Measurement of inflation and the Philippine monetary policy framework

Diwa C Guinigundo[1]

For an inflation-targeting central bank, the choice of price index should reflect the most informative price level in the decision-making process of economic agents. Ideally, it should also be an index that responds strongly to the instruments of monetary policy. It is expected that each agent will accord different levels of importance to different price indices. However, for purposes of policy setting, the inclusion of prices that are not sensitive to monetary policy or those that largely reflect relative price changes may lead to an unnecessary monetary policy reaction that only makes anchoring of price expectations more difficult.[2]

A.   Operational aspects of inflation targeting in the Philippines

The inflation target-setting in the Philippines is based on the existing framework for coordination between government economic agencies under the Development Budget Coordinating Committee (DBCC).[3] The national government, through the DBCC, sets the inflation target based on the consumer price index (CPI) two years ahead in consultation with the Bangko Sentral ng Pilipinas (BSP). The BSP has full powers over and responsibility for the announcement of the inflation target and the determination of appropriate monetary policy to achieve the target.

The monetary policy framework provides for exemption clauses to recognise the fact that there are limits to the effectiveness of monetary policy and that there may be occasional breaches owing to factors beyond the control of the central bank. These exemptions include price pressures arising from: (1) volatility in the prices of agricultural products; (2) natural calamities or events that affect a major part of the economy; (3) volatility in the prices of oil products; and (4) significant government policy changes that directly affect prices, such as changes in the tax structure, incentives and subsidies. Thus, the communications strategy will need carefully to specify the reasons, plan of action and length of time involved to bring inflation back to target.

---

[1]   Deputy-Governor, Bangko Sentral ng Pilipinas.

[2]   Measurement of inflation has long been the subject of empirical debate. The use of different indices has varying implications on inflation. Consumer price index (CPI) inflation is an indicator of how much the cost of a typical market basket of goods and services commonly purchased by households behaves over a specific time period. The advantage is that it includes imported components. However, it does not capture the substitution effects that happen between periods unless the basket is modified accordingly. There are also arguments that the CPI basket does not take into account the different consumption baskets across income class.

[3]   A government interagency body responsible for setting the annual government targets for macroeconomic variables used in the formulation of the fiscal programme. Nonetheless, the jurisdiction over inflation forecasting and setting of appropriate inflation target that is consistent with the macroeconomic targets remains with the BSP. For a complete account of the Philippines' monetary policy framework, see DC Guinigundo (2005), "Inflation targeting: the Philippine experience," in The Bangko Sentral and the Philippine Economy, (ed Vicente B. Valdapeñas, Jr), Manila, Bangko Sentral ng Pilipinas, pp 346–91.

The decision-making process of the Monetary Board (MB) is supported by the Advisory Committee (AC).[4] The meetings of the Advisory Committee provide for a more in-depth, comprehensive, broad-ranging assessment of monetary conditions, economic outlook, inflationary expectations and the forecast inflation path. The recommendations to the MB are voted on by AC members via majority vote.

There are a number of disclosure and accountability mechanisms to help the public better monitor the BSP's commitment to achieving the inflation target. These include regular reports, publications, press statements, seminars and conferences, and highlights of the MB meetings on monetary policy, among other things. In cases when the BSP fails to achieve the inflation target, the BSP Governor issues an open letter to the President outlining the reasons why actual inflation did not fall within the target, along with the steps that will be taken to bring inflation back towards the target.[5]

B.   Relevant price index for setting the inflation target in the Philippines

As mentioned above, the price index used as the basis for determining the inflation target is the CPI. Consumer prices for a representative basket are compared to a base year and weighted by the appropriate consumption pattern. Hence, the determination of the base year and the composition of the basket are important, lest the CPI become irrelevant.

