and coordinated the participation of other relevant government agencies in the mission's visit, as well as arranged courtesy visits with the heads of the agencies. The BSP likewise provided funding support to AMRO by initially co-sharing with the DOF the contribution of the Philippines to its operational budget. Subsequently, the DOF has made arrangements to make the national government shoulder the entire cost of contribution to the AMRO as part of the international commitments of the Republic. The conversion of AMRO into an international organization is also underway, in order to institutionalize it as an independent surveillance entity with an exclusive mandate to serve the needs of the ASEAN+3 region.

BSP Participation in Other Surveillance Activities

Aside from the BSP's participation in multilateral and regional surveillance as mentioned, the BSP also participates actively in policy exchanges and data and information sharing surveillance activities carried out under a number of regional and multilateral forums. These surveillance activities usually involve the members' voluntary exchange, on a regular basis, of data and are mainly undertaken for purposes of promotingregional policy dialogue, peer review and information sharing.

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[6] CMIM evolved from the CMI, the first regional currency swap arrangement launched by the ASEAN+3 countries in May 2000. The then CMI is composed of: (a) the ASEAN Swap Arrangement (ASA) among ASEAN countries; and (b) a network of individual bilateral swap arrangements (BSAs) among the ASEAN+3 countries. Initially, the total size of the CMIM Arrangement was US$120 billion, but this was doubled in 2012 to US$240 billion.

[7] Based on the Joint Ministerial Statement (JMS) issued by the ASEAN+3 Finance Ministers' Meeting (AFMM+3) held on 4 May 2011 in Hanoi, Vietnam.

Under the Executives' Meeting of East Asia-Pacific Central Banks (EMEAP), the BSP participates in the data and information sharing activities of the EMEAP Monetary and Financial Stability Committee (MFSC) established in 2007, which is tasked to undertake macro-monitoring activities and enhance crisis management mechanisms in the EMEAP region. The MFSC was formerly chaired by the BSP from 2009-2012 and currently chaired by the Hong Kong Monetary Authority (HKMA). In addition, EMEAP central banks instituted a dialogue process among its members to promote monetary and financial stability in the region by undertaking an integrated regular macro-monitoring and risk management exercise. These exercises are undertaken through teleconferences, meetings, and workshops to discuss emerging issues in the areas of financial markets, banking supervision, payment and settlement systems, and other monetary and financial stability related topics.

The BSP also participates in policy dialogue activities under the Bank for International Settlements (BIS). The BIS is the world's oldest international financial organization established on 17 May 1930 with headquarters in Basel, Switzerland and representative offices in Hong Kong and in Mexico. The BIS primarily caters to central banks and international organizations by providing them with investment and asset management services. As a shareholding member of the BIS, the BSP has played host to several important events of the BIS as well as collaborated in research projects undertaken in collaboration with other central banks and supervisory authorities in Asia and the Pacific. This include the BIS Meeting on Monetary Policy Operating Procedures held on 20-21 September 2010; the FSI-SEACEN Regional Seminar on Basel II/III: Pillar 2–Supervisory Review Process held on 13-15 March 2012; and the FSI-SEANZA Regional Seminar on Basel III and Liquidity Risk held on 8-10 May 2012 in Manila.

The BSP has also issued regulations that have contributed to the overall stability of the domestic financial system, by taking into consideration best practices and international standards set by the BIS. Many of these regulations were drawn from lessons learned from the Asian financial crisis and the recent Global Financial Crisis

Issues on the Effectiveness of Regional Surveillance Mechanisms

Amid fast-paced regional economic integration and increasing interdependence, it is inevitable that countries will continue to affect each other economically, financially, politically and as recent climate change spillover shows, even environmentally. In managing economic and financial linkages, regional surveillance mechanisms are increasingly serving the need for a cooperative mechanism to identify vulnerabilities and help prevent crises. At the same time, they also serve as an effective framework for regional policy dialogue and cooperation to deal with policy spillovers, both to mitigate political tensions and to find scope for collaborative and coordinated actions. In effect, surveillance serves as the foundation upon which regional cooperative schemes can be built toward achieving greater regional stability.

