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The Impact of Import Flows and Trade Regime on Economic Growth: A Granger Causality Investigation on Zambia (1970-2015)

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Abstract

The comparative advantage theory still remains one of the most applicable theories in international trade. Through international trade, countries have recorded increased economic growth and welfare through the flow of imports and exports. However, this flow of trade has not been without challenges resulting in governments implementing trade controls. It has, however, been argued that such controls will constrain growth due to lack of flow of technology and capital. This study was, therefore, aimed at investigating the causal relationship between import and economic growth using trade liberalization as a dummy variable. Using time series data from 1970 to 2015 and Johansen Cointegration, the study found the variables to be cointegrated. The Granger Causality test found unidirectional causality from imports to economic growth and from trade liberalization to imports. The study concluded that the Import-Led Growth model is vital to Zambia's economic growth as the country is still in its infancy.

Keywords: Trade Regime, Granger Causality, VECM, Economic growth, Imports.

INTRODUCTION

Internation trade brings with it both costs and benefits. According to the comparative theory of trade, international trade brings about gains in trade that include increased economic growth due to increased income of factors, increased consumption beyond the level of the country's production potential and improved production efficiencies, competition and specialisation as observed by Gupta [1]. The focus of trade is thus, the derivation of maximum gains from trade. If trade is to be modelled as a utility function, such a utility function will include gains from imports and gains from exports.

Apparently, countries adopt either an Export-Led Growth (ELG) strategy or an Import-Led Growth (ILG) Strategy. The emphasis on export-led strategy is in line with the export promotion strategy in which many economists believe that an export-oriented country is more likely to improve its economic welfare. Shihab & Abdul-Khaliq [2] observes that export of goods and services is one of the most important sources of foreign exchange earnings that ease the pressure on the balance of payments and create employment opportunities. According to the Neo-classical economists' view on trade, there is a strong association between trade expansion and economic growth. They further argued that export growth is the main driver of economic growth and Helpman & Krugman [3] posit that export growth expedites economic growth through economies of scale, specialization in production and dissemination of technical knowledge. It is for this reason among many other reasons that economies especially the developing economies tend to promote export and achieve a positive balance of trade. The importance of export-oriented strategy cannot be overemphasised as growth in exports overcomes the Balance of payment problems which may be exacerbated by the growing propensity to import. According to Easterly [4], exports help entry to the international market and expansion of the manufacturing sector and in addition, they boost economic efficiency through better allocation of resources thereby promoting economic growth in the long run and Bakari & Mabrouki [5] adds that exports of goods and services are seen as an engine of economic and social development for a number of reasons, including exports that require companies to innovate and improve to maintain market share.

The other facet of international trade is import. Arguably, no country will want to be an import-dependent. However, it is a phenomenon that trade has to flow in both directions, that is; in the country as import and out of the country as export. According to the law of comparative advantage, trade should be mutually beneficial to any two countries considering trade. While, most countries emphasise exports promotion, some other emphasis imports substitution. However, imports still remain rife for many countries owing to a number of factors that include; resource endowment, technological advantage and in somewhat way, absolute advantage of one nation over the other. Katircioglu & Katircioglu [6] note that since the economy of small islands is based on a few sectors, their export capacity is quite limited; therefore, the island economies heavily depend on imports of goods and services from abroad. Although very few economies emphasis Import-led strategy, the importance of imports to any country cannot be overemphasised. Recent endogenous growth models according to Ugur [7] have emphasized the importance of imports as an important channel for foreign technology and knowledge to flow into the domestic economy. The new technology is seen alive in imports of capital and intermediate goods such as machines and labour productivity which could increase over time as workers acquire the knowledge to unbundle this new embedded technology. Imports also help in generating economic efficiency as well as price stability. It is through import that competitiveness is enhanced which in turn is expected to improve the general economic welfare in the country. Liu *et al*. [8] add that imports play a central role in the countries whose manufacturing base is built on export-oriented industries. Hanson [9] on Import-led growth hypothesis exemplifies the role of imports by supposing a socialist economy that first imports capital goods and develops industrial infrastructure and then promotes economic growth. In this case, the amount of capital goods that a socialist country can import limits its achievable rate of economic growth.

