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SADC Countries' Inflation

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Abstract

A structural VAR based on quarterly data over the period 1996-2014 is employed to assess the pass-through from South African inflation to the domestic inflation of other SADC countries, taking into account the openness of the latter to the former. South Africa's inflation is expected to exert influence on the dynamics of domestic inflation in other SADC countries due to the substantial dependence of the majority of the latter on imports from South Africa. This is supported by the evidence that open economies are vulnerable to exchange rate and foreign inflation shocks. The impulse response results reveal that South African inflation has a statistically significant effect on inflation in five of the eight countries studied. The effect of the shock to South African inflation is most profound in the CMA and SACU countries as well as Zambia and Seychelles. This can be attributed to the close trade links among the CMA and SACU countries with South Africa governed by the trade cooperation agreement which strengthens the transmission of inflation to these countries. However, there is a delayed response of inflation in Zambia and the Seychelles. The results therefore provide evidence of the critical role that shocks to inflation in South Africa play in the inflation dynamics of other SADC countries, particularly those with strong import dependence on South Africa. For monetary policy perspective, the results suggest that inflation forecasts in the SADC countries studied must incorporate South African inflation to better guide monetary policy decisions. At a broader macroeconomic management level, to limit the influence from South Africa, the affected SADC countries should critically review their growth policies and accelerate the pace of economic diversification in order to improve economic resilience and enhance policy buffers.

JEL classification: E31

Key words: Inflation; imports; impulse response

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1. Introduction

Evidence from the empirical estimates of various inflation models is broad and diverse (Calderón and Schmidt-Hebbel, 2010). Studies on African economies tend to be convergent on the key drivers of inflation, dominated by monetary and exchange rate influences due to high fiscal deficit monetization by central banks and as economies were slowly liberalised in the 1990s (Durevall and Ndung'u, 1999; Akinboade et al., 2004). Further, there is overwhelming evidence that the exchange rate is a key driver of inflation in most African countries (Durevall and Ndung'u, 1999; Durevall and Sjö, 2012). This reflects the over-reliance of these economies on intermediate and final consumer imports as they predominantly remain raw commodity exporters with a very small manufacturing base. Consequently, these economies remain vulnerable to exchange rate and foreign inflation shocks.

The literature documents the significance of the pass-through from exchange rate and import price fluctuations to domestic inflation and noted to have contributed to the disinflation experienced in most industrialised countries in the 1990s (McCarthy, 2000). It is further observed that the inclusion of import prices and the exchange rate in inflation forecasting models tends to improve forecasts which form the basis for monetary policy decisions.

Lotfalipour et al. (2013) present evidence that countries with a higher degree of international trade are exposed to higher rates of inflation contrary to the negative lead evidence presented by Romer (1993). By and large, the majority of studies have confirmed a negative trade openness-inflation relationship (refer to Lotfalipour, et al. 2013 for a comprehensive review of the studies). For instance, more open European countries have tended to experience lower inflation similar to a number of developing countries studied by Iyoba (1973) and Kim and Beladi (2005). Evidence of a negative openness-inflation link was established for Zambia and Zimbabwe by Kim and Beladi (2005) in a sample of 62 countries studied over the period 1947-2002. Sachsida, et al. (2003) also confirmed that countries with higher degree of openness experienced reductions in the rates of inflation. Romer's justification for a negative correlation between trade openness and inflation is based on the influence of domestic output expansion which generates a larger negative terms of trade thereby steepening the Phillips curve.

Trade openness increases market competition and reduces the pricing power of firms and consequently dampens inflation via lower mark-ups (Lotfalipour, et al., 2013). In addition, trade allows countries to benefit from specialization as countries produce and export goods of their comparative advantage, reflecting lower prices. This enables countries to consume outside their production possibility frontier and thus maximize welfare. The more open an economy is the more exposed it is to external shocks some of which may have adverse impact on domestic prices. Further, trade liberalisation is associated with declining prices and therefore lower prices (Kim and Beladi, 2005). Das et al. (2016) established a strong pass-through from India's inflation to two neighbouring countries, namely, Nepal and Bhutan, with pegged currencies to the Indian rupee and heavy reliance on India for food and fuel imports due to their narrow and weak domestic production base.

This study focuses on the pass-through from South African inflation to domestic inflation of other SADC countries², taking into account their degree of openness to the former. In line with existing evidence in the literature (McCarthy, 2000; Kim and Beladi, 2005; Lotfalipour et al., 2013), South African inflation is expected to exert influence on the dynamics of domestic inflation in other SADC countries due to the substantial dependence of the majority of the latter on imports from South Africa. For instance, over the study period, 1995-2014, the share of imports from South Africa in their respective gross domestic product averaged about 20%, with significant variations across member countries (Table 1 – Appendix). The dependence on imports from South Africa is higher among members of the Common Monetary Area³: Lesotho (73.8%), Swaziland (50.7%), and Namibia (34.9%). The close trade relation with South Africa and currency peg to the rand implies that Lesotho, Namibia and Swaziland import inflation directly from South Africa similar to the evidence found by Das et al. (2016) for Nepal and Bhutan with respect to their relationship with India. Botswana, a member of SACU⁴, also exhibits relatively high dependence on South Africa for imports, with a share of 33.1%. Countries with moderate dependence on South Africa for imports are Zimbabwe, Zambia and Mozambique. The rest of the member countries tend to have very little exposure to South Africa, below 10%, as measured by the ratio of imports to their respective GDP. Generally, countries with very high (CMA and SACU) and low exposure to South Africa (DRC, Seychelles, Mauritius and Angola) tend to have inflation rates very close to South Africa's while countries with moderate exposure have higher inflation rates than South Africa (Table 1 and figures 1 and 2 - Appendix). This seemingly inconsistency is empirically examined in the structural VAR framework in section 2.

Further, SADC countries with higher overall openness⁵ to the world have on average lower levels of inflation compared to less open countries (Figure 3 - Appendix), consistent with the results in cross country studies of inflation and openness. In SADC, Lesotho and Tanzania are the most and least open countries to the rest of the world, respectively. Despite, its relatively higher openness, Lesotho's inflation was higher than some less open countries. In contrast, Tanzania's inflation is relatively lower than more open countries such as Mozambique, Zambia and Angola. These results show that, although the relationship between openness and inflation in the SADC group is broadly consistent with those in other cross-country studies, other factors besides openness drive the inflationary processes in these countries.

Inflation rates in the SADC region show some convergence between 2010 and 2013 before diverging in 2014 and 2015 (Figure 4 - Appendix). Prior to 2010, SADC countries had widely varying inflation rates. South African inflation ranged between 1.4% and 11.5% from 1996

²Southern African Development Community (SADC) is an inter-governmental organisation established in 1992 among 15 Southern African States (Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia, and Zimbabwe) to further socio-economic cooperation and integration as well as political and security cooperation.

