Journal of Economic Policy and Management Issues

ISSN: 2958-6313 Volume 2, Issue 2, 2023, pp. 65-75

Economic implications of external monetary policy shocks for Lesotho: An empirical investigation

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Keywords:

- Global trade
- External shocks
- Monetary policy
- Structural vector autoregression

Abstract

This paper investigates the responses of Lesotho's economic growth and inflation to monetary policy shocks emanating from the USA. Among the countries that Lesotho's economy is integrated into, the USA stands out as the key export destination claiming a substantial share of Lesotho's textile and clothing exports, according to historical data. Using the structural vector autoregression analysis, the results show that Lesotho's inflation temporarily increased following a shock to the USA monetary policy rate. Moreover, Lesotho's economic growth, measured by growth in the real gross domestic product (GDP), decreased over the horizon following a shock to the United States monetary policy rate. The effect on Lesotho's economic growth can be attributed to declines in demand for Lesotho's exports that have largely characterised periods of economic crises in the USA including the recent trade war between the USA and China, which according to the Central Bank of Lesotho, has been a major source of significant declines in Lesotho's manufacturing production among other factors. Given that Lesotho is a small open economy operating under a fixed exchange rate regime where the Loti is pegged to the Rand, policy options available for Lesotho to mitigate external shocks could encompass the identification of additional buffers targeted at diverting the country's capital to the most productive sectors other than clothing and textiles sub-sector. Policymakers in Lesotho could also exploit avenues to expand intra-regional trade with countries in both the Southern African Customs Union (SACU) and the Africa Continental Free Trade Area (AfCFTA).

1. Introduction

A country's integration in global trade can present both positive and negative aspects to the economy at large. On the positive side, being integrated into global trade can assist smaller open economies especially those in the third world to adapt to using their resources effectively (Plank et al., 2018), and can at times benefit economic growth and development (Hoekman, 2002; Xu et al., 2020). For instance, according to the classical Ricardian theory of comparative advantage, a country can benefit from global trade by exporting products in which it possesses a greater comparative advantage associated with relative labour productivity, and likewise, importing products in which its comparative advantage is less (Golub and Hsieh, 2000). However, the new trade theory as posited by Krugman (1983) demonstrates how in the explanation of the benefits of global trade, increasing returns can be an alternative to comparative advantage.

Despite its perceived benefits, being integrated into global trade can have some negative aspects including increased vulnerabilities to external shocks as have been witnessed in smaller open economies in recent decades. As an example, evidence from a small open economy in Latin America, Mexico, suggests that the country's economic activity has been adversely affected by it being integrated into the global world in which increases in the world interest rate have been found to induce a sharp decline in output in Mexico (Antinolfi and Huybens, 2003). Likewise, similar findings have been confirmed for small open economies in East Asia, namely, Thailand, Korea, and Malaysia in which Cook and Devereux (2006) observe that an increase in external interest rate tends to substantially match macroeconomic data on prices and other aggregates including the gross domestic product (GDP).

Even more so, economies that have fixed exchange regimes and are highly dependent on international trade can be more vulnerable to external shocks. Economic literature shows that in a small open economy, two effects can be transmitted through the trade channel, and these are the expenditure-switching effect and the expenditure-reducing effect (see for example, Sutherland, 2006; De Paoli, 2009; Ncube et al., 2012; Arbatli-Saxegaard et al., 2022; Oskolkov, 2023). The expenditure-switching effect demonstrates how monetary policy can affect the demand for imports thus switching consumer spending towards domestic goods. In this view, monetary stimulus (tightening) in advanced economies, for

example, the United States of America, could lower (increase) the demand for imports through the impact on exchange rate appreciation (depreciation) in foreign countries (Arbatli-Saxegaard et al., 2022; Ncube et al., 2012).

Unlike the expenditure-switching effect, the expenditure-reducing effect shows how tighter monetary policy in the United States of America (USA) can lower its demand for imports from other countries including small open economies. In this case, shocks to the United States monetary policy are likely to have significant spillover effects on foreign variables such as inflation and GDP growth depending on how integrated these economies are to the USA (Arbatli-Saxegaard et al., 2022). The expenditure-reducing effect, therefore, can be used to explain the economic effects of global shocks in countries like Lesotho whose main economic mainstay is manufactured exports traded under the Africa Growth and Opportunity Act (AGOA).

AGOA is a unilateral trade policy concession that grants eligible products of selected Sub-Saharan African economies duty-free and quota-free access to the United States market (Owusu and Otiso, 2021; Cook and Jones, 2015; Tadesse and Fayissa, 2008; Lall, 2005). Lesotho has been one of the principal beneficiaries of the AGOA since 2000 resulting in significant outcomes on the country's exports of selected manufactured products. One of the positive outcomes of AGOA in Lesotho is that over the past decade, the USA has been a key destination for Lesotho's exports with its share revolving around 30 – 40 per cent (International Monetary Fund, 2022a).

