

TRADE OPENNESS AND ECONOMIC GROWTH IN MOZAMBIQUELawrence MASHIMBYE^{1*}Ashenafi Beyene FANTA¹

Abstract:

Mozambique pursued open trade policy from 1986 and recorded sustained economic growth for over two decades. However, whether or not trade openness contributed to the country's economic development remains unclear, calling for an empirical examination. To this effect, we examined short-run and long-run relationship between trade openness and economic growth in Mozambique between 1981 and 2017 using Vector Error Correction Model and Granger causality, accounting for government consumption and exchange rate. We report short-run and long-run causality from economic growth to trade openness, not vice versa. We conclude that trade openness is not the reason behind economic growth in Mozambique.

Key words: economic growth, granger causality, Mozambique, trade openness, VECM

JEL classification: F4

1. Introduction

Countries, especially in the developing world, are encouraged to open their economies to trade to accelerate economic growth. Mozambique started macroeconomic policy reform in 1986. Through this reform, the country pursued trade liberalization. Applied tariffs rate and maximum tariffs were reduced drastically as from 1986. For example, between 2001 and 2012, applied tariffs were dropped from 13.8 to 10.1 percent (OECD, 2015). The reforms strengthened exports and imports markets. Exports grew from 16 to 30 percent of GDP between 2000 and 2012 (OECD, 2015). During the same period, imports grew from 37 to 71 percent of GDP (OECD, 2015). This reflects growing openness and Mozambique's integration in an international market.

In Mozambique, trade liberalization occurred in the period of drastic changes to other two economic fundamentals. Firstly, the country reformed exchange rate regimes. In the mid 80's, exchange rate was fixed by government, and there was a constant devaluation between 1987 and 1992. During this period, the parallel exchange rate was much higher than the official exchange rate. Then exchange bureaus were legalized in 1996 followed by shift to market determined exchange rate. Secondly, there was an increased in government spending. Government spending was financed mainly by foreign aid, and the inflows of foreign direct investment. Government spending was mainly on the sectors predetermined by donors, mostly agricultural sector.

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After 1992, the year in which political conflict ended, Mozambique sustained economic growth at high rates, making the country one of the top economic performers in southern Africa region (World Bank, 2018). The high economic growth was accounted for by the post-war catch-up and reconstruction, large donor assistance and large mega projects. An example of such projects is Mozal which produce aluminium mainly for export market. Mozambique experienced devastating floods in the year 2000, however, soon after the economy continued to grow at fast rate. Economic growth was recorded to an average of 8.7% between 2001 and 2008 (WTO, 2009).

According to the new endogenous growth models, trade openness influences economic growth through diffusion of advanced technology, knowledge accumulation, and production specialisation in the host economy (Krugman, 1981; Romer, 1990; Grossman and Helpman, 1991). Economies with more open trade attract competition from multinational corporations. Competition drives domestic firms to innovate and learn to produce large volumes of products with fewer input resources (Grossman and Helpman, 1991; Krugman, 1981). However, trade openness could also have detrimental effects on economic growth, under Prebisch-Singer thesis, due to decline in the terms of trade in countries that export primary commodities (Toye and Toye, 2003).

Trade openness and economic growth is among the most researched subject in development economics. But there are still contradictions on the direction of causality. Empirical evidence shows that trade openness promotes economic growth (Edwards, 1992; Karras, 2003; Dollar and Kraay, 2004; Dao, 2014; Dritsakis and Stamatiou, 2016). However, in contrast, some studies show that the relationship runs from economic growth to trade openness or its bidirectional (Awokuse, 2008; Chaudhry et al, 2010; Idris, Yusop, and Habibullah, 2016). Some studies also suggest that trade openness has adverse effects on economic growth (Tekin, 2012, Menyah et al, 2014). All these studies analyzed multi-country data, and the statistical sensitivity of such analysis is often poor (Levine and Renelt, 1992).

Long-run dynamics is another unclear dimension in the relationship between trade openness and economic growth. While evidence is conclusive on the short-run relationship, there are still contrasting evidence on the long-run relationship. In essence, studies which explored short-run and long-run dynamics found that, trade openness has adverse effects on economic growth in the short-run (Gries and Redlin, 2012; Malefane and Odhiambo, 2018) but associated with a faster economic growth in the long-run (Dollar and Kraay, 2004; Gries and Redlin, 2012). However, recent studies from low and middle-income countries, Malefane and Odhiambo (2018) and Moyo and Khobai (2018), report that trade openness has negative effect on economic growth in the long-run.

