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THE IMPACT OF MACROECONOMIC POLICIES ON AGRICULTURE IN SWAZILAND: AN EMPIRICAL ANALYSIS (1980-2012)

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ABSTRACT

Policymakers in Swaziland view agriculture as an engine to foster economic growth, reduce poverty and eradicate inequality among the populace when the right policies are formulated and implemented within their rightful institutional framework. This study is an empirical investigation of the effect of macroeconomic policies on the agricultural sector in Swaziland using annual time-series data for the period 1980 to 2012. The study used the bound test approach to cointegration to analyse the data. The cointegration results revealed that there was long run relationship amongst the variables of agriculture GDP and export. The results also revealed that real money supply, real exchange rate, real GDP, and real government expenditure had a significant long run impact on agriculture GDP with elasticity coefficients of 0.07, 0.24, 0.88 and -0.3 respectively, while short run coefficients were -0.002,0.23,-0,94 and -0.4 respectively. In the case of agriculture exports, the results further revealed that real money supply, real government expenditure, discount rate, real exchange rate and real GDP had a significant impact on the sector`s exports with long run elasticity coefficients of 0.13,-0.32,-0.01,0.5 and 2.53 respectively, while short run elasticities were 0.06,0.35,0.01,0.46 and -1.34 respectively.The Central Bank of Swaziland needs to adopt policies aimed at providing affordable credit to agriculture. In terms of the low response of the agricultural sector to macro-policy variables the study recommends that policymakers should intensify the promotion of finished or processed agriculture exports and create a disincentive to imports.

Keywords: Agriculture, exports, prices, macroeconomic policy, cointegration, autoregressive distributed lag model (ARDL), Swaziland.

1. INTRODUCTION

1.1 Background

Agriculture is traditionally the backbone of the Swaziland `s economy. The agricultural sector of Swaziland is split between a largely rain-fed subsistence production by smallholders established on the Swazi Nation Land (SNL) and cash cropping established on large private estates (Title Deed Land). Agriculture in the Title Deed Land (TDL) occupies about 40 per cent of the land, while the rest is occupied by the traditional sub-sector (Manyatsi & Mhazo, 2014). Essentially, agriculture in Swaziland is regarded as a major source of income for both the populace and government through the diverse agricultural activities that take place in the country. These activities include sugarcane production, citrus fruits, maize and other cereal crops, cotton, forestry and livestock.

The agricultural sector is classified as a strategic sector good enough to empower other sector activities in Swaziland. The performance of the agricultural sector has important implications for the achievement of the macroeconomic policy objectives namely; economic growth, job creation, external balance, enhancing food security and poverty reduction. On average the sector appears to be the least contributor to the gross domestic product of Swaziland but it employs more than 70% of the working population. According to the World Bank (2011) the agricultural sector accounts for 29% of formal sector paid employment and provides a living for about 75% of the total rural population.

Despite the country`s agricultural potential, production has been falling in recent years. In the 1980s the agricultural sector`s share to GDP fluctuated between 15% and 25%. The share then declined from 16% in 1988 to 10% in 1993 and further appreciated to 12% in 2000. Since 2001 the contribution of agriculture has been gradually falling to as low as 8% in 2011.

The agricultural sector is also a key source of the raw materials to the manufacturing sector, particularly to those industries that further process sugarcane, citrus fruits and wood (Musaba et al. 2014).

The economy of Swaziland is also heavily dependent on exports with the agricultural sector as the key leading export earner. In the period 1980 to 1990 the share of agricultural exports to total exports in Swaziland was 70% in 1985 to 1987. The trend then followed a downturn since the early 1990s and the contribution of agriculture to total exports then fell to below 30% (Fig. 1).