In comparison to other qualifying countries, since the inception of AGOA in 2000, Lesotho has been exceptionally benefiting from AGOA exports resulting in the country ranking among the top producers of apparel exports to the USA by Sub-Saharan Africa. Trends in the data show that during the decade 2000 to 2010, Lesotho's total exports to the USA increased tremendously from US$140.15 million in 2000 to US$298.93 million in 2010 (AGOA, 2022). By 2019, the value of Lesotho's total exports to the USA had increased further to US$334.63. However, thereafter, Lesotho's economy particularly manufacturing production plummeted following trade wars that also adversely affected real GDP in the country (Central Bank of Lesotho, 2019).

Apart from trade wars, the COVID-19 pandemic and the Russia-Ukraine war are other external factors that have added to the reduced demand for Lesotho exports in recent years. Lesotho and other Sub-Saharan African economies have particularly suffered given their undiversified export structure as major economies like the USA tightened their monetary policy to mitigate the effects of the Covid-19 pandemic and the war in Ukraine (International Monetary Fund, 2022b; International Monetary Fund, 2023a).

Against this background, the purpose of the present paper, therefore, is to investigate how the shocks to the USA monetary policy affect real GDP and inflation in Lesotho considering that the USA is the key export destination for Lesotho's exports. As a contribution to the literature, this study separates the USA monetary policy interest rate into exogenous and endogenous behavioural assumptions. However, in both scenarios (exogenous or endogenous), the two variables representing Lesotho's economy are restricted from influencing the USA monetary policy rate. This restriction is appropriate for a small open economy model whose economic shocks are assumed to have no significant effects on the rest of the world according to the small open economy literature (see for example, Gandolfo, 2002; Caliendo and Feenstra, 2022; Ncube et al., 2012). Conversely, empirical evidence shows that changes in the global interest rate can affect the real variables in small open economies, which provides a further motivation for the present study.

This paper is organised as follows: - the next section following the introduction provides a country-based review of literature showing the trends in selected indicators related to the study. Thereafter, the next section discusses research methods followed by a discussion on data analysis and empirical findings. The last section provides concluding remarks and suggests areas for future research.

2. Literature review

Based on Lesotho's historic export structure and dependence on trade-based privileges, this study focuses on how the effects of external monetary policy shocks to Lesotho are likely to be transmitted to the domestic economy through the expenditure-reducing effect. As argued by Claessens et al. (2000) and Jääskelä and Smith (2011), economies that depend more on international trade are more vulnerable to trade shocks although the severity of such shocks is largely driven by the nature of exported products (Fahad and Abdurraza, 2022). In this context, the economy of Lesotho would hypothetically be more affected by the world demand shock especially given that the country's trade is largely concentrated in exports from the manufacturing sector, especially textiles and clothing exports, which have been continually receiving a major boost through the AGOA.

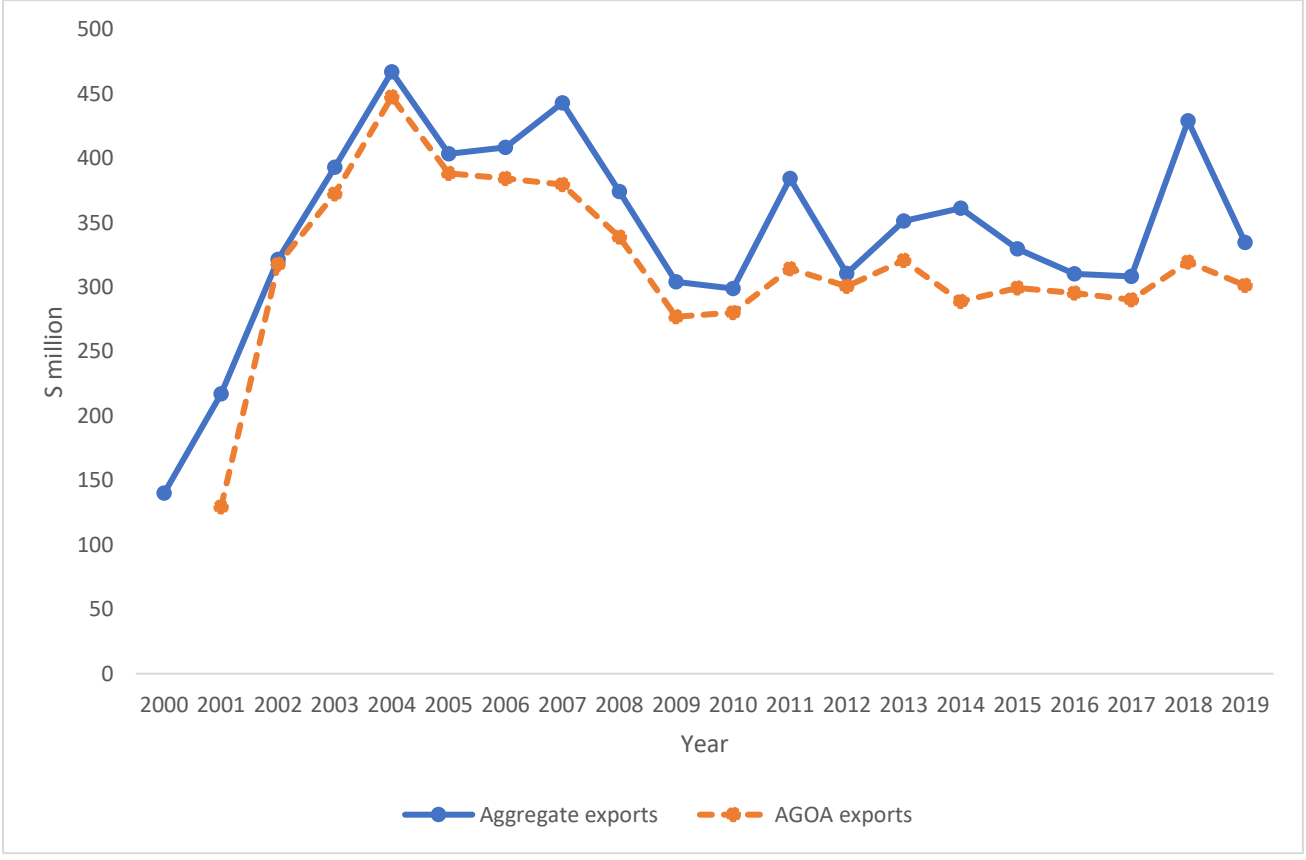
Considering that the United States like other economies has been hit by different crises, some of the policy responses undertaken by the United States Federal Bank have caused headwinds in the country's aggregate demand. For example, during the 2007-2008 global financial crisis, there was a significant decline in overall consumption by USA citizens (Hamilton, 2009). This decline in the USA consumption demand was also reflected in the dwindling demand for