In our study, we examined the short-run and long-run relationship between trade openness and economic growth in Mozambique for the period 1981 to 2017. We advance evidence on trade openness and economic growth, focusing on the direction of causality, and short-run and long-run dynamics, in a low-income country which sustained economic growth for more than two decades. Our study is unique in that we also explore the effect of exchange rate and government consumption on trade openness and economic growth using a single country data.

The rest of this paper is organized as follows. Section 2, reviews theoretical and empirical literature. Section 3 presents an overview of trade openness and economic growth in Mozambique. Section 4 describes research methodology. Section 5 presents empirical findings, and section 6 concludes.

2. Literature review

2.1 Theoretical literature

Tariffs and non-tariff regulations are an important trade instrument for expanding or restricting imports and exports of goods and services in a country. Developing countries are encouraged to reduce trade barriers to achieve economic growth. However, whether trade openness can improve economic growth remains an area of research in development economics.

Trade openness is defined as trade to GDP (OECD, 2011). It is also measured using the ratio of exports to GDP and ratio of imports to GDP (Malefane and Odhiambo, 2018), tariff rate (Silajdzic and Mehic, 2018), tariff and non-tariff barriers (Harrison, 1996; Edwards, 1992), and policy and institutional parameters (Rodriguez and Rodrik, 2000). Economic growth is measured using real GDP, gross national income (GNI), and per capita GDP. Per capita GDP is calculated by dividing the GDP of the country by its population.

Romer (1990) argue that economies of countries with more trade openness grow faster than those of countries with less open. Trade openness can potentially enhance economic growth by providing access to goods and services, and improved technology; achieving efficiency in allocation of resources and knowledge accumulation; and improving total factor productivity (Krugman, 1981; Romer, 1990; Grossman and Helpman, 1991). However, Prebisch - Singer thesis suggest that trade openness could be detrimental for economies that produce primary commodities (Toye and Toye, 2003). Countries that produce primary products are prone to terms of trade shocks (Toye and Toye, 2003).

2.2 Empirical literature

Empirical testing of trade openness and economic growth started in the early 90s, when Edwards (1992) and Dollar (1992) reported that trade openness is linked with faster economic growth. A decade later, this evidence was corroborated by Dollar and Kraay (2004). In another paper, Karras (2003) concluded that the effect of trade openness on economic growth is positive, permanent, statistically significant and economically sizeable. A 10-percentage point increase in trade openness increases economic growth by 0.25% to 0.3% (Karras, 2003). Dao (2014) analyzed data from 71 countries and reported that a 10-percentage point increase in trade openness will result in a 0.04 percentage-point increase in growth rate.

However, some recent studies present contrasting evidence (Tekin, 2012; Menyah et al, 2014; Malefane and Odhiambo, 2018; Moyo and Khobai, 2018). Tekin (2012) analyzed data from 27 least developed countries in Sub-Saharan Africa, and shows that, except in Burkina Faso and Zambia, trade openness has negative effect on economic growth (Tekin, 2012). Other studies, however, have shown that the relationship runs from

economic growth to trade openness (Awokuse, 2008; Chaudhry et al, 2010; Idris, Yusop, and Habibullah, 2016).

In recent studies, it was noted that the relationship between trade openness and economic growth is concealed in the short-run and long-run dynamics. Chaudhry et al (2010), Dritsakis and Stamatiou (2016), and Keho (2017) report short-run and long-run relationship between trade openness and economic growth. Gries and Redlin (2012) argue that, in the long-run, trade openness has positive link with economic growth. But, in the short-run, the effects of trade openness on economic growth are negative in low-income countries (Gries and Redlin 2012). However, Malefane and Odhiambo (2018) report negative impact of trade openness on economic growth in the short-run and long-run. Moyo and Khobai (2018) and Hye and Lau (2015) also report that trade openness has negative impact on economic growth in the long run.

There are several factors which could confound the relationship between trade openness and economic growth. In the context of Mozambique, it's critical to focus on government consumption and exchange rate, as there were drastic changes to these economic fundamentals during years of macroeconomic reforms and trade liberalization. Trade liberalization attracted huge capital inflows in the form of donor assistance and foreign direct investment. Capital inflows triggered an increase in government spending.