Conversely, the effect of dependency on imports cannot, however, be ignored. As noted by Bakari & Mabrouki [5], imports generally reflect the weakness of the state in achieving its needs itself and makes them dependent and at the mercy of foreign countries. He furthered that imports unlike exports, lead to the exit of the local currency and weaken the trade balance, thereby weakening economic growth. A country that tends to rely heavily on imports is more likely to impede its own growth unless the import of such goods is for capital and technology use. The problem however that faces many developing countries is the substantial importation of final consumer goods which may result in deterioration of the home manufacturing industries and subsequently contracted national output.

Zambia is among many countries that remain highly import-dependent. For this reason, Zambia's economy is seen to be adversely affected by exchange rate volatility. While currency depreciated is seen as the tool to boost export, and hence boosting economic growth, this may not be the case in Zambia as the country is import dependent. The results mainly have been induced inflation in the country and a deteriorating balance of payment. Such adverse effects may negate growth trajectories thereby inhibiting the country's capacity to expand its GDP. On the other hand, it is understood that countries with a higher marginal propensity to import tend to switch to imported goods as the economy grows thereby decelerating the growth potential of the local economy.

In trying to achieve the balance between export growth and import demand, the government has employed two trade regimes since independence. The first being the controlled trade of the UNIP era and the other one being the liberalised trade of the MMD regime. According to Samuelson as cited in Dwivedi [10], free trade promotes a mutually profitable regional division of labour, enhances the potential real national product of the nations and makes possible higher standards of living of people world over. On the other hand, the gains from free trade have been questioned as various empirical findings including Welmesfelder in Dwivedi [10] on Germany which found that Germany gained by less than 1% of the national income through free trade leading to a conclusion by Kindleberger [11] that "it is reasonable to believe in the doctrine of free trade but unreasonable to be doctrinaire about it".

In Zambia, the extent to which these two trade regimes have impacted on trade growth and subsequently on economic growth in the past five decades can only be speculative as currently, there is lack of empirical evidence. Thus, this paper employs an empirical investigation to ascertain the causal relationship between imports and Economic growth. This study is aimed at contributing significant empirical evidence to policy formulation on the role of imports in economic development.

LITERATURE REVIEW

Various studies have been undertaken on the relationship between imports and economic growth. This section, therefore, reviews such studies both as theoretical and empirical literature.

THEORETICAL LITERATURE

The starting point in understanding the relationship between imports and economic growth is a look at the neoclassical model. The neoclassical model in Kim *et al*. [12] asserts that under perfect competition, when trade barriers are removed and then market is opened up to imports, an industry reduces factor usage in the short run. However, in the

long run, the industry becomes more productive and competitive, and expands its investments in new technology, resulting in a rightward shift of the industry supply curve. The model asserts further that, under imperfect competition, an import-substituting domestic market shrinks as imports increase, causing disinvestment and thereby reducing productivity. Furthermore, higher future expected profits lead to more active research and development (R&D) investment and innovation efforts, and such R&D may be greater for exporting firms than for import-substituting firms in light of the large impact of market opening. Grossman & Helpman [13] adds that imports of capital goods and intermediate goods that cannot be produced domestically enable domestic firms to diversify and specialize and further enhancing their productivity.

According to the Endogenous model, imports can be a channel for long-run economic growth as it provides domestic firms with access to the much needed intermediate and foreign technology [3]. According to Lawrence & Weistein [14], growth in imports can serve as a medium for the transfer of growth-enhancing foreign R&D knowledge from developed to developing countries. Thus, growth in imports has the potential to grow the economy.

