

Trade Openness and Total Sector Productivity in Zimbabwe: Empirical Analysis Using ARDL and Granger Casuality Approach

Lawrence Dumisani Nyathi¹, Mthulisi Nkala², Mbheki Mlobane³

¹National University of Science and Technology, Lecturer-Department of Banking & Economic Sciences, Faculty of Business & Economic Sciences, Zimbabwe.

²Lupane State University, Graduating Candidate-Department of Accounting & Finance, Faculty of Commerce, Zimbabwe.

³Lupane State University, Economist-Department of Accounting & Finance, Faculty of Commerce, Zimbabwe.

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ABSTRACT

This study explores the relationship between trade openness and total sector productivity in Zimbabwe using the ARDL and Granger Casuality Approach covering the period 1990 to 2023. The bulk of economic literature do point out that trade openness is a potent catalyst for national development and productivity. Economic literature further provide evidence of the short- and long-term connections between trade openness and economic growth. Given that most nations now desire to generate wealth through international commerce and transfer technology, this study tackles significant issues about the relationship between trade openness and total sectorial productivity.

The research findings indicate that trade openness and total sectoral productivity had a positive long-term association. The research also revealed that total sectoral productively is significantly related to inflation, exchange rate, unemployment and labour rate. Therefore, this paper recommends that policy makers and government negotiators in Zimbabwe should put policies that promote openness through the removal of trade barriers and export encouragement into effect in order to increase overall economic growth. In conclusion, some of the trade barriers that are deterring trade openness and productivity are solved if government of Zimbabwe implements a vibrant economy to boost productivity.

Keywords: trade openness, total sectoral productivity, Granger causality, Autoregressive distributed lag (ARDL), Zimbabwe, and Africa.

INTRODUCTION

The link between trade openness or liberalisation and productivity has initiated a lot of debate among economists. It is a relatively consistent view, regarding the relationship between trade openness and economic growth in the circle of foreign economic theory, that trade openness can facilitate the promotion of economic growth (Kong et al, 2021). Trade openness, is the degree to which countries are open to international trade with their imports and exports. In contrast, their economic performance is generally measured by gross domestic product (GDP) or productivity in different forms Fatima et al (2020). Udeagha and Ngepah (2021) in their study used the newly developed nonlinear autoregressive distributed lags (NARDL) framework to re-examine the link between trade openness and economic growth in South Africa



over the period 1960-2016. The results show that trade openness has short and long-run asymmetric effects on economic growth. Furthermore, Kong et al (2021) pointed out in their studies that there is a long-term stable co-integration relationship between opening-up and the quality of economic growth under exchange rate fluctuation from 1994 to 2018 in China. Trade openness can significantly promote the quality of economic growth in both the short and long term. Alam & Sumon (2020) in their study of 15 Asian countries over a period 1990- 2017 examined the causal relationship between economic growth and trade openness. Empirical results confirmed that the impact of trade openness on economic growth is found to be positive. Hummera et al (2020) used the newly developed bootstrap auto regressive distributed lags (ARDL) cointegration test to examine the long-run relationship among FDI, GDP and TO for selected South Asian countries for 1975–2016. The study revealed that economic growth (EG) is significantly related to trade openness for Bangladesh, India and Sri Lanka and the expansion of trade openness is crucial for growth in these countries. Khobai et al (2018) and Hye and Lau (2015) both point out that trade openness has a longterm negative impact on economic growth. Keho (2017), and Dritsakis and Stamatiou (2016) posits that trade expansion fueled by trade openness can be a potent catalyst for national development and productivity. Nyarota et al (2015) postulates that a combination of trade policies required to support long term, sustainable economic growth is especially important. This is due to the perception that global trade is a source of productivity and growth, which raises the standard of living and broadens people's choices. Gries and Redlin (2012) suggest that when trade is coupled with a nation's competitive edge, resource allocation can be done more efficiently.