Government consumption, especially on capital formation has positive and significant effect on economic growth (Alexiou, 2009). In contrast, Dao (2014) found that government consumption has negative effect on economic growth. On the other hand, trade openness is also linked with real exchange rate depreciation (Gantman and Dabós, 2018). Capital inflows – such as foreign aid and foreign direct investment – can affect exchange rate and long run productivity (Sy and Tabarraei, 2010).

In general, evidence on trade openness and economic growth is inconclusive, and our understanding of the short-run and long-run dynamics remains incomplete. Studies reported positive long-run relationship between trade openness and economic growth. However, evidence from low-income countries suggests that trade openness has negative effect on economic growth in the long-run (Tekin, 2012; Malefane and Odhiambo, 2018; Moyo and Khobai, 2018). Most studies on trade openness and economic growth used multi-country data, combining developing and developed countries in their analysis.

2.3 Trade openness and economic growth in Mozambique

In 1986 Mozambique reformed its economic policies to pursue trade liberalization. As shown in Annex 1, the country's international trade doubled between 1981 and 2017. Trade as percentage of GDP (trade openness) in Mozambique grew from 14% in 1985 to 118% in 2014 (Annex 1). Trade openness expanded at even higher rate as from 1997 (Annex 1). This trend shows Mozambique's growing openness, which is higher than most countries in the Southern African Development Community (SADC) region, and its economic integration in the international markets.

Mozambique sustained economic growth at high rates for most of years in the past two decades, and the country was among the top economic performers in the region (Annex 1). The country reported higher economic growth between 1987 and 2017 (Annex 1). However, the economy contracted (-17.39%) in 1983 due to draught. After the general

elections in 1994, the country intensified the programme of economic reform and received large amounts of foreign aid and foreign direct investment. The reforms yielded results with record high economic growth in 1996 (7.88%). However, in 2000, the economy contracted again because of the impact of flood disaster (Annex 1). Altogether, economic growth had periods of sharp upward and downward swing between 1981 and 2000 but with steady pattern as from 2001.

Exchange rate depreciated as from 1997 (Annex 1). Exchange rate depreciation in Mozambique is higher than in Zambia, but lower than in Angola and Malawi (Annex 1). Government consumption as percentage of GDP was 24% in 1994, 10% in 1996, and 22% in 2017 (Annex 1). Government consumption in Mozambique is higher than that of other selected SADC countries between 1981 and 2017 (Annex 1).

Mozambique's industrialization shows some shift from agriculture to industry and service sectors, but with predominant service sector (Annex 2). Although the industry's total output is lower – less than \$3 billion annually between 1981 and 2017; the sector has higher production per worker compared to other sectors (Annex 2). Industry sector's performance is tied with export product evolution. Between 1981 and 2017, Mozambique's export products evolved from agrarian into industrial. In the 80s and early 90s, the dominant export products were cashew nuts, sugar, and cotton. Between 2001 and 2017, raw aluminium was the country's main export. In the same period, there was a rapid increase in export of refined petroleum, aluminium bars, and soft drinks. Fundamentally, Mozambique had a rapid expansion in industrial production for export market, especially after year 2000.

3. Methodology

3.1 Data

We obtained annual data for the period 1981 to 2017 from the World Development Indicators (WDI) of the World Bank (World Bank, 2018). We used annual data points as this is consistent with the reported data in the source database – WDI. We restrict the analysis to the period 1981 and 2017 due to several considerations. Firstly, this period coincides with Mozambique's macroeconomic reform of 1986. Secondly, data on trade openness, government consumption, exchange rate was unavailable for the years prior 1981. This provides 37 years period and 148 data points, sufficient for statistical inference and interpretation of findings.

We measured trade openness as the ratio of sum of imports and exports to GDP or trade to GDP. The downside of this measure is that it's at aggregate level and does not capture restrictions, due to protection of infant industry, at sectoral level. Again, low trade to GDP ratio does not always imply high trade barriers but could also be due to size of economy and geographic location. Despite, we opted for this measure because of data accessibility. Trade to GDP is common and widely used (Karras, 2003; Chaudhry et al, 2010; Gries and Redlin, 2012; Dao, 2014; Dritsakis and Stamatiou, 2016; Malefane and Odhiambo, 2018). We measured economic growth using per capita GDP. Government consumption is the final consumption expenditure as a percentage of GDP, and the Exchange rate is the local currency (Mozambican Metical) relative to the US dollar.