The standard trade model in Soumaya & Wilson [15] summaries that economic growth is usually biased. Growth that is export-biased worsens the terms of trade while the economy that is import-biased improves the terms of trade. They added that international transfers of income may affect a country's terms of trade, depending if they shift the world relative demand curve. Import tariffs and export subsidies affect both relative supply and demand. The terms of trade effects of an export subsidy hurt the exporting country and benefit the rest of the world, while those of a tariff do the reverse [15].

According to Chang *et al*. [16] the relationship between imports and economic growth is quite complex as imports are expected to improve the productive efficiency of domestic import-substituting firms through innovation and restructuring which in turn enhances the performance of the economy. This view endorses the Import-led hypothesis that suggests economic growth could be driven primarily by growth in imports.

Additionally, the Specific Factors and Income Distribution Model according to Soumaya & Wilson [15], suggests that the gains from trade are bigger in the export sector of every country and smaller in the sector competed by imports. This model provides insights into the meaning of economic efficiency, how complex economies simultaneously determine prices and quantities (and that it is relative prices that matter) and how changes in demand conditions or technology can affect income distributions among owners of factors of production.

The Keynesian income determination model posits that growth in imports above exports will lead to reduced national income. In his model, Keynes made net export (export minus imports) as one of the determinants of the national income which is the Gross Domestic Product (GDP). The other factors being Consumption (C), Investment (I) and Government spending(G) as shown in the equation below

$$\boldsymbol{Y = C + I + G + (X - M)}\text{.....(1)}$$

From the income identity above, Uslu [17] observes that there should be some facts beyond the simple GDP equation that lead to a positive relationship between the GDP and imports. He adds that firstly, similar to the export sectors, increase in domestic competition due to the imports may stimulate domestic firms to increase quality, making these firms competitive in the global competition. Secondly, attaining high-quality raw materials and intermediate goods may increase the factor productivity in domestic sectors[17]. Thus, even if imports outweigh the export, income is expected to rise through the reserve impact on the domestic productivity.

EMPIRICAL LITERATURE

A number of empirical studies have been undertaken to understand the long run relationship between imports and economic growth. These are reviewed below.

Ugur [7] analysed empirically the relationship between imports and economic growth in Turkey where import was decomposed to its categories and then a multivariate VAR analysis was used to determine the relationship. Using quarterly time series data from 1994:1 to 2005:4 on real GDP, real export, real aggregate imports, real investment goods import, real raw material import, real consumption goods import and real other goods import which variables are deflated by producer price index (PPI), the study found a bidirectional causality between Imports and GDP. The study further found that while there is a bidirectional relationship between GDP and investment goods import and raw materials import, there is a unidirectional relationship between GDP and consumption goods import and other goods import.

Another study by Saaed & Hussain [18] on causality relationship between Exports, Imports and Economic growth on Jordan, employed cointegration, VECM and Granger causality tests on annual times series data from 1977 to 2012 found evidence of cointegration and the causality test found a causal relationship between the variables under examination. They concluded that the Jordan GDP was Import-led as the causal nexus was unidirectional from Imports to GDP and not vice versa

Similarly, Kim *et al*.[12] in their study on whether imports could be beneficial for economic growth, found that imports have a significant positive effect on productivity growth but exports do not and further, the study revealed that the productivity-enhancing impact of imports was due to competitive pressures arising from consumer goods imports and technological transfers embodied in capital goods imports from developed countries. They concluded that while there is still a widespread philosophical tendency in Korea and East Asia to view exports as beneficial and imports as harmful, imports have a significant positive impact on productivity growth and hence economic growth as they can promote productivity by promoting both competition and adoption of advanced technology. Thus, such a view is misguided.

