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Short- and Long-term Impact of Trade Openness on Financial Development in sub-Saharan Africa

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Abstract

We extended a recently proposed index of trade openness to a panel data setting in order to investigate the short- and long-term impact of trade openness on financial development for a panel of 43 sub-Saharan African countries over the period 1996 to 2014. We found that trade openness enhances financial development in the long term. In the short term, however, the effect of openness is not clear but appears to be negative. When we divided the sample into low- and middle-income groups, we found that openness enhances financial development in the former group but detrimentally affects it in the latter group. This suggests a non-linear relationship between financial development and openness. Among other factors that may be relevant in explaining the trade openness–financial development nexus, we examined the role of governance, human capital development, and infrastructural development. We found that governance, human capital development and infrastructure development are critical to financial development, particularly in the long term. Our findings have relevant policy implications, which we elaborate on in this paper.

JEL Classification: F13; G21.

Keywords: Financial Development; Trade openness; Short- and Long-run Impact; Sub-Saharan Africa.

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1 Introduction

Several studies have identified a link between financial development and trade openness (see Newbery & Stiglitz, 1984; Braun & Raddatz, 2005; Do & Levchenko, 2007; Baltagi, Demetriades, & Law, 2009; Kim, Lin, & Suen, 2010; Iyke, Antwi-Asare, Gockel, & Abbey, 2016, for example). For example, Rajan and Zingales (2003) argue that trade and capital account openness may promote financial development by enhancing foreign direct and portfolio investments. The lack of finance has been the major hindrance to the growth of firms. Hence, a well-developed financial system ensures that funds are available for all firms to access, and, as a consequence, improves their competitiveness. Rents are generally driven towards zero as firms become competitive. Rajan and Zingales (2003) also argue that various local monopolies or interest groups naturally stifle financial development in order to prevent new firms from becoming competitive. Trade and capital account openness can weaken the opposition to financial development by local monopolies. To Rajan and Zingales (2003), trade and capital account openness does not only weaken local monopolies opposition to financial development, but also creates incentives for them to adopt a different stance towards financial development. Others argue that financial development may improve trade policy and openness. According to Feeney and Hillman (2004), if capital markets are incomplete, local interest groups face higher risks owing to the lack of alternative investment avenues. Therefore, these interest groups naturally lobby for protectionist policies. However, well-developed capital and financial markets lower information asymmetries and ensure a higher degree of portfolio diversification. In essence, financial development may be associated with lower incentives for protectionist policies, thus enhancing trade openness.

The complex relationship between financial development and trade openness has been a subject of interest to researchers and policymakers. This paper attempts to contribute to the existing literature by extending a recently proposed index of trade openness to the panel setting and investigating the short- and long-term impact of trade openness on financial development for a panel of 43 sub-Saharan African countries over the period 1996 to 2014. As highlighted by Squalli and Wilson (2011) and Iyke (2017), previous studies in trade openness literature have mostly used simple outcome-oriented measures of openness. The popularity of the outcome-oriented measures is mainly the result of the fact that, when compared with the policy-oriented measures, they are less biased and the data for establishing them is publicly available (Iyke, 2017; Iyke & Ho, 2017). However, one problem arises when using the existing outcome-oriented measures, and that is that they are unable to take into account a countrys global interaction and interconnectedness (Squalli & Wilson, 2011). Hence, the effects of openness on macroeconomic variables that are reported using these measures may miss a critical aspect of openness. Therefore, efforts to establish the true extent of the effects of openness on financial development are certainly worthwhile.

A solution to this problem is to use the composite trade share measure of openness developed by Squalli and Wilson (2011) for a cross section of coun-

tries. However, in a cross-country setting, rich time series dynamics are not fully captured by this composite index. Iyke (2017) and Iyke and Ho (2017) extended the composite trade share measure to a panel setting in order to take full advantage of the cross-country and time series information embedded in panel data (Beck & Levine, 2004) and examined the effect of openness on growth and emissions. In the present paper, we follow their lead and utilise the composite index in a panel data setting. In addition, when dealing with macroeconomic relationships like the openness–finance nexus, most studies prefer to focus on measuring long-run effects. However, in practice, the policymaker may also want to know how the financial system reacts to openness-oriented policy changes in the short run. This is especially necessary when the financial system is in distress. For example, it may be irrational for policymakers to pursue policies that may only correct the devastating effects of the recent global financial crisis of 2007/2008 in the long run. As John Maynard Keynes famously puts it: In the long run we are all dead.¹ What this implies is that, in most circumstances, short-run adjustments are necessary to understand the equilibrium policy paths of macroeconomic variables. Therefore, ignoring the short-run effects means that important information is lost. Recent studies have highlighted the need to also focus on short-run effects (see Catao & Terrones, 2005; Loayza & Ranciere, 2006; Kim et al., 2010; Chudik, Mohaddes, Pesaran, & Raissi, 2017, for example). The present study extends the literature on the openness–finance nexus by estimating both short- and long-run effects.

Institutions and policymakers have often raised concerns regarding the suitability of openness and liberalisation policies, especially those encouraged by developing countries. Most sub-Saharan African countries have pursued drastic trade liberalisation policies under the International Monetary Fund (IMF) and World Bank-sponsored Structural Adjustment Programmes in order to resuscitate their ailing economies (see Quarcoo, 1990; Logan & Mengisteab, 1993; Lall, 1995; Stein & Nissanke, 1999). Were these policies conducive to real and financial-sector growth? Or did they prevent them from rising? These are hard questions to answer without thorough number-crunching. In fact, previous attempts have presented mixed findings (Greenaway & Morrissey, 1993; Ponte, 1995; Noorbakhsh & Paloni, 1999; Akyüz & Gore, 2001; Ahmed, 2013). Perhaps the conflicting evidence may be related to the fact that many statistical offices in sub-Saharan Africa (SSA) are still reeling from the impact of the structural adjustments, as pointed out by Jerven (2013), and are therefore unable to compile very reliable data. Evidently, further empirical exploration is necessary to understand what openness or liberalisation brings to an economy. Our study adds to the sub-Saharan African literature in this regard.