3.2 Empirical model

We used Vector Autoregressive (VAR) model to estimate the short-run and long-run relationship between trade openness and economic growth, controlling for government consumption and exchange rate. VAR predicts multiple time series variables using a single model (Sims, 1980). Therefore, it allows for simultaneous estimation of bidirectional relationship between trade openness, economic growth, government consumption, and exchange rate. VAR treat all variables and their lags in the model as a priori endogenous (Sims, 1980). This means, trade openness, economic growth, government consumption, and exchange rate were modelled as if they influence each other equally. The main drawbacks of VaR are their lack of economic theory and explanation. Despite this limitation, VAR models are superior to all structural models and provides better forecasting results (Bentour, 2015). A VAR specification is represented by:

$$Y_t = c + \alpha_1 e_{t-1} + \alpha_2 e_{t-2} + \cdots + \alpha_p e_{t-p} + e_t \dots\dots\dots (1)$$

Where Y_t is the vector of trade openness, economic growth, government consumption, and exchange rate with (p) lags, $\alpha_1 e$ are (n x n) coefficient matrixes, and e_{1t} is an (n x 1) unobservable zero mean white noise vector process with time invariant covariance matrix Σ . We estimated the autoregressive coefficients using ordinary least squares.

We tested all variables for stationarity using Augmented Dickey-Fuller (ADF) test (Brooks, 2014, p. 362). As shown in table 1, all series are non-stationary at level, but stationary at first difference.

Table 1: Augmented Dickey-Fuller Test of unit root

Variables	Level <i>t</i> -Stat	p-Value	First difference <i>t</i> -Stat	p-Value
Economic growth	-2.994	0.1339	-6.555	<0.001
Trade openness	-3.126	0.1001	-3.887	0.0126
Government consumption	-2.898	0.1630	-5.165	0.0001
Exchange rate	-2.113	0.5386	-4.447	0.0018

Source: Author’s computation, using data from World Development Indicators

We conducted cointegration test to assess the long-run association between the series. We found two cointegrating vectors. We, therefore, saw that an error correction model is the appropriate econometric specification. We introduced cointegration constraints by estimating Vector Error Correction Model (VECM). In this model, the equation is differenced and an error-correction term measuring the previous period’s deviation from long-run equilibrium is included. VECM gives the edge because it is robust over long-time horizon (Hoffman and Rasche, 1996).

Table 2: Johannsen test statistics for Cointegration

Null	Alternate	Trace	5%	Maximum	5%
$r \leq 0$	$r \geq 1$	63.3119	47.21	31.3375	27.07
$r \leq 1$	$r \geq 2$	31.9744	29.68	17.8265	20.97
$r \leq 2$	$r \geq 3$	14.1479*	15.41	10.9478	14.07

Source: Author's computation, using data from World Development Indicators

VECM is specified as follows:

$$\Delta y_t = \alpha ecm_{t-1} + \sum c_i \Delta y_{t-1} + \mu_t \dots \dots \dots (2)$$

Where y_t is a vector variable. Δy_t is the vector if the first differences of variables (trade openness, economic growth, government consumption, and exchange rate), y_t ; u is an $m \times 1$ vector of intercept coefficients; c is $m \times m$ coefficient matrices; and u_t is an $m \times 1$ error vector with contemporaneous correlation but no autocorrelation. The coefficients of α determine the size of the effects of the r error correction terms in the m equations of the VECM.

The relationship between trade openness and economic growth in a VAR model are difficult to interpret from the parameter matrices. As such, we interpreted model results using Impulse Response Function (IRF). IRF describes the evolution on trade openness and economic growth along a time horizon after a shock in a given moment (Lütkepohl, 2010). We tested for impulse response of economic growth to standard deviation shock of trade openness, and vice versa.

