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Determination of an Optimal Net Capital Inflows Threshold Level for Economic Growth in Eswatini

Simiso Mkhonta

Abstract

This paper estimates the optimal net capital inflows threshold level for economic growth in Eswatini beyond which they are detrimental to the economy; to assist enact optimal exchange controls. The Generalized Moments Methods (GMM) is used in the estimation of the threshold level of net capital inflows in the form of foreign direct investment, to control for possible endogeneity, autocorrelation and heteroscedasticity. The study also plots the relationship between net capital inflows and economic growth graphically to determine the threshold level of net capital inflows for economic growth. The study uses annual data spanning from 1982 to 2016. The FDI nonlinearity relationship with GDP growth is confirmed using M-G non-linear causality test and a quadratic specification of FDI effect on economic growth is adopted to solve for the threshold. FDI squared lagged 6 years is found to be significant and it derives a threshold of 14.1 per cent of GDP through optimization and by inspecting the plotted graph of net capital inflows and economic growth. This implies that a ratio of capital inflows to GDP below 14.1 per cent of GDP results in a positive GDP growth. However, if the ratio is above the threshold it leads to negative GDP growth. The lower threshold for Eswatini confirms that the country has underdeveloped financial sector, human capital and investment environment therefore implying insufficient capacity to absorb the inflows.

Key words: Net Capital Inflows, Economic Growth, Absorptive Capacity and Eswatini.

1. INTRODUCTION

This paper examines the optimal net capital inflows threshold level for economic growth in Eswatini. The impact of net capital inflows on economic growth have been extensively studied. There is a broad consensus in research that capital inflows have a positive effect on growth. However, capital flows’ positive impact on growth can only be realized when economies have sufficient absorptive capacity. Economies have to develop their financial sector, policy environment, human capital and investment atmosphere to realize positive spinoff from capital inflows.

Low elasticities of supply due to low capacity of economies result in increases in prices and strengthening of the real effective exchange rate, which is detrimental to economic growth. This limited absorptive capacity of developing countries in handling capital inflows point to a nonlinearity in the relationship between capital inflows and growth. Many studies have confirmed the significant and nonlinear relationship between net capital inflows and economic growth including Chen and Quang (2012), Baharushah and Devedason (2015), Khadraoui (2012) and Nguyen and To (2017).

Eswatini like all other developing economies lacks enough foreign investment inflows for investment purposes though there was a surge in early 2000 because of the African Growth Opportunity Act (AGOA) (Masuku and Dlamini, 2009). The country experienced high economic growth in the 1980s, because it was regionally a comparatively safer destination for investment. Neighboring countries were experiencing political instability. As the political climate normalized in the region competition for investment tightened for Eswatini. Government investment has also been compromised by a fall in the South African Customs Union (SACU) receipts. Eswatini is therefore in need of net capital inflows to emulate the growth of the 1980s.
Since the global financial crisis, the government has run an intensive bond programme in the domestic financial market to finance the fiscal deficit. The lean domestic financial market has been resilient in financing the deficit but not for long. Under this situation, capital inflows are very important in supporting economic growth and broadening the tax base to ease the fiscal strain. On the other hand, the limited absorptive capacity of developing countries poses a net capital inflows dilemma.

As a result, the aim of the paper is to determine the threshold level of net capital inflows Eswatini can handle in the form of foreign direct investment. There are limits to this source of finance given that massive inflows could turn out to be harmful to the economy. Capital inflows in the form of foreign direct investment have fallen from levels of 10 per cent of GDP in the 1980s to levels below well below 5 per cent after the turn of millennium; the Government is therefore in a serious drive to attract foreign direct investment and is weary of its negative consequences. As the Government pushes aggressively to attract foreign direct investment, she ought to know the limit/threshold of the foreign direct investment lest it be harmful to the economy. The paper therefore determines the threshold level of foreign direct investment beyond which it would have negative effects in the economy given the level of development of the Eswatini economy. The threshold level of investment will in turn inform the Exchange Controls regulations in the Central Bank of Eswatini in their bid to optimize foreign exchange flows.

The paper is organized as follows; in section 2, the graphical relationship between net capital inflows and economic growth is explained; in section 3, related theoretical and empirical literature review is discussed; section 4, is the Methodology and Data Analysis, section 5 are the Empirical Results and section 6 are the Conclusion and Policy Recommendations.

2. ECONOMIC GROWTH AND NET CAPITAL INFLOWS

Figure 1 shows the trend of capital inflow and economic growth from 1982 to 2016. There is seemingly a positive relationship between net capital inflows and economic growth. The Eswatini economy is in dire need of capital inflows as net capital inflows fell from a high of 10 percent in the 1980 to lows of below 5 percent beyond the turn of the millennium as earlier noted. The absorptive capacity of the economy remains a challenge to the aggressive campaign for high net capital inflows as shown by Nguyen and To (2017).

The GDP growth rate has slumped from an average of 6 per cent recorded in the 1980s to an average of 2.6 per cent recorded after 2010. A high deceleration in the GDP was evident after the 1980s. The per capita GDP growth has also followed the same trend as GDP growth, which translates to worsening poverty levels, as the population remained high.

Figure 1: Net FDI and GDP growth

![Graph showing net FDI and GDP growth](image-url)

Eswatini Central Statistics Office

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1The government of Eswatini receives at least over 50 percent of her revenue from the regional customs union, the South African Customs Union (SACU).
After the cross of the millennium, Eswatini economic growth was supported by the introduction of the African Growth and Opportunity Act (AGOA), which was later withdrawn in 2015 and reinstated in 2018. The regional markets played a significant role in supporting the economy during the loss of AGOA. It is anticipated that growth will be enhanced by the reintroduction of the country to AGOA while maintaining the newly found regional markets despite competition from the Far East (Swaziland Business Year Book, (2010)).

Alike, the foreign direct investment growth has fallen from levels around 10 per cent in the 1980s to an average growth rate of less than 5 per cent in the past 10 years. Economic growth in Eswatini has been declining after the 1980s, particular after 1990 following the lifting of sanctions on South Africa. This has resulted in greater competition for investors as earlier mentioned. Both net capital inflows and growth have been on the decline in the period under review; hence the aggressive drive by Government to attract foreign direct investment (FDI) and the concern of choking the economy in the process.

### 3. EMPIRICAL AND THEORETICAL LITERATURE

The theoretical underpinning of impact of the foreign capital inflows on economic growth has been vague according to Feldstein (1994). The conventions aggregate demand identified by Olasode (2015) demonstrate the supposed impact of foreign capital on growth. From the framework of a simple Keynesian macroeconomic model of an open economy or national income identities, where; GDP ($Y$) = Consumption ($C$) + Investment ($I$) +Government ($G$) and Net Exports ($X-M$).

$$Y=C+I+G\ (X-M)\ ..........\ (1)$$

And also

$$Y=C+S+T\ ..................\ (2)$$

Where:
- $S$ = Savings
- $T$ = Taxes

Then:

$$C+I+G+(X-M)=C+S+T$$

$$(X-M)=(S-I)+(T-G)\ ppt\ (3)$$

Government savings ($T-G$) and the investment and savings gap, ($S-I$) are financed by the External savings ($X-M$) hence the link between growth and capital inflows.

Among other authors, Borts and Kopecky (1972) and Johnson (1964) have studied net capital inflows and economic growth theories. The authors argue that capital inflows are expected to increase economic growth depending on country’s capacity to absorb the investment. Countries with a high absorptive capacity of investment are expected to benefit positively from capital inflows. According to Borts (2017), the absorptive capacity may include financial sector, policy environment, human capital and investment atmosphere strengths. Theory postulates that capital inflows reinforce growth dynamics. Capital flows tend to go to the countries with good economic environments.

Nguyen and To (2017) employed a Threshold Auto-Regressive (TAR) model to analyze the impact of foreign direct investment on economic growth with panel data for eight ASEAN countries in the period 2002 to 2014. He found threshold values of 4.73 per cent and 4.91 per cent of GDP with asymptotic 95 per cent confidence interval in their current absorptive capacity. He uses some of the variables that have been proven to affect economic growth in past studies including government consumption, level of human capital, trade openness, inflation and a proxy for governance and country specific effects.

Baharumshah at el (2015) confirm a non-linear relationship between foreign capital inflows
and growth based on the development of the financial sector. The paper gives evidence on the effects of different categorization of capital flows, namely, foreign direct investment, portfolio equity and debt inflows when using a threshold regression model. The author finds positive benefits of capital flows on economic growth only for countries above a certain threshold of financial development. Therefore, capital inflows tend to compromise economic growth given a threshold of financial development hence their non-linear relationship with economic growth.

Chen and Quang (2012) investigate the relationship between international financial integration and growth relying on non-linear panel techniques and find that international financial development follows a threshold condition regarding the level of economic, institutional, financial development and the inflation rate.

Soumia and Abderrezak (2013) use the Ordinary Least Square (OLS), Two Stage Least Square (TSLS) and the Generalized Moments Methods (GMM) to analyze the effect of foreign direct investment on economic growth and found the results of the GMM more relevant. They find that foreign direct investment (FDI) is an important factor in contributing to economic growth in North Africa for the countries analyzed namely; Algeria, Morocco and Tunisia. However, they find the effect to be very small owing to challenges of attracting foreign direct investment. The control variables they use in their model are trade openness, financial development, exchange rate etc.

Tomasz Michaowski (2012) found mixed results for the effect of foreign direct investment on economic growth depending on the reduction of barriers to FDI effectiveness. He observes that it does not help to only attract more FDI to the region, but there is also a need to reduce the barriers to FDI effectiveness. Levels of FDI as low as 5 percent of GDP can results in higher economic growth compared to those attracting levels beyond 16 percent of GDP.

There is therefore a broad consensus on the positive and non-linearity in the relationship between the capital inflows and economic growth judging from the foregoing theoretical and empirical literature. There are levels of FDI where growth is positively influenced and there are levels beyond, which FDI has a negative impact on economic growth as mentioned earlier. The level beyond which the impact of FDI on economic growth becomes negative results from the saturation in the FDI absorptive capacity of the economy emanating from low skills, less developed financial markets and the investment environment generally.

The threshold Auto Regressive model is one of the most popularly used in literature to analyze the nonlinear (optimum levels of capital inflows) effects of capital inflows on economic growth though it does not take into account endogeniety of the variables, which can be addressed by employing the Generalized Moments Methods (GMM) as in Soumia and Abderrezak (2013).

4. METHODOLOGY AND DATA ANALYSIS.

4.1 Methodology
From the study by Palát (2017), one can estimate a quadratic polynomial to the nonlinearity impact of foreign direct investment on economic growth. Differentiating the quadratic specification of economic growth with respect to foreign direct investment will yield the optimal threshold of foreign direct investment a country can absorb given the level of human capital, financial development and investment environment.

Absorptive capacity refers to the ability of an organisation or region to identify, assimilate and exploit knowledge from the
environment (Cohen and Levinthal, 1989). The study handles the absorptive capacity of the economy through the variable capturing human capital development. A majority of studies as cited in the literature review point to the absorptive capacity of the economy of the country as a constraint to reaping benefits from an influx of foreign direct investment. The optimal level of FDI is found by differentiating the estimated results in equation 4 which are presented in table 2. Following Nguyen and To (2017), Wilson and Briscoe (2004), Pelinescu (2014), Keho (2017), Dritsakis et al (2006), Barro (2013), Mitchell (2005) and Brimelow (1993) there is enough evidence to believe that economic growth is influenced by foreign direct investment, gross fixed capital formation, inflation, trade openness and human capital. Net Foreign direct investment is regarded as capital inflow/outflow depending on its net position in line with Baharumshah et al (2015). The model to be estimated is therefore as follows;

$$\text{GDPgr}_t = \alpha_1 + \alpha_2 \text{NFDI}_t^2 + \alpha_3 \text{NFDI}_t + \alpha_4 \text{GCONS}_t + \alpha_4 \text{GFCF}_t + \alpha_5 \text{INF}_t + \alpha_6 \text{TOP}_t + \alpha_7 \text{ENR}_t + \varepsilon_t$$

(4)

Where GDPgr is real growth, NFDI is net foreign direct investment as a per cent of GDP, GCONS is government consumption as a per cent of GDP, GFCF is gross fixed capital formation as a per cent of GDP, INF is the inflation rate, TOP is trade openness as a per cent of GDP, and ENR is the primary school enrolment rate as a percent of total population (This could be referred to as the absorptive capacity of the Eswatini economy).

To find the level of NFDI beyond which economic growth is affected negatively optimal control theory is applied by firstly estimating a quadratic form of equation 4 (Palát (2017) and Hassan and Shakur (2017)). The derivative of GDPgr with respect to NFDI is taken and equated to zero as follows;

$$\frac{\partial \text{GDPgr}}{\partial \text{NFDI}} = -2\alpha_2 \text{NFDI} + \alpha_3 = 0 \ldots \ldots \ldots (5)$$

The optimal level of NFDI subject to economic growth is obtained by solving equation 5 as follows;

$$\text{NFDI}^* = \frac{\alpha_3}{2\alpha_2} \ldots \ldots \ldots \ldots \ldots (6)$$

The Generalized Moments Method (Soumia and Abderrezak (2013), is employed to determine the threshold effect level of net capital inflows beyond which they result in negative economic growth instead of the threshold Autogressive Model to address the endogeneity, heteroscedasticity and autocorrelation in the variables. The Hausman test for GMM estimation used by Zongxin Qian (2014) is employed to test for endogeneity. The F statistics is found to be significant showing the presence of endogeneity and the need for instrumental variables (Guo Z et al. (2016))

The study uses the M-G nonlinear causality tests used by Anoruo (2011). The null hypothesis that FDI does not M-G cause GDPgr is $\alpha_3=0$. The null hypothesis that FDI does not M-G cause GDPgr is $\alpha_{12}=0$, which is the coefficient for

$$\frac{\text{FDI}_t - \zeta_2}{1 + \text{FDI}_t^2 - \zeta_2}$$

in equation 7 below. The null hypothesis is rejected with an F-statistic that is greater than the critical value at conventional levels according to Anoruo (2011). The results show that $\alpha_{12}$ is statistically different from 0 and

$$\frac{\text{FDI}_t - \zeta_2}{1 + \text{FDI}_t^2 - \zeta_2}$$

is thus found to be highly correlated to the GDPgr in the M-G nonlinear causality specification equation below;
\[
\text{GDP}_{grt} = \beta_1 \frac{\text{GDP}_{t-1} - \zeta_1}{1 + \text{GDP}_{t-1}^1} - \\
\beta_2 \text{GDP}_{t-1} - \beta_3 \frac{\text{FDI}_{t-2} - \zeta_2}{1 + \text{FDI}_{t-2}^2} - \\
\beta_4 0. \text{GDP}_{t-1} + \\
\mu_t \text{...........................................(7)}
\]

4.2 Data Analysis
The variables are seemingly I(1) by inspection as seen in figure 2 below. The variables are then tested for stationarity using the augmented dicky fuller test and are indeed all found to be integrated of order one.

Figure 2: Graphical Analysis

Table 1: Stationarity Tests (First Difference)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Intercept</th>
<th>Intercept &amp; trend</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDPgrt</td>
<td>-7.263***</td>
<td>-7.167***</td>
</tr>
<tr>
<td>FDI</td>
<td>-11.360***</td>
<td>-11.330***</td>
</tr>
<tr>
<td>INF</td>
<td>-4.671***</td>
<td>-4.695***</td>
</tr>
<tr>
<td>GCONSt</td>
<td>-6.170***</td>
<td>-6.123***</td>
</tr>
<tr>
<td>GFCFt</td>
<td>-2.647**</td>
<td>-5.190***</td>
</tr>
<tr>
<td>ToPt</td>
<td>-7.749***</td>
<td>-8.090***</td>
</tr>
</tbody>
</table>

The Wu-Hausman test in table 2 shows that there is endogeniety in the variables with a significant F statistics. The variables are also found to be with an F and Chi-square greater than the critical value (Anoruo, 2011).

5. EMPIRICAL RESULTS.

5.1 Graphical Results.
The graphical plot of variables GDPgr on y-axis and FDI on x-axis fitted with a quadratic regression line gives an idea of the optimal level of FDI beyond which growth is affected negatively. The data shows an optimal level of FDI close to 15 per cent of GDP in figure 2 below.

Figure 3. Foreign Direct Investment plotted against GDP growth

Table 2. Endogeniety and Non-linearity Test

<table>
<thead>
<tr>
<th>Wu-Hausman F test:</th>
<th>df</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.1221</td>
<td>5</td>
<td>0.0023</td>
</tr>
</tbody>
</table>

Test statistics

<table>
<thead>
<tr>
<th>t-statistic</th>
<th>Value</th>
<th>(df)</th>
<th>Prob</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.382</td>
<td>(41)</td>
<td>0.0016</td>
</tr>
<tr>
<td>F-statistic</td>
<td>11.438</td>
<td>(1,41)</td>
<td>0.0016</td>
</tr>
<tr>
<td>Chi-square</td>
<td>11.438</td>
<td>1</td>
<td>0.0007</td>
</tr>
</tbody>
</table>

Critical value=3.595

The Wu-Hausman test in table 2 shows that there is endogeniety in the variables with a significant F statistics. The variables are also found to be with an F and Chi-square greater than the critical value (Anoruo, 2011).
If the p-value of J statistics is 0, then either the model or the over restricting conditions (i.e. your choice of instruments and constraints) are rejected. (Baum (2013) and Newey and West (1987a) state that a J statistics with a p-value shows that the model is correctly specified and the Instrumental variables are correct. The results show a J statistics with a high p-value proving that the model is correctly specified and the Instrumental variables only, through Sargan test or J-statistic.

Differentiating the GDP with respect to NFDI and solving the optimal level of FDI as a percent of GDP yield at 14.1 per cent threshold as follows;

\[
\text{GDPgr}_t = -53.54 - 0.02 * \text{NFDI}_t^2 - 0.69 * \\
\text{NFDI}_t - 0.19 * \text{GCONS}_t + \\
0.12 \text{GFCF}_{t-1} + 0.15 * \text{INF}_t + 0.14 * \text{TOP}_t + \\
0.40 * \text{ENR}_{t-2} + 0.31 * \text{GDPgr}_{t-1} + \\
\epsilon_t \]

\[
\frac{\partial \text{gdpgr}}{\partial \text{FDI}} = 2 * (-0.02461)\text{NFDI}_t + 0.69 = 0
\]

Optimal FDI as a percent of GDP = 
\[
-0.693258 \\
2*(-0.02461) \\
= 14.1
\]

The results obtained give a level of FDI as a percent of GDP of 14.1 percent. This suggests FDI as a percent of GDP less that 14.1 percent deliver positive results on GDPgr and beyond 14.1 percent of GDP negative effects result on GDPgr with a lagged effect of 6 years. There is a long run negative impact of massive net capital inflows in form of foreign direct investment on economic growth.

\(\text{FDI}_t, \text{GFCF}_t, \text{TOP}_t, \text{ENR}_t, \text{GDPgr}_t\), are found to have a positive impact on economic growth and statistically significant at 1 per cent level of significance in line with studies by Nguyen, T.Q., and To, K.N. (2017). FDI(t-6)^2 is statistically significant at 1 per cent level and has a negative effect on economic growth where its derivative gives the optimal level of net FDI inflows. GCONS is statistically significant at 1 per cent and negatively affects economic growth. A percentage change in FDI leads to 0.69 per cent change in economic growth, a percentage change in GFCF leads to a 0.12 percent change in economic growth, a percentage change in ENR leads to 0.19 per cent fall in economic growth, a percentage change in ToP leads to a 0.14 percent change economic growth, a per centage change in ENR leads to a 0.40 percent change in economic growth.

---

**Table 3. Estimation of Non-linear Equation 5 of FDI (Dependent variable: GDP Growth)**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Parameter Value</th>
<th>Std. Error</th>
<th>T-stats</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-53.54</td>
<td>0.12</td>
<td>-455.9</td>
<td>0.00</td>
</tr>
<tr>
<td>FDI(_t-6)</td>
<td>-0.02</td>
<td>0.00</td>
<td>-113.5</td>
<td>0.00</td>
</tr>
<tr>
<td>FDI(_t)</td>
<td>0.69</td>
<td>0.00</td>
<td>341.1</td>
<td>0.00</td>
</tr>
<tr>
<td>GCONST</td>
<td>-0.19</td>
<td>0.00</td>
<td>-87.1</td>
<td>0.00</td>
</tr>
<tr>
<td>GFCF(_t-1)</td>
<td>0.12</td>
<td>0.00</td>
<td>165.4</td>
<td>0.00</td>
</tr>
<tr>
<td>INF(_t)</td>
<td>0.15</td>
<td>0.00</td>
<td>28.4</td>
<td>0.00</td>
</tr>
<tr>
<td>ToP(_t)</td>
<td>0.14</td>
<td>0.00</td>
<td>1565.0</td>
<td>0.00</td>
</tr>
<tr>
<td>ENR(_t-2)</td>
<td>0.40</td>
<td>0.00</td>
<td>315.2</td>
<td>0.00</td>
</tr>
<tr>
<td>GDPgr(_t-1)</td>
<td>0.31</td>
<td>0.00</td>
<td>543.0</td>
<td>0.00</td>
</tr>
<tr>
<td>R sq.</td>
<td>0.45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>DW</td>
<td>2.07</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>J-stats</td>
<td>9.02</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prob (J-stats)</td>
<td>0.99</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
(the higher the level of human development hence the absorptive capacity the higher the economic growth) and a percentage change in GDPgr(t-1) leads to a 0.31 percent change in economic growth. Ruzima.,M. (2016) found non-consensus in the impact of INF on economic growth and the current study shows a positive and significant impact of INF on economic growth. The study finds that INF is statistically significant at 1 percent and its percentage increase leads to a 0.15 percent increase in economic growth. He also notes that the empirical findings are diversified based on the economic conditions, methodology employed, data used, nature of the study whether cross section, panel data or country specific, and time period of the study as well as the number of explanatory variables included in the model.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The net capital inflows in the form of net foreign direct investment should be limited to less than 14.1 percent of GDP or equals to 14.1 percent of GDP for lasting positive effects to be realized on economic growth. The capacity of FDI that sub Saharan countries can absorb are mixed according to MichaowskiIs, T (2012) but could reach above 16 percent of GDP depending on how the host economy makes it effective. The absorptive capacity of the Eswatini economy to host net foreign direct investment of above 14.1 percent diminish in the 6 years from the receipt of the investment. This implies that the government of Eswatini should invest in the development of the financial sector, policy environment, human capital and investment atmosphere to increase the absorptive capacity of the economy and avoid an economic down turn 6 years down the line. The model addresses the absorptive capacity of through variable ENR and the higher the level of it the higher the economic growth.

There could be continuum levels of foreign direct investment inflows and outflows that deliver 14.1 percent net capital inflows (FDI). The Government could therefore choose any levels of either to deliver net capital inflows that are 14.1 percent to GDP. The broad Government policy could be to minimize capital outflow and maximize capital inflows subject to a constraint of net capital inflow of 14.1 percent of GDP. Or rather, increase the absorptive capacity of the economy to attract FDI greater than 14 per cent.

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Estimating and Forecasting Time Varying Volatility in Consumer Prices: Application of the GARCH Model

Bongani P. Dlamini and Sive Kunene

Abstract

The objective of the study is to estimate and forecast time varying volatility using the most suitable method for modelling and forecasting inflation volatility in Eswatini using monthly data spanning from 1990 to 2018. The study uses the Generalised Autoregressive Conditional Heteroskedasticity (GARCH) model and its extensions, which are the Threshold GARCH (TGARCH), Exponential GARCH (EGARCH), and the GARCH in Mean (GARCH-M) models. In comparing the models, the results reveal that the GARCH is the best model for modelling volatility in headline CPI amongst the four selected models as it has the smallest AIC and SBC values. The statistical significance of the ARCH and the GARCH terms, and that their values are less than one indicates that volatility clustering is persistent in the Eswatini CPI. The GARCH model reveals that headline inflation volatility is mainly driven by “food and non-alcoholic beverages” and the “transport” components followed by housing and utilities. The EGARCH model results also show the presence of an asymmetric effect on the headline inflation volatility. The RMSE, MAE and MAPE and Theil’s coefficient results indicate that the EGARCH model is the best model for forecasting headline inflation volatility both in-sample and out of sample.

Key words: GARCH, Consumer Price Index, Inflation Volatility, Forecasting, Eswatini

1.0 INTRODUCTION

Inflation volatility refers to the fluctuations in any chosen measure of inflation (Samimi & Shahryar, 2009). At Eswatini, headline inflation is measured through the all-items Consumer Price Index (CPI) that is compiled by the Central Statistics Office (CSO) and changes in the year-on-year measure of the CPI characterizes inflation volatility. Generally, the negative effects of inflation volatility on the economy has been widely documented in a number of countries with varying economic structures and monetary policy frameworks. Friedman (1977) asserts that the harmful effects of inflation on economic growth mainly come through inflation volatility. Evidence in this direction is also revealed by Elder (2004) and Rother (2004). Shakin, Bashir and Salam (2014) state that price instability affects investment by making returns from financial assets more uncertain.

