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The nexus between financial inclusion, trade and economic growth in Africa?

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ABSTRACT

Numerous studies have investigated the nexus between economic growth and financial inclusion, or between economic growth and trade openness. This paper advanced on earlier work and uses granger causality tests and cointegration techniques so as to establish whether there exists a long-run equilibrium relationship between all three variables in Africa using a panel of 30 African countries for the period 2004–2017. Study findings unveil a unidirectional causality relationship from economic growth to financial inclusion; from economic growth to trade in Africa. In particular, enhancing financial inclusion in the financial system promotes the trade-growth nexus. We recommended policy makers to concentrate on pro-growth policies so as to enhance financial inclusion which drives trade.

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1. Introduction

Based on existing literature, a well-known debate on whether financial inclusion and trade influence economic growth is evident. In the view of some previous empirical studies, trade and financial inclusion have a significant positive impact on economic growth in the long run (Alam & Sumon, 2020; Bayar & Gavriletea, 2018; Evans, 2017; Keho, 2017; Kim, Yu, & Hassan, 2018; Makun, 2017; Sethy & Sethi, 2018; Zahonogo, 2017). This view is in line with the propositions of endogenous growth literature, which posit that permanent changes in variables that are apparently affected by government policy result in permanent changes in economic growth rates. There are other studies, however, that argue that trade and financial inclusion have little or no impact on growth (Melefane & Odhiambo, 2019; Nkwede, 2015; Okoye, Erin, & Modebe, 2017). On the other hand, some studies concluded that the impact of trade and financial inclusion on economic growth is negative (Gour'ene & Mendy, 2017; Maune, 2018). Based on existing literature, therefore, there is no clear consensus regarding the impact of trade and financial inclusion on economic growth.

African leaders are in the process of establishing the African Continental Free Trade Area, an agreement which was signed by all countries on the African continent with the exception of Eritrea which is yet to sign. Under this agreement, trade will begin on 1 July 2020. Hence, the main objective of this study is to investigate the impact of financial inclusion and trade on economic growth in Africa. This can act as a parameter for assessing the effectiveness of the African Continental Free Trade agreement that is already effective in Africa.

This study contributes to literature as the results shed extra light on the nexus among economic growth, financial inclusion, and trade in African countries. This contribution is crucial as there exists mixed empirical results on the nature of the relationship between these variables. What also still remains unknown is whether financial inclusion is one of the channels through which trade influences economic growth in Africa? This study, therefore, seeks to answer this question. Also there are no empirical studies that have investigated the impact of financial inclusion on trade though theoretical literature point towards a positive relationship between the two.

Also the empirical results can provide policymakers with a better understanding of the dynamics between the three variables simultaneously. Section 2 of this paper constitutes literate review relevant to the study. Section 3

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explains data and econometric methodology used in the study. Section 4 examine the nexus among economic growth, financial inclusion, and trade. Finally, Section 5 concludes with policy implications and remarks.

2. Literature review

2.1. Trade and economic growth

The nexus between trade and economic growth has been theoretically controversial (Zahonogo, 2017). Theoretical foundations of the possible positive links between trade and economic growth come from two sources. First, the neo-classical approach attributes the gains of trade openness by comparative advantages. Second, the endogenous growth literature submits that in the long run, trade enhances economic growth through knowledge dissemination and technology diffusion (Keho, 2017). Conversely, some theories from the endogenous growth models hypothesise that trade openness may have a mixed effect on economic growth, contingent on whether the force of comparative advantage positions the economy's resources towards activities that generate long-run growth (e.g. by means of externalities in research and development) or whether they divert from such activities.

Several studies conclude a positive relationship between trade and economic growth (Abdullahi, Safiyanu, & Soja, 2016; Keho, 2017). Despite the theoretical predictions of a growth-enhancing effect of trade, recent developments indicate that trade is not always beneficial to economic growth (Zahonogo, 2017). Some studies found a weak or no relationship between the two variables (Fenira, 2015), others even found the relationship to be negative (Guei & Le Roux, 2019; Usman, 2011). Zahonogo (2017) further attest that the advantages of trade are however not automatic. Kim and Lin (2009) find a positive long run effect of trade on economic growth, though the effect varies with the level of economic development. Also Herzer (2013) finds a positive impact of trade for developed countries and a negative impact for developing ones. Other researchers found no causality between trade and economic growth (Musara, Gwaindepi, & Dhoro, 2014 and Ulaşan, 2015). Musara et al. (2014) asserts that nexus between trade and growth does not establish a causality relationship because economies trade more and become more open as they grow.