Puente and Calvo (2009) conducted studies using cross-country data, multiple regressions, and the fixed effect model. Their findings indicated that economies that are focused on exporting will see positive economic growth. Other studies, like the one by Ahmed (2008), have looked into the idea that increased commerce results in higher incomes. While on the same note, (Squali and Wilson, 2006) using the Granger-causality test the study revealed the link between trade openness and economic progress. Van Biesebroeck (2005) studied productivity differences in nine low-income sub-Saharan African countries (Burundi, Cameroon, Cote d'Ivoire, Ethiopia, Ghana, Kenya, Tanzania, Zambia, and Zimbabwe) between exporters and non-exporters. The purpose of this was to ascertain how trade openness and productivity relate to one another. The study revealed that labor productivity and total factor productivity were higher in exporters and future exporters. The study also discovered that the productivity gaps between non-exporters and exporters were greater than the gaps that existed before they started exporting. In addition, productivity gaps narrowed before they left the export market and far more after they stopped exporting. According to the study's findings, exporters in sub-Saharan Africa are more productive than non-exporters, and the productivity disparity is caused by both learning from exporting and self-selection.

Levine & Renelt (1992) used imports and exports as a proportion of GDP to quantify the degree of openness. The results of the econometric calculations also showed that companies that imported or exported had relatively high production levels. Furthermore, there was a positive relationship between exports and productivity development. This suggested that export-related activities increased productivity growth.

This study will look at the nexus between trade openness and total sector productivity. Previous studies done in by Ncube et al (1999) in for Zimbabwean reveal that trade liberalisation took place from 1991 to 1995 in the financial sector scoring some positive benefits. Furthermore, Makochekanwa et al (2012) studies on trade liberalisation for Zimbabwe experiences from 1980 to 2004 reveal that trade liberalisation has a positive impact before policy reversals in the late 2000s. Therefore, this study tries to resolve this issue by objectively evaluating the nature of the long-term relationship between total sectorial productivity in Zimbabwe and trade openness. The study's findings will shove policy-makers to create and implement policies that support Zimbabwe's developmental objectives by enlightening them about the country's trade openness and sector productivity. Further to redress policy gaps in current trade policies as well as encouraging government of Zimbabwe to disentangle macroeconomic imbalances that are retarding



economic growth.

Analyzing Trade Openness and Productivity in Zimbabwe

After the enunciation of the Unilateral Declaration of Independence (UDI) in 1965 the economy of Rhodesia took a positive twist economically (Renwick, 1981). The UDI government ran the import substitution strategy due to sanctions imposed on them and import controls. The import substitution strategy was destined to lessen the economy's dependence on the international market because of sanctions and import controls were destined to enable the effective use of the limited foreign currency. From 1965 to 1974, the Real Gross Domestic Product (RGDP) increased at an average annual rate of 7%; but, in the later part of that period, the intensifying war of independence caused disruptions to the economy (Davies and Rattso, 1999).

Thus, at independence in 1980, the country inherited a heavily controlled economy. The new government continued with the import substitution development strategy which saw it imposing several policy controls on trade, foreign currency use, interest rates, price and exchange rates. Specifically, the government was rationing foreign currency, there were import bans and quotas, and prices were regulated Makoshika et al (2012).

By the end of the first decade (1980-1989) the economy of Zimbabwe was weakening due low productivity, market distortion, and unstainable public sector spending, growing rates of unemployment. The investment climate was thawing associated with foreign currency allocations and an unstable macroeconomic environment characterized by high budget deficits and growing inflation. Thus, during this period no trade liberalization took place.

By 1990 the economy was already feeling a lot of pressure over expenditure and underperformance. In an effort address the problems emanating in the economy, the government agreed to implement ESAP as recommended by IMF and the World Bank which poised to kick in market reforms. The main objective of ESAP in the area of trade was to ensure adequate trade liberalization which would see complete abolition of quantitative controls and the reduction and harmonization of tariffs and duties. The specific trade-related objectives of ESAP as outlined in the Government of Zimbabwe (1992) Framework of Economic Reform were removal of export incentives, phasing out of import licensing regime, elimination of foreign currency controls, reduction of tariffs and creation of a tariff band ranging from 0% to 30%, removal of surtax and raising of the minimum duty to 10% and Achieving export growth rate of 9% a year over 5 years (from 1991 to 1995) GoZ, (1992).

