

Financial Inclusion and the Trade-Growth Nexus: Evidence from the Emerging Zimbabwean Economy

Alexander Maune
University of South Africa, Pretoria, South Africa
alexandermaune6@gmail.com

Abstract: This study examined the effect of financial inclusion in the trade-growth nexus in Zimbabwe using time series data collected from the World Bank databases from 1980 to 2016. The study precisely examined whether financial inclusion is a passage within which trade openness impacts growth in Zimbabwe. Also examined was the complementarity effect of financial inclusion and trade openness on growth. The effect of financial inclusion and trade openness on growth has received much attention from researchers across the globe and literature is awash with theoretical and empirical evidence of such studies. What is yet to be examined is whether financial inclusion is a passage within which trade openness influences growth. The study finds a negative significant effect of financial inclusion and trade openness on growth in Zimbabwe. Moreover, the findings show a complementary, strong and positive nexus linking financial inclusion and trade openness on growth in Zimbabwe. Policy-makers are, however, implored to formulate policies meant to deepen financial inclusion in order to enhance growth through trade openness. The article will help expand the academic knowledge and as such contribute in filling the gap that exists within the body of knowledge. The article is important to policy-makers, the academia, private sector and researchers at large.

Keywords: *Financial Inclusion, Economic Growth, Trade Openness, Emerging Economy, Zimbabwe*

1. Introduction

Background of the Study: Globally, financial inclusion has attracted a lot of attention from policy-makers, governments and researchers as one of the main pillars of economic development. Regionally and nationally, financial inclusion (FI) has also been embraced as one of the most important aspects of fostering development. The importance of FI in economic development and growth has, however, seen the formation of organisations or networks such as the Global Partnership for Financial Inclusion (GPMI) and the Alliance for Financial Inclusion (AFI) with the main thrust of developing national financial inclusion policies and strategies. Despite the role of FI in economic development and growth, studies have shown that more than 2.7 billion people are still financially excluded (Otchere, 2016). Otchere (2016) further argues that about 400 million small to medium enterprises (SMEs) are also financially excluded in developing countries. To Evans (2015), 23% of Africa's adult population holds an account at the bank, despite how critical or important FI is in the development and growth of a country. Although prior studies have yielded mixed and inconclusive results concerning the nexus between trade openness and GDP, there seems to be some consensus as the majority of the studies contend that trade has an influence on economic growth. For example, Keho (2017) finds a positive significant nexus between trade and GDP in the short and long run.

More so, his study shows a strong, positive and complementary trade-capital formation nexus on economic growth. To Keho (2017), many studies have shown a positive nexus existing between trade openness and GDP. Some of the studies include (Frankel & Romer, 1999); (Dollar & Kraay, 2004); (Freund & Bolaky, 2008) and (Chang, Kaltani, & Loayza, 2009). Other studies such as (Vlastou, 2010); (Ulaşan, 2015); (Polat, Shahbaz, Rehman, & Satti, 2015) and (Musila & Yiheyis, 2015), however, deny the presence of a positive trade-GDP nexus (Keho, 2017). Keho (2017) points out that the mixture of results from the empirical studies can be ascribed to three factors which are (1) the sample size (countries), (2) the econometric models, and (3) the proxy used for trade openness. From all these studies, the role of FI in the trade-growth nexus has been silent. Though many studies regarding the impact of FI on economic growth have been done previously, the role of FI in boosting trade openness' ability to influence economic growth and development has received little attention if any. The study works towards influencing Zimbabwe's FI policies to not only influence trade nonetheless should also enhance the effect of trade on GDP. The article intends to reinforce that economic growth in Zimbabwe is influenced by FI and trade indicators separately.

Organization of the Remainder of the Article: The rest of the article is arranged in the following major headings: literature review, methodology, data analysis & interpretation, conclusion and references.

Problem Statement and Research Gap: There are many studies in the literature that have explored the effect of (1) trade openness on GDP and (2) the impact of FI on GDP. The majority of these studies point towards a strong and positive nexus between the variables. To this end, the effect of FI and trade openness on GDP and the impact of FI on trade openness have so far not been investigated. Very rarely does one find such studies in literature especially in relation to Africa in general and Zimbabwe in particular. Not much is known regarding the nexus between FI-trade-growth though the effect of trade openness on GDP in Africa in general and Zimbabwe in particular cannot be overemphasized.

Contribution of the Article: This article seeks to fill the gap in the body of knowledge as it is (1) one of its types to the author's best knowledge to examine the impact of FI on trade openness` ability to influence GDP (2) in Zimbabwe. This article therefore, is of significant value to policy-makers, government and the academia.

2. Literature Review

There has been growing theoretical evidence of positive relationships between trade openness and growth in many developed nations though such relationships have not been proven empirically in developing nations, particularly African in countries (Musara, Gwaindepi, & Dhoru, 2014). The nexus between economic growth and trade openness has been theoretically controversial (Zahonogo, 2017). Literature has shown the potential of trade openness in enhancing economic development and growth in both the short and long-run through the provision of goods and services, efficient allocation of resources and improved productivity as a result of knowledge dissemination and technology diffusion (Grossman & Helpman, 1991); (Rivera-Batiz & Romer, 1991) and (Barro & Sala-i-Martin, 1997). It is therefore expected that countries with more trade openness will relatively outperform those with less openness (Keho, 2017). While conventional wisdom predicts a growth-enhancing effect of trade, recent developments suggest that trade openness is not always beneficial to economic growth (Zahonogo, 2017). Zahonogo (2017) further argues that the advantages that come with trade openness are, however, not automatic.