The survey, generation, and rebasing of the CPI are undertaken by the independent National Statistics Office (NSO). The CPI has been rebased seven times, most recently in 2000. The NSO is currently processing the commodity outlet survey, which will be the basis for determining the revised market basket of commodities.[6]

Rebasing an index is necessary to ensure that this barometer of economic phenomena is truly reflective of the current situation. Consumer tastes and technology change over time, causing the fixed market basket of goods and services to become outmoded. To capture such changes for a more meaningful price comparison, revision or updating of the fixed market basket, the sample outlets, the weights and the base year have to be undertaken periodically. The market basket used in the construction of the 2000 CPI was drawn from the results of the updating activity of the 1994 market basket for the provinces and selected cities.[7]

The consumer items that constitute the CPI basket are determined by the nationwide Family Income and Expenditure Survey (FIES) conducted every three years by the NSO. The latest rebasing exercise used 2000 as the base year to coincide with the FIES conducted on the

---

[4]   The Advisory Committee is composed of the following members: (1) the BSP Governor, who serves as Chair; (2) the Deputy Governor for Monetary Stability; (3) the Deputy Governor for Supervision and Examination; (4) the Managing Director of the Monetary Policy Sub-Sector; and (5) the Managing Director of the Treasury Department. The technical secretariat consists of staff from the BSP's Department of Economic Research, Center for Monetary and Financial Policy and the Treasury Department (monetary operations).

[5]   Open letters to the President have been issued on 16 January 2004, 18 January 2005, 25 January 2006, 19 January 2007 and 14 January 2008.

[6]   NSO hopes to start computing the weights by 2009 and possibly start the rebasing of the CPI with 2006 as the new base year by 2010.

[7]   The number of items in the 2000 market basket was almost identical to the 1994 market basket. Market baskets for Guimaras, Biliran, Saranggani, Cagayan de Oro City and Apayao were added to the existing 84 provincial/selected city market baskets. Source: National Statistics Office, http://www.census.gov.ph.

same year, which covered 41,000 households. The year 2000 was also perceived to be a more politically, economically and socially stable year. To account for the geographical differences in consumption patterns, weights were generated for each province or city. The basket weight for each item of expenditure is a proportion of that item to total national expenditure. Likewise, geographical weights were also determined where the weight of a region is equal to the sum of the weights of the provinces belonging to that region. The sum of the weights for the region is equal to the national weight.

The use of the CPI as the basis for policy setting under inflation targeting is largely governed by pragmatic considerations. The frequency with which it is published and the fact that it is an index readily understood by the public rendered its adoption appealing. The GDP deflator, while output-based, is available only on a quarterly basis and is subject to periodic revisions in the national income accounts. This makes it less reliable for target-setting purposes.

As part of a new framework that rests on anchoring inflation expectations towards the desired inflation path of the BSP, the inflation target naturally has to be based on a price index with which the public is familiar. This aids in the explanation of the underlying factors that affect inflation performance. In this regard, building a constituency of support for the price stability objective of monetary policy will be facilitated. Given the usual asymmetry in perception about relative price changes and overall price changes, public understanding of the price index used for target-setting could be nuanced as well. In this regard, the CPI has an inherent advantage.

CPI inflation also tends to be affected by the transitory effects of volatile price movements of certain commodities. Temporary shocks or disturbances that are due to factors outside the direct control of economic policy (eg oil price shocks) may cause fluctuations in CPI inflation that may not necessarily require a monetary response. As such, the BSP also monitors "core" inflation to supplement its analysis of the appropriate stance of monetary policy. When the impact of such disturbances on price data is eliminated, core or underlying inflation serves as a useful alternative indicator of the path of inflation. Core inflation is computed by excluding selected unprocessed food and energy-related items from the CPI basket. Excluded items account for 18.5% of the CPI.[8] Despite the reduction in the share of food over the years, it still accounts for a large part of the CPI.