In order to ascertain the trade-led hypothesis, Hye *et al*.[19] employed an ARDL for long-run relationship and the Granger causality on the direction of causality using annual data from 1970 to 2009 on Pakistan and Bangladesh, 1960 to 2009 on India and Sri Lanka, 1965 to 2009 on Nepal and 1981 to 2009 on Bhutan. The ARDL on all the countries showed the existence of the long run relationship between the variables while the Granger causality found that in Bangladesh, only exports cause economic growth and that in the long run, export cause imports while in the short run, imports cause exports. On Bhutan and India, the study found bidirectional causality between economic growth and exports; economic growth and imports; and exports and imports in the long run. For Nepal, the study found unidirectional causality from exports to economic growth, and bidirectional causality between imports and economic growth in the long run. For Pakistan, in the long run, there was empirical evidence of unidirectional causality from economic growth to exports and bi-directional causality between economic growth and imports and lastly bidirectional long-run causality from export-growth and import-growth was found for Sri Lanka and unidirectional causality from exports to imports in the long run. They concluded that the Export-Led Growth (ELG) model was relevant for all countries except Pakistan; while the Import-Led Growth (ILG) model was relevant for all six Asian countries. The growth-Led Export (GLE) model was relevant for all countries except Bangladesh and Nepal while Growth-Led Import (GLI) model was relevant for all the countries.

A related study by Ashraf *et al*. [20] analysed the causal relationship between imports and economic growth for Pakistan on disaggregated imports over the period 1970-2008. The results of Granger Causality technique strongly supported a bi-directional causality between chemicals imports to the gross domestic product (GDP) and machinery imports to the gross domestic product (GDP). However, neither food imports cause GDP nor GDP caused food imports. They concluded that at aggregate level there is a bi-directional causality between imports and growth. They further recommended that a careful policy should be adopted about the imports of those goods (raw materials) which are necessary for the production in the domestic industries and which have a positive impact on the economic growth.

Bakari & Mabrouki [5] conducted their study on the impact of exports and imports on economic growth using annual data from 1980 to 2015. Using Johansen co-integration of Vector Auto Regression Model and the Granger-Causality tests, the result found no relationship between exports, imports and economic growth in Panama. On the other hand, the study found strong bidirectional causality from imports to economic growth and from exports to economic growth. The results from Bakari & Mabrouki [5] are consistent with Ugur [7] on bidirectional causality which results were also consistent with the ILG and the GLI hypothesis studied by Hye *et al*. [19].

Also, Moyo & Mapfumo [21] investigated the causal relationship between imports and economic growth in Zimbabwe using cointegration and Granger Causality tests on time series data from 1975 to 2013. The results found no evidence of cointegration. However, the causality test found that imports Granger caused economic growth though this was a weak evidence which only stood at 10% level of significance. The study further revealed that GDP does not cause imports. Thus, there is no bidirectional causality between imports and economic growth. They observed that absence of evidence for Cointegration between the two macroeconomic variables under concern, suggests that economic growth does not create incomes to be spent on imports in the long run as it would be expected for a developing country like Zimbabwe. Expansion of imports could be influenced by other factors rather than economic growth in Zimbabwe.

Uslu [17] undertook the study of Cointegration and causality between Turkish, imports and GDP on quarterly data from 1998 to 2014. The study found Cointegration between the variables and thus, the VECM and Granger causality was employed. The study found a bi-directional Granger causality between imports and GDP since statistics in the F-statistics' both equations were significant at 5%. However, in the short run, the coefficients on Error Correction Terms

were not significant in both equations indicating that there is no Granger causality between imports and GDP. He concluded that causality only occurred in the long run and not in the short run.

Accordingly, Saaed & Hussain [18] on the impact of exports and imports on the economic growth of Tunis employed the Johansen and Juselius Cointegration test to determine the presence or otherwise of a Cointegrating vector in the variables and the Granger causality to determine the direction of causality among the variables, at least in the short run on time series data from 1977 to 2012. The results of Cointegration test found that GDP, export and import were cointegrated, indicating an existence of long-run equilibrium relationship between all the variables under study while the Granger causality test confirmed the presence of unidirectional causality between GDP to imports and between export and import, but not the other way. They concluded that there is evidence that growth in Tunisia was propelled by a growth -led import strategy as well as export-led growth and that Imports are seen as the source of economic growth in Tunisia. These results were consistent with the study by Hye *et al*. [19] on Nepal.