(Kim & Lin, 2009) cited by Zahonogo (2017) find that trade openness contributes to long-run economic growth, with effects varying according to the level of economic development. Also (Herzer, 2013) in Zahonogo (2017) finds that the impact of trade openness is positive for developed countries and negative for developing ones. The relationship between trade and growth does not however establish a cause and effect relationship because as economies grow, they trade more and become more open (Musara, Gwaindepi, & Dhoru, 2014). The static and dynamic gains from trade arise from comparative advantage theory and the effects of trade on the level of investment, and on the state of technical knowledge (Marrewijk, 2012). Many studies suggest that FI is a precondition for economic growth (Evans, 2015). Countries with low GDP per capita seem to be less financially inclusive (Sarma & Pais, 2011). Theoretical literature shows that: (1) FI enhances trade openness, (2) trade openness can have a positive or negative impact on economic growth and (3) FI can have a positive or negative impact on economic growth. What has not been shown by literature which this study seeks to show are (1) the impact of FI on trade openness and (2) the role of FI in enhancing the impact of trade openness on economic growth.

Empirical Literature Review: Empirically, a number of studies have examined the trade-growth nexus. However, evidence regarding this nexus seemed to be mixed and inconclusive across countries and methodologies. Summarily, the findings of these studies can be placed into three main categories: (1) trade openness has a positive impact on economic growth, (2) trade openness has a negative impact on economic growth, and (3) there is no causality between trade openness and economic growth. What still remains to be known is whether there are other channels through which trade openness influences economic growth? If there are, is FI one of the channels through which trade openness influences economic growth in Zimbabwe? This study, therefore, seeks to answer these questions. The impact of FI on trade openness need also to be examined since there are no empirical studies that have investigated this relationship though theoretical literature point towards a positive relationship between the two. In his study on the impact of trade openness on GDP in Cote d'Ivoire, Keho (2017), using the Toda and Yamamoto Granger causality tests and the Autoregressive Distributed Lag bounds test to co-integration, find a positive nexus linking trade and GDP in both periods.

Moreover, that study shows a complementary, strong and positive capital formation-trade nexus on growth. Musara, Gwaindepi, & Dhoro (2014) in an attempt to investigate the relationship between trade and economic growth in a long run using data collected from 1975 to 2005, find that trade and economic growth co-integrate through strengthened macroeconomic policy stability. Another study by (Mangir, Acet, & Baoua, 2017) using Johansen co-integration approach, Vector Error Correction (VEC) technique examine the nexus that exists between trade and GDP in Niger from 1970 to 2015. The findings show a bi-directional causality between the variables. Abdullahi, Safiyanu, & Soja (2016) in an empirical analysis of West Africa from 1991 to 2011 using panel data of 16 countries find that a one percent rise in export variable leads to a growth in GDP of 5.11% with imports having a positive though the insignificant impact on GDP. However, (Rigobon & Rodrik, 2005) find the effect of trade on income levels to be negative though significant. (Fenira, 2015) finds that trade openness had a weak relationship with GDP. (Vamvakidis, 2002), (Afzal & Hussain, 2010) and (Ulaşan, 2015) find no causal relationship between trade-growth nexus. However, (Klasra, 2011) and (Shahbaz, 2012) disputed Afzal & Hussain's (2010) results after their study found a causal trade-growth nexus in Pakistan.

Table 1: Empirical Literature on the Trade-Growth Nexus

Author	Country/Countries of study	Methodology	Research findings
(Balassa, 1978)	11 countries	Regression Analysis	Discover a positive correlation between export and growth.
(Jayme Jr, 2001)	Brazil	Literature Review	Finds no relationship between trade and growth.
(Rassekh, 2007)	150 countries	Empirical Inquiry	Lower income economies drive many benefits from global trade as compared to higher income economies.
(Chang, Kaltani, & Loayza, 2009)	82 countries	Harris-Todaro Model	Trade openness has a positive impact on GDP.
(Kim & Lin, 2009)	61 countries	Instrument-variable threshold regression approach	Found an income threshold level benchmark that trade openness impacts GDP.
(Dufrenot, Mignon, & Tsangarides, 2010)	75 developing countries	Quantile Regression Approach	The findings show the impact of trade openness on GDP in different growth economies.
(Kim, Lin, & Suen, 2011)	High & Low-income countries	Instrumental Variable threshold regressions	Trade openness has a positive impact on capital accumulation, financial developments, and economic development in high-income economies. However, in low-income economies the impact is significant though negative.
(Usman, 2011)	Nigeria	OLS	Finds that export, import and exchange rate all have a negative impact on real output.
(Musara, Gwaindepi, & Dhoro, 2014)	Zimbabwe	Engle-Granger co-integration OLS	Find that trade & economic growth co-integrate though the relationship depends on the strength of macroeconomic policy stability.
(Sakyi, Villaverde, & Maza, 2015)	115 developing countries	Granger Causality	A positive bi-directional causal relationship exists between trade & GDP.
(Brueckner & Lederman, 2015)	41 sub-Saharan African countries	Instrumental variable approach on panel data	Trade openness enhances GDP in both periods.