AGOA-related exports during that period. Hence, consequent to the recessionary conditions in the United States in 2008, the Lesotho textile and clothing subsector contracted by 8.0 per cent (Central Bank of Lesotho, 2008).

In recent years, following the Russia-Ukraine war that started in 2022, there have been some spillover effects in different regions globally, especially those that depend on oil from Russia. One of the effects is that because of the war, economies that depend on imported oil from Russia had to face high oil prices due to restrictions in the Russian energy supply (Avalos and Huang, 2022). Furthermore, in the case of sub-Saharan Africa, the new global economic shock emanating from the invasion of Russia in Ukraine has resulted in lower demand for the region's exports by its key trading partners including the United States of America (USA) and the Euro area. Regarding the USA, the deteriorating economic conditions in the region were accompanied by tighter monetary conditions, particularly during 2022 (International Monetary Fund, 2022b).

Figure 1 shows the trends in exports from Lesotho to the United States of America since the inception of the AGOA. The figure also shows that over the reviewed period, there is a slight difference between total exports to the United States of America and AGOA exports suggesting that Lesotho's exports to the USA mainly consist of those that are traded through the AGOA concessions.

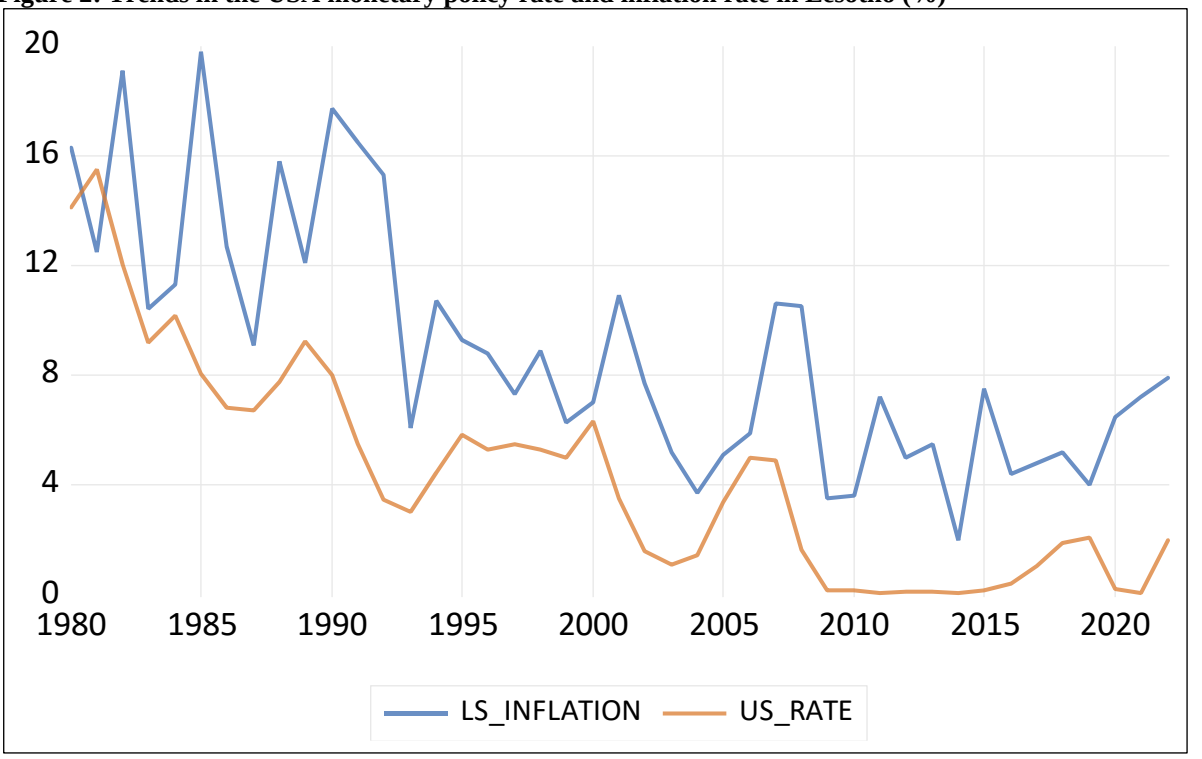
Figure 1: Trends in exports from Lesotho to the United States of America (2000 – 2022)