³ South Africa, Lesotho, Namibia, and Swaziland. Lesotho, Namibia, and Swaziland have pegged their currencies to the South African rand which is freely used in transactions in these countries.

⁴ Southern African Customs Union (SACU) is a customs union among five countries of Southern Africa: Botswana, Lesotho, Namibia, South Africa and Swaziland established in 1910.

⁵Overall openness is defined as the ratio of the sum of exports and imports to gross domestic product. Average inflation rates for Zimbabwe, Lesotho and Namibia are computed from 2010, 2000 and 2003, respectively.

to 2015, with the highest inflation recorded in 2008⁶, reflecting the South African economy's greater susceptibility to global economic shocks compared to other SADC Member countries. As a result, first order effects of global economic shocks are likely to have a greater impact on the South African economy than in other SADC economies who are likely to be more prone to second order effects of these shocks.

This study employs a structural VAR model consisting of five variables, namely, South African inflation, openness, money supply, domestic inflation and exchange rate to establish the pass-through from South African inflation to domestic inflation of other SADC countries⁷, taking into account their degree of openness to the former. CPI is used as a measure of inflation due to its common use and data availability compared to producer and wholesale price indices. This is in addition to CPI being the principal concern for monetary policy. Impulse response functions and variance decomposition are used to assess the extent and importance of the pass-through from South African inflation to other SADC countries' inflation. The model is estimated for each country separately due to differences in institutional set-ups which may lead to different impacts.

The rest of the paper is structured as follows. Section 2 presents the model specification and estimation method. Data sources and description are outlined in section 3. Section 4 presents the empirical results. Section 5 concludes.

2. Model Specification and Estimation Method

The estimated empirical model expands on Romer (1993) such that the structural VAR model consists of five variables, namely, South African inflation, openness, money supply, domestic inflation and the exchange rate similar to Kim and Beladi (2005) and Das et al. (2016).

All the variables in the SVAR⁸ set up (equation 1) are treated a priori as endogenous and theoretically motivated restrictions imposed on contemporaneous relations among the variables. The marginal effect of a shock to any of the variables in the system and on itself can be traced out over time using impulse response analysis⁹ in a dynamic interaction form.

$$AX_t = A_0 + \sum_{i=1}^p A_i X_{t-i} + B\varepsilon_t \quad (1)$$

⁶ South African inflation peaked during the global and economic financial crisis that started in 2007

⁷Southern African Development Community (SADC) is an inter-governmental organisation established in 1992 among 15 Southern African States:Angola, Botswana, Democratic Republic of Congo (DRC), Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Seychelles, Swaziland, Tanzania, Zambia, and Zimbabwe) to further socio-economic cooperation and integration as well as political and security cooperation.

⁸ SVAR models treat every variable as endogenous due to the difficulty of finding exogenous variables in macroeconomics (Gottschalk, 2001).

⁹ Impulse response functions are calculated from the estimates of the VAR. They show how current and future values of each variable in the VAR respond to a one-off unit increase in the current value of one of the structural shocks in the VAR holding other shocks constant.

where A is an invertible $(n \times n)$ matrix capturing contemporaneous relations among X_t variables, X_t is an $(n \times 1)$ vector of macroeconomic variables, A_0 is a vector of constants, A_1 to A_p is $(n \times n)$ matrix of unknown parameters on lagged values of X_t to be estimated, B is an $(n \times n)$ matrix reflecting direct effects of some ε_t on more than one X_t variable, ε_t is an $(n \times 1)$ vector of uncorrelated structural innovations or shocks corresponding to each element of X_t with covariance matrix $E(\varepsilon_t \varepsilon_t') = \Sigma_\varepsilon$, $t = 1, 2, \dots, T$, and n is the number of variables in the system. Further manipulation of equation 1 yields

$$X_t = \Psi_0 + \sum_{i=1}^p \Psi_i X_{t-i} + e_t \quad (2)$$

where $\Psi_0 = A^{-1}A_0$, $\Psi_1 = A^{-1}A_1$, $\Psi_2 = A^{-1}A_2, \dots, \Psi_p = A^{-1}A_p$; and $e_t = A^{-1}B\varepsilon_t$ is an $(n \times 1)$ vector of white noise error term with zero mean and constant variance $E(e_t e_t') = \Sigma_e$. Equation 2 is a reduced form representation of equation 1 as the latter cannot be estimated directly since the structural model cannot be identified. Structural shocks are orthogonal to each other while the reduced form errors, e_t , are not.

In order to recover individual structural shocks from VAR residuals, additional information is required. This takes the form of identifying restrictions imposed on A and B . Thus, the structure linking the structural shocks and the reduced form residuals takes the form

$$Ae_t = B\varepsilon_t \quad (3)$$

To identify A and B and thus generate impulse response functions, at least $2n^2 - n(n+1)/2$ additional restrictions are required in addition to n normalisation restrictions. A non-recursive identifying structure is adopted whereby a priori restrictions are imposed on contemporaneous interactions among X_t variables in order to identify the coefficient matrix A . Thereafter, the dynamic impact of ε_t can be traced on the path of any element in X_t as per the following identification scheme

$$X_t' = (cpi_t^{SA}, o_t, m_t, cpi_t^D, s_t) \quad (4)$$

$$\begin{pmatrix} 1 & 0 & 0 & 0 & 0 \\ 0 & 1 & 0 & 0 & a_{25} \\ 0 & 0 & 1 & a_{34} & 0 \\ a_{41} & a_{42} & a_{43} & 1 & a_{45} \\ a_{51} & a_{52} & a_{53} & a_{54} & 1 \end{pmatrix} \begin{pmatrix} e_t^{cpi(SA)} \\ e_t^o \\ e_t^m \\ e_t^{cpi(D)} \\ e_t^s \end{pmatrix} = \begin{pmatrix} b_{11} & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 \\ 0 & b_{22} & 0 & 0 & 0 \\ 0 & 0 & b_{33} & 0 & 0 \\ 0 & 0 & 0 & b_{44} & 0 \\ 0 & 0 & 0 & 0 & b_{55} \end{pmatrix} \begin{pmatrix} \varepsilon_t^{cpi(SA)} \\ \varepsilon_t^o \\ \varepsilon_t^m \\ \varepsilon_t^{cpi(D)} \\ \varepsilon_t^s \end{pmatrix}$$

cpi_t^{SA} is a measure of inflation for South Africa derived from the consumer price index, o_t is a measure of openness computed as the ratio of each countries' imports from South Africa to its GDP similar to Sachsida et al. (2003) and Kim and Beladi (2005), m_t is money supply, cpi_t^D is a measure of inflation for non-South African countries derived from the consumer price index, and s_t is the exchange rate defined as the number of domestic currency units per US dollar. South African inflation, openness, money supply, inflation for non-South African countries, and exchange rate shocks are denoted as $\varepsilon_t^{cpi(SA)}$, ε_t^o , ε_t^m , $\varepsilon_t^{cpi(D)}$ and ε_t^s , respectively.

