

The Link between Globalization and Economic Growth: Evidence from Ethiopia

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Abstract

Globalization is making many African countries to be increasingly aware of the need to take into account an ever-expanding interconnection of economies and sociocultural influences in the management of their national affairs. However, the existence and direction of causal relationship between economic growth and globalization are very debatable. In this context, the paper analyses the relationship between economic growth and globalization in Ethiopia, using an unrestricted vector autoregressive model, for the 1970-2014 period. By taking the case of Ethiopia as one of the few countries in Africa that have shown the fastest growth rates in recent years, the paper investigates whether this growth has been influenced by the process of globalization. The results indicate that globalization and economic growth tend to move in the same direction, both in the medium and long term. The policy implications of this would be that Ethiopia needs to increase its participation in the globalization process by opening up its economy to attract more investment and to benefit from its possible growth enhancing effects.

Keywords: Economic Growth, Globalisation, Vector Autocorrelation, Ethiopia

1. Introduction

The world is increasingly shrinking as transport and communication networks grow dense ushering everyone into a new era of transboundary intensive economic, political, social, and cultural relations. This contemporary process of globalization, being unique for many reasons including the involvement of new technological and institutional innovations, presents new opportunities and challenges for the ostensibly intractable developmental problems that Africa faces (Kieh 2013).

Globalization is making many African countries, at various stages of development, to be increasingly aware of the need to take into account an ever-expanding interconnection of economies and sociocultural influences

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in the management of their national affairs. This greater integration is not only confined to bringing opportunities and benefits to these countries, but also exposes them to various new risks (Stiglitz 2004; Potrafke 2015). Thus, analysing the impact of globalization on growth is crucial for policy making, particularly for African countries that have long been marginalized and yet to be part of the global economy (Herbst 2005; Gygli *et al.* 2018).

Several empirical studies have used time-series analyses to investigate the impact of globalization on economic growth in the African context (Aka 2006; Sakyi 2011; Umaru *et al.* 2013; McMillan, *et al.* 2014; Asongu 2017; Zahonogo 2017). These studies, however, use trade openness and capital flows as proxies for globalization, which is inadequate to capture the nature of globalization that comprises many dimensions other than trade openness. This paper examines the effects of globalization on economic growth in Africa by taking the case of Ethiopia. The paper has two main novelties *vis-à-vis* the extant literature in the area. First, it uses a comprehensive measure of globalization: the KOF index which includes economic globalization, social globalization and political globalization. Second, the study considers country-specific growth responses to globalization using individual country time-series data along with a time-series dataset that covers the period 1970–2014, with a significantly longer time span than in previous studies.

Ethiopia is selected to in this study primarily because it is one of the countries in the continent that has registered the fastest growth rate in recent years, which makes it possible to investigate whether this growth has been influenced by the process of globalization.¹ Moreover, Ethiopia offers two relevant time-periods that traverse both autocratic (before 1991) and non-autocratic governments (after 1991) that match with the time boundary between different eras of globalization having implications on the type and speed of its integration.²

2. Literature Review

Globalization emerged as a reform agenda in the last decade of the 20th century operating mainly through the channels of international trade and mobility of capital aided by collaborative international policies that focused on liberalization of markets (Gurgul and Lach 2014; Modou and Yun Liu

2017). Although, there is an overemphasis on its economic aspect, globalization has other important dimensions that can be considered to be essentially political, social and even cultural (Potrafke 2015). This multifaceted nature of the concept contributed to the proliferation of various definitions, making the concept fluid and difficult to reach at a consensus on its meaning. For brevity, this paper follows the definition offered by Clark (2000).³

Achieving economic growth is undeniably considered as a measure of policy success by many developing country governments and finding out the effect of globalization on economic growth is crucial for improving economic policies. However, the empirical evidence on the effect of globalization on economic growth is largely inconclusive with no clear indication of either positive or negative impact of globalization on growth.

Thus, it is possible to categorize the existing view of empirical literature on the link between globalization and economic growth as having a mixed and an inconclusive evidence that straddles between unidirectional causality, neutral situation, and bi-directional causality (Stiglitz 2004; Ying *et al.* 2014). However, the weight of the evidence seems to tip the scale towards the positive effect of globalization *vis-à-vis* growth (Dollar 1992; Edwards 1998; Dollar and Kraay 2001; Rao and Krishna 2011). Accordingly, globalization is explained to have positive effect on growth mainly by increasing trade openness/flows and Foreign Direct Investment (FDI) (Dollar and Kraay, 2001) and *inter alia* through the promotion of effective allocation of domestic resources, diffusion of technology, improvement in factor productivity and augmentation of capital. Trade openness allows countries to use their comparative advantages and FDI enhances technology and skill transfers, which will subsequently increase innovation and promote production efficiency. However, the positive impacts of globalization on growth are not thought to be the same for all countries. For instance, Stiglitz (2004) highlights that developed countries derive the greatest benefits from globalization while developing countries are adversely affected by it due to trade imbalance and exposure to risks associated with exchange rate and interest rate changes. This assertion has been supported by Samimi and Jenatabadi (2014) who examined the effect of economic globalization on

growth for 33 Organization of Islamic Cooperation (OIC) countries. Their findings highlight that economic globalization benefits high and middle-income countries as opposed to low-income countries.

Much of the positive evidence on globalization's effect on growth is obtained by equating globalization as trade openness (Dollar 1992; Edwards 1998; Greenaway et al. 1998). Since the early 1990s, almost all developing countries have become more integrated with the world economy as the globalization process intensified technology transfer and contributed to efficiencies in production (McMillan *et al.* 2014). However, as Rodriguez and Rodrik (2000) note, the use of openness fails to adequately capture the nature of globalization, which has additional dimensions other than trade openness.