In our empirical analysis, apart from constructing a longitudinal, composite trade share index in order to better understand the openness–finance nexus, we subdivided the sub-Saharan African countries into middle-income and low-income cohorts, thereby allowing relative homogeneities across countries. Moreover, we modelled the openness–finance relationship by employing a dynamic,

¹See also Diamond (2009, 531).

distributed lag approach which enabled us to restrict countries to a homogeneous long-run path and, at the same time, allowed elastic, heterogeneous short-run adjustments to the equilibrium. Our results suggest that trade openness promotes financial development in the long term. In the short term, however, the effect of openness is not clear but appears to be negative. By subdividing the countries, we found that openness enhances financial development in the low-income countries but is detrimental to it in the middle-income countries. This evidence suggests a non-linear relationship between financial development and openness. Furthermore, we found that governance, human capital development and infrastructure development are critical to financial development, particularly in the long term. In other words, these factors help to better explain the openness–finance relationship.

The rest of the paper is organised as follows: Section 2 provides an overview of the relevant literature; Section 3 outlines the methodology and describes the data; Section 4 presents the empirical results; and Section 5 concludes the paper.

2 The relevant literature

There is a growing body of literature exploring the complex linkages between financial development and trade. Some studies focus on the channels in which trade influences financial development, whereas others show how financial development affects international trade. With regard to how trade influences financial development, studies demonstrate that trade openness promotes financial development through both the supply and demand sides of the financial market. Concerning the supply side of financial development, Rajan and Zingales (2003) point out that trade openness weakens the incentives of incumbent firms or interest groups to block financial development in order to reduce entry and competition. In addition to limiting the ability of incumbent firms to block financial development, trade openness also creates incentives for them to adopt a different stance towards such development. As a result, trade openness tends to increase investment and banking activities, thereby promoting financial development. A similar view is shared by Braun and Raddatz (2005), who further explore the impact of trade on finance through the political channel. They demonstrate that trade liberalisation reduces the power of interest groups in blocking financial development, thereby improving the general development of the financial system. As regards the demand side of financial development, studies show that an increase in trade openness may trigger demand for new financial products and services. For example, Newbery and Stiglitz (1984) argue that, by affecting price elasticity, trade openness may increase both uncertainty and income volatility. As a result, this could promote financial development by increasing the demand for insurance products. In the same vein, Svaleryd and Vlachos (2005) argue that trade openness increases exposure to foreign competition and to the external shocks of a country, thereby increasing the demand for new financial instruments in order to achieve risk diversification. Do and Levchenko (2007) demonstrate that a comparative advantage in trade will af-

fect the production pattern of a country and, therefore, the demand for external finance. They show that countries specialising in financially dependent goods will experience a demand for external finance, thus leading to a higher level of financial development.

Another strand of the literature focuses on how financial development influences trade patterns. For example, studies such as those of Kletzer and Bardhan (1987) and Beck (2002) show that countries with a relatively well-developed financial sector will have a comparative advantage in industrial sectors that rely heavily on external financing. In other words, the level of financial development of a country will affect the pattern of international trade. Feeney and Hillman (2004) try to link financial market development and trade liberalisation by modelling how the equilibrium composition of the asset portfolio can affect individual attitudes to free trade. In their model, they show that financial market participants have lower private incentives to pursue protectionist trade policies, thereby enhancing trade openness.

The finance–openness nexus has also been identified by empirical studies, although the topic has not been explored exhaustively. The early studies focus on the impact of financial development on trade. For example, Beck (2002) finds that financial development exhibits a strong impact on both the levels of exports and the trade balance of a manufacturing sector that enjoys large economies of scale. He concludes that the degree of financial development is an important determinant of the pattern of international trade. Svaleryd and Vlachos (2005) indicate that the pattern of industrial specialisation and international trade is largely influenced by the level of financial development. In particular, countries with well-developed financial systems tend to specialise in industries that rely heavily on external financing. Recently, Niroomand, Hajilee, and Al Nasser (2014) also found that financial market development including both the banking sector and stock market exerts a positive and significant impact on trade openness both in the short and long run.

More recently, there have been studies exploring the reverse link – that is, how trade affects financial development – although the findings are highly inconclusive. For example, Do and Levchenko (2007) show that the trade pattern can influence the pace of financial development. They find that countries with a comparative advantage in financially intensive goods have a higher demand for external finance, thereby promoting financial development. On the other hand, countries that mainly export goods which do not rely heavily on external finance will experience a slower pace of financial development. Law (2008), in exploring the impact of trade openness on financial development in Malaysia, finds that trade openness is an important determinant in promoting financial development. Law (2009) reports similar findings with regard to a group of developing countries. Recently, Iyke et al. (2016) attempted to identify the links among finance, trade and growth in countries of the West African Economic and Monetary Union. They reveal that trade openness fosters financial deepening in these countries. However, Baltagi et al. (2009), in testing whether trade openness can explain the pace of financial development, find that trade openness is negatively associated with the degree of financial openness. This implies

that relatively closed economies can benefit more from trade liberalisation than other economies. In addition, Aizenman and Noy (2009), while examining the endogenous determination of both financial and trade openness, find that there is two-way feedback between financial and trade openness. Furthermore, Gries, Kraft, and Meierrieks (2009), in attempting to identify the interactions among finance, trade and growth in 16 sub-Saharan African countries, find only limited evidence to suggest that finance promotes growth via trade openness, or that openness has promoted growth via the impact of financial development. In addition, they fail to identify any predominant relationship between trade and finance in these countries. Kim, Lin, and Suen (2012) also examine the relationship among finance, trade and growth in a group of 63 countries and find that the finance–trade nexus depends on the level of income of the study country. In poorer countries, they reveal the coexistence of the positive impact of finance on trade and a negative impact of trade on finance. In richer countries, they find that finance promotes trade, while trade has an ambiguous impact on finance. The findings that the finance–trade nexus depends on the level of income of the study country is also supported by Huang and Temple (2005). They find strong evidence that trade promotes financial development in the high-income group but not in the low-income one. It is in the context of these highly debateable empirical findings, that this paper seeks to enrich the existing literature by further exploring the short- and long-run impacts of trade openness on financial development in sub-Saharan African countries.

