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TRADE OPENNESS AND ECONOMIC GROWTH: EMPIRICAL EVIDENCE FROM LESOTHO

Malefa R. Malefane[1] and Nicholas M. Odhiambo[2]

Abstract

This paper examines the dynamic impact of trade openness on economic growth in Lesotho using the autoregressive distributed lag (ARDL) bounds testing approach. The study employs four indicators of trade openness, which include three trade-based proxies and an index of trade openness. The empirical results of this study show that trade openness has no significant impact on economic growth in both the short run and long run irrespective of which proxy of trade openness is used. These empirical results have important policy implications for Lesotho. Among others, this study suggests that the policymakers adopt policies aimed at boosting human capital and infrastructural development so that the economy grows to a threshold level required to reap the benefits of trade openness in its various forms. The policymakers should also pursue policies that enable the expansion in both international trade and economic growth, such that beneficial growth effects can be realized from trade with no exclusions.

Key words: Trade Openness, Economic Growth; ARDL; Exports; Imports; Lesotho

JEL Classification Code: C13; F43; 040

1. Introduction

Based on existing literature, an eminent debate on whether international trade influence economic growth is evident. In the view of some previous empirical studies, including Makun (2017), Singh (2011) and Karras (2003), trade openness has a significant and positive impact on long-run economic growth. This view is synonymous with the propositions of endogenous growth literature, according to which permanent changes in variables that are supposedly affected by government policy result in permanent changes in economic growth rates (Jones, 1995). In some cases, however, trade openness has a negative impact or no significant impact

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on economic growth (see Adhikary, 2011). According to Zahonogo (2017), in sub-Saharan African countries, trade openness has beneficial growth effects up to a certain threshold, beyond which the trade effect on growth declines. This argument seems to be more applicable to the least developed countries, of which Lesotho is not an exception.

Therefore, the empirical evidence from previous studies on the impact of trade openness and economic growth is mixed. Consequently, whether a country is a developed, developing or least developed country is essential in determining whether trade openness has a significant impact on economic growth. It is against this background that this study aims to examine the impact of trade openness on economic growth in Lesotho – a small, least developed country in Sub-Saharan Africa (SSA).

Lesotho is a relatively small landlocked economy, currently a member of the Southern African Customs Union (SACU) and a beneficiary to other regional and external trade agreements. Since its independence in 1966, Lesotho has pursued external trade dealings through the adoption of various strategic policies coordinated using development planning. Hence, development planning serves as a key instrument for coordinating medium-term development activities in Lesotho (Kingdom of Lesotho, 2000).

During the past decade, the country introduced new national development strategies, including Vision 2020, a poverty reduction strategy and a growth strategy. Most importantly, each of these strategies addresses trade-related issues differently. For instance, the Government of Lesotho adopted the poverty reduction strategy in 2004 as a first step towards implementing its Vision 2020 (Enhanced Integrated Framework, 2002). In particular, Lesotho's poverty reduction strategy identifies constraints to the country's trade and industry. Consequently, the strategy recommends the creation of an enabling environment through the formulation and monitoring of policies relevant to, among others, the role of trade in poverty reduction (see Kingdom of Lesotho, 2004, p. 25).

Overall, in recent decades, there have been marked developments in Lesotho's trade policy across different sectors. One of such developments was the trade liberalization in the agricultural sectors, which the country achieved through the removal of quantitative restrictions on whole grain, and the removal of the distortions caused by price fixing. In the manufacturing sector, the major development in trade policy relates the adoption of Lesotho's export and growth strategy. This adoption of the export and growth strategy has brought with it various elements that have shaped trade policy in the trade and industry sector. Among others, the

changes include the diversification of export products and markets, the removal of trade distortions and the preservation and maintenance of external competitiveness (WTO, 1998).

Even though Lesotho has made policy changes in order to open up its economy to international trade, evidence from this study shows that impact of trade openness on economic growth in the country is insignificant. Therefore, as a main contribution, this study demonstrates that when a country is least developed, increased trade openness can be associated with insignificant effects on economic growth. The second contribution of this study is that it questions the implementation of trade facilitation measures adopted by Lesotho in line with the 2002 SACU Agreement. This is because even though SACU countries have opened their economies further to international trade, some member countries like Lesotho still face insignificant growth effects from trade.

This paper is organised into five sections. The second section is the review of studies on trade openness and economic growth. The third section discusses the empirical model specification and estimation techniques. The fourth section analyzes and discusses the results. The fifth section concludes the paper with main policy implications and recommendations.

2. Literature review

Based on theories of international trade and existing empirical evidence, there is no clear consensus regarding the impact of trade openness on economic growth. According to Yanikkaya (2003), international trade theory provides little guidelines concerning the effects of international trade on economic growth and technical progress. Nevertheless, empirical evidence emerging from various studies shows that trade openness can have significant positive effects on economic growth in some cases or significant negative effects in other cases.