(Musila & Yiheyis, 2015)	Kenya			Granger Causality	Trade openness positively impacts investment ratio but not GDP.
(Lawal, Nwanji, Asaleye, & Ahmed, 2016)	Nigeria			ARDL	The findings show a two-way causality between trade openness and GDP in both the short and long run.
(Abdullahi, Safiyanu, & Soja, 2016)	16 West Africa countries			Multiple Regression Model	Find a positive and significant impact of exports on GDP with imports having a negative import on GDP.
(Mangir, Acet, & Baoua, 2017)	Niger			Johansen co-integration approach, VEC	Empirical results show the existence of a bi-directional causality among variables in Niger economy.
(Keho, 2017)	Cote d'Ivoire			ADL, co-integration, Toda & Yamamoto Granger causality	Positive nexus between trade openness and GDP as well as a strong, positive and complementary trade-capital formation nexus.

Source: Author`s compilation

Findings from the literature show that FI affects the poor through two channels, that is, (1) aggregate growth and (2) changes in the distribution of income. To many authors, FI enhances growth and reduces inequality through trickle-down effects. According to (Beck, Demircuc-Kunt, & Levine, 2007), FI not only reduce income inequality but also benefit the poor disproportionately and is strongly related to poverty alleviation. To others, improved financial services increased economic activities and employment opportunities for rural households resulting in inclusive economic growth. (Sarma & Pais, 2010) find that FI reduces the dominance of informal financial institutions which are exploitative in nature and access to formal financial services increases the efficiency of the resource allocation and reduces the cost of capital. The study by (Wong, 2015), quantifies the impact of FI on productivity, GDP growth, and income inequality in six countries. The study found that the impact of FI on productivity and GDP growth was positively significant in many instances; while the impact of FI on income inequality varies from instance to instance. The null hypothesis is that the variable contains a unit root, and the alternative is that the variable was generated by a stationary process. The DF-GLS tests for a unit root in a time series.

Overall, the findings show a strong nexus existing between FI and macroeconomic performance (Wong, 2015). Contrary to the above mentioned studies that show a positive effect of FI on economic growth, (Barajas, Chami, & Yousefi, 2011) find negative effect of private credit on growth in Mena region with (Sassia & Goaid, 2012) showing a meaningful negative effect of bank development on growth on the same region. The above literature review shows some gaps which this study seeks to bridge. The first objective of this study is to investigate whether FI indicators are significant determinants of trade in Zimbabwe. However, the study`s aim is also to establish the fact that trade when powered by FI will lead to significant economic growth in Zimbabwe. Table 2 below shows the list of variables used in this study, their definitions, sources and a priori expectation as given in previous studies. The variables are in three categories which are as follows, (1) FI (DCF & DCP), (2) trade openness (OPEN) and (3) control variables (INFL, POP, GCE, FDI & UNEMPL).

Table 2: List of Variables, Definitions, Sources and a Priori Expectation

Variable	Definition	Source	Expected sign
DCF	“Domestic credit provided by the financial sector includes all credit to various sectors on a gross basis, with the exception of credit to the central government, which is net. The financial sector includes monetary authorities and deposit money banks, as well as other financial corporations where data are available” (The World Bank, 2017).	WDI	+/-
DCP	“Domestic credit to private sector refers to financial resources	WDI	+/-

	provided to the private sector, such as through loans, purchases of nonequity securities, and trade credits and other accounts receivable, that establish a claim for repayment” (The World Bank, 2017). FI enhances economic growth and reduces inequality through trickle-down effects (Shaw, 1973) and (McKinnon, 1973). (Barajas, Chami, & Yousefi, 2011) and (Sassia & Goaid, 2012) find a negative effect of private credit and bank development on economic growth.		
OPEN	Trade openness is the sum of exports and imports of goods and services measured as a share of the gross domestic product. (Balassa, 1978) argues that exports increase foreign currency inflows which then enhances production and growth. However, trade openness also encourages the importation of cheap inputs thereby crowding out domestic firms (Baltagi, Demitriades, & Law, 2009).	WDI	+/-
INFL	Inflation as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly (The World Bank, 2017). The impact of inflation on economic growth has shown to be both positive and negative.	WDI	+/-
POP	“Annual population growth rate for year t is the exponential rate of growth of midyear population from year $t-1$ to t , expressed as a percentage. Population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship” (The World Bank, 2017). Population growth has shown to be a trigger for economic growth on the one hand but on the other hand it can lead to economic decay.	WDI	+/-
GCE	“General government final consumption expenditure (formerly general government consumption) includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defence and security, but excludes government military expenditures that are part of government capital formation” (The World Bank, 2017). (Keynes, 1936) argues that GCE is critical for economic growth, however, other studies show that GCE results in a negative impact on economic growth.	WDI	+/-
FDI	“Foreign direct investment are the net inflows of investment to acquire a lasting management interest (10% or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital as shown in the balance of payments” (The World Bank, 2017). Although economic growth requires FDI, (Bornschiefer & Chase-Dunn, 1985) note that FDI has a negative effect on economic growth.	WDI	+/-
UNEMPL	Unemployment refers to the share of the labor force that is without work but available for and seeking employment (The World Bank, 2017). The higher the unemployment the less the demand for goods and services as well as the revenue collected through income tax.	WDI	-

Source: Author’s compilation

3. Methodology

Data Sources for the Study: Time series annual data from 1980 to 2016 for Zimbabwe was used for the purposes of this study. The period 1980 to 2016 was selected mainly due to data availability. The data used was extracted from the Global Financial Development and the World Development Indicators` World Bank databases. A quantitative approach was used due to the data availability and reliability. Nevertheless, this

approach fails to give an in-depth experience of the population under study. The researcher had to pursue this approach, because it was the best approach available for the purposes beforehand due to the accessibility of legitimate data.