3 Methodology and data

3.1 Empirical model specification

Previous studies examined the effects of financial development on trade openness by specifying finance as a function of trade and other variables (Beck, 2002; Svaleryd & Vlachos, 2005; Kim et al., 2010). Our objective is to examine the effects of openness on financial development; hence we reverse the specification. Following Zhang, Zhu, and Lu (2015), we specify financial development as a function of openness and other variables. Our empirical specification is of the form:

$$\ln FD_{it} = \alpha_i + \beta \ln TO_{it} + \gamma \ln CONT_{it} + \epsilon_{it} \quad (1)$$

where FD , TO and $CONT$ denote financial development, trade openness and a set of control variables, respectively; \ln is the natural logarithm operator; α_i represents country-specific fixed effects; β and γ constitute a set of parameters to be estimated; ϵ denotes the iid error term; and i and t denote the cross-sectional and time subscripts, respectively. In our application, the control variables are initial income and inflation.

Most empirical studies focus on estimating only Eq. (1), that is, the long-run relationship between financial development and trade openness. In reality,

policymakers will be satisfied knowing the reaction of financial development to openness-oriented policy changes in the short run. This is particularly relevant in times of financial distress. We recover the short-run effects of openness on financial development by recasting Eq. (1) into a dynamic, distributed lag model of the form:

$$y_{it} = \mu_i + \sum_{j=1}^p \lambda_{ij} \Delta y_{it-j} + \sum_{j=0}^q \delta'_{ij} X_{it-j} + \epsilon_{it} \quad (2)$$

The short-run adjustment mechanisms can be derived under standard regularity conditions by reparametrising Eq. (2) into the following form:

$$\Delta y_{it} = \mu_i + \phi_i y_{it-1} - \theta'_i X_{it} + \sum_{j=1}^{p-1} \lambda^*_{ij} \Delta y_{it-j} + \sum_{j=0}^{q-1} \delta'^*_{ij} \Delta X_{it-j} + \epsilon_{it} \quad (3)$$

Eq. (3) is the dynamic, distributed lag error-correction model. y and X denote the outcome variable (measures of financial development) and the covariates (trade openness, initial income, and inflation), respectively; μ and ϵ are the country fixed effects and the iid error term, respectively; and λ_{ij} and δ_{ij} are the parameters to be estimated.²

The additional parameters are defined as follows:

$$\phi_i = -1 - \sum_{j=1}^p \lambda_{ij}; \theta_i = \sum_{j=0}^q \delta_{ij} / (1 - \sum_k \lambda_{ik}); \lambda^*_{ij} = - \sum_{m=j+1}^p \lambda_{im}, j = 1, 2, \dots, p-1; \delta'^*_{ij} = - \sum_{m=j+1}^q \delta_{im}, j = 1, 2, \dots, q-1$$

The error-correction term is denoted by ϕ_i , which shows the rate of adjustment of the variables to equilibrium. By definition, if the estimated value of ϕ_i is negative and statistically significant, then we say that the variables are cointegrated. The parameter θ'_i shows the number of cointegration relationships in the model.

Apart from enabling policymakers to distinguish the short-run effects from the long-run effects of trade openness on financial development, Eq. (3) accounts for the contemporaneous feedback causality from financial development to openness. Feedback causality, if unaccounted for, biases the empirical estimates. Moreover, the model accommodates the persistence and the adjustment to equilibrium paths of financial development and openness. Lastly, the model takes into account cross-sectional heterogeneities in the finance–openness nexus because parameters are allowed to vary over time and across countries.³

Three estimators have been proposed to estimate Eq. (3) – two for extreme cases and one for the intermediate case. If only the intercepts are assumed to be heterogeneous, the model can be estimated using the dynamic fixed-effects

²Similar specifications appear in Iyke and Ho (2017).

³Studies such as those of Catao and Terrones (2005), Loayza and Ranciere (2006), Kim et al. (2010), Chudik et al. (2017), and Iyke and Ho (2017) put forward similar arguments.

(DFE) estimator. In contrast, if parameters are assumed to be heterogeneous across countries, the model can be estimated using the mean group (MG) estimator of Pesaran and Smith (1995). These are the two extreme estimators. Finally, if we allow the intercept, short-run parameters, and the error terms to be heterogeneous but restrict the long-run parameters to be homogeneous across countries, the model is estimated using the pooled mean group (PMG) estimator of Pesaran, Shin, and Smith (1999).

Most studies have favoured the PMG estimator, since it brings together the pooling and averaging advantages of the DFE and the MG estimators, respectively. Pesaran et al. (1999) have demonstrated that the PMG estimator is superior because of its flexibility.⁴ In this paper, we test the performance of this estimator against the DFE and MG estimators using the standard Hausman test in order to ensure that the estimator performs satisfactorily. We are a priori biased towards the PMG estimator, since it permits our study to model a homogeneous, long-run, cross-country finance–openness nexus alongside modelling short-run heterogeneous adjustments of these variables to equilibrium across countries.

3.2 Measuring trade openness

Underlying our objective of estimating the effects of trade openness on financial development is the measure of trade openness. What does trade openness really mean? The answer differs from one author to another. According to Krueger (1978), trade openness connotes the pursuit of export-friendly policies by a country. To Anderson and Neary (1992), trade openness is the degree of market distortion attributable to tariff and non-tariff barriers. Meanwhile, Leamer (1988) and Pritchett (1996) argue that trade openness shows the trade intensity of a country. In contrast, Harrison (1996) argues that trade openness shows the degree of neutrality of the incentives between earnings from exports and savings from imports.