2.2. Financial inclusion and economic growth

Several studies have empirically examined the finance-growth nexus. However, evidence with regards to this nexus is mixed and inconclusive across countries and methodologies. Several studies conclude a positive impact of financial inclusion on economic growth (Sharma, 2016; Lenka & Sharma, 2017; Okoye et al., 2017; Iqbal & Sami, 2017). Some studies found a weak or no causality relationship between the two variables (Gour'ene & Mendy, 2017), others found the relationship to be even negative (Kim et al., 2018). Others found the relationship between financial inclusion and economic growth as bi-directional (Evans & Lawanson, 2017; Kim et al., 2018). Others have concluded that economic growth drives financial inclusion and not the other way (the demand-following hypothesis) (Babajide, Adegboye, & Omankhanlen, 2015; Evans, 2015).

3. The conceptual framework of the study

The study seeks to investigate the impact of financial inclusion and trade on economic growth in Africa for the first time in the panel form by applying panel causality test. The study tested the following three hypotheses relevant to the conceptual model.

- H1A, B: Financial Inclusion causes trade and vice-versa.
- H2A, B: Trade cause economic growth and vice-versa.
- H3A, B: Financial inclusion cause economic growth and vice-versa (Figure 1).

4. Data and methodology of the study

This study used annual data from the World Bank databases from 2004 to 2017 (World Bank, 2017). The study used variables namely, financial inclusion, trade and economic growth. World Bank defined financial inclusion as the process of ensuring easy accessibility to or usage of affordable financial services and products (transactions,

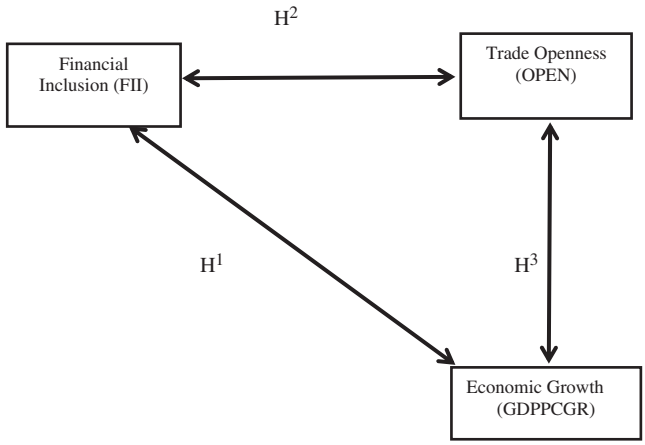

Figure 1. Conceptual framework and possible casualty.

credit, savings, payments, and insurance) that suits the necessities of businesses and individuals, conveyed in a viable and responsible manner (World Bank, 2017). Sarma (2008) has criticised several empirical studies (Evans, 2015; Sarma, 2012) for using single indicators to proxy financial inclusion. While addressing financial inclusion, we developed an index of financial inclusion considering five indicators of financial inclusion widely used in similar studies namely ATMs per 1000 km^2, bank branches per 1000 km^2, outstanding loans as a percentage to GDP, ATMs per 100,000 adults, bank branches per 100,000 adults. The study computed a new index of financial inclusion using the principal component analysis by combining the Sarma (2008) and Camara and Tuesta (2014) approaches to overcome the weaknesses of each methodology. The study also used trade openness (OPEN) to proxy trade, and gross domestic product per capita growth (GDPPCGR) to proxy economic growth in the estimation.

4.1. Unit root test

Before carrying out data analysis, there is need to test the presence of unit root by ascertaining the order of integration (Choi, 2001). For robustness, three-unit root tests were applied in-order to determine the variables order of integration. The study conducted three first generation panel unit root tests which assumes panel cross sectional independence; the Maddala and Wu-Fisher Chi-square using Augmented Dickey Fuller and Phillips and Perron tests (Maddala & Wu, 1999) and Im, Pesaran and Shin test (Im, Pesaran, & Shin, 2003). The ADF and PP tests have hitches of lower power in rejecting the null of a unit root (Liang & Teng, 2006; Luintel & Khan, 1999). The CIPS has large powers over the conventional unit root test; it is used per se to serve as complementary to the results of ADF and PP tests.