Earlier studies that take globalization as openness and financial flows argue that globalization, particularly financial globalisation, allows for greater possibility of international risk sharing and enables efficient capital allocation, which is more beneficial to less developed countries that are short in capital and rich in labour (Fischer, 1998; Summers, 2000; Karras 2003). For instance, Karras (2003) argued that trade openness promoted growth and suggested that global and national policies should be developed so that trade among different countries would become easy.

Relatively recent studies, however, have argued that the growth effects of globalization depend on the economic structure of countries during the process of globalization and highlight the importance of complementary policies that focus on enhancing human capital and financial system (Poggio and Calderon 2010; Gurgul and Lach 2014). For example, Gurgul and Lach (2014) found a positive evidence of globalization on growth in their study of ten CEE countries using the Solow growth model with a set of panel models that used autoregressive disturbances for the year 1990-2008.

Another group of studies that employ multidimensional indices to measure globalization, like the KOF index of globalization, broadly reach a similar conclusion to studies that use openness and financial flows.⁴ Dreher *et al.* (2008)⁵, who updated the earlier KOF index, also reached the same

conclusion. Similarly, Ying *et al.* (2014) studied the effect of short-run dynamics and long-run equilibrium relationships between globalization and the growth of ASEAN countries between 1970 and 2008 by applying panel fully-modified OLS (FMOLS). They found that economic globalization had a significantly positive influence on economic growth. Using the KOF index for individual country time-series data, Mutascu and Fleitcher (2011) analysed the link between globalization and economic growth in Romania for the 1972–2006. Employing an unrestricted vector autoregressive model, they found that globalization was likely to have a growth enhancing effect both in the medium and long term in the case of Romania.

The weight of the empirical evidence seems to suggest that globalization and the opening up of economies for international trade promotes specialization based on comparative advantage contributing to growth (Greenaway *et al.* 2002). However, this advantage may not apply to all as there are differences among countries. Many countries in Latin America and Africa are well-endowed with natural resources but do not seem to benefit from the promises of globalization as their economies are less diversified and geared towards the traditional specialization patterns. Some studies found that the impact of globalization on growth, measured in terms of trade openness, was positive for developed countries and negative for developing ones (Kim and Lin 2009; Herzer 2013:195).

When it comes to Africa, recent trends in the global economy i.e. the high demand for commodities and their rising prices, have supported high growth rates leading to the ‘Africa rising’ narrative based on the claim that six of the world’s fastest growing countries in the past decade are African, with a similar economic prospect projected for the coming decade. Though the ‘Africa rising’ narrative is characterised *inter alia* as ephemeral (see Taylor 2014), the fact that Africa has gained greater integration in the global economy particularly between 2000 and 2010 is undeniable. This coupled with increasing agricultural productivity, rising global food and commodity prices as well as relatively stable macro and political trends have made foreign and local entrepreneurs more willing to invest in Africa. Some of the recent empirical evidence on the nexus between globalization and development in Africa is provided below.

Empirical studies on Africa do not reflect the consistent positive impact of globalization on growth. For instance, Aka (2006) examined the relationships between openness or globalization on economic growth in Côte d'Ivoire using a three-variable vector autoregressive (VAR) model, and found that the three variables were tied together in the long-run. Despite the positive effect of openness on growth in the short-run, however, globalization and openness did not have positive contribution to the long-run economic growth of the country in the period 1969-2001.

Sakyi (2011) uses data for 31 Sub-Saharan African countries over the period 1980–2005 and shows that economic globalisation and per capita GDP have been cointegrated. The results of a group mean FMOLS estimator for cointegrated panels indicate that economic globalisation has a positive influence on per capita GDP in the long-run.

Using the Annual Average Growth Rate (AAGR) technique, Umaru *et al.* (2013) analysed globalization's effects on Nigeria's economic performance between the years 1962 and 2009. The results of the study indicated that globalization had negative effects on petrol manufacturing industry and solid mineral sectors while having positive effects on agriculture, transportation and communication sectors.

McMillan *et al.*, (2014) focusing on structural change and productivity growth analysed the effect of globalization in Africa and Latin America. Their results showed that since 1990 structural change had a growth reducing effect in both Africa and Latin America and overall, globalization appeared not to have fostered the desirable kind of structural change in these continents.

Asongu (2017) examined the marginal, threshold, and net effects of financial globalization on financial development for 53 African countries for the period 1996–2011. The results from the quintile regressions showed that financial globalization had positive marginal effects but negative net effects. However, this analysis only focused on a single dimension of globalization, which was measured by the net foreign direct investment flows.

Finally, a recent study by Zahonogo (2017) using data from 42 SSA countries obtained from the World Bank and International Monetary Fund data bases estimated a dynamic heterogeneous panel for the period 1980–2012. The results indicate that the effect of globalization on economic growth is non-linear with an inverted U curve type response, for SSA.