4. Data Analysis and Interpretation

This study examined the effect of financial inclusion in the trade-growth nexus in Zimbabwe using time series data collected from the World Bank databases from 1980 to 2016. A statistical model was used to examine the nexus among growth – dependent – and explanatory variables as described and explained in the literature. The following equation [1] shows the general econometric model specification

$$GROWTH = f(DCF, DCP, OPEN, INFL, POP, GCE, FDI, UNEMPL) \quad (1)$$

Where: GROWTH – Economic Growth
 DCF – Domestic credit financial
 DCP – Domestic credit private
 OPEN – Trade openness
 INFL – Inflation
 POP – Population growth
 GCE – Government Consumption expenditure
 FDI – Foreign direct investment
 UNEMPL – Unemployment

Table 3: Proxies Used to Measure Variables

Variable	Measure
Economic growth (GROWTH)	GDP per capita (annual %)
Domestic credit financial (DCF)	Domestic credit provided by the financial sector (% of GDP)
Domestic credit private (DCP)	Domestic credit to private sector (% of GDP)
Trade openness (OPEN)	Exports & imports of goods & services (% of GDP)
Inflation (INFL)	Inflation, consumer prices (annual %)
Population growth (POP)	Population growth (annual %)
Government consumption expenditure (GCE)	General government consumption expenditure (% of GDP)
Foreign direct investment (FDI)	Foreign direct investment, net inflows (% of GDP)
Unemployment rate (UNEMPL)	Unemployment, total (% of total labour force)

Source: Author's compilation

The above proxies for variables were selected in line with other previous studies and data availability. The following general econometric model was used to examine the effect of trade on growth in Zimbabwe.

$$GROWTH_t = \alpha_t + \beta_1 GROWTH_{t-1} + \beta_2 OPEN_t + \beta_3 X_t + \dots + \beta_k X_{kt} + u_t \quad (2)$$

Where the variables x_t, x_t, \dots, x_{kt} is a set of $k - 1$ explanatory variables which influence $GROWTH_t$, and the coefficient estimates $\beta_1, \beta_2, \dots, \beta_k$ are the parameters which quantify the effect of each of these explanatory variables on $GROWTH_t$ and to make the model more realistic, a random disturbance term, denoted by u_t , is added to the equation to represent unobserved shocks in each time period whereas t denotes the time-series dimension, α is a scalar and β is $K \times 1$ and X_t is the t^{th} observation on K explanatory variables.

The presence of the parameters α_t , which represent different intercepts each year, allows for aggregate economic growth to change over time. The following econometric model was also used to analyze the effect of FI on trade in Zimbabwe.

$$OPEN_t = \alpha_t + \beta_1 OPEN_{t-1} + FI\ Variables_t + Control\ Variables_t + u_t \quad (3)$$

The following comprehensive econometric model (equation 4) below examined the following relationships: (1) the effect of trade on growth, (2) the effect of FI and trade on growth and (3) the nexus among growth and independent variables.

$$GROWTH_t = \alpha_t + \beta_1 GROWTH_{t-1} + \beta_2 GROWTH_{t-2} + \beta_3 OPEN_t + \beta_4 FI_t + \beta_5 (OPEN_t \cdot FI_t) + \beta_6 INFL_t + \beta_7 POP_t + \beta_8 GCE_t + \beta_9 FDI_t + \beta_{10} UNEMPL_t + u_t \quad (4)$$

A (β_5) that is positive and significant denotes the complementarity of trade and FI in boosting economic growth in Zimbabwe.

Preliminary Diagnostic: Table 4 and 5 below denotes some pre-estimation diagnostics that were carried out that include correlation analysis and descriptive statistics.

Table 4: Correlation Analysis

	GROWTH	OPEN	DCP	DCF	FDI	INFL	POP	UNEMPL	GCE
GROWTH	1.000								
OPEN	-0.060	1.000							
DCP	-0.369	-0.145	1.000						
DCF	-0.307	-0.343	0.886	1.000					
FDI	0.160	0.582	-0.236	-0.312	1.000				
INFL	-0.130	0.166	-0.160	-0.190	0.036	1.000			
POP	0.298	-0.753	-0.283	-0.064	-0.343	-0.155	1.000		
UNEMPL	-0.092	0.802	0.034	-0.187	0.567	0.082	-0.863	1.000	
GCE	0.257	-0.360	-0.017	0.176	-0.022	-0.471	0.312	-0.188	1.000

Source: Author's compilation (NB. ** 5% level of significance)

Table 4 above clearly shows that variables FDI, POP and GCE were positively insignificantly correlated individually with economic growth in Zimbabwe. These findings partially resemble what theoretical literature states. Contrary to theoretical literature, trade openness and other FI variables such as DCP and DCF negatively significantly correlated individually with economic growth in Zimbabwe.