Foreign inflation, South Africa inflation, is assumed to be exogenous and therefore not determined by any of the variables under consideration, hence the zero exclusion restriction imposed on all variables. Openness, measured as the ratio of imports to GDP, is assumed to be responsive to changes in relative prices approximated by the nominal exchange rate. Domestic inflation adjusts to changes in openness, money supply and the exchange rate, but not contemporaneously to foreign inflation. Money supply is driven by domestic inflation (standard money demand equation specification). The exchange rate depends upon innovations in macroeconomic variables as it reacts almost instantaneously to all information. The study focuses on identifying the impact of a one off shock to South African inflation on other SADC countries' inflation given their degree of openness to the former.

Finally, variance decomposition is estimated to determine the proportion of variation in inflation in other SADC countries' attributable to shocks to South African inflation, openness, money supply and the exchange rate.

3. Data Sources and Description

The study is restricted to eight countries in SADC (i.e. Botswana, Congo DR, Lesotho, Mauritius, Namibia, Mozambique, Seychelles and Zambia) and the sample period 2001q4 to 2014q4 due to some missing observations on some variables for the remaining seven countries. The year 2015 is excluded because of a terms of trade shock that hit most SADC countries --- its exclusion is intended to insulate the findings of the study from the effects of this shock. Zimbabwe was excluded on account of the extreme behaviour of the variables under study affected by the economic downturn (hyperinflation) induced by drastic domestic policy changes.

Annual series on gross domestic product (GDP) were obtained from the World Bank's World Development Indicators. Quarterly series for broad money, exchange rate and the consumer price index were obtained from the International Monetary Fund online database. Annual series on merchandize trade (imports and exports) by SADC Member States with South Africa and the rest of the World were obtained from the United Nations Conference on Trade and Development online database. The annual series were converted to quarterly series using the quadratic-match sum method.

The structural VAR of the sampled countries were estimated using the natural logarithms of all the variables in the model. All the variables were tested for stationarity using the Augmented Dickey Fuller (ADF) and the Phillip Perron tests (Table 2).

Table 2: ADF and PP Tests in Levels¹⁰

	Log of Opennes (ADF)	Log of Opennes (PP)	Log of Broad Money (ADF)	Log of Broad Money (PP)	Log of CPI (ADF)	Log of CPI (PP)	Log Exchange Rate (ADF)	Log Exchange Rate (PP)
Botswana	-3.84*	-2.27	-1.75	-1.57	-0.57	-0.16	-2.50	-2.04
Congo DR	-2.17	-2.38	-0.75	-0.71	-1.54	-1.78	-2.22	-1.21
Lesotho ¹¹	-5.06*	-1.76	-2.73	-2.55	4.24	3.86	-1.11	-1.42
Mauritius	-3.98*	-3.08	-2.38	-2.67	0.0037	-0.31	-3.72*	-2.78*
Namibia	-2.66	-2.51	-2.73	-2.61	-1.14	-1.27	-1.11	-1.42
Mozambique	-2.47	-2.90	0.63	2.36	-1.24	-1.13	-1.74	-2.36
Seychelles	-1.37	-2.50	0.80	0.85	-2.34	-1.95	-2.75	-2.12
Zambia	-2.66**	-2.56	-3.77*	-3.49*	-3.33**	5.89	-1.83	-1.93
South Africa	n/a	n/a	n/a	n/a	-4.05*	-1.96	n/a	n/a

(*) and (**) means the null hypothesis of a unit root is rejected at 5% and 10% level of significance, respectively.

At least one of the two tests (ADF and Philip Perron) show that openness for all the countries are integrated of order one¹². Similarly, Broad money are also integrated of order one for all the countries except in Mozambique, where it is integrated of order zero. CPI are integrated of order one in all the countries. The exchange rate is integrated of order one in all the country except for Mauritius where it was integrated of order zero.

4. Empirical Results and Discussion

4.1. Impulse Response Functions

The impulse response functions with ± 2 standard deviations error bounds for a one standard deviation in South African inflation shock to the eight SADC countries under study are depicted in figure 5. As a robustness check, the model is re-estimated excluding openness and the results are presented alongside the original model in figure 5. The results are broadly the same as those with the model that includes openness.

By and large, the response of domestic inflation to the shock to South African inflation varies among SADC countries and appears to be immediate and stronger in some and statistically insignificant in others.

The error bounds for all the countries except for Mozambique, Mauritius and Democratic Republic of Congo (DRC) are mostly wide and statistically significant. This suggests that,

¹⁰ The t-statistics are given.

¹¹ The unit root test for Lesotho takes into account the structural break in the series.

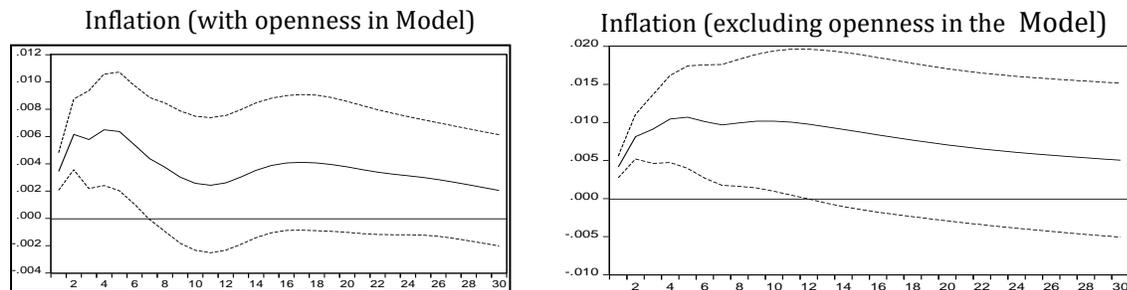
¹² The unit root tests take into account the exogenous variables such as the trend and intercept. The choice of the exogenous variable included in each test equation is determined using the Schwartz information criteria, starting with a general form that includes both the intercept and a constant, the test equations are subsequently reduced to a more specific form, by excluding the intercept and constant and/or the trend only.

while the shocks to South African inflation have a positive and persistent impact on some SADC countries domestic inflation, they do not transmit (not significantly different from zero for) to Mozambique, Mauritius and Democratic Republic of Congo inflation. One plausible explanation for this response could be that inflationary pressures from South Africa are suppressed by the low volume of trade between South Africa as confirmed by the limited trade exposure to South Africa (Table 1). In addition, Mozambique and Mauritius instituted price controls and subsidies in 2008 that could have masked inflationary pressures from South Africa.