From these definitions, it is clear that trade openness can be measured based on trade outcomes or policies. In the empirical literature, the measures of openness clearly fall into these two categories. For example, Edwards (1998) and Lee, Ricci, and Rigobon (2004) developed several policy-oriented measures of openness in their studies. Similarly, Alcalá and Ciccone (2004), Cavallo and Frankel (2008), and Chang, Kaltani, and Loayza (2009) have used various outcome-oriented measures of openness in their studies. Generally, outcome-based measures are more popular than the policy-based measures because of the subjectiveness of the latter. Policy-based measures are largely contingent on the researchers biased understanding of openness; hence the empirical results are influenced by such biasedness (see Dollar & Kraay, 2003; Alcalá & Ciccone, 2004; Cavallo & Frankel, 2008; Chang et al., 2009; Frankel, 2009). In contrast,

⁴The DFE estimator produces inconsistent estimates if cross-sectional variation of the slope parameters exists. In the same vein, the MG estimator is inconsistent if the long-run parameters are homogeneous across countries. The PMG estimator, however, produces consistent estimates under these conditions (Pesaran et al., 1999).

outcome-oriented measures are objectively developed based on publicly available trade data (Iyke & Ho, 2017). The trade intensity ratio (TS) constructed as the sum of exports and imports to nominal gross domestic product (GDP) (i.e. $X + M/GDP$, where X , M and GDP denote exports, imports and gross domestic product, respectively) is the widely used outcome-oriented measure of openness (Chang et al., 2009; Zhang et al., 2015).

The existing outcome-based measures of openness are limited in that they do not measure a countrys interaction and interconnectedness with other countries (Squalli & Wilson, 2011; Iyke, 2017; Iyke & Ho, 2017). As argued by Squalli and Wilson (2011), a good measure of openness should not only account for a countrys share of trade, but should also account for its interaction and interconnectedness with other countries. They proposed a measure of openness that accounts for these dimensions of trade for a cross-section of countries. An extension of this measure to a panel data setting has been undertaken by Iyke (2017). This paper follows the lead of the latter paper by employing the recently developed measure of openness for sub-Saharan African countries. The new measure of openness can be constructed as

$$CTS_i = \frac{(X + M)_i}{\frac{1}{n} \sum_{j=1}^n (X + M)_j} \frac{(X + M)_i}{GDP_i} \quad (4)$$

where CTS denotes composite trade share. This measure is defined as trade share or intensity (TS) adjusted by the fraction of a countrys trade relative to average world trade (Iyke, 2017). Recall that $TS_i = (X + M)_i/GDP_i$, where i is a country belonging to j , a set of countries $1, \dots, n$. Furthermore,

$$WTS_i = \frac{(X + M)_i}{\sum_{j=1}^n (X + M)_j} \quad (5)$$

whereby $nWTS_i > 1$, given that a country is a major trader and its trade outcome is larger than the world average. Under such condition, TS_i has to increase. The key difference between the TS and CTS is that the former penalises larger countries, while the latter penalises smaller countries (Squalli & Wilson, 2011).

3.3 Measuring financial development

Financial development is a multifaceted concept encompassing financial depth, efficiency, access, and stability (Ho & Iyke, 2017). Accordingly, there is no comprehensive measure of financial development (Zhang et al., 2015). In developing countries such as those in SSA, the banking sector plays a critical role in economic activities than the stock market (see Levine, 1997). Therefore, we have followed the literature and used three bank-based measures of financial development.

The first measure is private-sector credit to GDP (PC), which measures the extent to which new firms have opportunities to obtain bank finance (Ross, Loayza, & Beck, 2000; Baltagi et al., 2009; Iyke et al., 2016). According to

Rajan and Zingales (2003), the variable measures the ease with which an enterprise with a sound project obtains funds from banking institutions. This characteristic makes the variable a suitable measure of the efficiency of financial development, which is particularly relevant in developing countries with some level of market distortions (Beck, Demirgüç-Kunt, & Levine, 2000; Ross et al., 2000; Chinn & Ito, 2006; Zhang et al., 2015). This is because the *PC* isolates credit issued to the private sector from credit to state-owned enterprises associated with low efficiency. A high *PC* suggests that the financial system is more efficient and developed (Ross et al., 2000). The second measure is liquidity liabilities to GDP (*LL*), which is the sum of currency and demand, as well as interest-bearing liabilities of banks and non-bank financial intermediaries, as a percentage of GDP (Ross et al., 2000; Baltagi et al., 2009; Kim et al., 2010; Iyke et al., 2016). The pitfall in using this measure is that it entails double-counting and takes into account liabilities supported by credits to the public sector (see Kim et al., 2010). The third measure is bank assets to GDP (*BA*), which is defined as the domestic assets of deposit-money banks as a share of GDP (Beck et al., 2000) Levine et al., 2000). It therefore measures the extent of savings allocation of domestic banks (see Kim et al., 2010). The measure does not distinguish the destination of bank allocation of societal savings. The funds could end up financing non-performing projects or state-owned institutions.

3.4 Data

To examine the effects of openness on financial development, we used a panel of 43 sub-Saharan African countries over the period 1996 to 2014. The majority of the countries in the sample adopted trade liberalisation policies during the period of study and are therefore suitable for empirical investigation. The period restriction is mainly motivated by availability of data. Some of the countries have many missing observations with respect to trade before the 1990s. Moreover, governance measures are only available as from 1996. However, this restriction has minimal impact on our estimates, since we have sufficient observations as a result of pooling countries together. The data mainly come from the Global Financial Development, World Development Indicators, International Financial Statistics, Worldwide Governance Indicator and United Nations Development Programme databases. Table 1 shows the variables, their descriptions, and their sources. The 43 countries included are to be found in Table A.1 of the Appendix. In Table 2, we report the descriptive statistics of these variables. The figures show that middle-income countries in SSA outperformed their low-income counterparts in all but one of the indicators. Trade openness is greater in the middle-income countries than in the low-income countries; and so is the level of financial development. The level of governance, infrastructure development, and human capital development is higher in the middle-income countries as well. However, the level of inflation is lower in the low-income countries than in the middle-income countries.