We applied Granger causality on bivariate VAR model of cause and effect between trade openness and economic growth. Granger causality is founded on the concept that causes occur prior effects and knowing the status of cause at earlier period could enhance the prediction of the effect at later period (Granger, 1969). Causality analysis focuses on both the short-run and long-run relationship. Short-run and long-run models are represented as:

$$\Delta Y_t = c_{1i} + \alpha_1 e_{t-1} + \lambda_{11}, \Delta Y_{t-1} \dots \lambda_{1p} \Delta Y_{t-p} + \beta_{11} \Delta X_{t-1} + \beta_{1p} \Delta X_{t-p} + e_{1t} \quad (3)$$

$$\Delta X_t = c_{2i} + \alpha_2 e_{t-1} + \lambda_{21}, \Delta Y_{t-1} \dots \lambda_{2p} \Delta Y_{t-p} + \beta_{21} \Delta X_{t-1} + \beta_{2p} \Delta X_{t-p} + e_{2t} \quad (4)$$

Where e_{t-1} and e_{2t} are white noise. If $\beta_{11} \dots \beta_{1p}$ are jointly statistically significant in equation 3, then X (trade openness) Granger caused Y (economic growth) in the short run. If $\alpha_1 e$ is statistically significant, then X (trade openness) Granger caused Y (economic growth) in the long run. Similarly, in equation 4, if $\beta_{21} \dots \beta_{2p}$ are statistically significant, then Y (economic growth) Granger caused X (trade openness) in the short run. If $\alpha_2 e$ is statistically significant, then Y (economic growth) Granger caused X (trade openness) in the long run.

3.3 Ethical consideration

Ethical clearance exemption was obtained from University of Stellenbosch Departmental Ethical Screening Committee (Ref: USB-2019-9599).

4. Empirical results

An important step in VECM is lag length selection. As reported in table 3, all alternative information criteria specified lag (1). However, we applied lag (3) in our analysis model, as it was the minimum lag length that correct residual autocorrelation (Hendry and Juselius, 2001). Efficiency cost of including slightly more lags other than those specified by information criterion is small (Gonzalo, 1992; Brooks, 2014, P. 202).

Table 3: Lag-order selection criterion

Lag	AIC	HQIC	SBIC
0	58.153	57.7747	58.3283
1	-411.198*	-414.603*	-409.621*
2	-364.107	-367.512	-362.529
3	-323.169 [^]	-326.574 [^]	-321.591 [^]

Source: Author's computation, using data from World Development Indicators

Table 4 reports estimation output for the VECM model. Our model shows long-run positive relationship from trade openness to economic growth. The long-run VECM error term for economic growth is significant on cointegration equation 1 (p-value=0.020) and cointegration equation 2 (p-value=0.001) at 5% significant level (table 4). The time series converge at speed of 65% (coeff=-0.65) in equation 1 and 53% (coeff=-0.53) in equation 2 (table 4). The findings shows that trade openness and economic growth in Mozambique are tied and moves in the same direction in the long run. Similar observations were reported in other studies by Chaudhry et al (2010), Gries and Redlin (2012), and Keho (2017) who found significant long-run relationship from trade openness to economic growth. However, the findings are inconsistent with Hye and Lau (2017), Moyo and Khobai (2018), and Malefane and Odhiambo (2018) who reported no long-run relationship between trade openness and economic growth.

The VECM output shows that short-run relationship from trade openness to economic growth is statistically insignificant. The time series converge at speed of 33% (coeff=0.33) in equation 1 (p-value=0.284) and 19% (coeff=0.19) in equation 2 (p-value=0.493). Our findings are different from those of Chaudhry et al (2010), Keho (2017), Dritsakis and Stamatiou (2016), Gries and Redlin (2012), and Malefane and Odhiambo (2018) who reported either positive or negative short-run relationship from trade openness to economic growth.

Our model reports short-run and long-run relationship from economic growth to trade openness. In table 4, the long run cointegration coefficient has a positive sign in equation 1 (coeff=0.83), and negative sign in equation 2 (coeff=-0.44). According to these results, economic growth and trade openness influence each other and move in the same direction in cointegration equation 1 but move to opposite direction in cointegration

equation 2. In the short run, both equation 1 and 2 have a negative sign and are statistically significant (table 4).

Our results on short-run and long-run relationship from economic growth to trade openness support evidence from earlier studies by Awokuse (2008) and Chaudhry et al (2010). Our findings suggests that as Mozambique's economy grows, it creates international markets for expansion of exports and imports and influences reduction of tariff and non-tariff barriers to trade. Again, the findings are interpreted in line with the positive role of industrialization, especially manufacturing, on economic growth (Guisan, 2017). As from 2001, Mozambique experienced significant growth in industrial production, such as aluminum and refined petroleum, and this led to expansion of the export market.