Table 5: Descriptive Statistics

	GROWTH	OPEN	DCP	DCF	FDI	INFL	POP	UNEMPL	GCE
Mean	-0.12	66.62	29.79	55.77	0.97	777.66	2.29	5.27	18.16
Std. Error	1.23	3.10	3.60	5.51	0.23	695.93	0.15	0.12	0.92
Median	-0.67	69.26	27.11	51.08	0.43	20.15	2.11	5.19	18.18
Std. Dev.	7.50	18.83	18.71	28.09	1.39	4117.15	0.91	0.59	5.57
Kurtosis	0.49	-0.46	8.97	8.53	8.32	34.82	-1.04	1.80	2.20
Skewness	-0.44	0.27	2.46	2.37	2.40	5.89	0.49	1.22	-1.27
Maximum	13.04	109.52	103.63	164.56	6.94	24411.03	3.89	6.93	27.49
Minimum	-19.06	35.92	7.48	22.17	-0.45	-2.40	1.06	4.39	2.05
AAD	5.62	14.95	11.45	18.36	1.00	1368.71	0.75	0.42	3.80
MAD	4.15	13.56	6.73	12.50	0.52	14.75	0.68	0.21	2.40
IQR	8.35	30.38	12.59	24.49	1.54	41.01	1.50	0.40	5.57

Source: Author's compilation (NB. ** 5% level of significance)

Table 6 below shows the Shapiro-Wilk and Grubbs' tests the tests show the preliminary strength/significance of the variables of choice. The Shapiro-Wilk test examines the normality of a continuous variable. The null hypothesis is the normality distribution of the data. The Prob < W value is the p-value in the listed output. On one hand if the alpha = 0.05 and the p-value < 0.05, reject the null hypothesis that the data is normally distributed. On the other hand, if the p-value > 0.05, the null hypothesis is not rejected. Grubbs' test statistic (G) is the variation among the sample mean and either the minimum or maximum data value, divided by the standard deviation. Grubbs' test statistic is used to calculate the p-value to reject the null hypothesis when it is true. In this case reject the null hypothesis (Reject H_0 if $G >$ critical value). Also the data set shows that the maximum value (24, 411.03) is in fact an outlier at the 0.05 significance level.

Table 6: Shapiro-Wilk and Grubbs' Tests

Shapiro-Wilk Test									
	GROWTH	OPEN	DCP	DCF	FDI	INFL	POP	UNEMPL	GCE
W	0.96	0.95	0.78	0.80	0.76	0.18	0.91	0.90	0.88
p-value	0.26	0.11	0.00	0.00	0.00	0.00	0.01	0.02	0.00
Alpha	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05	0.05
normal	Yes	Yes	no	No	no	no	No	no	no
Grubbs' Test									
Alpha	0.05								
outlier	24411.03								
G	19.17								
G-crit	3.61								
Sig	Yes								

Source: Author's compilation (NB. ** 5% level of significance)

Natural Logarithms Transformation: The variables underwent transformation into natural logarithms before examination as per the standard norm in modern econometrics (Brooks, 2008). The author was compelled by the reasons provided by (Brooks, 2008) to use log transforms in this study and these are: (1) logarithms often help to rescale data to achieve constant variance that overcomes a common statistical problem, (2) logarithms transformation helps to bring positively skewed distribution closer normal distribution and (3) taking logarithms to transform a non-linear, multiplicative nexus into a linear, additive one between variables. Standard Deviation of inflation in table 5 above which exceeds 1, 000 provides evidence of abnormality in the variable, hence the need for logarithmic transformation. The regression equation had the variables in natural logarithm (Brooks, 2008 and Maune, 2017). This had the effect of rendering the coefficients elastic, thus, avoiding compromising the model's significance for the purposes of this study (Maune, 2017).

Unit Root Test: Time series unit root test was conducted using the Augmented Dickey-Fuller, DF-GLS and Phillips-Perron unit-root tests for checking stationary of each of the variables for the entire study period, that is, 1980 to 2016. The Dickey-Fuller unit root test was developed by (Dickey & Fuller, 1979) to test whether a variable has a unit root or, equivalently, that the variable follows a random walk. It performs the modified Dickey-Fuller t-test (known as the DF-GLS test) proposed by (Elliott, Rothenberg, & Stock, 1996). The Phillips-Perron unit root tests that a variable has a unit root (Phillips & Perron, 1988). This test uses the (Newey & West, 1987) standard errors to account for serial correlation, whereas the augmented Dickey-Fuller test uses additional lags of the first-differenced variable. The results are presented in Table 7.

Table 7: Time Series Unit Root Test of Each Variable

Variable	Dickey-Fuller		DF-GLS	PPerron	z(t)
	z(t)	p-value	z(t)	z(rho)	
Ln GROWTH	-4.117	0.0001	-3.834	-3.072	-1.346
Ln LGROWTH	-1.852	0.0366	-1.822	0.038	0.226
Ln 2GROWTH	-1.846	0.0371	-1.892	0.059	0.337
Ln OPEN	-1.411	0.0839	-1.192	0.041	0.239
Ln LOPEN	-1.267	0.1072	-0.964	0.091	0.562
Ln OPEN.FI	-4.377	0.0013	-2.139	0.188	0.718
Ln DCP	-4.434	0.0001	-2.657	0.253	0.465
Ln DCF	-4.216	0.0001	-2.546	0.092	0.208
Ln FDI	-1.622	0.0573	-1.479	-3.370	-1.142
Ln INFL	-1.786	0.0418	-1.792	-3.207	-1.313
Ln POP	-4.667	0.0000	-3.468	-0.952	-1.073
Ln UNEMPL	-3.498	0.0007	-3.554	-0.065	-0.217
Ln GCE	-2.965	0.0028	-2.995	-0.237	-0.280

Source: Author's compilation from STATA/SE 12.0

Note: DF-GLS is Dickey-Fuller, pperron is Phillips-Perron test, the p-value is the MacKinnon's approximate.

