

Economic Growth Spillover in CMA Countries

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¹ Disclaimer: The views in this paper are those of the author and do not represent those of the South African Reserve Bank.

1. Introduction

South Africa, being the most financially advanced economy in Africa, has strong trade and financial links to the global economy. South African GDP is closely correlated to world GDP, a correlation that has increased over the last few decades (Canales-Kriljenko, 2013). With its highly developed and globally integrated financial markets, shocks to global financial conditions rapidly spillover to the South African domestic economy (Ebeke and Kyobe, 2015) as evidenced in the recent financial crisis. At the same time, South Africa's trade and financial integration with the rest of Africa has significantly expanded over the last few years. South African firms have further diversified their export markets into Africa, with exports to Sub Saharan Africa (SSA), for example, amounting to about 15 percent of exports in 2011. South Africa has also expanded its foreign direct investment to the continent with some South African banks already having an important Pan African presence. This increased linkages increase the scope for inward and outward spillovers to Africa particularly in SSA where the linkages are strongest.

Against the background of sluggish economic activity in South Africa, questions are being asked on the potential spillover effects to the rest of Africa. The main concern is that the slowdown in economic growth in South Africa could potentially serve as an impediment to growth in major South African trading partners in Africa. This paper focuses on the potential spillovers from South Africa to the Common Monetary Area (CMA) countries as well as to Southern African Development Community (SADC) countries. SADC countries have been growing robustly recently, recording an average growth rate of around 5.2% between 2010 and 2011, and if there are significant growth spillovers from South Africa to these countries, the risk exists that the rest of SADC, particularly CMA may also start slowing down. This paper aims at shedding some light on the existence and the magnitude of growth spillovers from South Africa to CMA and to SADC, i.e. it seeks to examine the impact of South African economic growth on growth in the rest of SADC, including the CMA.

The paper is organized as follows. The next section provides a brief survey of the literature. This is followed by the description of the methodological framework including a brief description of the data. Section 4 discusses the estimation strategy and the results, while section 5 concludes and provides suggestions for further research.

2. Brief Survey of the Related Literature

Since the onset of the global financial crisis, spillover analysis has been carried out for a number of countries and regions. The common message from various studies is that spillover exist and are generally dependent on the strength of trade and financial linkages. An IMF study (World Economic Outlook, April 2007, Chapter 4) shows that on average a 1 percentage point decline in GDP growth in the Euro area is associated with a slowing in GDP growth of about 0.25 percentage points in sub-Saharan Africa as a whole.

Canales-Kriljenko, et.al. (2013) used a panel data and a vector autoregressive (VAR) models to examine the nature and magnitude of spillovers from South Africa to the Botswana, Lesotho, Namibia and Swaziland (BLNS) countries. The results showed significant spillovers from South Africa into these countries. However, the study also found that shocks to real GDP growth in South Africa do not seem to systematically affect growth developments in BLNS countries as a group, although it suggest some strong spillovers onto the smaller economies.

Using a global vector autoregressive model (GVAR) to analyze the global growth spillover effects on Africa, Gurara and Ncube (2013) found significant growth spillover effects to African economies from both the Euro zone economies and BRICs². In both cases, the magnitudes of the adverse effects on fragile and resource dependent economies were relatively higher than those of the more diversified African economies.

Arora and Vamvakidis (2004) studied the extent to which South African economic growth is an engine of growth in SSA. They estimated a panel regression model for 47 African countries covering four decades. The results indicate that South African growth has a significant positive impact on growth in other African countries, with a 1-percentage-point increase in South African growth being associated with a 1/2-3/4 percentage point increase in the rest of Africa's growth. The results hold even after controlling for global factors and are robust to the inclusion of other growth determinants and to changes in the sample and the period considered.

Following Diebold and Yilmaz (2012) methodology, Ruch (2013) used variance decompositions from the VAR and construct a total spillover index for the South African economy. The results show that the South African economy has been significantly affected by international spillovers over the sample period, with the variation in South African industrial production due to spillovers from other countries or common shocks averaging 37.6 per cent. This variation peaked to an average of 62.2 per cent over the financial crisis period and remains significantly high.