And Hussain [22] on causality test of imports, exports and economic growth used both cointegration and Granger causality test and the results found no cointegration and the casuality test found that exports and imports Granger cause GDP. The study further found that there was a bidirectional causality between export and GDP however, there was no significant causality between exports and imports. They concluded that the discovery of a growth-led increase in exports suggests that the growth in Pakistan's economy will help increase exports and provide more products to meet domestic demand. That is, growth in GDP will cause an increase in exports.

Another study on trade openness and economic growth by Karahasan [23] found the absence of Cointegration relationship between variables. The causality tests found that there was no causality between imports and economic growth and on the other hand, the study found that exports and trade volumes separately have a two-way causality with the GDP. They concluded that though the effects of openness on economic growth is proved to be effective over various channels such as increasing transfer of goods and services to accelerate demand and supply based linkages in production, there other motives underlying the impact of growth on international flows.

From the above literature, we conclude that there is strong evidence of nexus between the variables economic growth, import and export and that their direction differs from country to country.

THEORETICAL FRAMEWORK

Most of these studies have confirmed empirically the existence of causality between import and economic growth either as bidirectional or unidirectional. However, these studies have not captured trade regimes as one of the variables that can influence international trade. Thus, this study incorporates trade regime as a dummy variable to account for variations in trade regimes experienced in Zambia and adopts a modified theory of Import-Led Growth which assumes that growth in imports will lead to expanded GDP taking into account trade openness. This can be expressed as;

$$GDP = f(IMP, TL) \quad \text{(2)}$$

From the mathematical expression above, an economic model of the logged variables is established as follows;

$$LGDP = \beta_0 + \beta_1 LIMP + \beta_2 DTL \quad \text{(3)}$$

Where;

LGDP is the log of variable economic growth as measured by the Gross Domestic Product, LIMP is the log of variable imports as measured by the annual value of imports

DTL is dummy variable Trade Regime where D=0 if the trade regime is controlled (restricted) and D=1 if the trade regime is liberalised (open)

β_0 is the constant coefficient and β_1,and β_2 are slope coefficients of the variables imports and trade regime

Empirical analysis

Methodology and data

The main objective of this study was to investigate the causal relationship between imports and economic growth incorporating the dummy variable trade regime on annual data from 1970 to 2015 obtained from the World Bank statistics. The first step in our analysis was to test for stationarity. Stationarity according to Gujarati [24] implies that the mean and variance are constant over time, and the covariance between two periods depends only on the lag between the two time periods and not the actual time at which the covariance is computed. The study adopted the ADF and the PP test

of stationarity. Upon establishing the order of integration, the next step was to establish the optimal lag length and finally conduct the Cointegration test. The procedure requires that if variables are cointegrated, then VECM is adopted and if no Cointegration, VAR is used. After Cointegration test, the next step was the Granger causality test in accordance with Granger [25]. Having tested for Granger causality, the next procedure is to conduct diagnostic tests on the results obtained. The essence of the diagnostic tests is to cure for undesirable outcome and conclusions.

EMPIRICAL RESULTS

ADF UNIT ROOT TEST

To determine the order of integration, the ADF unit root test was carried out on variables. The unit root test equation follows that;

$$Y_t = \rho Y_{t-1} + U_t \ldots\ldots (4)$$

Where if $\rho = 1$, it is unit root and nonstationary and subtracting Y_{t-1} which is the lag of the variable from both sides yields the first difference of that variable whose equation is given by;

$$\Delta Y_t = (\rho - 1) Y_{t-1} + U_t \ldots\ldots (5)$$

The null hypothesis underlying unit root testing is that the variable under investigation has a unit root ($\rho = 1$) against the alternative hypothesis that it does not have a unit root ($\rho \neq 1$) and thus stationary [24]. The results of the unit root test at 5% for variables used in the analysis in their logged form are reported in Table below.