4 Empirical results

4.1 Basic results

We begin the empirical analysis by estimating a simplified relationship between finance and openness. This model includes only openness as a determinant of financial development. Lag specification is an important feature of the dynamic, distributed lag procedure applied in this study (see Pesaran & Smith, 1995; Pesaran et al., 1999). Since we are interested in the short- and long-run estimates, we specify a common lag across countries. Our data is annual, so we impose a unit maximum lag across these countries. As mentioned earlier, although we are in favour of the PMG estimator, we still apply the MG and DFE estimators in order to ensure that this bias does not influence the estimates. We then test the PMG against these other estimators to confirm its superiority. Table 3 sets out the basic results. The results show that there is strong evidence in support of a stable, long-run relationship between finance and openness; that is, the coefficient of the error-correction term is negative, statistically significant, and below unity in absolute terms, indicating that the variables converge to equilibrium over time. This condition is required for the validity of the coefficient estimates, because an unstable relationship would imply that the coefficients are time-varying. In addition, the Hausman test generally indicates that the PMG estimates are the best; hence, the rest of the paper will concentrate on the PMG estimates.

The assumption that countries are expected to move along a balanced growth path, and that markets are expected to be in equilibrium in the long run, implies that a good estimator should reflect this. The PMG estimator is designed to reflect this assumption, while at the same time accounting for the heterogeneous temporary adjustments shaped by country-specific financial market frictions, capital market imperfections, fiscal and monetary policy-response functions, labour markets frictions, and external exposures. The long-run PMG estimates show that the effect of openness on financial development is positive. The long-run effect is independent of the measure of financial development. The short-run results, albeit statistically insignificant, show that the effect of openness on financial development might be negative. But why might openness be detrimental to financial development? A possible explanation may be that the economies become exposed to external shocks in the form of imported inflation, the spillover effects of debt contagion, fierce external competition, uncertainties in respect of prices and exchange rates, among others, all of which are detrimental to growth and financial development. However, over time, local-market participants will revise their expectations as a result of this experience, policies may be pursued in order to limit the degree of exposure to uncertainty, and local markets will adjust to this external competition. As a consequence, the short-term negative effect of openness reverses as local markets become efficient after completely digesting the information. This appears to be the case here. Our findings are similar to those documented by Kim et al. (2010) for a larger and diverse group of countries.

At this point the results are too basic to be valid. There are a number of variables omitted in Table 3. The common ones are initial income and inflation. Both variables have been widely documented in the literature as influencing financial development and openness (see Romer, 1993; Roubini & Sala-i Martin, 1995; Boyd, Levine, & Smith, 2001; Sachida, Carneiro, & Loureiro, 2003; Khan, Senhadji, & Smith, 2006, for example). We therefore catered for omitted-variable bias by including them in our model. The results obtained from this model are shown in Table 4. Such results suggest that the finance–openness relationship is stable, as shown by a negative and statistically significant error-correction term. These results are broadly similar in qualitative terms to those reported above; that is, openness is positively associated with financial development in the long term, while, in the short term, the association appears to be negative though statistically insignificant.

4.2 The role of economic development

Various theories suggest that economic development has a positive impact on financial development. Studies such as those of Greenwood and Jovanovic (1990) and Greenwood and Smith (1997) have demonstrated that there is a significant cost associated with the formation of a financial system. Therefore, economic development reduces the importance of this fixed cost to each market participant, thereby encouraging more people to participate in financial activities. In their empirical study, Garcia and Liu (1999) argue that economic development promotes financial development in the sense that higher income tends to be associated with a better business environment, better education, and better-defined property rights. The positive impact of economic development on financial development is also found in empirical studies such as those of Garcia and Liu (1999), and El-Wassal (2005). Moreover, it is natural that economic expansion be associated with openness. This is because, as countries expand, their markets for products and services become smaller. Optimally, openness would be essential for expanding economies in order to gain access to foreign markets and so trade their surpluses (see Iyke, 2017). These arguments emphasise the importance of economic development in the relationship between openness and financial development.

This section examines the role of economic development with regard to the finance–openness nexus. In order to do this, we classify the countries in the sample into low-income and middle-income countries. Since the period for this study ends in 2014, we use the World Banks 2014 edition of country classifications and subdivide our sample into these two income groups. Table A.1 in the Appendix shows this classification. The results obtained using these subsamples are shown in Table 5. We only report estimates for trade openness, the constant, and error-correction terms in order to keep the table simple. The results are indicative of a very stable finance–openness relationship in both the low- and middle-income countries. Interestingly, the long-term effect of openness on financial development is positive in the low-income countries but negative in the middle-income countries. The short-term effects are, however, immaterial

in both cases. These results appear to suggest that low-income countries in SSA have substantial market distortions that are rapidly reduced as openness increases. In the middle-income countries, the source of the negative effects of openness may be attributed to potentially unfavourable competition induced by openness. Perhaps, the influx of foreign direct and portfolio investment may crowd out domestic financial institutions, which institutions are essential for further financial development. Overall, this finding indicates a non-linear relationship between financial development and openness – the non-linearity being a function of economic development.

4.3 Quality of governance

The existing literature demonstrates that differences in corporate governance systems will affect the development of external financing across countries. Earlier studies, such as those of Modigliani and Miller (1958) and Jensen and Meckling (1976), provide a perspective that external finance can be viewed as a set of contracts. Therefore, the enforcement of laws and contracts fundamentally determines the rights of securities holders and the operation of financial systems (Beck & Levine, 2005). Also, the law and finance theory put forward by Porta, Lakonishok, Shleifer, and Vishny (1997), La Porta, Lopez-de Silanes, Shleifer, and Vishny (1998, 2000) and Shleifer and Vishny (1997) contends that countries with legal systems that enforce private-property rights, enforce private contractual arrangements, and protect legal interests of investors will encourage more savers to finance firms, thereby promoting the growth of the financial market. In line with the theory, empirical studies suggest that better legal institutions generally increase the valuation of firms and banks and lower the cost of capital, thereby fostering financial development (see Claessens, Djankov, Fan, & Lang, 2002; La Porta, Lopez-de Silanes, & Shleifer, 2002; Caprio, Laeven, & Levine, 2007). In line with these arguments, there exists a positive association between the quality of governance and financial development. Furthermore, countries with sound governance are likely to pursue trade-friendly policies, unlike those with poor governance; hence a positive association between governance and trade openness should exist.