Table 1. Comparison of CPI Weights for all Income Households

	2000	1994	Difference
Food, beverages and tobacco	50.03	55.12	-5.09
Food	46.58	50.98	-4.39
Non-food	49.97	44.88	5.09
Clothing	3.00	3.66	-0.66
Housing and repairs	16.80	14.69	2.11
Fuel, light and water	6.95	5.74	1.21
Services	15.89	12.28	3.61
Miscellaneous	7.33	8.51	-1.18

Source: National Statistics Office

---

[8] Excluded items are rice (9.4%); corn (0.9%); fruit and vegetables (5.3%); LPG (1.3%); kerosene (0.3%); and oil, gasoline and diesel (1.3%).

Simple tests for equality of means and variances of quarterly series for CPI inflation and CPI core inflation were conducted for three sample periods: 1995–2001, 2002–2008Q2 and 2002–08. The results failed to reject the null hypothesis of equal means and variances for the sub-sample periods at 1% level of significance.[9] Furthermore, the correlation between headline and core CPI inflation is at a high 0.91. Hence, there appears to be no added benefit to using core as the basis for target setting.

Table 2. Tests for Equality of Means and Variances of CPI Inflation and CPI Core Inflation (p-values)

	1995-2001	2002-2008.Q2	2002-2008
Test for equality of means (t-test)	0.87	0.52	0.33
Test for equality of variances (F-test)	0.86	0.19	0.04

Estimates for different sub-periods after the adoption of inflation targeting in 2002 fail to reject the null of equal means and variances between CPI inflation and CPI core inflation at 1% level of siginifcance.

Excluding asset price components from headline inflation also has little effect. Currently, the CPI includes only rent and minor repairs. The rent component of the CPI is, however, not reflective of the market price because of rent control legislation. The absence of a real estate price index (REPI) reflects valuation problems, owing largely to the institutional gaps in property valuation and taxation.[10] While the price deflator derived from the gross value added from ownership of dwellings and real estate could represent real property price, it is also subject to frequent revisions, making it difficult to forecast inflation.[11]

The volatility of inflation using CPI core and PGDP has narrowed since the adoption of inflation targeting in 2002. Headline CPI inflation, on the other hand, exhibits greater volatility. This is not surprising since headline CPI inflation encompasses even the volatile components.

---

[9] If the last two quarters of 2008 are included, the level of significance at which the null of equal variance can be rejected dropped significantly to 4%. This implies greater volatility in the components of headline inflation.

[10] E Domingo and R Fulleros (2005), "Real estate price index: a model for the Philippines", BIS Papers no 21, Proceedings of a joint conference organised by the BIS and the IMF in Washington, D.C.

[11] Used imputed rents for owner-occupied housing. The benchmark estimates for the number of owner-occupied dwelling units and the average rent are derived from the Census Population and Housing, and the Family Income and Expenditure Survey, respectively. The average rent is updated using the rental index from the consumer price index (CPI). The gross value added (GVA) is the difference between the imputed rent and intermediate inputs, which are basically the cost of repairs and maintenance of dwelling units. Source: http://www.nscb.gov.ph.

Table 3. Moments of Year-on-Year Inflation Rates in the Philippines

Sample period: 1995-2001	CPI Inflation	CPI Core Inflation	GDP Deflator Inflation
Mean	6.55	6.63	7.53
Median	6.24	6.40	6.80
Maximum	10.18	10.18	11.56
Minimum	2.51	3.26	4.88
Std. Dev.	1.93	1.87	1.89
Skewness	0.06	0.04	0.65
Kurtosis	2.43	2.29	2.42
JB Probability	0.82	0.74	0.31
Observations	28	28	28
Sample period: 2002-2008	**CPI Inflation**	**CPI Core Inflation**	**GDP Deflator Inflation**
Mean	5.49	4.90	5.22
Median	4.74	4.74	4.77
Maximum	12.18	8.02	10.08
Minimum	2.35	2.42	2.03
Std. Dev.	2.66	1.78	1.90
Skewness	0.69	0.21	0.58
Kurtosis	2.57	1.72	2.98
JB Probability	0.30	0.35	0.46
Observations	28	28	28

GDP deflator series has been rebased to 2000=100 to make it comparable with the CPI and CPI core series.