4.2. Diagnostic tests

For robustness, different diagnostic tests such as the lag length selection and stability tests were conducted to substantiate the optimal lag selection procedure carried out.

4.3. Cointegration test

The study tested for cointegration between trade, financial inclusion and economic growth before running the model, in order to discern the essentiality of an error correction term (Johansen, 1995; Johansen & Juselius, 2009; Phillips & Perron, 1988). The Johansen and Juselius (2009) maximum likelihood approach was used to perform the cointegration test: the maximal-eigenvalue statistic ($\lambda_{\max}$, (r, $r+1$) and the trace statistic (λ_{trace} (r)) given by:

$$\lambda_{max,}(\gamma,\ \gamma+1) = -\mathrm{T}\ \ln\ (1-\ \hat{\lambda}_{\gamma+1}) \tag{1}$$

Table 1. Descriptive Statistics.

Variable	FII	GDPPCGR	OPEN
Mean	0.188548	2.451822	76.77853
Maximum	0.900000	121.7795	225.0231
Minimum	0.010000	−62.37808	19.10080
Std. Dev.	0.188051	7.729124	35.26960
Skewness	1.811877	7.290531	1.308896
Kurtosis	6.050168	148.6538	5.457597
Probability	0.000000	0.000000	0.000000
Observations	420	420	420

Source: Author's computation based on The World Development Indicators Database (2018).

Table 2. Correlation of the Variables.

Variable	FII	GDPPCGR	OPEN
FII	1.000000	0.011808	0.580815
GDPPCGR	0.011808	1.000000	0.039518
OPEN	0.580815	0.039518	1.000000

Source: Author's Computation.

$$\left(\lambda_{trace}\left(\gamma\right)\right) = \quad -\mathrm{T}\sum_{i=r+1}^{n} ln(1-\hat{\lambda}_i) \tag{2}$$

Where $\hat{\lambda}_i$ is the estimated value of the ith ordered eigenvalue of matrix A and *r* represents the number of independent equilibrium relationships. The test concludes that there is a long-run relationship if the maximal-eigenvalue statistic and the trace statistic are greater than the critical values from Johansen and Juselius (2009).

4.4. Econometric methodology

Unlike most other studies, this study computed an index of financial inclusion which is comprehensive compared to other studies that used a single indicator to proxy financial inclusion. A dynamic pairwise Granger causality test was deployed to explore the nexus between trade, finance inclusion, and economic growth in Africa.

5. Results and discussion

5.1. Descriptive statistics

Table 1 presents a descriptive statistic of the data used in this study over 14 periods (2004–2017). We found that on average financial inclusion is very low (0.19) in Africa, and there exist severe financial inclusion disparities as portrayed by the maximum and minimum values of 0.9 and 0.01 respectively in line with Ndlovu (2017). Mean economic growth for African countries is 2.45% and on average the values range from −62% to 121% indicating a high disparity in economic performance. The average measure of trade hovers around 77% which signifies greater trade openness.

5.2. Correlations test

This study found a positive correlation between all the variables indicating no multicollinearity as shown by the correlation levels which are less than 75% (Table 2).

5.3. Unit root test

For the exploratory investigation, we performed panel unit root rest. The results of the unit root tests are shown in below, and they indicate stationarity (that is the absence of unit root) which was established at level-I (1). The results from Tables 3 and 4 respectively reveal that the study overwhelmingly reject the null hypothesis of a unit root in variables such as economic growth (GDPPCGR), financial inclusion (FII), and trade openness (OPEN). However, the non-stationary variables are stationary after first difference. Meanwhile, since all the three-unit roots tests indicate I (1) series, it is thus concluded that all variables are I (1) series.

Table 3. IPS, ADF and PP Unit Root Test @ I (0) Level.