Omotosho and Doguwa (2013) notes that internationally there are mixed results on the evidence for autoregressive conditional heteroscedastic (ARCH) effects on inflation; however, there is substantial evidence that countries experiencing higher levels of inflation have higher levels of volatility, which impacts negatively on growth. When inflation is high, interest rates also increase in effort to curb inflation. The higher interest rates dampens demand for credit since it becomes more expensive to borrow money from banks and this affects both investment and consumption.

In recognition of the negative effects of inflation volatility, most central banks have made price stability as part of their primary mandate. In this regard, they have mainstreamed policies which would assist them in arresting domestic drivers of high inflation and thus anchoring inflation expectations at levels in line with price stability. One important aspect of achieving the price stability mandate involves
proper estimation of inflation volatility and understanding its dynamics. Inflation forecasts are crucial in managing monetary policy and hence central banks must acquire accurate inflation forecasts to guide their decision-making (Ahmed & Abdelsalam, 2017 and Arabi, 2014). Soderstrom (2002) points out that the accurate measurement of inflation uncertainty is crucial because higher inflation uncertainty requires policies that are more active.

A number of models for modeling volatility of time series have been developed over the years. Omotosho and Doguwa (2013) and Aridi (2014) asserts that the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) methodology as proposed by Bollerslev (1986) has become one of the most useful methods in modeling volatility of time series data, including consumer price indices. The estimated conditional volatility can serve as a proxy for inflation uncertainty (Arid, 2014). However, time varying volatility models have been used to a limited extent in modelling and forecasting inflation. To the authors’ best knowledge, there is no study which has been done which compares different sets of time varying GARCH models and their ability to forecast inflation volatility in Eswatini and hence this study is conducted. Specifically, the study seeks to determine the most appropriate time varying GARCH model for modelling and forecasting consumer prices in Eswatini. By determining the most appropriate model for modelling and forecasting consumer prices volatility in Eswatini, the study will help contribute towards monetary policy decisions aimed at anchoring inflation expectation.

The remainder of the paper is organized as follows: the next section presents a stylized facts on inflationary trends in Eswatini whiles section 2 presents the review of literature. The methodological approach used by the study is presented on section 3 whiles the results and discussion, and the conclusion are presented in section 4 and Section 5, respectively.

1.1 Eswatini CPI Inflation Subcomponents
Inflation in Eswatini is categorized into 12 subcomponents using the Classification of Individual Consumption by Purpose (COICOP) approach as shown on Table 1. The weights were assigned based on the Eswatini Income and Expenditure Household Survey for 2013. Currently, the major four CPI components as per the weights include food and non-alcoholic beverages (29.22 per cent), housing and utilities (29.15 per cent), transport (10.5 per cent) and education (9.11 per cent).

<table>
<thead>
<tr>
<th>Inflation component</th>
<th>Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food and non-alcoholic beverages</td>
<td>29.22</td>
</tr>
<tr>
<td>Clothing and footwear</td>
<td>0.39</td>
</tr>
<tr>
<td>Housing, water, electricity, gas, and other fuels</td>
<td>29.15</td>
</tr>
<tr>
<td>Furnishing, household equipment and maintenance</td>
<td>4.75</td>
</tr>
<tr>
<td>Health</td>
<td>3.39</td>
</tr>
<tr>
<td>Transport</td>
<td>10.5</td>
</tr>
<tr>
<td>Communication</td>
<td>2.74</td>
</tr>
<tr>
<td>Recreation and culture</td>
<td>1.07</td>
</tr>
<tr>
<td>Education</td>
<td>9.11</td>
</tr>
<tr>
<td>Restaurants and hotels</td>
<td>1.79</td>
</tr>
<tr>
<td>Miscellaneous goods and services</td>
<td>4.47</td>
</tr>
<tr>
<td>Overall inflation</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Central Statistics Office

1.2 Eswatini’ Inflationary Episodes
Figure 2 presents the monthly headline inflation trend for Eswatini from January 1990 to June 2018. Over the review period, there are six notable spikes in inflation. The first upswing was observed in 1990, in part, due to the mini-oil shock in which oil prices drastically increased. A second spike
was observed from 1992-1995 a period in which the country suffered one of its worst drought episodes whiles the third upswing was observed in 2001-2002, partly driven by a weaker exchange rate hence the country suffered from imported inflation.

The 2008-2009 financial crisis also caused a major upswing in headline inflation, in part, driven by higher food prices and supply bottlenecks. The second round effects of the financial crisis also caused another spike in inflation in 2011-2012. The most recent spike in inflation was observed in the year 2015-2016, mainly driven by the El-Nino induced drought which not only hampered food production and supply in the country but also in the region as a whole.

**Figure 2: Eswatini Headline and Food & Non-Alcoholic Beverages CPI**

During this drought period, food inflation urged up from 3.90 per cent in November 2015 to 18.96 per cent in December 2016, a 15.06 percentage point's increase. Post the drought period, headline inflation drastically moderated from 8.68 per cent in December 2016 to 3.95 per cent in March 2018 after which it remained stable. The sharp decline was largely due to a faster moderation in food prices as food inflation fell from 18.96 per cent to -1.33 per cent over the same period.

**2.0 REVIEW OF LITERATURE**

Shaikn, Bashir and Salam (2014) assert that higher inflation volatility makes future inflation more uncertain. They state that higher inflation creates more inflation volatility and since most contracts are in nominal terms, uncertainty about future inflation entails a higher risk premium and results in arbitrary allocation of wealth. This creates higher economic costs and thus has a negative impact on growth. Price instability has a negative effect on investment since it makes returns on financial assets more uncertain (Shaikn, Bashir & Salam, 2014). Ball (1992), and Bashir and Salam (2014) assert that a higher current inflation creates more uncertainty about the level of future inflation.

Shaikn, Bashir and Salam (2014) used a combination of the Autoregressive Integrated Moving Average (ARIMA) model and the GARCH model, including the Glosten, Jagannathan, and Runkle (1993) extension usually referred to as the GJR-GARCH to determine the most appropriate model for modeling the differenced log of CPI for Pakistan. The findings of the study revealed that the ARMA-GARCH is the most appropriate specification for modelling inflation in Pakistan. The ARMA-GARCH results indicated that volatility in headline inflation in Pakistan is largely driven by past variance with the GARCH term having a coefficient of 0.9618 whiles the ARCH term had a coefficient of -0.1075 and both were highly significant at 1 per cent level.

Omotosho and Doguwa (2013) used a family of GARCH models to determine a more parsimonious approximation of dynamics of inflation in Nigeria between 1996 and 2011. The results revealed that the asymmetric Threshold GARCH (TGARCH) provides a more appropriate model for explaining the
dynamics for headline inflation and core CPI volatilities in Nigeria. The GARCH model was found to be more appropriate for food CPI. The TGARCH model results revealed that volatility in headline inflation is mainly driven by new information as captured by the ARCH term with a coefficient of 0.4518 whiles the GARCH term had a coefficient of 0.3843 and were statistically significant at 5 per cent and 10 per cent level, respectively. The EGARCH model results indicate that the headline CPI conditional variance is largely explained by the ARCH term with a coefficient of 0.8411 whiles the GARCH term had a coefficient of 0.5570 and both were statistically significant at 5 per cent level. On the contrary, the GARCH model results revealed that conditional variance in headline CPI in Nigeria is mainly explained by past variance with a GARCH(-1) coefficient of 0.4110 whiles the ARCH term has a coefficient of 0.2549 and were both significant at 5 per cent level.

Ngailo, Luvanda and Massawe (2014) used the ARCH and GARCH models to determine the best fitting model in capturing the stochastic variation in the inflation data in Tanzania using data from 1997 to 2010. The study assessed the goodness of fit using Akaike Information Criterion (AIC), Bayesian Information Creterion (BIC) and the Minimum Standard Error (MSE). The results of the study indicated that the GARCH model is the best model for forecasting inflation in Tanzania. The results revealed that conditional variance in headline inflation in Tanzania is manly driven by past variance with a GARCH term coefficient of 0.5427 whiles the ARCH term had a coefficient of 0.4573 and were both highly significant at 1 per cent level.

Rizvi et al. (2014) posit that there are several ways for measuring inflation volatility and there are still debates on which one is the most appropriate. Like most authors, they state that the most common way to measure inflation volatility is the use of ARCH and GARCH models. They used time varying GARCH models to determine inflation uncertainty in ten Asian countries. They used two GARCH extensions, which are the TGARCH and the Exponential GARCH (EGARCH) models to analyse its asymmetric behavior if it exists at all. The findings of the study revealed that the asymmetric TGARCH and the EGARCH are more effective in capturing volatility compared to the symmetric GARCH. The EGARCH results indicated that inflation volatility in China, Hong Kong, Pakistan, Singapore, South Korea and Thailand is largely driven by past variance than new information with the GARCH coefficient highly significant at 1 per cent for all these countries. The ARCH term was insignificant in Singapore and South Korea.

Based on the AIC and the BIC, Uwilingiyimana, Mungà’tu and Harerimana (2016) found that the TVGARCH performs better than the ARIMA and GARCH models in modelling and forecasting inflation in Kenya, however, a combination of ARIMA-GARCH models was found to be the most appropriate. The GARCH model results indicated that volatility in headline CPI in Kenya is largely driven by past variance with the ARCH term having a coefficient of 1.1836 whiles the GARCH(-1) and GARCH(-2) terms had a coefficients of -0.3031 and 0.2682, respectively. All coefficient were highly significant at 1 per cent level.

3.0 METHODOLOGY AND DATA ANALYSIS

3.1 Methodology
To determine the appropriate model for estimating and forecasting time varying volatility in consumer prices (Headline CPI) in Eswatini, the study compares four models from the GARCH family, namely; GARCH, TGARCH, EGARCH and the GARCH in mean (GARCH-M) model. The study further used the top four CPI subcomponents of CPI,
which were selected based on their weights, to identify the components which drives the volatility in consumer prices. As per the 2013 weighting, the top four CPI subcomponents are; food and non-alcoholic beverages (29.22 per cent), housing and utilities (29.15 per cent), transport (10.5 per cent) and education (9.11 per cent).

3.1.1 Conditional mean equation
Modelling a GARCH model requires that a mean equation be estimated simultaneously with the GARCH model. The mean equation gives the variance and residuals through which the GARCH model is estimated. The mean model for Headline CPI is specified as follows;

\[ \text{CPI}_t = C + \sum_{i=0}^{a} \beta_i \text{CPI}_{t-i} + \varepsilon_t \]  

(1)

Where, CPI\(_t\) is the consumer price index of Eswatini at time \(t\), \(C\) is the constant, CPI\(_{t-i}\) is the consumer price index of Eswatini at time \(t-i\) and \(\varepsilon\) is the error term. Before modeling the GARCH models, the study starts by testing for the presence of auto regressive conditional heteroscedasticity (ARCH) effect in the series using the ARCH test and the Breusch-Pagan-Godfrey test as presented in Asterou and Hall (2007).

3.1.2 Variance Equations

(a) The GARCH Specification
The GARCH(q, p) model as proposed by Bollerslev (1986) arises from modelling the square of the conditional variance of the errors of the mean equation as a function of the past values of itself, as well as past values of the errors and can be presented as follows;

\[ \sigma_t^2 = \alpha_0 + \sum_{j=1}^{q} \alpha_j \varepsilon_{t-j}^2 + \sum_{i=1}^{p} \beta_i \sigma_{t-i}^2 \]  

(2)

Where \(\sigma_t^2\) denotes the conditional variance at time \(t\), \(\alpha_0\) is a constant, \(\alpha_j\) is the ARCH term coefficient and \(\alpha_{t-i}\) is the GARCH term coefficient. \(\alpha_{t-i}\) represent the lagged values of the squared residuals and represent the lagged fitted variance from the model. The condition for a well specified GARCH model is, \(\alpha_0 + \beta_1 < 1\) for covariance stationary.

(b) The Threshold GARCH Specification
The TGARCH is an extension of the GARCH model which Glot et al. (1983) introduced. The TGARCH builds up from the GARCH model by including an additional term, \(\gamma\) which captures possible asymmetries in the data. The TGARCH model specification is as follows;

\[ \sigma_t^2 = \alpha_0 + \alpha \varepsilon_{t-1}^2 + \gamma h_{t-1} \varepsilon_{t-1}^2 + \beta \sigma_{t-1}^2 \]  

(3)

Where \(h_t\) is an indicator function which takes the value of 1 for \(\varepsilon_{t-1}\) and 0 otherwise, \(\gamma\) is the asymmetric parameter, \(\alpha_0\), \(\alpha\) and \(\beta\) are as defined in equation 2. A positive shock (good news) is obtained when \(\varepsilon_{t-1} > 0\) and a negative shock (bad news) is obtained when \(\varepsilon_{t-1} < 0\). Positive shocks have an impact on \(\sigma\) whiles negative shocks have an effect on \(\alpha\) + \(\gamma\) on the conditional variance. If \(\gamma \neq 0\), news impact is asymmetric and if \(\gamma > 0\), there is leverage effect as negative shocks increase volatility more than with an equivalent amount of positive shocks. If the asymmetric parameter \(\gamma\) is zero, the TGARCH reduces to the basic GARCH model.

(c) The Exponential GARCH Specification
The EGARCH model, which was introduced by Nelson and Cao (1991) is another GARCH extension. An EGARCH (q, p) process can be identified as follows;

\[ 
\log \sigma_t^2 = w + \sum_{j=1}^{q} \alpha_j \left( \frac{\varepsilon_{t-j}}{\sigma_{t-j}} \right) + \sum_{j=1}^{q} \beta_j \frac{\varepsilon_{t-j}}{\sigma_{t-j}} + \sum_{i=1}^{p} \beta_j \log \sigma_{t-i}^2 \]  

(4)

Where \(w, \alpha, \beta\) and are parameters to be estimated. \(W\) is the constant, \(\alpha_j\) is the ARCH term coefficient, \(\beta_j\) is the GARCH term coefficient and \(\gamma\) is the asymmetric term. In the EGARCH model specific, on the left hand-side is a log of the variance series,
which makes the leverage effect exponential instead of quadratic. This guarantees that the coefficient of the conditional variance are positive (Asterou and Hall, 2007). If the \( \gamma_1 = \gamma_2 = ... = 0 \), the model is said to be symmetric. If \( \gamma_1 < 0 \), the positive shocks (good news) generate less volatility than negative shocks (bad news).

(d) The GARCH in Mean (GARCH-M)
An introduction of the conditional variance or standard deviation into the mean equation results in a GARCH-in-Mean (GARCH-M) model (Engle, Lilien & Robins, 1987). The specification for the GARCH-M conditional variance is the same as that of equation 3.

3.1.3 Lag order Selection, Diagnostic and Unit Root Tests
The study uses the Akaike Information Criterion (AIC) and Bayesian Information Criterion (BIC) to determine the optimum lag length for the model. After estimation, the models are tested for serial correlation and normality using the LM test and Jarque Bera tests respectively to assess its stochastic properties such residual autocorrelation and model stability. Before the estimations, unit root tests for stationarity will be conducted using the Augmented Dickey Fuller (ADF) test which is the most commonly used in literature.

3.1.4 Forecasting and forecast evaluation
To forecast inflation volatility, the study uses data from January 1990 to December 2016 for in-sample forecasts and for out of sample forecasts it uses data from January 2017 to June 2018. The forecasts were evaluated using the root mean square error (RSME), the mean absolute (MAE) methods, mean absolute percentage error (MAPE) and the Theil coefficient to identify the best model.

3.2 Data Analysis
All data for the study is sourced from Eswatini Central Statistics Office (CSO). For headline CPI, the study uses monthly data spanning from 1990M01 to 2018M06 whiles for the CPI subcomponents it uses data spanning from 2005M12 to 2018M06. The data for subcomponents could not be traced back prior to 2005 since there was a change in the groupings for the subcomponent items.

3.2.1 Descriptive Statistics
The preliminary statistics in Table 2 indicate that the normality hypothesis cannot be accepted for headline CPI. The series has a Jarque-Bera statistic of 27.60162 which is highly significant at 1 per cent, an indication for non-normality. The non-normality for headline CPI could be due to the low kurtosis, which is below 3. The headline CPI also has a positive skewness with a value of 0.528905. The headline CPI series also has high standard deviation of 34.52225, which is an indication for volatility.

3.2.2 Stationarity Test Results
The stationarity test results presented on Table 3 indicate that Education CPI (ECPI) is stationary at levels (p<0.5 per cent). All the other CPIs, namely; headline CPI (HCPI),
food & non-alcoholic beverages (FCPI), CPI for housing & utilities (HUCPI), and CPI for transport (TCPI) are non-stationary at levels and were integrated of order one I(1) (p<0.01 per cent). The data for the non-stationary series are therefore differenced once to make them stationary.

Table 3: Results of Augmented Dickey-Fuller

<table>
<thead>
<tr>
<th>Variables</th>
<th>At levels</th>
<th>First Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>LHCPI</td>
<td>-1.164</td>
<td>-11.580***</td>
</tr>
<tr>
<td>LFCPI</td>
<td>-2.251</td>
<td>-8.1220***</td>
</tr>
<tr>
<td>LHUCPI</td>
<td>0.281</td>
<td>-13.477***</td>
</tr>
<tr>
<td>LTCPI</td>
<td>0.031</td>
<td>-11.852***</td>
</tr>
<tr>
<td>LECPI</td>
<td>0.242</td>
<td>-13.324***</td>
</tr>
</tbody>
</table>

Note: *** denote significance at 1 per cent, otherwise not significant.

4.0 EMPIRICAL RESULTS

4.1 Testing for the ARCH Effect in the Mean Model

Before estimating a GARCH model the prerequisite is to ascertain if there are any ARCH effects in the data series. That is in order to know which models require the ARCH estimation method instead of the OLS. As stated in the methodology, the test can be done along the lines of the Breusch-Pagan test, which entails estimation of the mean equation by OLS to obtain the residuals and then test for the presence of heteroscedasticity in the residuals. The results of the test are shown in the table below.

Table 4: Heteroscedasticity Test results of the Mean Equation

<table>
<thead>
<tr>
<th>Test</th>
<th>F-Static</th>
<th>Probability</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARCH Test</td>
<td>1.826395</td>
<td>0.0434**</td>
</tr>
<tr>
<td>Breusch-Pagan-Godfrey</td>
<td>5.039452</td>
<td>0.0254**</td>
</tr>
</tbody>
</table>

The results on Table 4 indicate the presence of ARCH effects or heteroscedasticity in the residual of the mean equation with both the ARCH Test and the Breusch-Pagan-Godfrey significant at 5 per cent level and therefore the study proceeded to estimate the GARCH models.

4.2 Estimating the GARCH Model

One of the drawbacks of the ARCH specification, according to Engle (1995), was that it looked more like a moving average specification than an autoregression. From this, a new idea was born which was to include the lagged conditional variance terms as autoregressive terms. The appropriate way to obtain a proper order of the GARCH process is to estimate the mean and conditional variance equations simultaneously. As such, GARCH processes are estimated by maximum-likelihood (M-L) techniques so as to obtain estimates that are fully efficient. The GARCH (1, 1) model is the most popular form of conditional volatility from literature, especially for financial data where volatility shocks are very persistent. In that regard the results of the GARCH (1, 1) model are presented below.

Table 5: Headline CPI GARCH Model Results

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>z-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Equation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.005452</td>
<td>0.000647</td>
<td>8.433294</td>
<td>0.00***</td>
</tr>
<tr>
<td>DLHCCI(-1)</td>
<td>0.0516</td>
<td>0.0639</td>
<td>0.8084</td>
<td>0.042**</td>
</tr>
<tr>
<td>Variance Equation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>6.40E-07</td>
<td>4.37E-07</td>
<td>1.463410</td>
<td>0.1434</td>
</tr>
<tr>
<td>RESID(-1)^2</td>
<td>0.033758</td>
<td>0.013200</td>
<td>2.557504</td>
<td>0.011***</td>
</tr>
<tr>
<td>GARCH(-1)</td>
<td>0.956157</td>
<td>0.016692</td>
<td>57.28160</td>
<td>0.00***</td>
</tr>
<tr>
<td>LM Test</td>
<td>F-Statistic</td>
<td>0.386417</td>
<td>0.5346</td>
<td></td>
</tr>
</tbody>
</table>

Note: *** and ** indicate significance at 1 per cent and 5 per cent, respectively.

The LM Test statistic is 0.386417 and it is statistically insignificant thus the null hypothesis of no ARCH effect or heteroscedasticity cannot be rejected. There is therefore no heteroscedasticity in residuals series. The model failed the normality test, with a Jarque-Bera statistic of 18.9 and a probability of 0.00, less than the rule of thumb of 0.5. However, it is an
inherent feature of the errors from regression models for financial data.

From the estimations, the variables of interest are the sums of the coefficients of the RESID (-1)^2, which is 0.03 and the GARCH(-1) which is 0.96 and are both statistically significant. These coefficients are statistically significant and their sum is 0.99 which is very high and close to one. This implies that volatility of inflation is persistent in Eswatini, meaning that the volatility today is close to the volatility in the period before and shocks to the time series die rather slowly. Furthermore the response of the conditional variance to new information (captured by the coefficient of RESID (-1)^2) is very low at 0.03 compared to the autoregressive (captured by GARCH(-1)) persistence of the conditional variance at 0.96. The volatility clustering is obvious from the Figure 3 as inflation exhibits significant periods of high volatility followed by relatively more tranquil periods of low volatility.

![Figure 3: Headline CPI Volatility](image)

From Figure 3, evidence of volatility is observed in the periods around 1998, 2002 and 2008. Unsurprisingly, these periods correspond with 1998 Asian crisis, 2002 dot com bubble and terrorism crisis in the United States, and the 2008 world financial crisis. Furthermore, most volatility was observed from 2001 when South Africa introduced inflation targeting regime, which is associated with currency volatility. The volatility of inflation also follows that of exchange rate, high in times of financial turbulences, and otherwise calm.

### 4.3 Volatility of the components of inflation

The major components of CPI inflation in Eswatini are Food and non-alcoholic beverages (29.22%), Housing and utilities (29.15%), transport (10.50%), and Education (9.11%). These components are also modelled with the GARCH to identify the major contributor to the volatility in the headline inflation.

#### Table 6: GARCH Estimations of the components of CPI

<table>
<thead>
<tr>
<th>Variable</th>
<th>Food &amp; Non-alcoholic Beverages</th>
<th>Housing &amp; Utilities</th>
<th>Transport</th>
<th>Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean Equation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>0.0044***</td>
<td>0.0056</td>
<td>0.0054*</td>
<td>0.0056*</td>
</tr>
<tr>
<td>DLT CPI(-1)</td>
<td>0.381***</td>
<td>0.0053*</td>
<td>0.229**</td>
<td>0.0504*</td>
</tr>
<tr>
<td>Variance Equation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>3.45E-05</td>
<td>0.000119</td>
<td>6.85E-05</td>
<td>0.00626*</td>
</tr>
<tr>
<td>RESID(-1)^2</td>
<td>0.6555**</td>
<td>0.022***</td>
<td>0.0263</td>
<td>0.1092**</td>
</tr>
<tr>
<td>GARCH(-1)</td>
<td>0.1533*</td>
<td>0.5938*</td>
<td>0.7883***</td>
<td>0.1698*</td>
</tr>
<tr>
<td>RESID(-1)^2 + GARCH(-1)</td>
<td>0.81</td>
<td>0.62</td>
<td>0.81</td>
<td>0.27</td>
</tr>
</tbody>
</table>

**Note:** ***, ** and * indicate significance at 1 per cent 5 per cent and 10 per cent, respectively.

From the models, all the coefficients to the autoregressive parameter of the mean equations are less than one, implying the systems are covariance stationary. Moreover, the sum of conditional variance parameters in all the models are less than one and statistically significant, but not very high. This implies differing volatility persistency in each model. For food and non-alcoholic beverages CPI, the results indicate that its conditional variance is largely driven by new information than past variance with the
RESID(-1)^2 having a coefficient of 0.655525 whiles the GARCH(-1) term had a coefficient of 0.153359. The RESID(-1)^2 coefficient is statistically significant at 5 per cent level whiles the GARCH(-1) is weakly significant at 10 per cent level. Housing and utilities CPI volatility is mainly explained by past variance with the GARCH(-1) term having a coefficient of 0.593866 which is significant at 10 per cent level whiles the RESID(-1)^2 coefficient is 0.021819 per cent and is significant at 1 per cent level. Similarly, transport CPI volatility is also largely driven by past variance with the GARCH(-1) term having a coefficient of 0.788364 which is significant at 1 per cent level whiles the RESID(-1)^2 coefficient is 0.026376 and insignificant. Education CPI volatility is explained by past volatility with a GARCH(-1) coefficient of 0.169858 which is significant at 10 per cent level whiles the RESID(-1)^2 coefficient is 0.109201 and is significant at 5 per cent level.

The sum of the coefficients of RESID(-1)^2, and GARCH(-1) parameters, given as in the last row, shows 0.81 for Food and non-alcoholic beverages, as well as Transport components. This implies that volatility in the headline inflation is mostly driven by the two components, followed by Housing and Utilities at 0.62, with the lowest contributor being 0.27 for Education.