Source: AGOA Data Centre (2022)

Figure 1 further points to the significant declines in Lesotho's exports to the United States of America around the periods during which economic crises occurred in the USA. These periods include 2004 during which there was a surge in crude oil prices in the USA from $22.56 per barrel in 2003 to $36.77 per barrel in 2004 (United States Energy Information Administration, 2023), which could be partly attributed to the war in Iraq that started in March 2003. After 2004, Lesotho's exports to the USA dropped sharply from $467.05 million to $388.34 in 2005 (Figure 1). Another economic crisis that affected the USA and subsequently its demand for Lesotho's exports was the 2007-2008 financial crisis. Figure 1 shows that between 2007 and 2009, Lesotho's total exports to the USA decreased significantly from $443.02 to $304.15. Further significant declines in Lesotho's exports to the USA including AGOA exports occurred around 2011, 2014 and 2018 which are the years during which there was either low consumption in the USA economy (2011), slow economic growth (2014) or instigation of trade war with China (2018).

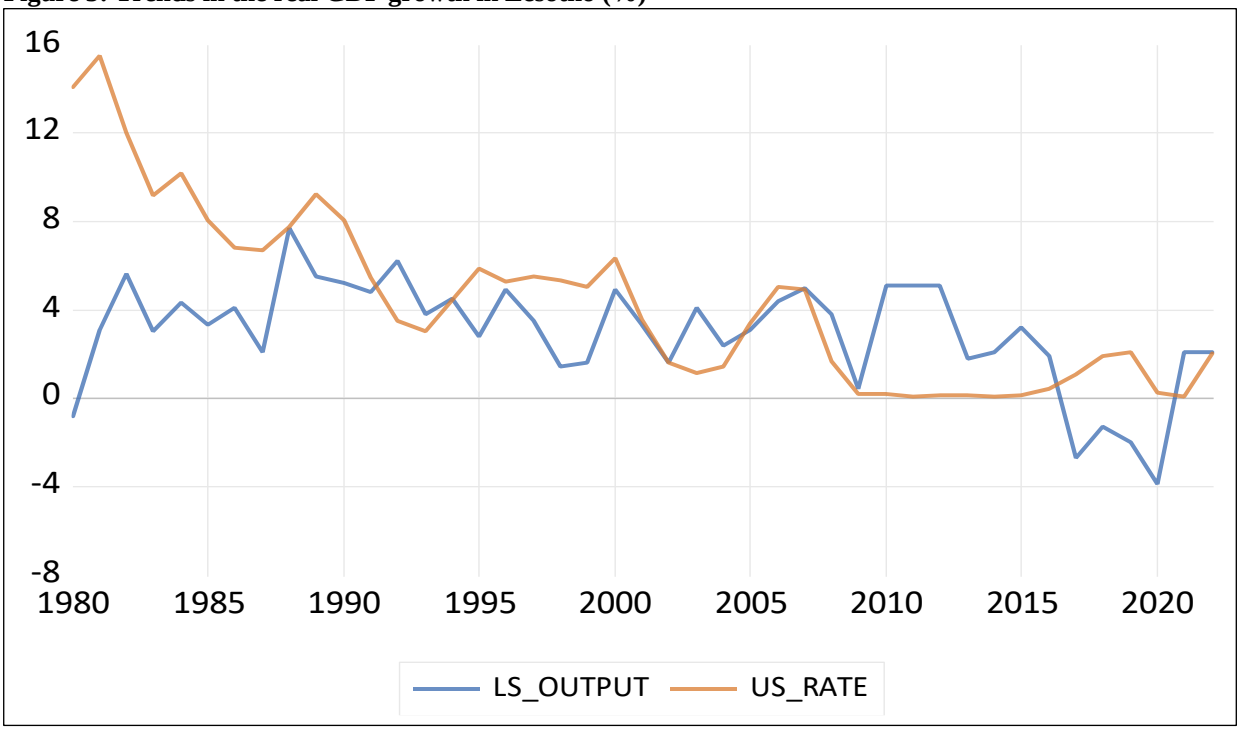
Figure 2: Trends in the USA monetary policy rate and inflation rate in Lesotho (%)



Source: World Bank (2021) and IMF (2023b)

Figure 2 depicts the trends in the USA monetary policy rate and inflation rate in Lesotho. The figure shows how Lesotho's inflation has evolved from two-digit figures in the 1980s and early 1990s to a single-digit state in recent years. Lesotho's double-digit inflation of the 1980s and early 1990s mimics the trend in South African inflation, which at that time was also in double-digits (Thamae and Mohapi, 2014). In recent years, Lesotho's inflation, like that of South Africa, is in single digits. However, Lesotho's economic growth and inflation continue to be connected to a host of external factors including the impact of the war in Ukraine, sluggish regional performance, and climate change, which tends to create further inflationary pressures in the economy (Central Bank of Lesotho, 2021; International Monetary Fund 2023a).