In the case of the CMA countries (Namibia and Lesotho), the impact of the shock to South African inflation is immediate and permanent. Inflation in these countries rises sharply and peak after about two years and then adjust to new level after some correction sixteen quarters afterwards. Gaomab (1998) and Ackah et al (2015) also found a long-run dominant influence of foreign prices and imported inflation from South Africa on Namibian inflation. Similar to the CMA countries, inflation in Botswana (SACU Member) responds immediately but the impact of the shock dies out gradually by about the fifth year. This result conforms to a priori empirical expectations for countries that have harmonized their monetary and exchange rate policies with South Africa to be impacted strongly by foreign shocks. For Zambia and Seychelles, the shocks from South African inflation raise domestic prices permanently but with a lag of one year, initially exceeding the new level. The lagged response in Zambia and Seychelles could reflect uncertainty about the nature of the shock by agents whether permanent or temporary before price adjustments can be effected. The market tends to overreact to the shock but the correction is effected to reflect the permanent nature of the shock. Overall, the results confirm the notion that countries with a higher degree of international trade are exposed to higher rates of inflation (Lotfalipour et al. 2013).

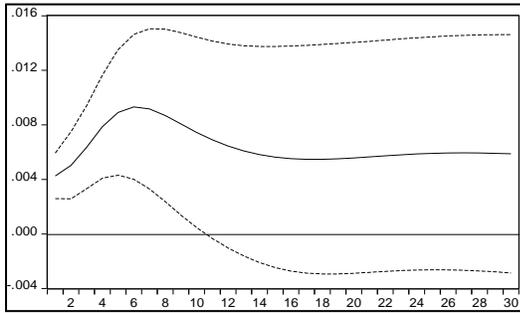
Figure 5: Response to South African Inflation Shock in other SADC Countries

Lesotho

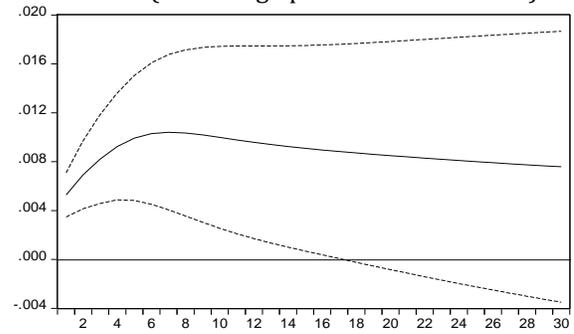


Namibia

Inflation (with openness in Model)

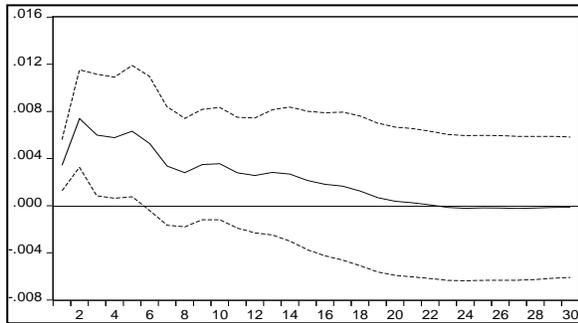


Inflation (excluding openness in the Model)

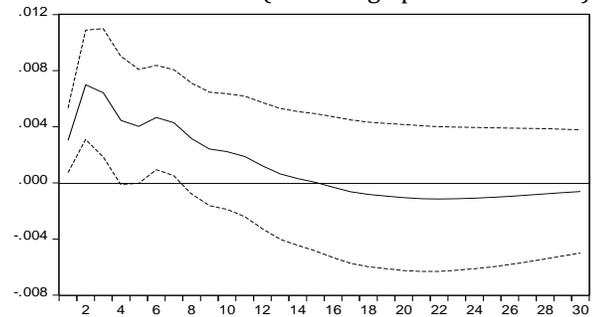


Botswana

Inflation (with openness in model)

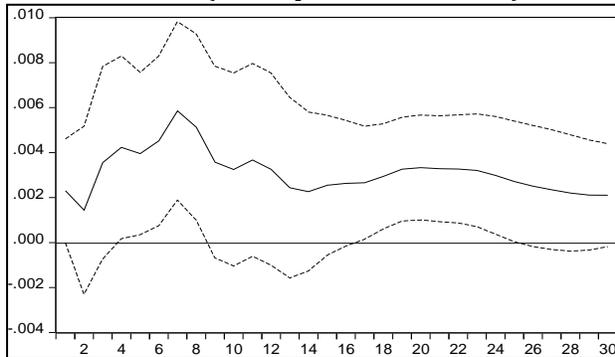


Inflation (excluding openness in l)

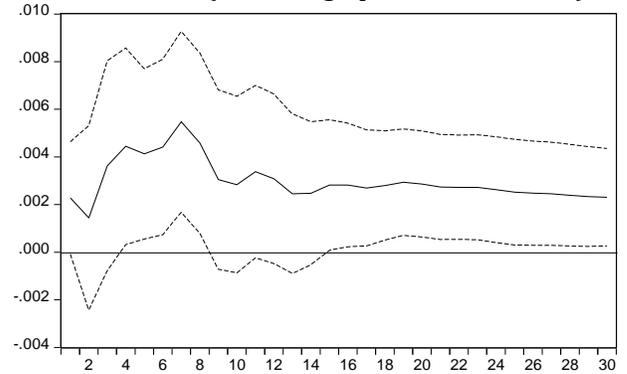


Zambia

Inflation (with openness in model)

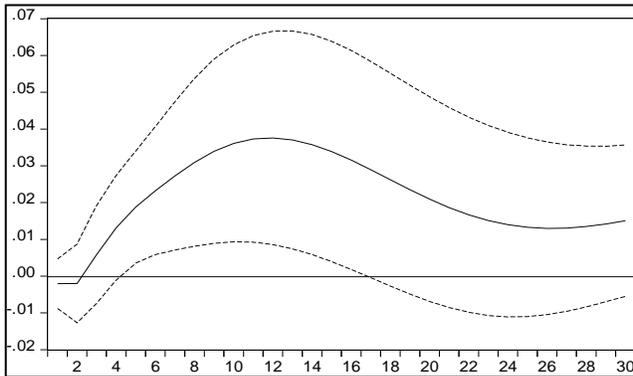


Inflation (excluding openness in model)

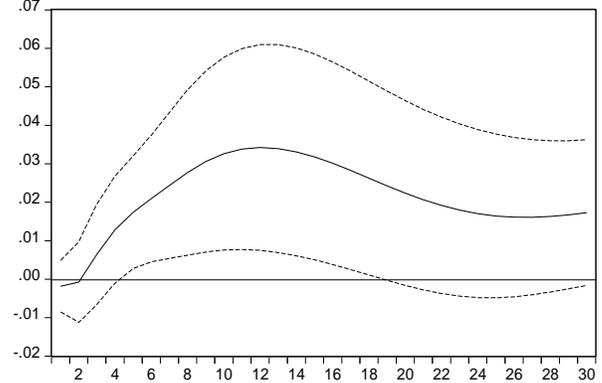


Seychelles

Inflation (with openness in model)