3. The Methodological Framework

The basic framework for this paper is a standard panel data regression model. The fundamental advantage of panel data set is that it allows more flexibility in modelling differences in behaviour across individual units of observations. Using $i = 1 \dots N$ to subscript cross sectional units observed over time period $t = 1 \dots T$, the model could be depicted in the following general form:

$$y_{it} = \alpha_i + \beta'X_{it} + \delta'Z_{it} + \varepsilon_{it}$$

Where:

y_{it} is the dependent variable,

X_{it} is a k -vector of exogenous explanatory variables,

Z_{it} is a vector of cross section or period specific effects and $Z_{it}^j = 0, \forall i \neq j$, and $Z_{it} = 1 \forall i = j$. Note that $Z_{it} = Z_t$ if the variable vary only across time but constant across units and $Z_{it} = Z_i$ if variable vary across individuals and not across time.

ε_{it} are error term and are *i.i.d.*, $\forall i$ and $\forall t$ and $Var(\varepsilon_{it}) = \sigma_\varepsilon^2$.

α_i is a constant while β' and δ' are vectors of parameters.

The dependent variable in this paper is GDP and the main independent variables³ are:

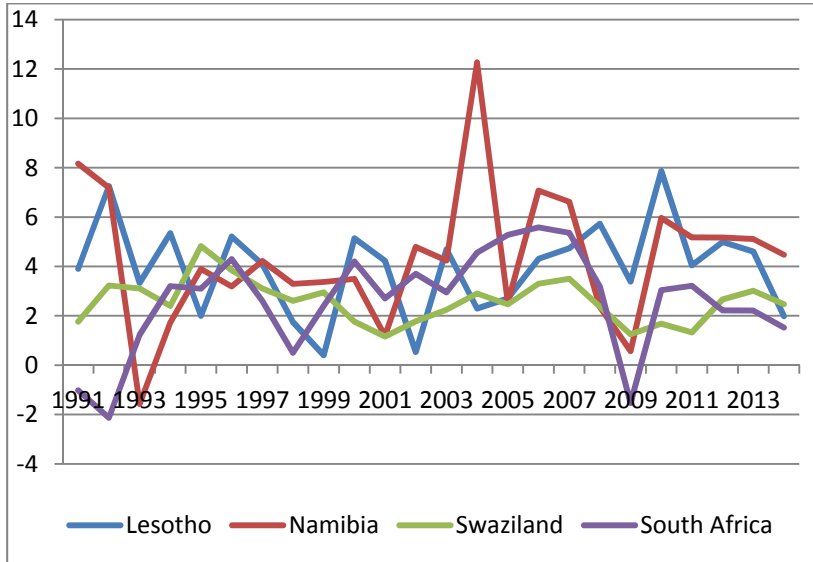
- Lagged dependent variable: This is take into account the intitial conditions and/or to ascertain the degree of persistence, as in Canales-Kriljenko, et.al (2013)

² In terms of the magnitudes, a percentage decline in Euro zone growth rate could lead to 0.34 to 0.6 percentage point drop in African countries growth rates while an equivalent shock in BRICs growth could dent African growth rate to the tune of 0.09 to 0.23 percentage points.