Figure 3: Trends in the real GDP growth in Lesotho (%)



Source: World Bank (2023)

3. Methodology

This study employs country-level data consisting of real GDP growth, inflation, and foreign interest rate in the empirical investigation of the following hypothesis: structural shocks to the USA economy and their resultant monetary policy responses can significantly affect Lesotho's output growth and inflation. In this context, two domestic variables are employed, and these include Lesotho's real GDP growth (LS_OUTPUT) and inflation (LS_INFLATION). In addition to domestic variables, the foreign interest rate for the United States of America (US_RATE) is also included in the empirical analysis. Given the strong trade links between the United States and Lesotho through the AGOA concessions, the present study hypothesis that shocks to the United States monetary policy rate can be transmitted to Lesotho through the expenditure-reducing effect, which in times of lax monetary policy in the USA could result in an increase in the demand for imports (or increase in demand for Lesotho's exports), *ceteris paribus*.

The period of analysis for the present study is 1980 to 2022, and annual time series data is employed. The data for Lesotho's inflation (LS_INFLATION) and real GDP (LS_OUTPUT) is obtained from the World Bank's World Development Indicators (2023). However, the missing values for inflation for 2006, 2007, and 2008 are obtained from the International Monetary Fund (2023b). In addition, data for the United States monetary policy rate (US_RATE) is obtained from the IHS Global Insight database.

All the variables, namely, LS_OUTPUT, LS_INFLATION, and US_RATE were first tested for stationarity to determine if the vector auto regression (VAR) and subsequently the structural vector auto regression (SVAR) can be estimated in levels or first differences. The Zivot-Andrews (1992) unit-root test was employed for this purpose, given its advantage of allowing structural breaks in the data. The results of the Zivot-Andrews unit root test are reported in Table 1. These results indicate that all three variables employed in this study variables are stationary, which, therefore, leads to the estimation using the variables in levels.

Table 1: Results of the Zivot-Andrews unit root test

Variable	Intercept only	Trend and intercept
LS_OUTPUT	-6.285***	-6.387***
LS_INFLATION	-6.882***	-7.300***
US_RATE	-5.392***	-5.918***

Source: Author's own computations

Following the unit root tests but before the estimation of the structural parameters and the determination of the impulse responses, the optimal lag length for the vector auto regression was established using different lag selection criteria. The five criteria employed in the current analysis are the Likelihood Ratio (LR) test statistic, Final Prediction Error (FPE), Akaike Information Criteria (AIC), Schwartz Criterion (SC), and the Hannan-Quinn Criterion (HQ). According to these lag selection criteria, the optimal length selected for this study is lag one, which therefore leads to the estimation of SVAR(1).

In the empirical estimation, the study then assumes a three-variable SVAR(1) for a small open economy, Lesotho. The variables of analysis are mixed between one exogenous variable represented by the USA interest rate and two endogenous variables represented by Lesotho's real GDP and inflation. Because Lesotho is regarded as a small open economy, shocks to its real GDP or inflation are assumed to not affect the USA monetary policy rate even though the shocks to the USA monetary policy rate are assumed to have a significant effect on the real sector in Lesotho.

For mathematical representation, let r_{it} represent the interest rate for the United States of America, which is exogenous as earlier mentioned. On the other hand, let z_{it} represent the endogenous domestic variables, which are Lesotho's real GDP growth and inflation.

After the initial estimation of the unrestricted VAR, the structural vector autoregression is augmented with an equation for the foreign interest rate (r_{it}), which is inserted using the model object in EViews 13. The foreign interest rate is as expressed in Equation (1) in the following system:

$$r_{it=} \beta_i r_{it-1} + \varepsilon_{rt} \quad \text{(1)}$$

$$z_{1t} = a_{12}^0 z_{2t} + \beta_1^0 r_t + \beta_1^1 r + a_{11}^1 z_{1t-1} + a_{12}^1 z_{2t-1} + \varepsilon_{1t} \quad \text{(2)}$$

$$z_{2t} = a_{21}^0 z_{2t} + \beta_2^0 r_t + \beta_2^1 r_{t-1} + a_{22}^1 z_{2t-1} + a_{21}^1 z_{1t-1} + \varepsilon_{1t} \quad \text{(3)}$$

In Equation (1), the underlying behaviour is such that the foreign interest rate only responds to shocks to itself but does not react to shocks to Lesotho's domestic variables. This behavioural assumption validates the small open economy case, which fundamentally has a negligible effect on the rest of the world variables since its economic size is relatively smaller compared to the rest of the world (Caliendo and Feenstra, 2022; Gandolfo, 2002).