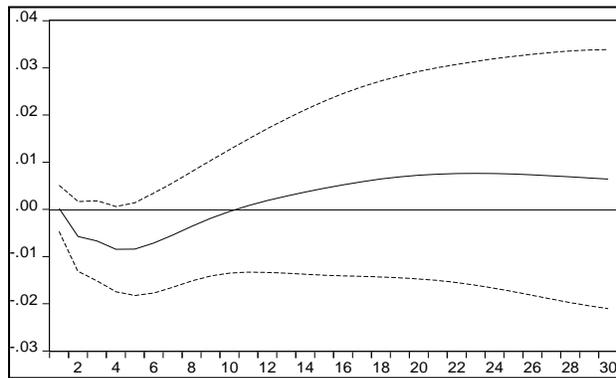


Inflation (excluding openness in model)

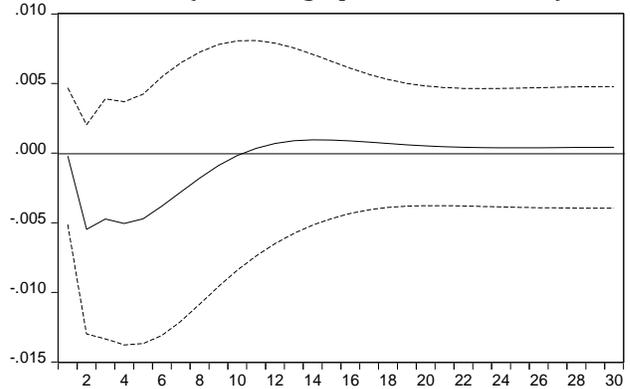


Mozambique

Inflation (with openness in model)

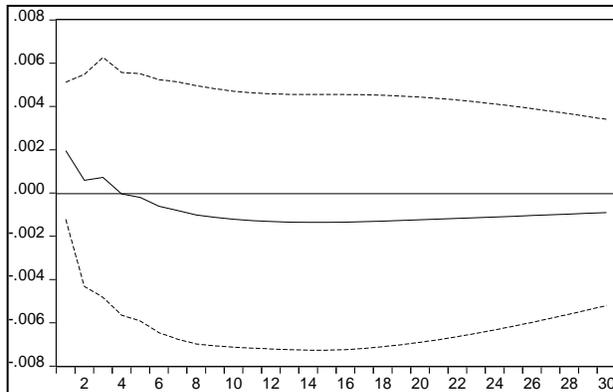


Inflation (excluding openness in model)

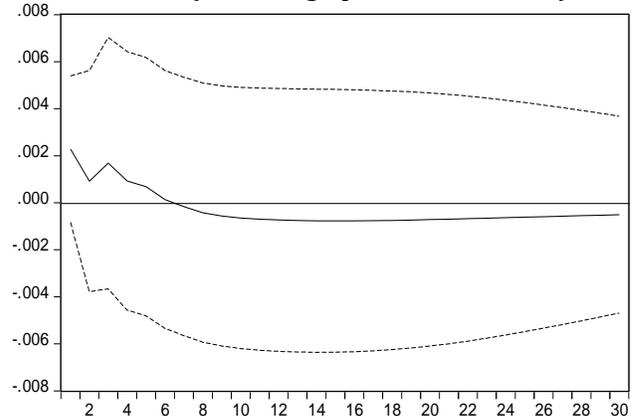


Mauritius

Inflation (with openness in model)



Inflation (excluding openness in model)



4.2. Variance decomposition for the estimated SVAR

The variance decomposition analysis results, isolating the relative importance of each random shock on the domestic inflation of the eight countries under study, are summarized in table 3. The results confirm that shocks from South African inflation tend to have a high

and dominant effect in accounting for the variations in domestic inflation in the CMA countries at all forecasting horizons. This validates the significance of external influence from South Africa. In the case of Zambia, about 40% of the variation in domestic inflation is accounted for by the shock induced by South African inflation. However, for Seychelles, the dominant influence tends to emanate from the exchange.

Table 3: Variance Decomposition of Domestic Inflation

Lesotho					
with openness included the model					
Horizon (Quarters)					
Variable	2	4	6	8	10
SA_Inflation	46.1	45.8	45.8	46.4	46.9
Openness	0	0	0.1	0.1	0.1
Money Supply	5.9	5.9	6	5.9	5.8
Dom. Inflation	47.8	48	47.9	47.4	47.1
Exchange rate	0.2	0.2	0.2	0.2	0.2
excluding openness in the model					
Horizon (Quarters)					
Variable	2	4	6	8	10
SA_Inflation	57.4	60.4	61.5	61.5	61.7
Money Supply	9	8.6	8.5	8.5	8.4
Dom. Inflation	31.7	29.6	29	28.9	28.7
Exchange rate	2	1.3	1.1	1.1	1.1
Namibia					
with openness included in the model					
Horizon (Quarters)					
Variable	2	4	6	8	10
SA_Inflation	47.1	46.5	44.7	43.3	42.5
Openness	30.1	33.6	35.4	36.6	37.8
Money Supply	3.2	3	2.9	2.8	2.7
Dom. Inflation	19.6	16.9	17	17.4	17
Exchange rate	0	0	0	0	0
excluding openness in model					
Horizon (Quarters)					
Variable	2	4	6	8	10
SA_Inflation	60.6	74.5	76.9	75.6	73.3
Money Supply	1.1	7.1	12.7	17.3	21.3
Dom. Inflation	37.1	17.1	9.3	6.3	4.8
Exchange rate	1.3	1.4	1.1	0.8	0.7

Botswana

Variable	with openness included the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	8.3	23.7	45.1	50.7	54.4
Openness	32	23.7	12.6	9.4	7.6
Money Supply	2.1	4.7	7.5	8	8.2
Dom. Inflation	4.6	8.1	13.6	15.7	16.6
Exchange rate	53	39.8	21.2	16.2	13.2

Variable	excluding openness in the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	79.5	77.8	77.4	76	76
Money Supply	11.5	12	11.6	11.8	11.6
Dom. Inflation	9	10	10.8	11.9	12
Exchange rate	0.1	0.1	0.2	0.3	0.4

Mozambique

Variable	with openness included the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	53.5	53.7	53.7	53.5	53.1
Openness	0.6	0.8	0.9	0.9	0.8
Money Supply	3.4	3.3	3.3	3.4	3.4
Dom. Inflation	42.5	42.1	42	42.2	42.6
Exchange rate	0.1	0	0	0	0.1

Variable	excluding openness in the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	7.1	5.7	5.4	5.4	5.4
Money Supply	7.5	11.3	13.2	13.7	13.8
Dom. Inflation	68.9	60.7	56.4	55.2	55.1
Exchange rate	16.5	22.2	25	25.7	25.8

Zambia

Variable	with openness included the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	2.6	34.4	33.8	37	38.5
Openness	70.1	41.9	41.9	39.5	37.3
Money Supply	0.8	2.6	2.7	2.8	3.1
Dom. Inflation	7.2	8.3	8.9	8.6	9.7
Exchange rate	19.3	12.8	12.7	12.1	11.4

excluding openness in the model

Variable	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	73.5	73.2	73.6	73.8	73.6
Money Supply	6	5.9	5.8	5.8	5.8
Dom. Inflation	20.4	19.7	19.5	19.3	19.3
Exchange rate	0.1	1.2	1.1	1.1	1.2

