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Trade, Institutional Quality and Income: Empirical Evidence for Sub-Saharan Africa

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Abstract: This paper looks at how trade liberalization and institutional quality influence real income. Previous evidence has provided mixed results, and we find that indicators representing trade liberalization have been very weak. By using strongly balanced panel data of 45 Sub-Saharan African countries covering the last 34 years (1980–2013), along with numerous advanced econometric instruments (random effect, fixed effect, system-generalized method of moments, pooled mean group) and composite trade indicators (KOF indicators), this paper determines the impact of trade liberalization, social factors and political globalization on real income per capita in both static and dynamic settings. The paper also considers short-term and long-term effects. The study confirms that free trade has a significant positive impact on the growth of real income per capita in static and dynamic settings. However, it also finds that countries must pay in the short-term to gain more significantly in the long-term. Further, we point out that social factors, especially information flows, can have significant but varying influences on real income under different scenarios and that political globalization both challenges and gives opportunities for improving living standards. We also find that institutional quality is a key factor for economic development in any situation.

Keywords: trade liberalization; globalization; institutional quality; economic growth

JEL Classification: F6; O43; O47

1. Introduction

Does trade lead to higher income? Theoretical models (such as Ricardo's theory) have shown that trade openness improves the efficiency of the allocation of world resources, and the comparative advantage gained will improve production and trade. As a result, national income will increase above the production frontier curve. It is also widely accepted that openness to trade increases the level of competition, improves firms' productivity, and brings more business opportunities to local enterprises, thus leading to an improved economic development. However, the empirical evidence is mixed. Using a large number of samples over the last three decades with many countries, Yanikkaya (2003) argues that trade liberalization does not necessarily lead to growth but finds that trade barriers are positively associated with growth, especially for developing countries. Ortega and Peri (2014) did not find a robust effect in their analysis of the association between trade and income, which extended the instrumental variables strategy introduced by Frankel and Romer (1999). They did, however, identify an effect related to institutional factors where openness to immigration holds the key to income improvement, with increasing productivity, productive skills and a higher rate of innovation. They estimated that if Uganda adopts the immigration policies of Ireland, its income per capita would increase by 70%.

Previous studies have shown that trade openness or trade flows are important factors in improving the income of citizens (Sachs and Warner 1995; Lucas 2009; Frankel and Romer 1999; Rodrik 2000; Alcalá and Ciccone 2004). However, the question arises as to whether openness to trade is a consequence or cause of changes in income level, especially in Sub-Saharan Africa. There are two types of trade. In the first type, countries trade because they have competitive advantages. After meeting the needs of their citizens, the surplus is exported. In these countries, the level of trade openness is low or medium. In the second type, countries trade because they do not have another way to survive. For example, some countries in Sub-Saharan Africa cannot grow crops because their environment is too harsh, or their systems are too old-fashioned. However, they have raw materials, so they export diamonds, gold or oil, and import food and other necessary goods. Because of these differences in the types of trade, areas with different economic conditions should be analyzed separately.

To the best of our knowledge, very few studies have given a regional picture of how trade liberalization can influence income in Sub-Saharan Africa, which is a unique area of the world with low standards of living, but very high trade openness. The following five points explain the contribution of our analysis.

First, we identify significant problems in the measurement of indicators of income and in previous trade indicators. Their weaknesses influence not only calculations but also the way that issues are approached.

Second, we apply the most advanced composite trade liberalization indexes, namely KOF indicators. These indexes can help us overcome the limitations stemming from the under-representation of trade in indicators used in previous studies and explain more precisely the reality of the situation in Sub-Saharan Africa.

Third, institutional factors have a remarkable influence on economic progress (Rodrik et al. 2004; Perugini and Pompei 2017; Lin and Fu 2016; Benassy-Quere et al. 2007), but they have been ignored in previous research. Further, there is no empirical study explaining how trade influences income in Sub-Saharan Africa that takes account of institutional factors. In this paper, we examine institutional quality from a legal, economic and political perspective.

Fourth, previous studies used traditional econometric tools that may lead to bias in the analysis. However, in contrast, we use advanced analytical instruments, such as the fixed- and random-effect estimators and generalized method of moments (GMM), to analyze with both static and dynamic models how trade liberalization influences income in the Sub-Saharan Africa area.

Fifth, there are potential differences between short-term and long-term effects. Hence, we provide a pooled mean group estimation to capture the impacts in all possible scenarios.

2. Literature Review

2.1. GDP as a Measure of Income and Its Constraints

One of the most important indicators of the financial status of individuals is income, widely defined as GDP per capita by most economists. GDP, as defined by the OECD, is “an aggregate measure of production equal to the sum of the gross values added of all resident institutional units engaged in production (plus any taxes, and minus any subsidies, on products not included in the value of their outputs).” Although this is not a comprehensive indicator reflecting the prosperity of the whole of society, it is widely used and is significantly related to economic growth and general living conditions in the long-term (Schulte and Butzmann 2010).

There are some advantages to using GDP to explain income and economic security. First, the method of measurement is obvious, well known and advanced. Second, the GDP data is readily available and easy to use and is provided by prestigious organizations, such as the World Bank, IMF and so on. Third, GDP is an intuitive and useful measure as it is expressed in units of money (Schulte and Butzmann 2010, p. 8).

However, there are two issues of concern when using GDP per capita to represent income. First, the GDP per capita and income are calculated using different datasets. 'GDP per capita' is the gross domestic product divided by the midyear population, with total GDP being "the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products." On the other hand, 'income' is "the sum of all the wages, salaries, profits, interest payments, rents, and other forms of earnings received . . . in a given period." (Case and Fair 2007) Second, divergences between GDP per capita and real wages are also influenced by income distribution and relative prices.

There are several limitations to using GDP to explain the financial status of individuals or welfare issues. First, GDP is designed to measure the value of all finished goods produced within an economy over a set period and is not built to explain money flows or welfare or well-being. Second, the GDP calculation is based on market transactions. Therefore, it does not include productive activity that is non-trade or that which is traded on the 'black market'. Further, voluntary work and hand-made products that do create value are also not included in GDP. This divergence between the GDP per capita and income is more apparent in the rural and poor areas of Sub-Saharan Africa, where people usually produce and consume everything themselves. Third, the GDP per capita is the 'average' gross domestic product and it, therefore, does not show wealth distribution, which currently is a more serious global problem. Fourth, GDP does not describe intermediate products since it measures only the final value of all goods and services within an economy. Fifth, GDP ignores externalities. Many external factors, such as pollution, have significant negative impacts on human life and it is difficult to evaluate their effect monetarily. Sixth, GDP has, in some cases, failed to assess correct values of some public goods and services. We try to use GDP to compare the power of two economies, but some technology factors (such as transportation infrastructure, technology accumulation) or institutional factors (education, corruption, democracy) are hard to estimate. Seventh, GDP is based on currency evaluation, but sometimes the exchange rate is affected by factors not related to the economy. The exchange rate is a useful tool for policymakers to encourage or restrain exports and imports and, as it is sometimes used as an economic-political tool, it does not follow market laws. However, variations in the exchange rate can significantly affect people's lives by changing the prices of goods and services within the country.

Although there are many problems in using GDP, it is nevertheless an important indicator (or maybe a unique choice because of its completeness of data) of household income and living standards—the growth of which would benefit all citizens. Hence, in this paper, to help overcome the weakness of GDP as an indicator of economic security, we use the GDP per capita with the purchasing power parity (PPP) method.