Nonetheless, several concerns have been raised about the capacity of RFAs to conduct independent surveillance. Lamberte and Morgan (2012), borrowing from Eichengreen, argues that peer monitoring is costly and subject to increasing returns, suggesting that if scale economies are strong, there may be an argument for centralizing it at a global institution like the IMF. They also noted that there are arguments for assigning the responsibility of surveillance and conditionality to an entity outside the region, such as the IMF, that is better capable of following time-consistent policies. Some scholars likewise believe that an independent surveillance unit may provide contrasting assessments of vulnerabilities within the region, or when regional officials might be more candid with one another in surveillance discussions than in the presence of IMF officials.

Moreover, there is also plenty of room for improving and enhancing the scope, content and overall quality of output of regional surveillance mechanisms to be at par with the surveillance quality of the IMF. However, considering the enormous financial and technical resources devoted by the IMF to its surveillance activities, regional surveillance mechanisms may be hard pressed at the moment to match the same, given its limited resources and evolving

surveillance capabilities. There is also the question of what additional value may be gained from regional surveillance aside from local knowledge and insight, which remains difficult to implement and appreciate at the moment. Similarly, another question is how such a regional surveillance unit makes use of the assessments of other regional entities without duplicating its key findings as pointed out by Lamberte & Morgan (2012).

Notwithstanding these concerns regarding the effectiveness of regional surveillance mechanisms, there are indications for its continued development and progress, if recent developments in the gradual strengthening of AMRO as a surveillance unit are considered. The AMRO is undergoing various improvements in its technical expertise by recruiting highly competent staff, undergoing capacity building programs and having joint cooperation in technical and operational build up with other surveillance entities. It also continues to improve on its surveillance activities by gradually raising the quality of content, format and structure of its periodic surveillance reports.

Future Directions: Improving the Effectiveness of Regional Surveillance Mechanisms

Efforts to create and establish regional surveillance mechanisms are evidently shaped by the need to closely monitor fast evolving developments and inter-linkages in regional economies, which may potentially cause contagion. With this perspective, cooperation in surveillance appears to be the most pragmatic, convenient and workable public good solution for the region to address possible spillover effects. Considering that other institutions, particularly the IMF, are involved in surveillance, it may be useful for regional surveillance to assume a complementary role to global surveillance. Since the IMF already produces high-quality analyses of global and national economic developments, regional surveillance should increasingly focus on monitoring and providing recommendations on how to address policy spillovers and finding scope for collective action (Takagi, 2010).

There is also scope for regional surveillance to monitor systemically important financial institutions (SIFIs), both with global and regional presence, as warranted by the lessons from the global and EU crises. Recent developments which include the financial stability assessment of jurisdictions with SIFIs under OECD and BIS surveillance are also welcome developments as far as improved surveillance is concerned. Moreover, the other function of AIMO, which is to monitor regional economic integration, is another value added of regional surveillance.

Greater independence in regional surveillance mechanisms could also enhance their effectiveness. Independence ensures candor and impartiality in surveillance and assessment, especially when the identification of crisis vulnerability is involved. There must be both the right incentive and protection to encourage the staff of the independent surveillance unit to be candid in raising issues that authorities may find uncomfortable discussing openly. Finally, regional surveillance must aim to reach senior policymakers directly by using periodic fora of finance ministers and central bank governors, or better still, heads of state or governments. It is in such fora that the impact of peer pressure can be maximized. There is no reason to create a resident executive board of mid-level officials for an East Asian surveillance unit when appropriate forums for dialogue already exist (Takagi, 2010).

With regard to the newly established AMRO, there is a need to accelerate the development of its capacity and expertise as an independent regional surveillance mechanism. Towards this end, it should develop closer links with other regional organizations such as the ADB, the ADB Institute and the ASEAN Secretariat, as well as with global international financial institutions, such as the IMF, the World Bank, BIS, and the OECD in order to further improve, develop and broaden its surveillance capabilities and technical expertise.