It may be important to note that the early period of inflation targeting has been characterised by disinflation and greater productivity gains. While the indicative estimates of productivity (Table 4) are not disaggregated into tradable and non-tradable sectors, it is possible that given the structural shift of the economy towards the largely non-tradable services sector (both in terms of share to GDP and growth rate), the estimated productivity gains could have translated into lower inflation.

Table 4. Indicative Productivity Estimates for the Periods 1994-2001 and 2002-2007

	$\alpha^* \Delta L/L$	$(1-\alpha)^* \Delta K/K$	TFP
1994-2001	0.41	2.89	0.45
2002-2007	0.67	1.88	3.10

Source: Author's own estimates using the simple growth accounting method where the residual is taken as the total productivity (TFP) growth rate. Assumes labor share of 25% ($\alpha = 25$). For labor, full-time equivalent employment (L) was used. Capital stock (K) series was derived using the perpetual inventory method with 20% annual rate of depreciation.

C. Comparison of different measures of inflation

Tests on the stationarity of residuals confirm the presence of cointegrating relationship between CPI and CPICORE, using the following autoregressive distributed lag (ARDL) specification, $LCPI_t = \beta_0 + \beta_1 LCPICORE_t + \beta_2 LCPICORE_{t-1} + \beta_3 LCPI_{t-1} + \varepsilon_t$. The results are as follows:

$$LCPI_t = -0.04 + 1.21 LCPICORE_t - 1.09 LCPICORE_{t-1} + 0.89 LCPI_{t-1}\ ^{12}$$

Adjusted R² = 0.99   *Durbin Watson = 1.79*

Table 5. Summary of Stationarity Tests on the Residuals (ε_t) of CPI Equation

	Augmented Dickey Fuller	Elliot-Rothenberg-Stock DF-GLS	Phillips-Perron	Kwiatkowski-Phillips-Schmidt-Shin [1/]
FULL SAMPLE (1995-2008)	-6.52	-6.26	-6.44	0.14
Inflation Targeting (2002-2008)	-4.61	-4.40	-4.58	0.14

Unless otherwise stated, all reported test statistics are significant at 1% level of significance.
[1/] Null is that residuals are stationary. Unlike ADG, PP and DF-GLD tests which compare t-stat with McKinnon critical value, KPSS test uses LM stat vis-a-vis asymptotic critical values.

The same ARDL specification for CPI against GDP deflator (rebased to 2000=100) was also tried. Stationarity tests on the residuals of the specification given below also indicate a cointegrating relationship between the two price indices (results not reported). However, the impact multiplier of GDP deflator is much smaller than the CPICORE. This is expected because of lags in the release of GDP data.

$$LCPI_t = 0.15 LPGDP_t - 0.14 LPGDP_{t-1} + 1.48 LCPI_{t-1} - 0.49 LCPI_{t-2}$$

Adjusted R² = 0.99   *Durbin Watson = 1.68*

In addition, the table below shows that the three commonly considered measures of inflation, namely headline CPI inflation, core CPI inflation and PGDP inflation, are highly correlated.

Table 6. Correlation of Different Measures of Inflation (1995-2008)

	Headline CPI inflation	Core CPI inflation	GDP Deflator inflation
Headline CPI inflation	1.00	0.91	0.82
Core CPI inflation	0.91	1.00	0.84
GDP Deflator inflation	0.82	0.84	1.00