2.2. Trade and Income

Broda and Weinstein (2006) argued that greater variety in the products traded would increase consumer welfare. Using disaggregated data of the US trade from 1972 to 2011, they found that the import of new varieties of products expands 2.6 percent of GDP as consumer surplus. Similarly, Chen and Jacks (2012) showed a strong relationship between varieties of imports on customer welfare. According to their research, in the case of Canada, an imported product variety increase of 76% will lead to an improvement of 28% in customer welfare and also increase immigration flows by 25%.

Furthermore, Jones (2001) concluded that "trade restrictions are harmful to long-run incomes". Similarly, Manole and Spatareanu (2010), by using data from 131 developed and developing countries found, contrary to the work of Yanikkaya (2003), that trade protection will reduce income per capita. In addition, Feyrer (2009a, 2009b) found evidence of a positive causal effect of trade on income from within-country estimates.

Some previous studies have mentioned trade openness as an essential policy in promoting innovation, technological diffusion (Grossman and Helpman 1991; Eaton and Kortum 1996; Lucas 2009)

and market efficiency. International markets will enhance specialization (Matsuyama 1992; Galor and Mountford 2008) and offer valuable experiences from international competitors (Weil 2005).

Another issue relates to how to measure trade in research. Some researchers have used trade volumes or the share of trade (Frankel and Romer 1999; Irwin and Terviö 2002). Others have used trade barriers (Clemens and Williamson 2004) or composite measures, (Dollar 1992) used the price distortion and variability index and Sachs and Warner (1995) used the trade openness index.

There are some advantages and disadvantages of the different approaches. Kee et al. (2009) argued that macroeconomic differences could be captured with trade flows, while the composite measures could explain influences of poor economic management or geographic characteristics. Frankel and Romer (1999) used the cross-country variation to determine impacts of bilateral geography as causal effects of trade openness on income per capita. However, Rodriguez and Rodrik (2001) showed that the value of this approach is likely to be negated by institutional factors, such as colonization history or immigration. Further, Rodrik et al. (2004) argued that institutional quality should be taken into account in determining a country's income per person, more than geography or trade. They concluded that institutional factors must be studied since their effect is increasing in our current world. Actually, to the best of our knowledge, there is no paper that includes institutional factors in determining impacts of trade on income per capita.

Further, Nissanke and Thorbecke (2006) argued that trade openness will mean that integrated countries are more likely to face economic shocks and greater volatility. Deeper integration means more impact from global economic events, such as a financial crisis. As a result, citizens face reduced economic security.

Discussion about the impact of trade liberalization on the economic development of the Sub-Saharan Africa region is currently very limited, and there are two conflicting opinions. On the one hand, Hassan (2001), Kopperschmidt and Matutes (1997) and Tupy (2005) argued that free trade could have a positive impact on the economy. However, free trade was not seen as a strategy for sustainable development by Hassan (2001), and Tupy (2005) believed that its role was often exaggerated.

On the other hand, using empirical analysis, Mukhopadhyay (1999) found that import liberalization negatively affected economic growth in low-income countries in Sub-Saharan Africa in the 1980s and early 1990s. Furthermore, studying data from 23 countries from 1996 to 2011 using quantitative instruments, such as system-GMM, Akpan and Atan (2016) conclude that trade openness reduced economic growth in the Sub-Saharan Africa region over that period.

More importantly, the impact of trade on economic growth depends on many factors, including institutional quality, democracy, rule of law, property rights, labour market and financial liberalization, infrastructure, and education (Hassan 2001) as well as supporting policies, institutions, capital markets, and foreign direct investment (Kopperschmidt and Matutes 1997). Further, Hassan (2001) emphasised that the problem of Sub-Saharan Africa lays in the domestic trade between the citizens themselves and the free movement of resources within the country. Ignoring internal trade may distort the economy and exacerbate inequality. This argument is also supported by Tupy (2005), who found that the protection ratio of Sub-Saharan Africa was very high, while the domestic trade ratio was low. Increasing trade liberalization merely through abandoning protectionism will not significantly change the lives of people in Sub-Saharan Africa. For the region to develop, the countries of Sub-Saharan Africa need to promote internal trade (Tupy 2005; Hassan 2001), reduce the protection rate (Tupy 2005), stimulate freedom of resource movement (Hassan 2001), and carry out institutional reform (Hassan 2001; Kopperschmidt and Matutes 1997; Tupy 2005). Akpan and Atan (2016) also found evidence that the "positive impact of trade openness on growth is conditional on the quality of domestic institutions". Accordingly, if control of corruption, government effectiveness, and the rule of law improve, then the positive effect of trade on income will be stronger. However, the relationship between trade liberalization and economic development is not the same with all countries; it depends on the socio-economic and political characteristics of each country (Mukhopadhyay 1999; Kopperschmidt and Matutes 1997).

There is no general agreement that sustainable development can be achieved by export promotion and trade liberalization (Hassan 2001).

In addition, it is widely accepted that the impacts of trade openness differ between small and big manufacturers. With proper financial resources, advanced technology and top management skills, large-scale industry can easily benefit from trade when they export products and services to developing countries, such as in Asia, India and so on. However, in the Sub-Saharan Africa area, most industries are small, and they will suffer losses in competing with international firms. They will soon realize that free trade and globalization is a ‘double-edged sword’ (Aradhyula et al. 2007). Thus, in the next section, we analyze the impact of trade, investment liberalization, social factors, political globalization and institutional quality on real income per capita in Sub-Saharan Africa, following both static and dynamic settings and short-term and long-term scenarios.

3. Methodology

3.1. The Model Specification

The Cobb-Douglas function is a popular baseline model employed in the growth analysis. The original equation can be explained as follows:

$$Y = AL^{\alpha}K^{\beta} \quad (1)$$

where Y is the total production within a year and L (labour) and K (capital) are inputs. A is the total factor productivity, while α and β are output elasticities. We transform by the logarithm of the Equation (1):

$$\ln Y = \ln A + \alpha \ln L + \beta \ln K \quad (2)$$

Further, individual country characteristics, such as area and population, are also vital factors in both theoretical and empirical studies (Frankel and Romer 1999). In addition, according to the Levi Institute, globalization is a process of both interaction and integration between entities of different countries and is driven by trade, investment, information, technology, culture and politics (theory of globalization). Previous literature has considered trade as an independent issue, explained only in terms of trading goods and services between countries. Researchers overlook the fact that the impact and significance of trade go beyond a simple trading activity. In fact, trade exists along with investment streams, information flows, spillover of cultures, tourism and global political cooperation. Therefore, it is unreasonable to separate trade liberalization from these issues, because they happen simultaneously when a country opens up its economy. Isolation of the impacts of trade results in incorrect estimations. With this new perspective, we add sub-indicators of KOF indexes to the equation. Moreover, as mentioned before, the role of institutions in the economic analysis is unavoidable and an institutional quality variable should be added to the equation.

Hence, in this paper, we extend the basic model (2) and re-write it as follows:

$$\begin{aligned} \ln GDPPC_{it} = & b_0 + b_1 AEF_{it} + b_2 EC_{it} + b_3 PC_{it} + b_4 IF_{it} + b_5 CP_{it} + b_6 PG_{it} + \\ & b_7 \ln CapitalStock_{it} + b_8 \ln POP_{it} + b_9 \ln Area_{it} + b_{10} InstitutionalQuality_{it} + \alpha_{it} \end{aligned} \quad (3)$$

where i and t refer to countries and years in panel data; $\ln GDPPC$ is the logarithm of the GDP per capita following the purchasing power parity (PPP) method. AEF (actual economic flows), EC (economic constraints), PC (personal contact), IF (information flows), CP (cultural proximity), PG (political globalization) are KOF globalization sub-indicators. More details about the KOF indexes can be found in Table A2. $\ln CapitalStock$, $\ln POP$, $\ln Area$ are the logarithms of capital stock, population and area, respectively. $Institutional Quality$ is the control-variable and is analyzed by three dimensions: Legal, political and economic. Data on institutions is provided by Kuncic (2014). α_{it} is the error terms.