Concluding Remarks

Regional surveillance mechanisms are helping bring East Asian policy dialogue and cooperation to a higher and deeper level by opening doors towards greater regional policy coordination and identifying ways of overcoming emerging economic vulnerabilities. Essentially, surveillance is now seen to contribute to the deepening of the dialogue process, allowing for a concerted approach to problem resolution, and acts as foundation for building viable regional institutions (AEM, 2009). In an environment where other public institutions, notably the IMF, conduct surveillance, it is more helpful if regional surveillance is designed to complement global surveillance. Since the IMF already produces high-quality global and regional surveillance analyses, the regional surveillance unit can have a relatively lean institutional setup for information gathering and dissemination. Over time, it is desired that regional surveillance increasingly focus on addressing policy spillovers and finding scope for collective regional policy responses.

Moving forward, AMRO is also seen to evolve into a regional monetary organization for East Asia, similar to the Arab Monetary Fund in the Middle East and the Latin American Reserve Fund (FLAR) in Latin America (Chalongphob, 2010). With recent steps being undertaken to convert AMRO into an international organization, it may well be expected that AMRO will perform a multitude of other activities to support various aspects of financial cooperation in the region, such as spearheading macroeconomic policy coordination, coordinating regional financial regulatory frameworks, contributing to capital market development as well as, in the long run, facilitating regional financial and monetary integration.

However, as Takagi (2010) notes, the primary determinant of success for a regional surveillance unit would be whether it can build its reputation, gather respect and establish its credibility to the public over time, based on the objectiveness of its findings, merits of its analyses and effective delivery of key messages. In particular, as the surveillance unit increasingly undertakes policy coordination over time, the need to build its reputation for neutrality, evenhandedness, and competence will become critical for its success. More importantly, it is the technical competence of the staff that shall help determine the quality of the surveillance output and recommendations of the surveillance unit.

References

International Monetary Fund (IMF) (2012). IMF Factsheet on Surveillance. Retrieved from the IMF website: http://www.imf.org/external/np/exr/facts/surv.htm.

IMF (2011). IMF Performance in the Run-Up to the Financial and Economic Crisis: IMF Surveillance in 2004-07. Washington, D.C.: The International Monetary Fund.

Joint Ministerial Statement. (2011, May). 14th ASEAN+3 Finance Ministers' Meeting, Ha Noi, Vietnam.

Kawai, M. & Houser, C. (2007). Evolving ASEAN+3 ERPD: towards peer reviews or due diligence? (Asian Development Bank Institute (ADBI) Discussion Paper No. 79). Retrieved from ADBI website: http://www.adbi.org/discussionpaper/2007/09/20/2363.asean3.regional.financial. cooperation/

Kawai, M. & Lombarti, D. (2012). Financial Regionalism. In Finance and Development, 49(3), September 2012 Issue. Retrieved from http://www.imf.org/external/pubs/ft/fandd/2012/09/ pdf/fd0912.pdf.

Lamberte, M. & Morgan, P. (2012). Regional and global monetary cooperation (ADBI Working Paper Series No. 346). Retrieved from ADBI website: http://www.adbi.org/workingpaper/ 2012/02/21/5006.regional.global.monetary.cooperation/

Sussangkarn, C. (2010). The Chiang Mai Initiative Multilateralization: origin, development and outlook (ADBI Working Paper Series No. 230). Retrieved from ADBI website: http://www.adbi.org/workingpaper/2010/07/13/3938.chiang.mai.initiative.multilateralisation.

Takagi, S. (2009, December). Regional surveillance for economic stability. In Asia Economic Monitor. Retrieved from the ADB website: http://aric.adb.org/pdf/aem/dec09/Dec_AEM_complete.pdf

Takagi, S. (2010). Regional surveillance for East Asia: how can it be designed to complement global surveillance? (ADB Working Paper on Regional Economic Integration No. 50). Retrieved from the ADB website: http://aric.adb.org/pdf/workingpaper/WP50_Regional_Surveillance.pdf

Views from Washington:

My Work At the Fund

AUTHOR

Alphew T. Cheng

Mr. Cheng was seconded as Philippine representative to the Advisor post in the Southeast Asia Voting Group of the International Monetary Fund's Executive Board in November 2012. He joined the BSP in February 1996 and was the Chief Reserve Management Officer at BSP's Treasury Department (TD) prior to his secondment. He headed reserve management front office operations, assisted in overseeing the domestic market and foreign exchange operations, and participated in various meetings and committees on reserve management, monetary policy, financial markets, risk management, and financial stability. He holds masteral degrees in Economic Policy Management and Computational Finance from Columbia University, New York, USA, and De La Salle University, Manila, Philippines, respectively.

**Views from Washington* is a regular column on relevant issues that is contributed by BSP Officials on secondment to the International Monetary Fund in Washington D.C., U.S.A.

Since I started my secondment at the International Monetary Fund (hereafter the "Fund"), I often get asked by my colleagues from the BSP Treasury Department, "what do you do there?" I would say it is different, but not totally new. I still keep up with economic and financial market developments but more from a global stability than a reserve management perspective. I also comment on staff papers, but this time not just limited to BSP Treasury matters.

Part of my job is to liaise with Philippine authorities on all matters concerning the Fund. As Fund employee, I am tasked to help country authorities understand what the Fund is doing. Hence, I take this opportunity to explain briefly the work of the Fund, the role of the Office of the Executive Director (OED) and Advisors, and the work program of the Fund moving forward. These also provide some elaboration on what I do at the Fund.

The Work of the Fund

The Fund aims to facilitate global trade by promoting stability in the international monetary system through international monetary cooperation. To achieve this, the Fund undertakes multilateral and bilateral surveillance of economic developments in member countries, extends financial assistance to members experiencing external financing pressures, and provides technical assistance to improve formulation and implementation of macroeconomic and financial policies, especially in countries under IMF program and emerging markets and developing countries (EMDCs). Underpinning the Fund's work is a continuing effort to be at the forefront of economic and financial research, and a set of standardized statistics gathered from members.

While the Fund is known to focus on assessing whether the exchange rates of member countries are correctly valued and whether their external positions are sustainable, the sub-prime crisis in the US and the fiscal problems in Europe have led to some evolution in the Fund's work. Attention has increasingly shifted to financial stability, fiscal and debt sustainability, unconventional monetary and macroprudential policies, spillover effects, international reserve accumulation and capital flow management. Fund staff has published numerous research papers on these topics that can be found at the Fund's website (www.imf.org). Moreover, staff reports on member countries now include an evaluation of the financial sector and an assessment of risks from both domestic and external developments. Noteworthy is the publication of the Fund's institutional view on liberalization and capital flow management that expresses support for the temporary use of capital account measures to promote domestic stability. This represents an important shift from the stance of the Fund against capital controls during the Asian crisis.

Given the prolonged weakness and persistent risks in the global economy, the Fund has directed its efforts to help promote sustainable growth across its membership. Discussion on structural policies, such as those concerning labor markets, external competitiveness, and energy subsidies have intensified. To better serve low-income member countries under the current environment, the Fund has boosted efforts to increase its capacity to provide concessional lending through the Poverty Reduction and Growth Trust (PRGT), and

has coordinated more closely with other international organizations such as the World Bank and the regional development banks to address poverty. In addition, the Fund has tailored its engagement with members that have lower populations and higher exposure to natural disasters, to ensure that Fund services are adapted to their unique situation. With regard to its lending activities, the Fund continues to explore refinements in the loan facilities to enhance the appropriateness of conditionalities and to increase the flexibility of disbursements based on country-specific circumstances. Moreover, it has expanded its available resources for lending through bilateral borrowing arrangements, pending the increase in quota subscription from members based on the reforms agreed in 2010. The Bangko Sentral is supporting this resource-building effort of the Fund by signing a note purchase agreement with the Fund last September, and through its continued participation in the Fund's New Arrangements to Borrow (NAB) program.