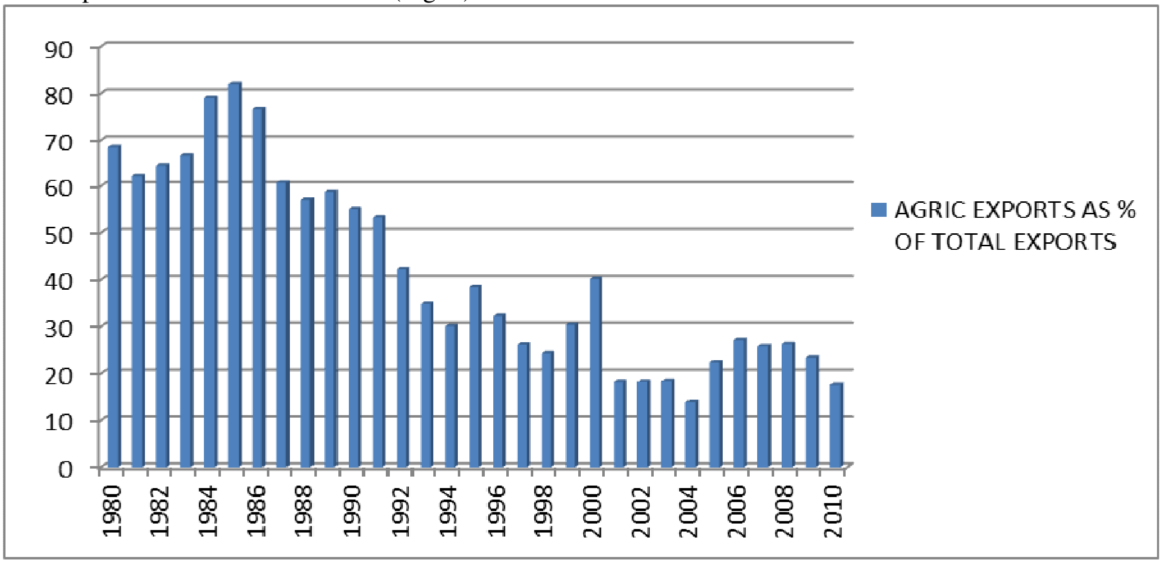

Figure 1: Agricultural exports as a share of total exports in Swaziland.
Source: Central Bank of Swaziland.

The downward trend experienced by the agricultural sector has been a cause for concern for policy makers as well as monetary authorities in Swaziland. In order to stimulate better growth levels in the different sectors of the economy, the Swaziland government has been pursuing an expansionary fiscal policy and the Central Bank of Swaziland has responded with different strategies aimed at stimulating growth. In its monetary policy stance, the Central Bank of Swaziland reduced the discount rate from 5.5% in 2011 to 5% in 2012 in an effort to help commercial banks reduce their lending rates and help stimulate economic growth, particularly in key strategic sectors of the economy. Studies have shown that changes in macroeconomic policies have an effect on agriculture (Ali et al., 2010: Muroyiwa et al., 2014; Khalili et al., 2012; Asfaha & Jooste, 2007; Abbas, 2014; Shashanka et al. 2005)

However, empirical research in Swaziland (e.g Kongolo et al., 2011) focused primarily on climatic episodes as the major factors that affect the agricultural sector. The monetary and fiscal factors have rarely been considered as possible explanation for the performance of agriculture in Swaziland. This therefore underscores the importance of exploring the role of some economic factors (budget allocation, exchange rates, interest rate, and money supply) in influencing agriculture.
1.2 Objectives
This study, sought to examine the effect of macroeconomic policies on agriculture in Swaziland from 1980 to 2012. Specifically it examined the impact the exchange rate movements have on the performance of agriculture in Swaziland and investigated if there exists a long-run relationship between macroeconomic policies and the agricultural variables in Swaziland.

1.3 Hypotheses of the Study

The following hypotheses were tested:

1. Macroeconomic policy variables impact on agriculture in Swaziland.

2. Changes in the exchange rates have effect on the performance of the agricultural sector in Swaziland.

3. There is a long-run relationship between the macroeconomic policies and the agricultural variables in Swaziland.

2. LITERATURE REVIEW

Numerous studies have been conducted to examine the effect of macroeconomic policies on the agricultural sector worldwide. Having been pioneered by the United States of America, (Schuk ,1974) linked the macroeconomics to agriculture and argued that tight monetary policy increases interest rates, inducing capital inflows which cause the exchange rate to depreciate and hence impact negatively on agricultural exports. Choe (1989) noted that the macroeconomic environment that faces the agricultural sector consists of four mechanisms through which events and policies in macro-economy may be transferred to agriculture. These are the exchange rate, interest rate, rate of inflation and the effect of business cycle fluctuations.