Evidence from two recent studies reveals this ambiguity in the impact of trade openness on economic growth. In the first study, Zahonogo (2017) employs a dynamic growth model to examine the impact of trade openness on economic growth in 42 Sub-Saharan African countries. The results show that there is a trade threshold below which increased trade openness has beneficial effects on economic growth and above which the trade effect on growth declines. In another recent study, Makun (2017) applies an extended Solow growth model to assess the impact of trade openness on economic growth in Malaysia. The results indicate that trade openness has a significant and positive impact on economic growth in Malaysia.

Karras (2003) examines the relationship between trade openness and economic growth in 56 economies for the period from 1950 to 1992 using the ratio of total trade to GDP as a measure of trade openness. The results show that a 10 percent increase in trade openness causes a 0.5 increase in the real growth rate of GDP per capita, which is an indication that trade openness has a positive impact on economic growth.

Employing the percentage share of trade in GDP as a measure of trade openness, Hassan (2005) investigates the relationship between trade openness and economic growth in Bangladesh over the period from 1974 to 2003. The results provide evidence that there exists a positive long-run equilibrium relationship between trade openness and economic growth, which is an indication that trade openness is beneficial to economic growth in Bangladesh.

Using an augmented Solow growth equation, Rao and Rao (2009) estimate the effects of trade openness on economic growth in Fiji and find that a 10 percent increase in trade openness causes a 2 percent increase in economic growth in Fiji. These results confirm the positive effect of trade openness on Fiji's economic growth.

Focusing on Ghana and Nigeria, Osabuohien (2003) analyses the impact of trade openness on economic performance using the ratio of trade to GDP as a proxy for the degree of trade openness for the period 1975 – 2004. The results reveal that trade openness had a positive impact on economic growth in both investigated countries, but with higher effects in Ghana than in Nigeria.

In another study on Ghana, Sakyi (2011) examines the impact of trade openness and foreign aid on economic growth using the share of exports and imports in GDP as a measure of trade openness. The results show that trade openness has a significant positive impact on economic growth in both the short run and the long run.

Awokuse (2008) focuses on the separate roles of exports and imports in a neoclassical growth framework to determine whether trade openness stimulates economic growth in Argentina, Columbia and Peru. The results provide strong evidence in support of growth effects of trade openness emanating from the imports and some modest evidence in favour of growth effects of trade openness emanating from the exports. This is an indication that trade openness contributes positively to economic growth in these three South American countries.

In another study employing the neoclassical growth framework, Singh (2011) examines the effects of trade on economic growth in Australia. The findings show that exports had positive

and significant growth-effects while the growth-effects of imports were found to be predominantly negative. This evidence indicates mixed evidence regarding the impact of trade openness on economic growth in Australia.

In a study investigating the long-run relationship between trade openness and economic growth in Pakistan and Turkey, Klasra (2011) uses the ratio of total trade to GDP as a measure of trade openness. The results confirm a positive long-run relationship between trade openness and economic growth in Pakistan, but not in Turkey.

Musila and Yiheyis (2015) investigate the impact of trade openness on economic growth in Kenya and find that trade openness has a positive effect on economic growth in Kenya, even though not significantly so. In another study, Hye and Lau (2015) examine the link between trade openness and economic growth in India using the trade openness index to measure the impact of trade openness on economic growth. The results show that trade openness has a positive impact on economic growth in the short run, but has a negative impact in the long run.

While a number of studies concluded that trade openness has a positive effect on economic growth, Adhikary (2011) finds that trade openness had a negative but diminishing influence on economic growth. Using the ratio of export and imports over GDP as a proxy for the degree of trade openness in Bangladesh for the period 1986 – 2008, the results revealed that there is a significant negative relationship between trade openness and economic growth.

Table 1 presents a summary of studies on trade openness and economic growth.

Table 1: A summary of selected studies on trade openness and economic growth

Study	**Region or country**	**Measure(s) of Trade Openness**	**Impact of Trade Openness on Economic Growth**
Zahonogo (2017)	42 Sub-Saharan African countries	Exports plus imports to GDP; Exports to GDP; Imports to GDP	Positive up to a threshold
Makun (2017)	Malaysia	Exports plus imports to GDP	Positive
Karras (2003)	56 countries	Exports plus imports to GDP	Positive
Hassan (2005)	Bangladesh	Exports plus imports to GDP	Positive
Rao and Rao (2009)	Fiji	Exports plus imports to GDP	Positive
Osabuohien (2007)	Ghana and Nigeria	Exports plus imports to GDP	Positive
Sakyi (2011)	Ghana	Exports plus imports to GDP	Positive