### 4.4 Modelling the GARCH Extensions

A major restriction to the ARCH and GARCH specifications is the fact that they are symmetric, meaning what matters is the absolute value of the innovation and not its sign. Thus in ARCH/GARCH models a big positive shock will have exactly the same effect in the volatility of the series as a big negative shock of the same magnitude. The study continues to model Eswatini CPI using three extensions of the GARCH model. These extensions are the GARCH in mean (GARCH - M) model, which allow the conditional mean to depend on its own conditional variance; The TGARCH whose main target is to capture asymmetries in terms of negative and positive shocks; and the Exponential GARCH (EGARCH) model, will be used as to further support the results obtained from the TGARCH model. Just like the TGARCH, the EGARCH model allows for the testing of asymmetries or leverage effects. The results of these GARCH extensions for headline CPI are shown below.

### Table 7: Summary of the Headline CPI Volatility Models and Characteristics

<table>
<thead>
<tr>
<th></th>
<th>GARCH</th>
<th>GARCH-M</th>
<th>TGARCH</th>
<th>EGARCH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Mean Equation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>C(constant)</strong></td>
<td>0.001***</td>
<td>0.020***</td>
<td>0.001***</td>
<td>0.001***</td>
</tr>
<tr>
<td><strong>DLHCPI(-1)</strong></td>
<td>0.663***</td>
<td>0.083***</td>
<td>0.662***</td>
<td>0.672***</td>
</tr>
<tr>
<td><strong>ω(RSID(-1)^2)</strong></td>
<td>0.033870*</td>
<td>0.052423***</td>
<td>0.044762*</td>
<td>0.214398**</td>
</tr>
<tr>
<td><strong>β(GARCH)</strong></td>
<td>0.918***</td>
<td>0.709***</td>
<td>0.928***</td>
<td>-0.549**</td>
</tr>
<tr>
<td><strong>γ(Asymmetry)</strong></td>
<td>-</td>
<td>-</td>
<td>-0.028</td>
<td>-0.127**</td>
</tr>
<tr>
<td><strong>Persistence</strong></td>
<td>0.952</td>
<td>0.76148</td>
<td>0.973</td>
<td>0.781878</td>
</tr>
<tr>
<td><strong>AIC</strong></td>
<td>-7.273</td>
<td>-7.267905</td>
<td>-7.268</td>
<td>-7.265082</td>
</tr>
<tr>
<td><strong>SBC</strong></td>
<td>7.215</td>
<td>7.198676</td>
<td>7.199</td>
<td>7.195983</td>
</tr>
</tbody>
</table>

Note: ***, ** and * indicate significance at 1 per cent, 5 per cent and 10 per cent level, respectively.

### 4.5 GARCH-M results

The results for a GARCH-M model based on the specification that uses the variance series to capture risk in the mean equation were found to be insignificant. Re-estimating the model but using the Standard Deviation from the ARCH-M part to include the conditional standard deviation in the mean equation, we got the results presented in the last column of Table 7. In the results the conditional standard deviation (SQR (GARCH)) coefficient is significant, suggesting that the standard deviation better captures an effect of the risk on the mean return. Furthermore, the coefficient to the autoregressive parameter of the mean equation, 0.083, which is less than one, implying the system is covariance stationary.
The results further indicate that the conditional variance in headline CPI is mainly driven by past variance than new information with the GARCH(-1) term having a coefficient of 0.709459 whiles the RESID(-1)^2 has a coefficient of 0.052423 and were both highly significant at 1 per cent level. The sum of conditional variance parameters is 0.76 which is less than one, indicating moderate volatility in Eswatini CPI.

4.6 Threshold GARCH
The TGARCH model results in Table 7 indicate that conditional variance in headline CPI is mainly driven by past variance than new information with the GARCH(-1) term having a coefficient of 0.928557 whiles the RESID(-1)^2 has a coefficient of 0.044762. The GARCH(-1) term is highly significant at 1 per cent whiles the RESID(-1)^2 term is weakly significant at 10 per cent level. The main target of this model is to capture asymmetries in terms of negative and positive shocks. To do that it simply adds into the variance equation a multiplicative dummy variable to check whether there is statistically significant difference when shocks are negative. The threshold term (γ) is negative and statistically insignificant, which shows that for the Eswatini CPI there are no asymmetries in the news as far as the TGARCH is concerned which implies that bad news has equal effects on the volatility of the series as good news. However, the persistence of volatility is also high as shown by the sum of the ARCH and GARCH coefficients, which is at 0.97 and less than one and covariance stationary.

4.7 The Exponential GARCH
The EGARCH model allows for the testing of asymmetries just like the TARCH, however the variance series are in logs which makes the leverage effect exponential instead of quadratic, and therefore the estimates of the conditional variance are guaranteed to be non-negative. The results in Table 7 indicate that conditional variance in headline CPI is mainly driven by past variance with the GARCH(-1) having a coefficient of -0.549795 whiles the RESID(-1)^2 term had a coefficient of 0.214398 and were both significant at 5 per cent level. The coefficient of the RES/SQR[GARCH](l) term is negative and statistically significant, that for Eswatini CPI asymmetries exists as far as the EGARCH is concerned and bad news has larger effects on the volatility of the series than good news. The sum of conditional variance parameters is 0.78 which is less than one, indicating moderate volatility in Eswatini CPI.

4.8 Forecasting Volatility
The estimated models, which are the GARCH, GARCH-M, TGARCH, and EGARCH, were then used for forecasting volatility both in-sample (1990M1 to 2016M12) and out-of-sample (2017M1 to 2018M6) with the aim of identifying the best forecasting model among them. The forecast results are evaluated using the Root Mean Squared Error (RMSE), Mean Absolute Error (MAE), Mean Absolute Percentage Error (MAPE), and the Theil’s Coefficient to find the best forecasting model. The model with the lowest value of is selected as the best model for forecasting inflation volatility.

Table 8: In-sample Forecasts (1990M1 - 2016M12)

<table>
<thead>
<tr>
<th>Model</th>
<th>RMSE</th>
<th>MAE</th>
<th>MAPE</th>
<th>Theil</th>
</tr>
</thead>
<tbody>
<tr>
<td>GARCH</td>
<td>0.006072</td>
<td>0.004796</td>
<td>287.2268</td>
<td>0.434217</td>
</tr>
<tr>
<td>GARCH-M</td>
<td>0.006083</td>
<td>0.004818</td>
<td>302.3490</td>
<td>0.429172</td>
</tr>
<tr>
<td>TGARCH</td>
<td>0.005507</td>
<td>0.004350</td>
<td>275.0152</td>
<td>0.384635</td>
</tr>
<tr>
<td>EGARCH</td>
<td>0.005500</td>
<td>0.004338</td>
<td>272.6839</td>
<td>0.384690</td>
</tr>
</tbody>
</table>

From the results in Table 8, it is evident that the EGARCH is the best model in forecasting headline inflation volatility in-sample, followed by the TGARCH. That is because the model has the smallest value (grey cells) in most of the tests, except for the Theil’s coefficient, which selects the TGARCH.
However the TGARCH came second as it has the second smallest values (blue cells).

Table 9: Out of sample Forecasts (2017M1 - 2018M6)

<table>
<thead>
<tr>
<th></th>
<th>GARCH</th>
<th>GARCH-M</th>
<th>TGARCH</th>
<th>EGARCH</th>
</tr>
</thead>
<tbody>
<tr>
<td>RMSE</td>
<td>0.008175</td>
<td>0.008184</td>
<td>0.008183</td>
<td>0.008160</td>
</tr>
<tr>
<td>MAE</td>
<td>0.006152</td>
<td>0.006187</td>
<td>0.006175</td>
<td>0.006153</td>
</tr>
<tr>
<td>MAPE</td>
<td>249.9937</td>
<td>251.5803</td>
<td>251.2830</td>
<td>249.7893</td>
</tr>
<tr>
<td>Theil</td>
<td>0.426607</td>
<td>0.425882</td>
<td>0.426621</td>
<td>0.424334</td>
</tr>
</tbody>
</table>

The results from Table 9 reveal that the EGARCH model is the best in forecasting headline inflation volatility out of sample as evidenced by its lower values of all the tests compared to the other models and it is followed by the GARCH, which has the lowest values for the RMSE and MAPE.

5.0 CONCLUSION AND POLICY RECOMMENDATIONS

The study modelled and forecasted inflation volatility in Eswatini’s headline CPI in an effort to understand the inflation dynamics between the year 1990M01 and 2018M06 using the GARCH, TGARCH, EGARCH, and the GARCH-M models. In comparing the models, the results revealed that the GARCH is the best model for modelling volatility in headline CPI amongst the four selected models as it has the smallest AIC and SBC values (more negative). The statistical significance of the ARCH and the GARCH terms, and that their values are less than one indicates that volatility clustering is persistent in the Eswatini CPI and shocks do not die out quickly. When the GARCH model was estimated for the components of the CPI, the results show that headline inflation volatility is driven by “food and non-alcoholic beverages” followed by “transport” components. The EGARCH results also revealed the presence of an asymmetric effect on the headline inflation volatility.

Amongst the four models selected, the EGARCH model was found to be the best model in forecasting headline inflation volatility in-sample followed by the TGARCH model. The results further shows that the EGARCH model outperform all the other models in forecasting headline inflation out of sample. Monetary policy authorities can therefore use either an EGARCH or the TGARCH to model and forecast inflation volatility both in-sample and out of sample.

REFERENCES


Zana Mabuza and Ntobeko Dlamini

Abstract

This paper examines the relationship between the development of the financial sector and economic growth in Eswatini. Two measures of financial development considered by existing empirical literature were used and these include the ratio of money supply (M2) and private sector credit (PSCR) to GDP respectively. By employing the vector error correction mechanism (VECM), the study sought to establish the long run and short relationship among the variables. The study further uses the Granger causality to test for the direction of causality among the variables through VECM framework. The empirical results indicate the existence of short and long run unidirectional relationship running from financial development to economic growth. This suggests that an improvement of the financial sector in Eswatini drives economic growth.

Keywords: Financial Development, Economic Growth, VECM, Granger Causality.

1.0 INTRODUCTION

The monetization of an economy and invariably the development of the financial sector are without question the burning issue linked to economic growth even though there is disagreement about how the two (financial sector development and economic growth) variables are linked. Opposing economic views have sparked a debate of whether the relationship runs from financial sector to economic growth or visa-a-versa (Tesso, 2015). The views held have thus been classified into two perspectives that can be categorized into the supply and demand hypotheses.

Proponents of the supply leading hypothesis argue that financial development has positive effect on economic growth. In essence, the hypothesis pre-supposes that a well-developed and active banking system plays an important role in providing funding necessary to stimulate economic growth (Schumpeter, 1912). Patrick (1966) echoed the same view and adds that a well-developed financial sector not only stimulates funding towards economic growth but also facilitates financial transactions and mobilizes savings. Contrary to the supply side hypothesis, the demand side hypothesis postulates that expansion in the economy creates demand for financial services and that financial intermediaries are effectively a response to these demands and changes. In other words, this hypothesis suggests a growth-led finance relationship. In accordance with this view, Robinson (1952) claimed that ‘where enterprise leads finance follows and not vice versa.

Empirical findings on the study of the relationship between financial development and economic growth in various countries remain inconclusive with no clear consensus about the direction of the relationship. Majid (2008), Giri and Mohapatra (2012) found that there exists unidirectional causality running from financial development to economic growth while other researchers (Al-Qudah, 2016; Vazakidis and Adamopoulos, 2011) found there to exist bidirectional causal relationship running from financial development to economic growth and from economic growth to financial development. These inconclusive findings as Majid (2008) puts it could be due to a number of reasons which include different set of data, methodology and sample period.
This study examine the causal and dynamic relationship between financial development and economic growth during the period 1980 to 2016 by adopting the Granger causality test through the vector error correction model (VECM). The rest of the paper is organized as follows; section 2 provides an overview of the financial sector in Eswatini; section 3 provides a brief review of empirical literature; section 4 discusses the research methodology; section 5 is the empirical analysis and discussion of results; section 6 concludes the study with policy recommendations.

2.0 FINANCIAL SECTOR AND ECONOMIC GROWTH IN ESWATINI

Eswatini has a small but highly diversified and developing financial sector, generally dominated by the non-banking sector. The banking sector, composed of 4 commercial banks with 74 branches across the country, remains well capitalized and profitable financial system, with South African banks accounting for a larger share of the market. The whole system is regulated by the Central Bank of Eswatini (CBE). In an endeavour to develop the financial sector in Eswatini, the Ministry of Finance together with the Central Bank of Eswatini and the Financial Services Regulatory Authority came up with a financial development plan of 2017-2019. Having identified a number of gaps in the prevailing system, the plan mainly seeks to deliver a stable, diverse, modern and inclusive financial sector. The over-riding priorities of the plan are to strengthen the commercial banking system and improve its competitiveness, enhance rural financial access through microfinance institutions and community banks, and strengthen the enabling environment through the legislative, regulatory and policy infrastructure (Financial Sector Development Implementation Plan, 2017).

In Figure 1, we show graphically the relationship between the measures of financial sector development (which are broad money supply (M2) to GDP and private sector credit (PSCR) to GDP) and GDP in Eswatini. The M2 to GDP ratio (M2/GDP) shows that financial depth has been steadily increasing since 1980 while GDP has been decreasing over the years. The country enjoyed some double digit GDP growth in the period 1986 to 1990, recording an average growth of 11.1 percent, benefitted from big investments, but then suffered under major exodus of companies post 1994 (RSA independence year). The increase in M2/GDP in latter years of the study period, was backed by growth in money supply due to an increase in net foreign assets in 2016 while GDP growth was slowed by drought conditions, loss of international markets and closure of major mining activity in the latter years of the study. Generally, the M2/GDP ratio has been growing faster than GDP during the study period.

Figure 1: Trend in Financial Sector Development and GDP Growth Rate (1981-2016)

The PSCR/GDP has also been increasing steadily between 1980 and 2016, but was
generally slower than that of the economic growth. In this ratio, a peak of an average of 17.7 per cent is noted during the period 2003-2004 following a rise in private sector credit that was supported by the lower lending rates in that period. In the second half of the study period, the PSCR/GDP ratio acts as a leading indicator to GDP, where growth in the ratio would often lead to growth in the GDP in the short-term.

3.0 LITERATURE REVIEW
Empirical evidence on the link between financial development and economic growth is vast across countries and regions providing mixed findings on the direction of causality. In line with theoretical underpinnings, some studies are found to be in agreement with either or both supply leading and demand following hypotheses. Several studies have supported the supply-leading hypothesis. For example, a study by Kiprop (2015) revealed that financial development exerts a positive and statistically significant effect on economic growth in Kenya hence confirming the supply-leading hypothesis.

The granger causality test results by Tesso (2015) when investigating the direction of causality between economic growth and financial development also revealed the existence of causality running from financial sector to economic growth in Ethiopia.

Balago (2014) empirically investigated the relationship between financial sector development measured by banking sector credits, total market capitalization and foreign direct investment and Economic Growth in Nigeria. Using a VECM the study indicated that financial development had a positive and significant impact on economic growth. Ali et al (2014) used the VECM to study the relationship between financial sector development and growth in Pakistan. From the analysis, the study revealed that there was long run association among the inflation, credit to private sector, deposits, foreign direct investment, domestic savings and economic growth. The study thus supported the “supply-leading” hypothesis in Pakistan economy.

Karbo and Adamu (2011) examined the relationship between financial development and economic growth in Sierra Leon over the period 1970-2008. Using the Autoregressive Distributed Lag (ARDL) model, the results indicated that financial development exerts a positive and significant effect on economic growth.

Giri and Mahapatra (2012) used the multi-variate VAR to test for the existence of the supply-leading and demand following hypotheses in India. The result from vector error correction models revealed the presence of a supply leading hypothesis for the Indian economy. Kiteng (2013) also investigated the causal relationship between financial development and economic growth in South Africa. By using the pair wise Granger causality test under the VECM the results revealed to facts. Firstly, the economic growth Granger causes the financial development. Secondly, there exist long-run and short-run causality relationships from economic growth to bank assets.

Ogunyiola (2013) studied the long run and short run dynamics between financial development and economic growth in Cape Verde for the period 1980-2011 through the Johansen and Juselius approach to long run cointegration. The results presented by this study revealed a uni-directional causal relationship running from financial development to economic growth when money supply was used while a bi-directional relationship existed when domestic credit provided by commercial banks was used.

Sibindi and Bimha (2014) made a contrary finding when investigating the causal relationship between banking sector development and economic growth in
Zimbabwe. Using the Granger causality test based on a vector error correction model, they established a long-run relationship between economic growth and banking sector development. The study thus concluded that economic growth spurred banking sector development in Zimbabwe which was consistent with the “demand following” finance-growth hypothesis. In the same vein, Best and Francis (2015) examined the question of whether financial development is supply-leading or demand-following in Barbados, using the Granger causality approach within a multivariate framework. Findings of this study supported the demand-following hypothesis in the short-run.

Mutlugün (2014) analysed the relationship from a Turkish experience through a Vector Auto regression and Granger causality test using quarterly time series data from 1988 to 2012. Two variables namely; private credit as a share of gross domestic product (GDP) and private credit as a share of domestic credit were used to proxy financial development while real GDP proxied economic growth. The empirical results of the study showed that the demand-following hypothesis was valid for the Turkish economy.

Using the VECM framework Akinlo and Egbetunde (2010) studied the causal relationship between financial development and economic growth for ten Sub-Saharan African countries. The results from this study revealed a two-way causal relationship for countries such as Chad, South Africa, Kenya, Sierra Leon and Eswatini. The other five countries presented a case of unidirectional causality indicating that financial development promotes economic growth.

More recently, Odo et al (2016) analyzed the relationship between financial development and economic growth in Nigeria and South Africa. Using the VECM and granger causality tests, the study found unidirectional causality running from financial development to economic growth in both Nigeria and South Africa validating the supply-leading hypothesis of financial development developed by Patrick (1966).

4.0 METHODOLOGY AND DATA ANALYSIS

The study uses annual time series data covering the period 1980-2016. Data for this study has been sourced from the Central Bank of Eswatini. Focus of the study and analysis is on bank-based data; aggregate data collected from the four commercial banks operating in the Kingdom of Eswatini. The study uses time series data on the selected variables; GDP, Money Supply (M2), Private Sector Credit (PSKR), Inflation (CPI) and Prime Lending Rate (PR). To test the relationship between financial development and economic growth in this paper, the variables are subjected to stationarity tests in order to determine whether there is unit root or not. A graphical presentation of the variables is presented in Figure 2. Looking at the variables, there may be some evidence of possible non-stationarity of the variables. Applying formal unit root tests, the Augmented Dickey-Fuller (ADF) test and the Phillip Perron (PP) tests were used. Table 1 presents the results of the ADF and PP test at levels and first difference for all the variables. The results from the table indicate that all the variables are stationary after first difference.

---

Central Africa Republic, Chad, Democratic Republic of Congo, Gabon, Kenya, Nigeria, Sierra Leon, South Africa, Eswatini and Zambia.
Applying formal unit root tests, the Augmented Dickey-Fuller (ADF) test and the Phillip Perron (PP) test are used. Looking at the variables, there is a need to determine whether there is a unit root or not. The variables are subjected to stationarity tests in order to investigate the trend and the forecast. The study uses time series data on the selected variables sourced from the Central Bank of Eswatini. Focus of the study and analysis is on bank lending. The development and economic growth is thus written in twofold as the:

\[ \text{GDP} = \text{FD} \]  
\[ (2) \]

where GDP represents real gross domestic product at time \( t \) and FD denotes the variables representing indicators of financial development. The functions are then presented in log linear econometric format as:

\[ \log GDP_t = \beta_0 + \beta_1 \log FD_t + \beta_2 \text{INF}_t + \beta_3 \text{PR}_t + \varepsilon_t \]  
\[ (3) \]

where financial development (FD) is captured by real money supply as a ratio of real GDP (M2/GDP) and real private sector credit as a ratio of real GDP (PSCR/GDP). In addition to the above-indicated variables representing financial development and economic growth, inflation rate (INF) and the prime lending rate (PR) are included as control variables. \( \beta_0 \) is the intercept, \( \beta_1, \beta_2, \beta_3 \), denote coefficients for the estimation parameters and \( \varepsilon_t \) is the error term.

To estimate the relationship between the economic growth and financial development, the Vector error correction model (VECM) is employed. The VECM as special form of a Vector Autoregressive (VAR) model is very useful in the analysis of multivariate time-series data and is an extension of the univariate Autoregressive model. The VAR model has been useful in describing dynamic interrelationship of financial and economic variables and forecasting. Financial and economic variables tend to have bidirectional relationships. The general VAR(p) model has many parameters, and they may be difficult to interpret due to complex interactions and feedback between the variables in the model. According to Eryigit (2012) and Toraman et al (2011), if the time series are stationary at level the VAR model is used.

However, if the variables are not stationary at levels and the cointegration equations are statistically significant the VECM becomes appropriate. In order to investigate the

This study seeks to empirically establish if either or both of the hypotheses, namely the demand following or supply leading hypotheses do exist in Eswatini or not. Following Pal (2014), the functional specification for the model examining the relationship between financial sector development and economic growth is thus written in twofold as the:

\[ \text{Demand Following Condition:} \]  
\[ \text{FD} = \text{f(GDP)} \]  
\[ (1) \]

\[ \text{Supply Leading Condition:} \]  
\[ \text{GDP} = \text{f(FD)} \]  
\[ (2) \]

where financial development (FD) is captured by real money supply as a ratio of real GDP (M2/GDP) and real private sector credit as a ratio of real GDP (PSCR/GDP). In addition to the above-indicated variables representing financial development and economic growth, inflation rate (INF) and the prime lending rate (PR) are included as control variables. \( \beta_0 \) is the intercept, \( \beta_1, \beta_2, \beta_3 \), denote coefficients for the estimation parameters and \( \varepsilon_t \) is the error term.

To estimate the relationship between the economic growth and financial development, the Vector error correction model (VECM) is employed. The VECM as special form of a Vector Autoregressive (VAR) model is very useful in the analysis of multivariate time-series data and is an extension of the univariate Autoregressive model. The VAR model has been useful in describing dynamic interrelationship of financial and economic variables and forecasting. Financial and economic variables tend to have bidirectional relationships. The general VAR(p) model has many parameters, and they may be difficult to interpret due to complex interactions and feedback between the variables in the model. According to Eryigit (2012) and Toraman et al (2011), if the time series are stationary at level the VAR model is used.

However, if the variables are not stationary at levels and the cointegration equations are statistically significant the VECM becomes appropriate. In order to investigate the
relationship between financial development and economic growth, we employed the granger causality test via the vector error correction model (VECM).

The Granger causality test is conducted to check for the direction of the linkage between financial development and the economic growth. From the results produced by the VECM, the Granger procedure is selected to check for the short run and long run causal relationship between GDP and the variables of financial development. The granger causality results are based on four possible outcomes. The first outcome postulates that neither variable granger causes the other while the second points to a unidirectional relationship where X granger causes any of the FD variables. We also expect to test a relationship where there is bidirectional causality between economic growth and financial development.

To test whether there exist long run equilibrium between financial development and economic growth in Eswatini, the study employs the maximum likelihood criteria developed by Johansen and Juselius (1990) and Johansen (1991) known as the Johansen Cointegration Test. The Johansen cointegration offers two tests, the trace and eigenvalue test with the view to identifying the number of cointegrating relationships.

To avoid an over parameterization of the specified model (equation 3), a more parsimonious model using the lag selection criteria is necessary (Ali, 2016). The optimum lag length is determined through an unrestricted VAR which further helps to test for the number of cointegrating relationships among the variables. Much focus is on the link between financial deepening indicators and economic growth. After establishing the optimum lag length, the study proceeds to test for long-run relationship using the Johansen and Juselius co-integrating approach developed by Johansen (1991).

5.0 EMPIRICAL RESULTS

The unrestricted cointergrating vector with normalized co-integrating coefficients was estimated; the results are presented in Table 2. Specifically, the results reveal that there is strong positive and significant relationship between the ratio of broad money supply to GDP (M2) and real gross domestic product (GDP). All things held constant, the study shows that a one per cent point increase in M2 raises real GDP by 0.51 per cent indicating that the level of financial depth stimulates economic growth in Eswatini. Equally the results indicate that real private sector credit has positive impact on GDP though the result is insignificant. This therefore means that there is long run positive relationship between economic growth and financial deepening variables in the model. As expected, the money market interest rate (PSCR) is significant and negatively related to GDP. This result implies that a rise in prime lending rate reduces economic growth by 0.01 per cent. It is important to also note that inflation carries an insignificant negative sign indicating? the negative price effect on growth.