Chebbi et al. (2010) studied the impact of monetary policy and the exchange rate changes on agricultural supply, prices and exports in Tunisia using the multivariate cointegration approach, for the period 1967 to 2002. The results indicated that changes in macroeconomic variables had an effect on the agricultural sector.

Ali et al. (2010) investigated the link between macroeconomic indicators and agricultural variables (income, export and commodity price) in Malaysia. In their study, it was found that the changes in Malaysia`s money supply had significant relationships with both agricultural income and exports. The study also revealed a significant positive relationship between exchange rate and agricultural income.

Ahmad et al. (2011) examined the impact of monetary and macroeconomic factors on real wheat prices in Pakistan for the period 1976-2010 using Johansen's co-integration approach. Results from the study provided evidence of a long-run equilibrium relationship among the variables. The results showed that real money supply; openness of the economy, and the real exchange rate had a significant effect on real wheat prices in the long run.

Karbasi and Naghaivi (2013) estimated the effect of financial repression on growth of the agricultural sector in Iran and found that there exist a long-run negative relationship between agricultural value-added and the macroeconomic variables.

Nampewo et al. (2013) investigated the sectoral effects of monetary policy in Uganda over the period 1999 to 2011 using a vector autoregressive (VAR) approach. Their results revealed that the exchange rate channel is the most effective monetary policy transmission channel to all the three sectors studied, while interest rates and bank credit to these sectors remain relatively weak channels of monetary policy especially within the manufacturing sector.

Muroyiwa et al. (2014) estimated the impact of monetary policy on South Africa`s agriculture using the vector error correction model (VECM) covering the period 1970-2011. The results revealed a negative relationship between inflation, interest rates and the performance of the agricultural sector in South Africa.

Abbas (2014) examined the relationship between the macroeconomic variables and agricultural production in Mozambique for the time period 1980 to 2012. The empirical results revealed that the area harvested, labour force, interest rate, gross domestic product and the exchange rate had an impact on agricultural production in Mozambique.

In summary, the forth going have shown that macroeconomic policy measures can impact on agriculture. However, to the best of our knowledge, no research works have been carried out to show the effect of macroeconomic policies on agriculture sector in Swaziland. As a result, this paper was aimed at closing this gap in the literature by examining the effect of monetary and fiscal policy measures on agriculture in Swaziland for the period 1980 to 2012.

3. METHODOLOGY

3.1 Model Specification

This study used secondary data spanning a period of 33 years (1980-2012) which were obtained from the Statistical Bulletins of the Central Bank of Swaziland and the Central Statistics Office. The dataset includes agriculture GDP, exports, prices, total government expenditure, money supply, the discount rate, real exchange rate and real GDP of Swaziland. The models applied are as follows:

$$\log Y = \beta_1 + \beta_2 INT + \beta_3 \log M2 + \beta_4 \log EXR + \beta_5 \log GDP + \beta_6 \log GE + u_i \qquad (1)$$

$\log X = \alpha_1 + \alpha_2 INT + \alpha_3 \log M2 + \alpha_4 \log EXR + \alpha_5 \log GDP + \alpha_6 \log GE + u_i$ (2)

$\log P = \phi_1 + \phi_2 INT + \phi_3 \log M2 + \phi_4 \log EXR + \phi_5 \log GDP + \phi_6 \log GE + u_i$ (3)

Where :

Y -denotes real agricultural production measured as the real agricultural value

X- denotes agricultural exports

P- denotes agricultural commodity prices measured as agricultural output prices and proxied by agricultural GDP deflator which is found by dividing current prices over constant price GDP in the agricultural sector.

INT – denotes the discount rate by the Central Bank of Swaziland.

M2 – is the broad definition of money supply.

EXR – denotes the real exchange rate between Swaziland local currency and the US dollar.

GDP - denotes real GDP.

GE- denotes real total government expenditure in Emalangeni (local currency).

3.2 Estimation Procedure

Because macroeconomic variables are at most non-stationary and in order to overcome the problem of spurious regression that is common in the time series analysis of non-stationary variables the study applied unit root testing techniques in order to determinee whether the variables are stationary or not. These tests include the Augmented Dickey-Fuller test and the Phillip Peron test for stationarity. Once the stationarity of all the variables was established, the Autoregressive Distributed Lag (ARDL) cointegration approach, which examined the existence of a long run relationship among the variables in question, was applied.