Sources of basic data: NSO and National Statistical Coordination Board (NSCB)
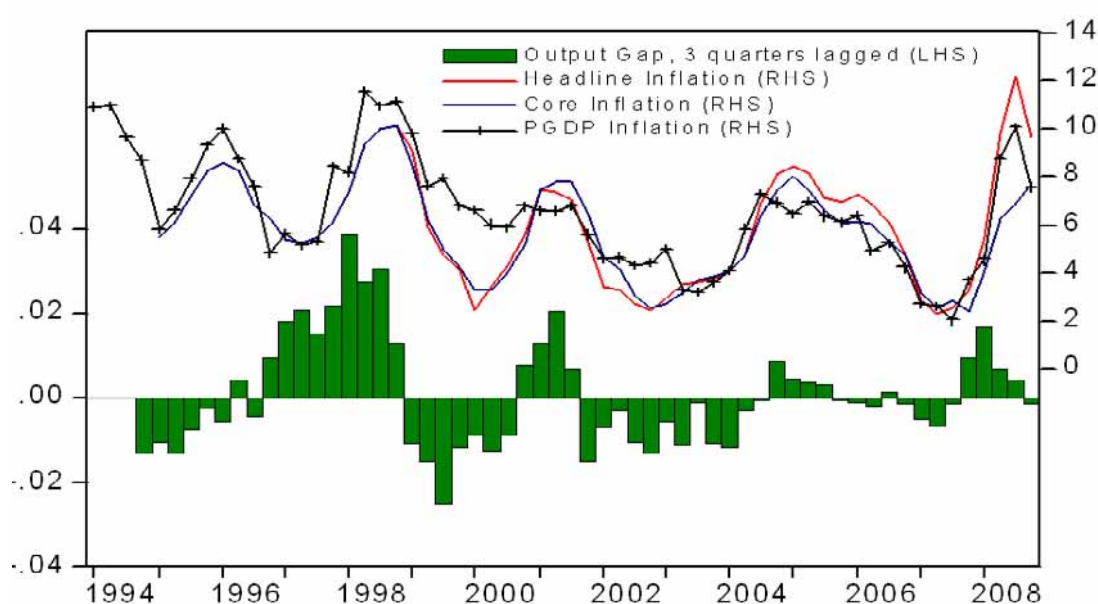Note: GDP deflator from the National Income Accounts has been rebased to 2000=100 to make it comparable with the CPI and Core CPI.

---

[12]   All regressors are significant at 1% level of significance.

However, the three measures of inflation deviate significantly from each other during the pre-inflation targeting period and earlier phase of inflation targeting (see Figure 1). In the periods 1997Q4–2000 (Asian financial crisis), and 2002 (lagged effects of the dot-com bubble and US terrorist attacks), PGDP inflation exceeded both headline and core inflation rates. These periods were characterised by unfavourable external developments coinciding with constrained production capacity of the domestic economy. The gap was more pronounced during the Asian financial crisis when output gap was at its highest.

The trend reversed in 2005–06 with a marked increase in headline and core inflation relative to PGDP inflation. This trend largely reflected the second-round effects from continued increases in global oil prices, which led to higher domestic pump prices, minimum wage adjustments throughout the country, and hikes in transport fares and utility charges, the El Nino phenomenon and the two-percentage point increase in the value-added tax.

Figure 1. Performance of Different Measures of Inflation (1995-2008)