Table 2: Normalized Cointegration Coefficients

<table>
<thead>
<tr>
<th>Variable(s)</th>
<th>Log(M2(-1))</th>
<th>Log(PSCR(-1))</th>
<th>INF(-1)</th>
<th>PR(-1)</th>
<th>Constant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Coefficient</td>
<td>1</td>
<td>0.509</td>
<td>0.088</td>
<td>-0.003</td>
<td>-0.01</td>
</tr>
<tr>
<td>Standard Error</td>
<td>-0.060</td>
<td>-0.0718</td>
<td>-0.010</td>
<td>-0.006</td>
<td></td>
</tr>
<tr>
<td>t-statistic</td>
<td>[8.55]</td>
<td>[1.227]</td>
<td>[0.272]</td>
<td>[2.166]</td>
<td></td>
</tr>
</tbody>
</table>

Since long run cointegration between variables of financial development and economic growth has been identified, the study proceeds to establish the speed of adjustment towards long run equilibrium using the short run error correction mechanism (ECM) through the VECM approach. Table 3 shows the results of the short run relationship among the variables and further reveals the coefficient of short run speed of adjustment of the independent variables (ECM).
### Table 3: Short Run Coefficient Estimates

<table>
<thead>
<tr>
<th>Variable(s)</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECT(-1)</td>
<td>-0.242</td>
<td>0.028</td>
<td>-8.655</td>
<td>0.000*</td>
</tr>
<tr>
<td>Δ(Log GDP(-1))</td>
<td>0.0424</td>
<td>0.125</td>
<td>0.338</td>
<td>0.740</td>
</tr>
<tr>
<td>Δ(Log GDP(-2))</td>
<td>0.111</td>
<td>0.105</td>
<td>1.059</td>
<td>0.306</td>
</tr>
<tr>
<td>Δ(Log GDP(-3))</td>
<td>-0.162</td>
<td>0.092</td>
<td>-1.531</td>
<td>0.147</td>
</tr>
<tr>
<td>Δ(Log M2(-1))</td>
<td>-0.033</td>
<td>0.022</td>
<td>-1.526</td>
<td>0.148</td>
</tr>
<tr>
<td>Δ(Log M2(-2))</td>
<td>0.111</td>
<td>0.105</td>
<td>1.059</td>
<td>0.306</td>
</tr>
<tr>
<td>Δ(Log M2(-3))</td>
<td>-0.162</td>
<td>0.106</td>
<td>-1.531</td>
<td>0.153</td>
</tr>
<tr>
<td>Δ(Log PSCR(-1))</td>
<td>0.0895</td>
<td>0.023</td>
<td>3.851</td>
<td>0.001*</td>
</tr>
<tr>
<td>Δ(Log PSCR(-2))</td>
<td>-0.005</td>
<td>0.028</td>
<td>-0.185</td>
<td>0.856</td>
</tr>
<tr>
<td>Δ(Log PSCR(-3))</td>
<td>0.0895</td>
<td>0.023</td>
<td>3.851</td>
<td>0.001*</td>
</tr>
<tr>
<td>Δ(PR(-1))</td>
<td>-0.0062</td>
<td>0.002</td>
<td>-3.289</td>
<td>0.005*</td>
</tr>
<tr>
<td>Δ(PR(-2))</td>
<td>0.007</td>
<td>0.001</td>
<td>6.477</td>
<td>0.000*</td>
</tr>
<tr>
<td>Δ(PR(-3))</td>
<td>-0.008</td>
<td>0.0013</td>
<td>-6.057</td>
<td>0.000*</td>
</tr>
<tr>
<td>Δ(INF(-1))</td>
<td>-0.000</td>
<td>0.001</td>
<td>-0.778</td>
<td>0.449</td>
</tr>
<tr>
<td>Δ(INF(-2))</td>
<td>-0.002</td>
<td>0.001</td>
<td>-2.219</td>
<td>0.042*</td>
</tr>
<tr>
<td>Δ(INF(-3))</td>
<td>-3.750</td>
<td>0.000</td>
<td>-0.005</td>
<td>0.996</td>
</tr>
<tr>
<td>CONSTANT</td>
<td>0.050</td>
<td>0.006</td>
<td>7.793</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

From Table 3, the results indicate that the error correction term (ECT) lagged by one year is statistically significant and carries the expected negative sign which confirms that there exist long run equilibrium relationship running from financial development indicators, interest rates and inflation rate to economic growth at 5 per cent level of significance.

Given the results of the VECM in Table 3 which found there to exist both long run and short run relationship between the variables specified in the model, the study proceeds to conduct short run Granger causality test. Table 4 shows the Granger causality test results for each equation specified by the corresponding dependent variable and error correction term ECT(-1).

### Table 4: Granger Causality/Block Exogeneity Wald Test Results

<table>
<thead>
<tr>
<th>Dependent Variables</th>
<th>Explanatory Variables</th>
<th>Explanatory Variables</th>
<th>ECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔLogGDP</td>
<td>ΔLogGDP</td>
<td>ΔLogM2</td>
<td>ΔLogPSCR</td>
</tr>
<tr>
<td></td>
<td>-31.06*</td>
<td>17.26*</td>
<td>6.84</td>
</tr>
<tr>
<td></td>
<td>(0.00)</td>
<td>(0.00)</td>
<td>(0.08)</td>
</tr>
<tr>
<td>ΔLogM2</td>
<td>4.30</td>
<td>-2.91</td>
<td>2.99</td>
</tr>
<tr>
<td></td>
<td>(0.23)</td>
<td>(0.41)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>ΔLogPSCR</td>
<td>1.66</td>
<td>5.26</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>(0.65)</td>
<td>(0.15)</td>
<td>(0.10)</td>
</tr>
<tr>
<td>ΔINF</td>
<td>0.19</td>
<td>3.14</td>
<td>3.47</td>
</tr>
<tr>
<td></td>
<td>(0.98)</td>
<td>(0.37)</td>
<td>(0.32)</td>
</tr>
<tr>
<td>ΔPR</td>
<td>4.95</td>
<td>5.09</td>
<td>2.71</td>
</tr>
<tr>
<td></td>
<td>(0.18)</td>
<td>(0.16)</td>
<td>(0.44)</td>
</tr>
</tbody>
</table>

Note: Numbers in parentheses denote probability values, *indicates significance at 5% statistical level.

With GDP as the dependent variable, Table 4 indicates that there is short run causality running from real money supply (M2), real private sector credit (PSCR) and interest rate (PR) to real gross domestic product (GDP). The significance of the error correction term coefficient confirms that all the variables identified granger cause GDP in the long run. Based on the ratio of money supply and private sector credit to GDP as dependent variables, the Granger causality test results reveal that there is no significant causal relationship running from the explanatory variables to either of the two dependent variables. The insignificance of the error correction term also reveals that there exist no long run causal relationship between the two variables and its independent variables, implying that private sector credit and money

* denotes statistical significance at 5 per cent.
supply growth are independent against any change in the economic environment in the short run and long run. This study therefore, dispute the notion that the demand for financial services is dependent upon the growth of the economy, instead we accept the view which states that financial system in a country can support economic activity especially the leading sectors in the economy hence driving growth upwards.

In order to determine the appropriate VECM specification, the optimum number of lags required was selected using the VAR Lag Order selection criteria. The results as presented in Table 5 suggest that the optimal lag length is 4. The optimum lag length was chosen using the Akaike information criterion (AIC) and the Hannan-Quinn information criterion (HQ).

### Table 5: VAR Lag Order Selection Criteria

<table>
<thead>
<tr>
<th>Lag</th>
<th>LogL</th>
<th>LR</th>
<th>FPE</th>
<th>AIC</th>
<th>SC</th>
<th>HQ</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>-12.83</td>
<td>NA</td>
<td>7.42</td>
<td>2.36</td>
<td>3.51*</td>
<td>2.74</td>
</tr>
<tr>
<td>2</td>
<td>6.82</td>
<td>27.03</td>
<td>1.14</td>
<td>2.70</td>
<td>4.99</td>
<td>3.46</td>
</tr>
<tr>
<td>3</td>
<td>36.51</td>
<td>31.54</td>
<td>1.13</td>
<td>2.41</td>
<td>5.84</td>
<td>3.54</td>
</tr>
<tr>
<td>4</td>
<td>97.34</td>
<td>45.62*</td>
<td>2.40*</td>
<td>0.17*</td>
<td>4.75</td>
<td>1.68*</td>
</tr>
</tbody>
</table>

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Tables 6 and 7 present the Johansen co-integration test results based on the Trace and the Maximum Eigenvalue test. The Trace test results indicate that there exists 2 cointegrating equations at 5 per cent level of significance while the Maximum Eigenvalue test results reveal that there is 1 cointegrating equation at 5 per cent level of significance. Therefore, we conclude that there is at least 1 cointegrating equation.

### Table 6: Unrestricted cointegration rank test (Trace)

<table>
<thead>
<tr>
<th>Hypothesized</th>
<th>Trace</th>
<th>Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.68</td>
<td>69.82</td>
<td>0.00</td>
</tr>
<tr>
<td>At most 1 *</td>
<td>0.55</td>
<td>47.86</td>
<td>0.03</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.37</td>
<td>29.10</td>
<td>0.19</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.23</td>
<td>15.49</td>
<td>0.36</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.01</td>
<td>3.84</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Trace test indicates 2 cointegrating equation(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

### Table 7: Unrestricted cointegration rank test (Maximum Eigenvalue)

<table>
<thead>
<tr>
<th>Hypothesized</th>
<th>Max-Eigen</th>
<th>Critical Value</th>
<th>Prob.**</th>
</tr>
</thead>
<tbody>
<tr>
<td>None *</td>
<td>0.68</td>
<td>33.88</td>
<td>0.02</td>
</tr>
<tr>
<td>At most 1</td>
<td>0.55</td>
<td>27.58</td>
<td>0.07</td>
</tr>
<tr>
<td>At most 2</td>
<td>0.37</td>
<td>21.13</td>
<td>0.27</td>
</tr>
<tr>
<td>At most 3</td>
<td>0.23</td>
<td>14.26</td>
<td>0.31</td>
</tr>
<tr>
<td>At most 4</td>
<td>0.01</td>
<td>3.84</td>
<td>0.54</td>
</tr>
</tbody>
</table>

Max-eigenvalue test indicates 1 cointegrating equation(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

The variance decomposition results which indicate the magnitude of the predicted error variance for a series accounted for by innovations from each of the independent variable over different time-horizons beyond the selected time period. Table 8 shows the variance decomposition of GDP. The results indicate that variation in GDP is explained by an own shock. The second largest contributor to variation in GDP is money supply (M2) accounting for 10.4 per cent in the tenth year. Inflation (INF) becomes the third contributor accounting for 6.4 per cent while prime lending(PR) and private sector credit(PSCR) account for the least.
and economic in the Kingdom of Eswatini. Using two measures of financial development (money supply (M2) and credit extended to the private sector (PSCR) both as ratio of GDP this paper uses the granger causality test through the VECM approach to study the short run and long run dynamics between the two variables.

The results from the Johansen and Juselius (1990) cointegration approach show that there exists at least one cointegration equation. The results further revealed that there is positive long run relationship between the ratio of broad money supply (M2) to GDP and the ratio of private sector credit (PSCR) to GDP to economic growth (GDP). Moreover, the lending rate together with inflation were found to have significant negative impact on economic growth in the long run. In the case of prime lending rate the study concludes that access to financial services through the cost of borrowing to finance either investments or personal needs is a challenge. The study also concludes that inflation has negative impact on economic growth which implies that a rise in the price of commodities result in the reduction in real gross domestic product.

Contrary to Akinlo and Egbetunde (2010), the study found that there exist uni-directional causality from financial development to economic growth in both the short and long run. This therefore, implies evidence of supply induced growth in the country. The result is consistent with Patrick’s (1966) initial expectation of a scenario where causality runs from finance to economic especially among developing countries. It is worth noting that the country’s financial sector thrives in an environment of low growth, which is in part due to the nature of development of the financial sector.

From the foregoing empirical results and given that the supply leading condition prevails, the study recommends for the

<table>
<thead>
<tr>
<th>Period</th>
<th>S.E.</th>
<th>LOG (GDP)</th>
<th>LOG (M2)</th>
<th>LOG (PSCR)</th>
<th>INF</th>
<th>PR</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.05</td>
<td>100.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.08</td>
<td>93.26</td>
<td>4.81</td>
<td>0.29</td>
<td>1.49</td>
<td>0.15</td>
</tr>
<tr>
<td>3</td>
<td>0.13</td>
<td>91.90</td>
<td>4.65</td>
<td>0.12</td>
<td>2.51</td>
<td>0.82</td>
</tr>
<tr>
<td>4</td>
<td>0.17</td>
<td>88.46</td>
<td>6.90</td>
<td>0.12</td>
<td>3.36</td>
<td>1.16</td>
</tr>
<tr>
<td>5</td>
<td>0.22</td>
<td>86.70</td>
<td>7.51</td>
<td>0.10</td>
<td>4.36</td>
<td>1.32</td>
</tr>
<tr>
<td>6</td>
<td>0.27</td>
<td>84.10</td>
<td>8.87</td>
<td>0.19</td>
<td>5.23</td>
<td>1.51</td>
</tr>
<tr>
<td>7</td>
<td>0.30</td>
<td>83.18</td>
<td>9.34</td>
<td>0.19</td>
<td>5.68</td>
<td>1.61</td>
</tr>
<tr>
<td>8</td>
<td>0.34</td>
<td>82.38</td>
<td>9.74</td>
<td>0.15</td>
<td>6.00</td>
<td>1.73</td>
</tr>
<tr>
<td>9</td>
<td>0.37</td>
<td>81.72</td>
<td>10.07</td>
<td>0.13</td>
<td>6.24</td>
<td>1.85</td>
</tr>
<tr>
<td>10</td>
<td>0.41</td>
<td>81.10</td>
<td>10.37</td>
<td>0.11</td>
<td>6.36</td>
<td>1.96</td>
</tr>
</tbody>
</table>

In order to ascertain the veracity of the results presented in this study and the economic implication thereof, the appropriateness of model is checked by the inverse roots of the AR characteristic polynomial test.

**Figure 3: Inverse Roots of Characteristic Polynomials**

Figure 3 shows the stability test results which are tested using the AR characteristic polynomial test. From the results, all AR roots are found to lie within the unit circle, which is an indication that the model relating to GDP as a dependent variable is stable and hence economic implication can be drawn from the results presented.

6.0 CONCLUSION AND POLICY RECOMMENDATION

This paper was an attempt to examine the relationship between financial development
acceleration of the strategies aimed at deepening the development of the financial sector as enshrined in the Financial Sector Development Implementation Plan. Encompassed in the plan are a set of bank specific recommended policy actions, which include among others:

- Reducing costs through increased use of low-cost delivery channels.
- Encouraging the extension of private sector credit to productive sectors.
- Promoting SME development and micro-financing at affordable rate.

REFERENCES


The Interaction between Monetary Policy and Financial Stress in Eswatini

Thandeka Mdladla and Sive Kunene

Abstract

The study investigates the interaction between monetary policy and financial stress in Eswatini. This is achieved by first constructing the Financial Stress Index of Eswatini (EFSI), and thereafter employing a Structural Vector Autoregression (SVAR) model to explore the relationship between monetary policy and financial stress. Granger causality test results indicate that GDP and inflation cause discount rate movements while GDP and the discount rate causes EFSI movements. Furthermore, impulse response functions indicate that monetary policy through the discount rate responds positively (increases) to an increase in inflation from an EFSI shock, as expected. There is therefore a positive relationship between the discount rate and the EFSI as well as a positive relationship between inflation and the discount rate. On average, the EFSI accounts for 0.32 per cent variation in monetary policy while monetary policy accounts for 81.02 per cent variation to its own shock over a 12-quarter period (36 months). GDP and inflation, on average, accounts for 1.02 per cent and 17.64 per cent variation in monetary policy over a 12-quarter period, respectively. The discount rate accounts for 6.74 per cent variation in EFSI shock whilst GDP and inflation account for 8.15 per cent and 3.96 per cent variation in EFSI shocks. Therefore, discount rate dynamics in Eswatini are explained by inflation developments and marginally explained by EFSI dynamics.

Key words: Financial Stress Index, Monetary Policy, Structural Vector Autoregression, Eswatini

1. INTRODUCTION

The recent global financial crisis has sparked several debates, including that of the interaction between monetary policy and financial conditions (Gameiro, et al. 2011). Saldias (2017) asserts that economic developments emanating from the financial crisis have spurred renewed interest to understand the interactions between monetary policy, financial conditions, and financial fragility. The author further posits that these relationships are likely to be non-linear. Dudley (2017) argues that developments in the financial markets have had a major influence on the broader financial conditions landscape and therefore it is important to understand how they affect the economic outlook and, therefore, the appropriate setting of monetary policy. Dudley (2017), and Adrian and Liang (2016) state that monetary policy also affects market development and financial conditions. Saldias (2017), and Adrian and Liang (2016) state that an accommodative monetary policy is essential for stimulating an economy; however, if sustained for an extended period, it can promote a build-up of financial fragilities. Evidence from countries such as Sweden and Norway indicate that such a build-up can hardly be contained using monetary policies alone (Saldias, 2017). Saldias (2017) posits that the transmission of monetary policy to output depend on non-linear ways on the health of the financial sector. During financial stress episodes, stimulative policies undertaken by central banks’ need to be more substantial for them to be effective than during normal times. Dudley (2017) states that the focus on financial conditions by monetary policy
authorities is not financial conditions themselves but for their effect on economic activity and by extension the price stability objectives.

Based on the aforementioned link, unlocking the interaction between monetary policy and financial stress (conditions) is essential for deepening informed policy decisions by monetary authorities. However, in Eswatini, no research has been conducted to determine the interaction between monetary policy and financial conditions. It is therefore against this backdrop that this study is undertaken. Specifically, this study seeks to determine the relationship between monetary policy and financial conditions and hence the strength of the effect under alternative conditions.

This study will assist in deepening the understanding of the interaction between monetary policy and financial stress and therefore contribute to a body of knowledge aimed at assisting local monetary policy authorities to take better-informed policy decisions.

The rest of the paper is organized as follows; Sections 2 presents the stylized facts, while section 3 presents the literature review, unpacking findings from previous studies linking monetary policy transmission mechanism to economic growth and financial conditions. Section 4 discusses the methodology approach adopted by the study and data analysis, whilst section 5 discusses the results and finally section 6 presents the conclusion and policy recommendations.

2. MONETARY POLICY AND FINANCIAL CONDITIONS IN ESWATINI

Monetary policy in Eswatini is mainly influenced by its membership to the Common Monetary Area (CMA), where the Lilangeni is pegged one-to-one to the Rand.

Therefore, monetary policy has limited independence in achieving the Central bank of Eswatini objective due to the requirement to maintain the peg under this agreement. However, price and financial stability remain the primary objective of the Central bank of Eswatini.

The Government of Eswatini actively participates in open market operations where treasury bills and bonds are sold to the domestic economy to fund Government activities. In the wake of the financial crisis and domestic fiscal challenges, the Government of Eswatini increased its public sector borrowing, recording 15 per cent in total debt to GDP in 2008, decreasing to 6.79 per cent of GDP in 2012 then rising again to 11.39 per cent of GDP in 2018. This increase in debt, a critical component in the compilation of financial conditions, has an effect on financial conditions of Eswatini.

On the other hand inflation, averaged 12.63 per cent in 2008 due to the financial crisis, decreasing to an average of 5.64 per cent in 2013 and rising again to an average of 7.83 in 2016 as a result of the El’Nino induced drought. In response to rising inflation during the financial crisis, the Central Bank of Eswatini increased interest rates (the discount rate) to an average of 11 per cent in 2008, decreasing to an average of 5 per cent in 2013 thus indicating a recovery from the financial crisis and rising again to an average of 7 per cent in 2017 to curb inflationary pressures emanating from the drought.

There is therefore a link between monetary policy and financial conditions in Eswatini since activities in the components of financial conditions rely on monetary policy decisions of the Central bank, hence the study to establish the interaction of these two variables.
Traditionally, monetary policy has been captured through a policy rate or short-term rate such as the Federal Funds Rate in the United States (Saldias, 2017). Saldias (2017) argues that with the zero lower bound becoming binding in most economies, this approach has been dropped as a result of loss of some of its significant properties. The use of yield curves has been recently adopted as one of the new measures for supporting joint monetary policy and financial stability analysis. Saldias (2017) used the yield curve slope as a proxy for monetary policy stance and computed it as the difference between a 10-year government bond yields and the 3-month T-bill rate. This was on the basis that interest rates were closer to the zero lower bound in the sample and therefore could not be used as a single benchmark for monetary policy stance.

Zheng (2013) analyzed the impact and effectiveness of conventional monetary policy during periods of low and high financial stress in the US economy and the results revealed a regime dependent effect of conventional monetary policy. The results revealed that the output response to monetary policy economic shocks was larger during periods of high financial stress than periods of low financial stress. The results further revealed that monetary policy shocks continue to be effective even during periods of high financial stress. Concluding the study, Zheng (2013) asserts that a substantial expansionary monetary policy can be used to move the economy out of a high financial stress regime. Fry-McKibbin and Zheng (2016) also reported similar results to Zheng (2013) in the U.S.

Avdjiev and Zeng (2014) examined the nonlinear nature of the interactions among credit market conditions, monetary policy and economic activity. The results revealed that the interactions between the aforementioned variables vary substantially as the economy moves from one phase of
business cycle to another. Similar to other authors, some of which are cited above, the results by Avdjieiv and Zeng (2014) revealed that the impact of most shocks tend to be largest during periods of low economic activity and smallest during times of moderate economic growth. On the contrary, credit risk shocks had the largest impact when output growth is considerably above its long-term trend.

Adrian and Liang (2016) assert that an easing monetary policy stance creates an inter-temporal trade-off between improving current financial conditions and increasing future financial vulnerabilities. Adrian and Liang (2016) argue that even though monetary policy can influence vulnerabilities, its efficacy will largely depend on the cost of a stricter monetary policy on activity and inflation.

4. METHODOLOGY AND DATA ANALYSIS

4.1 Theoretical Model

The Taylor rule forms the basis of the study where Taylor (1993) proposed that the US policy rate (nominal interest rate) is defined as a function of real interest rates, inflation rate and the output gap as follows:

\[ i_t = \pi_t + c_1(\pi_t - \pi^*_t) + c_2(y_t - y^*_t) \]  

where \( i_t \) denotes the nominal federal funds rate, \( \pi^*_t \) is the real interest rate, \( \pi_t \) is the inflation rate, \( \pi^*_t \) is the inflation target, \( y_t \) represents log of real GDP and \( y^*_t \) represents potential output. According to Taylor (1999), an increase in inflation triggers an increase in the policy rate. Furthermore, increases in real income leads to an increase in money demand (assuming money supply remains constant), therefore interest rates should rise.

The study follows the Taylor rule and introduces the financial stress index as an additional variable in the Taylor rule equation to determine the interaction between monetary policy and the EFSI. The Structural Vector Autoregression (SVAR) model is applied in the study, with EFSI and interest rates as the main variables of interest while GDP and inflation act as control variables in the model.

4.2 Empirical Model: The Structural Vector Autoregression Model (SVAR)

To determine the interaction between monetary policy and financial stress, the study employs Vector Autoregression (VAR) models introduced by the seminal work of Sims (1980). A VAR model can be defined as a system of multivariate time series models where each variable in the system is explained by past values of itself and past values of all other variables in the system. VAR models have been widely used to understand the empirical effects of monetary policy on real economic activity (Walsh, 2010), due to their ability to capture the dynamic relationships among variables in the system.

The study specifically uses an extension of the VAR known as a Structural Vector Autoregression (SVAR) model, which uses economic theory to identify the contemporaneous relationship among variables (Bernanke, 1986; Blanchard and Watson, 1986; Sims 1986). Purely exogenous shocks are identified to trace out their dynamic effects in the model. Correct identification of the innovations ensures meaningful interpretation of impulse response functions to be generated. Interest rates and the EFSI are the variables of interest in this study; however, inflation and GDP are included as control variables.
The basic structural equation of the VAR model in matrix format can be represented by the following equation:

$$AX_t = \sum_{i=1}^{p} B_i X_{t-i} + \varepsilon_t$$

Where $X$ is the vector of four endogenous variables, namely; GDP, inflation, discount rate and the financial stress index, all in first differences. $A$ represents the square matrix of coefficients, while $\varepsilon$ represents the vector of disturbances (serially uncorrelated) and $p$ is the number of lags.

The reduced form VAR can be written as follows:

$$X_t = A^{-1} \sum_{i=1}^{p} B_i X_{t-i} + e_t$$

Where $e_t$ represents serially uncorrelated reduced form disturbance terms. The relationship between the structural shocks $\varepsilon_t$ and reduced form VAR residuals $e_t$ is as follows:

$$e_t = A_0 \varepsilon_t$$

Following Sims (1980), Cholesky decompositions are applied to the reduced form VAR, which entails imposing constraints that define matrix $A_0$ as a lower triangular matrix.

The order of the endogenous variables in the SVAR model cannot be overlooked as it determines the link between the residuals of the SVAR model and the underlying innovations. The variables are ordered based on the economic theory, specifically the Taylor rule. When the economy overheats or is in a recession, inflation will increase or decrease, respectively, then the policy rate will respond to inflationary developments to maintain price stability. Developments in GDP, inflation and the discount rate lead to developments in the EFSI. Therefore, GDP is ordered first, followed by inflation, interest rates and finally EFSI.

### 4.3 Data Analysis

The study uses quarterly data spanning from December 2010 to March 2018. This is because some of the variables used in developing the Financial Stress Index of Eswatini (EFSI) only begin in December 2010 hence the chosen period for the data set. Furthermore, at the time of conducting this study, GDP in Eswatini was only available on an annual frequency basis, therefore due to the low frequency problem, GDP growth data is interpolated into a quarterly series. Inflation is derived from the Consumer Price Index (CPI) and quoted as year-on-year inflation. Table 1 presents the variables used and their sources.