Awokuse (2008)	Argentina, Columbia and Peru	Real exports; Real imports	Positive
Klasra (2011)	Pakistan and Turkey	Exports plus imports to GDP	Positive
Singh (2011)	Australia	Exports; Imports	Significant positive effect from exports; significant negative effect from imports
Hye and Lau (2015)	India	Trade Openness Index	Positive in the short-run; Negative in the long-run
Adhikary (2011)	Bangladesh	Exports plus imports to GDP	Negative

3. Empirical model specification and estimation techniques

3.1 Empirical model specification

The empirical model testing the impact of trade openness and economic growth in this study is adapted from Jin (2000). This model is specified as follows:

$$GROWTH = (OPEN, INV/GDP, GOV/GDP, INFL, M2/GDP) \quad (1)$$

In equation 1, GROWTH is economic growth proxied by real GDP per capita growth rate; INV/GDP is the ratio of investment to GDP; GOV/GDP is the ratio of government consumption expenditure to GDP; INF is the inflation rate; M2/GDP is a measure of financial development; and OPEN is a measure of trade openness which is substituted systematically by OPEN1 in Model 1, OPEN2 in Model 2, OPEN3 in Model 3 and OPEN4 in Model 4; where OPEN1 is the ratio of exports and imports to GDP, OPEN2 is the ratio of exports to GDP , OPEN3 is the ratio of imports to GDP, and OPEN4 is the index of trade openness that takes into account the impact of trade openness on economic growth that results after taking the country size and geography into account.

The choice of the dependent variables for this study was driven by different factors, which include openness to international trade, investment, macroeconomic stability – proxied by inflation rate, financial stability, and government size. Trade openness, for instance, has been identified as one of the factors that influence economic growth. Bahmani-Oskooee and Niroomand (1999) affirm that there is a strong positive association between trade openness and economic growth. Their argument is that international trade serves as an engine of growth that could bring some positive effects in an economy when higher levels of openness to trade are realized. This association between trade openness and economic growth is further reinforced by policies that facilitate trade among countries (Karras, 2003). Thus, trade openness is expected to have a positive impact on economic growth.

Following Yanikkaya (2003) and Zahonogo (2017), this study includes three proxies of trade openness that are derived from trade-based indicators, namely, the ratio of exports and imports to GDP (OPEN1), the ratio of exports to GDP (OPEN2), and the ratio of imports to GDP(OPEN3). In addition to the three trade-based proxies of trade openness, this study also includes the fourth proxy, which is an index of trade openness that takes into account country size and geography. The trade openness index is derived from an ordinary least squares (OLS) regression in which trade openness, proxied by the ratio of exports and imports to GDP, is

regressed on variables capturing country size and geography (see also Frankel and Romer, 1999 and UNCTAD, 2012). In this OLS regression, country size is proxied by the population size and the real GDP per capita, while geography is proxied by the ratio of arable land to total land size. After the OLS estimation of the trade openness regression, the residuals from the regression are used as time series representing 'residual openness'. This residual openness is then used as a fourth proxy of trade openness (OPEN4).

Apart from trade openness, the other independent variable, investment, is also considered to be significant in the determination of economic growth. In Sub-Saharan Africa, in particular, investment has been found to be one of the factors that influence economic growth (Ghura and Hadjimichael, 1995). This study, therefore, expects investment to have a positive impact on economic growth.

Government consumption expenditure is another variable that has been used in this study. Although there is no unanimous conclusion on the effect of government consumption on economic growth, this variable has been included in other studies on trade openness and economic growth (see Eris and Ulasan, 2013; and Karras, 2003). One of the arguments relating to the role of government expenditure is that higher capital outlays tend to lead to more resilient economic growth, while higher current expenditures are associated with less favourable economic performance (Gupta *et al*., 2005). In another view, a larger government size is considered to be unfavourable to efficiency and economic growth (Ram, 1986). The expectation from the current study is that government consumption expenditure is either negatively or positively related to economic growth.

Inflation rate is also included in the empirical investigation of this study. The reason behind the inclusion of inflation rate in this study is that high inflation rate indicates macroeconomic uncertainties that are likely to cause a decline in economic growth (Eris and Ulasan, 2013). Moreover, evidence shows that in both fast-growing and slow-growing Sub-Saharan African countries, high inflation rates tend to exert a negative influence on economic growth (see Bittencourt *et al*, 2015). In this regard, the inflation rate is expected to be negatively related to economic growth.

This study also includes financial development as one of the explanatory variables. Theoretically, financial development is expected to have a positive impact on economic growth since financial intermediation may positively influence the steady-state economic growth (Akinboade, 1998). However, this is not always the case. For instance, in the presence of

information asymmetries that restrict access to short-term finance by small entrepreneurs, financial development, could be related negatively to economic growth (Bittencourt *et al,* 2015). In the current study, financial development is expected to have a positive impact on economic growth.