³³ All data are sourced from the World Bank database

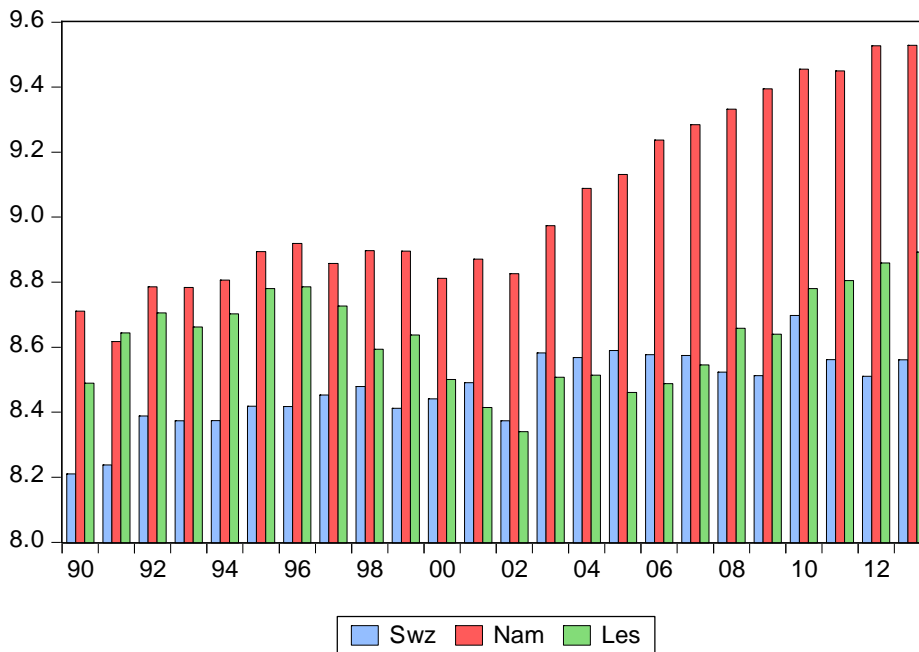
- South Africa's GDP: to capture the influence of growth in South Africa on CMA countries.

Figure 1: GDP growth rates in CMA countries



Source: World Bank Database

Figure 2: Gross fixed capital formation (in log scale)⁴

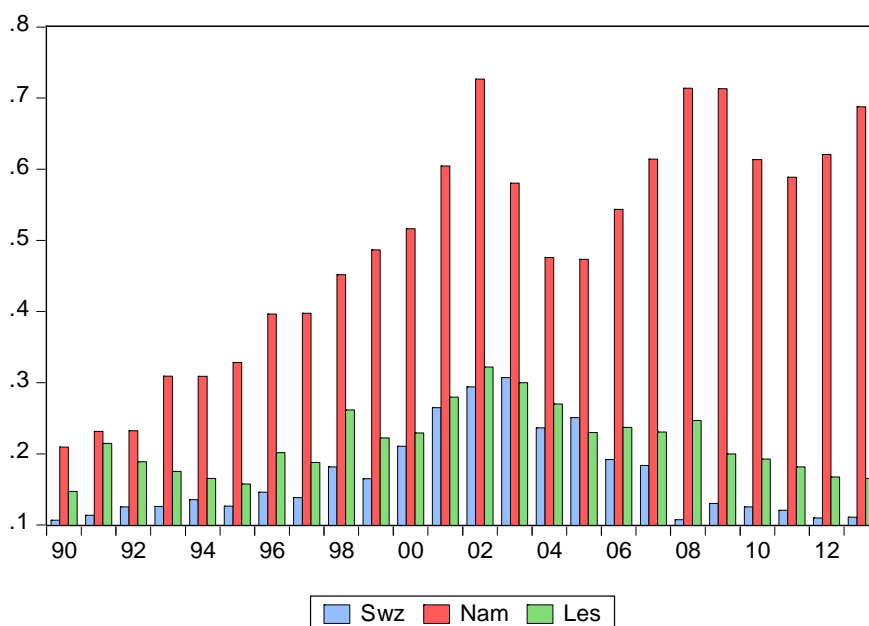


- Gross fixed capital formation: This is used as a proxy for the stock of capital as in the standard economic growth literature.