3. Data and Methodology

3.1. Data sources and description

To analyse the impact of globalization on economic growth, this paper considered two variables—economic growth and globalization using a time series data from 1970 to 2014. The data on GDP as a measure of economic growth, is taken from the World Bank data base. The data on KOF index which is used as a proxy for globalization is obtained from Dreher *et al.* (2008).⁶

The KOF index is composed of economic, social, and political globalization with each sub-index having 36 per cent, 37 per cent and 27 per cent weights, respectively (see Appendix A, Table A). Economic globalization has two dimensions – actual economic flows and restriction measures. Economic flows include trade, foreign direct investment and portfolio investment (computed as a percentage of GDP). The second sub-index measures restrictions on trade and capital using hidden import barriers mean tariff rates, taxes on international trade (as a share of current revenue) and an index of capital controls (Dreher 2006: 1093). Social globalization in the KOF index is composed of three categories. The first covers personal contacts, the second includes data on information flows and the third measures cultural proximity (Gurgul and Lach, 2014). Political globalization is captured by the number of embassies and high commissions in a country and the number of international organizations to which the country is a member and the number of UN peace missions a country participated in. Moreover, the number of treaties signed between two or more states since 1945 is considered as a measure of political globalization (Gurgul and Lach, 2014).

In terms of econometric methodology, this paper used the Unrestricted Vector Autoregression (VAR) model, which fits a multivariate stochastic

time-series regression of each dependent variable on lags of itself and on lags of all the other dependent variables. Usually, this model is used for forecasting systems of interrelated time-series and for analysing the dynamic impact of random disturbances on the system of variables (Cromwell et al., 1994). In VAR model, all variables are often treated as being *a priori* endogenous and in this study, the variables GDP growth rate and KOF are treated as endogenous.

VAR specification needs to be parsimonious requiring that the model is expressed with the lowest possible number of parameters suitable for the economic question at hand. Thus, following Mutascu and Fleischer (2011) and assuming that each of two equations contains k lag values, for the t period the VAR model for this study can be written as:

$$GDP_t = a_1 + \sum_{j=1}^k \beta_j GDP_{t-j} + \sum_{j=1}^k x_j KOF_{t-j} + u_{1t} \quad (1)$$

$$KOF_t = a_2 + \sum_{j=1}^k e_j GDP_{t-j} + \sum_{j=1}^k f_j KOF_{t-j} + u_{2t} \quad (2)$$

Where GDP_t and KOF_t are assumed to be stationary, and μ_{1t} and μ_{2t} are uncorrelated white-noise disturbances or in the language of VAR are called impulses/innovations or shocks (Gujarati 2009). Equations (1) and (2), are not reduced-form equations as GDP_t has a contemporaneous impact on KOF_t and the vice-versa (Gujarati 2009). These equations are called a structural VAR and can be expressed in a matrix form as:

$$\begin{bmatrix} GDP_t \\ KOF_t \end{bmatrix} = \begin{bmatrix} a_1 \\ a_2 \end{bmatrix} + \begin{bmatrix} \beta_1 \chi_1 \\ e_1 f_1 \end{bmatrix} \begin{bmatrix} GDP_{t-1} \\ KOF_{t-1} \end{bmatrix} + \dots + \begin{bmatrix} \beta_k \chi_k \\ e_k f_k \end{bmatrix} \begin{bmatrix} GDP_{t-k} \\ KOF_{t-k} \end{bmatrix} + \begin{bmatrix} \mu_{1t} \\ \mu_{2t} \end{bmatrix} \quad (3)$$

where a_1 , a_2 are the intercept terms; β , e are the coefficients of the endogenous variables and the μ are the stochastic error terms.

In a VAR model, the order of variables is important in terms of explaining how the variables relate to each other despite the fact that all variables are treated as dependent and independent.⁷ Thus, this study imposes that the

KOF_t is the most exogenous variable in that it is relatively less affected contemporaneously to shocks to GDP_t variable. However, it may be affected with a lag. Similarly, GDP_t can be taken as the most endogenous variable as it may immediately respond to the shocks that may come from globalization. This order can be justified by the fact that it may take some time for the effects of globalization, mainly in the form of trade and FDI flows, to be felt on economic growth.

The VAR estimates have important advantages as they are consistent as endogenous variables are used; they are also efficient and equivalent to GLS because all equations have identical regressors. Before estimating Eq.1 and 2 by using Ordinary Least Squares (OLS), unit root tests of variables and joint lag selection were conducted. The unit root tests were applied using the common tests suggested by Greene (2008), namely the Augmented Dickey-Fuller (ADF) test.⁸ The result of this test is given in Table 1, which clearly shows that there is no unit-root in the series. As cointegrating relationship can be estimated using least squares, these tests were also complemented by first running a simple linear regression of GDP on KOF index followed by the step that uses the residuals obtained from this regression and their changes which are regressed on the lagged value. The 5% critical value of the test for stationarity in the co-integrating residuals is -3.37. Since the unit root t-value of -0.5717 is greater than -3.37, it indicates that the errors are not stationary, and hence that the relationship between KOF and GDP per capita is spurious i.e., we have no co-integration. In this case, we can estimate the coefficients of the model using a VAR in differences. Other tests such as Granger causality Wald tests and residual tests are also conducted (see Appendix A, Table B and C).

Table 1: Augmented Dickey-Fuller test for unit root

Interpolated Dickey-Fuller				
	<i>Test statistic</i>	<i>1% critical value</i>	<i>5% critical value</i>	<i>10% critical value</i>
Z(t)	0.398	-4.260	-3.548	-3.209

MacKinnon approximate p-value for Z(t)=0.9966. *Source:* Author's computation

The order of VAR or the lag length of the endogenous variables was determined based on data congruency using information criteria of Schwarz Criterion (SC), the Hannan-Quinn (HQ) criteria, and the Akaike criterion

(AIC). Thus, a VAR lag selection criterion is used, which recommends that a joint lag order of three (3) is appropriate as indicated by the LR, FPE, AIC, and HQIC information criteria (see Table 2).

Table 2. VAR Lag Order Selection Criteria

lag	LL	LR	FPE	AIC	HQIC	SBIC
0	-124.329		1.62686	6.16238	6.19282	6.24597
1	-1.99644	244.66	0.005066	0.39007	0.481386	.640837*
2	-1.2157	1.5615	0.005939	0.547107	0.6993	0.965052
3	9.82785	22.087*	0.00423*	0.20352*	0.416589*	0.788642
4	10.6731	1.6905	0.004973	0.357411	0.631357	1.10971

*indicates lag order selected by the criterion

LR: Sequential modified LR test statistic (each test at 5% level)

FPE: Final Prediction Error

AIC: Akaike Information Criterion

HQIC: Hannan-Quinn Information Criterion

SBIC: Schwarz's Bayesian Information Criterion

Source: Author's computation

4. Results and Discussion

Following the VAR lag selection procedure, a simple VAR with no structure and assumptions on order of variables between KOF and GDP and with three lags is used.⁹ The results of this model, given in Table 3, can be taken to be stable and illustrative of the autoregressive link between economic growth and globalization and vice-versa in Ethiopia in the period 1970–2014.

Table 3. Unrestricted Vector Autoregression of Economic Growth and Globalization estimates

	D(LNGDP)	D(LNKOF)
D(LNGDP(-1))	0.482381*** (0.16295)	0.203665 (0.12670)
D(LNGDP(-2))	-0.205426 (0.18673)	-0.362336*** (0.14519)
D(LNGDP(-3))	0.447783*** (0.18156)	-0.041474 (0.14117)
D(LNKOF(-1))	0.609207*** (0.22437)	0.081737 (0.17446)
D(LNKOF(-2))	0.254998 (0.19996)	-0.522803*** (0.15547)
D(LNKOF(-3))	0.226977 (0.23068)	0.127686 (0.17937)
Constant	-0.006839 (0.01001)	0.019275* (0.00778)
R-squared	0.404883	0.331758
Adj. R-squared	0.299863	0.213833
Sum sq. resids	0.090021	0.054424
S.E. equation	0.051456	0.040009
F-statistic	3.855275	2.813299
Log likelihood	67.30987	77.62612
Akaike AIC	-2.941945	-3.445177
Schwarz SC	-2.649384	-3.152615
Mean dependent	0.015866	0.013362
S.D. dependent	0.061495	0.045123
Determinant residual covariance (d of adj.)		3.99E-06
Determinant resid covariance		2.74E-06
Log likelihood		146.1704
Akaike information criterion		-6.447335
Schwarz criterion		-5.862213

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author's computation

The VAR stability condition check test shows that the VAR satisfies the stability condition, which requires the moduli of the eigenvalues of the dynamic matrix to lie within the unit circle (Baum, 2013) (see Table 4 and

Appendix A, Figure A). Residual tests are focused at VAR Lagrange-multiplier (LM) test for residual autocorrelations, Unit Root Tests of VAR residuals and White Test for Residual Heteroskedasticity.

Table 4. VAR Stability Condition Check Test

Root	Modulus
-0.266993 - 0.705039i	0.753900
-0.266993 + 0.705039i	0.753900
-0.011038 - 0.606244i	0.606345
-0.011038 + 0.606244i	0.606345
0.560091 - 0.070470i	0.564506
0.560091 + 0.070470i	0.564506

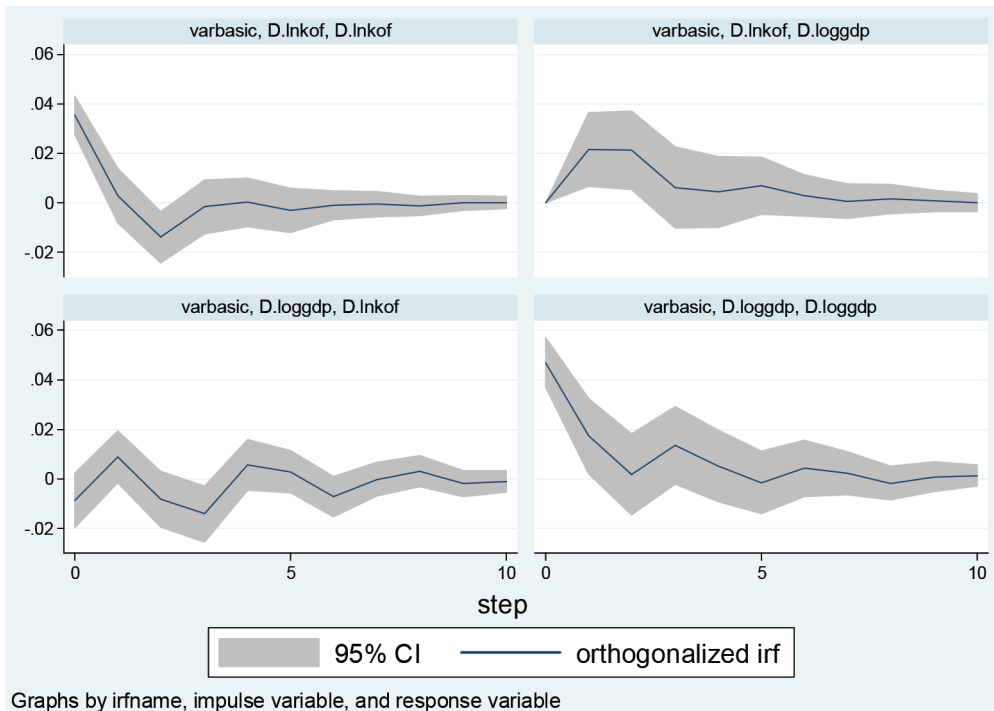
No root lies outside the unit circle.