The Augmented Dickey-Fuller (ADF) test to examine the stationarity of the variables is applied using the following model:

$\Delta y_t = \alpha_0 + \alpha_1 t + \gamma y_{t-1} + \sum_{j=1}^{p} \Delta y_{t-j} \delta_j + \varepsilon_t$ (4)

From equation (4), α_0 is a constant, α_1 is the coefficient on a time trend series, γ the coefficient of y_{t-1} measures the unit root, p is the lag order of the autoregressive process, δ_j is a measure of lag length, $\Delta y_t = y_t - y_{t-1}$ are first differences of yt , yt_{-1} are lagged values of order one of y_t , y_{t-j} are changes in lagged values, and ε_t is the white noise (Ssekuma, 2011).

In order to confirm the robustness of the ADF test results, the Phillips Perron (PP) test was also applied. Basically, PP test uses the standard DF or ADF test, but modify the t-ratio so that the serial correlation does not affect the asymptotic distribution of the test statistic. In the PP test, one has to decide whether or not to include a constant and/or time trend. In the ADF and PP tests the null hypothesis is tested for unit root while the alternative hypothesis for stationarity.

Cointegration refers to the existence of a long-run relationship between two or more time series variables which are individually non-stationary at their initial level (Gujarati & Potter, 2009). To model a long run relationship between economic variables, early econometricians developed a number of cointegration methods which have become popular among researchers. These include: the Johansen and Juselius approach, the Engel-Granger method and the Autoregressive Distributed Lag (ARDL). All of these methods have drawbacks. This study however employed ARDL or bound test approach to cointegration developed by Pesaran et al. (2001) because of its advantages over others.

The use of the bounds test method is based on three validations. Firstly, it advocates for the use of the ARDL model for the estimation of level relationships because the model suggests that once the order of the ARDL has been recognized, the relationship can be estimated by OLS. Second, the bounds test allows a mixture of I(1) and

I(0) variables as regressors, that is, the order of integration of appropriate variables may not necessarily be the same. Essentially, the ARDL technique is advantageous in that it does not require a specific identification of the order of the underlying data. Third, this technique is suitable for small or finite sample size (Pesaran et al., 2001). Neyaran (2004) (as cited by Kirton, 2011) stated that the bounds test can identify long run relationships more efficiently in small samples ranging from 30 to 80 observations. Furthermore, the bound testing approach is possible even when the explanatory variables are endogenous. The ARDL cointegration test, assumes that only one long run relationship exists between the dependent variable and the exogenous variables (Pesaran et al., 2001). Essentially, the bounds test employs the Wald or F-test of significance of the lagged levels of the variables in equations (2) to (4), both of which are reformulated in a conditional error correction version of the ARDL model generally represented as follows:

$$\Delta \ln Q_t = \beta_0 + \sum_{i=1}^{p} \beta_i \Delta \ln Q_{t-i} + \sum_{i=0}^{p} k_i \Delta \ln X_{t-i} + \psi_1 \ln Q_{t-1} + \psi_2 \ln X_{t-1} + u_t \quad (5)$$

where Qt refers to agricultural value added, exports and agricultural commodity prices, X_t is a k-vector, where it comprises of the independent variables corresponding to equations (1) - (3): k and ψ coefficients are column vectors of the parameters and all others are non-vector coefficients. Δ is the first difference operator and ut is a white noise error term. Once the estimation of equation (11) is done, the F-statistic will be computed to test whether the macroeconomic policy variables have a long-run impact on agricultural variables in Swaziland. This is done by conducting the F-test for the joint significance of the coefficients of the lagged levels of the variables and comparing it to the critical value bounds computed by Pesaran et al. (2001).

The null hypothesis (Ho) of non-existence of long-run effect (no cointegration):
H_0:β0=βi=ψ1 =ψ2=0
is tested against the alternate hypothesis (H_1) that there exist a long-run effect (existence of cointegration
H_1: β0≠ βi ≠ ψ1≠ ψ2≠0
According to Pesaran et al.(2001), the lower values of the asymptotic critical value bounds assume that the explanatory variables are integrated of order zero or I(0), while the upper bound critical values assume that the explanatory variables are integrated of order one or I(1). Hence, if the calculated F-statistic is found to be above the upper bound critical value, the null hypothesis of no cointegration can be rejected irrespective of the order of integration of the variables suggesting that there is a long-run cointegration relationship among the variables in the model. If the F-statistic is below the lower bound critical value, the null hypothesis cannot be rejected and if the calculated value falls within the bounds, the results are inconclusive.