Table-1: Adf and Pp Unit Root Test

	ADFt-st @Level	CV @Lvl	ADFtst @ 1st D	CV @1stD	PPt-st @Lvl	CV @Lvl	PPt-st @1stD	CV @Lvl	Remarks
LGDP	1.823	-3.52	-6.919	-3.521	1.476	-3.518	-6.911	-3.52	I(1)
LIMP	-0.5688	-3.52	-5.444	-3.521	-0.668	-3.518	-5.458	-3.52	I(1)
DTL	-2.000	-3.52	-6.398	-3.521	-2.050	-3.518	-6.398	-3.52	I(1)

The results of the stationarity test show that the variables exhibited unit root at level but became stationarity at first difference. It was therefore concluded that all the variables were integrated of the same order I(1).

LAG SELECTION

Before testing for Cointegration, it is required that an optimal lag is selected. This was done by the lag selection procedure. Under this procedure, a number of criteria are generated to which the optimal lag is that selected by the majority of the criterions. The results of the lag selection criterion are shown by the table below

Table-2: Optimal Lag Selection

VAR Lag Order Selection Criteria
Endogenous variables: LGDP LIMP
Exogenous variables: C DTL
Date: 08/16/18 Time: 21:52
Sample: 1970 2013
Included observations: 39

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-26.42377	NA	0.016320	1.560193	1.730815	1.621411
1	100.6164	228.0208*	2.97e-05	-4.749558	-4.408314*	-4.627123*
2	105.7591	8.703138	2.81e-05*	-4.808161*	-4.296296	-4.624508
3	107.5446	2.838395	3.17e-05	-4.694594	-4.012107	-4.449724
4	112.3041	7.078291	3.09e-05	-4.733545	-3.880436	-4.427457
5	112.9869	0.945411	3.72e-05	-4.563432	-3.539702	-4.196126

From the above table, the optimal lag selected by most criterions (SC and HQ) is lag 1. Thus, the Cointegration test adopts lag 1.

COINTEGRATION TEST

Cointegration is the existence of the long run equilibrium relationship between any two variables. According to Gujarati [24], if two or more time series are cointegrated, there exists a long-run equilibrium relationship between them. The Cointegration test was therefore undertaken to ascertain the long run equilibrium relationship between the variables. If the variables are found to be cointegrated, Vector Error Correction Model (VECM) is adopted in accordance with Engle & Granger [26] and if no Cointegration Vector Auto Regression (VAR) is adopted.

The results of Cointegration are summarised in the table below

Table-3: Johansen cointegration test results (trace test)

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.430634	23.65582	15.49471	0.0024
At most 1	2.10E-06	8.80E-05	3.841466	0.9932

Table-4: Johansen cointegration test results (rank test)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.430634	23.65573	14.26460	0.0013
At most 1	2.10E-06	8.80E-05	3.841466	0.9932

From the results of both the trace test and the Rank test of Max-Eigen Value, Cointegration was found as the null hypothesis of no Cointegrating equation was rejected by both tests. This means that there exists a long-run equilibrium relationship between the variables and in accordance with Engle & Granger [26], VECM was adopted.