<table>
<thead>
<tr>
<th>Data</th>
<th>Sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP growth (GDP)</td>
<td>Central Statistics Office</td>
</tr>
<tr>
<td>Discount rate(disrate)</td>
<td>Central Bank of Eswatini</td>
</tr>
<tr>
<td>Inflation(INFL)</td>
<td>Central Statistics Office</td>
</tr>
<tr>
<td>Financial Stress Index of Eswatini(EFSI)</td>
<td>Own calculations</td>
</tr>
</tbody>
</table>

Figure 2 illustrates the trend of the data over time. GDP, inflation and the discount rate move together over the period, reflecting that for Eswatini, an increase in GDP, increases inflation and the policy rate increases with a lag to curb inflation. The EFSI however, reflects fluctuations over time, as expected, indicating that the economy constantly moves between periods of low and periods of high financial stress. In between the year 2010-2011, the economy was under financial stress, coinciding with the global financial crisis.
The financial stress index (FSI) therefore captures the comprehensive part of a country’s financial system and is constructed using market-based indicators in real time and in high frequency. Cardarelli et al. (2011) and Balakrishnan et al. (2009) constructed FSI’s for Advanced Economies and Emerging Market economies, respectively, on the theory that financial stress signals stem from banking, securities and foreign exchange markets.

The study follows Balakrishnan et al. (2009) to construct the FSI of Eswatini (EFSI), which is composed of five variables that capture credit conditions in banking, securities markets and exchange markets. The five components of the index as defined by Balakrishnan et al. (2009) are the banking sector beta (β), stock market returns, time-varying stock market return volatility, sovereign debt spreads and an exchange market pressure index (EMPI). All these components help to associate the degree of financial stress with large shifts in asset prices, abrupt increase in risk, uncertainty and risk appetite, liquidity position, financial intermediation and credit availability.

Following Balakrishnan et al. (2009), the five components of the financial stress index are constructed as follows:

- The banking sector beta is defined as the standard capital asset pricing model (CAPM) beta, and is defined as follows:
  \[
  \beta_{lt} = \frac{\text{cov}(r_t^B, r_t^P)}{\sigma^B_t}
  \]
  (5)
  - Where \( r \) is the banking returns (year-over-year) computed over a 12-month rolling window.
  - Stock market returns are computed as the year-on-year change in the stock market index multiplied by -1.
  - Stock market volatility is a measure of market volatility (time-varying) from a GARCH (1,1) specification. During this process, month-over-month real returns are modelled as an autoregressive process with 12 lags.
  - Sovereign debt spreads can be defined as the bond yield minus the 10-year United States Treasury Yield.
  - Finally, the Exchange Market Pressure (EMPI) captures the depreciation of the exchange rate and declines in international reserves and is defined as follows:
  \[
  \text{EMPI}_t = \frac{(\Delta e_t - \mu_{\Delta e})}{\sigma_{\Delta e}} - \frac{(\Delta \text{RES}_t - \mu_{\Delta \text{RES}})}{\sigma_{\Delta \text{RES}}}
  \]
  (6)
  Where \( \Delta e \) and \( \Delta \text{RES} \) denote percentage changes (month-over-month) in the exchange rate and total reserves minus gold, respectively. The exchange rate is taken vis-à-vis the United States of America.
(US) as the anchor economy, while μ and σ denotes the mean and standard deviation, respectively.

In this particular paper, however, the components of the EFSI are limited to only the stock market returns (SR), sovereign debt spreads (SD) and the EMPI due to the unavailability of data to compile the other components. The EFSI is then calculated by assigning weights on the three components based on their relative contribution to EFSI volatility and summing the components up as follows:

\[
EFSI_t = w_1SR_t + w_2SD_t + w_3EMPI_t \quad \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots 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\cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots \cdots
5. EMPIRICAL RESULTS AND ANALYSIS

Impulse response results as illustrated in Figure 3 indicate that a 1 standard deviation shock to the EFSI leads to an increase in inflation for the first 2 periods (6 months) after the shock, followed by a decrease to normalcy after the 5th period. This indicates a positive relationship between the EFSI and inflation. The discount rate responds with an increase after a one standard deviation positive shock to the EFSI for the first 3 periods after the shock (9 months), thereafter decreasing to normalcy. Monetary policy through the discount rate responds positively (increases) to an increase in inflation as expected. Even though the impulse response functions are insignificant, there exists a positive relationship between the discount rate and the EFSI as well as a positive relationship between inflation and the discount rate.

Figure 3: Impulse Response Functions and Variance Decomposition

<table>
<thead>
<tr>
<th>Table 4: Dependent variable: EFSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excluded</td>
</tr>
<tr>
<td>GDP</td>
</tr>
<tr>
<td>INFL</td>
</tr>
<tr>
<td>DISRATE</td>
</tr>
<tr>
<td>All</td>
</tr>
</tbody>
</table>

Table 5: Variance Decomposition of the Discount Rate

<table>
<thead>
<tr>
<th>Period</th>
<th>DGDP</th>
<th>DINFL</th>
<th>DISRATE</th>
<th>EFSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.27</td>
<td>10.95</td>
<td>88.78</td>
<td>0.00</td>
</tr>
<tr>
<td>2</td>
<td>0.36</td>
<td>17.78</td>
<td>81.74</td>
<td>0.12</td>
</tr>
<tr>
<td>3</td>
<td>0.59</td>
<td>18.38</td>
<td>80.71</td>
<td>0.33</td>
</tr>
<tr>
<td>4</td>
<td>1.00</td>
<td>18.30</td>
<td>80.37</td>
<td>0.33</td>
</tr>
<tr>
<td>5</td>
<td>1.20</td>
<td>18.29</td>
<td>80.16</td>
<td>0.35</td>
</tr>
<tr>
<td>6</td>
<td>1.25</td>
<td>18.29</td>
<td>80.09</td>
<td>0.37</td>
</tr>
<tr>
<td>7</td>
<td>1.26</td>
<td>18.28</td>
<td>80.07</td>
<td>0.38</td>
</tr>
<tr>
<td>8</td>
<td>1.26</td>
<td>18.28</td>
<td>80.07</td>
<td>0.39</td>
</tr>
<tr>
<td>9</td>
<td>1.26</td>
<td>18.28</td>
<td>80.07</td>
<td>0.39</td>
</tr>
<tr>
<td>10</td>
<td>1.26</td>
<td>18.28</td>
<td>80.07</td>
<td>0.39</td>
</tr>
<tr>
<td>11</td>
<td>1.26</td>
<td>18.28</td>
<td>80.07</td>
<td>0.39</td>
</tr>
<tr>
<td>12</td>
<td>1.26</td>
<td>18.28</td>
<td>80.07</td>
<td>0.39</td>
</tr>
<tr>
<td>Average</td>
<td>1.02</td>
<td>17.64</td>
<td>81.02</td>
<td>0.32</td>
</tr>
</tbody>
</table>

The main purpose of the study is to determine the interaction between monetary policy and the financial stress index. The study further analyzes the variance decompositions of the discount rate, which is a proxy for monetary policy. The results in Table 6 and 7 indicate that on average, the EFSI accounts for 0.32 per cent variation in monetary policy while monetary policy accounts for 81.02 per cent variation to its own shock over a 12-quarter period (36 months). GDP and inflation, on average, account for 1.02 per cent and 17.64 per cent variation in monetary policy over a 12-quarter period, respectively. The discount rate accounts for 6.74 per cent variation in EFSI shock whilst GDP and inflation account for 8.15 per cent and 3.96 per cent variation in EFSI shocks. Therefore, discount rate dynamics in Eswatini are significantly explained by inflation developments and marginally explained by EFSI dynamics.
Table 6: Variance Decomposition of the EFSI

<table>
<thead>
<tr>
<th>Period</th>
<th>DGDP</th>
<th>DINFL</th>
<th>DDISRATE</th>
<th>EFSI</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.00</td>
<td>6.85</td>
<td>0.31</td>
<td>7.25</td>
<td>85.58</td>
</tr>
<tr>
<td>2.00</td>
<td>6.54</td>
<td>4.20</td>
<td>6.63</td>
<td>82.63</td>
</tr>
<tr>
<td>3.00</td>
<td>7.63</td>
<td>4.14</td>
<td>6.73</td>
<td>81.50</td>
</tr>
<tr>
<td>4.00</td>
<td>8.33</td>
<td>4.24</td>
<td>6.70</td>
<td>80.72</td>
</tr>
<tr>
<td>5.00</td>
<td>8.53</td>
<td>4.32</td>
<td>6.68</td>
<td>80.47</td>
</tr>
<tr>
<td>6.00</td>
<td>8.55</td>
<td>4.34</td>
<td>6.69</td>
<td>80.42</td>
</tr>
<tr>
<td>7.00</td>
<td>8.55</td>
<td>4.34</td>
<td>6.70</td>
<td>80.42</td>
</tr>
<tr>
<td>8.00</td>
<td>8.55</td>
<td>4.34</td>
<td>6.70</td>
<td>80.41</td>
</tr>
<tr>
<td>9.00</td>
<td>8.55</td>
<td>4.34</td>
<td>6.70</td>
<td>80.41</td>
</tr>
<tr>
<td>10.00</td>
<td>8.55</td>
<td>4.34</td>
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<td>11.00</td>
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<td>4.34</td>
<td>6.70</td>
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<td>12.00</td>
<td>8.55</td>
<td>4.34</td>
<td>6.70</td>
<td>80.41</td>
</tr>
<tr>
<td>Average</td>
<td>8.15</td>
<td>3.96</td>
<td>6.74</td>
<td>81.15</td>
</tr>
</tbody>
</table>

Correct specification and stability of the model are tested using diagnostic tests. These tests confirm that inverse roots of the characteristic polynomial lie within the unit circle, as seen in Figure 4, indicating that the model is stable. The model further passed the LM test for serial correlation as well as the Portmanteau test for serial correlation. There is therefore no serial correlation among the residuals. Jarque-Bera tests for normality confirm normality of the residuals. These results confirm that the model results are suitable for interpretation.

6. CONCLUSION AND POLICY RECOMMENDATIONS

The main objective of the study is to establish the interaction between monetary policy and financial stress, and the strength of the effect under alternative conditions. Granger causality test results indicate a unidirectional causal relationship from GDP and inflation to the discount rate and there is also a unidirectional causal relationship from GDP and the discount rate to the EFSI. This implies that GDP and inflation granger cause discount rate movements while GDP and the discount rate granger cause EFSI movements. We found that changes to GDP developments and inflation through a positive EFSI shock have a positive effect on monetary policy decisions by monetary authorities, as expected. Even though the impulse response functions are insignificant, discount rate dynamics in Eswatini are explained by inflation developments and marginally explained by EFSI dynamics.

To further understand the interaction between monetary policy and EFSI, the relationship can be explored in more advanced econometric models such as non-linear models following Zheng (2013) to analyze the impact and effectiveness of monetary policy during periods of low and high financial stress. Furthermore, the components of the EFSI need further analysis as it is possible that only a few of the components are responsible for the shift from low to high financial stress, and hence the need to manage those variables for stability purposes. This will further give authorities direction on monetary policy by determining the most appropriate policy decision given the state of the economy through EFSI movements.
REFERENCES


Effects of the Southern African Customs Union (SACU) Receipts on Monetary Policy in Eswatini

Sive Kunene and Thandeka Mdladla

Abstract

The main purpose of the study is to investigate the relationship between SACU receipts and monetary policy in Eswatini. It employed the use of a Structural Vector Autoregressive (SVAR) method to analyse quarterly data from 2005Q2 to 2017Q4. The variance decomposition results indicate that shocks on SACU receipts have a significant effect on both interest rates and broad money supply (M2) in Eswatini. On average, over a three-year period, a shock on SACU receipts accounts for 5.5 per cent of the variation in interest rates whiles GDP growth accounts for 2.7 per cent, M2 accounts for 5.5 per cent and inflation accounts for 6.1 per cent. A shock on SACU receipts accounts for 4 per cent of the variation in M2 whiles GDP growth, interest rates and inflation account for 1.88 per cent, 0.7 per cent and 3.4 per cent, respectively. Based on the findings of the study, the Central Bank should use open market operations to mop up excess liquidity arising from inflows of SACU receipts so that money supply does not increase as a result of the positive shocks of SACU receipts.

Key words: SACU, Monetary Policy, SVAR, Eswatini

1.0 INTRODUCTION

The paper empirically determines the effects of Southern African Customs Union (SACU) receipts on monetary policy in Eswatini. SACU member states consist of Eswatini, Botswana, Lesotho, Namibia and South Africa. These member states form a single customs region where barriers to trade as well as tariffs on all trade between member states are eliminated. The elimination of barriers to trade and tariffs applies to products originating from the member states but there exists an external tariff levied on products originating from non-members of SACU. This external tariff is remitted to SACU into a Common Revenue Pool (CRP) and shared among member states on an annual basis (remitted quarterly to respective member states) using an agreed revenue-sharing formula (RSF). Ngalawa et al., (2010) asserts that under the current revenue-sharing formula, Botswana, Eswatini, Lesotho and Namibia (BELN) receive close to half of the CRP collections combined despite that their gross domestic product (GDP) constitutes less than 10 per cent of SACU’s GDP. Eswatini is also a member of the Common Monetary Area (CMA) in which it pursues a fixed exchange rate regime with South Africa and there is free flow of capital between CMA member states. Given the impossible trinity theory, this implies limited monetary policy independence for Eswatini.

SACU revenues to member states are neither equal nor constant over time and therefore subject to fluctuations emanating from positive or negative internal and external factors. In recent years, SACU has been facing numerous challenges with serious economic implications for the smaller member states, especially Eswatini and Lesotho, which heavily rely on SACU revenues for their budgets (Honda et al., 2017, and Masenyetse & Motelle, 2012). These challenges include liberalization of global trade, which implies a reduction of tariffs in line with World Trade Organization commitments and the negotiations of various trade agreements with other regional bodies to enhance trade thus reducing SACU revenues (Masenyetse & Motelle, 2012). On top of the aforementioned challenges, Basdevant (2012) notes that the development of the Southern African Development (SADC) customs union will
result in a further decline in SACU revenues. Given the risks to SACU revenues, the prospects for stable and higher receipts remain bleak. This implies that if Eswatini continues relying heavily on SACU receipts as its main source of revenue without fiscal adjustments or intensifying on finding other revenue sources, its fiscas will continue to be strained. The strain on the fiscas as a result of the volatile SACU receipts by extension has ramifications for monetary policy and its effectiveness in ensuring price and financial stability. This is particularly true since public expenditure plays a great stabilization role in Eswatini. There is therefore a need to study the effects of SACU receipts on monetary policy in Eswatini. To the authors’ best knowledge, there is no published study specifically on the effects of SACU receipts on monetary policy in Eswatini and hence this study was conducted.

Specifically, the objective of the study is to determine the effects of SACU revenues on monetary policy in Eswatini. It is important for monetary policy authorities to understand the impact of SACU revenues on monetary policy in order to inform their monetary policy decisions.

The rest of the paper is organized as follows. Section 2 briefly presents stylized facts on SACU revenue trends in Eswatini, Lesotho and Namibia countries, and monetary policy in Eswatini. In section 3 we present literature review, while section 4 presents the methodology and data analysis. The empirical results are presented in Section 5 whiles section 6 presents the conclusion and recommendations.

2.0 SACU RECEIPTS AND MONETARY POLICY IN ESWATINI

Figure 1 shows a graphical presentation of interest rates, inflation and SACU receipts (in logarithm) trends in Eswatini. As shown in the figure, SACU receipts have been volatile over the review period. A significant decline in the receipts was observed during the 2008/09 financial crisis period and its second round effects. From the third quarter of 2012 onwards, SACU receipts have been trending down but pick up from the second quarter of 2017. Comparing SACU receipts and interest rates variables, interest rates relatively track SACU receipts developments prior to 2010 but respond with a lag. However, from the second quarter of 2015 to the first quarter of 2017, the two variables trend in different directions. This is the period during which Eswatini suffered a spike in inflation due to the El Nino induced drought which hampered food production. Consequently, interest rates increased to curb inflation whiles SACU revenue fell as a result of reduced imports and a slowdown in economic activity in the SACU region. The figure also indicates that inflation and interest rates also relatively track each other but interest rates respond with a lag.

Figure 1: SACU Receipts (logarithm), Interest Rate and Inflation Trends in Eswatini

3.0 LITERATURE REVIEW

Christiano and Fitzgerald (2000) assert that the standard monetarist doctrine is that unwavering commitment by the central bank to price stability is enough to ensure price stability. However, the foundations of this theory has been questioned and economist now believe that a tough, independent central bank is not sufficient to guarantee...
price stability. In this regard, Christiano and Fitzgerald (2000) argue that price stability does not only require a prudent monetary policy but also an appropriate fiscal policy. The Fiscal Theory of Price Level (FTPL) states that without a deliberate efforts to ensure an appropriate fiscal policy, the goal of price stability by monetary policy authorities will remain elusive (Sims, 1994, and Christiano & Fitzgerald, 2000). The FTPL implies that monetary policy authorities should go beyond just pursuing a prudent monetary policy but should also strive to convince fiscal policy authorities to pursue an appropriate stance (Christiano & Fitzgerald, 2000).

Pappa and Canova (2007) posit that fiscal and monetary policy actions may be closely related. In the past this was found to hold in European Monetary Union (EMU) countries where monetary authorities residually satisfied the budget constraints. In cases where policy decisions are tightly linked, identifying fiscal shocks in isolation from monetary disturbances may be misleading. A negative revenue shock could negatively co-move with output if government consumption partially plays an automatic stabilization role in that economy (Pappa & Canova, 2007). By extension, this could also affect monetary policy.

In the US, Bhattarai, Lee and Park (2014) found that a higher level of fiscal debt leads to an increase in inflation, and therefore by extension has implications on monetary policy. They therefore concluded that the effects of an aggressive monetary policy stance on inflation depends critically on the joint behavior of monetary and fiscal policy. Jawadi et al. (2016) assessed the impact of fiscal policy and monetary policy shocks for Brazil, Russia, India, China and South Africa (BRICS) and established that monetary contractions result in a decrease in real economic growth and constrict liquidity market conditions. They further established that Government spending shocks on the other end, have substantial Keynesian effects.

Using an ARDL model approach, Dube (2013) found the presence of a long run relationship between broad money (M3) and income, opportunity cost of holding money (domestic and foreign interest rate), inflation, and stock market prices in South Africa. Dube reported stock prices to be more imported as it brought stability to the model and without it there was no cointegration. In the short run, all variables except for domestic interest rate were statistically significant with negative coefficients for inflation and foreign interest rates whiles income and stock prices had positive coefficients. Dube (2013) concluded that from a policy perspective, stock prices and foreign interest rates should be accounted for in formulating monetary policy decisions.

Abakpa, Purokoyo and Asaph (2018) used an ARDL approach and found lagged money supply and GDP to be having a positive significant effect on money supply in Nigeria. Inflation, interest rates, exchange rate and foreign direct investment had insignificant coefficients. The pairwise Granger causality results revealed the presence of a unidirectional causality from GDP to money supply and a bidirectional relationship between interest rate and money supply. Investigating the determinants of growth in money supply in Nigeria, findings by Bakare (2011) revealed that credit extension to the private sector is the major determinant of changes in money supply. Net foreign assets was also one of the main determinants of changes in money supply in Nigeria.

Using data from 1983 to 2006, findings by Sanusi (2010) revealed that until mid-nineties fiscal deficit financing was the major driver for money supply in Ghana. Post this period net changes in net foreign assets of the Bank of Ghana became the major driver for monetary expansion driven mainly by foreign
aid and remittances inflows. Dritsakis (2011) used an ARDL approach to determine the demand for money in Hungary. The findings revealed that real income, inflation and the exchange rate all have a significant effect on money supply. Inflation and exchange rate had negative coefficients whiles real income (gross national product) had a positive coefficient in the long-run.

Studying the effects of fiscal deficit financing in Uganda, results by Bwire and Nampweo (2014) revealed that budget deficit has a positive and significant long run effect on inflation. Bwire and Nampweo (2014) note that this result is consistent with the hypothesis that increases in the fiscal deficits are associated with increases in seigniorage in the long-run. The Granger causality results revealed the presence of causality from money supply to budget deficit and from inflation to budget deficit. The observed causality from inflation to fiscal deficit is in line with the “Olivera-Tanzi effect” (Olivera, 1967 & Tanzi, 1977) which states that higher inflation leads to lower tax revenues. Bwire and Nampweo (2014) assert that causality between money supply and fiscal deficit could be explained by the fact that in the short run, a tighter monetary policy results in lower output growth which in turn may reduce tax revenues. Higher interest rates also makes public debt more expensive to service. Concluding their study, Bwire and Nampweo (2014) emphasized the need for monetary policy authorities to keep inflation in check in order to mitigate its effects on budget deficit in the long-run.

Bikker and Gerritsen (2018) used the Feasible Generalized Leased Squares (FGLS) approach to investigate the determinants of interest rates on time deposits and savings accounts in Netherlands. They found that interest rates are more sensitive to bank risk post the global financial crisis. The results also revealed that time deposits reflect the economic environment than interest rates on time deposits do. Hartwell (2012) used an FGLS to investigate the effects of central bank independence and central bank effectiveness in 91 countries. The results revealed that central banks that are more independent are correlated with lower interest rates but also had lower inflation and restrained bank credit. Other variables which were found to be significantly influencing interest rates are financial systems deposit as ratio of GDP and GDP per capita.

He (2017) utilized a vector autoregressive method to determine the relationship between money supply and macroeconomic in China and found that inflation and GDP are significantly and positively related to broad money supply whiles interest rates are negatively related to broad money supply. Apasung and Paul (2018) used an Robust Least Squares approach to estimate money demand in Nigeria and the results indicate that real income (GDP), interest rate, inflation rate and foreign interest rates (proxied by the U.S interest rate), are key determinants of money demand (M2) in Nigeria.

4.0 METHODOLOGY AND DATA ANALYSIS

The study uses quarterly time series data spanning from 2005Q2 to 2017Q4. All the data for the study were obtained from the Central Bank of Eswatini quarterly reports except for the SACU receipts which was obtained from the Southern African Customs Union. The variables used in the study are as follows; GDP growth (GDP_GR), Broad money supply (M2), SACU receipts for Eswatini (SACU), inflation (INFL) and Interest rate (INT). The variables were first subjected to a stationarity test to determine if they are stationary or not. Figure 2 shows a graphical presentation of the variables and it indicates that there may be some evidence of possible non-stationarity of the variables.
The Augmented Dickey Fuller (ADF) test was used to test for stationarity of the variables. The results presented in Table 1 indicate that all the variables are only stationary after first differencing and therefore are integrated of order one.

Table 1: Stationarity Test Results

<table>
<thead>
<tr>
<th>Variables</th>
<th>Augmented Dickey Fuller Test</th>
<th>Phillips and Perron Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Constant</td>
<td>Trend</td>
</tr>
<tr>
<td>LGDP</td>
<td>-0.07</td>
<td>-1.72</td>
</tr>
<tr>
<td>LM2</td>
<td>-1.49</td>
<td>-2.95</td>
</tr>
<tr>
<td>LSACU</td>
<td>-2.03</td>
<td>-2.06</td>
</tr>
<tr>
<td>INFL</td>
<td>-1.41</td>
<td>-1.41</td>
</tr>
<tr>
<td>INT</td>
<td>-1.96</td>
<td>-2.28</td>
</tr>
</tbody>
</table>

The study is based on the quantity theory of money. The Keynesian theory of demand for money states that the demand for money (M) is a function of the proportion of money income held as currency and bank deposits (k), real income (Y) and interest rate (i).

\[ M = kY + f(i) \]  \hspace{1cm} (1)

A number of studies have adopted the use of the Keynesian demand for money function, for example Dunne and Kasekende (2018) and He (2017) and hence this study adopts the Keynesian demand for money function. Since the study is aimed at determining the effects of SACU revenues on broad money supply, it adds SACU receipts to the model.

Literature suggest a positive relationship between real money balances (M) and real income (Y) and a negative relationship between M and nominal interest rate (i). As people get wealthier (GDP increases), they demand more money for transactional purposes. This will increase inflation as the economy heats up and thus interest rates will increase to curb inflation. An increase in interest rates increases the opportunity cost of holding cash and therefore demand for money decreases. Furthermore, an increase in interest rates also increases the cost of credit thus dampening the demand for credit hence money demand decreases. In turn, this would see inflation moderating. A priori expectation is a positive relationship between SACU receipts and broad money supply. Since the fisca largely plays a stabilization role in Eswatini, a positive shock on SACU receipts increases government revenues and therefore is likely to see an expansion in government expenditure thus increasing money supply. The increase in money supply would by extension result in increased inflation and therefore interest rates will also increase in order to curb inflation.