Table 7 above shows, that we cannot reject the null hypothesis that Ln OPEN, Ln LOPEN and Ln FDI exhibit a unit root under both the Dickey-Fuller and DF-GLS unit root tests. However, we can overwhelmingly reject the null hypothesis of a unit root in variables such as Ln GROWTH, Ln LGROWTH, Ln 2GROWTH, Ln DCP, LnOPEN.FI, Ln DCF, Ln POP, Ln UNEMPL and Ln GCE. However, the non-stationary variables are stationary at first difference. Other time series tests that were done included, vector error-correlation model, vector auto regression, Johansen tests for cointegration and collinearity tests.

Multiple Regression Analysis Results: The following table 8 & 9 shows the results of the regression analysis as extracted from STATA/SE 12.0 as given by equations 3 and 4 above.

Table 8: Regression Analysis, Impact of Financial Inclusion on Trade Openness in Zimbabwe 1980-2016

. reg lnOPEN lnLOPEN lnDCP lnDCF lnFDI lnINFL lnPOP lnUNEMPL lnGCE						
Source	SS	df	MS	Number of obs = 37		
Model	2.72736922	8	.340921152	F(8, 28) = 26.60		
Residual	.358882297	28	.012817225	Prob > F = 0.0000		
Total	3.08625151	36	.085729209	R-squared = 0.8837		
				Adj R-squared = 0.8505		
				Root MSE = .11321		
lnOPEN	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnLOPEN	.3862799	.1423745	2.71	0.011	.094639	.6779209
lnDCP	.1107766	.0450585	2.46	0.020	.0184785	.2030747
lnDCF	-.0883918	.0557052	-1.59	0.124	-.2024987	.0257151
lnFDI	.1310598	.0649303	2.02	0.053	-.0019439	.2640635
lnINFL	-.003449	.0132789	-0.26	0.797	-.0306496	.0237515
lnPOP	-.1850232	.0845044	-2.19	0.037	-.3581225	-.0119239
lnUNEMPL	-.1332629	.1968592	-0.68	0.504	-.5365107	.2699848
lnGCE	-.1098843	.059154	-1.86	0.074	-.2310558	.0112871
_cons	3.157298	.7663209	4.12	0.000	1.587561	4.727035

Source: Author's compilation from STATA/SE 12.0. (NB. ** 5% level of significance)

The results of the regression analysis are shown in table 8 above. The independent variables statistically significantly predicted trade openness (OPEN), with $F(8, 28) = 26.60$, $P > F 0.0000$, $R^2 = 0.8837$, *Adjusted R*² = 0.8505 and *Root Mean Squared Error (RMSE)* = 0.11321. The study also found that the independent variables added statistically significantly to the prediction of $p < 0.05$. The independent variables accounted for 85.05% of the dependent variability in Trade Openness (OPEN) in Zimbabwe for the period 1980 to 2016. Prob > F of 0.0000 shows the reliability of the results of the model. Therefore, there are only 0.0000 chances that the regression output was merely a chance of occurrence. The results show that LnLOPEN, LnDCP and LnPOP significantly impact on Trade Openness in line theoretical literature. The current study found that FI positively significantly impacts on trade openness in line with findings by (Evans, 2015). One year lagged trade openness has shown to have some positive and significant influence on the current year's trade openness.

Table 9: Regression analysis, Financial Inclusion and the Trade-Growth nexus in Zimbabwe 1980-2016

. reg lnGROWTH lnLGROWTH lnL2GROWTH lnOPEN lnLOPEN lnOPENFI lnDCF lnFDI lnINFL ln						
Source	SS	df	MS	Number of obs = 37		
Model	35.5799518	11	3.23454107	F(11, 25) = 7.60		
Residual	10.6391117	25	.425564468	Prob > F = 0.0000		
Total	46.2190635	36	1.28386288	R-squared = 0.7698		
				Adj R-squared = 0.6685		
				Root MSE = .65235		
lnGROWTH	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
lnLGROWTH	-1.752161	1.036344	-1.69	0.103	-3.886552	.3822297
lnL2GROWTH	-2.617408	.8536678	-3.07	0.005	-4.37557	-.8592462
lnOPEN	-7.729164	1.500793	-5.15	0.000	-10.8201	-4.638224
lnLOPEN	1.987721	.9539163	2.08	0.048	.023094	3.952349
lnOPENFI	1.31135	.3062704	4.28	0.000	.6805742	1.942126
lnDCF	-1.833226	.3854625	-4.76	0.000	-2.627101	-1.039351
lnFDI	1.409208	.4638599	3.04	0.006	.4538702	2.364545
lnINFL	-.0895427	.0823565	-1.09	0.287	-.259159	.0800737
lnPOP	.6388755	.5646885	1.13	0.269	-.5241221	1.801873
lnUNEMPL	1.420199	1.163178	1.22	0.233	-.9754116	3.81581
lnGCE	1.092696	.3683419	2.97	0.007	.3340812	1.85131
_cons	46.24174	10.84361	4.26	0.000	23.90891	68.57456

Source: Author's compilation from STATA/SE 12.0 (NB. ** 5% level of significance)