3.2. Data and Hypotheses

This paper uses balanced panel data of 45 Sub-Saharan African countries (Appendix A) covering the period 1980–2013. Data is from the IMF, World Bank, KOF Swiss Economic Institute and Penn World Table 9.0.

Income per capita, computed as the GDP per capita (PPP) is a very good indicator to determine the real situation of a household's financial ability. Different from GDP alone, the GDP per capita includes the effects of population growth. With the PPP method, we exclude the influence of price fluctuation and focus on how much real money households have. While GDP tends to describe how strong a nation's economy is, the GDP per capita (PPP) allows us to focus on the real financial capacity of the population in the Sub-Saharan African countries. Data for this indicator is collected from the IMF.

Our most important goal is to determine whether or not trade liberalization influences real income. As we mentioned before, trade openness fails to explain the whole picture, and the use of a composite indicator such as KOF indicators may be a better option. The index, produced by the KOF Swiss Economic Institute (Dreher 2006; Dreher et al. 2008), covers not only economic factors but also social and political factors in the analysis. We think that this is a good one to employ since, when a country opens up to trade, the impact is not only about economics, but also about changing social structure and political fundamentals.

However, it would be limiting if we analyzed only this general index. Hence, we have focused on its sub-indicators to understand the whole picture and what has happened in detail. The KOF globalization index includes three dimensions: Economic, social and political factors.

Economic factors are defined by two measures: Actual economic flows (covering trade, foreign direct investment (FDI), portfolio investment and income payments for foreign nationals) and economic constraints (referring to restrictions on trade and capital by hidden import barriers, tariffs, taxes and capital controls). Using actual economic flows and economic constraints allows us to analyze the effect of free trade on real income looking at two aspects: (1) The actual flows of trade and foreign investment (both FDI and portfolio investment); and (2) policies on trade and capital. Our first hypothesis: Trade liberalization improves real income per capita.

The second dimension concerns social factors, which are covered by three determinants: Personal contacts (captures direct interaction between people from different countries by letters, telecommunications, tourism, immigration, employment payments, and foreign stocks), information flows (referring to the potential flow of ideas and images between countries by the Internet, television and newspaper) and cultural proximity (explains how beliefs and values move across national borders and the domination of US cultural products). To the best of our knowledge, there is no study that mentions or describes the impacts of these social factors on real income. However, they are cannot-be-ignored factors, which could potentially have a significant impact. While trade liberalization mostly focuses on trading goods and services, foreign investment and on capital flows, social factors refer to the flow of ideas, culture and information, which should be considered as institutional factors, and which are increasing their role day-by-day. We expect that these social flows would help people have access to more useful information to run business plans and improve their quality of life. Our second hypothesis: Personal contact, information flows and cultural proximity raise people's real income.

The third dimension is political globalization determined by the number of embassies and high commissions and of international organizations of which the country is a member. It is a measure of how deep a nation is integrated into the global environment, and it is an important institutional factor. It is widely accepted that when a country participates intensively in regional and world organizations, its government will be stronger and more effective since it has to adapt to the requirements of international organizations, especially when applied to under-developed and developing countries with their weaker voice in the global playground. We expect that their political globalization would lead to the improvement of their citizens' living standards. Our third hypothesis: Political globalization increases the real income of the household.

Further, to explain in more depth how institutional quality can influence income distribution, we include three more indicators in the model: Legal, political and economic institutional quality. These indicators are provided by [Kuncic \(2014\)](#). He emphasized the important role of institutions in economic and social activities, and we firmly believe that the improvement of the institutional quality is crucial to the increase in the real income of citizens. Our fourth hypothesis: Institutional quality improves income growth.

3.3. Estimation Methods

Our dataset is a balanced panel data of 45 Sub-Saharan African countries covering the period 1980–2013. Hence, the ordinary least squares estimator may be biased. To deal with this problem, fixed and random effect estimators are usually employed. A random effect model can be the appropriate method for controlling the potential correlation of explanatory variables with unobserved effects. In the case where unobserved effects do not correlate with any of the explanatory variables, the random effects estimation would be a good choice; otherwise, we use the fixed effects estimation. The Breusch and Pagan Lagrangian multiplier test ([Breusch and Pagan 1980](#)), Hausman test ([Hausman 1978](#)), [Kaiser \(2014\)](#) (for application) are a good way of determining the best model. To control the potential heteroscedasticity and serial correlation (autocorrelation), we use cluster-robust standard errors proposed by [Arellano \(1987\)](#), [Froot \(1989\)](#) and [Rogers \(1993\)](#).

The effect of lag time is, however, crucial in economic research since economic policies naturally need time to show results; previous data is an important information source to determine any expected fluctuations. Further, the static panel data ignores dynamic characteristics of the model and can be misspecified ([Greene 2008](#); [Bond 2002](#)). Further, [Nickell \(1981\)](#) and [Baum \(2006\)](#) argue that because of the within-transform N (units or groups), the lagged dependent variables may correct with the error term and create bias, even when we increase N . Hence, we also use the system-GMM two-step estimation, which is proposed by [Arellano and Bover \(1995\)](#), [Blundell and Bond \(1998\)](#) and [Roodman \(2009\)](#) (for application) to determine the effect of lag-time on our model and correct errors. This method is especially appropriate to the panel data with ‘small T and large N ’ ([Bond 2002](#); [Baum 2006](#); [Roodman 2009](#); [Sarafidis et al. 2009](#); [Baltagi 2008](#)). It is also a good method to control potential heteroscedasticity, correlation, endogeneity and causal effects ([Greene 2008](#); [Bellemare et al. 2015](#)). We also provide the Sargan test ([Sargan 1975](#)) for checking whether over-identifying restrictions are valid or not and the Arellano-Bond test for autocorrelation ([Arellano and Bond 1991](#); [Roodman 2009](#)).

However, all fixed effect, random effect, system-GMM estimators may only provide overall impacts and therefore not distinguish the short-term and long-term effects ([Baltagi 2008](#)), while the influences of independent variables on dependent variables may differ between the short- and long-terms, especially in the analysis of economic policies. This shortage of information may lead to governments and citizens taking the wrong action since the last results could be very different to reality. Hence, we also provide a pooled mean group estimation, introduced by [Pesaran and Smith \(1995\)](#) and [Pesaran et al. \(1999\)](#), to solve this problem and show the whole picture of how economic policies influence our living standards in both the short- and long-term.

The long-term relationship can be estimated only in the case of cointegration or stationarity data. To check whether the panel data satisfies this requirement, we use three different tests to find potential correlations, since there is no perfect test for all situations ([Örsal 2008](#)): Augmented Dickey-Fuller, Phillips-Perron ([Maddala and Wu 1999](#)) and Westerlund panel-data cointegration test ([Westerlund 2007](#)). A rejection of null-hypothesis in at least one of the three tests suggests the possibility of a long-term correlation.

Based on the results of these three tests (Tables 1 and 2), we confirm that our variables are satisfactory for long-term panel estimations.

Table 1. Augmented Dickey-Fuller and Phillips–Perron stationarity test.

Variable	Augmented Dickey–Fuller		Phillips–Perron	
	Prob > Chi2		Prob > Chi2	
	Without Trend	Trend	Without Trend	Trend
lnGDPPC	35.750	170.109 ***	71.463	99.206
AEF	66.654	59.303	125.556 ***	105.855
EC	28.209	58.027	48.754	96.709 *
PC	47.602	56.401	52.972	49.855
IF	15.812	52.211	12.169	40.754
CP	56.348	54.248	161.947 ***	191.849 ***
PG	53.050	88.067	84.113	161.593 ***
lnCapitalStock	16.074	96.250	11.644	40.044
lnArea	1.142	0.600	1.123	0.940
lnPOP	250.007 ***	136.804 ***	477.796 ***	98.484
Legal Institutional Quality	277.431 ***	287.574 ***	195.467 ***	155.743 ***
Economic Institutional Quality	205.149 ***	237.598 ***	122.512 **	58.456
Political Institutional Quality	243.548 ***	203.374 ***	184.704 ***	142.288 ***

*** Significance at the 1% level; ** Significance at the 5% level; * Significance at the 10% level

Table 2. The Westerlund error-correction-based panel cointegration tests¹.

Dependent Variable: LnGDPPC				
Independent Variables	Gt	Gα	Pt	Pa
AEF	−2.019 **	−10.794 ***	4.743	0.883
EC	0.122	−7.529 ***	0.851	−3.536 ***
PC	−1.813 **	−9.904 ***	4.418	0.235
IF	−5.256 ***	−13.018 ***	9.704	3.870
CP	−7.690 ***	−11.277 ***	1.501	−0.573
PG	−0.534	−10.549 ***	1.512	−1.279
lnCapitalStock	−3.665 ***	−5.537 ***	4.870	2.512
lnArea	−5.914 ***	−6.985 ***	1.845	−0.111
lnPOP	−5.427 ***	6.232	4.241	5.661

*** Significance at the 1% level; ** Significance at the 5% level

4. Findings and Discussion

As we discussed before, the paper uses a balanced panel data of 45 Sub-Saharan African countries covering 34 years (1980–2013) with numerous advanced econometric tools, such as the fixed effect, random effect, system-GMM and pooled mean group. We also provide sufficient tests for reliability and suggest the best models. To understand the whole picture of how trade liberalization influences real income per capita of these Sub-Saharan African countries, we implement estimations of several controlled variables to describe them as fully as possible. All estimations use cluster-robust standard errors to control the potential heteroscedasticity and serial correlation and to improve the robustness of estimated coefficients.

4.1. Static Settings

Table 3 shows the relationship between trade liberalization and real income per capita, and then takes account of institutional quality. Since this is a balanced panel data and there is no time-variant variable, we use the robust Hausman specification test (Kaiser 2014) to suggest a better option—random

¹ The Ga and Gt: The rejection of null-hypothesis shows the evidence of cointegration of at least one of the cross-sectional units. The Pa and Pt: The rejection of null-hypothesis provides the evidence of cointegration for the panel as a whole.

effect estimation is recommended. Model 1.1 is the basic model. We include the legal, economic and political institutional quality in models 1.2, 1.3 and 1.4, respectively.

Table 3. The effect of trade liberalization on real income per capita in a static setting.

Dependent Variable: The Logarithm of GDP per Capita (PPP)				
Independent Variables	Model 1.1	Model 1.2	Model 1.3	Model 1.4
AEF	0.00748 *** (4.86)	0.00389 *** (2.79)	0.00455 *** (3.27)	0.00470 *** (3.15)
EC	−0.00306 (−1.33)	−0.00100 (−0.51)	−0.00172 (−0.78)	−0.00178 (−0.98)
PC	0.00988 ** (2.14)	0.00583 * (1.74)	0.00565 * (1.70)	0.00580 * (1.72)
IF	0.00385 (1.40)	0.00884 *** (3.07)	0.00878 *** (3.22)	0.00865 *** (3.31)
CP	0.00541 (1.35)	0.00078 (0.26)	0.00332 (1.28)	0.00256 (0.99)
PG	0.00358 * (1.84)	0.00357 *** (2.71)	0.00306 ** (2.14)	0.00320 *** (2.67)
lnCapitalStock	0.32115 *** (4.53)	0.24392 *** (3.68)	0.25797 *** (3.85)	0.25996 *** (4.06)
lnPOP	0.09503 (0.64)	−0.14131 (−0.93)	−0.19422 (−1.37)	−0.17678 (−1.26)
lnArea	−0.21650 *** (−2.83)	−0.07878 (−0.88)	−0.05861 (−0.70)	−0.05837 (−0.71)
Legal Institutional Quality		0.50564 *** (4.21)		
Economic Institut. Quality			0.12609 (0.91)	
Political Institut. Quality				0.54725 *** (4.21)
Constant	−0.03708 (−0.03)	3.73299 ** (2.47)	4.17697 *** (2.85)	3.67205 *** (2.72)
Cluster-Robust Hausman Test	13.93	17.19*	12.02	13.62
Breusch-Pagan Lagrangian Multiplier Test	9888.55 ***	4612.45 ***	4637.67 ***	4982.23 ***
Autocorrelation	Controlled	Controlled	Controlled	Controlled
Heteroscedasticity	Controlled	Controlled	Controlled	Controlled
No. Obs	1268	751	796	805
R-Square	0.7420	0.7527	0.7949	0.7789

*** Significance at the 1% level; ** Significance at the 5% level; * Significance at the 10% level.

In all four scenarios, regression results show that trade and investment flows (both foreign direct and portfolio investment) strongly improve household incomes. Accordingly, when a country increasingly opens up its economy, signs trade agreements and expands investment attractiveness, people's standard of living will improve. This result is similar to [Hassan \(2001\)](#), [Kopperschmidt and Matutes \(1997\)](#), [Tupy \(2005\)](#).

There are several reasons for this improvement. Opening up the domestic market and importing more goods will give people more opportunities to access commodities at a lower price and with more choice. In fact, international corporations with the advantages of capital, economies of scale, management experience and low input costs will create products with a very competitive factory cost. Furthermore, facing the competition of foreign enterprises means domestic firms must also try to innovate with technology, improve product quality and lower prices to be competitive. In addition, participation in global markets will also help countries reach larger markets, thereby increasing the demand for production, creating jobs and improving the lives of people. This is particularly

important in the context of the Sub-Saharan African countries since their exports are mainly natural resources, raw materials, petroleum and precious stones, while their imports are machinery, food and consumer goods.

Inward foreign investment plays an important role in promoting economic development and improving people's living standards. Accordingly, FDI not only helps to create more jobs, but it also brings revenue to the government through taxes and fees and promotes the transfer of science, technology and management experience. Furthermore, FDI acts as a catalyst in the development of auxiliary industries, especially as the requirement for localization increases. In fact, there is a view that FDI does not bring as much benefit as governments expect since the profits will go back to the home country in the end. Host countries do benefit from job creation, taxes, fees and infrastructure improvement. However, the transferred technology is mostly basic technology—advanced and core technology is confidentially secured at the origin. Also, FDI enterprises tend to use auxiliary enterprises originating from their own countries. In addition, experts are always warning about the negative impact on the environment from FDI projects. Nevertheless, FDI generally plays a vital role in expanding the economy of a country.

Inward investment flows, in the form of portfolio investments, provide a tremendous source of capital for domestic enterprises to expand production and also to provide additional goods and services to the market. Concerning production inputs, capital is an essential factor that has been implied in most economic theories, both classically and modernly. The lack of capital has always been a big challenge for developing countries though. Especially with the current 'start-up' trend, this investment channel offers enormous opportunities in the future for young businesspeople. However, we did not find evidence of the effect on people's incomes of removing barriers to trade and capital.

Regarding personal contact, in all four scenarios, we found that the direct interaction among people from different countries has a positive effect on economic growth. There are a number of reasons for this result. First, direct contact will promote the exchange of information, science and technology, especially when most individuals, organizations and enterprises want to expand international bilateral cooperation. Second, financial, non-financial and remittance support play an important role in enabling people to invest in production and business to improve living standards for themselves, their families and relatives. Third, increasing the number of international experts in Sub-Saharan Africa will significantly assist enterprises, institutions and governments in producing and operating efficiently. Fourth, the increasing demand for tourism also creates a great driving force for economic development.

We also find that the flow of knowledge, information, science and technology through the development of the Internet, newspapers and television significantly improves incomes for people in developing countries. From a macro perspective, the flow of information helps countries to access new technologies, inventions, management experience, and larger markets more easily. In today's 'knowledge economy', information is considered to be a precious resource. The development of the Internet, the press, and television has played an essential role in promoting innovation, invention and creativity, thereby increasing productivity, lowering costs and bringing more profit for society. From a citizen's perspective, the development of the Internet and the media can help people easily access the knowledge of humankind at low cost or even free of charge. Therefore, they can apply the knowledge gained in work and production, leading to productivity enhancement and possibly to starting a business. Furthermore, it is a fact that, in developing countries, the number of people who do not go to school is enormous and that the laborers are mostly unskilled. People want to go to school and also want to be trained properly, but when income is not enough to meet basic needs, people cannot afford to invest in education. This vicious circle makes it very difficult for the poor to improve their lives, leading to a larger gap between the rich and the poor. Therefore, the development of information technology and information spillover has opened up many good learning opportunities at the lowest cost. People can learn almost everything on the Internet, from basic knowledge to professional skills, as well as working skills, such as teamwork or soft skills. Study methods are also very diverse with

many different levels. In addition, the flow of information also promotes people's participation in politics, thereby enhancing transparency and the effectiveness of government operation.

Political globalization, in all four scenarios, significantly raises the incomes of people. For businesses, organizations and governments, international cooperation plays a crucial role. On the one hand, this promotes the exchange and transfer of science and technology. On the other hand, developing countries often receive considerable support from international organizations (i.e., FAO, IMF, World Bank), both financially and non-financially. This support is important for economic development. Furthermore, prominent international organizations often have strict regulations for member countries, not only about economic policies but also with social and political issues. Participation in and the response of these organizations puts pressure on countries to reform and to improve the performance of government and macroeconomic policies. In addition, participation in international organizations will also help governments to gain a better voice in international markets, protect national interests, and seek mutually beneficial cooperation opportunities. In general, the trend is of increasing participation, which has a significant influence on economic growth, thereby improving people's living standards.

Legal institutional quality, as expected, also has a remarkable impact on the living standards of people. Accordingly, efficient operation and transparency help businesses, as well as people, to maximize their potential, thus boosting economic growth. In fact, legal systems are one of the 'weakness' issues for developing countries. If the rules are not practical or not sufficiently clear, they will cause numerous difficulties for businesses and people. Furthermore, if the rule of law is not respected, this leads to many violations, corruption and red tape, which can significantly inhibit economic development.

In addition, the quality of political institutions is an important issue, directly influencing economic development. Sub-Saharan Africa has the world's lowest transparency index. In that area, the incidence of corruption and bureaucracy is high. Political activity is not democratic and is ineffective. The voice of the people is almost meaningless. This results in ineffective government, inappropriate policies and a notable hindrance to economic development. When it comes to economic institutional quality, we did not find evidence of the effect of that on the real income of households.

4.2. Dynamic Settings

Dynamic analysis, capturing the effect of lag-time, is quite important when looking at economic phenomena as dynamic subjects, i.e., emphasizing the impact of past events on the present and future. In fact, previous data is always very useful, and it does influence the decisions of policymakers. Table 4 provides estimations with dynamic settings using system-GMM to cover the effect of lag-time and correct error terms, which was explained in the previous chapter. Model 2.1 is the baseline model. We include legal, economic and political institutional quality in models 2.2, 2.3 and 2.4, respectively. In the model 2.1, the constant term has been suppressed because of perfect collinearity with a year-dummy instrument available, which creates automatically by the estimator. In other models, we include the constant term in estimation since omitting constant instruments results in a strong bias and efficiency loss (Han and Kim 2014).

Comparing the results between the static model and the dynamic model, we find some differences as follows. First, for trade liberalization in static models, only actual economic flows have a positive effect on real income. However, in the dynamic model, in all four scenarios, the coefficients of both the actual economic flow and the economic constraints are positive, indicating that both free trade and investment flows, as well as favorable trade and capital policies, have an essential role in improving people's income. Accordingly, favorable trade policies such as the reduction of hidden import barriers, tariff rates, taxes on international trade and restrictions on capital accounts, can all intensify trade activities between Sub-Saharan Africa and the rest of the world, thereby improving the lives of the people. We suppose that although trade liberalization can lead to some negative impacts, such as increasing inequalities and a negative effect on the environment, for people's incomes, the positive impact of trade liberalization is undeniable. This result contrasts with the findings of Akpan and

[Atan \(2016\)](#), even though both studies use the same dynamic settings. The reasons for this difference relate to the data and approach method. First, this study determines the relationship between trade liberalization and economic growth in terms of a comprehensive view of globalization, in that the trade must be considered simultaneously with investment, cultural flow, information and global political cooperation; [Akpan and Atan \(2016\)](#) only reflected the impact of the trade itself. Second, [Akpan and Atan \(2016\)](#) used trade openness to represent trade indicators; this is a relative indicator and has many limitations. Third, the data used by [Akpan and Atan \(2016\)](#) only covers 23 countries from 1996–2011, while the data in our study covers 45 Sub-Saharan Africa countries from 1980–2013.

Table 4. The effect of trade liberalization on real income per capita in a dynamic setting.

Dependent Variable: The Logarithm of GDP per Capita (PPP)				
Independent variables	Model 2.1 ²	Model 2.2	Model 2.3	Model 2.4
AEF	0.00069 *** (3.60)	0.00095 *** (3.36)	0.00033 (1.28)	0.00043 ** (2.41)
EC	0.00043 *** (3.03)	0.00103 *** (3.88)	0.00083 *** (3.83)	0.00119 *** (5.69)
PC	0.00092 ** (2.32)	−0.00089 (−1.48)	−0.00025 (−0.75)	−0.00009 (−0.27)
IF	0.00120 *** (4.80)	0.00096 *** (3.44)	0.00073 *** (3.17)	0.00100 *** (6.12)
CP	−0.00056 (−1.22)	0.00005 (0.06)	−0.00013 (−0.17)	0.00002 (0.02)
PG	−0.00040 ** (−1.96)	−0.00014 (−0.70)	−0.00037 * (−1.68)	−0.00048 ** (−2.14)
lnCapitalStock	0.01224 * (1.79)	0.00026 (0.03)	0.00184 (0.30)	0.00946 (0.96)
lnPOP	−0.00164 (−0.05)	0.00661 (0.42)	0.01967 (1.42)	0.01706 (1.17)
lnArea	−0.00592 (−0.14)	−0.02737 ** (−2.52)	−0.02545 *** (−3.85)	−0.02413 (−1.34)
Legal Institutional Quality		0.06109 ** (2.34)		
Economic Institut. Quality			0.04288 *** (2.90)	
Political Institut. Quality				0.02199 (1.05)
lnGDPPC–Lag (1)	1.09995 *** (32.34)	1.13009 *** (31.67)	1.16903 *** (50.84)	1.13416 *** (38.88)
lnGDPPC–Lag (2)	−0.14705 *** (−4.54)	−0.19195 *** (−6.36)	−0.21351 *** (−7.09)	−0.19238 (−8.43)
Arellano-Bond test (AR2)	−1.601	−0.3451	−0.77692	−0.77195
Sargan test	35.222	35.299	34.644	35.376
No. Obs	1190	743	788	795

*** Significance at the 1% level; ** Significance at the 5% level; * Significance at the 10% level.

Second, in the static model, personal contact has a positive effect on real income, but in the dynamic model, only in model 2.1 is this indicator significantly positive. This reflects the fact that support through direct exchange, overseas remittances and tourism are only useful in specific periods.

² In this estimation, the constant term has been suppressed because of perfect collinearity with a year-dummy instrument available, which creates automatically by the estimator. In other models, we include constant term in estimation since omitting constant instruments results in a strong bias and efficiency loss ([Han and Kim 2014](#)).

For sustainable development, people have to try their best and continuously improve their capabilities and skills for a better life. This is also evident when, in both settings, information flows are significantly positive and powerful. The flow of information, science and technology and the development of the Internet and information technology are all essential for the development of the country. These changes are also essential for improving the living standards of the people.

Third, we find that political globalization is not significant in models 2.1, 2.2, and is even negative in models 2.3 and 2.4. In fact, the question of the effect of political globalization on economic development is still ambiguous, especially for developing countries. On the one hand, political collaboration can help weak countries to raise their voice and position on international issues as well as to take advantage of the international community's support for economic development. It also creates the foundation for economic cooperation. However, on the other hand, it limits the power of the government in implementing macroeconomic instruments. In addition, all countries often focus on their own interests; therefore, cooperation sometimes yields unequal benefits. Support is often accompanied by extreme constraints. If the government does not efficiently use loans and financial aids or there is corruption, this support may lead to a negative impact on economic development.

Institutional quality, as expected, has a positive impact on economic development and income generation. In particular, in the dynamic model, the improvement of the economic institutional quality improves people's livelihoods. Accordingly, the enhancement in the quality of regulations, policies on the economy, finance, credit, the business environment and the banking system, all have a substantial effect in promoting economic development and production, thus creating more jobs and improving the lives of people. In fact, in developing countries, economic regulations often lack practicality, making it difficult for business. The complexity of business procedures and the lack of clarity and adequacy in managing regulations make it difficult for companies to start and expand their businesses, especially small and medium enterprises. Along with the high rate of corruption, companies often have to bribe officials or go to the 'back door' for more 'comfortable' business. In addition, unfair competition leads to market distortion, which negatively affects economic growth. Therefore, improving the economic institutional quality is one of the important solutions to promoting economic progress, thereby improving standards of living. However, we find no evidence of the impact of political institutional quality on people's incomes.

4.3. Short-Term and Long-Term Effects

Since impacts of policies may be effective over time, analysis for both the short-term and long-term is necessary. Table 5 provides estimated results based on a pooled mean group estimation developed by Pesaran and Smith (1995) and Pesaran et al. (1999). Model 3.1 is the fundamental model. In models 3.2, 3.3 and 3.4 we add institutional quality variables.

Table 5. The effect of trade liberalization on real income per capita in short-term and long-term.

Independent Variable	Dependent Variable: The Logarithm of GDP per Capita (PPP)							
	Model (3.1)		Model (3.2)		Model (3.3)		Model (3.4)	
	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term	Long-Term	Short-Term
AEF	0.00456 *** (5.78)	−0.00188 ** (−2.16)	−0.00353 *** (−3.86)	−0.00066 (−0.83)	0.00325 *** (8.02)	−0.00207 * (−1.92)	0.01491 *** (6.81)	−0.00127 (−1.28)
EC	0.00317 *** (3.28)	−0.00287 * (−1.86)	0.00543 ** (2.01)	−0.00352 (−1.49)	0.00432 *** (9.20)	−0.00380 * (−1.91)	−0.0035 * (−1.86)	−0.00348 (−1.54)
PC	0.00376 ** (3.26)	−0.00241 (−0.96)	−0.00363 (−0.85)	0.00198 (0.58)	−0.00737 *** (−10.33)	−0.00028 (−0.09)	0.02447 *** (6.80)	0.00085 (0.40)
IF	0.00743 *** (6.93)	−0.00176 * (−1.76)	0.01287 *** (10.86)	−0.00114 (−0.87)	0.00968 *** (15.77)	−0.00092 (−0.83)	−0.00120 (−0.60)	−0.00039 (−0.37)
CP	−0.03094 *** (−5.27)	−0.00236 (−0.45)	−0.28698 *** (−12.17)	0.00404 (0.84)	−0.01901 *** (−6.30)	−0.01290 (−0.84)	−0.12309 *** (−7.67)	−0.00212 (−0.29)
PG	0.00022 (0.31)	−0.00053 (−1.25)	−0.02260 *** (−8.98)	0.00089 (0.97)	−0.00278 *** (−4.35)	0.00044 (0.57)	0.00442 *** (3.15)	0.00090 (1.15)
lnCapitalStock	0.02879 (0.81)	0.20688 *** (3.28)	0.50818 *** (10.82)	0.25860 ** (2.19)	0.10832 *** (7.56)	0.25584 ** (2.30)	0.63935 *** (11.50)	0.10391 (1.04)
lnPOP	0.35925 *** (3.67)	1.29754 (0.90)						
lnArea	−64.103 *** (−6.90)	−1.6827 (−0.94)		−0.14219 (−1.27)		−0.25229 (−1.19)		−0.18399 (−1.15)
Legal Institutional Quality			1.34690 *** (5.78)	0.19936 * (1.73)				
Economic Institut. Quality					0.32900 *** (5.00)	0.00196 (0.02)		
Political Institut. Quality							1.64183 *** (8.03)	0.17633 ** (2.15)
Error Correction		−0.12511 *** (−4.35)		−0.02527 (−1.03)		−0.16609 *** (−4.01)		−0.05576 *** (−3.05)
No. Obs	1229		712		757		766	

*** Significance at the 1% level; ** Significance at the 5% level; * Significance at the 10% level.

Regression results show that both actual economic flows and economic constraints have short-term negative effects but positive long-run impacts on economic development. This result is well suited to theories of economic development. In the first stage, when the government decides to open up its economy, sign trade agreements and attract investment, it will create tremendous competitive pressure in the domestic market. Foreign enterprises, with huge advantages in capital, large-scale production, management experience, modern equipment and technology, can easily dominate in the early stages of integration. Faced with this fierce competition, domestic enterprises have two options: (1) Promote innovation, reform comprehensively, change technology and compete; or (2) accept bankruptcy or possible mergers and acquisitions. Since domestic firms in developing countries have outdated technology and lack competitiveness, at this stage most of them may go bankrupt, leading to job losses, a fall in wages and an increase in inequality. However, after a period of openness, existing businesses will grow stronger with larger markets, bigger capital capability and higher management experience accumulating over time. In addition, many new and modern firms will be established with strong competitiveness, that can compete with foreign enterprises. In fact, the free trade and improvement of the institutional quality vigorously promote the opportunity for entrepreneurship (Angulo-Guerrero et al. 2017), innovation (Navas 2015), innovation incentives and R&D (Long et al. 2011). In general, the government needs to accept short-term costs to gain the more enormous benefits in the long run.

Personal contact has no impact on real income per capita in the short-term but has a positive effect in models 3.1 and 3.4, and a negative effect in the long-term in model 3.3. Information flows, as expected, play an important role in improving the lives of people in the long run.

Furthermore, we find evidence of the negative impact of cultural proximity on per capita income in the long run. This index in essence reflects the flow of beliefs and values, as well as the domination of US cultural products. It also reflects changes in the culture of eating, living and shopping. Sociologists use the term ‘assimilation’ to describe this phenomenon. Leading countries tend to spread and impose their ideas on smaller countries, and then profit. The effect of this phenomenon, in fact, has not been fully researched. On the one hand, it can give people a chance to access modern culture and lifestyles. On the other hand, it can also cause the disappearance of core cultural values, increasing psychological dissatisfaction of people with their government, and thereby leading to economic and political instability. With each region and different levels of economic development, this influence varies. The estimation shows that, in Sub-Saharan Africa, this phenomenon is negative in the long run.

Political globalization in the long-term is not significant in model 3.1, has a negative impact on the real income per capita in models 3.2 and 3.3 and is positive in model 3.4. The results are quite similar to the dynamic setting estimations and reinforce our arguments about the role of global political cooperation for developing countries.

Regarding institutional quality, all three aspects (legal, economic and political) have positive impacts on real income of households in the long run, improving living standards. The legal quality even has a positive effect in the short run. In Sub-Saharan Africa, the state of institutions is one of the core weaknesses. In this area, the level of corruption is very high, officials are bureaucratic, and the law is inappropriate and ineffective. Furthermore, policies and mechanisms for economic growth are weak; most people have no voice and transparency is very low compared to the rest of the world. These are major obstacles to economic development, and they require constant effort from the government.

5. Conclusions

This paper aims to assess the impact of trade, capital and investment liberalization on people’s real incomes. We have used the balanced panel data of 45 Sub-Saharan African countries during the last 34 years (1980–2013) and employed advanced econometric instruments, including both static and dynamic settings, and short-term and long-term investigation.

To address the shortcomings of the trade liberalization index used in previous studies, we used the KOF indexes. This approach allowed us to include not only trade and economic factors but also

social and political factors in our estimations. Further, the role of institutional quality in economic and social development is remarkable, but studies on this issue are inadequate. We included institutional factors in our estimations with a high expectation of its working.

We find that, first, although trade and investment liberalization has significant positive impacts on the growth of real income, there is still a difference in the way in which trade influences real income per capita between the static and dynamic models. In the static setting, while flows of trade and foreign investment improve real income, reduction of economic constraints (hidden import barriers, mean tariff rate, taxes on trade and foreign account restrictions) does not. However, in the dynamic setting, the improved flows and reduced constraints both influence positively in enhancing the economic living standards of people in Sub-Saharan Africa. More interestingly, the impacts of both aspects are negative in the short-term but positive in the long-term. The reasons were explained in the previous chapter as to the adaptation process of local enterprises to the international environment.

Second, for personal contact in the static model, we find evidence of direct interaction among people from different countries having a positive effect on income generation. The financial support or remittances of relatives, the development of tourism, as well as the rise of experts living and working locally, all have a positive influence on the economy in Sub-Saharan Africa. Long-term impact estimation also provides a similar result. We did not, however, find evidence of this effect in dynamic models.

Third, we find that the flow of knowledge, information, science and technology via the expansion of the Internet, newspapers and television enhances real income significantly in both static and dynamic settings. Although the short-term impact of this factor is unclear, the substantial role of information flows in promoting long-term economic development is undeniable. The development of information technology has enabled people, as well as firms, to access easily modern technologies and unlimited knowledge resources at the lowest cost. It also changes the way companies do business and enables them to participate in the global market.

Fourth, we also detect negative effects of the flows of beliefs and values, as well as from the domination of US cultural products on people's income. We think that this problem can increase the dissatisfaction with the government, thereby causing economic and political instability.

Fifth, the impact of political globalization is complex and differs in particular situations. Accordingly, in the static model, this factor has a positive impact on economic growth, by improving people's standards of living. However, in the dynamic model and the long term, it has a negative impact on real GDP per capita. Governments should carefully consider cooperative activities based on mutual benefits and ensure supportive resources are used for growth efficiently.

Sixth, institutional quality plays a vital role in developing the economy and improving people's living standards in the static, dynamic and long-term models. This result is supported by [Hassan \(2001\)](#), [Kopperschmidt and Matutes \(1997\)](#), [Tupy \(2005\)](#). In Sub-Saharan Africa, corruption is high, the law is distorted, the management mechanism is ineffective, and the political system is weak. Hence, to be able to develop, Sub-Saharan African governments need to open up their economies, actively attract investment and capital, boost economic reforms and improve institutional quality. This is the key solution to improving their citizens' standards of living.

Finally, we conclude that it is necessary to distinguish between static and dynamic settings as well as short- and long-term effects, since they may provide different, and sometimes-even opposite, results. Further, each region has different factors and conditions; hence studies based on particular areas should be recommended.

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Appendix A. Variables Specification

Table A1. Variable and symbol definitions.

Variable	Definition and Sources
lnGDPPC	The logarithm of gross domestic product based on purchasing-power- parity (PPP) per capita GDP, Current international dollar; IMF World Economic Outlook Database October 2016, updated October 4, 2016
lnPOP	The logarithm of population, total; World Bank, accessed 25.12.2017
lnArea	The logarithm of land area (sq. km); World Bank, accessed 25.12.2017
AEF, EC, PC, IF, AEF, CP, PG	AEF (actual economic flows), EC (economic constraints), PC (personal contacts), IF (information flows), CP (cultural proximity), PG (political globalization): KOF Globalization Index 2016, Dreher (2006) , updated in Dreher et al. (2008) .
Institutional Quality	Institutional Quality Indicators 2013; Kuncic (2014)
lnCapitalStock	The logarithm of capital stock at current PPPs (in mil. 2011US\$); Penn World Table 9.0

Table A2. Variables, weights and description of KOF indexes.

Indicates and Variables	Weights (%)	Description
1. Economic Factors	36	
1.1. Actual Economic Flows	50	It includes data on trade, FDI and portfolio investment, which are provided by World Bank, UNCTAD STAT and IMF's International Financial Statistics.
- 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	
1.2. Economic Restrictions	50	This indicator refers to restrictions on trade and capital using hidden import barriers, mean tariff rates, taxes on international trade and capital controls.
- Hidden Import Barriers	22	
- Mean Tariff Rate	28	
- Taxes on International Trade (percent of current revenue)	26	
- Capital Account Restrictions	24	
2. Social Factor	37	
2.1. Personal Contact	33	It captures direct interaction among people living in different countries, including international letters, telecom traffic, the degree of tourism, government and workers' transfers received and paid, the stock of foreign.
- Telephone Traffic	25	
- Transfers (percent of GDP)	2	
- International Tourism	26	
- Foreign Population (percent of total population)	21	
- International letters (per capita)	25	
2.2. Information Flows	36	The purpose of this indicator is to extend proxy people's potential for receiving news from other countries. This is the important key for them to contribute to the global spread of ideas.
- Internet Users (per 1000 people)	37	
- Television (per 1000 people)	39	
- Trade in Newspapers (percent of GDP)	25	
2.3. Cultural Proximity	32	It explains belief and values moving across national borders and also refers to the domination of U.S. cultural products, which calculated by traded books, the global spread of McDonald's.
- Number of MacDonald's Restaurants (per capita)	47	
- Number of IKEA (per capita)	47	
- Trade in books (percent of GDP)	6	
3. Political Globalization	27	It bases on the number of embassies and membership participation in international organisations, including U.N.
- Embassies in Country	25	
- Membership in International Organizations	27	
- Participation in U.N. Security Council Missions	22	
- International Treaties	26	

(Source: [Swiss Economic Institute 2017](#)).

List of 45 Sub-Saharan African countries: Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Chad, Comoros, Congo Dem. Rep., Congo Rep., Cote d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, Zimbabwe.

Appendix B. Descriptive Statistics

Table A3. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
lnGDPPC	1440	7.390	0.982	5.027	10.843
lnPOP	1528	15.526	1.501	11.055	18.962
AEF	1507	47.990	21.498	3.990	99.650
EC	1316	35.612	16.447	4.270	85.630
PC	1507	32.780	16.863	5.500	81.050
IF	1507	33.174	16.558	1.000	86.400
CP	1507	5.228	5.526	1.000	42.520
PF	1507	48.191	18.076	8.300	90.940
lnArea	1530	12.037	2.022	6.131	14.681
Legal Institution Quality	867	0.438	0.144	0.073	0.833
Political Institution Quality	934	0.389	0.157	0.043	0.794
Economic Institution Quality	921	0.382	0.148	0.000	0.779
lnCapitalStock	1496	23.693	1.510	18.485	28.381

Table A4. Covariance matrix of fundamental model 1.1.

e(V)	AEF	EC	PC	IF	CP	PG	lnCapitalStock	lnPOP	lnArea	_cons
AEF	2.370×10^{-6}									
EC	-3.600×10^{-7}	5.326×10^{-6}								
PC	-1.691×10^{-6}	9.783×10^{-7}	0.00002133							
IF	-1.190×10^{-6}	-1.303×10^{-6}	9.894×10^{-7}	7.534×10^{-6}						
CP	-4.444×10^{-7}	1.273×10^{-6}	-2.196×10^{-6}	-1.376×10^{-6}	0.00001594					
PG	6.980×10^{-7}	-1.408×10^{-6}	-1.358×10^{-6}	-2.441×10^{-6}	1.532×10^{-7}	3.785×10^{-6}				
lnCapitalStock	-0.00001158	-0.00005011	0.00002174	-0.00004085	-0.00002325	7.160×10^{-6}	0.00502091			
lnPOP	0.00004659	0.00011779	0.00006411	-0.00002815	0.0000206	-0.0000694	-0.00794829	0.02215309		
lnArea	-0.00004586	-0.00002384	0.00002813	0.00008265	-5.979×10^{-6}	-7.598×10^{-6}	0.00154322	-0.0073295	0.00583698	
_cons	0.00008237	-0.00052331	-0.00243394	0.00045681	0.00023164	0.00095807	-0.0109437	-0.07571542	0.00920142	1.3870565

Table A5. Covariance matrix of fundamental model 2.1.

e(V)	L.lnGDPPC	L2.lnGDPPC	AEF	EC	PC	IF	CP	PG	lnCapitalStock	lnPOP	lnArea
L.lnGDPPC	0.0011566										
L2.lnGDPPC	-0.0008747	0.00104754									
AEF	3.883×10^{-6}	-3.373×10^{-6}	3.720×10^{-8}								
EC	5.686×10^{-7}	-3.696×10^{-7}	-8.926×10^{-9}	1.971×10^{-8}							
PC	2.323×10^{-6}	2.667×10^{-6}	1.101×10^{-8}	3.796×10^{-9}	1.564×10^{-7}						
IF	1.353×10^{-7}	2.969×10^{-6}	1.534×10^{-8}	-1.293×10^{-8}	4.829×10^{-8}	6.275×10^{-8}					
CP	-3.245×10^{-6}	6.373×10^{-6}	-1.792×10^{-8}	-9.630×10^{-9}	5.644×10^{-8}	2.766×10^{-8}	2.118×10^{-7}				
PG	9.878×10^{-7}	-3.077×10^{-6}	2.153×10^{-9}	6.578×10^{-11}	-1.374×10^{-8}	-1.141×10^{-8}	-4.803×10^{-8}	4.170×10^{-8}			
lnCapitalStock	-0.00013576	0.00011245	-7.119×10^{-7}	2.702×10^{-7}	1.178×10^{-6}	-6.474×10^{-8}	3.648×10^{-7}	4.118×10^{-8}	0.00004696		
lnPOP	-0.00013981	-0.00041959	3.792×10^{-8}	-7.499×10^{-7}	-9.984×10^{-6}	-5.973×10^{-6}	-3.686×10^{-6}	1.314×10^{-6}	-0.0000716	0.00108056	
lnArea	0.00040696	0.00036895	1.363×10^{-6}	6.299×10^{-7}	9.622×10^{-6}	6.854×10^{-6}	1.407×10^{-6}	-7.242×10^{-7}	-2.310×10^{-6}	-0.00124787	0.00188667

Table A6. Covariance matrix of fundamental model 3.1 (long-term).

e(V)	AEF	EC	PC	IF	CP	PG	lnCapitalStock	lnPOP	lnArea
AEF	6.218×10^{-7}								
EC	2.172×10^{-7}	9.335×10^{-7}							
PC	3.376×10^{-8}	2.702×10^{-7}	1.333×10^{-6}						
IF	1.276×10^{-8}	-5.522×10^{-7}	-2.229×10^{-7}	1.152×10^{-6}					
CP	-6.283×10^{-8}	6.706×10^{-7}	-1.792×10^{-6}	-8.354×10^{-7}	0.00003453				
PG	-5.321×10^{-8}	-7.208×10^{-8}	-3.905×10^{-7}	-1.706×10^{-8}	-2.837×10^{-7}	5.316×10^{-7}			
lnCapitalStock	-9.863×10^{-7}	-2.116×10^{-7}	0.00001775	5.493×10^{-6}	-0.00006559	-4.371×10^{-6}	0.00126704		
lnPOP	-6.777×10^{-6}	-1.951×10^{-6}	-0.00002812	-0.00004453	0.00023782	-9.597×10^{-6}	-0.00295217	0.00956272	
lnArea	-0.00068362	0.00061468	-0.00023945	-0.00135236	0.00521239	-0.0006238	-0.01388575	0.13546927	86.276029

Table A7. Covariance matrix of fundamental model 3.1 (short-term).

e(V)	__ec	D.AEF	D.EC	D.PC	D.IF	D.CP	D.PG	D.lnCapitalStock	D.lnPOP	D.lnArea	_cons
__ec	0.00082836										
AEF	2.851×10^{-6}	7.517×10^{-7}									
EC	-5.256×10^{-6}	-1.114×10^{-7}	2.384×10^{-6}								
PC	7.116×10^{-6}	2.524×10^{-7}	-1.110×10^{-7}	6.235×10^{-6}							
IF	-1.376×10^{-6}	-2.882×10^{-8}	-2.686×10^{-7}	-1.585×10^{-7}	9.941×10^{-7}						
CP	-0.00001139	-3.413×10^{-7}	-5.183×10^{-7}	-3.643×10^{-7}	-1.545×10^{-6}	0.00002776					
PG	-3.610×10^{-6}	7.127×10^{-10}	1.119×10^{-8}	-9.503×10^{-8}	7.638×10^{-8}	2.321×10^{-7}	1.811×10^{-7}				
lnCapitalStock	0.00026981	-0.00001531	7.322×10^{-6}	-0.00005378	-1.942×10^{-6}	-0.00005549	-1.727×10^{-6}	0.00398786			
lnPOP	-0.00650455	0.00004957	-0.00001336	-0.00072695	-0.0002205	0.00302108	-0.00006701	-0.00397206	2.0565736		
lnArea	-0.002775	0.00004456	-0.00005359	-0.00053152	0.00007569	-0.00113657	-0.00028201	0.00790757	0.16936925	3.2196832	
_cons	-0.65451174	-0.00239158	0.0043318	-0.00663241	0.00106944	0.0083998	0.00306447	-0.19082528	5.2724529	1.9531865	523.46142

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