

Business environment constraints and foreign equity participation in Africa

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ABSTRACT

Using logit regression on firm-level survey data, this study examines the linkages between foreign equity participation and different aspects of the business environment for a selection of ten African countries. The findings suggest that factors relating to finance (access to finance) and institutions (access to land, customs and trade regulations, corruption and the judiciary) significantly lower the probability of foreign equity participation. The business environment constraints are also examined according to different firm characteristics, namely the degree of foreign ownership, the size of the firm and the industry in which the firm operates.

JEL Classifications: F23, G30, C35.

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1. INTRODUCTION

As a latecomer to globalisation, the internationalisation of firms has taken off in the last three decades. In contrast to the established multinational enterprises (MNEs) that were run as extensions of national businesses, the new wave of globally integrated enterprises sought to internationalise all aspects of activity including production, management, capital and customers.

One consequence is the rise in demand for external finance. MNEs need capital to set up an affiliate abroad, invest in capital equipment, undertake research and development (R&D) and for other fixed costs. These large upfront costs cannot readily be funded out of retained earnings or internal cash flows from operations (Foley and Manova 2015). Access to capital, however, can vary across firms because of their heterogeneous nature² and across countries with different institutional environments. Indeed, firms with better access to finance may have a competitive advantage over those that are credit-constrained (Wagner and Weche Gelübcke 2015). In other words, credit constraints can restrain the internationalisation process of firms.

Much work on international trade and foreign investment assumes that firms can access the required resources to implement optimum financing

decisions. Raising money from sources outside the firm, however, is costly and is subject to information asymmetries (managers are assumed to know more about investment alternatives than investors) and moral hazard (managers do not always act in the best interests of investors). Given imperfect financial markets, the way in which firms obtain financial capital to pursue business opportunities is traditionally the preserve of corporate finance (Foley and Manova 2015). Extending the treatment of capital market imperfections to an international setting where financial markets are imperfectly integrated across countries, differential access to external finance becomes important.

Drawing on insights from corporate finance, this study examines the effects of factors relating to finance and other aspects of the business environment on the probability of foreign equity participation for a sample of African countries. The contributions of this study are twofold. First, using the 2013 wave of firm-level survey data from the World Bank's Enterprise Surveys, the effects of financial, infrastructural and institutional aspects of the business environment are analysed as potential binding constraints on foreign equity participation in ten African countries.³ The use of survey data on a broad range of perceived obstacles to business is in line with recent literature (see, for example, Dollar *et al* 2005, 2006; Ayyagari *et al* 2008; Gelb *et al* 2011). Second, the effects of the different aspects of the business environment on foreign equity participation are examined according to different firm characteristics, namely the degree of foreign ownership (minority, majority or fully foreign owned), the size of the firm (small, medium or large) and the industry in which the firm operates (manufacturing or services). Understanding the influence of the different aspects of the business environment on foreign equity participation is important in terms of prioritising reforms of the business environment.

This paper is structured as follows. Section 2 provides an overview of the literature on the linkages between the various business environment constraints and firm performance. Based on the theoretical and empirical literature, several hypotheses are set out. Section 3 describes the data and provides an outline of the logit method used in this study. In section 4, the linkages between the business environment and foreign equity participation are discussed. Robustness checks are also included in this section along with a breakdown of the results by different firm characteristics. Section 5 concludes and outlines the policy implications of the results.

2. LITERATURE REVIEW AND HYPOTHESES

2.1 *Foreign investment and financial constraints*

Until recently, the study of international trade and foreign investment has been undertaken separately from that of corporate finance (Foley and Manova 2015). The major themes on international trade include productivity and factor endowment differences that explain North–South patterns of trade according to comparative advantage (Heckscher 1919; Ohlin 1933). The role of economies of scale has been highlighted to explain production advantages

of differentiated goods that give rise to cross-border trade in a North–North direction (Helpman and Krugman 1985). With much of global trade conducted by MNEs, the microeconomic general equilibrium extensions of the trade literature have emphasised the importance of dissimilar factor endowments in explaining vertically integrated MNEs that separate headquarter activities from production activities geographically (Helpman 1984; Helpman and Krugman 1985). In another strand of the literature, horizontally integrated MNEs are motivated by the desire to increase foreign market share and economise on trade costs (Markusen 1984; Brainard 1993).

While offering different explanations for the existence of MNEs, it is only recently that the foreign investment literature includes insights from corporate finance. Multinational firms are unique insofar as they can raise external finance in one location and use it elsewhere via internal capital markets. Internally available financial capital and the possibility to arbitrage differences in the cost of capital endow MNEs with a distinct advantage compared with purely domestic firms (Foley and Manova 2015).

At the same time, multinational activity can be disadvantaged by financial constraints associated with international differences in accessing capital.⁴ MNEs incur substantial fixed costs when entering a new market. As internal funds are limited, the firm will need collateral to secure external debt finance. Costly sources of external finance, however, allow scope for managerial misbehaviour, especially in an environment where investor protection is weak (Antràs *et al* 2009). Therefore, a firm's ability to finance its costs can affect its decision to invest abroad (Buch *et al* 2009).