The Role of the OED and Advisors

The Office of the Executive Director is a decision-making body similar to the BSP's Office of the Monetary Board, except that the Executive Director sits as a Board member representing the voice of his constituency and not just his own. The Philippines belongs to the constituency called the South East Asia Voting Group (SEAVG), which also includes Brunei Darussalam, Cambodia, Fiji, Indonesia, Lao PDR, Malaysia, Myanmar, Nepal, Singapore, Thailand, Tonga, and Vietnam. The Board meets several times in a week to discuss administrative matters, policy issues, and surveillance reports. Discussions cover a wide range of topics from budget, human resource, audit, and evaluation issues to investment activity, lending facilities, policy advice, and governance reforms. The OED reconciles the different views within the constituency on Board items, and ensures that the interest of the constituency is heard and considered during Board discussions. Towards this end, the OED regularly seeks the views of members and participates in staff meetings with country authorities.

The OED joins Fund staff in their regular visits to member countries, which is more commonly known as the Article IV mission, where staff evaluates the economies of member countries based on their obligations under Article IV of the Articles of Agreement adopted by members when they joined the Fund. In brief, Article IV states that members should collaborate with the Fund to promote a stable system of exchange rates. The OED participates in said missions to ensure that Fund staff observes Fund policies in their evaluation of the performance, policies and risks of member countries, and that they accurately present the authorities' views in the staff report submitted to the Fund's Executive Board. More generally, in their capacity as Washington-based representatives of Fund members, the OED also facilitates communication between authorities and Fund staff on other matters concerning the Fund.

The Executive Director is supported by Advisors like myself. Advisors provide inputs to the Executive Director on assigned topics based on experience, research, and views from authorities as applicable. Advisors also draft the statement of the Executive Director for the Board meetings. Advisors attend the meetings as observers, but will take the chair on behalf of the constituency when necessary. Upon the conclusion of major Board discussions, Advisors provide feedback to authorities on behalf of the Executive Director.

The Work Program of the Fund

Despite signs of improvements noted in the Fund's most recent release of the World Economic Outlook, much work remains in order to sustain global recovery. Hence, the Fund will continue to provide thought leadership in financial sector reforms, as well as continue to assist members in balancing fiscal consolidation efforts and structural reforms with jobs and growth requirements. The Fund will intensify its work on the impact of unconventional monetary policy to ensure that there will be an orderly exit from monetary support in advanced countries, and that spillover effects of policy changes in said countries to other economies, such as emerging markets like the Philippines, can be managed properly through sound macroeconomic, macroprudential and structural policies. The Fund will also assist emerging markets in addressing financial stability risks arising from capital flows through further work on linkages between the macro-economy and the financial system. The Fund will continue to explore ways to enhance engagement and support development goals of low-income countries and small states, and assist troubled countries in the Middle East and North Africa to reestablish macroeconomic stability through policy advice, financial support, and capacity building.

Conclusion

The Fund's Independent Evaluation Office, which is tasked to conduct independent and objective evaluations of Fund policies and activities, has noted that the Fund's image has improved markedly in the aftermath of the global crisis. This, I believe, results from the fact that the Fund has become more responsive to calls for greater consideration of country-specific circumstances, as reflected in the recent shift in focus in the Fund's work, the new institutional view on the liberalization and capital flow management, and the improvements in the Fund's surveillance reports and lending facilities. It also reflects the Fund's increased effort to exercise even-handedness among the membership by paying attention not only to larger members, but also to smaller economies. With increasing importance in global growth, trade and finance, EMDCs like the Philippines will have a greater role to play at the Fund. The OED-SEAVG shall ensure that the Fund continues to allocate sufficient resources to help sustain the growth in EMDCs. It shall also ensure that the views and concerns of the constituency are reflected in the future policy direction and work of the Fund. Going back to the question "what do you do there?" – I perform my task as Advisor to the Executive Director, i.e., help in making the voice of emerging economies heard. This is part of my continuing service to the BSP and the Filipino people.

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