Output gap is calculated as the difference between actual GDP and trend GDP, derived using the Hodrick-Prescott filter.[13]
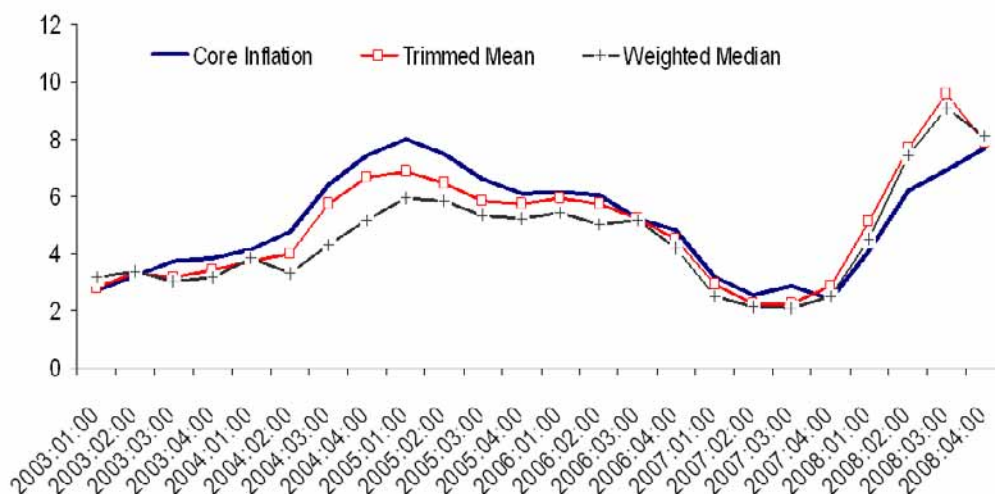
Near convergence was realised in 2007, the year when the economy registered the best growth performance, lowest inflation and high external payments surplus. This growth performance was made possible by major structural reforms in the fiscal and financial sectors that restored confidence in the economy.

However, the disinflation record was adversely affected in 2008 by the extraordinary increases in global commodity prices, as shown by the rise in inflation. Figure 2 shows the discernible spike in the alternative trimmed mean and weighted median measures of core inflation in 2008, an indication of stronger underlying demand pressures.

---

[13] The use of three-quarters lagged output gap is based on the estimated lags of monetary policy in the book by V Bayangos (2007), Inflation targeting and exchange rate uncertainty, Shaker Publishing BV, (Dissertation for the degree in Doctor of Philosophy in development studies, Institute of Social Studies, the Hague, the Netherlands).

Monetary policy responded by raising the policy rate by 100 basis points over the period June to August 2008. A neutral stance was adopted until November as the risks surrounding the inflation outlook over the policy horizon were assessed to have moderated. By December 2008, it was recognised that the near-term inflation outlook was supported by the downward shift in the balance of risks following the easing of commodity prices, the moderation in inflation expectations, and the expected slowdown in economic activity. These developments provided latitude for monetary easing to support growth and help the country ride out the global financial turmoil.[14]

Figure 2. Core Inflation, Trimmed Mean Inflation and Weighted Median Inflation (1995-2008Q2)

Source: BSP-Department of Economic Research
Notes:
1. Trimmed mean represents the average weighted inflation rate of the middle 70 percent in the lowest-to-highest ranking of year-on-year inflation rates for all CPI components.
2. The weighted median represents the middle inflation rate (corresponding to a cumulative CPI weight of 50 percent) in a lowest-to-highest ranking of year-on-year inflation rates

D.   Shift to point target with wider band

When inflation targeting framework was adopted in 2002, the inflation target was defined in terms of a range with one percentage point intervals. This range target was deemed to be stringent for a new inflation targeter. In 2008, the Government's inflation target was re-specified from a range target to a point target with a tolerance interval of ±1 percentage point. The point target currently stands at 4.0% ±1 percentage point for 2008 (or equivalent to a range of 3–5%), and 3.5% ±1 percentage point for 2009. The shift is consistent with standard practice among inflation-targeting central banks.

For the period 2002–07, the average inflation outturn was within the average of the lower and upper bounds of the target (which can be loosely interpreted as the implied long-run target). The average inflation was actually just 0.10 percentage point off the midpoint average for the