The VECM Cointegration results are presented below

Table-5: Vecm Estimate

Dependent Variable: D(LGDP)
Method: Least Squares (Gauss-Newton / Marquardt steps)
Date: 08/19/18 Time: 20:57
Sample (adjusted): 1972 2013
Included observations: 42 after adjustments
D(LGDP) = C(1)*(LGDP(-1) - 0.799310876729*LIMP(-1) - 6.35816513417)
+ C(2)*D(LGDP(-1)) + C(3)*D(LIMP(-1)) + C(4) + C(5)*DTL

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.047989	0.009080	-5.284977	0.0000
C(2)	-0.440771	0.137581	-3.203711	0.0028
C(3)	0.053430	0.029576	1.806547	0.0790
C(4)	0.034988	0.007679	4.556495	0.0001
C(5)	0.011040	0.011482	0.961554	0.3425

R-squared	0.590783	Mean dependent var	0.031269
Adjusted R-squared	0.546543	S.D. dependent var	0.043277
S.E. of regression	0.029142	Akaike info criterion	-4.121906
Sum squared resid	0.031423	Schwarz criterion	-3.915040
Log likelihood	91.56002	Hannan-Quinn criter.	-4.046081
F-statistic	13.35413	Durbin-Watson stat	1.974587
Prob(F-statistic)	0.000001		

GRANGER CAUSALITY

According to Engle & Granger [26], there is always a risk of spurious regression if a Cointegration between variables is proven; however, although Cointegration may detect the existence of a long-run relationship, it is incapable in indicating the direction of the causal effect between these variables. Gujarati [24] adds that Granger causality test

assumes that the information relevant to the prediction of the respective variables Y and X is contained solely in the time series data on these variables. Although there could be Cointegration, the direction of causality remain unclear, thus, Granger causality test aimed at establishing the direction of causality. The causality equation for the estimated VECM is stated as below.

$$\Delta LGDP_t = \varphi + \rho ECT_{t-1} + \sum_{i=1}^{k} \alpha_i \Delta LIMPt_{-i} + \sum_{j=1}^{k} \beta_j \Delta LGDP_{t-j} + \gamma DTL_t + \mu_{1t} \ldots\ldots\ldots (6)$$

$$\Delta LIMP_t = \varphi + \rho ECT_{t-1} + \sum_{i=1}^{k} \lambda_i \Delta LIMP_{t-1} + \sum_{j=1}^{k} \delta_j \Delta LGDP_{t-j} + \gamma DTL_t + \mu_{2t} \ldots\ldots\ldots (7)$$

The equations above were used to determine causality. Uslu [17] adds that in addition to determining the direction of the causality, such equations may also be used to distinguish the short run and the long-run relations between these variables. The Vector Error Correction Model-granger causality results are represented below

Table-6: Granger Causality Test Results

Pairwise Granger Causality Tests
Date: 08/19/18 Time: 21:10
Sample: 1970 2013
Lags: 1

Null Hypothesis:	Obs	F-Statistic	Prob.
LIMP does not Granger Cause LGDP	43	8.84652	0.0050
LGDP does not Granger Cause LIMP		2.41658	0.1279
DTL does not Granger Cause LGDP	43	1.86083	0.1802
LGDP does not Granger Cause DTL		0.14067	0.7096
DTL does not Granger Cause LIMP	43	22.4510	3.E-05
LIMP does not Granger Cause DTL		0.45567	0.5035

The null hypothesis under the Granger causality tests is that the independent variable does not cause the dependent variable. The decision rule under this test is that the null hypothesis is rejected if the probability value is significantly lower than the given level of significance. In this study, the level of significance taken is at 5%.

The results of the Granger causality test reject the null hypothesis that Import does not cause Economic growth. The results, however, could not reject the null hypothesis that economic growth does not cause Import. On trade liberalisation, the results could not reject the null hypothesis that trade liberalisation does not cause economic growth, however, the null hypothesis that trade liberalisation does not cause imports was rejected.

DIAGNOSTIC TESTS

Diagnostic tests are aimed at curing for spurious and misleading conclusions. These diagnostic tests also ensure that the developed model and conclusions thereof are in conformity to the classical linear regression assumptions. The results of the diagnostic tests are therefore presented below.

Table-7: Diagnostic Test Results

Test Type	Value	P-value
JB-Normality	0.6014	0.7403
White's Heteroscedasticity	0.5401	0.7445
Serial Correlation	0.0537	0.8179

Under the null hypothesis that the errors are not normally distributed, the results of the test reject the null hypothesis. Therefore, the errors were normally distributed as attested to by the p-value of 0.74 which is significantly higher than the JB statistic.