VAR satisfies the stability condition.

Source: Author's computation

As the VAR coefficients are seldom interpreted, the Impulse Response Functions (IRFs) were used in order to assess how an unexpected change in globalization at the beginning, affects growth through time. Zhang and Cheng (2009) note that the nature of IRFs can be understood as “how a shock to one variable affects another variable and how long the effect lasts in short run”. The IRFs with graph that shows the expected level of the shock in a given period surrounded by a 95% confidence interval (a low estimate and a high estimate). The graph places one impulse in each row and one response variable in each column with the effect of a shock over a 10-year period (see Figure 1).

As shown in Figure 1, the first row shows the effect of a one-standard-deviation impulse to the KOF index equation. Here, the KOF index seems to elevate around the second year following the initial impulse and keeps a constant rate of incline well into the 10th year. GDP also follow somehow a similar trend although the response does not seem to be statistically significant. The second row shows the impact of a shock to the GDP equation in which an impulse to the KOF index is associated with an increase in GDP. The point estimate roughly indicates the effect of a one-standard deviation impulse to the KOF index and is expected to cause a decline in GDP in the first two years. However, this rate will persistently elevate after the initial period well into the 10th year.



Notes

The vertical axis is expressed in units of the Y variable
 The solid line is a point estimate for the amount; Y is expected to change following a unit impulse after the number of periods on the horizontal axis.

Figure 1. The Impulse–response Graphs of Globalization and Growth

Source: Author’s computation

In order to see the accumulated responses of the endogenous variables (GDP and KOF), an accumulated response to Cholesky One S.D. innovations for 10 year graphs are used (see Figure 2).

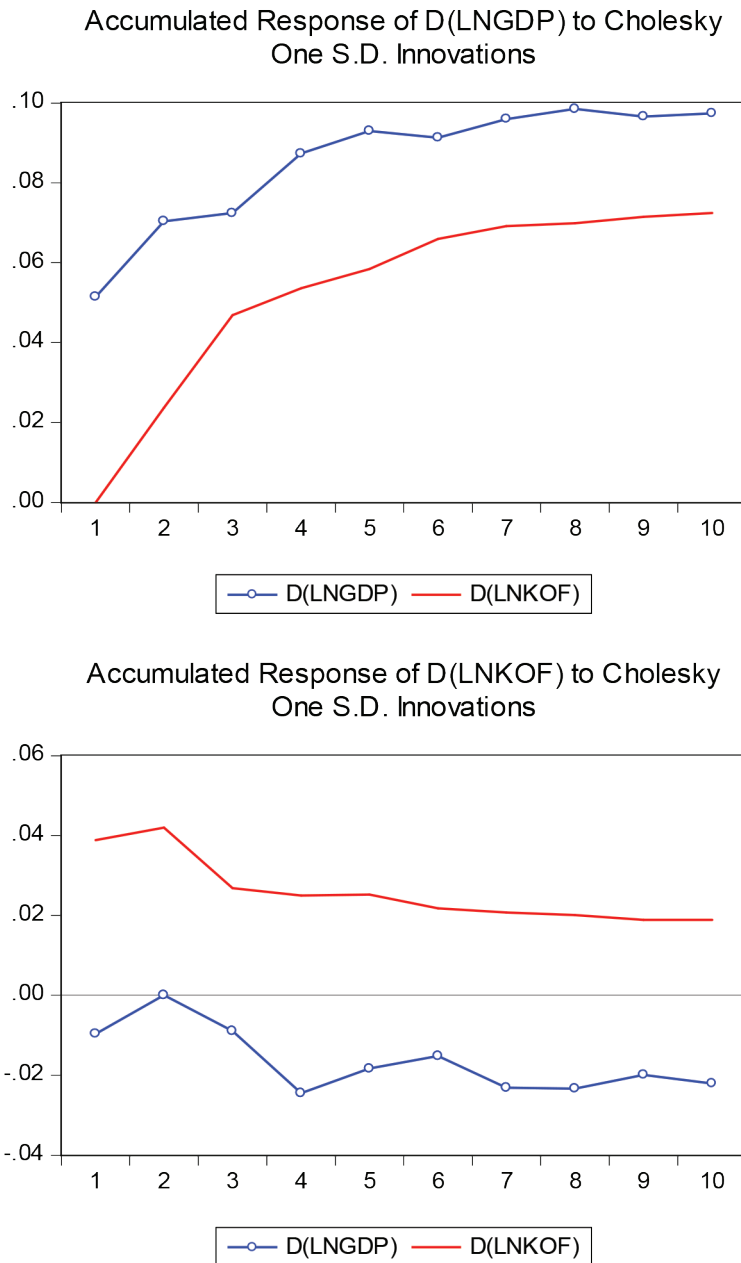


Figure 2. Accumulated Response
Graphs. *Source:* Author's computation

As shown in Figure 2, a positive impulse in GDP seems to cause a similar increase in KOF level on medium and long term. Similarly, a positive impulse in KOF is likely to determine an increase in GDP level. However, a short-term decline in KOF level may trigger a higher decline in GDP level that may extend from the short term to medium and long term time periods. Overall the IRFs indicate that globalization may have both short-run and long-run effects on economic growth in the Ethiopian case. This finding corroborates the conclusion reached by Dreher (2006, 1105) that states “globalization is good for growth. On average, countries that globalized more, experienced higher growth rates. This is especially true for actual economic integration and – in developed countries – the absence of restrictions on trade and capital”. Thus, this result has important implications for the need to increase participation in the globalization process from its current level in Ethiopia in order to benefit from its growth enhancing effects.