This section further aims to examine the intermediating role of governance in relation to the finance–openness nexus. To do this, we construct a composite measure based on existing measures of governance. Kaufmann, Kraay, and Zoido-Lobaton (1999) developed six measures of governance in their study. Our composite measure encompasses these six measures based on principal-component analysis. The six measures are: government effectiveness, the rule of law, regulatory quality, voice and accountability, corruption control, and political instability. The six measures generally capture a broad range of institutional and policy outcomes for several countries (Kaufmann et al., 1999). Over the period covered, the measures have missing observations for 1997, 1999 and 2001. To overcome this, we follow Akanbi (2015) and interpolate these missing observations. In constructing the composite measure from these measures of governance, we extract the loading matrix and use them as the weights. Since

principal component analysis is a widely known procedure, we will not outline it here.⁵

Table 6 shows the role of governance in the finance–openness relationship. Again, we keep the table simple by only reporting the coefficients for the variables of interest. As with the previous results, there exists a stable, long-term relationship between financial development and openness in the presence of governance. This is indicated by the error-correction term, which is below unity in absolute terms, is negative, and is statistically significant. The results suggest that openness and governance promote financial development in the long term. In the short term, however, the effects of governance on financial development are not very clear but appear to be negative. Perhaps low governance quality – which is broadly associated with corruption and mismanaged institutions – stimulates the demand for liquidity, thereby increasing financial development, while high quality of governance eliminates such needs and thus slows down financial development. A similar argument has been presented theoretically and empirically by Ahlin and Pang (2008).

4.4 The role of infrastructure

Infrastructure is considered to be an important part of government expenditure and forms one of the most productive sectors in an economy. It is a crucial sector in stimulating an economy and is regarded as the wheels of any economic activity, including financial activities (see World Bank, 1994). There are different types of infrastructure, such as transport services, power, and telecommunication, and these can improve the productivity of all inputs in the production process by facilitating market transactions and the spillover effects among firms and industries (Jimenez, 1995). In addition, public infrastructure can accelerate access to services, improve market mobility, and save business costs and time, thereby promoting financial activities (see Farhadi, 2015). This role of infrastructure is critical in open economies. The positive association between infrastructure and financial development is also supported by studies such as those of Pradhan, Arvin, and Norman (2015) and Pradhan, Arvin, and Hall (2016). Other studies such as those of Demurger (2001) and Farhadi (2015) reveal that infrastructure enhances total factor-productivity growth and hence economic growth. Based on the theoretical links discussed above, the association of infrastructure and financial development is positive via the channel of economic growth.

This section therefore evaluates the role of infrastructure in the finance–openness relationship. As argued by Calderón and Servén (2004) and Akanbi (2015), infrastructure is a complex concept. Consequently, to account for the various facets of infrastructure, we employ a broad measure from Akanbi (2015) to perform the analysis. The measure is extracted using principal-component analysis of infrastructure stocks, namely: total road network per 1 000 km; electricity generation per 1 000 people; and number of telephone subscribers

⁵For a comprehensive explanation of principal component analysis, consult Jolliffe (1986).

(main lines and mobile phones) per 1 000 people.⁶ The empirical estimates based on this measure of infrastructure are reported in Table 7. The results suggest convergence, as shown by the error-correction term, which is negative, statistically significant, and below unity in absolute terms. As can be seen from the coefficient of the infrastructure index, the variable has a positive effect on financial development both in the short and long term. The long-term effect of openness on financial development remains positive. What is interesting is that, once we introduce infrastructure, openness appears to enhance financial development in the short term as well, although the effect is insignificant. This finding generally accords with that of Pradhan et al. (2015, 2016).

4.5 Quality of human capital

The influence of human capital on financial development has received little attention in the literature. This may be because of the lack of a direct economic link between these two variables. However, by carefully observing the relationship between economic growth and financial development, we can isolate the links between human capital and financial development. Higher-quality human capital is associated with greater economic growth in line with growth theory (Lucas, 1988; Barro, 1991), which consequently enhances financial development in line with the feedback-causality literature (Patrick, 1966; Jung, 1986; Demetriades & Hussein, 1996; Calderón & Liu, 2003). In addition, observational evidence suggests that countries with high-quality human capital have very developed financial systems. Examples are South Korea, Hong Kong, Canada, Japan, the United States and the United Kingdom, among others. Trade openness is associated with technological change and knowledge spillovers (Grossman & Helpman, 1991), which require a rising level of human capital. Human capital may also influence both financial development and openness by influencing the quality of governance and institutions, saving and consumption habits, and the state of infrastructure. In essence, human capital is an important conduit between finance and openness.

This section further attempts to examine the role of human capital in the finance–openness relationship. To do this, we employ the Human Development Index (*HDI*) published by the UNDP. The *HDI* measures the average achievements in a country in three basic dimensions of human development: a long and healthy life, access to knowledge, and a decent standard of living as described by the UNDP. Mathematically, it is defined as the geometric mean of the three dimensions as follows:

$$HDI = (I_{Health} * I_{Education} * I_{Income})^{\frac{1}{3}} \quad (6)$$

The health dimension tracks life expectancy at birth, the education dimension tracks the mean of years of schooling for adults aged 25 years and older and expected years of schooling for children of school-entering age, and the

⁶Refer to Akanbi (2015) for the details.

standard-of-living dimension tracks the gross national income per capita.⁷

The results obtained using this measure are reported in Table 8. We have suppressed the coefficients of the other variables in order to keep the analysis tractable. There is evidence in support of convergence, as indicated by the negative and statistically significant error-correction term, which is also below unity in absolute terms. As before, openness has a positive effect on financial development in the long term. The effect of openness is, however, not clear in the short term but appears to be negative. Critically, the results show that human capital is important in financial development both in the short and long term. This is broadly consistent with the theoretical implications of human-capital development. In sum, financial development in SSA cannot be achieved in isolation. Concurrent improvement in human capital will be fundamental.