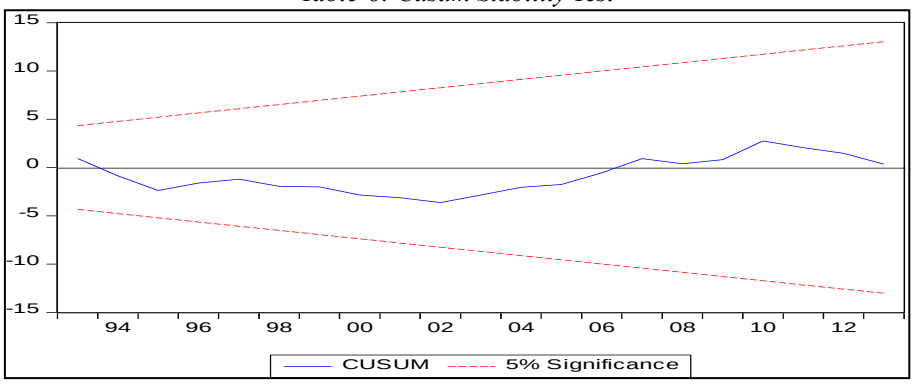
Under the null hypothesis that there is no heteroscedasticity (i.e. the errors are homoscedastic), it can be shown that sample size (n) times the R^2 obtained from the auxiliary regression asymptotically follows the chi-square distribution with df equal to the number of regressors (excluding the constant term) in the auxiliary regression. With P value equal to

0.7445 and critical value of 0.5401, the results of the heteroscedasticity test, therefore, cannot reject the null hypothesis. Thus, the errors are homoscedastic as required under the classical linear Regression according to[24].

The model was tested for autocorrelation using the LM serial correlation test. The results show that the null hypothesis of no serial correlation cannot be rejected based on an insignificant P value of 0.8179.

The last part of the diagnostic test was to test for model stability. The study adopted the Cumulative Sum (CUSUM) test. Under this test, the model is stable if the CUSUM line is within the 5% significance bounds. The results of the study found the model to be stable as shown by the figure below

Table-8: Cusum Stability Test



CONCLUSION

The aim of this study was to establish if there exist causality between imports and economics and if trade liberalisation can contribute to import and economic growth. The study found that while there was a long run equilibrium relationship between the variables, there was a one-way causality running from imports to economic growth and that trade liberalisation does cause imports. This means that when the country is open to trade, there is a tendency of an increased flow of imports which in turn triggers economic growth. Thus, this study found that the Import-Led Growth (ILG) hypothesis is significant to Zambia. It was therefore concluded that as a developing country, the growth in imports remains significant to catalyse economic growth through importation of capital and intermediate goods. However, what constitutes imports remains fundamental to stirring economic prosperity of the country.

POLICY IMPLICATION

The results of this study haveserious policy implications and as a result, attention must be paid to these results. The policy implications of this study include that;

The growth in imports is not growth in final consumables. This is this because the growth in final consumables will result is incapacitating the local manufacturing industry which will lead to mass job losses and threaten the balance of payments. In order to benefit from the import led growth strategy, the imported goods must be of capital in nature or intermediate goods. These class of imports will encourage investment in local industries and thereby growing the economy.

In order to manage and curtail dumping, final consumable imports should attract substantial tariffs. This will positively contribute to international earnings and thereby contribute to the economic growth of the country. These tariffs should not mean significant trade controls as this would threaten the flow of imports which would constrain economic growth or better still, there could be retaliation. However, trade openness should not mean laisse fair trade regime.

Disclaimer

This study is solely the work of this author. The data used was obtained from the World Bank Statistical data base and Index Mundi therefore, this author will not be held responsible for data that may be at variance with data from other sources.

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