Most of these trade policy objectives were implemented. Specifically, the liberalization of trade opened up the current account transactions and implementation of a market-based exchange rate system which allowed the exchange rate to be market determined. Major trade liberalization milestones were the removal of selected input items from the quantitative import controls to Open General Import Licence (OGIL), introduced during the second half of 1990. Another milestone was the removal of foreign currency controls and the introduction of foreign currency accounts (FCAs) in January 1994. This allowed a 60% retention which was then increased to 100% in July the same year. Thus, for Zimbabwe trade liberalization only started after 1990.

When ESAP expired in 1995, the government was not eager to pursue economic reforms resulting in a twoyear gap between the implementation of ZIMPREST and the expiry of ESAP. Most policies were reversed mainly due to poor macroeconomic performance; deficiencies in trade policies and sequencing of liberalization; fiscal indiscipline; exchange rate mismanagement; monetary policy mix; and incompetence of economic managers to understand the substances and process of trade liberalization. Overall, compared with the ESAP period when Zimbabwe implemented trade policy in full, liberalization during the post-ESAP period was characterized by numerous reversal and anti-liberalization policies (Makochekanwa et al, 2012).

Amidst the economic turmoil experienced in country after the Fast track Land Reform Programme (FTLRP) in 2000 industrial closure was the order of the day, severe brain drain, unstable exchange rate as well as unprecedented inflation reaching its peak in 2000 at 231 000 000 percent. With no functional economy Zimbabwe turned to SADC countries who became important trade partners. From 2001, the share of SADC in Zimbabwe's total trade stood at 42% and rose to 66.5% by 2016. In value terms, Zimbabwe's total trade with SADC countries increased from US\$1.2 billion in 2001 to US\$5.3 billion in 2016 (Chigumira et al, Nd)





Source: World Development Indicators, 2024

According to figure 1 above the greater part of the period 2001 to 2016, Zimbabwe recorded negative trade balances except in 2006 when trade was positive. The negative trade balances were driven mainly by rising imports and falling exports. This was necessitated by falling output countrywide both in the agriculture and manufacturing sector. Since 2009 when the government of Zimbabwe adopted dollarisation productivity in the entire economy remained suppressed as evidenced by growth of imports over time. Since 2018 the government of Zimbabwe has been on a growth mantra 'Zimbabwe is open for business.' The economy has witnessed an upheaval in a quite a number of sectors with the government setting achievable targets for the real sectors of the economy. It is against this background that this study explores the relationship between trade openness for influencing total sector productivity.

METHODOLOGY

Model Specification

The study computes the trade liberalization coefficients and other factors influencing sectorial productivity in Zimbabwe from 1990 to 2023 using the Autoregressive Distribution Lag model. The research will postulate specifications according to equation 1, where X is the dependent variable, Y is a vector of independent variables, and f is a function, when investigating possible relationships between two or more variables.

Y = (X).

The relationship in f(X) is captured by the ARDL model. According to the findings of Pesaran and Shin (1999) and Pesaran (2001), the ARDL (q, p) model of equation 1 can be represented by equation 2, where X_t



is the dependent variable which represents the sectoral productivity which is the economic performance and is generally measured by gross domestic product (GDP) or productivity in different forms (Fatima et al,2020). Meanwhile, Yt is the independent variable which are trade openness, inflation, exchange rate, and unemployment. q, p are the corresponding lags.

There are two stages that need to be completed for the ARDL model. The first steps involve estimating equation 2 and doing an F-bounds test to see if the variables have a long-term relationship or not. The creation of the Mistake Remedy paradigm (ECM) using the ARDL paradigm is the next step.

Data Source

Sectorial Productivity which is represented by the proxy GDP per capita data will be retrieved from World Development Indicators (WDI, 2023), Inflation and Exchange rate from RBZ and Zimstats bulletins and reports. Data for trade openness and unemployment will be gathered from The GlobalEconomy.com & WDI, 2023.