Congo (DR)

Variable	with openness included the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	46.6	51.3	51.5	51.1	51
Openness	2.6	2.2	2.4	2.6	2.6
Money Supply	5.8	5.2	5	4.9	4.9
Dom. Inflation	29.3	28.4	28	27.7	27.7
Exchange rate	15.7	13	13.2	13.7	13.8

Variable	excluding openness in the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	52.9	53.1	53.1	53	52.8
Money Supply	2.6	2.4	2.4	2.4	2.4
Dom. Inflation	36	34.9	34.7	34.8	35
Exchange rate	8.5	9.5	9.8	9.8	9.8

Seychelles

Variable	with openness included the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	0	0	0	0	0
Openness	3.2	9.5	10.3	10.1	9.9
Money Supply	9.5	13.5	14.1	13.9	13.7
Dom. Inflation	22.5	12	9.1	8.6	9.7
Exchange rate	64.8	65.1	66.5	67.4	66.7

Variable	excluding openness in the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	42.5	43.5	41.3	41.5	40.7
Money Supply	2.9	6.8	8.2	7.5	7.6
Dom. Inflation	39.7	20.8	19.3	20.5	22.3
Exchange rate	14.9	28.9	31.2	30.6	29.4

Mauritius					
Variable	with openness included the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	35.6	33.6	34.8	36.9	37.5
Openness	0.2	0.6	0.7	0.7	0.7
Money Supply	14.7	14.9	14.6	14.1	14
Dom. Inflation	48.7	49.3	48.3	46.8	46.3
Exchange rate	0.7	1.5	1.6	1.5	1.5

Variable	excluding openness in the model				
	Horizon (Quarters)				
	2	4	6	8	10
SA_Inflation	64.1	64.3	63.7	61.8	60.4
Money Supply	28.7	28.6	28.9	30.3	31.3
Dom. Inflation	5.3	5.3	5.4	5.8	6
Exchange rate	1.9	1.8	2	2.2	2.3

5. Conclusion

This study has assessed the implications of some SADC countries' trade exposure to South Africa and the transmission of inflation shocks from the latter to the former. A structural VAR was employed using quarterly data from 1996 to 2014. The results provide evidence of the critical role that shocks to inflation in South Africa play in the inflation dynamics of other SADC countries, particularly those with strong import dependence on South Africa. For monetary policy perspective, the results suggest that inflation forecasts in the SADC countries studied must incorporate South African inflation to better guide monetary policy decisions. At a broader macroeconomic management level, to limit the influence from South Africa, the affected SADC countries should critically review their growth policies and accelerate the pace of economic diversification in order to improve economic resilience and enhance policy buffers.

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Appendix

Table 1: Degree of Openness to South Africa and Inflation Rates, period average (1996-2014)

	Openness (%)	Inflation (%)	Deviation from South African Inflation (%)
Lesotho	73.8	6.8	0.8
Swaziland	50.7	7.1	1.1
Namibia	34.9	5.7	-0.3
Botswana	33.1	7.8	1.8
Zimbabwe	18.1	-	-6.0
Mozambique	15.7	10.2	4.2
Zambia	13.1	16.9	10.9
Malawi	9.4	18.7	12.7
Democratic Republic of Congo (DRC)	7.8	3.7	-2.3
Seychelles	6.5	6.0	0.0
Mauritius	5.0	5.4	-0.6
Angola	2.3	5.2	-0.8
Tanzania	2.1	9.0	3.0
Madagascar	1.6	9.5	3.5
South Africa	n.a	6.0	n.a

Figure 1: Openness to South Africa and Inflation (1996-2014)