The study uses the Structural Vector Autoregressive (SVAR) method introduced by the seminal work of Sims (1980) to estimate the relationship between the selected variables. The basic structural equation of the VAR model in matrix format can be represented by the following equation:

\[ AX_t = \sum_{i=1}^{p} B_i X_{t-i} + \varepsilon_t \]  \hspace{1cm} (2)

Where X is the vector of four endogenous variables, namely; GDP growth, SACU receipts SACU, broad money supply, Inflation...
and interest rate, all in first differences. A represents the square matrix of coefficients, while e_t represents the vector of disturbances (serially uncorrelated) and p is the number of lags.

The reduced form VAR can be written as follows:

\[ i_t = A^{-1} \sum_{i=1}^{p} B_i X_{t-i} + e_t \]  

(3)

Where e_t represents serially uncorrelated reduced form disturbance terms. The relationship between the structural shocks \( u_t \) and reduced form VAR residuals \( e_t \) is as follows:

\[ e_t = A_0 e_t \]  

(4)

Following Sims (1980), Cholesky decompositions are applied to the reduced form VAR, which entails imposing constraints that define matrix A0 as a lower triangular matrix. The SVAR approach necessitates that the variables be ordered in a structural manner, which depicts the way theoretically the variables are likely to influence each other. This determines the link between the residuals of the SVAR model and the underlying innovations. The variables in this study are ordered as follows: GDP growth, SACU receipts, broad money supply and interest rate. An increase in GDP growth will increase SACU receipts as imports will increase since Eswatini is largely an open economy. An increase in SACU receipts is likely to result in an expansionary fiscal stance, which in turn would affect M2. An increase in M2 will increase inflation and hence interest will respond.

An redistricted VAR model is used determine optimum lag length in order to ensure that a more parsimonious model is used. The study uses the Portmanteau test for autocorrelation, LM test for serial correlation and the Jarque-Bera test for normality as part of the model diagnostics. The inverse roots of the AR polynomial test is used to test for model stability. In the inverse roots of the AR polynomial test, a necessary condition is that the roots should lie within the circle to indicate model stability.

5.0 EMPIRICAL RESULTS

The impulse response results on Figure 2 indicate that a positive shock on the SACU receipts results in an increase in GDP growth over the first four quarters. This is probably because higher SACU revenues increase government revenues thus leading to an expansionary fiscal stance. A positive shock on SACU receipts also results in increase in M2 over the first two quarters before falling in the next quarter and thereafter normalizes. Inflation responds with an upward movement to a shock in SACU receipts in the first two quarters and normalizes thereafter. Interest rates respond with a slight fall in the first two quarters to a positive shock on the SACU revenues before picking up to its previous level in the third quarter and thereafter normalizes in the fifth quarter. The fall in the first two quarters is against a priori expectation since it is expected that a positive shock on SACU receipts would have a positive effect on the interest rate.
The variance decomposition results presented in Table 3 indicate that on average, variation in M2 is largely due to own shock, accounting for 89.5 per cent. The results further indicate that SACU receipts account for 4 per cent of the variation in M2 while GDP growth accounts for 1.9 per cent. Interest rates and inflation account for 3.9 per cent and 0.7 per cent of the variation in M2, respectively.

The study used the VAR lag order selection criteria to select the optimum lag length. The Akaike Information Criterion (AIC), Final Prediction Error (FPE) and the LR test selected an optimum lag length of four. However, the study used a lag length of two as indicated by Hannan-Quinn information criterion since it gave results that are more plausible.

Table 2: Variance Decomposition for Interest Rate

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP_GR</th>
<th>LSACU</th>
<th>LM2</th>
<th>INFL</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.25</td>
<td>3.59</td>
<td>4.19</td>
<td>6.25</td>
<td>85.72</td>
</tr>
<tr>
<td>2</td>
<td>1.51</td>
<td>3.19</td>
<td>3.28</td>
<td>6.80</td>
<td>85.23</td>
</tr>
<tr>
<td>3</td>
<td>2.03</td>
<td>5.44</td>
<td>4.94</td>
<td>5.95</td>
<td>81.64</td>
</tr>
<tr>
<td>4</td>
<td>3.05</td>
<td>6.04</td>
<td>5.09</td>
<td>6.08</td>
<td>79.73</td>
</tr>
<tr>
<td>5</td>
<td>3.19</td>
<td>6.01</td>
<td>5.12</td>
<td>6.04</td>
<td>79.63</td>
</tr>
<tr>
<td>6</td>
<td>3.19</td>
<td>6.00</td>
<td>5.19</td>
<td>6.07</td>
<td>79.55</td>
</tr>
<tr>
<td>7</td>
<td>3.19</td>
<td>6.01</td>
<td>5.20</td>
<td>6.07</td>
<td>79.53</td>
</tr>
<tr>
<td>8</td>
<td>3.19</td>
<td>6.01</td>
<td>5.19</td>
<td>6.07</td>
<td>79.54</td>
</tr>
<tr>
<td>9</td>
<td>3.19</td>
<td>6.01</td>
<td>5.19</td>
<td>6.07</td>
<td>79.53</td>
</tr>
<tr>
<td>10</td>
<td>3.19</td>
<td>6.01</td>
<td>5.19</td>
<td>6.07</td>
<td>79.53</td>
</tr>
<tr>
<td>11</td>
<td>3.19</td>
<td>6.01</td>
<td>5.19</td>
<td>6.07</td>
<td>79.53</td>
</tr>
<tr>
<td>12</td>
<td>3.19</td>
<td>6.01</td>
<td>5.19</td>
<td>6.07</td>
<td>79.53</td>
</tr>
<tr>
<td>Average</td>
<td>2.70</td>
<td>5.52</td>
<td>4.92</td>
<td>6.14</td>
<td>80.72</td>
</tr>
</tbody>
</table>

Table 3: Variance Decomposition for Broad Money Supply

<table>
<thead>
<tr>
<th>Period</th>
<th>GDP_GR</th>
<th>SACU</th>
<th>M2</th>
<th>INFL</th>
<th>INT</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.43</td>
<td>1.18</td>
<td>98.39</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>0.89</td>
<td>2.45</td>
<td>93.02</td>
<td>3.13</td>
<td>0.51</td>
</tr>
<tr>
<td>3</td>
<td>1.61</td>
<td>4.25</td>
<td>89.25</td>
<td>4.16</td>
<td>0.73</td>
</tr>
<tr>
<td>4</td>
<td>2.18</td>
<td>4.35</td>
<td>84.41</td>
<td>4.33</td>
<td>0.72</td>
</tr>
<tr>
<td>5</td>
<td>2.18</td>
<td>4.48</td>
<td>88.15</td>
<td>4.39</td>
<td>0.80</td>
</tr>
<tr>
<td>6</td>
<td>2.18</td>
<td>4.48</td>
<td>88.14</td>
<td>4.39</td>
<td>0.81</td>
</tr>
<tr>
<td>7</td>
<td>2.19</td>
<td>4.48</td>
<td>88.11</td>
<td>4.40</td>
<td>0.82</td>
</tr>
<tr>
<td>8</td>
<td>2.20</td>
<td>4.48</td>
<td>88.11</td>
<td>4.40</td>
<td>0.82</td>
</tr>
<tr>
<td>9</td>
<td>2.20</td>
<td>4.48</td>
<td>88.10</td>
<td>4.40</td>
<td>0.82</td>
</tr>
<tr>
<td>10</td>
<td>2.20</td>
<td>4.48</td>
<td>88.10</td>
<td>4.40</td>
<td>0.82</td>
</tr>
<tr>
<td>11</td>
<td>2.21</td>
<td>4.48</td>
<td>88.10</td>
<td>4.40</td>
<td>0.82</td>
</tr>
<tr>
<td>12</td>
<td>2.20</td>
<td>4.48</td>
<td>88.10</td>
<td>4.40</td>
<td>0.82</td>
</tr>
<tr>
<td>Average</td>
<td>1.89</td>
<td>4.01</td>
<td>89.50</td>
<td>3.90</td>
<td>0.71</td>
</tr>
</tbody>
</table>

Table 4: VAR Lag Order Selection

<table>
<thead>
<tr>
<th>Variables</th>
<th>Augmented Dickey Fuller Test</th>
<th>Phillips and Perron Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>C</td>
<td>C&amp;T</td>
</tr>
<tr>
<td>LGDP</td>
<td>-0.07</td>
<td>-1.72</td>
</tr>
<tr>
<td>LM2</td>
<td>-1.49</td>
<td>-2.95</td>
</tr>
<tr>
<td>LSACU</td>
<td>-2.03</td>
<td>-2.06</td>
</tr>
<tr>
<td>INFL</td>
<td>-1.41</td>
<td>-1.41</td>
</tr>
<tr>
<td>INT</td>
<td>-1.96</td>
<td>-2.28</td>
</tr>
</tbody>
</table>
The inverse roots of the AR polynomial results presented on Figure 3 indicate that the SVAR model is stable as all the roots are within the circle, a condition necessary for model stability.

The Portmanteau Test for autocorrelation indicates that the data does not suffer from autocorrelation since the P-value is insignificant as shown on Table 5. The LM Test also indicates the absence of serial correlation since the P-value is insignificant. However, the model failed the Jarque-Bera test indicating that the residuals are not normally distributed.

Table 5: Other Diagnostic Tests

<table>
<thead>
<tr>
<th>Test</th>
<th>Chi/LM Stat/ JB Stat</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Portmanteau Test</td>
<td>31.51772</td>
<td>0.1724</td>
</tr>
<tr>
<td>LM Test</td>
<td>21.54710</td>
<td>0.6617</td>
</tr>
<tr>
<td>Jarque-Bera Test</td>
<td>166.8358</td>
<td>0.0000</td>
</tr>
</tbody>
</table>

6. CONCLUSION AND POLICY RECOMMENDATIONS

The paper analyses the relationship between SACU receipts and monetary policy in Eswatini using a Structural Vector Autoregressive approach. It uses four variables, which are; broad money supply, SACU Receipts, GDP growth and interest rate. The impulse response results revealed that a positive shock on SACU receipts has a positive effect on broad money supply and GDP growth. The effect on interest rate was somewhat mixed. The variance decomposition results revealed that SACU receipts has a significant effect on both broad money supply and interest rate in the country. GDP growth also has a sizeable effect on broad money supply whiles interest rates had the least effect. GDP growth and broad money supply have a significant effect on interest rates.

Based on the findings of the study, the Central Bank should use open market operations to mop up excess liquidity so that money supply does not increase as a result of the positive shocks of SACU receipts since they have an effect on liquidity.

REFERENCES


Risk Taking Channel of Monetary Policy Transmission Mechanism in Eswatini- An Application of Panel VAR, SVAR and VECM

Simiso Mkhonta and Ntobeko Dlamini

Abstract

This paper empirically investigates the existence of the risk taking channel of monetary policy in Eswatini by using a panel of banking sector unsecured loans to total assets ratio and non-performing loans to total gross loans as a measure of bank risk over the period 2009Q1-2018Q1. Using the Panel Vector Error Correction model and the Structural VAR model, the results reveal the presence of risk-taking by the banking sector and suggest that restrictive monetary policy increases the probability of default on unsecured loans, which would result in an increase in non-performing loans.

Keywords: Monetary policy, Transmission mechanisms, Risk-taking channel; Eswatini, Panel VAR, VECM, SVAR.

1. INTRODUCTION

Credit booms have generally preceded most financial crises from the Credit Crisis of 1772, which originated in London and then spread to other parts of Europe. Of late, there has been the Global Financial Crisis of 2007-08 that originated in the United States. Prolonged low interest rates by Central Banks have compounded risk taking by commercial bank resulting in financial crisis. The narrow price stability objective of Central Bank led to them ignoring financial stability. The recent financial crisis has seen Central Bank broadsiding their mandate to also focus on financial stability. Particular emphasis has been put on how monetary policy affects risk perceptions and attitudes of banks.

The paper seeks to determine the existence of the risk-taking channel of monetary in the banking sector in Eswatini in the context of monetary policy changes. The paper will determine whether banks take more or less risk following monetary policy easing or tightening. Monetary policy movements as focused on price and output stability ought to take cognizance of its effects on financial stability; by its mere movement, banks adjust their risk perception and change their financial stability position.

The rest of the paper is arranged as follow; Section 2 gives an Overview of Monetary Policy and the Banking Sector in Eswatini; Section 3 is the Empirical and Theoretical Literature Review; Section 4 discusses the Measurement of Bank Risk and Data Description; Section 5 is the Methodology and Model Specification; Section 6 presents the Results and Discussions, and Section 7 are Conclusions and Policy Recommendations.

2. AN OVERVIEW OF MONETARY POLICY AND THE BANKING SECTOR IN ESWATINI

The discount rate is main monetary policy toll used by the Central Bank of Eswatini (CBE) in influencing monetary nominal and real variables (see graph 2. below). The CBE has occasionally altered the reserve requirement for the banking sector in a bid to influence commercial bank’s decision on credit and risk taking (see graph1. below). The Central Bank of Eswatini established the financial stability unit immediately after the global financial crisis of 2007/08 to looks into the soundness of financial institutions and monitor early warning indicators. The Financial Institutions Act, 2005 and the Central Bank Order, 1974 is currently under review with the aim of incorporating the Financial Stability Bill in line with the subsequent broad based shift in the focus of monetary policy by the Central Banks after the global financial crisis (Central Bank of...
The CBE has however exercised prudent monetary policy by pursuing a fixed exchange rate regime with South Africa. The choice of monetary policy regime rests on three premises as theory provides. Firstly, when price adjustment in the goods markets is slower relative to asset markets the monetary anchor is the best option of monetary policy regime. Secondly, when prices in the asset markets adjust faster than in the goods markets the exchange rate anchor provides a better insulation for the economy. Thirdly, Klein and Shambaugh (2007), Adam and Cobham (2007) and Said et al (2012) with respect to strong trade links and the risk of imported inflation suggest that bilateral trade flows between countries are enhanced in the presence of currency boards or monetary unions.

Therefore, when the CBE changes the discount rate it considers the South African Reserve bank’s (SARB) monetary policy stance given the parity between the two countries’ currencies. Consequently, the Eswatini and South Africa inflation trends move in the same direction. The monetary policy choice of exchange rate targeting is favorable for Eswatini because of the strong trade link with South Africa.

The financial sector in Eswatini is small and well diversified. The sector is regulated by Central bank of Eswatini and the Financial Services Regulation Authority (FSRA). The FSRA is focused on supervision of the non-bank financial services providers in Eswatini. The modernizations of the financial sector in Swaziland has benefitted from South Africa, the biggest and sophisticated economy in Africa. The banking sector in Eswatini consists of the Central Bank of Eswatini (CBE), three privately owned commercial banks a government owned development bank and a building society.

The Eswatini banking system has is adequate capital buffer. The capital ratios of the commercial banks are above the minimum and their profitability is high. The assets of the banking sector with respect to the four commercial banks (FNB, Standard Bank, Nedbank and Swaziland Development and Savings Bank) have more than doubled in the period under review (2009 q1 to 2018 q1) from plus 8 billion in 2009 to a level of plus 19 billion in 2018. The biggest bank has a total asset value of more than 7 billion Emalangeni and the smallest bank has a total asset value of just over 2 billion Emalangeni. Banks that fall in between are two and have total asset values of just over 5 billion Emalangeni each. The medium and large banks have shown strong growth from 2009 to 2018 with the small bank showing far weak growth. The local ownership of the small bank has led it lag behind in innovation hence its slow growth.

Graph 3. Commercial Bank Size and Growth.

Source: Central bank of Eswatini (CBE)

3. EMPIRICAL AND THEORETICAL LITERATURE REVIEW

Central banks change monetary policy in order to affect the credit that commercial banks extend. Monetary policy changes are
often exercised by changing the interest rate at which Central Banks lend to the commercial banks. The commercial banks then also change the level of interest rate at which they extend credit to their customers. The banks are open to the risk of their customers not being able to pay back the money received from the banks. There are different loans issued by banks and they have different payback risks. The commercial banks can invest in high-risk assets or low-risk assets depending on the monetary policy stance taken by the Central Bank. The dynamics behind the level of risk taking by the commercial banks influenced by monetary policy changes is twofold according to Swankiri (2009) and López et al (2011).

Firstly, interest rates lower than the benchmark rate will increase asset prices through the low cost of capital and consequently higher profit margin. The higher profit margins entice banks to search for higher yields, acquiring risky assets in the process. This is referred to as the risk-taking channel. The value of Banks’ assets from stocks to securitization base is driven up further increasing the appetite for risk taking with the euphoria of a healthy balance sheet and sufficient liquidity for a fall back. Secondly, interest rates lower than the benchmark rate will increase the appetite for commercial banks to increase investment on risky assets/loans to compensate for the low lending rates referenced on the monetary policy stance. Most literature refers to this channel of monetary policy transmission as the “search for yield”. In short, commercial banks would be recording low returns on loans due low interest rates but at the same time experiencing an increase in the valuation of its asset portfolio in stocks, bonds and mortgage security a combination of factors that increase the risk intake through unsecured loans; the search for yield and balance sheet euphoria.

De Nicolo et al. (2010) adds a third risk taking channels of monetary policy, the pro cyclical leverage attributed to Adrian and Shin (2008). The increase in the price of assets, brought about by interest rates lower than the benchmark rate, increase the value of the commercial banks’ equity and reduce the leverage ratio. With a targeted leverage ratio, banks will tend to increase their leverage levels to attain the targeted ratio. The funds raised therein would be apt to risky investments given both the yearning for yields and a healthy balance sheet capacity to embrace higher risk.

Brei et al (2017) in examining the risk taking tendency of banking sector in sub-Saharan Africa discovered that the regulatory environment in addition to macroeconomic determinants, such as growth, public debt, financial deepening and economic structure propagate commercial bank risk taking.

Jiménez et al (2009) investigated whether the stance of monetary policy has an impact on the level of risk of individual bank loans. In the study, they used micro data of the Spanish Credit Register covering the period 1984-2006. From the results, the study found that low interest rates reduce the probability of default of the outstanding loans of Spanish banks in the short term. In the medium term, however, due to higher collateral values and the search for yield, banks tend to grant riskier loans and, in general tend to soften their lending standards: they lend more to borrowers with a bad credit history and with prospects that are more uncertain.

While the documentation of the study of risk-taking channel continues to be covered in the developed world, empirical evidence in the Sub-Saharan economy is still scanty. This paper therefore, attempts to provide additional empirical evidence on the link between the stance of monetary policy and risk-taking with particular focus on the Kingdom of Eswatini.
4. MEASUREMENT OF BANK RISK AND DATA DESCRIPTION

The measurement of bank risk is difficult and wide. (Ashraf et al (2016), Jacques and Nigro (1997), Rime (2001), and Jokipi and Milne (2011) use risk-weighted assets to total assets ratio and non-performing loans as risk measures. The risk-weighted assets to total assets ratio is an ex-ante indicator of risks as it refers to future events, such as the potential returns of a particular security which is usually unsecure loans to total assets. Ashraf et al (2016), considers government securities as the safest among all assets and on the far end unsecured commercial loans as the most risky asset. Suwankiri (2010) uses a forward-looking indicator in the form of loan provision set aside to pay for losses that are anticipated to occur in the future as earlier mentioned.

The benchmark rate is the theoretical discount rate that CBE is supposed to follow. The discount rate is set by the CBE either could be below, above or equals to the benchmark rate. The benchmark rate is estimated using the Taylor rule in line with Aklan et al (2014) and Suwankiri (2010). The difference between the discount rate and the benchmark rate is the interest rate gap. Low interest rates that could result in banks increasing their risk-taking appetite are those that are below the benchmark. The benchmark rate’s theoretical base is derived from the Taylor Rule. The Taylor rule is therefore calculated as follows to give the benchmark rate:

\[ i_t = r^* + pi_t + \beta_1(pi_t - pi^*) + \beta_2(y_t - y^*) \]  

Where:

- \( i_t \) = nominal fed funds rate
- \( r^* \) = real discount rate (the average real discount rate)
- \( pi \) = rate of inflation
- \( pi^* \) = target inflation rate
- \( y^* \) = logarithm of potential output
- \( y \) = logarithm of real output
- \( \beta_1 \) and \( \beta_2 \)

The potential output is established using the Hodrick-Prescott filter (HP filter) which removes the cyclical trend in the output.

The Taylor rule regression below is run to obtain values of \( \beta_1 \) and \( \beta_2 \):

\[ CBE\ discount\ rate = constant + \beta_1*inflation + \beta_2*output\-gap. \]

\[ i_t = r^* + pi_t + 0.1637(pi_t - pi^*) + 0.00032(y_t - y^*) \]  

For the robustness of the results, data from 1980 to 2016 is used.

5. METHODOLOGY, MODEL SPECIFICATION

Various authors have adopted a wide diversity in methodologies in tackling studies on risk-taking channels of monetary policy. The papers use different variables and indicators in explaining the risk-taking channel selected from different authors but adopt mainly from the study done by Suwankiri (2010) in the case of Thailand. Methodologies chosen in examining the risk-taking channel range from dynamic panel models to GMM estimation and Structural Vector Autoregressive models depending on the objectives of different authors.

Ashraf et al (2016) explains the risk-taking channel of monetary policy as the risk-weighted asset and non-performing loans to total assets with independent variables being measures of regulatory pressure. He employs the GMM panel estimator of Blundell and Bond, which is suitable for the dynamic panel...
models having fixed effects and endogenous regressors. Aklan et al (2014) used a dynamic panel to estimate the risk-taking channel in Turkey and was able to capture the fixed effects in panel data by using variables for unique bank characteristics.

Lown and Morgan (2006) conduct VAR analysis using a measure of bank lending in the United States. The VAR analysis is able to show that the shocks to lending standards are significantly correlated with innovation in commercial loans at banks and in real output. The model criteria is determined by the objective of the author and the employment of the Panel VAR, SVAR and VECM permits the investigation of monetary policy shocks.

The holistic basic models are specified as follows; one with non-performing loans to total gross loans and the other with unsecured loans to total assets as independent variable in vector autoregressive nature:

\[ NPL_t = \alpha_{11} + \beta_{12} NPL_{it-n} + \beta_{13} \Delta MP_{it-n} + \beta_{14} TGAP_{it-n} + \epsilon_{1t} \]  
\[ UNS_{loans_t} = \alpha_{21} + \beta_{22} UNS_{loans_{it-n}} + \beta_{23} \Delta MP_{it-n} + \beta_{24} TGAP_{it-n} + \epsilon_{2t} \]

Where \( NPL_t \) are non-performing loans as a ratio of total assets and \( UNS_{loans_t} \) are unsecured loans to total assets, which is the risk-weighted assets to total assets. \( \Delta MP_t \) is the change in monetary policy stance, \( TGAP_t \) is the difference between the actual policy rate and that generated by the ‘Taylor rule’ with no interest rate smoothing.

In addition to the baseline we extend our model by introducing two bank-specific variables (Bank size and Bank profitability), which empirical literature has found to have an influence when banks undertake to engage in risky investments. The following model is thus used to assess the impact of bank specific characteristic on bank risk-taking:

\[ NPL_t = \alpha_{31} + \beta_{32} NPL_{it-n} + \beta_{33} \Delta MP_{it-n} + \beta_{34} TGAP_{it-n} + \beta_{35} Bank_{size_{it-n}} + \beta_{36} Bank_{profit}_{it-n} + u_{3t} + \epsilon_{3t} \]  
\[ UNS_{loans_t} = \alpha_{41} + \beta_{41} UNS_{loans_{it-n}} + \beta_{42} \Delta MP_{it-n} + \beta_{43} TGAP_{it-n} + \beta_{44} Bank_{size_{it-n}} + \beta_{45} Bank_{profit}_{it-n} + u_{4t} + \epsilon_{4t} \]

Where \( Bank_{size_{it-n}} \) is the bank size, which is to take big and small form; \( Bank_{profit_{it-n}} \) is bank profitability and \( u \) vector of dependent variable-specific random-effects.

Before estimating the panel, VAR model, the basic procedure to establish the stationarity as well as cointegration of the data used in the model is critical. Panel unit root tests are employed to check the stationarity of the data while the long-run relationship is checked using the Johansen Fisher Panel Cointegration.

In order to identify the impact and the sources of shocks on the risk-taking channel in the country’s banking sector, we consider the following structural VAR model from which impulse response functions are generated. The relationship between the reduced form disturbances \( \epsilon \) and the structural disturbances \( \epsilon \) takes the form specified in equations 7 and 8.
6. RESULTS AND DISCUSSIONS

In this section, we present the three main set of results provided by the panel VAR model, the VECM and the structural VAR impulse response function. We first discuss the test results for unit root and cointegration mainly to avoid spurious regression that may create potential bias of the results.

The variables that are chosen to investigate the impact monetary policy stance and bank characteristics are asset risk, defined as the risk-weighted assets to total assets ratio and non-performing loans to gross loans (Ashraf et al, 2016; Jacques and Nigro, 1997; Jokippii and Milne, 2011; and Beltratti and Paladino, 2013) and (Ashraf et al, 2016; Jacques and Nigro, 2017) and Ombuya, 2017 and Bredl, 2018 respectively.

The independent variables adopted in the study are the monetary policy stance (Central bank discount rate), a proxy of risk-taking channel measured as the deviation of the going Central bank discount rate from the benchmark rate and the idiosyncratic characteristics of banks captured in the form of size (Asset base) (Suwankiri, 2010) and profitability (lending margin) of banks (Martynova et al, 2015).

