

this way aggregate demand, will be affected and thus will determine the margin of the output gap, following which inflation adjusts.

This study estimated a standard VAR for Botswana, including variables such as inflation, output, money supply, the policy interest rate and the nominally effective exchange rate. These variables were varied to explore the different channels of the monetary policy. In other words, to explore the interest rate channel, the real prime rate was introduced to reflect how other market interest rates respond to the monetary policy, and the exchange rate was dropped from the standard VAR model. In exploring the credit channel, the total commercial banks' credit was introduced and the exchange rate and money supply were dropped from the standard VAR model. Finally, the exchange rate channel reflected inflation, output, the exchange rate and the policy rate. The results were statistically not significant but the study continued to analyse the impact of the policy interest rate on economic variables.

All VAR models included the same dummy variables to capture the structural breaks. Three dummy variables were included. The first dummy variable was introduced to capture the structural break due to the introduction of the Botswana Pula, the second dummy variable was introduced to capture the structural break due to the Pula devaluation, and the third dummy variable captured the 2008 economic recession.



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The data used for analysis were from 1995 quarter one to 2009 quarter four. The data were collected from different publications of the Bank of Botswana. The variables used were tested for stationarity; and were found to be stationary after the first difference. Hence, they were used in their first difference to follow the data-generating process (Marcet 2004: 3). The lags of the models were selected using the AIC approach and the SIC approach, as they were considered to be superior because they impose penalties when many variables are used. All models were found to be stable and they had no serial correlation, implying that the models were of best fit.

All the models estimated reflect a price puzzle in the first quarters. The presence of the price puzzle was also detected by Kganetsano (2007: 162), Mmopelwa (2004:53) and Mokoti (2009:48). However, Mokoti (2009:48) argues that the price puzzle reflects how the economy should react. He points out that prices rise with the cost of production caused by a contractionary monetary policy initiative.

The standard VAR model reflects that all the other variables (output, money supply and the exchange rate) affecting the demand conditions respond to the monetary policy interest rate with a lag, whereas inflation immediately responds to supply factors. Therefore, since a monetary policy aims at affecting the demand conditions, these results show that a monetary policy affects the economy with a one quarter lag.

Nonetheless, the standard VAR model generally shows that from the second quarter, the variables included in the model respond as predicted by economic theory, as some variables were flat indicating that it takes a one period lag for these variables to respond to a monetary policy shock. For example, a contractionary monetary policy leads to a decrease in inflation, an appreciation of the exchange rate and a decline in money supply in the second quarter. These responses last up to the fourth quarter, when the model is assumed to be at full capacity. This limited response implies that the monetary policy has little or limited influence on the economy.

These results are confirmed by the variance decomposition results, which reflect that the maximum contribution to inflation variation by 10.9 percent was the policy interest rate. Money supply contributed the least to variation in inflation, around 0.4 percent, implying that money supply is not important.

All the variables in the standard VAR model except for the real GDP fluctuated around the zero line in the seventh quarter. This means that the monetary policy effect lasts for about seven quarters in the economy. The real GDP does not show any response to a shock in monetary policy, possibly because the majority of the contribution to output comes from the mining sector.

With regard to the different channels, the monetary policy is more effective in the interest rate channel, with the policy interest rate being responsible for 15.1 percent variation in inflation. The credit channel follows with the policy interest rate contributing 12.7 percent and the exchange rate channel is the worst with the policy interest rate contributing 6.8 percent. The exchange rate channel is disadvantaged by the crawling peg exchange rate regime, while the credit channel is disadvantaged by the Government policies aiming at promoting economic diversification.

5.1 Limitation of the Study

This study faced challenges of availability of data, which resulted in one of the transmission mechanism of the monetary policy, the asset prices channel, not

being analysed. In addition, due to the fact that Botswana is still a developing country with undeveloped financial markets, the quality of data used is generally poor, which could explain the insignificant results of the impulse response function.

5.2 Direction for Future Work

As the financial sector in Botswana continues to develop, it would be useful to undertake an analysis of the asset prices channel. In the meantime, this study established that there is a price puzzle in Botswana, which calls for further investigation into the response of the economy to the monetary policy at the sectoral level, which might help to explain the puzzle.



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