⁴ Note that in Figure 2 through 6, Swz=Swaziland, Nam=Namibia and Les= Lesotho

- **Openness:** This is measured as a ratio of the sum of imports and export to GDP. Openness would capture the extent to which a country is vulnerable to external shocks. The more open the more vulnerable. However, it could be the case that the more open the economy the more favourable to the country by positively impacting of total factor productivity. The idea of a positive relationship between trade openness and economic growth is supported by many studies including Edwards, (1993, 1998) and Krueger (1997). Measuring this variable, however, is a challenging exercise. H Lane David (2007) has collected data for 30 distinct measures of trade openness and policy, the sheer number of these measures shows the challenging nature of measuring this variable.
- **Real effective exchange rate (REER):** This is used as a measure of competitiveness - with all its known shortcomings. According to Durand and Giorno, (1990), measures of competitiveness should ideally satisfy three basic criteria: first, they should cover all the sectors exposed to competition, i.e. represent all goods traded or tradable that are subject to competition and only those goods; second, they should encompass all the markets open to competition; and, third, they should be constructed from data that are fully comparable internationally. In practice, none of the indicators that are available fulfil these three criteria. Terms of trade are among the most common measures used, but are not available for CMA countries – hence the use of REER as a proxy for competitiveness.
- **The level of financial development:** This is proxied by the ratio of credit extension to GDP. The literature shows that economists hold different opinions regarding the importance of the financial system for economic growth. Levine (1997) found that the functioning of financial systems is vitally linked to economic growth. Moreover, he found ample country studies suggest that differences in financial development have, in some countries over extensive periods, critically influenced economic development. Various indices (see for example, Gelbard and Leite, 1999) and indicators (see Beck, et.al, 1999) have been used in various studies. None of these are available for CMA countries and thus we use credit extension as percentage of GDP.

Figure 3: Openness – ((imports + exports)/GDP) in logs



- Population: The size of the economically active persons – labour force has a bearing on economic growth. This stems from standard growth theory in labour is an important factor of production. Empirical treatment of labour as defined in growth theory is not as straight forward. We, nonetheless, use population size – the closet available measure as a proxy for labour force.

Figure 4: Population (in logs)