A cursory assessment of Ethiopia’s globalization index indicates that it is very low at 39.33 in 2017, which is 8.41 points below the average for Africa which stands at 47.74. The most significant contributing component to this overall index is political globalization while the country’s economic and social globalization indices are low (Appendix A, Table D). Thus, considering this low level of globalization, in general, and the economic globalization, in particular, increasing participation in the globalization process can contribute to growth. In this regard, Anyanwu (2006) found that the component of economic integration, mainly actual economic flows (trade, foreign direct investment, and portfolio investment), promoted economic growth in Africa. Similarly, Alimi and Atanda (2011) elaborated the channel through which globalization affected growth and suggested that globalization increased trade, technology transfer, foreign direct investment and living standards in a country and reduced poverty and brought employment which ultimately led to enhanced growth.

Thus, as increasing globalization requires opening-up the economy and making reforms, the state needs to liberalise its economic policies. There have been some liberalisation measures taken, following a regime change in 1991, including the elimination of non-tariff barriers and steady reduction of

tariffs on several commodities, including a significant reduction of the maximum tariff rate from 230 per cent to 35 per cent in 2003 (Bigsten *et al.* 2009). Despite these reforms, however, the country has not benefited from international trade or from attracting significant flows of FDI. This may indicate that the reforms may not be sufficient as can be judged from the recent World Bank's Doing Business report that ranked the country 161 from 190 (World Bank 2017). There is broad consensus that the rapid economic growth in Ethiopia since 2000 is largely driven by public investment in infrastructure (World Bank 2009). In fact, the state continued to be a major player in the economy, controlling key sectors including telecommunications, transport, banking and insurance (Haile *et al.* 2017). Moreover, the country's economy suffers from structural bottlenecks that can be characterized, among others, by limited diversification, small manufacturing sector and dominant agricultural sector that contributes to more than 40% to its GDP, and employing 80% of the work force (The World Fact Book 2017).

5. Conclusions

This paper conducted empirical investigations to establish the effect of globalization on economic growth in Ethiopia from 1970–2014. By taking the case of Ethiopia as one of the few countries in Africa that have shown the fastest growth rates in recent years, the paper investigates whether this growth has been influenced by the process of globalization using a time-series model. The results from the time-series estimation (VAR) indicate that globalization and economic growth tend to move in the same direction, both in the medium and long term time periods. Therefore, given the current low level of globalization, Ethiopia needs to intensify its participation in the process to benefit from some of its growth-enhancing effects. The policy implications of this would be taking measures that would expedite the opening up of its economy to attract more foreign direct investment, portfolio investment, and trade flows. This, in turn, would call for the need to focus on accelerating structural change in the economy and diversifying exports. This is particularly pressing as the country's exports remain primary commodities, with coffee alone accounting for not less than 50% of total foreign exchange earnings contributing to the decline in the terms of trade.

Appendices

Appendix Table A. The KOF Index of Globalization

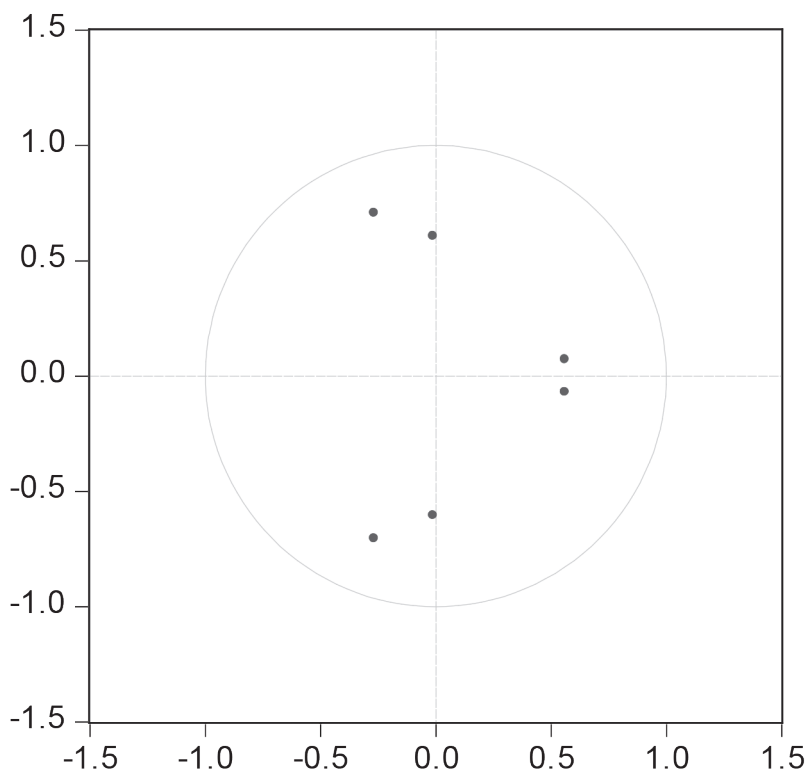
Indices and Variables	Weights (%)
A. Economic Globalization	36
i) Actual Flows	50
Trade (percent of GDP)	21
Foreign Direct Investment, stocks (percent of GDP)	28
Portfolio Investment (percent of GDP)	24
Income Payments to Foreign Nationals (percent of GDP)	27
ii) Restrictions	50
Hidden Import Barriers	22
Mean Tariff Rate	28
Taxes on International Trade (percent of current revenue)	26
Capital Account Restrictions	24
B. Social Globalization	37
i) Data on Personal Contact	33
Telephone Traffic	25
Transfers (percent of GDP)	2
International Tourism	26
Foreign Population (percent of total population)	21
International letters (per capita)	25
ii) Data on Information Flows	36
Internet Users (per 1000 people)	37
Television (per 1000 people)	39
Trade in Newspapers (percent of GDP)	25
iii) Data on Cultural Proximity	32
Number of McDonald's Restaurants (per capita)	47
Number of Ikea (per capita)	47
Trade in books (percent of GDP)	6
C. Political Globalization	27
Embassies in Country	25
Membership in International Organizations	27
Participation in U.N. Security Council Missions	22
International Treaties	26