	IPS		ADF		PP	
	Statistics	*p*-Value	Statistics	*p*-Value	Statistics	*p*-Value
GDPPCGR	−0.82270	0.2053	49.2592	0.5030	71.3228	0.0255
FII	0.01713	0.5068	63.5875	0.2862	112.125	0.0000
OPEN	−0.98544	0.1622	70.0792	0.1754	81.5332	0.0337

Table 4. IPS, ADF and PP Unit Root Test @ I (1) Level.

	IPS		ADF		PP	
	Statistics	*p*-Value	Statistics	*p*-Value	Statistics	*p*-Value
GDPPCGR	−3.42855	0.0003	103.611	0.0004	152.800	0.0000
FII	−5.07288	0.0000	124.820	0.0000	293.624	0.0000
OPEN	−5.50300	0.0000	129.610	0.0000	250.573	0.0000

Source: Author's calculations.

Table 5. Lag Length Selection Criteria.

VAR Lag Order Selection Criteria
Endogenous variables: FII GDPPCGR OPEN
Exogenous variables: C
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Sample: 2004–2017

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−200.521	NA	5737.61	22.31690	22.38786	22.34567
1	−144.475	100.924	105.5553	16.26083	16.61560	16.40468
2	−140.174	80.37205	101.2327	15.96860*	16.60719*	16.22752*
3	−137.559	43.81902	90.08234	15.88398	16.80639	16.25798
4	−134.062	51.61010	81.11653	15.74514	16.95136	16.23421
5	−133.259	20.85204	85.15989	15.79177	17.28182	16.39592
6	−132.185	19.07305	90.21676	15.84650	17.62036	16.56572
7	−131.822	14.03018	90.61056	15.93136	17.98904	16.76566
8	−130.065	27.37034*	91.31791	15.92294	18.26444	16.87232

*Indicates lag order selected by the criterion.

5.4. Diagnostic tests

5.4.1. Lag selection

Having ascertained the nature of stationarity between the variables under study, we proceeded to select the number of lags to use. Table 5 shows the results of the lag length selection criteria. Given the importance of lag length selection for granger causality tests (Canova & Ciccarelli, 2009), we carried out an optimum lag length selection criteria procedure and found two lags to be the optimal lag length based on the five most commonly used information criteria. Stock and Watson (2003) argues that using the optimum selection helps to achieve the best results as too few lags omits information that could result in a misspecified equation with the problem of autocorrelation while too many lags also pose the danger of wastage of degrees of freedom including increasing errors in the forecasts. The choice of the 2 lags by this study underscores the need for an accurate and more robust dynamics without necessarily overly shortening the estimation sample, which would compromise the degrees of confidence. According to Kutu and Ngalawa (2016), issues of serial correlation in the residuals are resolved with the right lag length selection.

5.4.2. Stability test

For robustness, the researcher also conducted diagnostic tests in the form of stability tests to see how good the model specifications are. The results indicate that the stability condition was satisfied as the entire eigenvalue lie inside the unit circle (see Appendix 4). As a result, the study concluded that granger causality test satisfies stability conditions.

5.5. Cointegration test

The panel of Johansen Fisher cointegration tests was employed to analyse the long-run relationship between trade openness, financial inclusion, and economic growth. The panel Johansen cointegration encompasses the

Table 6. Cointegration Test Results.

Date: 10/22/19 Time: 18:43
Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None*	0.388801	209.3961	47.85613	0.0000
At most 1*	0.112322	46.92630	29.79707	0.0002
At most 2	0.021919	7.607893	15.49471	0.5082
At most 3	0.000891	0.294257	3.841466	0.5875

*Denotes rejection of the hypothesis at the 0.05 level.
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level.
Source: Author's calculations.

maximum eigenvalue test and the trace test, which shows whether there exists a long-run relationship between the model variables. If the maximum Eigen and trace statistics are greater than the critical value at both 1% and 5%, then there exists cointegrating equation. Both tests indicate at most one cointegrating equation, implying the presence of a long-run relationship between the variables in the study (Table 6).