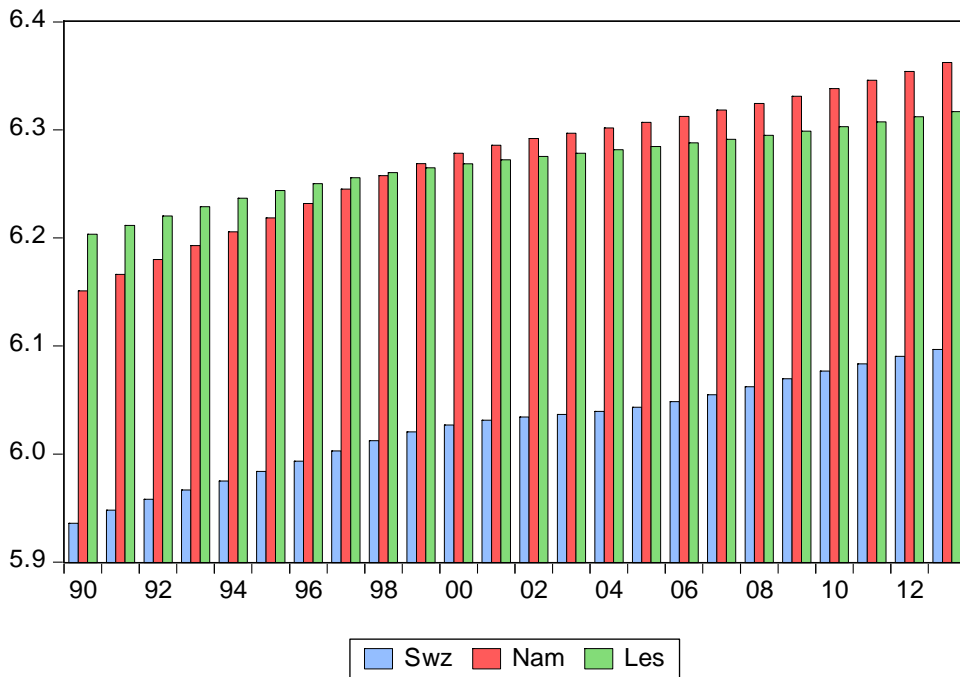


Figure 5: Financial development – Credit extension/GDP in logs

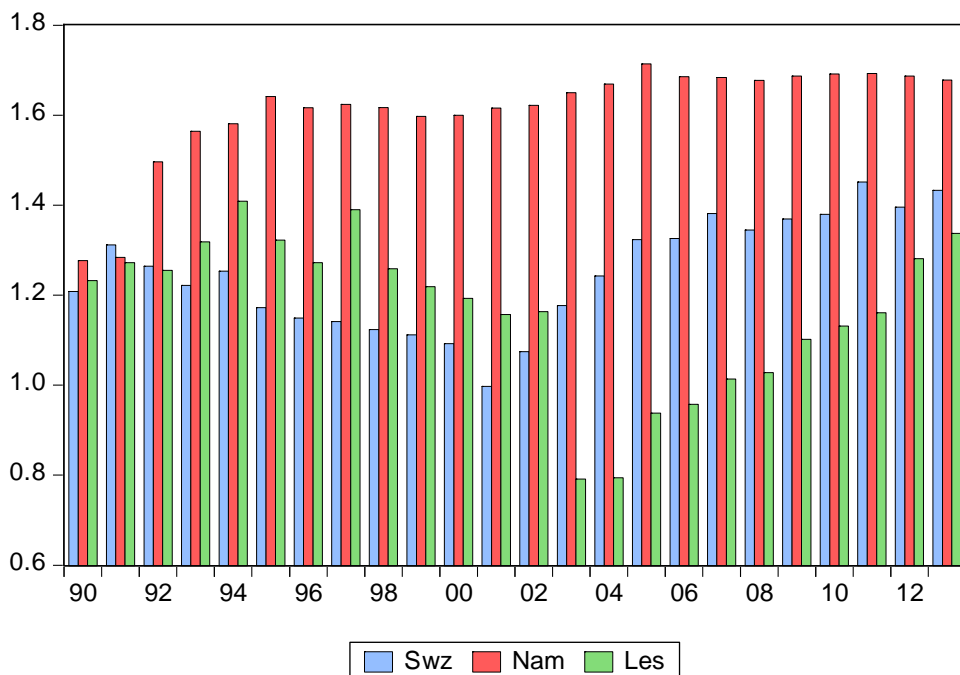
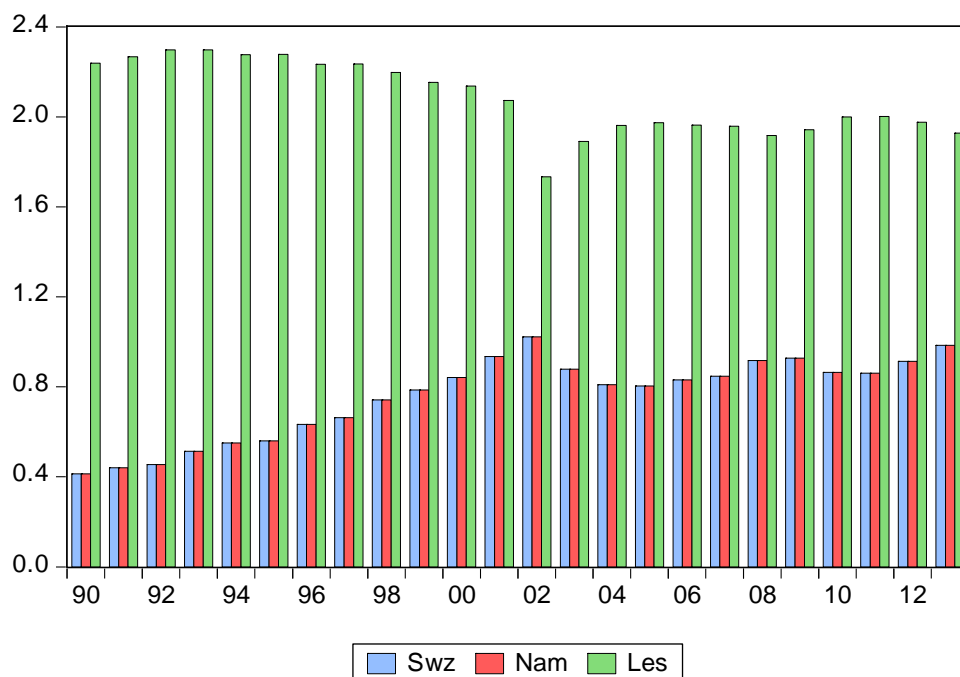


Figure 6: Competitiveness – REER in logs



4. Estimation and Results

Estimation is carried out in Eviews 9. Selected results from a fixed-effect panel regression are depicted in Table 2 and 3.