The other interesting results is the long-run relationship from government consumption to trade openness and economic growth. The results support evidence by Alexiou (2009) who found positive relationship between government consumption and economic growth. However, the findings are contrary to the study by Dao (2014), who reported that government consumption has a negative effect on economic growth. Government consumption is tied to trade openness and economic growth in the long run in Mozambique. However, in the short-run government consumption does not influence trade openness nor economic growth (table 4).

Table 4: VECM empirical model

Dependent Variable	Independent variable							
	Economic growth		Trade openness		Government consumption		Exchange rate	
	LD	L2D	LD	L2D	LD	L2D	LD	L2D
	-0.65* (0.020)		0.83* (<0.001)		-0.04 (0.838)		1.30* (0.001)	
_cel L2	-0.53* (0.001)		-0.44* (0.001)		0.29 (0.020)		-0.87* (<0.001)	
Economic growth	-0.30 (0.139)	-0.13 (0.311)	0.33 (0.284)	0.19 (0.493)	-1.14* (<0.001)	-0.25 (0.349)	-0.05 (0.731)	0.07 (0.654)
Trade openness	-0.46* (0.005)	-0.26* (0.018)	0.74 (0.003)	-0.04 (0.833)	-0.35 (0.176)	-0.56* (0.011)	-0.32* (0.020)	-0.001 (0.989)
Government consumption	0.11 (0.479)	0.02 (0.812)	-0.23 (0.340)	0.14 (0.530)	0.26 (0.302)	0.04 (0.830)	0.06 (0.634)	-0.10 (0.424)
Exchange rate	-0.92* (0.002)	-0.56* (0.004)	0.94* (0.035)	-0.30 (0.461)	-1.23 (0.009)	-0.71 (0.067)	-0.22 (0.356)	0.28 (0.239)
Constant	0.01 (0.755)		-0.009 (0.814)		0.06 (0.117)		0.01 (0.825)	

Source: Author's computation, using the data retrieved from World Development Indicators

As shown in table 4, we also find long-run relationship from exchange rate to trade openness and economic growth. The results suggest that the country's reform on exchange rate regime is tied with trade liberalization and economic growth in the long run. In the short-run, exchange rate appreciation has a positive relationship with

economic growth – equation 1 coefficient is -0.92 (p-value=0.002) and equation 2 coefficient is -0.56 (p-value=0.004). Exchange rate has a negative relationship with trade openness in the short run (table 4).

4.1 Goodness-of-fit of VECM

The goodness of fit test is satisfactory for trade openness, economic growth, and exchange rate models (table 5). The coefficients are statistically significant at 5% significance level. Government consumption model does not satisfy the goodness-of-fit test (table 5). The Root Mean Square Error (RMSE) for economic growth and trade openness are 20% and 16%, respectively, indicating better fit (table 5).

Table 5: Measures of Goodness of Fit for VECM

Equation	Parms	RMSE	R-sq	Chi2	P>chi2
Economic growth	11	0.200022	0.8326	109.3883	<0.001
Trade openness	11	0.161495	0.6500	40.856	<0.001
Government consumption	11	0.156269	0.4205	15.96664	0.1424
Exchange rate	11	0.287233	0.6860	48.05254	<0.001
Obs	34				
AIC	-1.380442				
HQIC	-0.6455719				
SBIC	0.7744204				

Source: Author, 2019

4.2 VECM model diagnostic test

We applied Lagrange-multiplier (LM) test of serial correlation and confirmed absence of serial correlation at lag (3). We conducted the parameter stability test for VECM. For each of the models, the moduli of the eigenvalues are within the unit circle, and therefore the parameters are stable.

4.3 Impulse response analysis

We analysed an impulse response among trade openness and economic growth. The graphs on the first row depict response of economic growth to standard deviation shock in trade openness, and the second row depict the effect of economic growth on trade openness (Annex 3). The effect of trade openness on economic growth is highest in period 2 but declines gradually in subsequent periods. Similarly, the effect of economic growth on trade openness is also higher in period 2.

4.4 Granger causality analysis

As shown in Table 6, economic growth Granger causes trade openness at the lag period 2, and trade openness does not Granger cause economic growth in lag 2 and lag 3. This implies that there is no causal link from trade openness to economic growth. However, economic growth Granger cause trade openness after two lagged periods. Granger causality establishes cause and effect from economic growth to trade openness. Our findings suggests that economic growth causes expansion of exports and imports in Mozambique.