3.2 Estimation techniques

This study uses the Autoregressive Distributed Lag (ARDL) bounds testing approach to cointegration following Pesaran, Shin and Smith (2001). The ARDL specification of the empirical model specified in equation (1) can be expressed as:

$$\begin{aligned}\Delta GROWTH = \alpha_0 &+ \sum_{i=1}^{n} \beta_{1i} \Delta GROWTH_{t-i} + \sum_{i=0}^{n} \beta_{2i}\, \Delta OPEN_{t-i} + \sum_{i=0}^{n} \beta_{3i}\, \Delta INV/GDP_{t-i} \\ &+ \sum_{i=0}^{n} \beta_{4i}\, \Delta GOV/GDP_{t-i} + \sum_{i=0}^{n} \beta_{5i} \Delta INF_{t-i} + \sum_{i=o}^{n} \beta_{6i} \Delta M2/GDP_{t-i} + \lambda_1 GROWTH_{t-1} \\ &+ \lambda_2 OPEN_{t-1} + \lambda_3 INV/GDP_{t-1} + \lambda_4 GOV/GDP_{t-1} + \lambda_5 INF_{t-1} + \lambda_6 M2/GDP_{t-1} \\ &+ u_t \end{aligned} \quad (2)$$

In equation 2, α_0 is the constant term while $\beta_1 ... \beta_6$ are the short-run regression coefficients, $\lambda_1 ... \lambda_6$ are the long-run coefficients and ε_t is the error term.

In order to carry out the ARDL bounds testing procedure, there are two stages involved. The first stage involves the testing of cointegration relationship, whose purpose is to determine whether there exists a long-run relationship among the variables. Using the computed F-statistic, the null hypothesis of no cointegration is tested against the alternative hypothesis and the results are compared to the critical values tabulated in Pesaran and Pesaran (2001). This F-statistic has a non-standard distribution, irrespective of whether the regressors are integrated of order zero $I(0)$; or integrated of order one, $I(1)$ (Pesaran and Pesaran 2009, p.308). In the second stage of the ARDL bounds testing technique, the estimation of the coefficients of the long-run relationships as well as drawing inference on the values of the estimated coefficients is carried out. In this stage, the optimal lag length for the ARDL model is selected with the use

of suitable lag selection criteria such as the Akaike Information Criterion (AIC) or the Schwartz-Bayesian Criterion (SBC).

The ARDL bounds testing approach has a number of advantages, hence its adoption in this study. First, unlike other cointegration tests, the power of ARDL bounds test does not suffer in finite samples when invalid restrictions are imposed (Banerjee, Dorados and Mestre, 1998). Second, due to its finite sample properties, the ARDL bounds testing approach to cointegration performs better even in smaller samples (Tang, 2010). Third, the ARDL approach also allows for testing of the existence of a long-run relationship between the variables without requiring them to have the same order of integration. Thus, the underlying variables could be I(0), I(1)or fractionally cointegrated (Pesaran and Shin, 1999). Fourth, with the ARDL approach, the OLS estimators of short-run parameters converge to their true values at rate $\sqrt{T}$, where T represents the sample size (Bentzen and Engsted, 2001). Fifth, the ARDL approach corrects for possible endogeneity among the explanatory variables (Wolde-Rufael 2010: 53).

Following the cointegration test based on equation (2), the error correction model (ECM) can be expressed as:

$$\begin{aligned}\Delta GROWTH_t = \alpha_0 &+ \sum_{i=1}^{n} \alpha_{1i}\, \Delta GROWTH_{t-i} + \sum_{i=0}^{n} \alpha_{2i} \Delta OPEN_{t-i} + \sum_{i=0}^{n} \alpha_{3i} \Delta INV/GDP_{t-i} \\ &+ \sum_{i=0}^{n} \alpha_{4i} \Delta GOV/GDP_{t-i} + \sum_{i=0}^{n} \alpha_{5i} \Delta INF_{t-i} + \sum_{i=0}^{n} \alpha_{6i} \Delta M2/GDP_{t-i} + \varphi ECT_{t-1} \\ &+ \mu_t \end{aligned} \quad (3)$$

Where φ is the coefficient of the error correction term, capturing the long-run dynamics; ECT is the error-correction term; and μ_t is the residual error term. The validity of the error correction mechanism lies in the size and sign of the coefficient representing the speed of adjustment. To conform the existence of a long-run relationship among the variables, the coefficient of the error correction term (φ) is expected to be less than one, negative and statistically significant (Enders, 2004).