Variables	Coefficients	t-Statistic
Intercept	-4.381455	-5.712926
GDP(t-1)	0.142785	3.781020
GFCF	0.141283	6.394096
Pop	0.529650	3.157051
PSC	-0.064765	-3.373909
REER	-0.056486	-2.840505
Openness	-0.013644	-0.335121
GDPsa	0.713724	19.08695
R-squared	0.998281	
Adjusted R-squared	0.998019	
S.E. of regression	0.015703	
Sum squared resid	0.014548	
Log likelihood	194.1152	
F-statistic	3806.783	

Table 2 shows that all variables, but *openness* are statistically significant at conventional significance levels. The variable redundancy test was then performed on the *openness* variable and the test statistics (not shown) do not reject, at conventional significance levels, the null

hypothesis that openness is insignificant. The results (which come automatically during the test in Eviews) are depicted in Table 3 without the insignificant *openness* variable.

Table 3: Explaining growth in CMA countries		
Variables	Coefficients	t-Statistic
Intercept	-4.186518	-8.355889
GDP(t-1)	0.145957	4.430738
GFCF	0.137191	6.888712
Pop	0.487337	4.527029
PSC	-0.062741	-3.220862
REER	-0.055224	-3.812568
GDPsa	0.719468	24.82988
R-squared	0.998278	
Adjusted R-squared	0.998048	
S.E. of regression	0.015586	
Sum squared resid	0.014576	
Log likelihood	194.0496	
F-statistic	4346.930	

It is important to note that the regression so far has been conducted in log levels of the data. Clearly this may be problematic if unit roots are present in the data – which may be more appropriate to use panel integration method. These methods are beyond this version of the paper, but instead the model in log first differences was estimated and did not yield satisfactory results. Overall the results can be summarized as follows:

- The main finding is that growth in South Africa exerts a significant influence on growth in CMA countries. In particular, the results show that a one percentage point reduction on South Africa’s GDP on average reduces growth in CMA countries by about 0.7 percentage points. This result is rather robust with respect to various specifications attempted. It is important to note that this result is not significantly different from those of Canales-Kriljenko, et.al (2013) who obtained similar magnitudes of influence from world growth to SACU countries’ growth.
- The results also show that the level of fixed capital formation plays a pivotal role in these countries’ growth. This suggests that the current policy debate that underscores infrastructural investments is valid.
- The results for openness do not seem to confirm the priors that the higher the openness the more positive on growth it is. This could be an indication that the vulnerability risk is more dominant factor than other positive factors that increase openness brings. Alternatively, it may be the case that this is due to the well-known problems associate with using export plus imports/GDP as a measure of openness. Moreover, the variable was not statistically significant. Consideration may be made to explore various measures of openness.

- Although population may not be a good measure of the size of the labour force, the results nonetheless shows that the population size has a positive impact on growth in the CMA countries.
- Contrary to expectations, the level of financial development has a negative impact on growth. This variable requires further interrogation as it may not be the best proxy for the financial development indicator. This is left for further research.
- Competitiveness as measured by the real effective exchange rate is also a significant factor influencing growth in CMA countries. An increase in real exchange rate implies loss of competitiveness by the CMA countries. Although the coefficient is small, it does show that rising REER does have a negative impact on growth in CMA countries.

5. Conclusion and Areas for Further Research

The significant impact of South Africa growth on the CMA countries seems to support the view that South Africa is a pillar of growth in these countries. Based on the estimate fixed effect panel data model the results suggest that a one percentage point reduction on South Africa's GDP on average reduces growth in CMA countries by about 0.7 percentage points.

Notwithstanding the robustness of these initial results, further work still has to be done. First, variables such as openness, labour force, and the level of financial development still need to be appropriately measured. Second, clearly the financial crisis may have generated some structural breaks in the data and this need to be robustly taken care off. Thirdly, with $t > N$ in the data used here, it may be important to consider the time series properties of the data. In this regard, as an area for further research, consideration may be given to the estimation of panel co-integration model.

Furthermore, it is also important to determine if there are any "spillbacks" from CMA countries to South Africa. This may necessitate a vector autoregressive model which will enable the analysis of how shocks to the CMA growth affect South Africa. This is the most immediate area for further research. Furthermore, the sample can be extended to include other regions and countries in Africa.

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