Apart from Equation (1), the other two equations in the above system represent the contemporaneous relationships between Lesotho's domestic variables and the foreign interest rate. Consequently, the equation for Lesotho's real GDP growth rate is given by Equation (2) where $z_{1t}$is domestic real GDP growth, z_{2t} is domestic inflation, r_t and r_{t-1} represent the current and lagged foreign interest rate respectively. This equation indicates that Lesotho's real GDP growth responds to shocks to its past values, shocks to domestic inflation, and shocks to the foreign interest rate. Similarly, Equation (3), which represents domestic inflation, indicates that Lesotho's inflation responds to shocks to its past values, shocks to domestic output, and shocks to the foreign interest rate.

In the next step of the analysis, restrictions are imposed on structural parameters associated with the endogenous variables, which essentially equates to the identification of the contemporaneous relations in the system. Since the shocks

to the domestic variables, namely, real GDP growth and inflation, are considered to have no significant effect on the foreign interest rate, the following restrictions are then imposed on the structural parameters:

Assuming the two endogenous variables at Lag 1, and using Views 13 structural model commands, the first restriction imposed is **L1(1,2) = 0** which implies that the first lag of domestic real GDP growth does not affect the foreign interest rate. The second restriction imposed is **L1(1,3) = 0** which implies that the first lag of domestic inflation does not affect the foreign interest rate. Both these two restrictions indicate that shocks to Lesotho's domestic output and inflation are restricted from affecting the foreign market (United States of America). Therefore, the interest rate for the United States of America would not be significantly affected by shocks arising from Lesotho's real GDP growth or inflation.

In matrix format, the restrictions which have been imposed on the lags of endogenous variables can be represented as follows:

$$L^* = \begin{bmatrix} NA & 0 & 0 \\ NA & NA & NA \\ NA & NA & NA \end{bmatrix} \quad \text{..... (4)}$$

where rows represent VAR equations while columns represent endogenous variables in specification order.

4. Results of the structural VAR and discussion

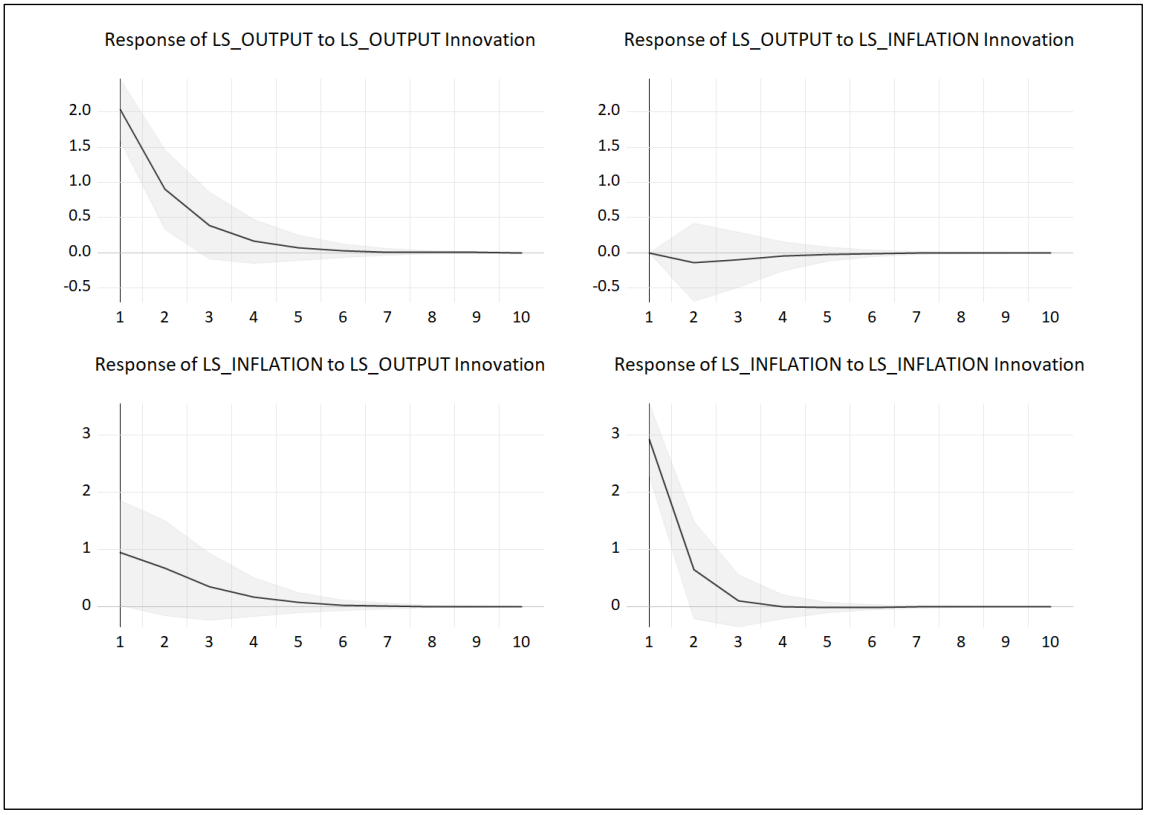
The results for the empirical estimation of the SVAR investigating the reaction of Lesotho output and inflation to shocks to the foreign interest rate are presented in two parts: first, the vector containing foreign variables is treated as exogenous while the vector for domestic variables is regarded as endogenous. In the second part of the estimation, both the foreign and domestic variables are treated as endogenous, but shocks to Lesotho's real GDP and inflation are still restricted from affecting the United States monetary policy interest rate.