3.3 Data Sources

This study uses annual time series data covering the period from 1975 to 2014. The data was obtained from the World Bank World Development Indicators (World Bank, 2015). The following definitions are used: Economic growth is measured by the growth rate in real GDP per capita expressed in 2005 constant USD prices; trade openness is proxied by the ratio of exports and imports to GDP (OPEN1), the ratio of exports to GDP (OPEN2), the ratio of imports to GDP (OPEN3), trade openness index (OPEN4) derived from residuals of an OLS equation regressing the ratio of exports and imports to GDP on per capita GDP, country size and population aged 15-64; country size is proxied by arable land to total land size; investment is proxied by the share of gross fixed capital formation in GDP; government consumption is proxied by the share of final government consumption expenditure in GDP; inflation rate is proxied by the annual growth rate in the consumer price index; and financial development is proxied by the ratio of liquid liabilities (M2) to GDP.

4. Empirical results

The variables were first tested for the presence of unit roots. The results of the unit root tests made it possible to determine whether the variables are integrated of order zero or order one in order for the ARDL estimation to be carried out. This study employs three different tests to test for stationarity of the variables, which are the Dickey Fuller test with Generalized Least Squares (GLS) detrending, Phillip-Perron test, and the Perron (1997) test. The results are reported in Table 2.

Table 2: Stationarity tests for all variables

Variable	Dickey Fuller GLS				Phillip-Perron				Perron (1997)			
	In Levels		In First Difference		In Levels		In First Difference		In Levels		In First Difference	
	No trend	Trend	No trend	Trend	No trend	Trend	No trend	Trend	No trend	Trend	No trend	Trend
GROWTH	-2.790	-6.057***	-1.085	–	-4.768***	-5.920***	–	–	-4.596***	-5.391***	–	–
OPEN1	-2.195	-2.331	-5.607***	-6.392***	-2.337	-2.147	-6.625	-7.134***	-1.415	-2.645	-6.259***	-6.167***
OPEN2	-0.967	-1.730	-4.694***	-4.778***	-1.126	-1.877	-4.606***	-4.516***	-2.510	-2.979	-6.378***	-6.306***
OPEN3	-1.985	-2.745	-5.628***	-6.463***	-1.934	-2.568	-6.750***	-7.586***	-1.619	-1.925	-4.676***	-4.591***
OPEN4	-1.192	-1.415	-5.032***	-6.381***	-1.027	-0.522	-5.938***	-6.994***	-2.492	-2.639	-6.699***	-8.133***
INV/GDP	-1.184	-1.444	-4.984***	-5.394***	-1.335	-1.672	-5.277***	-5.236***	-2.614*	-2.613	–	-4.629***
GOV/GDP	-0.745	-1.965	-0.701	-4.727***	-1.701	-2.229	-6.248***	-6.536***	-4.596***	-5.391***	–	–
INFL	-4.607***	-4.587***	–	–	-3.756***	-4.274***	–	–	-1.415	-2.645	-6.259***	-6.167***
M2/GDP	-1.365	-2.102	-1.298	-2.081	-2.589	-3.2553**	-4.577***	–	-2.510	-2.979	-6.378***	-6.306***

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively

The stationarity test results reported in Table 2 show that depending on the type of the test, and on whether the trend is included or not, the variables are either stationary in levels or are stationary after first differencing. Following the stationarity test results, in which the variables were found to be integrated of order zero or order one, the ARDL bounds testing procedure was carried out. Table 3 presents the results of the ARDL bounds test for cointegration.

Table 3: ARDL Bounds Test Results

Equation	**Dependent Variable**	**Function**	**F-Statistic**
Equation 1	GROWTH	F(GROWTH | OPEN1, INV/GDP, GOV/GDP, INFL, M2/GDP)	18.239***
Equation 2	GROWTH	F(GROWTH | OPEN2, INV/GDP, GOV/GDP, INFL, M2/GDP)	13.328***
Equation 3	GROWTH	F(GROWTH | OPEN3, INV/GDP, GOV/GDP, INFL, M2/GDP)	17.862***
Equation 4	GROWTH	F(GROWTH | OPEN4, INV/GDP, GOV/GDP, INFL, M2/GDP)	16.706***

Asymptotic Critical Values						
Pesaran *et al*. (2001), p.300, Table CI(iii) Case III	1%		5%		10%	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
	3.41	4.68	2.62	3.79	2.26	3.35

Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively

The results of the ARDL bounds test for cointegration reported in Table 3 show that in all the four equations, the calculated F-statistic is higher than the critical value bounds at 1% level of statistical significance for Equations (1) – (4). These results lead to the rejection of the null hypothesis of no cointegration, leading to the conclusion that there is cointegration among the variables. Following the cointegration test, the estimation of the long-run and the short-run coefficients for the model was carried out. The optimal lag length was determined using the Schwartz Information Criterion (SIC). The SIC selected ARDL(2, 0 0, 1, 0, 2) for Equation 1; ARDL(2, 2, 0, 1, 2, 2) for Equation 2; ARDL(2, 2, 0, 1, 2, 2) for Equation 3; and ARDL(2, 0, 0, 2, 0, 2) for Equation 4. Table 4 reports the empirical results for the four equations employed in the empirical analysis of this study.