5.4. Granger causality test

One of the objectives of this study was to examine the direction of causation between financial inclusion and economic growth. Theoretically economic growth is expected to have a direct bearing on financial inclusion since it generates extra demand for financial services following demand from other economic agents including investors (Shan, Morris, & Sun, 2001). Economic growth also motivates private businesses and individuals to plan investments that enhance the need for financial services (see Babajide et al., 2015; Zang & Kim, 2007). Improved firms' performance infers an increased need for capital for expanding the business, meaning financial inclusion positively responds to economic growth. Private investors and individuals borrow from financial intermediaries to finance their investments as they seek to exploit available opportunities. The study found from the model estimated that GDPPCGR→ FII and the path is significant. Hence, the model suggests that economic growth granger cause financial inclusion in line with the 'growth-led finance' approach. The outcome is also in line with Evans (2015), who studied the linkage between economic growth and financial inclusion in Africa between 2005 and 2014 and found that economic growth unilaterally causes financial inclusion. Likewise, Evans and Alenoghena (2017) assessed the link between financial inclusion and economic growth for selected African countries using Bayesian VAR over the period 2005−2014 and concluded that there exists a unidirectional causality from economic growth to financial inclusion, hence supporting the demand-following hypothesis. This result appears counterintuitive given numerous empirical evidences that financial inclusion is key to economic growth. The direction of causality obtained in this study means that the low levels of financial inclusion in Africa have not granger cause economic growth in Africa. This is expected since the region is characterised by other intervening barriers which lead to higher levels of financial exclusion which is projected around 90% thereby not contributing to economic growth as expected. Tackling these barriers could significantly increase economic growth.

The study also sought to examine whether financial inclusion is a passage within which trade openness influences growth. The model reveals a significant relationship among financial inclusion, trade openness and economic growth, in which case financial inclusion influence the trade-growth nexus in the path FII → OPEN→GDPPCGR. While financial inclusion according to the estimation does not directly granger cause economic growth, we found an indirect causality from financial inclusion through trade openness to economic growth with the significant path, FII → OPEN → GDPPCGR. This is in line with Evans (2015) and Maune (2017) who suggest that financial inclusion exerts a significant effect on trade openness. This finding supports the implementation of the ACFTA which can accelerate intra-African trade thus boosting Africa's trading position in the global market as it strengthens Africa's policy space and common voice in global trade which also boosts economic growth. Financial inclusion empowers people to participate in the economy, and thus to trade. It is essential for business growth and is an imperative mechanism for transforming the informal to the formal. Small businesses, which are more likely to have a lack of access to credit, will be the growth engines for intra-African trade – particularly in a digital era. This works only if the small businesses are financially included. Similarly, financial inclusion is an important part of converting informal to formal. Formality is important to trade as businesses need access to trade finance and other financial products

Table 7. Granger Causality Results.

Null hypothesis Sample: 2004–2017	Obs.	*F*-statistics Lags: 2	Prob.
GDPPCGR does not Granger Cause FII	420	6.21664	0.03756
FII does not Granger Cause GDPPCGR		0.23572	0.9602
OPEN does not Granger Cause FII	420	0.03033	0.9701
FII does not Granger Cause OPEN		4.17307	0.0162
OPEN does not Granger Cause GDPPCGR	420	0.35310	0.7028
GDPPCGR does not Granger Cause OPEN		5.10635	0.0065

Source: Author's Computation.

to support international trade. For informal cross-border traders, access to finance can support traders to improve and expand their businesses. Increased financial inclusion also means increased access to credit, a process that will attract more entrepreneurs to take up business opportunities and increase trade (Table 7).

5.5. Conclusion

The study examines the impact of financial inclusion and trade openness on economic growth in Africa using panel data collected from the World Bank's World Development Indicators and Global Financial Development databases for the period 2004–2017. A cointegrated-granger causality test was carried out to analyse the nexus that existed among the variables. The study reveals that economic growth granger cause financial inclusion in line with the 'growth-led finance' approach. Our study also reveals a significant relationship among financial inclusion, trade openness and economic growth, in which case financial inclusion influence the trade-growth nexus. While financial inclusion according to the estimation does not directly granger cause economic growth, we found an indirect causality from financial inclusion through trade openness to economic growth with the significant path. We therefore urge policy-makers in Africa to formulate and implement pro-growth policies meant to deepen financial inclusion through economic growth which also enhance the effect of trade openness on growth. It is also critical to embrace the formation of the African Continental Free Trade Area whose thrust is to enhance trade and growth in Africa.

Disclosure statement

No potential conflict of interest was reported by the author(s).

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Appendix

Appendix 1. Lag Order Selection Criteria.