Source: Dreher *et al.* (2008)

Annex Table B: Granger Causality Wald tests

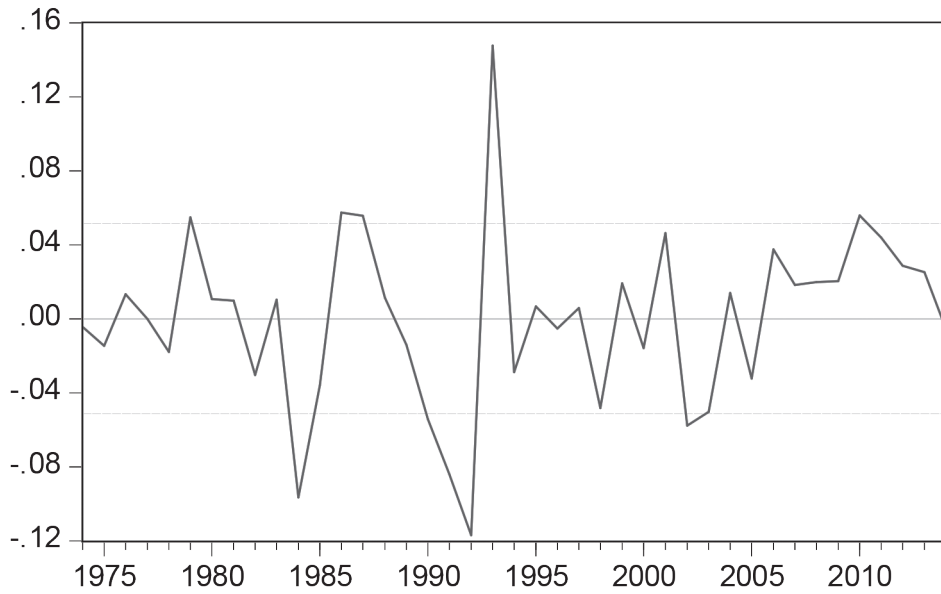
Equation	Excluded	chi2	df	Prob>chi2
D_loggdp	D.kof	11.85	3	0.008
D_loggdp	ALL	11.85	3	0.008
D_kof	D.loggdp	8.6234	3	0.035
D_kof	ALL	8.6234	3	0.035

Source: Author's computation

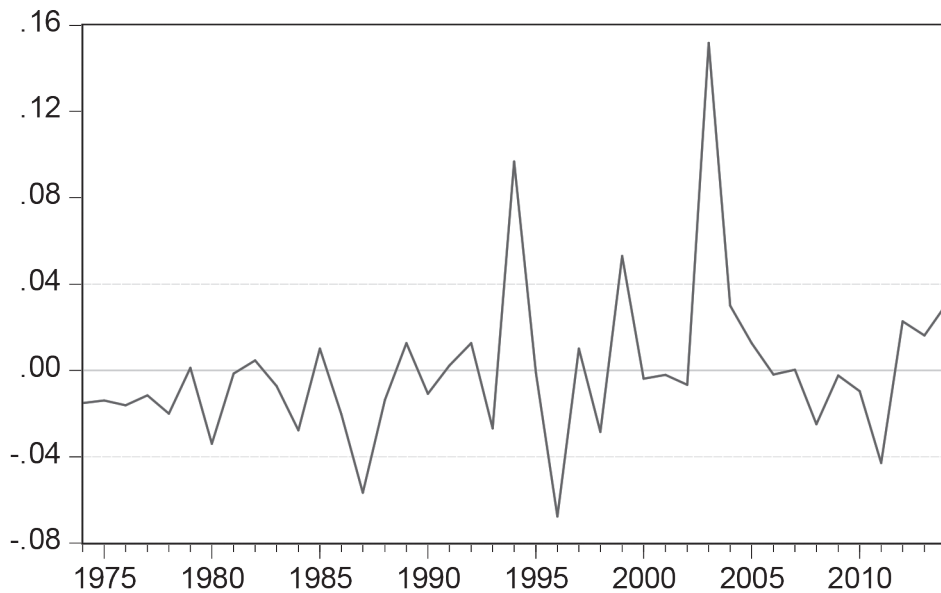
Annex Figure A: Inverse Roots of AR Characteristic Polynomial