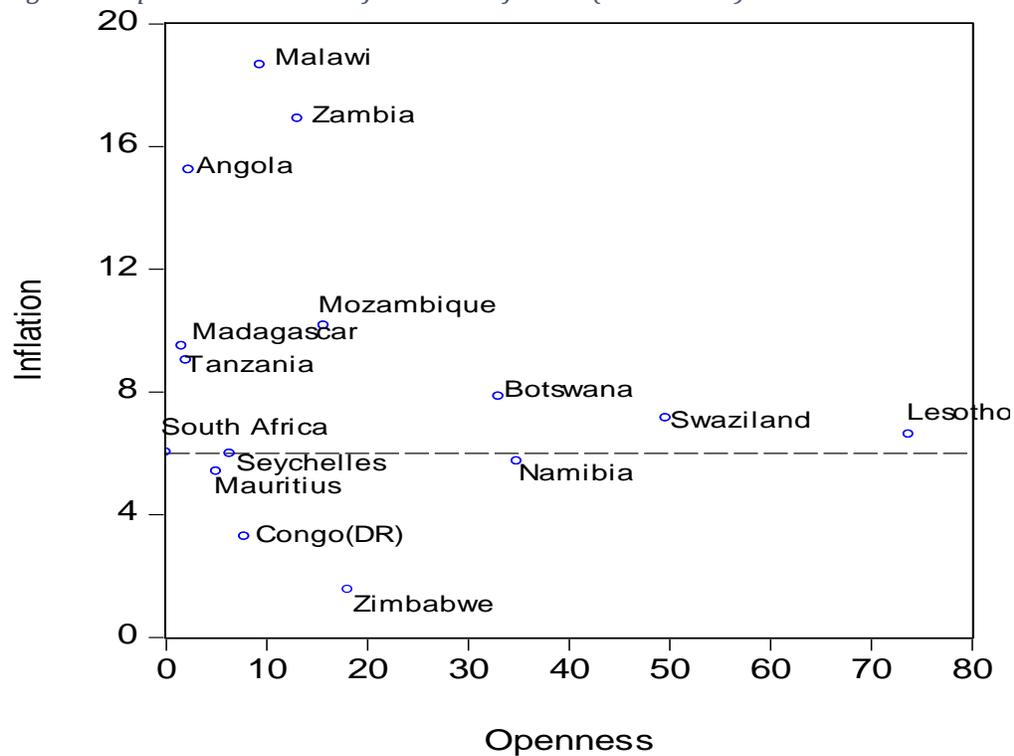
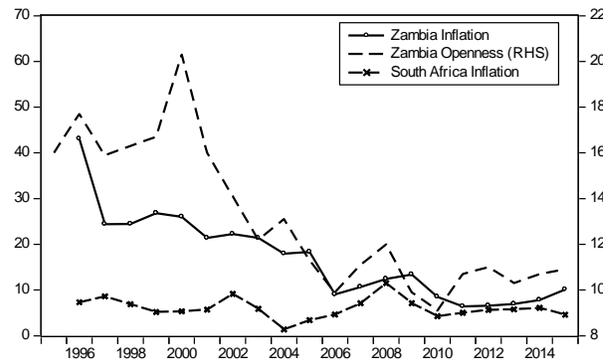
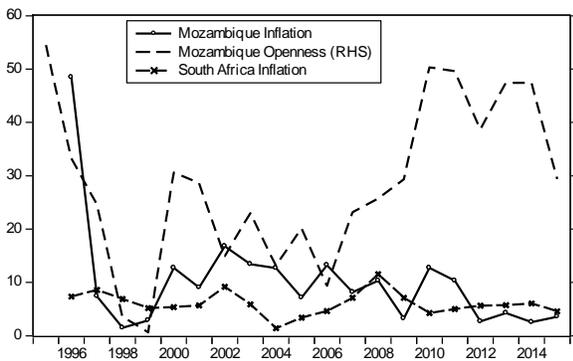
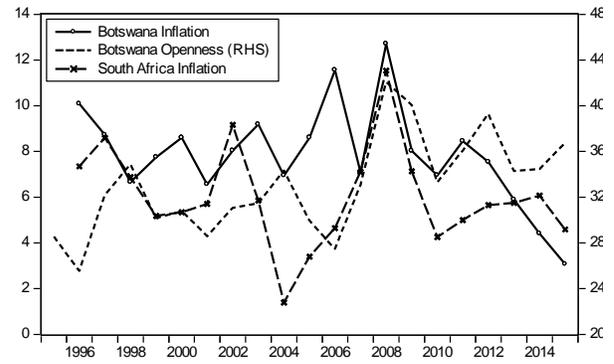
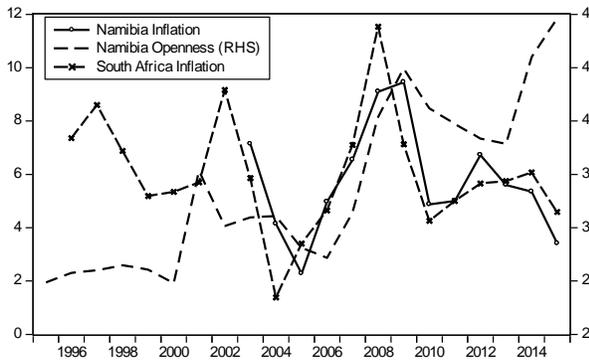
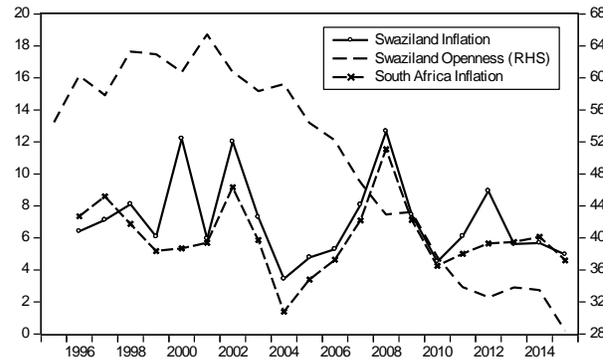
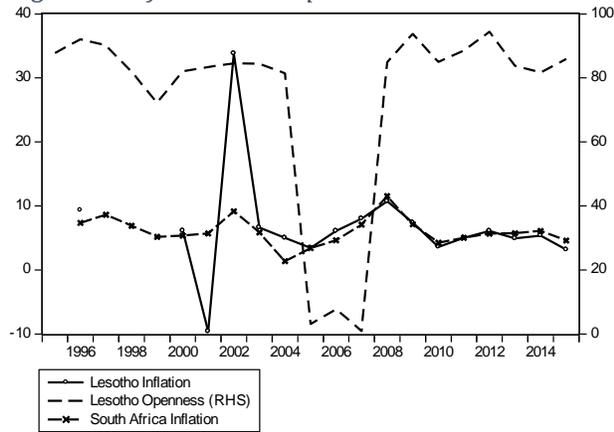


Figure 2: Inflation and Openness in SADC



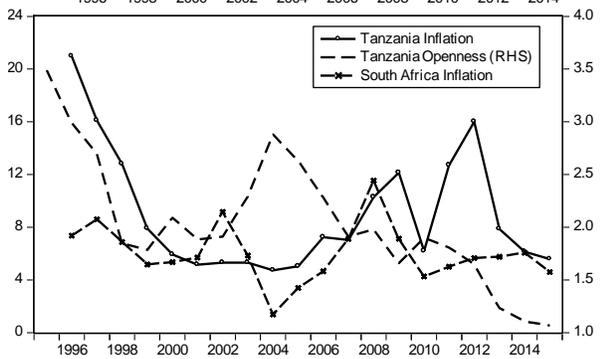
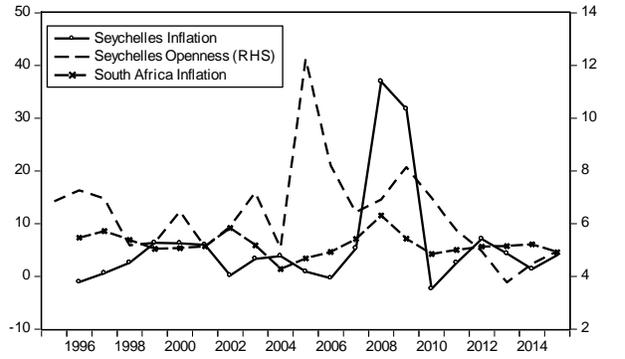
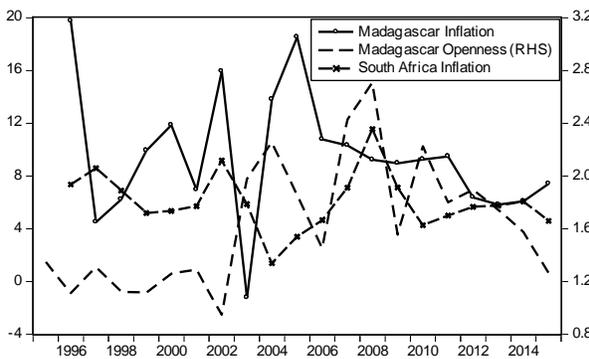
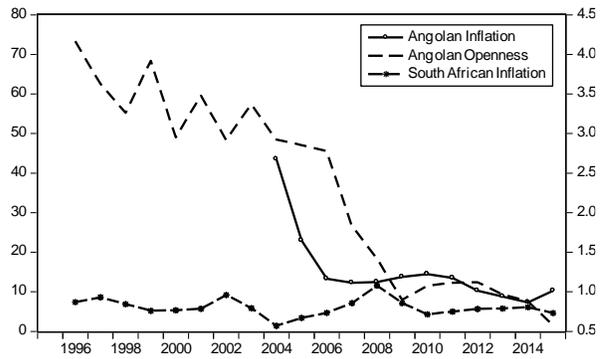
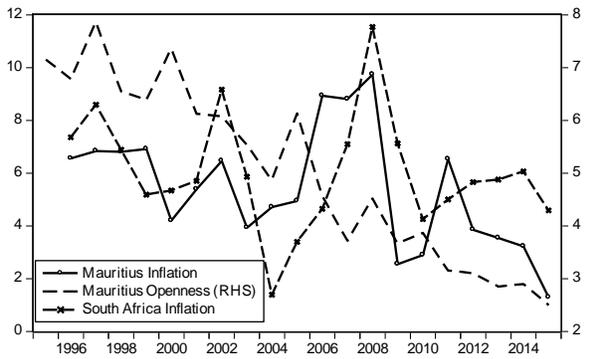
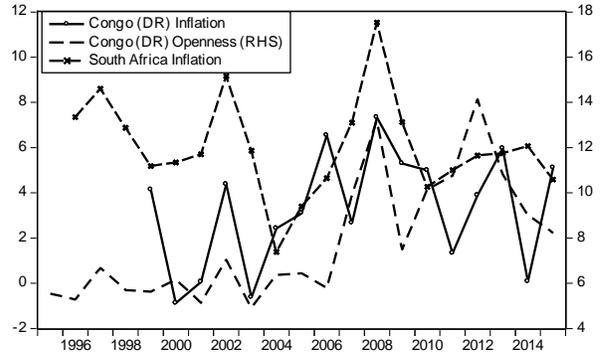
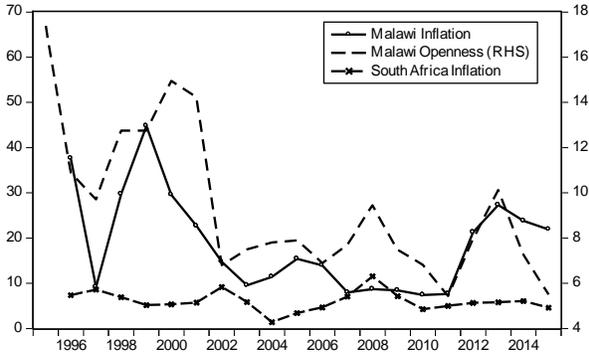