VAR Lag Order Selection Criteria
Endogenous variables: FII GDPPCGR OPEN
Exogenous variables: C Date: 07/22/19 Time: 22:33
Sample: 2004–2017 Included observations: 420

Lag	LogL	LR	FPE	AIC	SC	HQ
0	−2004.521	NA	57837.61	22.31690	22.38786	22.34567
1	−1443.475	1090.924	135.5553	16.26083	16.61560	16.40468
2	−1401.174	80.37205	101.2327	15.96860	16.60719*	16.22752*
3	−1377.559	43.81902	93.08234	15.88398	16.80639	16.25798
4	−1349.062	51.61010	81.11653*	15.74514*	16.95136	16.23421
5	−1337.259	20.85204	85.15989	15.79177	17.28182	16.39592
6	−1326.185	19.07305	90.21676	15.84650	17.62036	16.56572
7	−1317.822	14.03018	98.61056	15.93136	17.98904	16.76566
8	−1301.065	27.37034*	98.31791	15.92294	18.26444	16.87232

*Indicates lag order selected by the criterion.

Appendix 2. LM Tests.

VAR Residual Serial Correlation LM Tests
Null Hypothesis: no serial correlation at lag order h
Date: 10/24/19 Time: 08:26
Sample: 2004–2017
Included observations: 420

Lags	LM-Stat	Prob
1	32.40262	0.0089
2	55.61506	0.0000

Probs from chi-square with 16 df.

Appendix 3. Normality Tests.

VAR Residual Normality Tests
Orthogonalization: Cholesky (Lutkepohl)
Null Hypothesis: residuals are multivariate normal
Date: 10/24/19 Time: 08:25
Sample: 2004–2017
Included observations: 420

Component	Skewness	Chi-sq	*df*	Prob.
1	−0.284508	4.856689	1	0.0275
2	4.800623	1382.759	1	0.0000
3	3.583309	770.4062	1	0.0000
4	−0.350162	7.356825	1	0.0067
Joint		2165.379	4	0.0000

Component	Kurtosis	Chi-sq	*df*	Prob.
1	20.24530	4461.007	1	0.0000
2	58.49984	46203.48	1	0.0000
3	81.64315	92771.16	1	0.0000
4	5.892571	125.5045	1	0.0000
Joint		143,561.2	4	0.0000

Component	Jarque-Bera	*df*	Prob.
1	4465.863	2	0.0000
2	47,586.24	2	0.0000
3	93,541.57	2	0.0000
4	132.8613	2	0.0000
Joint	145,726.5	8	0.0000

Appendix 4. Model Stability Test-Roots of Characteristic Polynomial.

Endogenous variables; GDPPCGR, OPEN, FII

Root	Modulus
−0.808185 + 0.587181i	0.998971
−0.808185 − 0.587181i	0.998971
0.308699 + 0.950078i	0.998971
0.308699 − 0.950078i	0.998971
0.998971	0.998971
0.302933 + 0.932332i	0.980312
0.302933 − 0.932332i	0.980312
0.980312	0.980312
−0.793089 − 0.576213i	0.980312
−0.793089 + 0.576213i	0.980312
0.951162	0.951162
−0.769506 − 0.559079i	0.951162
−0.769506 + 0.559079i	0.951162
0.293925 + 0.904609i	0.951162
0.293925 − 0.904609i	0.951162
−0.755741 − 0.549078i	0.934147
−0.755741 + 0.549078i	0.934147
0.934147	0.934147
0.288667 + 0.888427i	0.934147
0.288667 − 0.888427i	0.934147
−0.727543 − 0.528591i	0.899292
−0.727543 + 0.528591i	0.899292
0.899292	0.899292
0.277897 + 0.855278i	0.899292
0.277897 − 0.855278i	0.899292

No root lies outside the unit circle. VAR satisfies the stability condition.

Appendix 5. Sample Countries.

Sample of countries used
Algeria, Angola, Botswana, Cabo Verde, Cameroon, Central African Republic, Democratic Republic of Congo, Côte d'Ivoire, Ethiopia, Egypt, Ghana, Guinea, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Morocco, Mozambique, Namibia, Nigeria, Senegal, Seychelles, South Africa, Swaziland, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe