ECONSTOR
Make Your Publications Visible.

A Service of
ZBW
Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Amavilah, Voxi Heinrich S.; Asongu, Simplice; Andrés, Antonio R.

Working Paper

Effects of globalization on peace and stability: Implications for governance and the knowledge economy of African countries

AGDI Working Paper, No. WP/17/014

Provided in Cooperation with:
African Governance and Development Institute (AGDI), Yaoundé, Cameroon

Suggested Citation: Amavilah, Voxi Heinrich S.; Asongu, Simplice; Andrés, Antonio R. (2017) : Effects of globalization on peace and stability: Implications for governance and the knowledge economy of African countries, AGDI Working Paper, No. WP/17/014, African Governance and Development Institute (AGDI), Yaoundé

This Version is available at:
https://hdl.handle.net/10419/173620

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

A G D I Working Paper

WP/17/014

Effects of globalization on peace and stability: Implications for governance and the knowledge economy of African countries

Forthcoming in: Technological Forecasting and Social Change

Voxi Amavilah
REEPS, Arizona, USA.
E-mail: amavilah@msn.com

Simplice A. Asongu
African Governance and Development Institute,
P.O. Box 8413, Yaoundé, Cameroon.
E-mail: asongusimplice@yahoo.com /
asongus@afridev.org

Antonio R. Andrés
Universidad del Norte,School of Business
Km. 5 vía a Puerto Colombia, Barranquilla, Colombia
E-mail: antoniorodriguez@uninorte.edu.co

Research Department

Effects of globalization on peace and stability: Implications for governance and the knowledge economy of African countries

Voxi Amavilah, Simplice A. Asongu & Antonio R. Andrés

January 2017

Abstract

We argue that there exists an indirect link between globalization and the knowledge economy of African countries in which globalization influences 'peace and stability' and peace and stability affects governance, and through governance the knowledge economy. We model the link as a three-stage process in four testable hypotheses, which permits an empirical analysis without sacrificing economic relevance for statistical significance. The results indicate that the impacts on governance of peace and stability from globalization defined as trade are stronger than those of peace and stability resulting from globalization taken to be foreign direct investment. We conclude that foreign direct investment is not a powerful mechanism for stimulating and sustaining the African knowledge. However, since the effects of globalization on peace and stability can influence governance both positively and negatively, we also conclude that the prospect for the knowledge economy in African countries may be realistic and attainable, as long as these countries continue to engage in the kind of globalization that enhances peace and stability.

JEL Classification: I20; I28; K42; O10; O55
Keywords: Globalization; peace and stability; Governance; knowledge economy, African countries

1. Introduction

Andrés, Asongu and Amavilah's (2015) analysis of the impact of formal institutions through the enforcement of intellectual property rights (IPRs) on the knowledge economy (henceforth KE) of 22 Middle East and North African (MENA) and Sub-Sahara African (SSA) countries concluded that IPRs were necessary, but inadequate, determinants of the KE. We claim that 'peace and stability' resulting from globalization may affect the KE through governance.[1] The claim permits us to close an existing gap in the understanding of KE in Africa.

We put forward four hypotheses, and apply a three-stage regression technique to estimate and test those hypotheses. In the first stage we associate peace and stability with trade and foreign direct investment (FDI) as measures of globalization (openness). In the second stage, peace and stability influences three indicators of governance: general governance (GG), economic governance (EG), and institutional governance (IG). Finally, we relate governance to measures of KE: Education (Educatex), information and communication technologies (ICTex), innovation (Innovex), and economic incentives (Creditex). Analysis finds positive and negative correlations among indicators of peace and stability and those of KE via governance, suggesting that for this group of countries trade openness is a more effective mechanism for innovation than FDI openness.

In the light of the above, the purpose of this paper is to assess the linkages between and among globalization, peace and stability, governance, and the knowledge economy. The corresponding research question is: *What is the relationship between globalization and stability, and how does such a relationship affect governance and thereby influence KE in African countries? The rationale and motivation for asking and pursuing the research question is that there is a clear gap in the current literature on a subject that is critical to technological progress and social change in African countries*. For example, increasing international competition brought about by the pace of globalization raises concerns regarding whether or not a KE is possible for African countries.

[1]We use the terms 'stability', 'peace and stability', 'peace and political stability', and 'no violence', interchangeably. In that sense 'peace and stability' *is* a singular noun. Asongu et al. (2016a) have established that globalization affects political stability. (ii) From intuition, such stability provides enabling conditions for institutional and economic governance. In essence, the effective delivery of public commodities (or economic governance) is more feasible when there is relative political stability and non-violence in a country. Moreover, the respect by the State and citizens of institutions that govern interactions between them (or institutional governance) is facilitated by peace and stability. (iii) It is also logical to postulate that such peaceful conditions for economic and institutional governance facilitate the drive towards knowledge-based-economies, notably, in terms of education, good information and communication infrastructure, innovation and economic incentives.

This line of inquiry contributes to the extant literature by articulating interconnections between macroeconomic variables and other phenomena which drive KE in Africa. We examine the interconnections by considering the four dimensions of the World Bank's KE index, namely: education, innovation, economic incentives and institutional regime and information and communication technology (ICT). Such a positioning opens up another angle for both policy and research by steering clear of the growing body of KE literature which has focused only on one or two dimensions of KE as in Lin (2006), Rooney (2005), Anyanwu (2012) broadly; Butcher (2011) on ICT; Ford (2007); Weber (2011), and Wantchekon, Klasnja and Novta (2014) on education; Oyelaran-Oyeyinka & Sampath (2007), and Carisle, Kunc, Jones, and Tiffin (2013) on innovation; and Cogburn (2003), Asongu and Le Roux (2017), Letiche (2006), Asongu and Nwachukwu (2016ab) on economic incentives and institutional regime.

The paper is organized as follows: Section 2 provides a background to the research, including key relationships among globalization, peace and stability, governance, and KE(cf. Tchamyou, 2016). Section 3 outlines the methodology: (a) variables and data, (b) the theoretical framework, (c) hypotheses, and (c) estimation technique. The empirical results and their implications for policy and further research are discussed in Sections 4, while Section 5 concludes.

2. Background

2.1 Globalization, and peace and stability

Globalization is essential to peace and stability, and hence to governance[2] (Asongu et al., 2016a). Bonaglia, Braga de Maceda, and Bussolo (2001) found that globalization as trade openness reduces corruption. Lalountas, Manolas, and Vavouras (2011) and Asongu (2014a) have confirmed the positive role of globalization in governance in developing nations, including African countries, as it relates to mitigating corruption. While the preceding references postulate a positive relationship between peace and stability and globalization, another strand of literature has asserted a negative correlation between globalization, and peace and stability as evident from the conflicts line of research. A good example of line of

[2] It is important to note that governance can be political (political stability/no violence and voice & accountability); economic (government effectiveness and regulation quality) and institutional (corruption-control and rule of law) (see Asongu et al., 2016a). Moreover, within the framework of the study, governance exclusively embodies the economic and institutional dimensions of governance because one dimension of political governance (i.e. political stability/non violence) is considered as exogenous to economic and institutional governance in the first hypothesis.

work is Rodrik (1997) who measures conflicts as latent frictions particular to any community relative to its institutional capability for managing such frictions. He represents globalization with external shocks transmitted through the mechanism of foreign trade, and shows that for developing countries both external shocks (globalization) and latent frictions (conflicts) have negative effects on economic growth, the former because of the poor quality of institutions and the latter because of declining terms of trade.

Messer and Cohen (2006) also provide evidence of the correlation between globalization and conflicts. They argue that external market forces tend to increase fluctuations in, and unpredictability of, crop export prices. Such price fluctuations and unpredictability have led to food insecurity and conflicts. In a related area, Olzak (2011) observed that economic and cultural globalization are associated with deaths from internal armed ethnic conflicts, and that socio-cultural globalization increases ethnic conflicts, but reduces non-ethnic conflicts. By implication, globalization stimulates intra-ethnic competition for scarce resources, but it also creates a new understanding that diffuses inter-ethnic frictions. This finding is reasonable; peace and stability is highly correlated with measures of democracy. In a study of 28 SSA countries over 1980-2005 years V.C. Jaunky (2013) shows that there is a direct correlation between economic growth and democracy in the short-run which turns into a bi-directional causation between the two in the long-run (cf. Barro, 1996).

Since globalization defuses inter-ethnic conflicts by promoting democracy, then one can argue that under conditions of peace and stability not all conflicts would affect governance and KE negatively. Hence, Rodrik's observation does not mean the absence of conflict, but the existence of the capability to manage conflicts effectively. To this interpretation, Tidwell and Lerche (2011) add that globalization and conflicts are complex and inter-active, and their marginal (short-run) effects on economic performance are likely ambiguous, because not all conflicts are violent, and not all violent conflicts have necessarily bad consequences. In the same vein Moahi (2007) has added another insightful perspective. He describes a situation in which the spread of globalization and the growth of KE tend to unbalance power relations between developed and developing economies. In the absence of appropriate IPRs globalization and conflicts harm indigenous knowledge and knowledge systems, such that that globalization can lead to economic growth and yet hurt KE if it upsets the relationship between governance and peace and stability. There is clearly a link between

globalization and conflicts, and so of opposite sign between globalization and peace and stability.

2.2 Governance, conflicts, peace and stability, and globalization

Neo-liberal economists have tended to over-stress the negative relationship between governance and conflicts (cf. Rodrik, 1997). Their logic is that conflicts weaken the quality of institutions of governance. Weak institutions are then unable to manage latent frictions of the kind Rodrik refers to, which in turn lead to even more severe conflicts. While such arguments are reasonable, they are nonetheless linear in form and static in content for ignoring the effects of globalization on peace and stability, and the indirect effects through peace and stability of globalization on governance as emphasized next.

Globalization affects governance indirectly through peace and stability as well as directly. Culturally, globalization spreads new ideas, technologies, tools, attitudes, and social networks, and these have direct effects on governance. Also, many countries are sensitive to international relations (e.g., trade, remittances, FDI, aid, education, health, international law, and diplomacy), which are aspects of globalization. Indeed, Bonaglia, et al. (2001) show 'how globalization improves governance' by asking whether 'there is an effect of globalization on governance' – the title of their paper. They specify the variables that affect institutional change, and assess whether or not such variables reduce corruption (cf.Acemoglu, Johnson, and Robinson, 2001). They found that high-level measures of globalization correlate with low-level indicators of corruption, although mineral exports, and in some cases trade liberalization, work against governance.

2.3 Globalization, peace and stability, governance, and KE

Although weak according to Andrés, et al. (2015), the connection between KE and governance is obvious. It is also hard to measure due to the lack of specificity with which to represent KE. M.H. Khan (2007) observes that liberal economists tend to think of governance as "market-enhancing capabilities that reduce transaction costs and enable markets to work more efficiently,[whereas for] … heterodox economists governance is the capacities to overcome entrenched market failures" (pp. 8-16). In this case governance is important to economic growth for two different reasons. First, economic growth happens when markets are efficient, even if output remains unchanged; in another, governance promotes economic growth only if it enhances productivity. In examining the historical evidence, Khan(2007)

finds a statistically strong effect of governance as market-enhancing capabilities on economic growth for a sample of developed and developing countries, but no such effect at all for African countries.

An example of market-enhancing governance is also evident from Bigsten and Durevall's (2002) study which uses globalization and market integration interchangeably, so that global markets imply the 'law of one price', and deviations from (exceptions to) that law are taken as punishable market offenses. They offer Zimbabwe's experience as an example of a country that has been punished by market forces for violating of 'the law of one price.' However, it seems that governance as productivity-enhancing is a better model for African countries, although it is also the mechanism S. Korea, Malaysia, and China have used with stellar, and India and Latin America with mixed, results, which seems to suggest that the problem is in the implementation of productivity-enhancing governance – not the model itself (see Khan, 2007, p. 21, last paragraph).

Fayissa and Nsiah (2010) provide further evidence of the effects of governance on economic growth for African countries. The 'good governance' goes hand-in-hand with good institutions as economic growth drivers, leading to the conclusion that (a) 'good governance has a positive and significant impact on growth, regardless of the proxy used for governance' (p.14), and (b) low-income countries benefit more from good governance than high-income countries. Such a conclusion is reasonable in light of the argument by Kaufmann and Kraay(2003), Kaufmann, Kraay, and Zoido-Labaton (2002),Kaufmann and Kraay (2002), Kaufmann and Zoido-Labaton (1999a, 1999b) that good governance leads to economic growth, but in the case of 'state capture', economic growth does not lead back to good institutions or good governance (cf. Khan, 2010). The result is also consistent with Alesina, Spolaore, and Wacziarg's (2000) assertion that performance depends on the balance between the 'economic integration' effect of trade and the 'political disintegration' effect of FDI.

Contrary to the preceding argument Quibria (2006) found that for Asian countries economic growth has been fastest in countries with low governance indicators. The inconsistency may be due to the different measures of governance used. Amavilah (2009b, 2009c, 2009d) observes that the influence of governance on economic performance depends on how governance is measured. For example, using the World Bank's six world governance indicators and the Mo Ibrahim Foundation's governance indicators for African countries, one finds that although governance has a positive effect on economic growth on average, the effects of specific measures of governance differ, often in opposite directions. According to

the six world indicators of governance, the 'rule of law' *constrains*, but with respect to Mo Ibrahim's indicators, it *promotes*, economic performance. Whichever way, there is a relationship between governance and economic performance activity (cf. Strulik and Prskawetz, 2013).

Using the KOF Index of Globalization, Dreher (2003, 2006) looked at 123 countries over the 1970-2000 period and determined that globalization led to economic growth, even as it did not reduce poverty and income inequality in all countries.[3] Political globalization had no major effect, information flows (ICTs) had minimal effects, and economic globalization had strong effects, but such effects were conditional on the nature of global relations between developed and developing countries. Amavilah (2009d) utilized Dreher's data to compare the effects of globalization, governance, and physical and human capital on the economic performance of Sub-Saharan African countries, and discovered that economic performance varied with measures of globalization and governance. However, it is social globalization rather than economic globalization that is most beneficial to growth. On average the quality of institutions is important to economic performance, but measures of institutional quality have different effects on performance.

Last, but not least, Goklany (2002) has argued that globalization improved the well-being of nations because it reduced hunger, infant mortality, and child labor, as well as increased life-expectancy. Tsai (2007) adds that while average and political globalization have improved the well-being of nations, social and economic globalization have had either negative or positive effects. Working with the Human Development Index (HDI) as a measure of national well-being Amavilah (2009b, 2009c) uncovered that social globalization is important to the well-being of 93 nations worldwide, but not nearly as much as material well-being (real GDP per capita). Thus, we claim that only certain kinds of globalization affect peace and stability in ways conducive to governance, and hence KE.

3. Methodology: Variables, data and methods

Below we consider a number of measurement issues, beginning with key variables and data**.**

[3]The KOF data is available at http://globalization.kof.ethz.ch/. As of 2015 KOF Index has grown to 207 countries and territories.

3.1 Variables and data

We investigate a panel of 53 African countries (excluding South Sudan) with data from African Development Indicators of the World Bank for the period 1996-2010. We limit the scope of the investigation to that period because the data for the indicators of peace and political stability is only available from 1996. The year 2010 is based on data availability at the time of the study. The focus on Africa is because there is a gap in the current literature about the KE of African countries.

Most of the data is from World Governance Indicators and World Development Indicators of the World Bank. For example, the governance indicators are from World Governance Indicators whereas other macroeconomic indicators are from World Development Indicators (see Table 1). The KE variables contain the four dimensions of the World Bank's KE index, namely: education, innovation, economic incentives and institutional regime and ICT. The political stability indicator is only available from World Governance Indicators, and that too has contributed to the scope of the study.

Table1characterizes key variables, data, and data sources. Additional variable definitions and clarifications are in table footnotes.Among the key variables are indicators of KE (Panel A), governance (Panel B), globalization (Panel C), and peace and stability (Panel D), as well as control variables (Panel E). Preliminary descriptive statistics reveal very high coefficients of correlation, some of them running as high as |-0.945| like that between Innovex and Creditex, for instance.[4] The high correlations indicate a strong presence of heteroscedasticity, along with multicollinearity, which is in line with previous literature which documented that constituent elements of the Knowledge Economy Index (KEI) are correlated with one another. Hence, we first apply the principal component analysis (PCA) to reduce a large set of highly correlated variables into a smaller set of uncorrelated principal components (PCs) that retain necessary and sufficient information as was in the initial dataset to KE and governance indicators (cf. Asongu, 2013a, 2013b, 2015; Andrés et al, 2015). We use the Kaiser (1974) and Jolliffe (2002) criterion for retaining the PCs with eigenvalues greater than the mean or one, because they denote eigenvectors which contain a significant proportion of the initial information.

[4] Such data and other auxiliary material are available upon request.

3.2 Knowledge economy indicators

Table 2below displays the first PCs for which eigenvalues are greater than one: education (*Educatex)*, information and communication technology (*ICTex)*, innovation *(Innovex)*, and economic incentives (*Creditex)*.

3.3 Governance indicators

We limit the concept of governance to economic and institutional dimensions only, because the political aspect of governance (peace and stability) is to be used in the first-phase of the estimation process. To begin with, we obtain a composite indicator of *general governance* (GG), and then decompose it into its economic (government effectiveness and regulation quality) and institutional (corruption-control and rule of law) dimensions. *Economic*

Table 1: Definition of variables

Variables	Signs	Variable definitions	Sources
Panel A: Knowledge Economy			
Panel A1: Education			
Primary School Enrolment	PSE	School enrolment, primary (% of gross)	World Bank (WDI)
Secondary School Enrolment	SSE	School enrolment, secondary (% of gross)	World Bank (WDI)
Tertiary School Enrolment	TSE	School enrolment, tertiary (% of gross)	World Bank (WDI)
Education in KE	Educatex	First PC of PSE, SSE & TSE	PCA
Panel A2: Information & Infrastructure			
Internet Users	Internet	Internet users (per 100 people)	World Bank (WDI)
Mobile Cellular Subscriptions	Mobile	Mobile subscriptions (per 100 people)	World Bank (WDI)
Telephone lines	Tel	Telephone lines (per 100 people)	World Bank (WDI)
Information & Communication Technology (ICT) in KE	ICTex	First PC of Internet, Mobile & Tel	PCA
Panel A3: Economic Incentives			
Financial Activity (Credit)	Pcrbof	Private domestic credit from banks and other financial institutions	World Bank (FDSD)
Interest Rate Spreads	IRS	Lending rate minus deposit rate (%)	World Bank (WDI)
Economic Incentives in KE	Creditex	First PC of Pcrbof and IRS	PCA
Panel A4: Innovation			
Scientific & Technical Publications	STJA	Number of Scientific & Technical Journal Articles	World Bank (WDI)
Trademark Applications	Trademark	Total Trademark Applications	World Bank (WDI)
Patent Applications	Patent	Total Residents + Nonresident Patent Applications	World Bank (WDI)
Innovation in KE	Innovex	First PC of STJA, Trademarks and Patents	PCA

Panel B: Governance			
Panel B1: Economic Governance			
Government Effectiveness	GE	Government effectiveness (estimate): measures the quality of public services, the quality and degree of independence from political pressures of the civil service, the quality of policy formulation and implementation, and the credibility of governments' commitments to such policies.	World Bank (WGI)
Regulation Quality	RQ	Regulation quality (estimate): measured as the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development.	World Bank (WGI)
Economic Governance	EG	First Principal Component of Government Effectiveness and Regulation Quality. The capacity of government to formulate & implement policies, and to deliver services.	PCA
Panel B2: Institutional Governance			
Rule of Law	RL	Rule of law (estimate): captures perceptions of the extent to which agents have confidence in and abide by the rules of society and in particular the quality of contract enforcement, property rights, the police, the courts, as well as the likelihood of crime and violence.	World Bank (WGI)
Corruption Control	CC	Control of corruption (estimate): captures perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as 'capture' of the state by elites and private interests.	World Bank (WGI)
Institutional Governance	IG	First Principal Component of Rule of Law and Corruption-Control. The respect for citizens and the state of institutions that govern the interactions among them	PCA
Panel B3: General Governance			
General Governance	GG	First principal component of Political Stability, Voice & Accountability, Government Effectiveness, Regulation Quality, Rule of Law and Corruption-Control.	PCA
Panel C: Globalization			
Trade Openness	Trade	Exports plus Imports of Commodities (% of GDP)	World Bank (WDI)
Financial Openness	FDI	Gross Foreign Direct Investment (% of GDP)	World Bank (WDI)
Globalization	Global	Trade Openness + Financial Openness	Employed interactively during

			regressions
Panel D: Political Stability/No Violence (Dependent variable)			
Political Stability	PolSta	Political stability/no violence (estimate): measured as the perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional and violent means, including domestic violence and terrorism.	World Bank (WDI)
Panel E: Control Variables			
Inflation	Infl	Consumer Price Index (Annual %)	World Bank (WDI)
Government Expenditure	Gov. Exp.	Government's Final Consumption Expenditure (% of GDP)	World Bank (WDI)
Economic Prosperity	GDPg	Gross Domestic Product (Annual %)	World Bank (WDI)
ICT Service Exports	ICTexp	ICT Service Exports (% of service exports, BoP)	World Bank (WDI)
Liquid Liabilities	Fdgdp	Financial System Deposits (% of GDP)	World Bank (WDI)
Financial System Efficiency	FcFd	Financial System Credit on Financial System Deposits	World Bank (WDI)

WDI: World Bank Development Indicators. WGI: World Governance Indicators.GDP: Gross Domestic Product. PC: Principal Component. PCA: Principal Component Analysis. Educatexis the first principal component of primary, secondary and tertiary school enrolments. ICTex: first principal component of mobile, telephone and internet subscriptions. Creditex: First PC of Private domestic credit and interest rate spread. PC: Principal Component. RL: Rule of Law. RQ: Regulation Quality. GE: Government Effectiveness. PS: Political Stability. CC: Control of Corruption. BoP: Balance of Payments. The definitions in Table 1 are from World Governance Indicators and World Development Indicators. The computation and presentation of the governance variables are such that higher values indicate better governance conditions.

Governance (EG) is defined as the ability of government to formulate and implement policies that are conducive to the economic activity.

Table 2: Principal component analysis (PCA) for KE indicators

Knowledge Economy dimensions		**Component Matrix (Loadings)**			**First PC**	**Eigen Value**	**Indexes**
Education	School Enrolment	PSE 0.438	SSE 0.657	TSE 0.614	0.658	1.975	Educatex
Information & Infrastructure	ICTs	Internet 0.614	Mobile 0.584	Telephone 0.531	0.730	2.190	ICTex
Innovation System	Innovation	STJA 0.567	Trademarks 0.572	Patents 0.592	0.917	2.753	Innovex
Economic Incentive	Economic Incentive	Private Credit -0.707	Interest rate Spread 0.707		0.656	1.313	Creditex

PC: Principal Component. PSE: Primary School Enrolment. SSE: Secondary School Enrolment. TSE: Tertiary School Enrolment. PC: Principal Component. ICTs: Information and Communication Technologies. Educatex is the first principal component of primary, secondary and tertiary school enrolments. ICTex: first principal component of mobile, telephone and internet subscriptions. STJA: Scientific and Technical Journal Articles. Innovex: first principal component of STJA, trademarks and patents (resident plus nonresident). Creditex: first principal component of private domestic credit and interest rate spread.

Table 3: Principal component analysis (PCA) for governance (Gov)

Principal Components	Component Matrix(Loadings)				Proportion	Cumulative Proportion	Eigen Value
	RQ	GE	RL	CC			
First PC (GG)	0.478	0.514	0.514	0.493	0.859	0.859	3.438
Second PC	0.786	-0.006	-0.149	-0.601	0.078	0.938	0.314
Third PC	0.392	-0.567	-0.385	0.614	0.033	0.971	0.132
First PC (EG)	0.707	0.707	---	---	0.906	0.906	1.812
Second PC	-0.707	0.707	---	---	0.093	1.000	0.187
First PC (IG)	---	---	0.707	0.707	0.935	0.935	1.871
Second PC	---	---	-0.707	0.707	0.064	1.000	0.128

PC: Principal Component. RL: Rule of Law. RQ: Regulation Quality. GE: Government Effectiveness. CC: Control of Corruption. GG (General Governance): First PC of RQ, GE, RL & CC. EG (Economic Governance): First PC of RQ & GE. IG (Institutional Governance): First PC of RL & CC.

Institutional governance (IG) denotes the respect for citizens and the state of institutions that govern the interactions among them as well between the people and institutions, and the government (Andrés et al. 2014). Table 3 above displays eigenvalues for GG, EG, and IG which are in excess of one.

3.4 Peace and stability indicators, and control variables

The indicators of peace and stability are not subjected to the PCA; they are used in the first-stage. Also not considered for the PCA are control variables which include: *inflation*, *government expenditure*, *per capita economic prosperity*, *ICT service exports*, *liquid liabilities* and *financial system efficiency*. Inflation is an annual percentage; financial efficiency are ratios of financial system credit (liabilities)/financial system bank deposits (assets); per capita economic prosperity is GDP growth rate adjusted for population growth; exports are percentages of ICT service exports as a ratio of total exports; and government expenditure and liquid liabilities are time-dynamics of current real GDP.

The choice of control variables is consistent with Andrés et al. (2015). With the exception of inflation, we generally expect control variables to affect KE positively. However, because the KE dimensions have distinct characteristics, the expected signs are neither predictable nor known *a priori*. For instance, per capita economic growth may not have the same effect on education and innovation. As another example, the presence of surplus liquidity issues documented in the African financial literature (Saxegaard, 2006; Asongu, 2014b; Tchamyou & Asongu, 2017) could change the expected sign of financial efficiency and liquid liabilities on economic incentives (credit availability).

3.5 Theoretical Framework

We claim that g*lobalization induces peace and stability, which affects governance, and hence KE*. The claim is theoretically sound and demonstrable as an augmented Solow (1957) aggregate production function in which KE(Y_{it})across countries(i) at any time(t) depends on conventional factors and forces of production (X_{it}) and the state of technology (A_{it}), i.e.,

$$Y_{it} = (X_{it}A_{it})^{\alpha} \exp(\mu_{it}). \quad (1)$$

Next we let the state of technology evolve as $A_{it} = A_{i0} \exp(gt + \beta_i Z_{it})$ such that (1) expands to

$$Y_{it} = X_{it}^{\alpha} A_{i0}^{\alpha} \exp(\alpha gt + \alpha\beta_i Z_{it} + \mu_{it}). \quad (2)$$

For $Stability \in Z_{it}$, we can restate (2) as

$$Y_{it} = X_{it}^{\alpha} A_{i0}^{\alpha} \exp(\alpha gt + \alpha\beta_1 Stability_{it} + \alpha\beta_2 Z_{it}^{*} + \mu_{it}), \quad (3)$$

where empirically $\alpha gt = \xi_t$is a time-fixed effect,Stability is a placeholder for 'peace and stability', and $Z_{it}^{*} = 1 - Z_{it}$ are sources of influence other than Stability.Dividing both sides of (3) by some $X_j$and taking the natural logarithms leads to the X_j -intensive form of (3) as:

$$y_{it} = a_{i0} + \alpha gt + \alpha x_{it} + \alpha\beta_1 Stability_{it} + \alpha\beta_2 z_{it}^{*} + \mu_{it}, \quad (4)$$

where$y_{it} = \ln\left(\frac{Y_{it}}{X_{jt}}\right), a_{i0} = \alpha \ln(A_{i0}),\ x_{it} = \ln\left(\frac{X_{it}}{X_{jt}}\right), z_{it}^{*} = \frac{Z_{it}^{*}}{X_{jt}}, i \neq j.$

Since our claim is that$Stability_{it} = f(Globalization_{it})$, and $Gov_{it} = f(Stability_{it})$,then the hypotheses we put forward are simply restatements of (4) as

$$Y_{it} = X_{it}^{\alpha} A_{i0}^{\alpha} \exp[(\alpha gt + \alpha\beta_1(Gov_{it}(Stability_{it}(Globalization_{it}))))]_{it} + \alpha\beta_2 Z_{it}^{*} + \mu_{it}). \quad (4')$$

We assumeA_{iO}^{α}instead of $(X_{it}A_{i0})^{\alpha}$for simplicity and to avoid discussion of whether or not $A_{it}$is factor- biased and or (dis)embodied. Also note that the arithmetic sign of $\alpha\beta_i$ is ambiguous, i.e., $\alpha\beta_i > 0$ *iff* $\alpha > 0$ and $\beta_i > 0$, or $\alpha < 0$ and $\beta_i < 0$. Similarly, $\alpha\beta_i < 0$ iff$\alpha > 0$ and $\beta_i < 0$, or $\alpha < 0$ and $\beta > 0$.

3.6 Testable hypotheses

We use three main steps to substantiate the proposition that globalization induces peace and stability, which in turn affects governance, and hence KE.The formulation of, and the connection between, testable hypotheses are based on intuition, the relevant literature and stylized facts we have engaged.The first-stage addresses globalization-induced peace and stability. The instrumentation process produces three main outcomes: trade-induced stability (TradeStab), stability induced by financial openness (FDIStab), and stability induced by general globalization (GlobStab).[5]

In the second-stage, governance is instrumented with globalization-induced stability obtained from first-stage regressions. Nine outcomes emerge from this exercise: EG as a function of trade-induced stability; EG as determined by stability that is induced by financial openness; EG as a function of globalization-induced stability; IG driven by trade-induced stability; IG as affected by stability based on financial openness; IG as caused by globalization-induced stability; GG as a function of trade-induced stability; GG as influenced by stability resulting from financial openness, and finally GG as a function of globalization-induced stability.

The third-stage of the estimation process deals with the KE-governance relationship. In the end the entire estimation process reduces to the following hypotheses:

Hypothesis 1: *Stability from globalization is associated with governance which influences KE in terms of education*.

Hypothesis 2: *Stability from globalization is associated with governance which influences KE in terms of ICT* .

Hypothesis 3: *Stability from globalization is associated with governance which influences KE in terms of economic incentives*.

Hypothesis 4: *Stability from globalization is associated with governance which influences KE in terms of innovation*.

With these four hypotheses the research problem is ultimately about the proposition that Globalization →Stability → Governance → KE.

[5]Two notes here: One, we use the term "induce" only to assert significant correlations between and among our key variables, not causation. Two, we have dropped *de juré* capital openness (KAOPEN) in preference for the *de facto* (Foreign direct investment) measurement because the former has a lower standard deviation.

3.7 Estimation technique

We utilize an instrumental variable (IV) panel fixed effects estimation strategy. As far as we are aware, this is the first attempt at tackling the endogeneity problem via a three-stage process. The strategy is appropriate because it requires the instruments to be strong, but not necessarily valid. In other words, we are more concerned with the strength of the instruments than we are with their validity for two main reasons. While existing research such as White (1980a, 1980b), for example, has laid the theoretical ground upon which the intuitive underpinning of our estimation technique, compared to previous studies we use the fixed effect strategy to reduce the influence of omitted variable due to geographical, cultural, and other factors (Oxley and McAleer, 1993; Pesaran, 2006). In that limited sense this is the first paper to engage such empirics. Second, the problem we confront is not concerned with instrument validity. For instance, the first-stage does not require us to prove that globalization is valid in inducing peace and stability, but that it is strong in doing so. Hence, while the validity of globalization as an instrument for peace and stability may consolidate the intuition for the empirics, it is not a necessary condition to validate the transition to stage-two of the estimation process.

The following are the three-stages of the estimation strategy:

3.7.1 First-stage regression:

$$Stability_{it} = \gamma_0 + \gamma_1 (Trade)_{it} + \gamma_2 (FDI)_{it} + \xi_t + \upsilon_{it}, \qquad (5)$$

where Stability represents 'peace and stability', Trade is for foreign trade openness, FDI is Foreign Direct Investment as represented by financial openness, and ξ_t is a time-specific constant, accounting for time fixed effects. In this stage the estimation process saves the fitted values for use in the second-stage regression.[6]

3.7.2 Second-stage regression:

$$Governance_{it} = \beta_0 + \beta_1 (TradeStab)_{it} + \beta_2 (FDIStab)_{it} + \beta_3 (GlobStab)_{it} + \xi_t + \varepsilon_{it}, \qquad (6)$$

[6]IVTradeStab: Trade Openness influenced stability. IVFDIStab: Financial Openness influenced stability. IVGlobStab: Globalization influenced stability.

where Governance = Goventails GG, EG, and IG, and TradeStab, FDIStab, and GlobStabrefer to globalization related peace and stability. Again, governance indicators are regressed on the fitted values of Stability from the first-stage, thereby generating nine main variables described above.[7]

3.7.3 Third-stage regression:

$$\begin{aligned} KE_{it} &= \alpha_0 + \alpha_1(EGTradeStab)_{it} + \alpha_2(EGFDIStab)_{it} + \alpha_3(EGGlobStab)_{it} \\ &+ \alpha_4(IGTradeStab)_{it} + \alpha_5(IGFDIStab)_{it} + \alpha_6(IGGlobStab)_{it} \\ &+ \alpha_7(GGTradeStab)_{it} + \alpha_8(GGFDIStab)_{it} + \alpha_9(GGGlobStab)_{it} + \alpha_{10}X_{it} + \xi_t + \omega_{it} \end{aligned} \quad (7)$$

where on the left-hand side *KE* is represented by *Educatex*, *ICTex*, *Innovex*, and *Creditex*, and on the right-hand side are indicators of governance as influenced by globaziation-related peace and stability, and X is a vector of control variables. Note that it would seem that (7) does not include the conventional factors of production like labor, and human and physical capital. However, these are implied by the "economic growth" variable.

Also note that(a) the vector of error terms, $\mu_{it,}$ in (1)-(4) is now specified in (5)-(7) as υ_{it} , ε_{it},and ω_{it} respectively, and (b) in a Solow production function framework $\xi_t = \alpha gt$ is a Hicks neutral Solow constant (residual). In Solow *originale* $A_{it} = \exp(gt)$,and its growth rate is$g$. Here we are saying that KE is augmented by globalization-influenced peace and stability acting through governance such that $A_{it} = (A_{i0}\exp(gt + \beta_i Z_{it}))^{\alpha}$. In that case the rate of technical change is $\alpha(g + \eta_i), \eta_i = \frac{d[\beta_i Z_{it}]}{dt}$.

A correlation analysis is employed to assess the degree of substitution of the 'generated regressors' from second-stage regressions to mitigate statistical problems that could bias the

[7]IVEGTradeStab: Economic governance (EG) associated with Trade openness (Trade) influenced stability (Stab). IVEGFDIStab: Economic governance (EG) associated with financial openness (FDI) influenced stability (Stab). IVEGGlobStab: Economic governance (EG) associated withGlobalisation(Glob) influenced stability(Stab). IVIGTradeStab: Institutional governance (IG) associated with Trade openness (Trade) influenced stability (Stab). IVIGFDIStab: Institutional governance (IG) associated with Financial openness (FDI) influenced stability (Stab). IVIGGlobStab: Institutional governance (IG) associated with Globalization (Glob) influenced stability (Stab). IVGGtTradeStab: General governance (GG) associated with Trade openness (Trade) influenced stability (Stab). IVGGFDIStab: General governance (GG) associated with Financial openness (FDI) influenced stability (Stab). IVGGGlobStab: General governance (GG) associated with Globalization (Glob) influenced stability (Stab).

signs of estimated coefficients and reduce their technical efficiency (cf. Pagan, 1984). From that analysis and previous literature, it is clear that in all three stages the regressions are consistent with Heteroscedasticity and Autocorrelation Consistent (HAC) standard errors, non-homogenous variance of an unknown form, and time fixed effects. To address these issues,we deploy the principal component analysis, followed by the HAC technique. Judge, Griffiths, Hill, Lütkepohl, and Lee (1985, Chapter 11) survey specifications of the heteroskedastic variance. We assume the variance to be of an unknown functional form, which does not defeat our purpose since we are not trying to correct for endogeneity with instrumental variables per se. Thus, we see no classical regression imperative for instrument validity. We are using an IV approach to demonstrate relations among globalization, peace and stability, governance, and KE. We do not care too much about whether one variable is valid in instrumenting another. What we care about most is that, based on the literature and intuition, there are grounds for strong relations among variables. In that sense the applied IV econometrics approach need not be restricted to the validity of the instruments.

4. Results and discussion

In this section we present the estimation results by stage, and then discuss their implications for policy and further research before we conclude.

4.1 Results

4.1.1First- and second-stage instrumentations

Table 4reports the instrumentation of the first- and second-stage regressions. Panel A indicates positive effects of trade on peace and stability, while those of FDI switch signs. In Panel B trade-influenced peace and stability affects governance more strongly than FDI-related peace and stability. Again, while the procedure for testing the strength of instruments could be limited to the information criterion in Panel A as documented in Beck, Demirguc-Kunt and Levine (2003), and Andrés and Asongu (2013), we have gone a step further to provide evidence on the strength of instruments in Panel B. The instrumentation process is not based on Ordinary Least Squares (OLS), because the instruments are neither strong nor valid using the OLS estimator. Therefore, we use the HAC procedure to generate results with appealing information criteria based on the strength of the instruments.

4.1.2 Third-stage instrumentation

Before engaging the third-stage regressions to analyze the main hypotheses, we examined multicollinearity and overparameterization issues in the fitted values from second-stage regressions. Summary statistics for the instrumented variables revealed a substantial degree of substitution among the fitted values obtained from the second-stage instrumentation process. Hence, the third-stage specifications employ the instrumented values independently across specifications.

4.1.3 Third-state regressions: Investigating the four hypotheses

The results for the KE Hypothesis 1 that peace and stability resulting from globalization is related to governance which influences KE in terms of education are reported in Table 5. The hypothesis is accepted across specifications. The positive signs are consistent with both intuition and the predictions of economic theory. In increasing order of relevance and significance the effects of trade-influenced stability on institutional governance are weakest whereas those of trade-influenced stability are the strongest, with other cases falling between the two extremes.

KE Hypothesis 2 holds that peace and stability from globalization is related to governance, which influences KE in terms of ICT. In this case the estimates that are significant have the expected signs, and are consistent with both commonsense and theoretical predictions. For example, the effects on IG of the peace and stability resulting from financial openness are strongest and positive, but they are lowest with respect to EG. The impact on GG from the stability influenced by financial openness falls in-between (Table 6).

Table 4: First and second-stage regressions (Instrumentation with panel HAC fixed effects)

Panel A: Instrumentation

	First-stage regressions Dependent variable: Globalization-influenced			Second-stage regressions Dependent variable: institutional and economic governance Governance affected by Globalization-influenced conflicts								
	Political Stability/No violence			**Economic Governance**			**Institutional Governance**			**General Governance**		
Constant	**-0.574*** (0.000)**	**-0.416*** (0.000)**	**-0.532** (0.010)**	0.542 (0.855)	1.495 (0.271)	-0.144 (0.813)	3.297 (0.372)	0.714 (0.736)	0.151 (0.840)	2.635 (0.554)	1.574 (0.433)	0.048 (0.954)
Trade	0.0004 (0,822)	----	0.001 (0.537)	---	---	---	---	---	---	---	---	---
FDI	---	0.001 (0.840)	-0.001 (0.789)	---	---	---	---	---	---	---	---	---
IVTradeStab	---	---	---	0.872 (0.878)	---	---	5.909 (0.384)	---	---	4.819 (0.575)	---	---
IVFDIStab	---	---	---	---	2.929 (0.413)	---	---	0.956 (0.850)	---	---	2.774 (0.600)	---
IVGlobStab	---	---	---	---	---	-1.520 (0.346)	---	---	-0.476 (0.791)	---	---	-1.410 (0.528)
Adjusted R^2	0.809	0.807	0.812	0.894	0.910	0.909	0.899	0.915	0.914	0.910	0.928	0.927
Fisher	**48.292*** **	**41.82*** **	**40.28*** **	**92.74*** **	**97.45*** **	**90.95*** **	**98.29*** **	**104.0*** **	**97.43*** **	**111.5*** **	**124.6*** **	**115.6*** **
Obs	567	440	419	542	418	397	554	430	409	542	418	397
Countries	51	45	45	50	44	44	51	45	45	50	45	44

Panel B: Testing the Strength of the instruments

Constant	0.0000 (1.000)	0.0000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)	0.000 (1.000)
Instrument	1.000 (0.822)	1.000 (0.840)	1.000 (0.534)	1.000 (0.878)	1.000 (0.413)	1.000 (0.346)	1.000 (0.384)	1.000 (0.850)	1.000 (0.791)	1.000 (0.575)	1.000 (0.600)	1.000 (0.528)
Ajusted R^2	0.809	0.807	0.812	0.894	0.910	0.909	0.899	0.915	0.914	0.910	0.928	0.927
Fisher	**48.292*** **	**41.82*** **	**41.28*** **	**92.74*** **	**97.45*** **	**90.95*** **	**98.29*** **	**104.0*** **	**97.43*** **	**111.5*** **	**124.6*** **	**115.6*** **
Obs	567	440	419	542	418	397	554	430	409	542	418	397
Countries	51	45	45	50	44	44	51	45	45	50	45	44

IVTradeStab: Trade Openness influenced stability. IVFDIStab: Financial Openness influenced stability; IVGlobStab: Globalization influenced Stability. *, **, ***: significance levels at 10%, 5% and 1% respectively. HAC: Heteroscedasticity and Autocorrelation Consistent

Table 5: Effects on Education (Educatex) with panel HAC panel fixed effects

	Dependent variable: *Educatex* (Third-Stage Regressions)								
Constant	**-21.05***	**-7.889****	-1.449	-2.615	**-23.56****	2.374	**-4.962***	**-11.63****	3.302
	(0.072)	**(0.030)**	(0.000)	(0.104)	**(0.026)**	(0.272)	**(0.087)**	**(0.028)**	(0.298)
IVEGTradeStab	**26.66***	---	----	---	---	---	---	---	---
	(0.068)	**8.400****							
IVEGFDIStab	---	**(0.024)**	----	---	---	---	---	---	---
IVEGGloStab	---	---	0.737	---	---	---	---	---	---
			(0.406)						
IVIGTradeStab	---	---	---	**3.937***	---	---	---	---	---
				(0.068)					
IVIGFDIStab	---	---	---	---	**25.71****	---	---	---	---
					(0.024)				
IVIGGlobStab	---	---	---	---	---	-1.956	---	---	---
						(0.361)			
IVGGTradeStab	---	---	---	---	---	---	**4.828***	---	---
							(0.068)		
IVGGFDIStab	---	---	---	---	---	---	---	**8.870****	---
								(0.024)	
IVGGGlobStab	---	---	---	---	---	---	---	---	-2.109
									(0.361)
Inflation	0.005	0.004	**0.005****	0.005	0.004	0.004	0.005	0.004	0.004
	(0.671)	(0.357)	**(0.013)**	(0.671)	(0.357)	(0.465)	(0.671)	(0.357)	(0.465)
Gov. Expenditure	**0.006****	0.003	-0.002	**0.006****	0.003	0.002	**0.006****	0.003	0.002
	(0.028)	(0.303)	(0.152)	**(0.028)**	(0.303)	(0.413)	**(0.028)**	(0.303)	(0.413)
GDP pcg	-0.009	-0.008	0.005	-0.009	-0.008	0.001	-0.009	-0.008	0.001
	(0.232)	(0.481)	(0.506)	(0.232)	(0.481)	(0.888)	(0.232)	(0.481)	(0.888)
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.936	0.946	0.985	0.936	0.946	0.944	0.936	0.946	0.944
Fisher	**58.21*****	**63.71*****	**200.57*****	**58.21*****	**63.71*****	**60.87*****	**58.21*****	**63.71*****	**60.87*****
Countries	31	28	28	31	28	28	31	28	28
Observations	149	125	125	149	125	125	149	125	125

IVEGTradeStab: Economic governance (EG) associated with Trade openness (Trade) influenced stability (Stab). IVEGFDIStab: Economic governance (EG) associated with financial openness (FDI) influenced stability (Stab). IVEGGlobStab: Economic governance (EG) associated with Globalisation(Glob) influenced stability(Stab). IVIGTradeStab: Institutional governance (IG) associated with Trade openness (Trade) influenced stability (Stab). IVIGFDIStab: Institutional governance (IG) associated with Financial openness (FDI) influenced stability (Stab). IVIGGlobStab: Institutional governance (IG) associated with Globalization (Glob) influenced stability (Stab). IVGGtTradeStab: General governance (GG) associated with Trade openness (Trade) influenced stability (Stab). IVGGFDIStab: General governance (GG) associated with Financial openness (FDI) influenced stability (Stab). IVGGGlobStab: General governance (GG) associated with Globalization (Glob) influenced stability (Stab). Gov. Government. GDPpcg: GDP per capita growth. *, **, ***: significance levels at 10%, 5% and 1% respectively. HAC: Heteroscedasticity and Autocorrelation Consistent. It is important to note that the high coefficient of determination (or R^2) may reflect the explanatory power of the control variables used, instead of the explanatory power of the independent variable of interest.

Table 7 represents KE Hypothesis 3 which states that stability from globalization is related to governance, which influences KE in terms of economic incentives. The significant estimates have mixed signs, with the negative effects for FDI related estimates and positive for trade related globalization estimates. Specifically, the positive values related to globalization influenced stability are highest in regard to IG and lowest with respect to EG, with GG lying between. In absolute terms, the effects of FDI-related estimates are highest in IG and lowest in EG, and GG from FDI-influenced stability is in the middle. The negative effect of FDI could be explained by the fact that FDI itself is weakly associated with the issues of surplus liquidity in African financial institutions. Trade is a mutually beneficial exchange of comparative advantages; FDI flows easily when the risk-free rate of return is higher in the destination, than it is in the originating, country. Alternatively, while trading activities are most likely to involve borrowing from domestic banks mainly, FDI activities involve foreign banks as the main financial players. In such cases FDI would have a limited positive impact on peace and stability, and could have a negative effect if it is driven by politics. Put differently, while trade tends to integrate, FDI politics tend to disintegrate (Alesina, Spolaore, Wacziarg, 2000, cf. Rodrik and Subramanian, 2009).

Table 6: Effects on ICT (ICTex) with panel HAC panel fixed effects

	Dependent variable: *ICTex* (Third-Stage Regressions)								
Constant	-40.98 (0.202)	**-24.28***** **(0.007)**	7.313 (0.103)	-4.573 (0.241)	**-61.02***** **(0.006)**	18.318 (0.117)	-9.203 (0.219)	**-32.98***** **(0.006)**	9.940 (0.109)
IVEGTradeStab	46.329 (0.198)	---	----	---	---	---	---	---	---
IVEGFDIStab	---	**25.68***** **(0.006)**	----	---	---	---	---	---	---
IVEGGloStab	---	---	-7.174 (0.127)	---	---	---	---	---	---
IVIGTradeStab	---	---	---	6.842 (0.198)	---	---	---	---	---
IVIGFDIStab	---	---	---	---	**78.64***** **(0.000)**	---	---	---	---
IVIGGloStab	---	---	---	---	---	-22.89 (0.127)	---	---	---
IVGGTradeStab	---	---	---	---	---	---	8.390 (0.198)	---	---
IGGFDIStab	---	---	---	---	---	---	---	**27.12***** **(0.000)**	---
IVGGGloStab	---	---	---	---	---	---	---	---	-7.732 (0.127)
Inflation	0.011 (0.465)	0.022 (0.113)	0.025 (0.116)	0.011 (0.465)	0.022 (0.113)	0.025 (0.116)	0.011 (0.465)	0.022 (0.113)	0.025 (0.116)
Gov. Expenditure	0.002 (0.636)	**0.006**** **(0.044)**	**0.010**** **(0.039)**	0.002 (0.636)	**0.006**** **(0.044)**	**0.010**** **(0.039)**	0.002 (0.636)	**0.006**** **(0.044)**	**0.010**** **(0.039)**
GDP pcg	**-0.051***** **(0.000)**	**-0.077***** **(0.000)**	**-0.058***** **(0.000)**	**-0.051***** **(0.000)**	**-0.077***** **(0.000)**	**-0.058***** **(0.000)**	**-0.051***** **(0.000)**	**-0.077***** **(0.000)**	**-0.058***** **(0.000)**
ICTservicesexport	**0.102***** **(0.006)**	**0.100**** **(0.010)**	**0.085**** **(0.025)**	**0.102***** **(0.000)**	**0.100**** **(0.010)**	**0.085**** **(0.025)**	**0.102***** **(0.006)**	**0.100**** **(0.010)**	**0.085**** **(0.025)**
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.777	0.817	0.809	0.777	0.817	0.809	0.777	0.817	0.809
Fisher	**20.95*****	**25.21*****	**23.94*****	**20.95*****	**25.21*****	**23.94*****	**20.95*****	**25.21*****	**23.94*****
Countries	28	27	27	28	27	27	28	27	27
Observations	201	185	185	201	185	185	201	185	185

IVEGTradeStab: Economic governance (EG) associated with Trade openness (Trade) influenced stability (Stab). IVEGFDIStab: Economic governance (EG) associated with financial openness (FDI) influenced stability (Stab). IVEGGlobStab: Economic governance (EG) associated with Globalisation(Glob) influenced stability(Stab). IVIGTradeStab: Institutional governance (IG) associated with Trade openness (Trade) influenced stability (Stab). IVIGFDIStab: Institutional governance (IG) associated with Financial openness (FDI) influenced stability (Stab). IVIGGlobStab: Institutional governance (IG) associated with Globalization (Glob) influenced stability (Stab). IVGGtTradeStab: General governance (GG) associated with Trade openness (Trade) influenced stability (Stab). IVGGFDIStab: General governance (GG) associated with Financial openness (FDI) influenced stability (Stab). IVGGGlobStab: General governance (GG) associated with Globalization (Glob) influenced stability (Stab). *,**,***: significance levels at 10%, 5% and 1% respectively. HAC: Heteroscedasticity and Autocorrelation Consistent. It is important to note that the high coefficient of determination (or R^2) may reflect the explanatory power of the control variables used, instead of the explanatory power of the independent variable of interest.

Table 7: Effects on Economic incentives (Creditex) with panel HAC panel fixed effects

	Dependent variable: *Creditex* (Third-Stage Regressions)								
Constant	**3.894*** (0.092)**	**3.030*** (0.000)**	0.483 (0.298)	**1.505*** (0.001)**	**6.308*** (0.000)**	-0.939 (0.439)	**1.809*** (0.007)**	**3.813*** (0.000)**	0.142 (0.819)
IVEGTradeStab	-3.562 (0.218)	---	----	---	---	---	---	---	---
IVEGFDIStab	---	**-1.802** (0.017)**	----	---	---	---	---	---	---
IVEGGloStab	---	---	**0.731* (0.089)**	---	---	---	---	---	---
IVIGTradeStab	---	---	---	-0.526 (0.218)	---	---	---	---	---
IVIGFDIStab	---	---	---	---	**-5.517** (0.017)**	---	---	---	---
IVIGGloStab	---	---	---	---	---	**2.334* (0.089)**	---	---	---
IVGGTradeStab	---	---	---	---	---	---	-0.645 (0.218)	---	---
IVGGFDIStab	---	---	---	---	---	---	---	**-1.903** (0.017)**	---
IVGGGloStab	---	---	---	---	---	---	---	---	**0.788* (0.089)**
Inflation	-0.0009 (0.591)	-0.0004 (0.831)	-0.0005 (0.847)	-0.0009 (0.591)	-0.0004 (0.831)	-0.0005 (0.847)	-0.0009 (0.591)	-0.0004 (0.831)	-0.0005 (0.847)
Gov. Expenditure	0.001 (0.174)	0.0001 (0.902)	0.0001 (0.870)	0.001 (0.174)	0.0001 (0.902)	0.0001 (0.870)	0.001 (0.174)	0.0001 (0.902)	0.0001 (0.870)
GDPpcg	0.0008 (0.662)	0.002 (0.457)	0.001 (0.705)	0.0008 (0.662)	0.002 (0.457)	0.001 (0.705)	0.0008 (0.662)	0.002 (0.457)	0.001 (0.705)
Liquid liabilities	**-1.731*** (0.000)**	**-1.944*** (0.000)**	**-1.956*** (0.000)**	**-1.731*** (0.000)**	**-1.944*** (0.000)**	**-1.956*** (0.000)**	**-1.731*** (0.000)**	**-1.944*** (0.000)**	**-1.956*** (0.000)**
Financial efficiency	**-1.158*** (0.000)**	**-1.236*** (0.000)**	**-1.267*** (0.000)**	**-1.158*** (0.000)**	**-1.236*** (0.000)**	**-1.267*** (0.000)**	**-1.158*** (0.000)**	**-1.236*** (0.000)**	**-1.267*** (0.000)**
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.975	0.980	0.980	0.975	0.980	0.980	0.975	0.980	0.980
Fisher	**261.09*** **	**306.20*** **	**304.37*** **	**261.09*** **	**306.20*** **	**304.37*** **	**261.09*** **	**306.20*** **	**304.37*** **
Countries	24	20	20	24	20	20	24	20	20
Observations	211	172	172	211	172	172	211	172	172

IVEGTradeStab: Economic governance (EG) associated with Trade openness (Trade) influenced stability (Stab). IVEGFDIStab: Economic governance (EG) associated with financial openness (FDI) influenced stability (Stab). IVEGGlobStab: Economic governance (EG) associated with Globalisation(Glob) influenced stability(Stab). IVIGTradeStab: Institutional governance (IG) associated with Trade openness (Trade) influenced stability (Stab). IVIGFDIStab: Institutional governance (IG) associated with Financial openness (FDI) influenced stability (Stab). IVIGGlobStab: Institutional governance (IG) associated with Globalization (Glob) influenced stability (Stab). IVGGtTradeStab: General governance (GG) associated with Trade openness (Trade) influenced stability (Stab). IVGGFDIStab: General governance (GG) associated with Financial openness (FDI) influenced stability (Stab). IVGGGlobStab: General governance (GG) associated with Globalization (Glob) influenced stability (Stab). *,**,***: significance levels at 10%, 5% and 1% respectively. HAC: Heteroscedasticity and Autocorrelation Consistent. It is important to note that the high coefficient of determination (or R^2) may reflect the explanatory power of the control variables used, instead of the explanatory power of the independent variable of interest.

Finally, the KE Hypothesis 4 states that peace and stability from globalization is related to governance, which influences KE in terms of innovation. Table 8 indicates that the effects range from the low of -14.26 to the high of 23.95.The positive impacts for EG are highest at 23.95, followed by GG at 4.33, and last by IG at 3.53. Regarding the negative effects, globalization-influenced peace and stability has the largest negative effect (-14.26) on IG, -4.47 on EG, and -4.82 on GG. The logical inference is that trade openness is a more effective mechanism for the innovation aspect of KE than FDI in these countries.[8]

[8]The results in Tables 5-8 stress the strength of the relationships, and not so much the statistical significance of individual coefficients, although those are important, too.

Most of the key control variables have the expected signs. For example, government expenditure improves education. ICT services and government expenditure have a positive impact on ICT. Third, the negative relationship between the financial indicators and economic incentives confirm the predictions of economic theory as documented by the literature on the surplus liquidity issues in African financial institutions (cf. Saxegaard, 2006; Asongu et al., 2016b).

Table 8: Effects on Innovation (Innovex) with panel HAC panel fixed effects

	Dependent variable: *Innovex* (Third-Stage Regressions)								
Constant	**-17.197***	-2.687	**4.258****	-1.785	-5.721	**9.251***	**-3.745***	-3.400	**5.449***
	(0.071)	(0.773)	**(0.048)**	(0.101)	(0.782)	**(0.062)**	**(0.075)**	(0.777)	**(0.053)**
IVEGTradeStab	**23.948***	---	----	---	---	---	---	---	---
	(0.072)								
IVEGFDIStab	---	2.934	----	---	---	---	---	---	---
		(0.790)							
IVEGGloStab	---	---	**-4.471***	---	---	---	---	---	---
			(0.078)						
IVIGTradeStab	---	---	---	**3.536***	---	---	---	---	---
				(0.072)					
IVIGFDIStab	---	---	---	---	8.980	---	---	---	---
					(0.790)				
IVIGGloStab	---	---	---	---	---	**-14.26***	---	---	---
						(0.078)			
IVGGTradeStab	---	---	---	---	---	---	**4.336***	---	---
							(0.072)		
IVGGFDIStab	---	---	---	---	---	---	---	3.098	---
								(0.790)	
IVGGGloStab	---	---	---	---	---	---	---	---	**-4.819***
									(0.078)
Inflation	0.006	**0.015****	0.010	0.006	**0.015****	0.010	0.006	**0.015****	0.010
	(0.288)	**(0.029)**	(0.239)	(0.288)	**(0.029)**	(0.239)	(0.288)	**(0.029)**	(0.239)
Gov. Expenditure	0.001	**0.006***	**0.004***	0.001	**0.006***	**0.004***	0.001	**0.006***	**0.004***
	(0.153)	**(0.055)**	**(0.066)**	(0.153)	**(0.055)**	**(0.066)**	(0.153)	**(0.055)**	**(0.066)**
GDP pcg	0.003	0.016	0.008	0.003	0.016	0.008	0.003	0.016	0.008
	(0.698)	(0.321)	(0.425)	(0.698)	(0.321)	(0.425)	(0.698)	(0.321)	(0.425)
Liquid Liabilities	**2.411***	2.943	**2.548***	**2.411***	2.943	**2.548***	**2.411***	2.943	**2.548***
	(0.080)	(0.130)	**(0.086)**	**(0.080)**	(0.130)	**(0.086)**	**(0.080)**	(0.130)	**(0.086)**
Time Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.976	0.974	0.974	0.976	0.974	0.974	0.976	0.974	0.974
Fisher	**164.98*****	**134.93*****	**139.05*****	**164.98*****	**134.93*****	**139.05*****	**164.98*****	**134.93*****	**139.05*****
Countries	13	11	11	13	11	11	13	11	11
Observations	81	65	65	81	65	65	81	65	65

IVEGTradeStab: Economic governance (EG) associated with Trade openness (Trade) influenced stability (Stab). IVEGFDIStab: Economic governance (EG) associated with financial openness (FDI) influenced stability (Stab). IVEGGlobStab: Economic governance (EG) associated with Globalisation(Glob) influenced stability(Stab). IVIGTradeStab: Institutional governance (IG) associated with Trade openness (Trade) influenced stability (Stab). IVIGFDIStab: Institutional governance (IG) associated with Financial openness (FDI) influenced stability (Stab). IVIGGlobStab: Institutional governance (IG) associated with Globalization (Glob) influenced stability (Stab). IVGGtTradeStab: General governance (GG) associated with Trade openness (Trade) influenced stability (Stab). IVGGFDIStab: General governance (GG) associated with Financial openness (FDI) influenced stability (Stab). IVGGGlobStab: General governance (GG) associated with Globalization (Glob) influenced stability (Stab). *,**,***: significance levels at 10%, 5% and 1% respectively. HAC: Heteroscedasticity and Autocorrelation Consistent. It is important to note that the high coefficient of determination (or R^2) may reflect the explanatory power of the control variables used, instead of the explanatory power of the independent variable of interest.

4.2 Discussion

We find that globalization-induced peace and stability can have positive and negative influences on governance and KE in African countries at the same time, depending on how

both globalization and governance are defined. The relations are of varying strengths. Overall, one may interpret such findings as meaning that the ambitions for KE in these countries are realistic and achievable as long as the countries continue to engage in the kinds of globalization that influence, peace and stability, and do so in ways that promote good governance. The results are encouraging because the positive impacts outweigh the negative ones, and they clarify why globalization may actually be positively associated with peace and stability, while at the same time increasing poverty and inequality. Such an interpretation would be consistent with Kremer and Maskin's (2007) skepticism about the net benefit of globalization for low-income countries and people.[9]

The use of extra instrumental variables of globalization and peace and stability in this study confirms that governance is a necessary, but insufficient condition, for KE. However, the results add that governance depends on peace and stability, which is driven by globalization. A major policy implication of that addition is that for African KEs to benefit from globalization, they must improve the kind of peace and political stability needed to initiate the positive role of governance in KE. The implication raises some concern, because African countries have had low levels of political stability (Asongu, 2014c). The situation is particularly concerning for the African countries with long histories instability.[10]

Where institutions for governance are deficient instability puts additional pressure on systems already strained. But to reverse the trend of the continent's low and falling overall index of KE, it is essential for policy to focus on improving conditions for peace and stability and governance (Anyanwu, 2012). The positive weight of trade openness on economic incentives and the negative effects of FDI estimates on economic incentives present starting points for new KE policies. The negative effect on governance of FDI-induced peace and stability means that FDI activities mainly involve foreign operators and financial institutions, often in cahoots with corrupt local political elites, which is consistent with literature on

[9]Maskin and Kremer (2007) have done a lot of work questioning whether globalization decreases or increases inequality and poverty, and how, using modified versions of Ricardo's theory of comparative advantage.

[10]Conflicts that have impeded progress in the region include inter alia, a series of aborted coup d'états between 1996-2003, the 2004-2007 Bush war, and the 2012 to present 'Séléka/Anti-balaka' conflicts in the CAR; the 2007/2008 post-election crises in Kenya, politico-economic strife in Zimbabwe and increasing determination of Boko Haram to destabilize Nigeria; Burundi (1993-2005); Sierra Leone (1991-2002); Angola (1975-2002); Chad (2005-2010); Liberia (1999-2003); the Darfur crisis of Sudan; waves of conflicts in the Democratic Republic of Congo; Côte d'Ivoire with a 2002-2007 civil war followed political crisis in 2011 and; Somalia where the Al-Shabab militant group has just been defeated after over 20 decades of civil war.

liquidity of African financial institutions. Trade activities generally involve domestic financial institutions and economic operators. It follows that FDI entails less domestic financial intermediation than trade openness. Two, trade openness is a more inclusive and less restrictive mechanism for innovation than FDI. This implication is not without precedent; in terms of resource intensity Al-Sadig (2013) examined a panel of 91 developing countries over 1970-2000 time period and found that the effects of FDI on private investment were positive. However, he also observed that high human capital low-income countries benefit more from FDI than others (cf. Choong, 2012).

Lastly, the results suggest a number of interesting future research directions, among them the following four. First, it would be interesting to use alternative measurements of globalization and peace and stability to test the current hypotheses. The tests in this paper assumed away causation, which implies that a second line for research would be to explore deeper the linkages running from KE to globalization instead of the other way around, including a reverse exposition of globalization-influenced conflicts or conflict- influenced globalization as starting points. To account for endogeneity bias, a third direction for research is to estimate the model as a system of seeming unrelated simultaneous equations. Finally, a fourth promising vein ready for mining is to integrate the current research into the opportunities opened up by the work of Hsiang, Meng, and Cane (2011), and Hsiang, Burke, and Miguel (2013) on climate-induced conflicts and to extend the analysis to as many developing countries as data availability would allow.

In summary, we assessed the interconnections between and among the determinants of KE in African countries. First we linked globalization to peace and political stability. Second, we examined how peace and stability relate to governance. Finally we estimated the effects of governance on KE. We found that even though some were statistically insignificant, all the coefficients at all stages were economically relevant. This is a significant result. *One broad implication of the findings, for example, is that while it is understandable why African countries are skeptical about the globalization, it turns out globalization offers important benefits to KE, by promoting social change through peace and stability, and that change facilitates good governance, and good governance is 'good' for KE*. This implication advises African countries to remain and continue to strengthen their integration into the world economy.

5. Conclusions

Previous research has led to the conclusion that formal institutions are necessary, but inadequate, determinants of KE. One key limitation of such research is that it did not consider the effects on KE of globalization either directly or indirectly through governance. We claim that globalization affects peace and stability, and the latter influences governance, which then may affect KE. We model the claim as a three-stage process in four hypotheses, and estimate each hypothesis using an instrumental variables technique that does not sacrifice economic relevance for statistical significance. The empirical evidence shows that globalization has varying relations with peace and stability, and that the latter influences governance differently depending on the kind of globalization involved.

Since the effects on governance of peace and stability influenced by globalization defined as trade are stronger than those resulting from peace and stability associated with globalization taken to be FDI, we further conclude that FDI is may not be a powerful mechanism for stimulating and sustaining KE in this group of countries. Moreover, globalization-influenced peace and stability have both positive and negative relations with governance simultaneously, which convinces us that the prospect for KE in African countries may be obtainable as long as these countries continue to engage in the kind of globalization that influences peace and stability. Improving peace and stability independent of globalization is another way to KE, but it is currently a difficult task given weak, or the absence of, institutions and ongoing conflicts. Even so, in situations where prevailing conflicts are due to unequal distribution of either resources (wealth) or the returns from resources (income), we conclude that there is a need for a sharp focus on economic and institutional governance more so than there is on general governance. Moreover, given the limits of the methodological approach that establishes relationships and not causality, these conclusions are exploratory and call for further confirmation using statistical techniques like Structural Equation Modeling.

Another caveat of this study is that the adopted KE path (globalization> peace/stability > governance > KE) ceteris paribus, is not unique because there are other future paths to knowledge and innovation in Africa (see Elani et al., 2013). Furthermore, the established conclusions may not hold if globalization keeps going on reverse. It is also important to note that in this study we have stressed that governance could be seen as having a “western bias” whereas the Chinese approach would rather focus in FDI and trade without caring about governance. Given China's massive presence in Africa, this assumption could be

clarified in a future study that is focused on China's-driven globalization as a starting point of investigated hypotheses.

References

Acemoglu, D., Johnson, S., Robinson, J., 2001.Colonial origins of comparative development: An empirical investigation. *J. Econ. Lit.* 91(5), 1369-1401.

Alesina, A., Spolaore, E., Wacziarg, R., 2000. Economic integration and political disintegration. *Am. Econ. Rev.*, 90(5), 1276-1296.

Al-Sadie, A., 2013.The effects of foreign direct investment on private domestic investment: Evidence from developing countries. *Emp.Econ.*, 44(3), 1267-1275.

Amavilah, V. H., 2009a.Knowledge of African countries: Production and value of doctoral dissertations. *Appl. Econ*, 41(7-9), 977-989.

Amavilah, V. H., 2009b. National symbols, globalization, and the well-being of nations.*MPRA Working Paper* No. 14882, Munich (accessed on 20/09/2016).

Amavilah, V. H., 2009c. National identity, globalization, and the well-being of nations. *MPRA Working Paper* No. 14848, Munich (accessed on 20/09/2016).

Amavilah, V. H.,2009d.Globalization, governance, and the economic performance of Sub Saharan African countries.*MPRA Working Paper* No. 15600, Munich (accessed on 20/09/2016).

Amavilah, V. H.2008.Domestic, resources, governance, global links, and the economic performance of Sub-Saharan Africa. *MPRA Working Paper* No. 11193, Munich (accessed on20/09/2016)

Andrés, A. R., Asongu, S. A., 2013. Fighting software piracy: Which governance tools matter in Africa? *J. Bus. Ethics*118 (3), 667-682.

Andrés, A. R.,Asongu, S. A.,Amavilah, V. H. S., 2015. The impact of formal institutions on knowledge economy.*J. Knowl.Econ.*6 (4), 1034–1062.

Anyanwu, J. C., 2012. Developing knowledge for the economic advancement of Africa. *Int. J. Acad. Res. Econ. Manage.Sci.* 1(2),73-111.

Asongu, S. A., 2013a. Modeling the future of knowledge economy: Evidence from SSA and MENA countries. *Econ. Bullet. 3*3(1), 612-624.

Asongu, S. A., 2013b. The 'knowledge economy'- finance nexus: How do IPRs matter in SSA and MENA countries?*Econ. Bullet.* 33(1), 78-94.

Asongu, S. A., 2014a. Globalization, (fighting) corruption and development: How are these phenomena linearly and nonlinearly related in wealth effect? *J. Econ. Stud.* 41(3), 346-369.

Asongu, S. A., 2014b. Correcting inflation with financial dynamic fundamentals: Which adjustments matter in Africa.*J. Afr. Bus.* 15(1), 64-73.

Asongu, S. A., 2014c. On the substitution of institutions and finance in investment. *Econ. Bullet.* 34(3), 1557-1574.

Asongu, S. A., 2015. Financial sector competition and knowledge economy: Evidence from SSA and MENA countries. *J. Knowl. Econ.*,6(4), 717-748.

Asongu, S. A., & Le Roux, S., 2017. Enhancing ICT for inclusive human development in Sub-Saharan Africa. *Tech. For. Soc. Chge*. DOI: 10.1016/j.techfore.2017.01.026.

Asongu, S.A., Nwachukwu, J. C., 2016a.The mobile phone in the diffusion of knowledge for institutional quality in Sub Saharan Africa. *World Dev.*, 86(October), 133-147.

Asongu, S. A., Nwachukwu, J. C., 2016b. The role of governance in mobile phones for inclusive human development in Sub-Saharan Africa. *Technov.* 55-56(September– October), 1-13.

Asongu, S. A., Efobi, U., Tchamyou, V. S., 2016a. Globalization and Governance: A Critical Contribution to the Empirics. *African Governance and Development Institute Working Paper* No. 16/017, Yaoundé.

Asongu, S. A., Nwachukwu, J. C., Tchamyou, V. S., 2016b. Information asymmetry and financial development dynamics in Africa. *Rev. Dev. Fin*. 6(2), 126-138.

Barro, R.J., 1996. Democracy and growth. *J. Econ. Growth* 1(1), 17-36.

Beck, T., Demirgüç-Kunt, A., Levine, R., 2003. Law and finance: Why does legal origin matter?.*J. Comp. Econ.*31, 653-675.

Bidwell, N. J., Winschiers-Theophilus, H., Kapuire, G. K., Rehm, M., 2011. Pushing personhood into place: Situating media in rural knowledge in Africa. .*Int. J. Hum-Comput. Stud.* 69 (10), 618-631.

Bigsten, A., Durevall, D. 2002. Is globalization good for Africa?*Working Papers in Economics* No. 67. Göteborg University. School of Business, Economics and Law.

Bonaglia, F., Braga de Macedo, J.,Bussolo M., 2001.How globalization improves governance. Working Paper No. 181. OECD Development Centre. November.

Butcher, N., 2011. *ICT in Africa: A few key Challenges*, in: ICT, Education, Development, and the Knowledge Society, Thematic Paper prepared for GeSCI African Leadership in ICT Program, December 2011, pp. 33-39.

Carisle, S., Kunc, M., Jones, E., Tiffin, S., (2013). Supporting innovation for tourism development through multi-stakeholder approaches: Experiences from Africa.*Tourism Manage.* 35(April), 59-69.

Choong, C-K., 2012. Does Financial Development Enhance the Linkages between Foreign Direct Investment and Economic Growth?*Emp. Econ.* 42(3), 819-834.

Cogburn, D., 2003.Governing global information and communications policy: Emergent regime formation and the impact on Africa. *Telecommun. Policy* 27(1-2), 135-153.

Dreher, A., 2003. Does Globalization Affect Growth?LehrstuhlfürVolkswirtschaftslehre, Mannheim (Germany): University of Mannheim.

Dreher, A., 2006. Does globalization affect growth? Empirical evidence from a new index. *Appl. Econ.* 38(10), 1091-1110.

Elani, S., De Beer, J., Kawooya, D., Oguamanam, C., Rizk, N, the OPEN Air Network, 2013. Knowledge & Innovation in Africa: Scenarios for the Future", *The OPEN Air Network* http://www.openair.org.za/images/Knowledge-Innovation-Africa-Scenarios-for-Future.pdf (Accessed: 23/02/2017).

Fayissa, B., Nsiah, C., 2010. The impact of governance on economic growth: Further evidence for Africa. Department of Economics and Finance Working Paper Series, Middle Tennessee State University, December.

Ford, D. M., 2007. Technologizing Africa: On the bumpy information highway, *Comput. Compos.* 24(3), 302-316.

Goklany, I.M., 2002. The globalization of human well-being. Policy analysis, No. 19447 (August 22). http://www.cato.org/pubs/pas/pa447.pdf (accessed 10/12/2013).

Hsiang, S.M., Burke, M., Miguel, E., 2013. Quantifying the influence of climate on human conflict. *Science* 341(6151), September 13.

Hsiang, S. M.,Meng, K. C.,Cane, M. A.2011. Civil conflicts are associated with global climate.*Nature* 476, 438-441. (August 25).

Jaunky, V.C., 2013. Democracy and economic growth in Sub-Saharan Africa: A panel data approach.*Emp. Econ.*, 45(2), 987-1008.

Jolliffe, I. T., 2002.*Principal Component Analysis* (2ndEd.). New York: Springer.

Judge, G.G., Griffiths, W.E., Hill. R.C., Lütkepohl, H., Lee, T.C., 1985.*TheTheory and Practice of Econometrics*, Second Edition. New York: John Wiley.

Kaiser, H. F., 1974. An index of factorial simplicity. *Psychometrika* 39, 31–36.

Khan, M.H., 2007. Governance, economic growth and development since 1960s. DESA Working Paper No. 54. UN Economic and Social Affairs.

Khan, M.H., 2010. Governance, growth and development. Elcano Royal Institute for Strategic and International Studies. http://www.realinstitutoelcano.org/ (accessed 25 June 2014).

Kaufmann, D., Kraay, A., 2003. Governance and growth: causality:Which way? – Evidence for the world, in Brief. (February). http://web.worldbank.org/archive/website00818/WEB/PDF/GROWTH-3.PDF (accessed 20 May 2014).

Kaufmann, D., Kraay, A.,Zoido-Lobaton, P., 1999a. Aggregating governance indicators. *World Bank Policy Research Department Working Paper* No. 2195. Washington DC.

Kaufmann, D., Kraay, A., Zoido-Lobaton, P., 1999b. Governance matters.*World Bank Policy Research Department Working Paper* No. 2196. Washington DC.

Kaufmann, D., Kraay, A., Zoido-Lobaton, P., 2002a. Governance matters II – Updated indicators for 2000/01. *World Bank Policy Research Department Working Paper* No. 2772. Washington DC.

Kaufmann, D.,Kraay, A., 2002b. Growth without governance. World Bank Policy Research Working Paper No. 2928, Washington DC.

Kremer, M., Maskin, E., 2007. Globalization and inequality. http://www.hse.ru/data/624/768/1238/Maskin.pdf (accessed 11 September 2014).

Lalountas, D.A., Manolas, G.A., Vavouras, I. S., 2011. Corruption, globalization and development: How are these three phenomena related? *J. Policy Model* 33, 636-648.

Letiche, J. M., 2006. 'Positive economic incentives. New behavioral economics and successful economic transitions.*Journal of Asian Economics* 17(5), 775-796.

Lin, B., 2006. A sustainable perspective on the knowledge economy: A critique of Austrian and mainstream view. *Ecol. Econ.* 60(1), 324-332.

Messer, E., Cohen, M. J., 2006.Conflict, food insecurity and globalization. *International Food Policy Research Working Paper* No. 206, Washington.

Moahi, K., H., 2007. Globalization, knowledge economy and the implications for indigenous knowledge. *Int. Rev. Inform. Ethics*, 07/09/2007),1-8.

Olzak, S., 2011. Does globalization breed ethnic discontent? *J. Conflict Resolut* 55(1), 3-32.

Oyelaran-Oyeyinka, B., Sampath, P. G., 2007. Innovation in African development: Case studies of Uganda, Tanzania and Kenya. A World Bank Study. http://info.worldbank.org/etools/docs/library/239730/InnovationInAfricaFinalPaper.pdf(Accessed22/03/2014).

Oxley L, McAleer, M., 1993. Econometric issues in macroeconomic models with generated regressors. *J. Econ. Surveys*740 (1), 1-40.

Pagan, A., 1984. Econometric issues in the analysis of regressions with generated regressors. *Int. Econ. Rev* 25(1), 221-247.

Pesaran, M. H., 2006. Estimation and inference in large heterogeneous panels with a multifactor error structure.*Econometrica* 74(4), 967-1012.

Quibria, M., G., 2006.Does governance matter? Yes, no or maybe: Some evidence from developing Asia.*KyklosInt. Rev. Soc.Sci* 59(1),99-114.

Rodrik, D., 1997. Globalization, social conflict and economic growth. United Nations Conference on Trade and Development (24th October 1997). http://unctad.org/en/docs/prebisch8th.en.pdf (Accessed: 20/05/2014).

Rodrik, D., Subramanian, A., 2009. Why didfinancial globalization disappoint?' *Int. Monet. Fund S Pap.* 56(1), 112-138.

Rooney, D., 2005. Knowledge, economy, technology and society: The politics of discourse.*Telemat. Inform.* 22(4), 405-422.

Saxegaard, M.,2006. Excess liquidity and effectiveness of monetary policy: Evidence from Sub-Saharan Africa.*IMF Working Paper* No. 06/115, Washington DC.

Solow, R.M., 1957. Technical change and the aggregate production. *Rev. Econ. Stat.* 39(3), 312-320.

Strulik, H., Prettner, K.,Prskawetz, A., 2013. The past and future of knowledge-based growth. *J. Econ. Growth*, 18(4),411-437.

Tchamyou, S. V., 2016. The role of knowledge economy in African business. *J. Know. Econ.* DOI: 10.1007/s13132-016-0417-1.

Tchamyou, V. S., Asongu, S. A., 2016. Information Sharing and Financial Sector Development in Africa. *J. Afr. Bus*. 17(1), 24-49.

Tidwell, A., Lerche, C., 2004. Globalization and conflict. Int.*J. Peace Stud.* 9(1), 47-59.

Tsai, M-C., 2007. Does globalization affect human well-being? *Soc. Indic. Res.* 18(1), 103-126.

Wantchekon, L., Klasnja, M., Novta, N., 2015. Education and human capital externalities: Evidence from colonial Benin. *Q.J.Econ*130(2), 703-757.

Weber, A. S., 2011. The role of education in knowledge economies in developing countries.*Procedia Soc. Behav. Sci.*, 15, 2589-2594.

White, H., 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroscedasticity. *Econometrica*48(4), 817-838.

White, H., 1980.Using least squares to approximate unknown regression functions. Int. Econ. Rev. 21(1), 149-170.