Table 6: VECM Granger causality: economic growth and trade openness

Null hypothesis	Lags	F-statistics	Prob > F	Decision
Trade openness does not Granger cause economic growth	2	0.14815	0.8629	Accept
Economic growth does not Granger cause trade openness	2	3.808	0.0336	Reject
Trade openness does not Granger cause economic growth	3	0.14642	0.9311	Accept
Economic growth does not Granger cause trade openness	3	2.7305	0.0634	Accept

Source: Author's computation, using data from World Development Indicators

5. Conclusion

We investigated short-run and long-run relationship between trade openness and economic growth in Mozambique using an annual data for the period 1981 to 2017. We included government consumption and exchange rate in our analysis. We find long-run bi-directional relationship between trade openness and economic growth in Mozambique. When we explore these results further with causality analyses, we find that in the long-run trade openness does not cause economic growth, but causality runs from economic growth to trade openness. This finding could be explained by an increase in industrial production in Mozambique, especially in the early 2000, which led to expansion of the export market.

We also conclude that short-run relationship only runs from economic growth to trade openness, and not vice versa. Our results support evidence by Awokuse (2008) and Chaudhry et al (2010) on the effect of economic growth on trade. We report short-run and long-run relationship from government consumption to trade openness and economic growth. We find that exchange rate has a relationship with trade openness and economic growth. The relationship between exchange rate and economic growth is positive in the short-run and long-run. However, the relationship between exchange rate and trade openness is only positive in the long-run, but negative in the short-run.

In general, our results suggest existence of a link between trade openness and economic growth, but with short-run and long-run dynamics. It is critical to distinguish the long-run relationship (cointegration) from causality. Even though long-run relationship is bidirectional, we only report causality from economic growth to trade openness. We also report short-run causality from economic growth to trade openness. Future studies should focus on analysis of causality using models suited for structural breaks to explore non-linearity through sector disaggregated trade openness measures. Mozambique should use government consumption as stimulus for short-term economic growth. The

country should be cautious about the impact of economic growth on trade openness, and the unintended sequel of exchange reforms on trade policies and economic growth.

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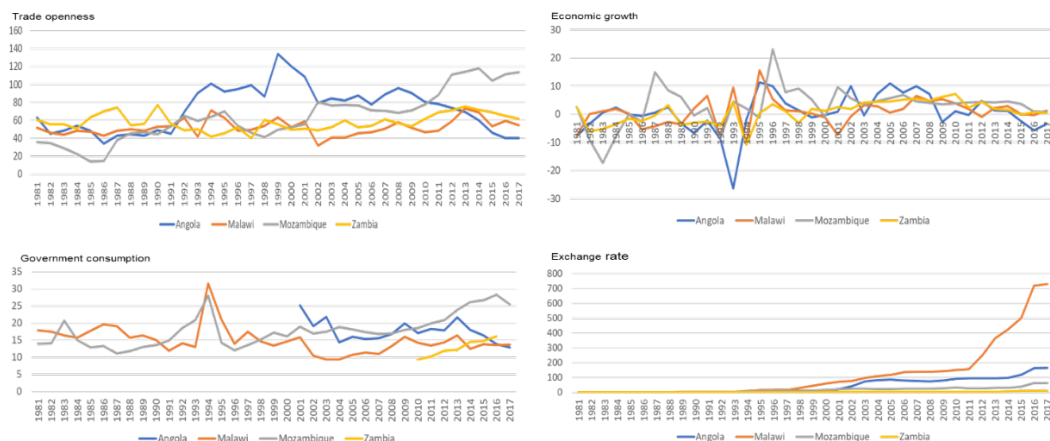
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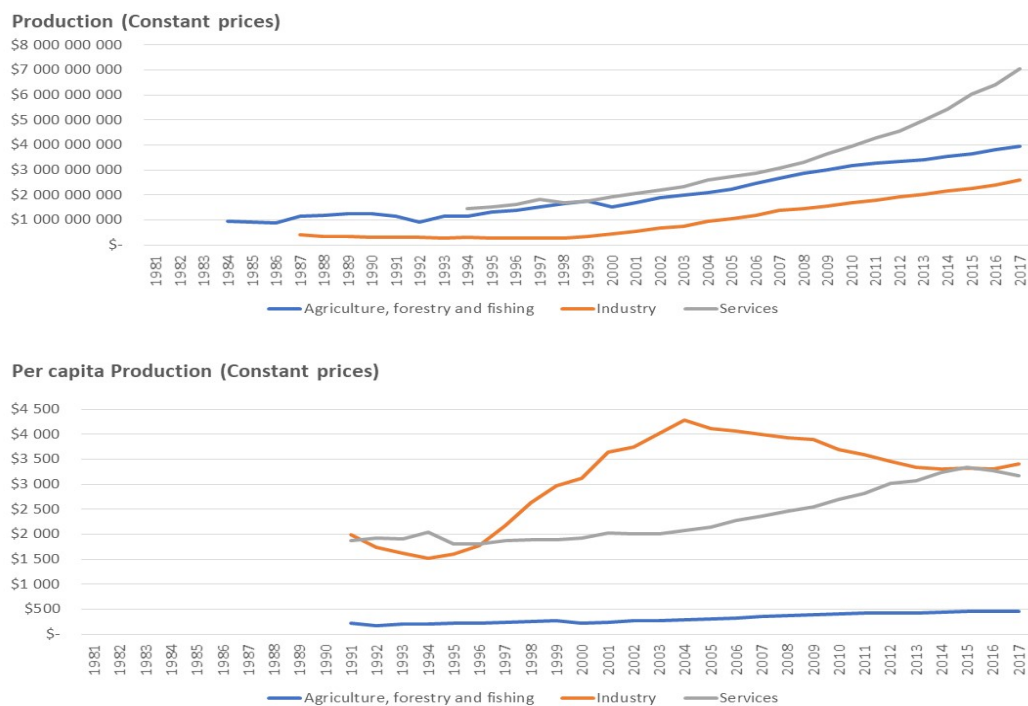
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Annex 1: Economic and demographic parameters in selected SADC countries