---

[14] Highlights of 2008 Monetary Board Meetings on Monetary Policy Issues (5 June, 17 July, 28 August, 6 October, 20 November, and 18 December).
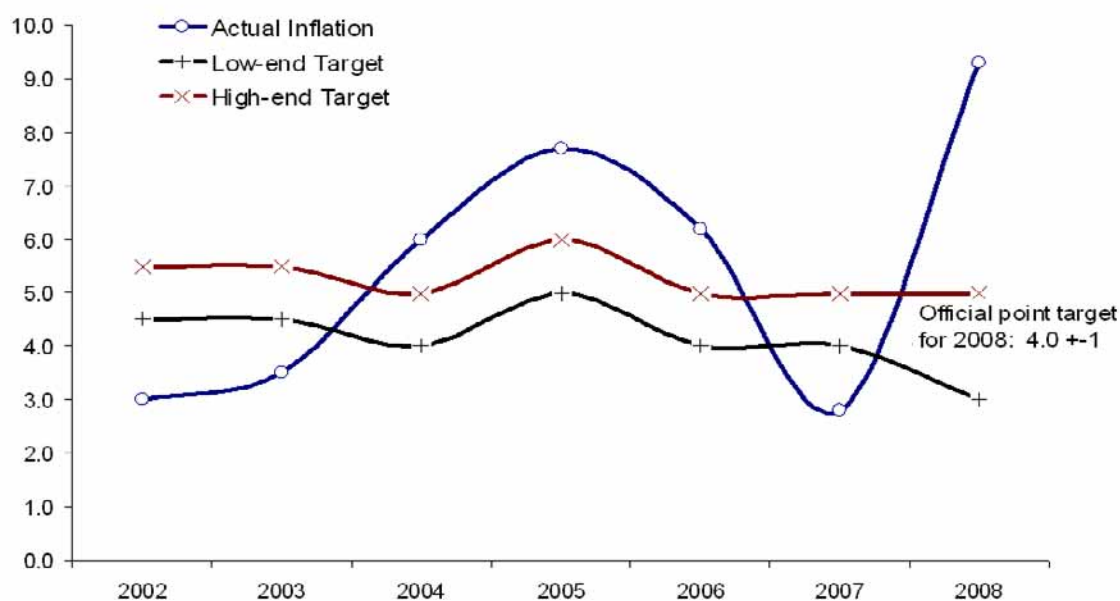
same period. The same scenario continues until the second quarter of 2008. It reversed and exceeded the upper-bound target.

Table 7. Average Inflation vis-à-vis the Average Inflation Target 2002-2008

	Average actual inflation	Inflation Target		
		Midpoint of average target range	Average lower bound of target	Average upper bound of target
2002-2007	4.9	4.8	4.3	5.3
2002-2008	5.5	4.7	4.1	5.3

However, when the inflation performance is analysed on a yearly basis, the overall picture points to continuous breaches (Figure 3). Hence, the shift from a range target to a point target with a tolerance interval effectively widened the BSP's target band. A broader target band is seen to provide added flexibility to monetary authorities in steering inflation. It helps ensure that the design of the inflation target is more consistent with the country's economic circumstances, and safeguards the credibility of the inflation-targeting framework. It also helps align monetary policy practices in the Philippines with those in other inflation-targeting countries.

Figure 3. Comparison of Annual Actual Inflation and Inflation Target Range

Under the inflation-targeting framework, we distinguish between the inflation target and the inflation forecast. The inflation target represents policymakers' desired inflation rate, which they commit to achieving over the policy horizon. Inflation targets, because of their institutional nature, tend to be less susceptible to revisions. Countries with a history of high inflation like the Philippines are more inclined to set a decelerating path for inflation targets across a period of several years instead of having a long-term point target.

The inflation forecast, meanwhile, represents the expectation or prediction of the inflation rate over the policy horizon, given the current information set. The inflation forecast changes over time as new information is incorporated into the assessment of future inflation. The forecast is a major factor considered by monetary authorities when deciding whether monetary policy instruments should be adjusted to attain the inflation target.