Table 2. Panel Unit Root Tests

<table>
<thead>
<tr>
<th>Statistic</th>
<th>big</th>
<th>small</th>
<th>high</th>
<th>low</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPS W-stats</td>
<td>91.23*</td>
<td>103.73*</td>
<td>54.30*</td>
<td>33.96*</td>
</tr>
<tr>
<td>Order of Integ.</td>
<td>l(1)</td>
<td>l(1)</td>
<td>l(0)</td>
<td>l(1)</td>
</tr>
<tr>
<td>ADF-Fisher</td>
<td>156.07*</td>
<td>153.81*</td>
<td>29.41*</td>
<td>78.19*</td>
</tr>
<tr>
<td>Order of Integ.</td>
<td>l(1)</td>
<td>l(1)</td>
<td>l(0)</td>
<td>l(1)</td>
</tr>
<tr>
<td>PP-Fisher</td>
<td>156.07*</td>
<td>153.81*</td>
<td>29.41*</td>
<td>78.19*</td>
</tr>
<tr>
<td>Order of Integ.</td>
<td>l(1)</td>
<td>l(1)</td>
<td>l(0)</td>
<td>l(1)</td>
</tr>
</tbody>
</table>

* denotes significance at 1 per cent. All variables expressed in percentages.

All the variables are integrated of order one except for changes in the monetary policy stance, which is integrated of order zero. Using a lag length of 1 based on the Akaike Information criterion (AIC).

6.1 Panel VAR with Unsecured Loans (ex-ante)

This section presents the results for impulse response functions and the variance decomposition from the panel VAR. The appropriate lag length selection is essential for panel VAR. The PVAR impulse response function in Graph 7 indicate that unsecured loans respond negatively to a change in the discount rate before increasing back to a new level of steady state by the tenth quarter. In the case of tight monetary policy (that is a situation where the discount rate is above the benchmark rate), unsecured loans were found to also found to have a negative and immediate response and thereafter returns to the equilibrium position.

The impulse response functions derived from the unrestricted panel-VAR in the case of bank size (both large and small) are presented in Graphs 9 and 10. The effect of bank size as shown, is negative in response to a shock on big bank assets and negative
for small banks. Similarly, Graphs 5 and 6 shows the response of unsecured loans to shocks in highly and lowly profitable banks. The results show that unsecured loans is responsive to such shocks, as there seems to be movement from the initial equilibrium in the immediate period.

Graph 7
Response of unsecure Loans to Change in Discount Rate

Graph 8
Response of unsecure Loans to Tight Monetary Policy

Graph 9.
Response of Unsecured Loans to Big Bank

Graph 10.
Response of Unsecured Loans to Small Bank

Graph 11.
Response of Unsecured Loans to Highly Profitable Banks

Graph 12.
Response of Unsecured Loans to Low Profitable Banks
Table 3A and Table 3B in appendix 2 reports the variance decomposition analysis of unsecured loans from the PVAR model. The variance decomposition shows that own shocks explain total variation in unsecured loans in the first quarter period. In the tenth quarter, approximately 9 percent of total variation in unsecured loans is explained by a change in monetary policy. In the same period, restrictive monetary policy accounts for at least 3 percent of total variation. Bank characteristic are captured in twofold in Table 3A and 3B and indicate that small banks account for larger share of fluctuations in unsecured loans but with less magnitude. Bank profitability is also captured in a similar fashion and indicates that medium profitable banks account for larger fluctuation in unsecured loans compared to the other categories.

6.2 Panel VAR with Non-Performing Loans (ex-post)
Graphs 13-18 again shows the time paths of the responses of non-performing loans to “shocks” in change in discount rate, tight monetary policy, bank size and bank profitability. The result show a positive and immediate response of non-performing loans to a shock on a change in discount rate and tight monetary policy in the first 4 quarters before normalizing to the equilibrium position. Small and big banks present contrasting results. In the case of small banks, non-performing loans were found to respond negatively to a shock on small banks assets in the first four quarters before increasing to a point above the equilibrium position. A shock on the on banks with high profitability indicates a positive immediate response of non-performing loans as opposed to lowly profitable banks which generate a negative response.
Table 4A and Table 4B in appendix A shows the variance decomposition analysis of non-performing loans. From Table 4A the results indicate that 25 percent of variance of the forecasting error of non-performing loans is determined by a change in the discount rate, 3 percent is determined by a restrictive monetary policy and 55 percent is determined by own innovations after 10th period. The result indicate therefore indicate that apart from own shocks, a change in monetary policy coupled with bank specific characteristic particularly small sized and highly profitable banks, are the leading variables determining the variation in non-performing loans.

The test for cointegration show a trace test and eigenvalue test indicating 7 cointegrating equation at 0.05 level of significance. VECM is constructed only if the variables are cointegrated; cointegration implies evidence of a long-run relationship among the variables. The estimated long-run equation from the vector error correction model in e-views is:

\[ \Delta \text{NPL} = \beta_1 \Delta \text{MP} + \beta_2 \text{RDUM} + \beta_3 \text{Bank_size} + \beta_4 \text{Bank_prof} + \epsilon \]

Table 3. Vector Error Correction Results NPL as Independent Variable.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independent Variable</th>
<th>Non-Performing loans to total assets ratio(NPL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \Delta \text{MP} )</td>
<td>0.1849</td>
<td>0.068*</td>
</tr>
<tr>
<td>( \Delta \text{MP} )</td>
<td>(14.280)</td>
<td>(7.164)</td>
</tr>
<tr>
<td>( \text{TGAP} )</td>
<td>0.0246</td>
<td>0.015*</td>
</tr>
<tr>
<td>( \text{TGAP} )</td>
<td>(-4.560)</td>
<td>(4.241)</td>
</tr>
<tr>
<td><strong>Bank_size</strong></td>
<td><strong>Big</strong></td>
<td>-0.1857*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(3.318)</td>
</tr>
<tr>
<td></td>
<td><strong>Small</strong></td>
<td>0.334*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(5.670)</td>
</tr>
<tr>
<td><strong>Bank_prof</strong></td>
<td><strong>high</strong></td>
<td>0.499*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.099)</td>
</tr>
<tr>
<td></td>
<td><strong>low</strong></td>
<td>0.334*</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.211)</td>
</tr>
<tr>
<td><strong>Constant</strong></td>
<td></td>
<td>0.170863 1.486</td>
</tr>
</tbody>
</table>

All the variables were found to be significant and in line with theory. The variables are found to be robust in both estimation. The monetary policy indicators are robust they remain significant and with the right signs in both model estimation. An increase in monetary policy (discount rate) results to an increase in non-performing loans. Non-performing loans is an ex-post measure of banks portfolio risk and credit quality. The banks will not give out risky loans when interest rates are high and this will result in a slow-down of the procurement of new unsecured loans but will record high non-performing loans as customers default due to high interest rates.

Therefore, higher interest rates reduce risk-taking by commercial banks but this can be seen in the estimation of unsecured loans in model below. This is in line with Jimenez et al (2009), Dubecq et al (2009), and Suwankiri (2010) who found that higher interest rates increase risk on outstanding loans leading to commercial banks recording high non-performing loans.

With non-performing loans as a measure of risk, an increase in interest rates above the benchmark more of non-performing loans will be experienced in the banking sector hence the positive sign. So tighter monetary policy results in a realization of high non-performing loans. This is in line with Ashraf (2010) who finds the high regulatory pressure variable to have a positive impact on non-performing loans.
Bank size shows that the small and medium banks experience higher non-performing loans because they are more into yield searching in a quest to grow.

In the case of bank profitability, the results indicate that high and low profitable banks take on more risk in the form of non-performing loans. Ample cash flow for highly profitable banks is susceptible to be channeled towards risky assets and the quest to grow for lower profitable banks entice them to aggressively search for higher yields. Medium profitable banks do not have extra cash flow to invest in risky assets like highly profitable banks and neither are they lowly profitable for them to search for yield.

Table 5. Vector Error Correction Results; Unsecured Loans as Independent Variable.

<table>
<thead>
<tr>
<th>Dependent variables</th>
<th>Independent Variable</th>
<th>Unsecured loans to total assets ratio(UNS_loans)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ΔMP&lt;sub&gt;t&lt;/sub&gt;</td>
<td>-0.234*</td>
<td>-0.1384</td>
</tr>
<tr>
<td></td>
<td>(-6.983)</td>
<td>(14.322)</td>
</tr>
<tr>
<td>TGAP&lt;sub&gt;t&lt;/sub&gt;</td>
<td>-0.038*</td>
<td>-0.0211</td>
</tr>
<tr>
<td></td>
<td>(-5.882)</td>
<td>(-5.295)</td>
</tr>
<tr>
<td>RDUM&lt;sub&gt;t&lt;/sub&gt;</td>
<td>-0.817*</td>
<td></td>
</tr>
<tr>
<td></td>
<td>(13.812)</td>
<td></td>
</tr>
<tr>
<td>Bank_size&lt;sub&gt;t&lt;/sub&gt;</td>
<td>Big</td>
<td>2.117*</td>
</tr>
<tr>
<td></td>
<td>(10.241)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Small</td>
<td>-1.964*</td>
</tr>
<tr>
<td></td>
<td>(9.464)</td>
<td></td>
</tr>
<tr>
<td>Bank_prof&lt;sub&gt;t&lt;/sub&gt;</td>
<td>high</td>
<td>-5.03*</td>
</tr>
<tr>
<td></td>
<td>(5.713)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>low</td>
<td>-1.65*</td>
</tr>
<tr>
<td></td>
<td>(2.912)</td>
<td></td>
</tr>
<tr>
<td>Constant</td>
<td>11.408</td>
<td>0.2868</td>
</tr>
</tbody>
</table>

The impact of monetary policy on unsecured loans to total assets ratio was found to be statistical significant and in line with existing theory and empirical literature. A unit change in monetary policy denoted by an increase in interest rates reduce the risk taking by commercial banks. In this regard, banks are reluctant to invest/ lend more money because the probability to default when interest rates increase is high. Steudler and Zurlinden (1997) show that an increase in interest rates result in a fall in unsecured loans.

Similarly, the TGAP variable was found to be statistically significant with a negative impact on unsecured loans to total assets ratio indicating that the risk-taking channel does exist. When monetary policy is restrictive, (i.e. the discount rate is well above the benchmark rate) banks are reluctant to take on more risk. This also confirms the findings by Suwankiri (2010) where he found that loose monetary policy in Thailand leads to banks procuring risky assets through loans.

Among the control variables, the effect of bank size on risk-taking by banks is in twofold. Larger and smaller banks are more reluctant to invest in risky assets/loan. On the other hand, the medium banks are yield searching hence they would be willing to invest in risky assets hence the high non-performing loans as shown in table three. This is seen in the model in table 4 where non-performing affect more the smaller banks.

The profitability coefficient was found to be statistically significant. Highly and profitable banks were found issue more unsecured loans with the abundance of cash flow due to profitability. This is in line with Aklan (2016) and Borio and Zhu (2008) where he confirms that more cash flow lead to bank issuing risky loans.

The impulse responses are carried out on the monetary policy variables of changes in interest and monetary policy stance as defined by the deviation of the discount rate from the benchmark rate. The results of the impulse response function are shown below.

The impulse response function based on non-performing loans (NPL<sub>t</sub>) are generated from a structural vector autoregressive model with a Cholesky one SD (df adjusted) innovation and yield the following results:
A positive shock in the discount rate results in an increase in non-performing loans, which peters out. The shock and the destabilization of non-performing last for an estimated period of 25 years approximately 100 quarters at baseline level. Interventions from the Central could help ameliorate the problem and shorten the life span of the crisis.

A tightening of monetary policy shock results; that is a shock in monetary policy with reference to the benchmark rate results in a more pronounced explosion in non-performing loans due to interest rates that far beyond the interest rate conducive to economic fundamentals of inflation and unemployment. These findings are in line with Ashraf (2016) and in his study of the risk-taking channel of monetary policy in Kenya.

Graph 16 and 17 below shows the impulse responses generated with respect to unsecured loans.

The impulse response function of the structural VAR confirm that tight monetary policy and an increase in interest rates lead to a reduction in risk taking (Jimenez et al, 2009; Dubecq et al, 2009; and Suwankiri, 2010) in that unsecured loans are avoided by commercial banks hence a fall in unsecured loans as shown in Graph 16 and 17. A tightening of monetary policy more procurement of unsecured loans hence reduction in risk-taking but on the other hand non-performing loans could be on the increase.

7. CONCLUSION AND POLICY RECOMMENDATIONS
The finding of the paper suggest that shocks in monetary policy should be avoided together with loose monetary policy. Monetary policy shocks are likely to follow as a reaction to prolonged loosening monetary policy as in the case of the global financial crisis of 2007/08. The US responded in a hawkish manner after leaving interest rates at below 0.5 per cent for a prolonged period (before 2010 to 2016). The interest rates were aggressively hiked resulting in a spate of non-performing loans emanating from erstwhile risk taking during the period of prolonged monetary policy loosening.
The conduct of monetary policy in Eswatini is makes no reference to an explicit benchmark rate has to incorporate risk management framework and make explicit reference to the benchmark rate to guide the central bank from overtightening and over loosening monetary policy, which would invariably end up weakening the financial sector accelerator to economic growth.

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The Impact of AGOA Loss and Anticipated Gains from Re-admission of Eswatini to AGOA Preferential Arrangement

Phindile Masuku and Nomvuyo Dube-Mabuza

Executive Summary

When Eswatini was designated as an AGOA eligible country in 2001, it greatly benefited the economy, especially the textile manufacturing industry. Exports to the US grew by 76 percent between the periods 2001 and 2002 as more Taiwanese textile companies invested in the country. This boosted the country's exports and provided significant employment opportunities especially for the low skilled labour force. In addition to the textile and apparel sector, other industries including the sugar industry, processed fruits industry, handicraft industry and other selected processed foods also benefitted from the agreement and boosted the country’s economic activity.

The country’s exports to the US however started to decline in 2005, greatly affected by the phasing out of the Multi-Fibre Arrangement (MFA) of the World Trade Organization’s Agreement on Textiles and Clothing, and they declined further during the global financial crisis in 2008. As the textile exports to the US experienced a steady decrease from 2005, textile exports to South Africa (SA) started increasing with more companies diverting to the SA market. When the country lost the AGOA agreement in 2015 the country’s exports to the US recorded a significant decline, falling by 74 percent further affecting the country’s overall performance. Massive job losses were reported especially in the textile and apparel industry and one firm that exported all its products to the US relocated some of its production lines to Lesotho.

Whilst dealing with the observed setbacks in economic activity, particularly in the manufacturing sector during the loss of AGOA, the most affected companies in the textile industry explored alternative coping strategies to avoid completely closing shop. They managed to take advantage of the regional and domestic demand and continued to maintain their production activity and their reported revenue contributions, especially taxes to government continued to grow. Overall, all the affected industries managed to adopt different coping strategies which include market diversification, payment of duty costs for their exports and also utilization of other trading arrangements.

As the country has been re-admitted into the AGOA arrangement, it is critical for the economy to take full advantage of this opportunity. In order for the country to extensively gain from the AGOA preferential trade agreement, there is need for all the sector products that are listed as eligible to trade under AGOA to fully utilize this duty-free access afforded by the US government. AGOA has a great potential to positively impact on the growth of exports in the country and further on the overall economic growth through the tangible incentives that offer wider market opportunities. There is need for government and relevant stakeholders to create awareness on the AGOA agreement as well as assist firms who have interest in taking advantage of the opportunity.

1. BACKGROUND

The United States and Kingdom of Eswatini have had good bilateral relations since Eswatini’s independence from the United Kingdom in 1968 as a constitutional monarchy. According to the US Department of State (2015), the United States supports health promotion and health systems strengthening, entrepreneurship, youth development and education, security sector...
capacity building, and trade promotion in Eswatini. There is a US policy in place, which seeks to maintain and strengthen bilateral relations, and stresses Eswatini’s continued political and economic reform. On January 18, 2001, Eswatini was designated as the 35th African Growth Opportunity Act (AGOA) eligible country. According to the AGOA official website, the AGOA scheme allows countries to export goods to the United States tariff-free.

Foreign investors took advantage of Eswatini’s AGOA-eligibility status, especially in the garment manufacturing industry. The duty-free-quota-free access to the US market under AGOA resulted in Taiwanese companies investing in the country, hence the textile sector in Eswatini grew significantly between the years 2000 and 2004. According to Amalgamated Trade Union of Eswatini (ATUSWA, 2014), as at 2014, the sector had employed at least 16,000 people. Therefore, considering that Eswatini faces an unemployment rate (strict definition) of around 23.0 percent (Ministry of Labour and Social Security, Labour Force Survey, 2016), the amount of people that the textile sector employs is quite significant. Even though the business sector did not take full advantage of the AGOA scheme, the textile industry was not the only beneficiary of the scheme. In the past years, the country had exported the following additional products under the AGOA scheme; sugar and sugar products, canned fruit, handicraft products, chili sauce, fruit and vegetables, honey and jam as well as ethanol.

In June 2014, it was announced that Eswatini would be removed from AGOA, effective January 2015 after failing to meet five benchmarks. These benchmarks included full passage of the amendment to the Industrial Relations Act allowing for the registration of trade union and employer federations; Terrorism Act; Public Order Act allowing for the full recognition of the freedom of assembly, speech and organization as well as Sections 40 and 97 of the Industrial Relations Act. Observers noted that exception from AGOA would surely affect the textile and manufacturing sectors of the economy as well as hurt private sector growth and result in job losses. The Economist- Intelligence Unit (July 2014) reported that the loss of AGOA status threatened to have serious negative consequences for the already weak Eswatini economy in general and in particular, the textile and apparel industry where it was predicted that there would likely be closures of companies that were totally dependent on AGOA, or their relocation to other countries. Shortly after the loss of AGOA status, the affected textile companies in Eswatini announced massive layoffs and some had to shut down their US production lines with some relocating part of their production lines to Lesotho (Company Survey Report, 2017). The resulting loss of employment increased hardship for the families of displaced workers (usually estimated at about seven dependents per employee (The Economist- Intelligence Unit, July 2014)). Investor perceptions of Eswatini as a stable location for foreign direct investment were also adversely affected threatening the country’s exports capability and GDP growth prospects.

The country was out of the AGOA agreement for three years before the US restored the trade benefits in December 2017. In the three years that the country lost its AGOA eligibility status, some observers have tried to quantify the loss to the economy, especially for the textile industry which was the hardest hit. According to the Times of Swaziland (January, 2018), the Federation of Eswatini Employers and Chamber of Commerce noted an estimated E600 Million in trade losses. The textile industry is one of the important sub-sectors within the manufacturing sector which accounts for a sizable share in GDP. It has a significant positive impact on trade. More importantly, the industry is
one of the significant informal employers in Eswatini and has a positive impact on other sectors such as transport operators, freight forwarders, commuter transport providers and street vendors (Kipling, 2010). On that account, any turbulence experienced in the apparel and textile sector is felt in the broader community not just the GDP itself. Hence, this underscores the importance of the sector in the continual growth of the Swazi nation as a whole.

Realizing this importance, it is therefore critical to study, in detail, the benefits of the AGOA arrangement for the period 2001 - 2014 and the effect on the economy during the years of ‘AGOA loss’ (i.e. 2015 - 2017), not only for the textile industry but also the other affected industries as well. These industries include; the sugar industry, handicraft products and the fruit processing industry. Such analysis would provide a guide on how the AGOA re-admission would prospectively influence the economy and business landscape of the country.

This study therefore aims at analyzing the impact of the AGOA loss and the anticipated gains from re-admission into the scheme. The main objectives include evaluating the impact on GDP, trade, financial sector and the government’s fiscal position, evaluating the impact on employment/unemployment during the eligible period and non-eligible period and the spillover effects on the economy. The paper will also highlight coping strategies for companies that continued trading with the US as well as draw lessons from other countries especially with respect to loss of AGOA. The rest of the paper is as follows: section 2 covers literature on AGOA loss for other countries, section 3 is the empirical strategy, section 4 presents the analysis, a summarized conclusion and recommendations is discussed in section 5.

What Is The African Growth Opportunity Act?: The African Growth and Opportunity Act (AGOA) is a United States Trade Act, enacted on 18 May 2000 as Public Law 106 of the 200th Congress. AGOA has since been renewed to 2025. The legislation significantly enhances market access to the US for qualifying Sub-Saharan African (SSA) countries. Qualification for AGOA preferences is based on a set of conditions contained in the AGOA legislation. In order to qualify and remain eligible for AGOA, each country must be working to improve its rule of law, human rights, and respect for core labor standards. The Act originally covered the 8-year period from October 2000 to September 2008, but legislative amendments signed into law by US President George Bush in July 2004 served to extend AGOA to 2015.

AGOA builds on existing US trade programs by expanding the (duty-free) benefits previously available only under the country’s Generalised System of Preferences (GSP) program. Duty-free access to the U.S. market under the combined AGOA/GSP program stands at approximately 6,500 product tariff lines, including the tariff lines that were added by the AGOA legislation. Notably, these newly added “AGOA products” include items such as apparel and footwear, wine, certain motor vehicle components, a variety of agricultural products, chemicals, steel and many others. After completing its initial 15-year period of validity, the AGOA legislation was extended on 29 June 2015 by a further 10 years, to 2025. The United States determines annually whether countries have met eligibility requirements set out in the AGOA legislation. The US President designates countries as eligible if they are determined to establish or are making continual progress towards meeting requirements.

2. REVIEW OF LITERATURE ON AGOA
The suspension of a certain country from benefitting from AGOA allows the study of the impact of the program on the country, the impact of the suspension thereafter as well as anticipated benefits of re-admission into
the program. For other eligible countries, the focus is on studying trends, primarily exports, GDP and employment, during the course of eligibility to observe any changes in dynamics of these variables.

2.1. Madagascar

One notable example to draw lessons from is Madagascar, which was a major apparel exporter with a large share of the US market prior to 2009. Madagascar was removed from AGOA in 2009 following an illegal seizure of the government (McAfee, 2014). Until the suspension, Madagascar had been an AGOA success story. According to Lewis (2004) the country exported on average over US$200 million worth of goods a year under the agreement, with a peak of over US$300 million in 2004. Half of all textile exports from that country, amounting to US$600 million, went to the US, and the textile sector was responsible for up to 8 percent of the country’s GDP. The textile industry in Madagascar also played an important role in terms of employment as it reportedly employed 100,000 workers, contributing significantly to poverty reduction in that economy.

AGOA suspension reduced total exports to the US by 57 percent in Madagascar. Exports fell from US$253 million in 2009 to US$108 million in 2010 and jobs were lost as a result of factory closure: approximately 27.8 percent job losses were reported (Fukunishi, 2013). The drastic fall of textile exports from Madagascar to the US after the suspension becomes quite clear as of 2011 whereby total exports to the US reached a low of US$87 million. This is illustrated in figure 1. Some firms restructured by increasing production for Europe in Madagascar, and shifting US destined production to Mauritius (Morris, 2013). This led to changes in the product mix in Madagascar, to shorter-run, more flexible and more complex products. Hence, arguably, effects of Madagascar being suspended from AGOA were mitigated by the free duty access to the EU market and change in trade mix.

On a paper to study the impact of Madagascar’s suspension from benefitting from AGOA, Fukunishi (2013) concluded that the suspension did not specifically affect low-skilled employment or female employment at greater rates due to the fact that exporters that continued in operation tended to increase their proportion of low-skilled over higher-skilled workers. As the textile sector continued to perform poorly, the resources and factors of production (labour) were reallocated to the rest of the economy. As a result, although total exports to the United States fell immediately following the loss of access to US markets for the textile sector, they gradually expanded as non-textile exports started to increase after 2010, hence, the Malagasy economy was able to readjust by tapping into other industries (Andriamananjara & Sy, 2015). It must be noted that Madagascar’s AGOA suspension had knock-on effects in the region, affecting raw materials providers to Malagasy factories such as Eswatini who lost an important market resulting in decreasing profits (Klaas, 2014).

**Figure 1: Madagascar’s Exports to the US: 2000 to 2017**

![Graph showing Madagascar's exports to the US from 2000 to 2017](source: AGOA Bilateral Trade Data Files)

In June 2014, the US announced the reinstatement of Madagascar’s AGOA eligibility, after nearly five years of suspension. From 2001-2009, Madagascar was a top exporter to the US under AGOA, averaging US$312...
million a year in exports (USAID, 2015). Madagascar has roared back to action since AGOA reinstatement. The economy has regained its footing and its exports are growing exponentially. Losing the AGOA scheme certainly hit hard on Madagascar but it is picking up where it left off, expanding on its existing textile knowledge and positioning itself for added exports.

With a skilled workforce and labor among the world’s cheapest minimum wage, ($38) per month, though with social security, medical benefits, transportation allowance and generally one meal per day on the job, factory workers can earn an average closer to $100 each month—the country is poised for sizable growth in the manufacturing sector (Donaldson, 2015). As shown in figure 8 above, total exports from Madagascar to the US have increased by 243 percent to US$741 million in 2017 from US$216 in 2014.