4. RESULTS AND DISCUSSION

To conclude with confidence that the data used are stationary, both the ADF and PP test were used. The results as presented in Tables 1 and 2 show essentially that at all the variables were not stationary at their initial level. The stationarity of the variables was examined by comparing the ADF and PP test statistics against their test critical values. If the test statistic is more negative than the given test critical value, the null hypothesis of unit or nonsationary series is rejected implying that the dataset for the variable in question is stationary. For instance, the ADF test statistics for agriculture exports(X) at their initial level were less negative than the given critical values (the values in brackets).

Given that the variables were not stationary at level, unit root tests were then applied to their first differences. The results presented in Table 1 for the ADF test indicate that all series were stationary at 1% level of significance.

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Table 1. Results of Augment Dickey-Fuller unit root tests

Augmented Dickey-Fuller (ADF) Test						
	Level			First Difference		
Variables	C	C&T	None	C	C&T	None
	-1.97	-2.69	3.2	-5.58*	-5.97*	-3.79*
LogX	(-2.62)	(3.21)	(-1.61)	(-3.67)	(-4.28)	(-2.64)
	-1.75	-3.22**	1.303	-6.42*	-6.302*	-6.24*
LogY	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-1.41	-0.51	-2.53**	-4.64*	-4.88*	-3.54*
LogP	(-2.62)	(-3.21)	(-1.95)	(-3.66)	(-4.28)	(-3.62)
	-1.72	-1.68	-1.04	-5.42*	-5.39*	-5.5*
INT	(-2.62)	(-3.21)	(-1.61)	(3.66)	(-4.28)	(-2.64)
	-1.04	-1.13	5.76	-6.09*	-6.33*	-1.56
LogGE	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-1.61)
	-2.4	-1.73	1.37	-4.26*	-4.57*	-3.63*
LogEXR	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-0.47	-1.45	1.01	-5.8*	-5.87*	-5.67*
LogM2	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-8.95*	8.11	1.46	-3.32**	-5.43*	-3.48*
LogGDP	(-3.66)	(-4.34)	(-1.61)	(-2.96)	(-4.34)	(-2.67)

*and ** denote significant at 1% and 5% levels respectively. C and T represent constant and trend. Values in Parentheses are Dickey-Fuller critical values.

At first difference all series were found to be stationary implying that the series were integrated of order 1. The PP test also showed that after taking the first difference, all the series were stationary at 1% level, while they all had unit root in their levels. (Table 2).

Table 2. Results of Phillips-Perron unit root tests

Phillips-Perron (PP) Test						
	Level			First Difference		
Variables	C	C&T	None	C	C&T	None
	-2.01	-2.38	4.04	-5.99*	-9.88*	-4.46*
LogX	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-1.55	-3.27	2.16	-7.51*	-6.91*	-6.304*
LogY	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-1.3	-0.91	-2.5**	-4.77*	-4.92*	-3.66*
LogP	(-2.62)	(-3.21)	(-1.95)	(-3.66)	(-4.28)	(-2.64)
	-1.72	-1.76	-1.04	-5.42*	-5.39*	-5.5*
INT	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-1.11	-1.09	5.74	-6.07*	-6.39*	-2.97*
LogGE	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-3.15**	-1.62	1.06	-4.15*	-5.16*	-3.65*
LogEXR	(-2.96)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-0.43	-1.43	1.01	-5.78*	-5.803*	-5.67*
LogM2	(-2.62)	(-3.21)	(-1.61)	(-3.66)	(-4.28)	(-2.64)
	-2.18	-0.72	4.02	-3.37**	-3.66**	-2.2**
LogRGDP	(-2.62)	(-3.21)	(-1.61)	(-2.96)	(-3.56)	(-1.95)

*,** and *** denote significant at 1% and 5% respectively, where null hypothesis is rejected. Values in Parentheses are Phillips-Perron critical values.