Source: Author's computation

D(LNGDP) Residuals

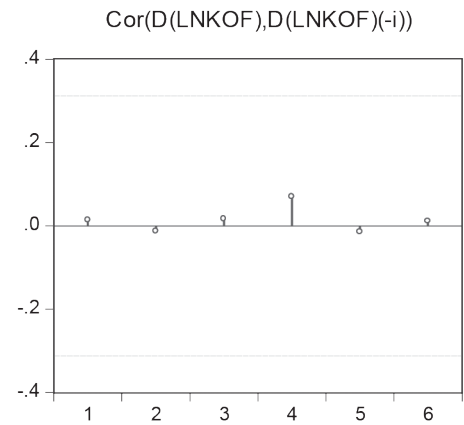
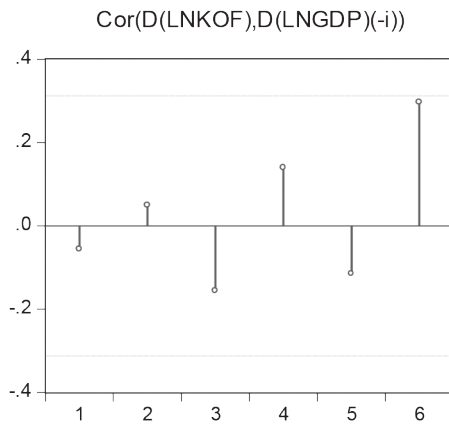
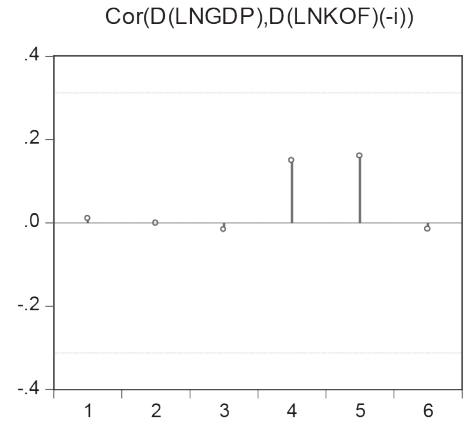
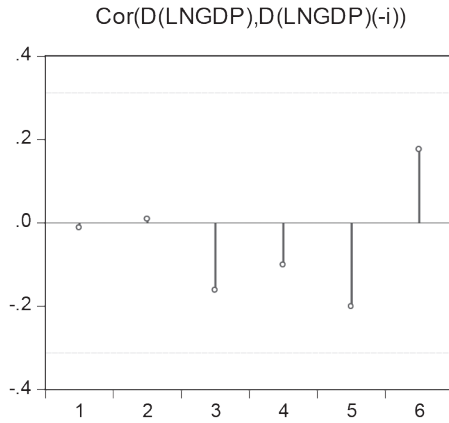


D(LNKOF) Residuals



Source: Author's computation

Autocorrelations with 2 Std.Err. Bounds

**Annex Table C: VAR Residual Serial Correlation LM Tests**

Null hypothesis: no serial correlation at lag order h

Sample 1970–2014; Observations: 41

Lags	LM-Stat	Prob
1	0.962012	0.9155
2	0.471461	0.9762
3	7.530384	0.1104
4	2.979379	0.5613

Probs from chi-square with 4 df.

Source: Author's computation

Annex Table D. Ethiopia’s KOF globalization index in 2017

Indices	Scores
Economic globalization	26.90
Social globalization	19.04
Political globalization	82.51
2017 KOF Index of Globalization	39.33*

*During the same year, the KOF globalization index for Africa averaged for 50 countries is 47.74.

*There is a two-year lag in the KOF globalization index and in 2017 the index measured the 2014 status.

Source: 2017 KOF Index of Globalization; <http://www.kof.ethz.ch/globalisation/>.

Notes

¹Ethiopia has made a significant leap forward in its economic growth in recent years. For instance, for the past eight years, Ethiopia has maintained a persistent growth rate of 11 percent per annum (Government of Ethiopia— GoE (2014).

²A similar approach was used by Mutascu and Fleischer (2011) in the case of Romania.

³Clark’s definition stresses on the multidimensionality of the globalization phenomenon and defines it as: ‘the process of creating networks of connections among actors at multicontinental distances, mediated through a variety of flows including people, information and ideas, capital, and goods’ (Clark 2000, 86)

⁴ There are other previous measures of globalization. Some of these include the Maastricht Globalization Index (MGI) and The New Globalization Index (NGI). The former incorporated environmental factors, represented by ecological footprint of exports and imports as a share of bio capacity (Figge and Martens 2014). The later index used distance weighting of some of the variables to improve the distinction between globalization and regionalization (Vujakovic 2010).

⁵The updated version of the index introduced the differentiation between *de facto* and *de jure* measures along the different dimensions of globalization, the differentiation between trade and financial globalization within the economic dimension of globalization and time-varying weighting of the variables entering the index (Gygli *et al.* 2018:1).

⁶The KOF Index of Globalization was introduced in 2002 (Dreher 2006) and later updated and described in more detail by Dreher *et al.* (2008). The index covers the economic, social, and political dimensions of globalization. According to Clark (2000), globalization can be conceptualized as a process of creating connections through the exchange of information, ideas, capital and goods. These connections integrate national economies, cultures, technologies and governance, eventually blurring economic boundaries between nations and producing a complex system of mutual interdependence. The index has a two-year lag and the longest available sample covers the period 1970-2014 at the time of conducting this research. <http://globalization.kof.ethz.ch>.

⁷This is sometimes referred to as the "black box" of VAR as the coefficients are difficult to interpret, especially when the lags are large. The coefficients are seldom the focus of analysis and can only be interpreted as short-term (causality) or long-term (cointegration) relationships (Bernanke and Gertler 1995).

⁸Apart from the ADF test, the Phillips-Perron (PP) test was also used. Unlike the ADF test that is based on the assumption of random error terms with a constant variance, the PP test allows for relatively mild or less restrictive assumptions with regards to the distribution of errors (Asteriou and Hall 2007; Gujarati 2009). The result of the PP test was similar to that of the ADF test.

⁹OLS is used equation by equation on the unrestricted VAR. Thus, weak exogeneity is considered to obtain efficient and consistent OLS estimations (Hunter and Ali 2014).

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