An AGOA strategy was developed with the aim of supporting the ability of Madagascar’s firms to successfully sell into the US market, leveraging every opportunity that AGOA provides. The strategy focused on the general business barriers faced by Madagascar’s entrepreneurs, and specifically those that disadvantaged firms that export to the US.

2.3. Lesotho
Lesotho is also another African country which has been quite successful in utilizing the AGOA scheme. The country’s fairly substantial clothing and textile industry to date can be attributed to exporting to the US market, through the AGOA scheme. Whilst the country already had an established infant textile industry prior to AGOA, the benefits which were brought about by AGOA saw Taiwanese companies investing in the country since 2001. According to Kipling (2010), in addition to the foreign direct investment attracted by AGOA, notable growth in employment was recorded, particularly for the low skilled labor which account for a larger portion of the country. Evidence shows that, employment in the textile industry grew from 9,847 in 1999 (pre-AGOA period) to about 53,087 in 2004 (during AGOA period), whereby the country’s garment industry became globally integrated, producing garments for huge brands including Gap and Lewis Strauss. The textile and garments industry in Lesotho has been hailed to be the country’s largest private sector employer (Mwanza, 2016). It is further noted that Lesotho exports substantially more apparel through AGOA than its closest rivals in the sector; Madagascar and Kenya. Furthermore, Lesotho’s textile exports are three times more than those of the Kingdom of Eswatini even though the two countries have similar geological features.

Figure 2; Lesotho’s Exports to the US: 2000 to 2017

However, Lesotho’s apparel export products to the US has been stagnant or declining in market share in the last decade. The country has been observed to be losing market share in the US against its competitors which include; Vietnam, Malaysia and Peru. In light of challenges in the US market, Lesotho has also tried to diversify its market share to the SACU region particularly RSA where a substantial amount of its products are now exported to.
3. RESEARCH METHODOLOGY

3.1. Data Collection

Both primary and secondary data was used to address the objectives of the paper. For primary data, a sample of companies was visited and interviewed on their performance during the Annual Company Survey exercise 2018. Questionnaires were also distributed to these specific companies to obtain quantitative data that would support the information gathered through the face-to-face interviews. The main information collected from the companies included information on employment figures, target markets, sales revenue, trade mix and other relevant qualitative information and the companies surveyed were under the Manufacturing and Agriculture sectors. A total of five textile companies, under manufacturing, which included the key beneficiaries from the AGOA scheme was visited during the surveys.

In order to obtain reliable and relevant secondary statistics, numerous sources were consulted such as:

- Data base from SIPA on the textile industry in Eswatini
- Database from the United States Census Bureau
- AGOA website on Swaziland and other selected African countries’ exports of apparel to the US market
- SRA summarized trade database
- Tax revenue data from the SRA
- Print Media

3.2 Data analysis

The information obtained from the questionnaires, interviews and secondary sources was analyzed and presented narratively, graphically and in table format. In terms of the limitations to the study, not all firms who benefitted under the AGOA arrangement were successfully contacted. Some firms did not return the questionnaire and efforts to get face-to-face interviews were unsuccessful. As a result, at the time of compiling this report, due to time constraints, some information from textile companies was not analysed. Another shortfall on the data was that most of it was aggregated at the industry level limiting the analysis of the company specific information.

4. RESULTS

4.1. Benefits of the AGOA Agreement and Effects of its Loss Post 2014

4.1.1. Trade Patterns

During the years of its AGOA eligibility, Eswatini traded successfully with the U.S, exporting products including textiles and apparel, sugar and sugar products, processed/canned fruits, handicraft products as well as other selected processed foodstuffs. Total exports to the US are shown in figure 3 below.

Figure 3; Eswatini’s Exports to the United States: 2000 to 2017

Source: United States Census Bureau

4.1.1.1. Eswatini’s Textile Exports to the US

The duty free quota access to the U.S. market under AGOA resulted in many Taiwanese companies investing in the country hence the textile sector in Eswatini grew significantly between the years 2000 and 2004. In 2005, the Agreement on Textiles and Clothing (ATC) was abolished, as a result, Eswatini textile companies had to compete with other giant companies from India and China in international markets, which were more competitive. This led to
a closure of some textile firms during that period. Second round effects of 2007-08 global financial crises led to a significant fall in global demand and US demand for textiles and apparels, in particular. The prices (for apparels) dropped significantly and the profitability of the textile industry was affected considerably. Again, this led to a closure of some textile companies as well as divergence from supplying the US market. All these factors resulted in a general downward trend in textile export sales to the US market.

However, a green light on the potential of regional markets emerged as a room for market diversification. In 2010, a dramatic shift occurred with sales to the US representing only 40 percent of the total volumes being produced and the greatest beneficiaries were South Africa who took advantage of the decline in exports (Southern Africa Trade Hub, 2014). As the US market had just recovered fully from the poor performance of the post-financial crises era, with growth rates reaching 4 percent, in June 2014 it was announced that Eswatini would be removed from AGOA with effect from January 2015. A 65 percent drop was observed in the textile exports to the US and their contribution to total US exports fell to 12 percent in 2015 from 67 percent in 2014. The textile sector further dropped by 62 percent in 2016 and 54 percent in 2017 reaching a low of US$641 thousand from US$55 million in 2014. This is shown in figure 4 below.

4.1.1.2. Eswatini’s Textile Exports to South Africa
When the global financial crisis greatly affected textile demand, in particular by the US markets, textile firms diversified to the regional market, mainly South Africa. When the AGOA scheme was lost in January 2015, usage of the regional market increased significantly. Evidently, textile exports to South Africa increased by 20 percent in 2015 followed by a further 24 percent in 2016 and 12 percent in 2017. In the same line, the contribution of textile exports to total South African exports also increased from 14 percent in 2015, to 16 percent in 2016 and a further 17 percent in 2017. Despite the AGOA loss, some textile companies have reported resilient growth and plans to intensify their operations due to increasing regional demand. To note further is that when the ATC was abolished in 2005, textile exports to South Africa were greatly affected by the closure of textile firms in the country leading to a significant drop in the textile exports before recovering in 2010.
4.1.1.3. Eswatini’s Exports to the US; Other Selected AGOA products

Even though the textile industry was the economy’s major beneficiary on the AGOA scheme, other industries including the sugar industry, fruit processing industry and handicrafts (curios) were also trading under the AGOA arrangement. The export trends for these products are shown in Figure 6. When AGOA was lost in 2015, sugar exports to the US dropped by 24 percent in 2015 to US$13.8 million, from US$18.1 million in 2014. Processed fruit declined by 82 percent in 2015 and by 2017, they had reached a low of US$304 thousand, declining by 92 percent from US$4.3 million recorded in 2014. Exports of handicraft products to US, also recorded a decline of 47 percent in 2015 before recovering by 30 percent in 2016. However, a drop of 40 percent was recorded in 2017. Unlike the textile products, other products such as sugar and handicrafts still qualified to trade on a different arrangement, the Generalized Special Preference (GSP).

4.1.2. Financial Implications

During the country’s AGOA eligible period, there was a notable increase in investments in the textile and wearing apparel industry. Even with the closure of most companies in the year 2005, there was a recorded increase in credit demand by the textile companies, mostly for business expansions and other related investments. However, in 2013, a 38 percent decline was recorded in loans given to the textile and wearing apparel industry from E14.5 million in 2012. A further drop of 95 percent was recorded in 2014, and the

The Generalized System of Preferences (GSP) is a U.S. trade program designed to promote economic growth in the developing world by providing preferential duty-free entry for up to 4,800 products from 129 designated beneficiary countries and territories. GSP was instituted on January 1, 1976, by the Trade Act of 1974. Some 5,000 tariff items are eligible for GSP benefits, approximately 3,500 of which are available to all GSP countries and approximately 1,500 of which are available solely to Least Developed Beneficiary Developing Countries (LDBDCs). In order to benefit from GSP, a good must be either wholly obtained or sufficiently manufactured in a GSP country. Sufficiently manufactured means that all 3rd-country materials have undergone a substantial transformation plus at least 35 percent of the good’s value has been added in the beneficiary country. Additionally, the good must be “imported directly”.

Figure 5: Eswatini’s Exports to South Africa
Analysis: 2001 to 2017

Figure 6: Exports to the US; Other Selected AGOA Products 2001 to 2017
credit demand remained even lower during the AGOA loss period, reaching a low of E297,000 by 2017. Figure 7 illustrates the extent of the impact on credit extension to the textile and wearing apparel industry.

**Figure 7: Loans Extended to the Textile and Wearing Apparel Industry 2004 to 2017**

4.1.3. Tax Revenue/Fiscal Implications

Tax revenues are a major source of government revenue and the Eswatini Revenue Authority is continuously striving to mobilize the required revenue to finance government expenditure. Figure 8 below illustrates the extent of the impact on tax revenue for the industries that were benefiting in the AGOA scheme. When the country lost its AGOA market in 2015, many companies looked for alternative markets, mainly in South Africa and as a result, the negative impact in terms of their contribution to tax revenue was minimal. To note, however, is that this analysis is aggregated, (including all companies in each of the specific industries) and as such any huge negative impact is partially offset by the performance of the companies that were not affected by the AGOA loss. The textile industry, which was a major beneficiary of the scheme, managed to increase its tax revenue contribution from E34million in 2014 to E93million in 2017. The sugar industry, which always had South Africa and the European Union as major preferential markets, recorded continued growth in their tax revenue contribution. Even though it had lost one of its major clients in the US, the fruit processing industry first recorded growth in 2015 and 2016 as the company improved on the performance of its other divisions and acquired alternative markets. However, it is worth noting that a drop is recorded in 2017, falling by 24 percent from 2016.

**Figure 8: Tax Revenue Contributions for The AGOA Benefitting Industries 2013 to 2017**

4.1.4. Gross Domestic Product (GDP)

Data sourced from the IMF website (2015) indicate that the country’s loss of eligibility under the AGOA adversely affected exports and employment, however, its overall impact on growth and total exports was observed to be modest. The modest effect was a result of the relative size of the textiles sector estimated to be about 3 percent of total GDP (IMF, 2014) and also the increased level of exports to the South African Market. In light of the numerous challenges experienced by the sector during the pre AGOA loss period (2001-2014), the textile sector’s total share of GDP was observed to have greatly improved after the global financial crisis in 2011-2012 but then more less recorded modest growth in the period leading up to the loss of AGOA in 2015. As depicted by figure 9, the textile and wearing apparel sector recorded relatively flat but steadily increasing contribution to both manufacturing output
and GDP prior to the AGOA loss. Between 2012 and 2014 textiles accounted for 9.4 and 2.9 percent of manufacturing and GDP, respectively. In 2015, there was a slight drop to 9.2 and 2.8 percent, respectively. However, in subsequent years (2016-2017) the contribution of textiles to manufacturing output rose notably and averaged 10.9 and 3.4 percent to manufacturing and GDP, respectively. This shows that, while loss of AGOA affected output in 2015, the gains made in exploring and optimising access to regional markets facilitated much stronger growth during the loss of AGOA.

**Figure 9: The Share of Textiles to Manufacturing and GDP**

![Graph showing the share of textiles to manufacturing and GDP from 2011 to 2017.](image)

Source: Author(s) calculations using data from the Central Statistics Office (CSO)

### 4.1.5. Employment

Since the early 2000’s when the country was listed under the AGOA arrangement, the textile sector was one of the major beneficiaries and the sector in turn became one of the leading employers of unskilled labour in the economy. A survey of textile firms in the Manzini and Shiselweni regions indicated an estimated 15,000 employees in the industry by the year 2015. These two main regions were selected because it is generally where the textile firms are concentrated and for purposes of this analysis were considered to be representative of the textile industry in the country. Regardless of the major setbacks experienced when the Agreement of Textiles and clothing (ATC) was abolished in 2005, leading to major job losses in the textile sector and the poor performance experienced by the US market during the financial crisis, the sector continued to positively contribute to employment as they diversified more to the South African market. After the loss of AGOA in January 2015, one of the major setbacks reported was the effect on employment figures in the country as other textile companies closed shop and relocated their businesses. In the same line, some textile companies scaled down and laid-off workers operating in the US production line. In the Manzini region alone, an estimated 1800 employees was reported to have been laid off by only two companies. The job losses, notwithstanding from AGOA linked companies, overall employment numbers on sampled companies show notable growth between 2010 to 2018. This reflects that during this period, the positive expansions linked to servicing the regional market yielded higher benefits that outweighed losses noted from the loss of the AGOA market. This, however, does not mean that the AGOA market was less important but reflects that a combination of both AGOA market and regional market could have resulted in much higher growth in employment creation than having these markets offsetting each other.

Out of the 14 interviewed companies, 3 reported to have been trading directly under the AGOA agreement. In times of higher demand they however did extend some of the work to some other textile companies, but still remain the main exporters to the US market. By the year 2010 the three companies had an estimated 7,900 employees, about half of the total employment for the sampled 14 companies. When it was announced mid-2014 that the country was to be removed from the AGOA agreement, massive layoffs were reported within the three companies, with employment numbers decreasing by
approximately 33 per cent to reach 5,260 by 2015. A slight pick-up is however observed in the employment numbers by 2018, as the companies strengthened their efforts in penetrating the South African market. Results from selected textile firms surveyed for their employment numbers are shown in Table 1 as summarised by region.

**Table 1: Summarised Employment Numbers for Selected Textile Firms (2005-2018)**

<table>
<thead>
<tr>
<th>Textile Firms</th>
<th>Number of Companies</th>
<th>Employment Figures</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>2005</td>
<td>2010</td>
</tr>
<tr>
<td>SHISELWENI</td>
<td>4</td>
<td>4,485</td>
<td>4,450</td>
</tr>
<tr>
<td>MANZINI</td>
<td>10</td>
<td>9,747</td>
<td>10,510</td>
</tr>
<tr>
<td>TOTAL</td>
<td>14</td>
<td>14,232</td>
<td>14,960</td>
</tr>
<tr>
<td></td>
<td>of which directly under the AGOA agreement</td>
<td>3</td>
<td>8,950</td>
</tr>
</tbody>
</table>

Source: Company Surveys 2018

### 4.2. COPING STRATEGIES DURING THE LOSS OF AGOA

While the country has been observed to have suffered major setbacks in economic activity particularly the manufacturing sector during the loss of AGOA, most companies especially in the textile industry developed efficient coping strategies to avoid completely closing shop and also as means to take advantage of the increasing regional demand. During the loss of AGOA, a number of textile companies reported their plans of intensifying their productivity in light of the available opportunities in the regional and domestic market. It was observed that different strategies were adopted by the different affected sub-sectors within the manufacturing sector which included the textile sector, food manufacturing sub-sector (fruit canning) and other manufacturing. Although different strategies were adopted by the sub-sectors, they all revolved mainly around market diversification, payment of duty costs for their exports and also utilization of other trading arrangements.

#### 4.2.1. Market Diversification

##### 4.2.1.1. Textile Sector

In light of the challenges brought about by the AGOA loss, available markets within the region especially in South Africa and domestically provided alternative markets for textile companies. Accessible opportunities were mainly through the retail clothing shops that have their distribution headquarters stationed in South Africa, through which they then distribute to their subsidiary shops throughout the region. Although some companies succeeded in shifting trade to the regional market as a coping strategy, they had to first retrench their employees and cut production lines.

##### 4.2.1.2. Handicraft

The handicraft industry selling through curios was also amongst the industries affected during the loss of AGOA in 2015. Since the sub-sector players had clients in the US which were supplied through AGOA, after the loss they diversified their markets throughout the region and overseas markets where possible. One of the major players specifically reported to have shifted and used the GSP arrangement to export to the US.

##### 4.2.1.3. Food Manufacturing

**Fruit Processing**

The food and beverage sub-sector producing processed fruits was also affected by loss of AGOA in 2015, losing its major fruit cups customer in the US, which affected the industry’s revenues and profits. However, it is on a continuous basis, penetrating the different markets around the world as a coping strategy. Ever since the loss, the industry has managed to acquire contracts to supply in other international markets and there are also plans to expand to other neighboring countries.
Sugar Production
For many years, the sugar industry’s exports have been highly dependent on the European Union. However, the returns from the European market have been gradually declining in recent years which has posed a significant challenge for the industry’s long term sustainability (SSA Annual Report, 2016/17). This resulted in the industry attempting to shift its markets to Africa and also to the US through AGOA. Even though the US market proved favorable for sugar performance, the loss of AGOA in January 2015, resulted in the industry focusing more on the African markets, especially through SACU, as a coping strategy. This has proven beneficial for the sugar sector as information gathered from the Swaziland Sugar Association (SSA) indicate that total sales revenue increased by 1.5 per cent to E4.64 billion in 2016/17 mainly driven by sales from the domestic market.

4.2.2. Payment of the duties

4.2.2.1. Textile Sector
Following the country’s loss of AGOA in 2015, some textiles companies which were solely dependent on the US market and were the most hit by the loss, continued supplying the US market and incurred the duty costs specifically to export all of the 2015 production to the US clients and avoid complete closure of the firm. During this time, the companies were able to re-strategize and look for other markets while keeping the businesses afloat. However, it should be noted that this strategy was only implemented in 2015 and was later on abandoned as other markets became accessible.

4.2.2.2. Curios and Food manufacturing
The handicraft and food processing sub-sectors (fruit canning and sugar production) failed to incur the export duties to the US after the loss of AGOA as some of the textile companies did. They did not adopt this strategy, instead, their focus on diversifying their markets assisted them to break even during the period of the loss 2015-2017.

4.2.3. Utilization of other Trading arrangements
During the loss of AGOA, almost all of the affected sectors including the textiles, curios, fruit canning and sugar adopted the utilization of other trading arrangements especially to the regional market through SACU, as a coping strategy. The sugar and handicraft industries also reported to have utilized the Generalized System of Preferences (GSP) program to export its products to the US economy after the loss of AGOA in 2015. Sugar sales to the US market post 2015 were made through the GSP arrangement and as shown in the figure 10 below, this approach proved to have worked for the industry post 2015, even though it had the limitation of the quota being lower under the GSP compared to trading under the AGOA agreement.

Figure 10: Sugar Sales by Market; 2013 to 2017

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4.3. ANTICIPATED GAINS FROM RE-ADMISSION IN 2018 AND BEYOND

4.3.1. Employment
The country’s textile and apparel industry continues to remain a major employment generator for Eswatini’s unskilled labour. In light of the country’s re-admission into AGOA, the economy is expected to benefit through increased employment opportunities for the low skilled population. Some companies who had previously laid off a sizable number of employees when the country lost AGOA in 2015, reported positively towards re-opening of their AGOA production lines once the AGOA paper work has been finalised. They reported to have plans of starting gradually, monitor the market situation and thereafter increase numbers as the market stabilizes. In the Manzini region alone, one company reported plans to double its employment size, hiring about 450 employees and another that had previously laid off about 1450 employees reported plans positively towards re-hiring an almost equal number. These employment opportunities already highlighted will improve the country’s employment rates which will in turn boost the standards of living in the Eswatini economy.
4.3.2. Increased Export volumes and productivity

Though the country generally relied on apparels and textiles during the 2001-2014 AGOA period, the country’s re-admission to the AGOA benefit gives adequate room for the country to increase its productivity in other sectors and in turn increase export volumes to the US market. According to the Times of Swaziland (2018), the new AGOA agreement has increased product lines which include steel, chemicals and agricultural products which the economy’s sectors can take advantage of and thus boost the country’s productivity and improve trade balances. The country’s increased benefit from AGOA has been anticipated to be much higher if there is increased export diversification to the US markets.

4.3.3. Foreign Direct Investment (FDI)

The country’s admission into AGOA in 2001 resulted in Taiwanese companies investing and taking advantage of the duty free access to the US market under AGOA as well as the ATC. This move highlights the potential the duty free access arrangements have on increasing foreign direct earnings for the country not only for the textile sector but also, for all the other sectors which are listed to be eligible to trade under AGOA. The country’s re-admission to AGOA has a good potential to attract foreign direct investment into the economy which can boost productivity and employment. Noting that the country was recently ranked poorly in the World Bank Ease of Doing Business Report for 2018, the country’s re-admission to AGOA is expected to contribute positively towards strengthening investor confidence.

4.3.4. Fiscal improvements

As firms take advantage of the AGOA opportunity again, their increased productivity is expected to grow their revenues thus contributing to an expansion of the country’s tax base. Potential foreign direct investment that can be brought about by the country’s re-admission into AGOA is also anticipated to boost the tax base. Government is set to also benefit from increased export earnings, especially if the duty free access is used to its full capacity and a majority of the economy’s sectors benefit from it.

4.4. Developments in The Textile Industry in 2018

On July 2018, the AGOA apparel visa system for Swaziland was re-authorized. This comes after some textile companies have indicated that they were eagerly awaiting finalization of the AGOA paper work to start shipping orders as they had already started looking for customers in the US. The AGOA re-admission is expected to boost the textile industry especially considering unfavorable market conditions in the South Africa market which slipped to a technical recession in the first half of 2018. Even though the interviewed textile companies had indicated that they had no plans of moving from the South African market whilst exploring the AGOA market, economic developments in South Africa have not been favorable since the beginning of 2018. One major company in the Manzini region which had earlier reported that its orders to South Africa were down by 25 percent resulting in about 200 workers being laid off, has since closed its garment-manufacturing subsidiary, which came with further job losses of about 1200 employees. Another company which supplies mainly protective clothing through Bidvest, reported challenges with their South African market as well, owing to persistent challenges to the South African mining sector. In the Shiselweni region, companies also reported a decline in the demand of its products by the South African market.

It was noted that in addition to the economic growth challenges in South Africa, the country is on a move to protect its textile industry. Considering that the textile industry plays a major role in employment, unions have
been protesting, putting pressure on the government to ensure that the industry is protected, including encouraging domestic growth as opposed to importing from other countries. However, there is light for the textile companies, as they now can re-establish their links with the US market and trade under the AGOA agreement to boost their performance and make up for the emerging difficulties from the South African market.

5. CONCLUSION AND POLICY RECOMMENDATIONS

5.1. Conclusion
The benefits of the country’s admission to the AGOA scheme in 2001 were instantly visible as there was an notable increase in FDI into the country, with more textile companies investing in the country during the period. This in turn created significant employment opportunities for the country’s low skilled labour and boosted the country’s exports. However, the expiration of the World Trade Organization’s Agreement on Textiles and Clothing at the start of 2005 led to a steady decline in textiles production in the country, hence its exports to the US, as a number of companies shut down. It is noted that there was a shift to the South African market in light of those challenges, and the South African market gained even more momentum around 2010 when the US was undergoing the financial crisis.

When the AGOA scheme was lost in 2015, it was a major blow for the manufacturing sector, especially the textiles manufacturing. There were massive lay-offs and the affected companies had to shut down their US production lines, or alternatively relocate. Different coping strategies were explored by the different companies in their specific industries in order to avoid completely shutting down. These included market diversification, payment of duty costs for their exports and also utilization of other trading arrangements. The companies moved to exploring more of the regional (South African) market, which had managed to be stronger by 2017. Notably, the gains made from the coping strategies particularly increasing sales to regional markets made the AGOA loss impact to be modest than previously anticipated. As the country has been re-admitted into the AGOA scheme, the honors remains on the business community and country’s authorities to maximize on the benefits of the scheme over and above the other coping strategies that were explored during AGOA loss.

5.2 Policy Recommendations
Evidence from countries like Madagascar who have had a similar experience of losing and then regaining its AGOA eligibility shows that there is room for instant recovery from AGOA losses through usage of as much as possible of the AGOA opportunities. As the country strives to find its footing again on the US market, it is critical for companies to take full advantage of this opportunity. Compared to the period 2001 to 2014, where the country only managed to utilize a portion of the potential AGOA benefits, there is a need for the relevant authorities to sensitize the business community on the full benefits of the agreement.

The country can also learn from countries like Lesotho and Madagascar, who managed to develop effective national AGOA strategies, which have been aimed at assisting the economies unlock their full potential and maximize on the AGOA benefits. In line with what these countries developed, the Eswatini economy needs to come up with a range of actions for the country to be able to successfully respond to the opportunities that AGOA offers. A framework that would help guide, communicate and monitor such actions would further be required, with the main aim of supporting the capacity of the domestic firms to take advantage of every
opportunity that the US market provides. These strategies can either relate to trade policy or business support. The country needs to ensure commitment to attaining the benchmarks set for AGOA eligibility and to continuously implement and monitor the required policies. Institutions and units responsible for trade promotions should assist in finding market opportunities and promoting the exports of the AGOA eligible products to the US. Such action may first need the selection of a few industries to prioritize, including those that were previously utilizing the agreement and develop market opportunity guides for those and then extend to all other eligible industries to ensure full utilization of the opportunities availed by the agreement. Training programs for the businesses need to be developed and sensitize them on the full range of products eligible for the AGOA agreement. The firms also need to be assisted with regards to attaining financial support. The government needs to further commit to addressing challenges faced by the domestic business community mainly relating to barriers that make doing business in the country costly and difficult. A closer look should be taken to analyse sector specific problems along with an analysis of how sustainable the development of other industries is.

AGOA has a great potential to positively impact on economic growth in the country. In the short-to-medium it is even more critical for companies to use this opportunity to cushion the ongoing decline in the country’s export products to South Africa, in light of the challenges in the South African economy.

REFERENCES


### ANNEX 1

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