Appendix Table A1 and Figure 4 present the estimation results and the resulting impulse response functions associated with the system in which the foreign interest rate is treated as exogenous. According to the results reported in Table A1, there is a significant positive relationship between the foreign interest rate and inflation in Lesotho, which confirms that inflation in Lesotho responds to contemporaneous shocks to the USA interest rate.

Specifically, a 1 per cent increase in the interest rate in the United States is associated with a 0.89 per cent increase in inflation in Lesotho. These findings suggest that monetary tightening by the United States through the increase in the interest rate could temporarily increase inflation in Lesotho. The dilemma with these findings is that while monetary tightening in the USA is associated with declines in the USA's demand for Lesotho exports, tighter USA monetary policy is likely to have spillover effects that could increase inflation in Lesotho though temporarily.

With these findings, the main implication for policy is that Lesotho needs to identify policy buffers to lessen the effects of external shocks in the country's real sector. This is because countries in possession of additional policy buffers have been found to withstand global crises relatively better (Pina, 2015; Cheung and Ito, 2009; Bar-Ilan and Lederman, 2007). The argument in this case is that policy buffers could create a vent for the monetary authorities of the affected country to stabilise inflation and output even with more room to manoeuvre in times of economic crises.

Figure 4: Impulse response function when the United States interest rate is exogenous



Author's own computations

The impulse response functions depicted in Figure 4 also provide further insights into the response of Lesotho's real GDP growth and inflation. The figure indicates that when the United States interest rate is treated as exogenous, domestic output growth decreases in response to a (negative) shock to domestic inflation, but then rises slightly over the horizon. Again, there is a negative response by Lesotho's inflation to a shock to domestic output growth. In addition to the initial impulse response functions, the study further reports the results of the robustness checks, which are discussed in the subsequent section of this paper.