The results of the main regression analysis are shown in table 9 above. The independent variables statistically significantly predicted Financial Inclusion and the Trade-Growth nexus in Zimbabwe, with $F(11, 25) = 7.60$, $P > F 0.0000$, $R^2 = 0.7698$, *Adjusted R*² = 0.6685 and *Root Mean Squared Error (RMSE)* = 0.65235. The study also found that the independent variables added statistically significantly to the prediction of $p < 0.05$. The independent variables accounted for 66.85% of the dependent variability in Financial Inclusion and the Trade-Growth nexus in Zimbabwe for the period 1980 to 2016. Prob > F of 0.0000 shows the reliability of the results of the model. Therefore, there are only 0.0000 chances that the regression output was merely a chance of occurrence. Trade openness is negatively significantly correlated to GDP in line with findings by (Vlastou, 2010); (Musila & Yiheyis, 2015) and (Ulaşan, 2015). Ln DCP was omitted due to collinearity. Lagged trade openness is, however, positively significantly impacting on economic growth in line with findings by (Keho, 2017), (Frankel & Romer, 1999), (Dollar & Kraay, 2004) and (Freund & Bolaky, 2008). The complementarity between financial inclusion and trade openness positively significantly impacted economic growth in Zimbabwe.

5. Conclusion

The study examines the effect of FI in the trade-growth nexus in Zimbabwe using time series data collected from the World Bank's World Development Indicators and Global Financial Development databases for the period 1980 to 2016. Multiple regression analysis was carried out to analyze the nexus that existed between the variables. The study precisely examined whether FI is a vehicle within which trade openness impacts growth in Zimbabwe. Also examined was the complementarity between FI and trade openness on growth in Zimbabwe. The results of the study show a positive and significant complementarity between FI and trade openness on growth in Zimbabwe. The impact of FI and trade openness on growth has been given a lot of attention by researchers the world over and literature is awash with theoretical and empirical evidence of such studies. What literature has not shown much is whether FI is a vehicle within which trade openness impacts economic growth.

It is because of this gap in knowledge which the author of this article had to undertake this research study to make some contribution to the board of knowledge. The study findings show that FI and trade openness have a negative significant effect on growth in Zimbabwe. Policy-makers in Zimbabwe are, however, urged to formulate and implement policies meant to deepen FI in order to enhance the effect of trade openness on growth. FI policies will help accelerate the positive effect of trade openness on growth. It is also critical to embrace the formation of global, continental, regional and national organizations and networks whose thrust will be to develop FI policies and strategies as these help to financially include the excluded population and enterprises. However, further future studies should examine the role of FI as a vehicle within which trade openness influences growth in Africa as a whole. Studies around FI in Africa are also critical as this will help accelerate regional integration through FI-trade openness nexus.

References

- Abdullahi, A., Safiyanu, S. & Soja, T. (2016). International Trade And Economic Growth: An Empirical Analysis Of West Africa. *Journal of Economics and Finance*, 12-15.
- Afzal, M. & Hussain, I. (2010). Export-led growth hypothesis: Evidence from Pakistan. *Journal of Quantitative Economics*, 130-147.
- Balassa, B. (1978). Exports and economic growth, further evidence. *Journal of Development Economics*, 181-189.
- Baltagi, B., Demetriades, P. & Law, S. (2009). Financial development, openness and institutions. *Journal of Development Economics*, 285-296.
- Barajas, A., Chami, R. & Yousefi, R. (2011). The Impact of Financial Development on Economic Growth in the Mena Region. *Finance and Development*.
- Barro, R. & Sala-i-Martin, X. (1997). Technological diffusion, convergence, and growth. *Journal of Economic Growth*, 1-26.
- Beck, T., Demirguc-Kunt, A. & Levine, R. (2007). Finance, Inequality and the Poor. *Journal of Economic Growth*, 27-49.
- Bornschier, V. & Chase-Dunn, C. (1985). *Transnational Corporations and Underdevelopment*. New York: Praeger.
- Brooks, C. (2008). *Introductory Econometrics for Finance* (2nd ed). New York: Cambridge University Press.
- Brueckner, M. & Lederman, D. (2015). Trade openness and economic growth: Panel data evidence from Sub-Saharan Africa. *Economica*, 1302-1323.
- Chang, R., Kaltani, L. & Loayza, N. (2009). Openness can be good for growth: The role of policy complementarities. *Journal of Development Economics*, 33-49.
- Dickey, D. & Fuller, W. (1979). Dickey, D. A., Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American Statistical Association*, 427-431.
- Dollar, D. & Kraay, A. (2004). Trade, Growth and Poverty. *Economic Journal*, 22-49.
- Dufrenot, G., Mignon, V. & Tsangarides, C. (2010). The trade-growth nexus in the developing countries: A quantile regression approach. *Review of World Economics*, 731-761.
- Elliott, G., Rothenberg, T. & Stock, J. (1996). Efficient tests for an autoregressive unit root. *Econometrica*, 813-836.

