# Box Article 2:

# Information Content of Monetary Aggregates in the Philippines<sup>1</sup>

Monetary aggregates have played a less prominent role in monetary policy analysis since the adoption of inflation targeting (IT) by many central banks in the 1990s. Former Bank of Canada Governor Gerald K. Bouey famously remarked, "We didn't abandon monetary aggregates, they abandoned us." Several studies, such as those by Estrella and Mishkin (1996) for the United States, Tallman and Chandra (1996) for Australia, Astley and Haldane (1997) for the United Kingdom, and Gertler and Hoffman for 46 advanced economies, provided empirical evidence that monetary aggregates do not significantly explain future output and inflation.

However, Borio et al. (2023) noted a renewed interest in monetary aggregates in explaining the post-pandemic inflation surge from 2021 to 2022. Their analysis of a panel of countries, including the Philippines, revealed a significant relationship between excess monetary aggregates growth in 2020 and average inflation from 2021 to 2022, even after controlling for the fiscal response and post-pandemic recovery.

This box article revisits the information content of monetary aggregates, specifically their role in forecasting gross domestic product (GDP) growth and inflation. Following Estrella and Mishkin (1997), a Granger causality test was conducted to establish the usefulness of the growth of reserve money (RM) and domestic liquidity (M3) as leading indicators for inflation and GDP growth. RM and M3 are then used in a series of vector autoregression (VAR) models to test their usefulness in a simplified forecasting exercise.

### Monetary aggregates Granger causes GDP growth but not inflation

The Granger causality test using a VAR model shows that RM and M3 are leading indicators of GDP growth from 2002 to 2019 (*Figure 1A*). This suggests that money growth potentially forecasts output growth during the pre-pandemic IT period. However, this relationship disappears when tested using the full sample (i.e., including the pandemic period). Additionally, neither RM nor M3 reliably forecast inflation in both the full sample and the pre-pandemic subsample.



#### Source: Staff calculations

Note: The lag order of the VAR model is based on the Akaike information criterion, with a maximum of eight lags considered. The expanding window has an initial period of 48 quarters or 12 years.

To test the robustness of the results, the Granger causality test was also performed using an expanding window approach (Figure 1B). The results confirm that monetary aggregates Granger causes GDP growth in the pre-pandemic period, with RM showing a more stable and stronger relationship with GDP growth compared to M3. Additionally, RM leads inflation in some periods, although this effect is weaker and less stable than its relationship with GDP growth.

#### Reserve money growth improves GDP growth forecast

In an approach similar to Albuquerque, Baumann, and Seitz (2015), a series of VAR models were estimated using all or a subset of the following variables: (a) annualized growth rates of real GDP, (b) total loan portfolio (TLP) growth, (c) RM or M3, and (d) term spread (TS).<sup>2</sup> These variables were pre-selected based on their statistical significance in estimating leads of GDP growth in a three-variable singleequation model.<sup>3</sup> The GDP growth forecasts produced by these VAR models were then benchmarked against the baseline VAR model, which contain only the term spread and GDP growth.<sup>4</sup>

Figure 2A shows that the model with RM has the lowest mean absolute error (MAE) and outperforms the baseline model.<sup>5</sup> This implies that reserve money growth has significant information content in forecasting future economic activity. In contrast, the model that includes M3 has a higher forecasting error than the model that includes RM, consistent with the initial Granger causality tests. Moreover, all forecast errors across the four specifications increased during the pandemic. However, the specification that includes both the term spread and money variables has significantly lower forecast error compared with the baseline model, as seen from the expanding window approach in Figure 2B.



Source: Staff calculations

The weakened relationship between money and output during the pandemic may have been influenced by the unprecedented uncertainty of that period. Despite the BSP's implementation of expansionary monetary policy measures, the increased liquidity did not immediately result in higher loan growth in the early stages of the pandemic due to heightened uncertainty.

## Monetary aggregates do not improve inflation forecasts

Using a similar approach for inflation, the forecast performance of different VAR models was compared against a baseline autoregressive (AR) model. As shown in *Figure 3*, VAR models with monetary aggregates underperformed relative to the benchmark AR model. This suggests that including monetary aggregates does not improve the accuracy of future inflation forecasts, consistent with the results of the Granger causality tests.



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Borio et al. (2023) argued that the relationship between excess money growth and inflation varies between high and low inflation regimes, with the relationship only existing during the former. Using a threshold AR model for 1989-2023, a high inflation regime was observed when inflation breaches 6.0 percent (Figure 4). Based on this threshold, average inflation during the IT period is lower compared with the pre-IT period, further supporting the weak relationship between money variables and inflation.



Figure 4

In summary, the results indicate that monetary aggregates contained useful signals for forecasting output growth from 2002 to 2019. The relationship between money and output suggests that monetary aggregates can still offer insights into future output trends. However, the money-output relationship has weakened since the onset of the pandemic in 2020, persisting through 2023. This finding warrants further investigation to ascertain whether this disruption is permanent or temporary.

The relationship between money and inflation supports the view that monetary aggregates have limited predictive power for inflation in the Philippines. This is likely due to the low inflation environment established after the adoption of the IT framework in 2002. Consistent with the findings of Borio et al. (2024), the growth of money aggregates may contain some information in explaining inflation during high inflation regimes. However, this information is not reliably predictive and requires considerable judgment.

### **ENDNOTES**

1/ This article was written by Shirra Jazel de Guia, Jan Christopher Ocampo, and Eduard Renzo Santos of the Department of Economic Research. A full version of this study will be forthcoming in the BSP Discussion Paper Series.

Source: Staff calculations

- 2/ The term spread is the difference between the yields of the domestic 10-year Treasury bond and 91-day Treasury bill.
- 3/ Albuquerque, Baumann, and Seitz (2015) used a single-equation approach in preselecting the variables that enter the VAR model.
- 4/ According to Hamilton and Kim (2002), the term spread already contains all the necessary information on future economic activity.
- 5/ We used the Diebold-Mariano test to determine whether the model performs better than the baseline model.

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