Model Assumptions and Diagnostic Tests

According to Kramer et al. (1985), a conventional regression output requires the addition of several specification checks. To determine whether the data gathered and used is reliable and objective, a number of tests were run in order to test for econometrics a priori postulations. These include the unit root which is performed on the time series to evaluate the integration order of the variables using the Augmented Dickey-Fuller (ADF), while the co-integration test will be tested using the Johansen test which is used to validate the long-run association between trade openness and sectorial productivity which is the F-bound tests, the ARDL test, and normality tests.

RESULTS AND DISCUSSION

Trend Analysis

The study will use of the trend analysis of the variables that will be used in the study. Trend analysis is a statistical technique used to identify and analyse patterns or trends in data over time.

Figure 2: Lag-Sectorial productivity



Source: Author's compilations using STATA 14.0



Figure 2 reveals that the sectorial productivity in Zimbabwe was stable between 1990 and 2000 as a result of the implementation of several macroeconomic policies, including fiscal discipline, as the government tried to lower its fiscal deficit by reducing spending, which raised government revenue. Sectorial productivity remained steady between 1990 and 2000 as a result of trade liberalization, which saw the government loosening trade restrictions and lower tariffs and quotas to boost exports and competition. Populist policies such as the land reform program and hyperinflation combined to cause a substantial decrease in sectorial production between 2000 and 2005. Sectorial productivity rose steadily between 2009 and 2014 due to the stable macroeconomic environment ushered by the dollarisation period and government of national unity. Sectorial productivity oscillated during 2018 and 2023 as a result of external shocks like the global COVID-19 epidemic.

Figure 3: Lag-Trade openness



Source: Author's compilations using STATA 14.0

The government's introduction of macroeconomic policies between 1990 and 1998 resulted in a gradual growth in trade openness, as depicted in the diagram. Due to Zimbabwe's decreased production as a result of the implementation of the land reform program, trade openness sharply decreased between 2000 and 2008. The country's trade openness increased significantly between 2009 and 2013. Trade openness gradually decreased between 2013 and 2017 due because of uncertainty of the new government in power and lack of robust policies and reversal of policies that characterized the economy.

Figure 4: Unemployment



Source: Author's compilations using STATA 14.0

The results reveal that there was a significant rise in unemployment from 1990 to 1995 due to the



implementation of the ESAP Policy. Employment remained depressed till 1999 due to unbudgeted activities that government was financing such the DRC war and War Vets payouts. The implementation of the land reform exercise further compounded the unemployment levels as the productive sectors of the economy collapsed. The unemployment rate was stable between 2013 and 2019

Figure 5: Inflation



Source: Author's compilations using STATA 14.0

The economy of Zimbabwe inflation was more of steady since 1990 till 2000. Inflation began to rise from 2003 and reached its peak in 2008 reaching 231 sextillion percent. The adoption of the US Dollar in 2009 wiped out inflation and the economy of Zimbabwe enjoyed a deflation period. The adoption of the local currency in 2016 witnessed the resurgent inflation and inflation soared through the COVID-19 pandemic to 2013 due to macroeconomic instability.

Figure 6: Exchange rates



Source: Author's compilations using STATA 14.0

The exchange rate volatility spiked from 1998 as the local currency crashed. The exchange rate plunged further from 2000 till 2008 as the zimdollar value plummeted perpetuated by the colossal decay of the productive sectors. During the dollarisation exchange rate stabilized due the abandonment of the zimdollar. From 2017 the exchange rate fluctuations resurfaced as the economy adopted the bond note as alternative currency for the US dollar. The presence of the local currency and controlled exchange rate system by the government has perpetuated the exchange rate fluctuations.



Figure 7: Labor rate



Source: Author's compilations using STATA 14.0

The study reveals that the labor rate fell sharply between 1995 and 2008 as a consequence of economic instability. From 2009 till 2014the labor rate sharply increased as a result of economic growth brought about by unity government. After that, it progressively decreased until 2023 as a result of high inflation, unstable economy and external shocks such COVID-19 pandemic.

Multi-collinearity

To determine whether there was multi-collinearity between the explanatory variables, a correlation matrix was employed. High correlation between two or more variables indicates multi-collinearity, which provides justification for remedial action. The correlation matrix is shown below in Table 2.

	Lag SP	lag TO	UNE	INF	EXR	LR
lagSP	1					
lag TO	-0.1025	1				
UNE	-0.0036	0.1327	1			
INF	0.0011	-0.2771	0.0049	1		
EXR	0.0467	0.0693	-0.2879	0.2041	1	
LR	-0.05	-0.5972	0.1509	-0.1361	-0.227	1

Table 2: Correlation matrix

Source: Author's compilations using STATA 14.0

Lag TO and lag SP had a weakly inverse association, according to the Pearson correlation matrix results, with a correlation coefficient of -0.1025. EXR and lag TO were shown to have a positive association with correlation allocations of 0.0693. A modest positive correlation score of 0.001 indicated a positive association between inflation and lagSP. All variables do not exhibit multicollinearity, according to the Pearson correlation values; as a result, the data is significant and amenable to statistical interpretation.

Unit Root Test

Before estimating the ARDL model, a unit root test is performed on the time series to evaluate the integration order of the variables. Table 3 reports the result of the augmented Dickey–Fuller (ADF) test.

Variables	ADF		MacKinnon Value		
	Level	1 st Diff	Level	1 st Diff	
lagSP	-0.77	-7.770**	-0.334.	-3.507***	
lag TO	-1.452	-6.786***	-3.043	-3.432***	
UNE	-0.343	-3.343***	-1.265	-4.215***	
INF	-2.459	-5.429***	-1.375	-3.755***	
EXR	-4.743	-5.749***	-0.71	-3.750**	
LR	-3.82	-4.820***	-1.22	-3.210***	

Table 3: ADF	and Mackinnon	unit root test	results 1980-2023
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NB: *, ** and *** denote statistical significance at 10%, 5% and 1% respectively.

Table 3 shows stationary of variables used in the model. The results reveal that ADF and Mackinnon tests are evenly the same. LagSP was stationary at 5% significance level, while the rest of the variables are stationary at 1% significance level. In the Mackinnon test all variables are stable at 1% significance level except for EXR which is stationary at 5% significance level. In conclusion, the findings meet the cointegration tests.

Granger Causality Using VAR

Equation Excluded		Chi2	df	Prob> chi2
lagSP	lag TO	19.612	2	0
lagSP	UNE	0.98484	2	0.611
lagSP	INF	5.7725	2	0.056
lagSP	EXR	1.9923	2	0.369
lagSP	LR	4.6074	2	0.1
lagSP	ALL	26.585	10	0.003
lag TO	lagSP	.15711	2	0.924
lag TO	UNE	1.5072	2	0.471
lag TO	INF	2.2886	2	0.318
lag TO	EXR	5.3916	2	0.067
lag TO	LR	3.1977	2	0.202
lag TO	ALL	20.767	10	0.023

Table 4: Granger causality test

Source: Author's compilations using STATA 14.0

Table 4 above reveals that lag TO does not granger cause lagSP, rather lagSP granger causes lag TO. According to the study's findings, sectorial productivity drives trade openness in a unidirectional granger causal relationship, with trade openness having no effect on sectorial productivity.

Long- and Short-Term Coefficient Estimation



Variable	Coefficient	Standard Error	T-Ratio [p Values]	
	Long-term co	oefficient estimates		
lagSP	0.765432	0.100087	4.49	[0.139]
lag TO	9.019513	0.004345	-2.49	[0.021]
UNE	-1.89545	0.088204	-21.49	[0.030]
INF	-0.00728	0.00328	24.08	[0.269]
EXR	0.027168	0.001128	9.60	[0.026]
LR	0.747046	0.077797	-2.57	[0.066]
	Short-term co	oefficient estimates		
lagSP	1.005535	0.234512	5.04	[0.023]
lag TO	10.63932	0.1995	7.47	[0.000]
UNE	0.049038	1.423953	0.83	[0.064]
INF	-1.64052	0.059008	-5.13	[0.050]
EXR	2.16541	0.320097	6.17	[0.000]
LR	27.12674	4.397425	-5.57	[0.340]

Table 5: Results of the long and short-term coefficients of ARDL-ECM

Source: Author Compilations using STATA 14.0

In the short-term trade openness with a beta coefficient of 9.019513 is statistically significant at represented by p-value of 0.000. The government of Zimbabwe has been on an overdrive to open the economy to enhance productivity through easing of business reforms and implementing policies that attract foreign direct investment to boost economic activities. The findings are similar to Raghutla (2020), who suggested that trade openness plays a substantial role in promoting economic growth while also promoting economic development in his research for five emerging market economies between 1993 to 2016.

Furthermore, the study revealed that sectorial productivity was significantly impacted by both short-term and long-term unemployment. In the short-term p-value is significant at 0.030 with a coefficient of .0490383. A rise in unemployment by .0490383 reduce sectoral productivity too. Meanwhile, In the long term, the study 0

Stability of the Model

To ensure the robustness of the model results, the CUSUM test was performed as shown in figure 8



Figure 8: Test results for Trade Openness



Based on the CUSUM results the parameter's coefficients were stable and constant as they were within 5% critical bound on the model which means to say that results presented are valid.

CONCLUSION AND POLICY RECOMMENDATIONS

The study explored the nexus of between trade openness and total sectorial productivity in Zimbabwe using the ARDL and Granger Causality approach between 1990 and 2023. This study's explanatory variables included unemployment, trade openness, labor rate, inflation, and exchange rate. The results reveal that both in short- and long-term trade openness the explanatory variables showed a relationship with the dependent variable GDP. The results of this study revealed that trade openness, unemployment, inflation and labour rate had a significant and positive relationship with total productivity, while the exchange rate has a negative impact on the total productivity. By utilising the Granger Causality test the study concluded that there is a unidirectional causal relationship in between trade openness and total productivity in Zimbabwe.

This study suggests some policy recommendations on the basis of findings. For a developing country like Zimbabwe, it has to reap the benefits of trade openness, it has to be consistent in its trade policy. Whilst in the short term, negative effects (in the form of reduced government revenue, for example) maybe experienced, it is in the long run that benefits start to accrue. Policy makers also need to be reminded that trade openness ought to be a process not an episode and therefore a long-time horizon is required when formulating and implementing trade liberalization policies.

The economy of Zimbabwe has been on the doldrums for the past two decades. The economy has a high appetite of foreign direct investment due its rich resource base and centrality to the North and South Corridor and COMESA markets. There is need for wider ease of doing business reforms and capacitating one-stop institutions such ZIDA formed in 2020 to effectively and efficiently attract and market economic opportunities displayed by the economy of Zimbabwe.

Furthermore, the government of Zimbabwe should also address the oscillating exchange rates and inflation that hamper national productivity both in the short and long run. Inflation which has been a mainstay in the Zimbabwe economy primarily due to poor policy mix needs to be redressed by effective means to lower it to sustainable levels. In order to lower effects of inflation and exchange rates relevant measures to enhance policy coordination among various arms of government should be put in place. Most particularly, monetary policy should be made to complement fiscal policy measures. It should be complimented by fiscal discipline that should be stalwartly observed to at every level of government. To keep in check the exchange rate there is need to develop a more vibrant economy as GDP growth generally improves exchange rate in the long run.

Unemployment levels in Zimbabwe have reached to unprecedented levels. Usually, high unemployment is entwined with high levels of informalisation of economy. IMF (2019) postulate that Zimbabwean economy is the second highly informalised country from Bolivia worldwide. Moreso, ZNCC (2024) also weighs in saying 80 percent of adults in Zimbabwe are engaged into the informal sector. Therefore, the government of Zimbabwe in collaboration with development partners need to implement the formalisation process of the informal sector. The sector has demonstrated that it can drive the entire economy and product goods and services.

Lastly, another important factor which is a prerequisite for these policies to succeed is the restoration of the country's long-term macroeconomic stability. Even if the authorities were willing to implement the trade and exchange rate reforms that are necessary for a successful unification policy, it will be difficult to achieve and maintain macroeconomic discipline in an inflationary, unstable exchange rate system and sanctioned economic system. The drive for re-engagement to mend relations with the international community should be pursued by the government as it only the other avenue to lay a firm basis for long



term development initiatives and thus boost confidence in the Zimbabwean economy.

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