In conveying to the public the views of BSP, the balance of supply and demand conditions is presented along with forecast of inflation conditional on available set of relevant information. In this manner, the inflation forecast that underpins the monetary policy decision towards the achievement of the inflation target is clearly specified.[15]

E.   Concluding remarks

Despite the conceptual appeal of various price indices, headline CPI still has conceptual, operational and practical advantages over other price indices to be used as basis for inflation targeting in the Philippines. This is particularly important given the relatively short period of experience of inflation targeting. Furthermore, recent study on inflation expectations indicates that agents are still largely backward-looking, as evidenced by the considerable inertia in how inflation expectations are formed.[16] Hence, an introduction of other price indices as basis for inflation target-setting may create confusion among the public, making the goal of anchoring of inflation expectations more difficult. However, this does not preclude efforts to broaden understanding of the relative importance of various price indices in analysing inflation dynamics for monetary policy decision-making, albeit not necessarily for setting the inflation target.

Going forward, given the high income disparity in the Philippines, it may be worthwhile to examine and perhaps eventually develop a CPI based on income class. Consumption patterns differ across various income classes. When prices of necessities such as food rise much faster than luxuries, the poor who tend to spend more of their budget on necessities suffer more than the non-poor households.

Son and Kakwani (2006) have proposed a method for establishing a more direct link between poverty measure and price index via the so-called price index for the poor (PIP). This PIP is derived using the price elasticity of poverty as weights. The percentage change in poverty is decomposed into two components, namely, the income and distribution effects. The income effect measures the change in poverty when all prices increase uniformly while the distribution effect captures the change in poverty when relative price changes. It is the latter that determines whether the price changes are pro-poor or not.[17]

Even if monetary policy ought to respond to general price changes and not to relative price changes, knowledge of PIP would nonetheless aid the BSP in coordinating and communicating to concerned government agencies the policy gaps that need to be addressed to stabilise prices. This is in recognition of the fact that price stability is best achieved when the purchasing power of the poor, who do not have adequate assets to be used a hedge against inflation, is protected.

---

[15]   The BSP, under its inflation-targeting framework, also assesses the inflation expectations, evidence of second-round effects, the yield curve, among a host of critical factors during the inflation process.

[16]   V Bayangos, J Basilio, D Floro and E Glindro (2008), "Quantifying the inflation expectations channel in the Philippines: some preliminary results", BSP WP 2008-2, Bangko Sentral ng Pilipinas (forthcoming).

[17]   H Son and N Kakwani (2006), "Measuring the impact of price changes on poverty", Working Paper no 33, International Poverty Centre, United Nations Development Programme.

References:

BSP Primer on inflation targeting, http://www.bsp.gov.ph/publications/primers.asp.

Bayangos, V (2007): *Inflation targeting and exchange rate uncertainty*, Shaker Publishing BV. (Dissertation for the degree in Doctor of Philosophy in development studies, Institute of Social Studies, the Hague, the Netherlands)

Bayangos, V, Basilio, J, Floro, D and E Glindro (2008): "Quantifying the inflation expectations channel in the Philippines: some preliminary results", BSP WP 2008-2 (forthcoming), Bangko Sentral ng Pilipinas.

Domingo, E and R Fulleros (2005): "Real estate price index: a model for the Philippines", BIS Papers no 21, Proceedings of a joint conference organised by the BIS and the IMF in Washington, D.C.

Guinigundo, DC (2005): "Inflation Targeting: the Philippine experience," in *The Bangko Sentral and the Philippine Economy*, (ed Vicente B Valdepeñas, Jr), Manila: Bangko Sentral ng Pilipinas, pp 346–91.

Highlights of 2008 Monetary Board meetings on monetary policy issues (17 July, 28 August, 6 October, 20 November and 18 December), http://www.bsp.gov.ph.

National Statistics Office, Philippines http://www.census.gov.ph.

National Statistical Coordination Board, Philippines http://www.nscb.gov.ph.

Son, H and N Kakwani (2006): "Measuring the impact of price changes on poverty", Working Paper no 33, International Poverty Centre, United Nations Development Programme.