5 Concluding remarks

Financial development and trade openness are important to economies in various ways. For example, financial systems ensure efficient allocation of limited resources by gathering and channelling funds from surplus-spending units to deficit-spending units, while trade openness facilitates technological and knowledge spillovers that are fundamental to economic growth and welfare enhancements. As a direct consequence, the relationship between financial development and trade openness has been a topic of considerable interest to both policymakers and researchers. To date, the literature has remained divided regarding this relationship. This paper has sought to join the debate by extending a recently proposed index of trade openness to a panel data setting and by examining the short- and long-term impact of trade openness on financial development for a panel of 43 sub-Saharan African countries over the period 1996 to 2014. We found that openness is associated with significant financial development in the long term. In the short term, the effect of openness on financial development is not clear, but the results suggest that it may be negative. In theory, the effects of openness on financial development could be influenced by the level of economic development. Therefore, we divided the sample into low- and middle-income countries in order to examine this theoretical prediction. We found that openness enhances financial development in the low-income countries and is detrimental to it in the middle-income countries. This finding suggests a non-linear relationship between financial development and openness. Among the factors that could explain the relationship between openness and financial development, we examined the role of governance, human capital development, and infrastructural development, as these are major issues in sub-Saharan Africa. We found that governance, human capital development and infrastructure development are critical to financial development, particularly in the long term.

Overall, our findings imply that openness may foster financial development in especially low-income sub-Saharan African countries but may be detrimental

⁷Refer to the UNDPs technical notes available at http://hdr.undp.org/sites/default/files/hdr2016_technical_notes_0.pdf.

to it in middle-income sub-Saharan African countries. A possible explanation for this is that, unlike the middle-income countries, the low-income countries may have substantial market distortions which may be reduced or removed by trade openness. Our findings further imply that good governance, improved infrastructure, and improved human capital are relevant in the development of financial systems in SSA. These are important factors that policymakers should take into account when pursuing openness, financial development and a growth agenda. We must add that it is important for further studies to be carried out before drawing strong conclusions concerning policy implications. A possible extension of our study would be to account for model uncertainty when examining the effects of openness on financial development. In theory, several factors could explain financial development, thereby raising questions regarding what factors to include in a financial-development model. Consequently, studies that seek to address the issue of model uncertainty with regard to the relationship between financial development and openness will certainly enrich our understanding.

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Table 1: **Description of variables, and data sources**

Variable	Description	Source
Dependent variables		
PC	Private sector credit extension as a percentage of GDP	Global Financial Development Database (GFDD): World Bank
LL	Liquid liabilities to GDP (%)	Global Financial Development Database (GFDD): World Bank
BA	Deposit money banks assets to GDP (%)	Global Financial Development Database (GFDD): World Bank
Independent variables		
Y	Initial income is initial GDP per capita obtained as the lag of GDP per capita (in constant 2010 USD)	World Development Indicators: World Bank
INF	Obtained as the percentage change in the consumer price index (CPI)	International Financial Statistics: International Monetary Fund
TO	Calculated as outlined in subsection 3.2	World Development Indicators: World Bank
GI	Composite quality-of-governance index as described in subsection 4.3	Worldwide Governance Indicators: World Bank
PI	Composite physical-infrastructure index as described in subsection 4.4	World Development Indicators: World Bank
HC	A measure of the quality of human capital (This is the human development index described in subsection 4.5.)	United Nations Development Programme (UNDP)

Table 2: **Descriptive statistics**

Variable	Observation	Mean	Standard deviation	Minimum	Maximum
All countries					
lnPC	817	1.0944	0.4094	-0.7027	2.2241
lnLL	768	3.1603	0.5870	1.4180	4.9253
lnBA	769	2.7159	0.8704	-0.4603	4.8032
lnTO	817	3.0381	1.6555	-1.2487	6.8778
lnY	771	6.8570	1.0438	4.8080	9.9121
lnINF	770	1.7549	1.2230	-6.4962	8.3297
PI	817	1.0434	0.2832	0.1698	2.8767
GI	817	-0.6498	0.6150	-2.2277	2.0107
lnHD	817	-0.8964	0.2605	-1.5159	-0.2851
Low-income countries					
lnPC	437	1.0064	0.3608	-0.7027	1.6672
lnLL	403	3.0676	0.5632	1.4180	4.9253
lnBA	404	2.4856	0.7610	-0.4603	4.5548
lnTO	437	1.9875	1.2578	-1.2487	5.3566
lnY	411	6.0891	0.3844	4.8080	9.2655
lnINF	400	1.7198	1.2971	-6.4962	6.2420
PI	437	1.0234	0.2723	0.1698	2.3820
GI	437	-0.8266	0.4782	-2.2277	2.0107
lnHD	437	-1.0687	0.1875	-1.5159	-0.6881
Middle-income countries					
lnPC	380	1.1957	0.4380	0.2083	2.2241
lnLL	365	3.2626	0.5965	1.5549	4.6048
lnBA	365	2.9707	0.9128	0.2608	4.8032
lnTO	380	4.2463	1.1596	1.2311	6.8778
lnY	360	7.7337	0.8498	6.1198	9.9121
lnINF	370	1.7928	1.1380	-3.3054	8.3297
PI	380	1.0665	0.2939	0.3731	2.8767
GI	380	-0.4464	0.6882	-1.6665	0.8677
lnHD	380	-0.6983	0.1793	-1.0985	-0.2851

Source: Computed by authors from sources listed in Table 1.