Table 4: Results of the long-run and short-run estimations of the ARDL

Panel 1: Long-run coefficients, Dependent variable is GROWTH								
	Equation 1		**Equation 2**		**Equation 3**		**Equation 4**	
Regressor	**Coefficient**	**Probability**	**Coefficient**	**Probability**	**Coefficient**	**Probability**	**Coefficient**	**Probability**
OPEN	0.007 (0.289)	0.775	0.034 (0.550)	0.587	0.003 (0.096)	0.925	–0.016 (–0.767)	0.451
INV/GDP	–0.019 (–0.673)	0.507	–0.003 (–0.083)	0.935	–0.020 (–0.774)	0.447	–1.032 (–1.286)	0.211
GOV/GDP	0.219** (2.559)	0.017	0.182 (1.679)	0.106	0.223** (2.498)	0.020	0.254*** (2.922)	0.008
INFL	0.104 (1.097)	0.284	0.0494 (0.972)	0.341	0.106 (1.114)	0.276	0.127 (1.428)	0.167
M2/GDP	0.134* (1.912)	0.068	0.147* (1.961)	0.062	0.132* (1.881)	0.072	0.139* (2.042)	0.053
C	–10.915 (–1.562)	0.131	–10.807* (–1.844)	0.078	–10.126 (–1.425)	0.167	–10.399* (– 1.967)	0.061
Panel 2: Short-run coefficients, Dependent variable is ΔGROWTH								
	Equation 1		**Equation 2**		**Equation 3**		**Equation 4**	
Regressor	**Coefficient**	**Probability**	**Coefficient**	**Probability**	**Coefficient**	**Probability**	**Coefficient**	**Probability**
ΔOPEN	0.006 (0.290)	0.774	0.030 (0.552)	0.589	0.003 (0.096)	0.924	0.038 (1.678)	0.105
ΔINV/GDP	–0.014 (–0.246)	0.808	–0.001 (–0.02)	0.999	–0.019 (–0.340)	0.736	–0.029 (–1.285)	0.210
ΔGOV/GDP	–0.148 (–1.404)	0.171	–0.154 (–1.467)	0.153	–0.149 (–1.400)	0.172	–0.117 (–1.161)	0.256
ΔINFL	–0.002 (–0.040)	0.968	–0.009 (0.163)	0.872	0.001 (0.003)	0.998	–0.008 (–0.159)	0.875

ΔM2/GDP	–0.063 (–0.514)	0.611	–0.058 (–0.478)	0.636	–0.066 (–0.540)	0.594	–0.120 (–0.961)	0.345
ECM(-1)	–0.890*** (–7.409)	0.000	–0.894*** (–7.537)	0.000	–0.892*** (–7.377)	0.000	–0.887*** (–7.817)	0.000
Test Statistic	**Equation 1**		**Equation 2**		**Equation 3**		**Equation 4**	
R-Squared	0.834		0.835		0.833		0.856	
R-Bar Squared	0.764		0.767		0.764		0.793	
F. Statistic	20.059[0.000]		20.279[0.000]		19.984[.000]		22.816[.000]	
RSS	93.456		92.610		93.748		80.848	
DW	2.723		2.758		2.232		2.586	
AIC	-77.850		-77.691		-77.905		-73.970	
SBC	-86.405		-86.245		-86.459		-82.365	