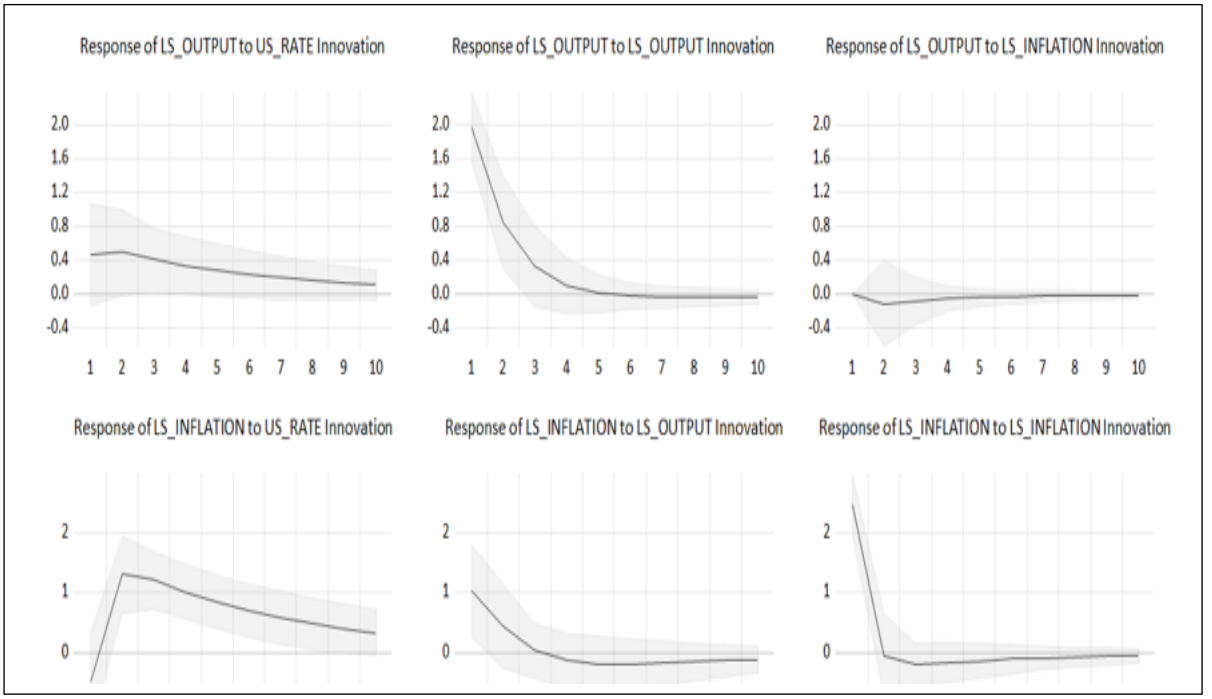
6. Robustness checks

To allow robustness checks, in the next step of the analysis, all variables including the foreign interest rate are treated as endogenous. However, as in the previous step of analysis, no lagged values of domestic variables are allowed to impact the foreign sector interest rate. After applying the necessary restrictions on the lags of the real GDP and inflation (which is that they are restricted from entering the United States interest rate equation), a new system is estimated, and the impulse response functions are reported. The results of the new estimations are reported in Figure 5 and are much like those obtained in the previous case when the United States interest rate variable is treated as exogenous.

From the results of the impulse response function reported in Figure 5, it can be inferred that domestic output growth increases slightly before it starts to decrease over the horizon in response to the United States interest rate shock. In comparison, Lesotho's inflation initially increases sharply in response to a shock in the United States interest rate, but thereafter decreases moderately over the horizon. This pattern shows a short-term response of domestic inflation to external monetary policy shock. In addition, the impulse response function shows that domestic output growth decreases

in response to a (negative) shock to domestic inflation. This contrasts with the negative response by domestic inflation to a shock to domestic output growth, which is depicted in the impulse response function.

Figure 5: Impulse response function when the United States interest rate is endogenous



7. Conclusion and policy implications

This study uses the experiences of Lesotho to investigate the economic implications of shocks to United States monetary policy in other economies in which it has higher trade linkages. Since Lesotho is a small open economy, the empirical analysis is mainly carried out under the assumption of exogeneity of the foreign interest rate in which feedback response between domestic and foreign sectors is restricted. In the empirical analysis, this study adopts a structural vector autoregression (SVAR) model consisting of three variables including the United States monetary policy rate, Lesotho's real GDP growth and inflation.

By assuming the exogeneity of the foreign interest rate, this study can demonstrate that while changes in the monetary policy rate in major economies like the United States of America could affect Lesotho's economy, in contrast, shocks to the Lesotho economy would not affect variables in the external economy. In this context, monetary policy shocks in the United States of America are expected to have significant effects on other economies especially those in Sub-Saharan Africa that are benefiting from the unilateral due-duty free access granted by the United States Government under the Africa Growth and Opportunity Act (AGOA). From the time of AGOA's inception in 2000, Lesotho has been one of its principal beneficiaries benefiting from the significant production of export volumes of clothing and textiles, which has contributed to real GDP growth in the economy.

The main implication of the findings of this study is that Lesotho's key domestic variables, namely, real GDP growth and inflation are to some extent susceptible to external shocks to the United States monetary policy rate given the trade ties between the two countries. It is therefore not surprising that there is evidence that Lesotho's inflation temporarily increased following a shock to the USA monetary policy rate. Moreover, Lesotho's output growth decreased over the horizon following a shock to the United States monetary policy rate. With these results, some useful implications for policy emerge. Based on the findings of this paper, it is recommended that policymakers in Lesotho consider identifying additional policy buffers that would guard against external vulnerabilities such as shocks to the United States monetary policy. This is because shocks emanating from Lesotho's larger key trade partners could affect trends in domestic output most likely through a changing demand for Lesotho's exports.

Alternative policy buffers to aid the Lesotho economy could therefore be those that aid the country's capital to be targeted at the most productive sectors other than the clothing and textiles sub-sector. Presumably, such a move would

require Lesotho to take advantage of the newly identified product niches for the Southern African Customs Union countries. Being a member of the Southern African Customs Union (SACU) could, therefore, create opportunities for Lesotho to expand trade within the SACU and the African Free Continental Trade Area (AfCFTA), especially in product lines that are currently unexploited.

The present study is limited to the analysis of shocks to the United States interest rate using a three-sector model. Future studies could employ additional variables to capture other effects that can be brought by shocks to the United States monetary policy to the economy of Lesotho. In so doing, future studies could provide further insights into other economic dynamics that are relevant to Lesotho.

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Appendix Table A1. Vector autoregression estimates with restrictions on domestic variables (Case 1: the United States interest rate is exogenous)

	US_RATE	LS_OUTPUT	LS_INFLATION
US_RATE(-1)	0.864 (0.052) [16.593]	0.166 (0.108) [1.534]	0.892 (0.146) [6.116]
LS_OUTPUT(-1)	0.000 … …	0.468 (0.132) [3.537]	0.221 (0.178) [1.232]
LS_INFLATION(-1)	0.000 … …	-0.022 (0.099) [-0.222]	-0.043 (0.134) [-0.322]
C	0.314 (0.310) [1.015]	1.126 (0.678) [1.663]	4.586 (0.914) [5.020]
R-squared Number of restrictions	0.868 2	0.323 …	0.654 …

Source: Author's computations. Note that standard errors are in parentheses ( ) while t-values are in square brackets [ ].