Table 3: **The simplified results**

Variable	PMG	MG	DFE
		Private credit	
Long-run estimates			
lnTO	0.0615(0.0000)	0.2674(0.2250)	0.1530(0.0490)
Short-run estimates			
ECT	-0.2124(0.0000)	-0.2768(0.0000)	-0.1170(0.0000)
Δ lnTO	-0.0162(0.3160)	-0.0211(0.3070)	-0.0117(0.4070)
Constant	0.2310(0.0000)	0.3297(0.0030)	0.0880(0.0060)
Hausman test (χ^2)	0.7000(0.4018)	0.2400(0.6210)	
		Liquid liabilities	
Long-run estimates			
lnTO	0.6270(0.0000)	-0.0701(0.7640)	0.2448(0.0530)
Short-run estimates			
ECT	-0.0934(0.0000)	-0.2776(0.0000)	-0.1287(0.0000)
Δ lnTO	-0.0416(0.0580)	0.0035(0.8940)	-0.0118(0.3660)
Constant	0.0997(0.0530)	0.9684(0.0000)	0.3372(0.0000)
Hausman test (χ^2)	7.0100(0.0081)	0.2500(0.6195)	
		Bank assets	
Long-run estimates			
lnTO	0.0300(0.0509)	-0.7730(0.0880)	0.2943(0.4060)
Short-run estimates			
ECT	-0.1099(0.0000)	-0.1602(0.0000)	-0.0796(0.0000)
Δ lnTO	-0.0136(0.6440)	-0.0071(0.8090)	-0.0211(0.3540)
Constant	0.3708(0.0000)	0.6566(0.0090)	
Hausman test (χ^2)	2.1400(0.1439)	2.0800(0.1492)	

Note: Figures in parentheses are p-values. ECT is the error-correction term.

Table 4: **Robustness analysis**

Variable	Private credit	Liquid liabilities	Bank assets
Long-run estimates			
lnTO	0.0724(0.0000)	0.0182(0.5310)	0.0817(0.0060)
lnY	0.1558(0.0000)	0.4922(0.0000)	0.5776(0.0000)
lnINF	-0.0038(0.0000)	-0.0091(0.0000)	-0.0143(0.0000)
Short-run estimates			
ECT	-0.2492(0.0000)	-0.2231(0.0000)	-0.1530(0.0000)
Δ lnTO(-1)	-0.0033(0.8510)	0.0052(0.8150)	-0.0003(0.9910)
Δ lnY(-1)	0.1302(0.4460)	-0.6250(0.0080)	-0.2547(0.2930)
Δ lnINF	0.0005(0.1780)	0.0010(0.3190)	0.0015(0.1110)
Constant	0.1014(0.0000)	0.0160(0.6030)	-0.1199(0.0190)

Notes: Figures in parentheses are p-values. ECT is the error-correction term.

Table 5: **The role of economic development**

Variable	Private credit	Liquid liabilities	Bank assets
Low-income countries			
Long-run			
lnTO	0.3704(0.0000)	0.0132(0.7100)	0.3261(0.0451)
Short-run			
ECT	-0.1551(0.0000)	-0.2368(0.0000)	-0.1356(0.0140)
Δ lnTO	-0.0172(0.2630)	0.0167(0.3610)	-0.0260(0.3841)
Constant	0.5066(0.0000)	0.0279(0.5040)	-0.4735(0.0273)
Middle-income countries			
Long-run			
lnTO	-0.0619(0.0000)	-0.0832(0.0430)	-0.0102(0.8410)
Short-run			
ECT	-0.3400(0.0000)	-0.2479(0.0000)	-0.1838(0.0000)
Δ lnTO	-0.0278(0.4200)	0.0199(0.6090)	0.0347(0.5100)
Constant	0.0895(0.0110)	0.0649(0.0670)	0.4387(0.0000)

Notes: Figures in parentheses are p-values. ECT is the error-correction term.

Table 6: **The quality of governance**

Variable	Private credit	Liquid liabilities	Bank assets
Long-run estimates			
lnTO	0.0362(0.0000)	0.1785(0.0000)	0.1089(0.0000)
GI	0.0281(0.0000)	0.5950(0.0000)	0.7338(0.0000)
Short-run estimates			
ECT	-0.2461(0.0000)	-0.1820(0.0000)	-0.1492(0.0010)
Δ lnTO	-0.0027(0.8730)	0.0299(0.2880)	0.0062(0.9410)
Δ GI	0.0148(0.7550)	-0.2707(0.0020)	-0.1595(0.0170)
Constant	0.0994(0.0000)	0.6442(0.0000)	0.6458(0.0000)

Notes: Figures in parentheses are p-values. ECT is the error-correction term.

Table 7: **The role of infrastructure**

Variable	Private credit	Liquid liabilities	Bank assets
Long-run estimates			
lnTO	0.1537(0.0000)	0.0425(0.0470)	0.0782(0.0030)
PI	0.1128(0.0070)	0.2220(0.0000)	0.1536(0.0000)
Short-run estimates			
ECT	-0.2614(0.0000)	-0.2566(0.0000)	-0.2480(0.0000)
Δ lnTO	0.0311(0.2074)	0.1270(0.1860)	0.0448(0.2582)
Δ PI	0.4391(0.0537)	0.0498(0.8500)	0.0330(0.0048)
Constant	0.0958(0.0000)	0.1586(0.0757)	0.1427(0.0010)

Notes: Figures in parentheses are p-values. ECT is the error-correction term.

Table 8: **The quality of human capital**

Variable	Private credit	Liquid liabilities	Bank assets
Long-run estimates			
lnTO	0.0379(0.0260)	0.0467(0.0910)	0.0958(0.0010)
lnHD	0.1255(0.0937)	0.6221(0.0000)	0.3858(0.1150)
Short-run estimates			
ECT	-0.2824(0.0000)	-0.2564(0.0000)	-0.1799(0.0000)
Δ lnTO	-0.0330(0.2935)	0.0673(0.0440)	-0.0098(0.7320)
Δ lnHD	1.0730(0.0705)	0.2886 (0.1972)	0.9644(0.0713)
Constant	0.1141(0.0010)	0.4460(0.0000)	0.1250(0.0630)

Notes: Figures in parentheses are p-values. ECT is the error-correction term.

A Appendix

Table A.1: **The selected sub-Saharan African countries in our sample**

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

Note: The classification is based on the World Bank 2014 edition available at <http://chartsbin.com/view/2438>.