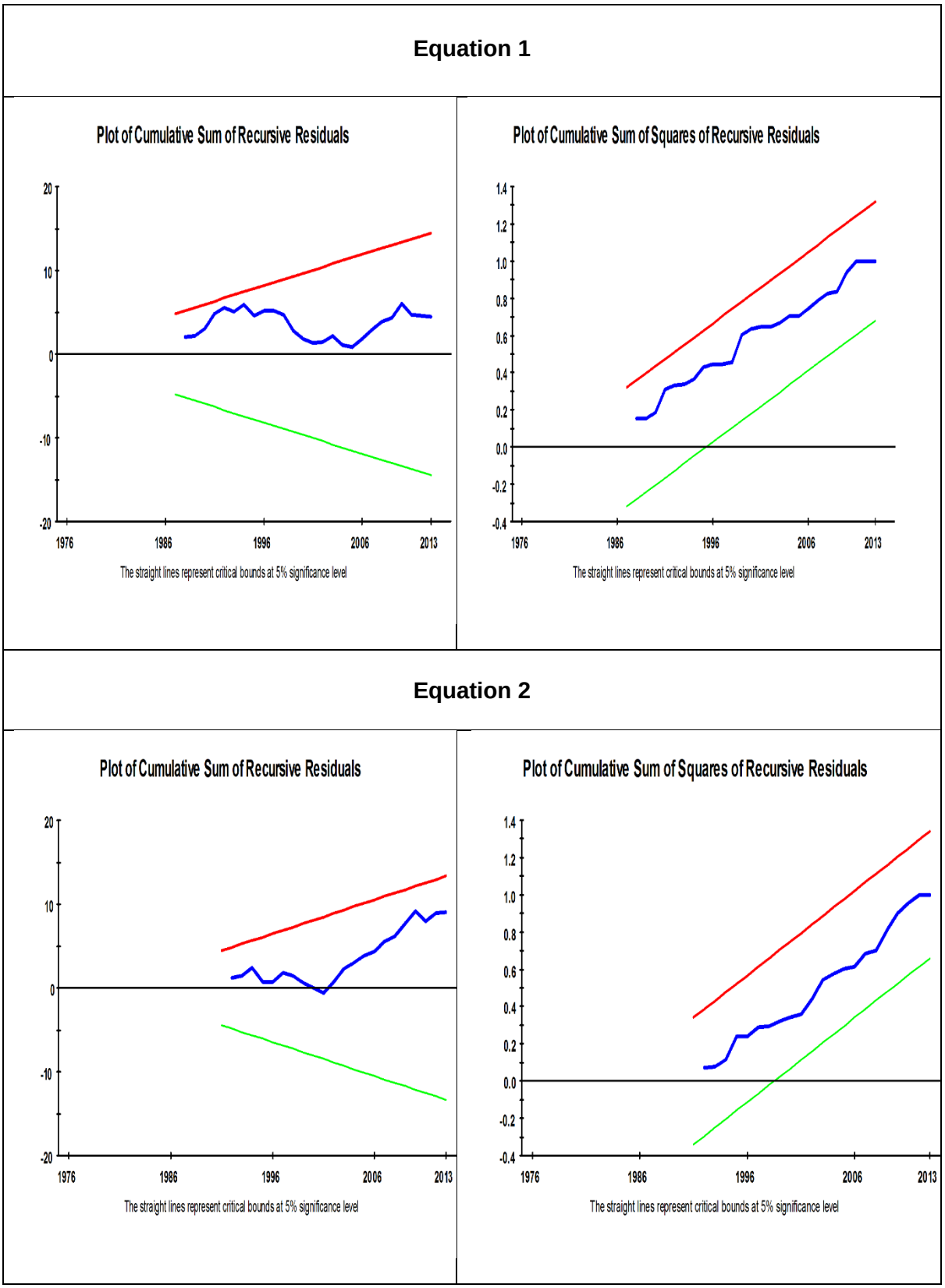
Note: *, ** and *** denote statistical significance at 10%, 5% and 1% levels respectively. T-ratios are in parentheses ( ).

The long-run results show that in all the four estimated equations, trade openness has no significant impact on economic growth in Lesotho. These empirical results are not surprising given that Lesotho is a least developed country (LDC). To some extent, these results are consistent with Young (1991). According to Young (1991), LDCs tend to experience dynamic losses from trade with respect to technical progress and economic growth. The main implication from these results, therefore, is that increased trade openness alone does not improve economic growth in Lesotho. However, among others, such as human capital, industrial and infrastructural development should be in place for the country to grow to a threshold level required to reap the benefits of trade openness. As Barnekow and Kulkarni (2017) point out, among others, factors such as high dependence on primary commodity exports and inadequate transport infrastructure impede growth in trade in Africa.

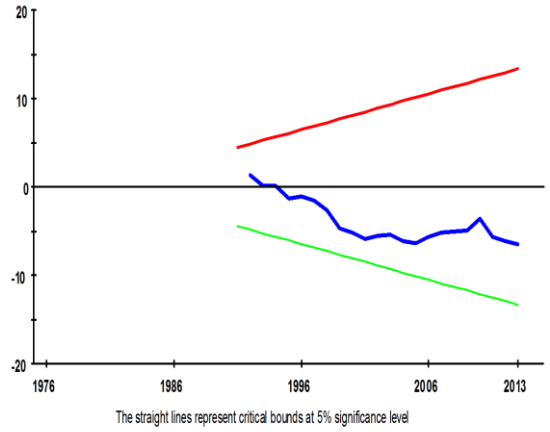
The long-run results also reveal that in almost all the estimated equations, the coefficients of government spending and financial development are positive and statistically significant. These results confirm the expectations of this study. Hence it can be concluded that expansions in government spending as well as increases in bank-based financial development support economic growth in Lesotho in the long run. In the short run, however, none of the explanatory variables has a statistically significant impact on economic growth. Other short-run results indicate that the lagged coefficient of the error correction term is negative and is statistically significant in all the four estimated equations. For each estimated equation, the ECM results show that economic growth rate adjusts to deviations from long-run equilibrium at a speed of adjustment given by the coefficient of the lagged error terms.