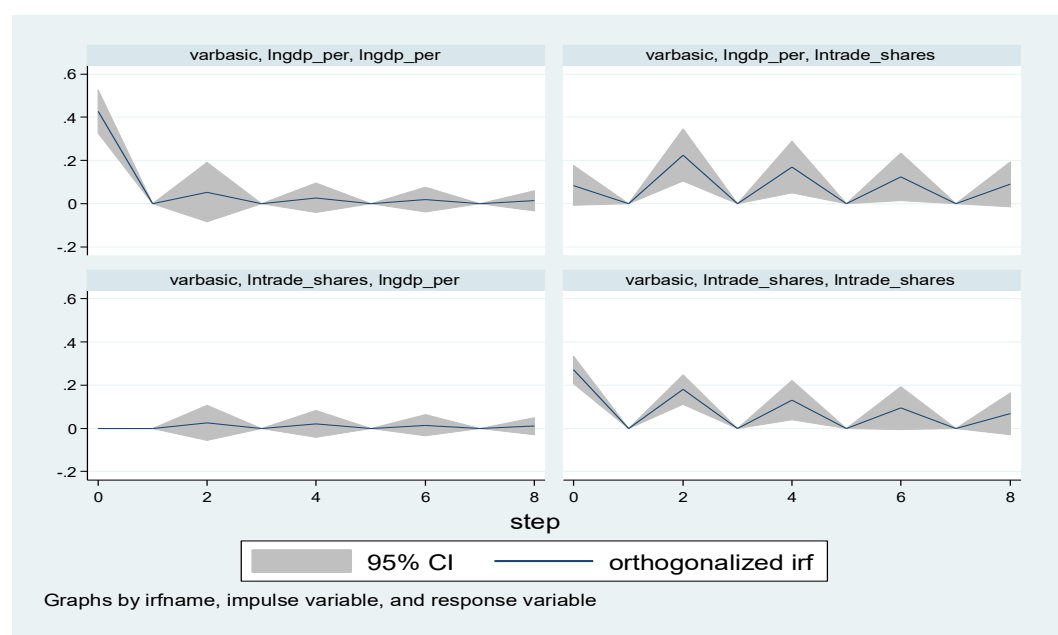
Source: Author's computation, using data from World Development Indicators

Annex 2: Sectoral production in Mozambique



Source: Author's computation, using data from World Development Indicators

Annex 3: Impulse response function



Source: Author’s computation, using data from World Development Indicators