In the ARDL it is possible that different variables have differing optimal number of lags (in the Johansen type of models this is impossible). The lag lengths for the models depicting the agricultural sector are chosen using the Schwarz Information Criterion, Akaike Information Criterion and Hanna-Quin Information Criterion. For equations relating to agriculture GDP and prices the lag length chosen is 1 based on Schwarz and Hannan-Quinn information criterion respectively. The model capturing agriculture exports, on the other hand, lag order 2 was selected as the preferred lag length. In order to examine the effect of macroeconomic policies on agriculture in

Swaziland, the overparameterized versions of the ARDL model (Pesaran et al., 2001) with the lags specified earlier were estimated. Then following Hendry`s general to specific modelling approach, a parsimonious model was selected by gradually deleting the insignificant coefficients. The results for the given equations are presented in Table 3.

The model presented in Table 3 shows that there exists a significant long run positive relationship between real exchange rate and the agriculture sector in Swaziland (both exports and GDP). From a fiscal policy perspective, the previous year value of real government expenditure significantly influenced the current level of agriculture GDP and exports in the period under review at 1% level of significance. The coefficient for government expenditure shows that an increase in expenditure by government has resulted to a fall in agriculture in the period under review.

The study also found that real money supply lagged by one year period is a significant determinant of agricultural GDP and export performance in Swaziland. According to Ali et al. (2010) a positive relationship between real money supply and agriculture GDP could mean a decline in interest rates which helps to keep the cost of borrowing low hence leading to an increase in credit available for farmers. The discount rate parameter indicates that there is a negative significant relationship between this variable and agriculture exports in Swaziland. The models as shown by Table 3 indicate that 55% and 71% of the total variations in agriculture GDP and exports are explained by the variables specified in the respective models.

The results also showed that current values of the money supply and exchange rate significantly impact on agriculture GDP and exports in the short run. The current value of the discount rate had a significant negative effect on agriculture GDP. The previous year value of money supply (M2 (-1)), agriculture GDP(Y (-1)) and real gross domestic product (GDP (-1)) were the only significant variables that had a short run impact on agriculture in Swaziland. Agriculture exports on the other hand were influenced by previous year GDP, discount rate, government expenditure, exports and exchange rate in the short run.

Table 3. Parsimonious model results for selected ARDL models.

Variable	**Agriculture GDP(Y)**	**Agriculture Exports(X)**
LogX(-1)	-	-2.33604*
LogY(-1)	-0.81502*	-
LogM2(-1)	0.054674*	0.292653*
LogEXR(-1)	0.19449**	1.169718*
LogGE(-1)	-0.24788*	-0.75005*
INT(-1)	-	-0.01813*
LogGDP(-1)	0.715716*	5.91025*
D(LogGDP)	0.612206	-
D(LogGE)	-0.32316*	-
D(INT)	-0.00832**	-
D(LogM2)	0.034449**	0.13647**
D(LogEXR)	0.178346***	0.4974**
D(LogY(-1))	0.327747***	-
D(LogM2(-1))	-0.0358**	-
D(LogGDP(-1))	-0.76536***	-3.1374**
D(INT(-1))	0.002435	0.02549*
D(LogGE(-1))	-	0.83899*
D(LogX(-1))	-	1.01051*
D(LogX(-2))	-	0.30074
D(LogEXR(-2))	-	0.5777***
Constant	-	-21.105*
R-squared	0.74	0.85
Adjusted R-squared	0.55	0.71

Note: Dependent variables are DLogY and DLogX: *(**) [***] indicate level of significance at 1%, 5% and 10%.

The diagnostic tests for serial correlation, heteroscedasticity, normality and Ramsey RESET test for model specification were conducted and they confirmed that the equations are correctly specified and that the error terms behave normally. These tests are presented in Table 4 and they include the Breusch-Godfrey LM test, Jarque-Bera, ARCH test and Ramsey RESET. The F-statistic for the BG test is insignificant implying that there is no serial correlation. The ARCH test which is a test for autoregressive conditional heteroscedasticity is insignificant indicating homoscedasticity. The Jarque-Bera statistics for normality are also insignificant, which implies that residuals in the series are normally distributed. The Ramsey RESET, which is a test of misspecification of the model was found to be insignificant across all models. This indicates that the models presented to capture the effect of macro-policies on agriculture in Swaziland are robust.