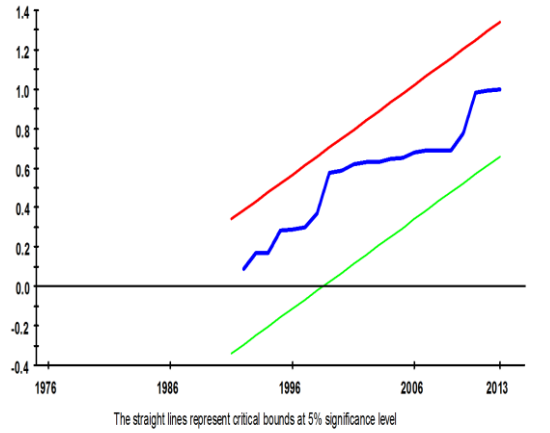
Following the estimation of the long-run and the short-run coefficients, the plots for cumulative sum of recursive residuals (CUSUM) and the plots for the cumulative sum of squared residuals (CUSUMQ) are examined. Figure 1 shows the CUSUM and CUSUMQ plots, which provide further insights on the stability of the Equation.

Figure 1: Plot of CUSUM and CUSUMQ

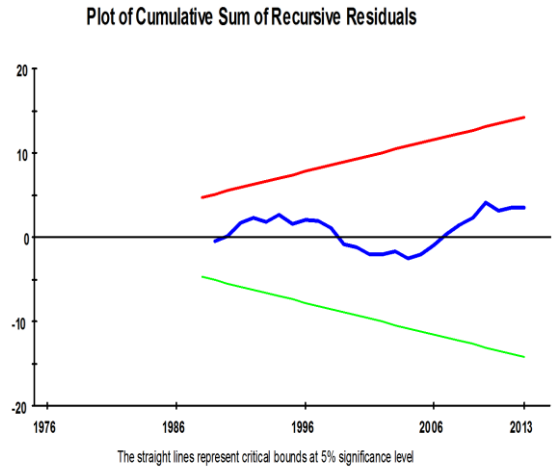


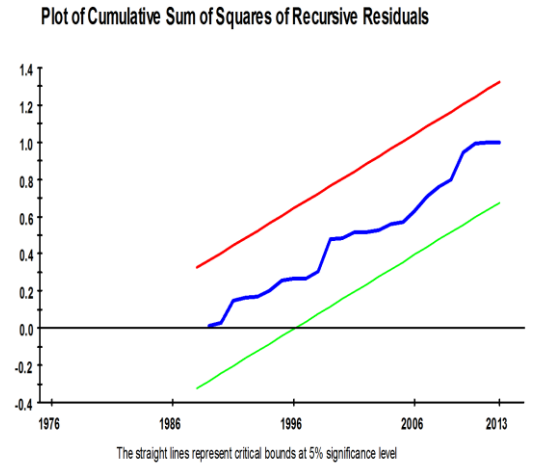
Equation 3





Equation 4





The plots for the cumulative sum of recursive residuals (CUSUM) are satisfactory. As displayed in Figure 1, the residual plots do not cross the boundaries at 5% level of significance. These residual plots indicate that there is stability in the parameters from the estimated ARDL models.

4. Concluding remarks

Lesotho is a small, landlocked economy in Southern Africa, categorized as a leas developed country (LDC). Like other economies in the Southern Africa Customs Union (SACU) region, Lesotho's total trade is largely influenced by its trade with the SACU countries, which jointly contribute a significant share in Lesotho's imports. This paper investigates the dynamic impact of trade openness on economic growth in Lesotho, using the ARDL modelling framework on data covering the period from 1979 to 2013. The study uses four equations, each equation employing a different proxy of trade openness.

The empirical results for all the four equations reveal that trade openness, measured by the ratio of exports plus imports to GDP and by the ratio of imports to GDP, has no significant impact on economic growth in Lesotho in both the short run and long run. These results, therefore, suggest that in the case of Lesotho, increased trade openness may not necessarily have growth effects as predicted. Zahonogo (2017) highlights that in Sub-Saharan African countries, there is a trade threshold below which greater trade openness has beneficial effects on economic growth and above which the trade effect on growth declines. This study therefore, questions the implementation of trade facilitation measures adopted by Lesotho in line with the 2002 SACU Agreement. This is because even though SACU countries have opened their economies further to international trade, some member countries like Lesotho still experience insignificant growth effects from trade openness.

Based on the results of this study, the main implication is that the policies adopted to enhance trade openness in Lesotho so far do not seem to be supporting economic growth in the country; hence, the policymakers need to revisit these policies. As a way forward, this study recommends that policymakers in Lesotho and in SACU area must ensure that the adopted policies enable the expansion in both international trade and economic growth, such that significant growth effects can be realized from trade with no exclusions. Among others, policies aimed at widening exports and improving industrial capacity should be targeted. In conclusion, the adopted policies should focus on boosting human capital and infrastructural development so that Lesotho's economy grows to a threshold level required to reap the benefits of trade openness in its various forms.

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