Figure 3: Openness to the Rest of the World and Inflation (1996-2014)

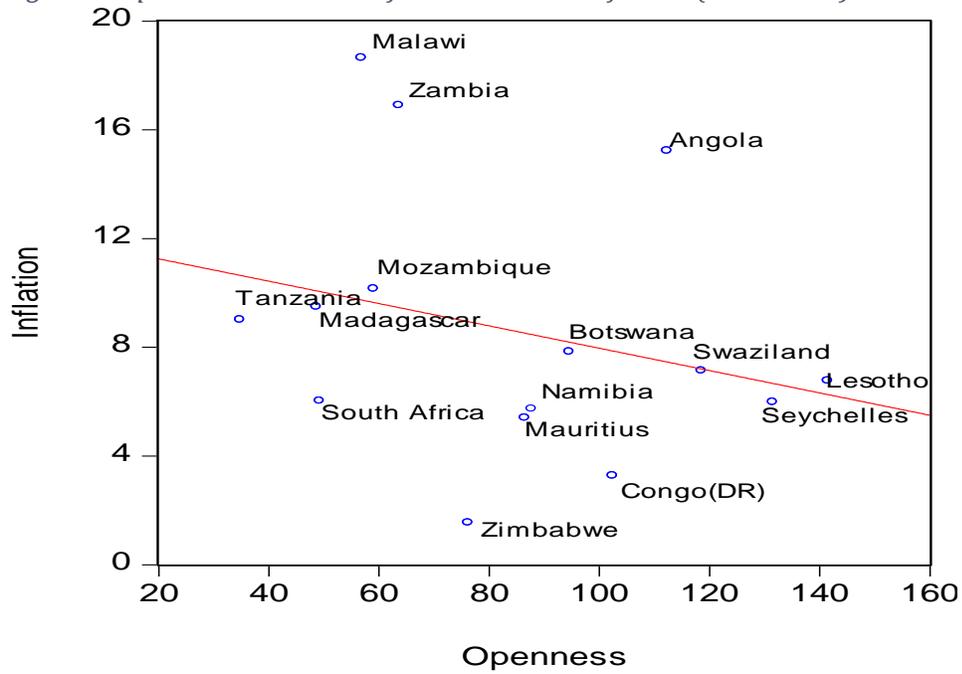
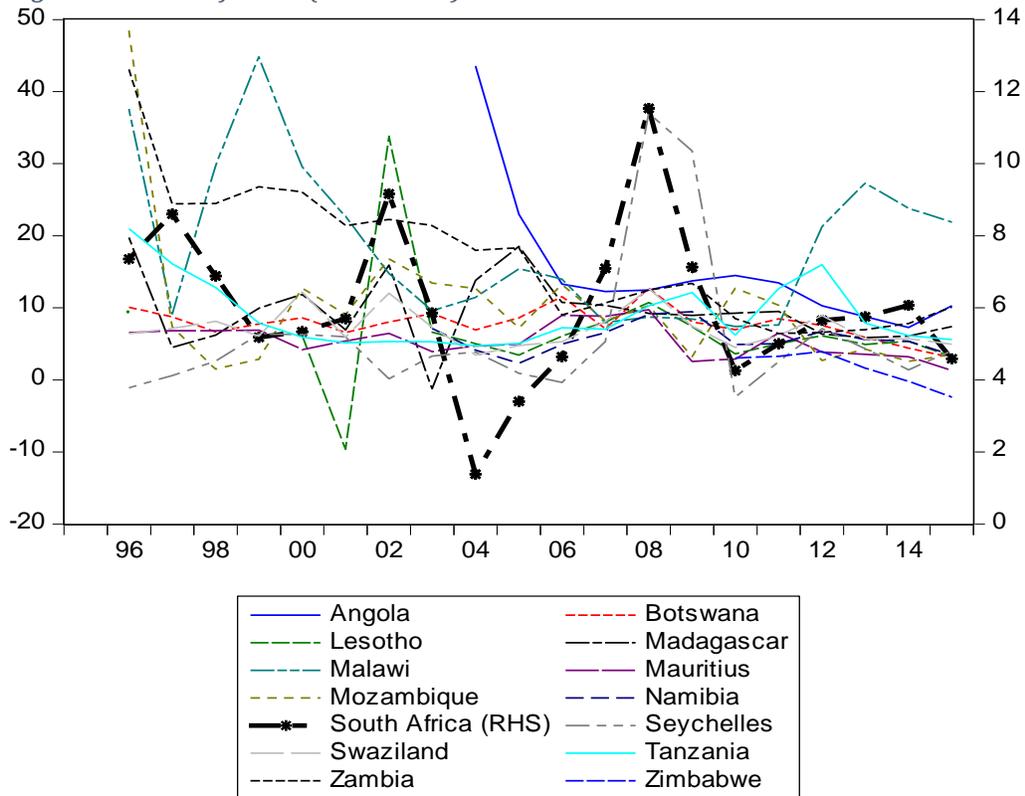


Figure 4: SADC Inflation (1996-2014)





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