Table 4. Diagnostic tests for specified ARDL models

Diagnostic tests	Agric GDP (Y)	Agric Exports (X)
Breusch-Godfrey serial correlation test	1.466 (0.243)	0.723 (0.225)
Heteroscedasticity test: ARCH	0.1022 (0.751)	0.222 (0.626)
Jarque-Bera normality test	2.988 (0.224)	0.352 (0.839)
Ramsey RESET	0.1262 (0.727)	1.552 (0.233)

Note: Numbers in parentheses denote F-statistic probability values.

Table 5 presents the results of the bound test to examine if there is truly the presence of long run cointegration among the selected variables. The F-statistic test the null hypothesis that: the coefficients of the lagged level variables are jointly equal to zero (that is, there is no cointegration or long-run relationship), which is tested against the alternative hypothesis (there exists long run relationship between the variables). Table 5 shows that the computed F-statistics of agriculture GDP and export models are greater than the critical upper bound values at 5% level; meaning that there exists a long run stable relationship between the variables in the selected ARDL models. In the case of agriculture prices, the computed F-statistic is less than the critical bound values. Thus the null hypothesis of no cointegration is not rejected at 5% level of significance.

Table 5. Results of bounds test for long run cointegration

	Critical Values	
Significance	Lower Bound	Upper Bound
	I(0)	I(1)
1%	3.516	4.781
5%	2.649	3.805
10%	2.262	3.367

Calculated F-value for Agriculture Exports: 4.678827 **

Calculated F-value for Agriculture GDP: 4.318619**

Calculated F-value for Agriculture Prices: 1.893516

** denotes significant at 5%.

Table 6 shows the results of the short run and long run elasticity coefficients of macroeconomic policy variables on the agriculture sector in Swaziland. These elasticities are the coefficients of the explanatory variable lagged by one period (multiplied by a negative sign) divided by the coefficient of the lagged dependent variables lagged by one period (Bardsen, 1989). The study found that a one percent point increase in money supply leads to agriculture GDP increasing by 0.07% and exports by 0.13% in the long run, ceteris paribus. In the short run, a

1% increase in the same variable led to a 0.002% fall in the value of agriculture GDP and a 0.06% increase in exports. Table 6 only shows that the discount rate had a negative impact on agriculture in the short run by reducing the sector`s GDP by 0.01%. In the case of agriculture exports, a one percent increase in the discount rate in the long run led to 0.01% fall in the sector`s exports. These results indicate that a 1% increase (depreciation) in real exchange rate increases the sector exports by 0.5% in both short run and long run. Real GDP also showed a positive impact on agricultural exports with an elastic long run coefficient. The result is such that a 1% increase in real GDP in the period under consideration, led to a 2.53% increase in agricultural exports.

Table 6. Short run and Long run elasticity coefficients.

	Agric. Exports		Agric.GDP	
Variable	Short run	Long run	Short-run	Long-run
Money supply(M2)	0.05841852	0.125277393	-0.0017	0.06708
Government Expenditure(GE)	0.359151812	-0.32107755	-0.39651	-0.3041
Discount rate(INT)	0.010912484	-0.007761	-0.0102	-
Exchange rate(EXR)	0.460214294	0.500726871	0.21883	0.23863
Real GDP	-1.3430506	2.5300295	-0.9391	0.87816

5. CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The primary objective of this study was to examine the impact of macroeconomic policies on the agricultural sector in Swaziland from 1980 to 2012. The results indicated that agriculture GDP and exports were positively related to real money supply. Results from an export model also provided evidence of a negative long run relationship between the discount rate and this variable implies that this monetary policy tool can be transmitted to the agricultural sector in Swaziland amongst other priorities of economic activities. Unexpectedly, the long run elasticity coefficients revealed that real government expenditure had a negative impact on both real agriculture GDP and exports.

5.2 Recommendations

In order to stimulate growth in the agricultural sector the study recommends for a reduction in government expenditure where policymakers are expected to examine the composition of the expenditure to agriculture, avoids wasteful expenditure and adopt policies that prohibit government from competing with the private sector. The Central Bank of Swaziland should adopt policies aimed at providing affordable credit to agriculture. In terms of the low response of the agricultural sector to macro-policy variables the study recommends that policymakers should intensify the promotion of finished or processed agriculture exports and create a disincentive to imports.

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