- Evans, O. (2015). The Effects of Economic and Financial Development on Financial Inclusion in Africa. *Review of Economic and Development Studies*, 17-25.
- Fenira, M. (2015). Trade openness and growth in developing countries: An analysis of the relationship after comparing trade indicators. *Asian Economic and Financial Review*, 468-482.
- Frankel, J. & Romer, D. (1999). Does trade cause growth? *American Economic Review*, 379-399.
- Freund, C. & Bolaky, B. (2008). Trade, regulations, and income. *Journal of Development Economics*, 309-321.
- Grossman, G. & Helpman, E. (1991). *Innovation and Growth in the Global Economy*. Cambridge: MIT Press.
- Herzer, D. (2013). Cross-country heterogeneity and the trade-income relationship. *World Development*, 194-211.
- Jayme Jr, F. G. (2001). Notes on Trade and Growth. Cedeplar-UFMG, 1-25.
- Keho, Y. (2017). The impact of trade openness on economic growth: The case of Cote d'Ivoire. *Cogent Economics & Finance*, 1-14.
- Keynes, J. (1936). *The general theory of employment, interest and money*. New York: Harcourt, Brace & Co.
- Kim, D. & Lin, S. (2009). Trade and growth at different stages of economic development. *Journal of Development Studies*, 1211-1224.
- Kim, D., Lin, S. & Suen, Y. (2011). Nonlinearity between trade openness and economic development. *Review of Development Economics*, 279-292.
- Klasra, M. (2011). Foreign direct investment, trade openness and economic growth in Pakistan and Turkey: An investigation using bounds test. *Quality and Quantity*, 223-231.
- Lawal, A. I., Nwanji, T. I., Asaleye, A. & Ahmed, V. (2016). Economic growth, financial development and trade openness in Nigeria: An application of the ARDL bound testing approach. *Cogent Economics and Finance*, 1-15.
- Mangir, F., Acet, H. & Baoua, M. (2017). An Empirical Analysis On The Relationship Between Trade Openness And Economic Growth In Niger. *EconWorld2017@Paris Proceedings* (pp. 1-14). Paris: EconWorld.
- Marrewijk, C. (2012). *International Economics: Theory, Application and Policy*. Oxford : Oxford University Press.
- Maune, A. (2017). The Role of Competitive Intelligence in Trade Facilitation in an Emerging Economy. *Journal of Economics and Behavioral Studies*, 132-148.
- McKinnon, R. (1973). *Money and Capital in Economic Development*. Washington, DC: Brookings Institution.
- Musara, M., Gwaindepi, C. & Dhoru, N. (2014). Relationship between International Trade and Economic Growth: A Cointegration Analysis for Zimbabwe. *Mediterranean Journal of Social Sciences*, 621-627.
- Musila, J. & Yiheyis, Z. (2015). The impact of trade openness on growth: The case of Kenya. *Journal of Policy Modeling*, 342-354.
- Newey, W. K. & West, K. (1987). A simple, positive semi-definite, heteroskedasticity and autocorrelation consistent covariance matrix. *Econometrica*, 703-708.
- Otchere, I. (2016). Financial Inclusion and development in Africa: Gaps, Challenges and Policy. 18th AERC Senior Policy Seminar (pp. 1-19). Nairobi: AERC.
- Phillips, P. & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, 335-346.
- Polat, A., Shahbaz, M., Rehman, I. & Satti, S. (2015). Revisiting linkages between financial development, trade openness and economic growth in South Africa: Fresh evidence from combined cointegration test. *Quality and Quantity*, 785-803.
- Rassekh, F. (2007). Is international trade more beneficial to lower income economies? An empirical inquiry. *Review of Development Economics*, 159-169.
- Rigobon, R. & Rodrik, D. (2005). The rule of law, democracy, openness, and income: Estimating the Interrelationships. *The Economics of Transition*, 533-564.
- Rivera-Batiz, L. & Romer, P. (1991). International trade with endogenous technological change. *European Economic Review*, 971-1001.
- Sakyi, D., Villaverde, J. & Maza, A. (2015). Trade openness, income levels, and economic growth: The case of developing countries, 1970-2009. *The Journal of International Trade & Economic Development*, 860-882.
- Sarma, M. & Pais, J. (2010). *Financial Inclusion and Development: A Cross-Country Analysis*. Indian Council for Research on International Economic Relations, 1-28.
- Sarma, M. & Pais, J. (2011). Financial inclusion and development. *Journal of international Development*, 613-628.

- Sassia, S. & Goaid, M. (2012). Financial Development, ICT Diffusion and Economic Growth: Lessons from MENA Region. *Telecommunications Policy*, 252-261.
- Shahbaz, M. (2012). Does trade openness affect long-run growth? Cointegration, causality and forecast error variance decomposition tests for Pakistan. *Economic Modelling*, 2325-2339.
- Shaw, E. (1973). *Financial Deepening in Economic Development*. New York: Oxford University Press.
- The World Bank. (2017, June 16). World Development Indicators/Data. Retrieved September 19, 2018, from The World Bank: <https://data.worldbank.org/data-catalog/world-development-indicators>
- Ulaşan, B. (2015). Trade openness and economic growth: Panel evidence. *Applied Economics Letters*, 163-167.
- Usman, O. (2011). Performance evaluation of foreign trade and economic growth in Nigeria. *Research Journal of Finance and Accounting*, 1-15.
- Vamvakidis, A. (2002). How robust is the growth-openness connection: Historical evidence. *Journal of Economic Growth*, 57-80.
- Vlastou, I. (2010). Forcing Africa to open up to trade: Is it worth it? *The Journal of Developing Areas*, 25-39.
- Wong, Y. (2015, May 15). IMF-MIT Study Shows How Financial Inclusion Drives Economic Growth. Retrieved July 27, 2018, from Mastercard Center for Inclusive Growth: <https://mastercardcenter.org/insights/imf-mit-study-shows-financial-inclusion-drives-economic-growth/>
- Zahonogo, P. (2017). Trade and economic growth in developing countries: Evidence from sub-Saharan Africa. *Journal of African Trade*, 41-56.