In developing countries, weak financial institutions can lead to credit rationing, implying firms are restricted to raising debt locally. Tenuous linkages between firms and banks, however, increase the scope for information asymmetries and financing constraints. Indeed, developing countries with weak financial institutions can be shut out of capital flows entirely (Ju and Wei 2010).

2.2 Foreign equity participation, infrastructural and institutional constraints

A weak financial system is not the only feature of many developing countries. Extending the study of financing constraints, some recent literature has assessed the effects of a broader spectrum of potential business environment constraints (Dollar *et al* 2005, 2006; Ayyagari *et al* 2008; Gelb *et al* 2011). For example, monetary and time-based measures of hard infrastructure (such as electricity and telecommunications) and soft infrastructure (for example, customs administration) can explain differences in foreign equity participation. More generally, foreign investment in developing countries is deterred mainly by financing constraints, poor infrastructure and institutional problems (Kinda 2010).

Good physical infrastructure is essential to provide linkages between the stages of the production process; transport networks are vital from the initial

stage of accessing raw materials through to the end stage of delivering final products to wholesalers, retailers and final consumers. A proper functioning and stable form of communications is also necessary to conduct a firm's operations smoothly. Conversely, an underdeveloped infrastructure that lowers connectivity between suppliers and customers can lead to higher transaction costs (Bigsten and Söderbom 2006) while also infringing on market access (Kinda 2010). For international firms, the effects of infrastructural constraints can be magnified as the movement of finished products to final destinations typically involves multiple modes of transport using some combination of roads, railways and shipping. Therefore, goods for export are exposed to additional infrastructural constraints, implying extra costs and delays in delivery.

The importance of institutions for firm performance and development has also been highlighted in the literature (Dollar and Kraay 2003; Glaeser *et al* 2004; Rodrik *et al* 2004; Acemoglu *et al* 2005). Effective institutions create an environment conducive to the formation and operation of firms. Institutional factors such as business licences and permits, tax rates and administration, corruption and the court system can impact firm performance (La Porta *et al* 1998). For example, the length of time to obtain a permit for business operations can take much longer in developing countries. Coercion into making unofficial payments to tax officials can become 'normal'. Without a dependable legal system, a firm's ability to acquire land, secure property rights and resolve any conflicts may also be in doubt. Consequently, weak institutions lead to low and uncertain returns on investment (Dollar *et al* 2006) and create barriers to competition or raise the costs and risks associated with doing business (Aterido *et al* 2011).

2.3 Foreign firm characteristics and business constraints

While the different aspects of the business environment are liable to constrain foreign equity participation, the size of effect can differ and can even change direction depending on specific firm characteristics such as the structure of ownership, the size of the firm and the industry in which the firm operates.

In terms of ownership, firms with foreign equity participation typically have preferential access to capital markets and therefore should be less credit-constrained when compared with domestic firms (Harrison and McMillan 2003). Wagner and Weche Gelübcke (2015) offer two main reasons why foreign-owned firms tend to have better access to external funds. First, foreign subsidiaries that belong to an international network provide collateral for external debt (via internal funds of the parent firm) and a strategy of risk diversification (via sales across domestic and international markets). Second, foreign firms usually have access to international financial markets.

At the same time, multinational networks can involve much complexity, more information asymmetries between the lender and the recipient and, consequently, higher costs of capital (Wagner and Weche Gelübcke 2015). In terms of the non-financial aspects of the business environment, foreign ownership

can involve risks (economic and political) and an incomplete understanding of the local language, laws and business practices (Oviatt and McDougall 1994). Indeed, the scope for agency costs and information asymmetries increase as linguistic, cultural and legal differences make it harder to monitor managers in international markets (Lee and Kwok 1988). Greater geographic diversification also tends to increase transaction costs (De Maeseneire and Claeys 2012).

Regarding a firm's size, larger firms tend to be less constrained when accessing external finance (Beck *et al* 2006; Aterido *et al* 2011) and can draw on financial and managerial resources from a bigger pool during critical times (Cressy and Olofsson 1997). Conversely, substantial impediments stand in the way of smaller firms when it comes to raising the required amount of capital on time, at a fair price and reflecting its true risk (De Maeseneire and Claeys 2012). Small- and medium-sized enterprises (SMEs) do not typically have access to externally raised equity such as initial public offerings or stock market flotations and instead tend to rely on expensive bank debt (Binks and Ennew 1996). Smaller firms are also disadvantaged as they have less ability to pledge collateral compared with their larger counterparts (De Maeseneire and Claeys 2012). In addition, the methods of evaluation by banks to assess loans and relatively higher costs in collecting and processing information tend to curb smaller firms to a greater extent.

More generally, smaller firms have less resources in terms of management skills, information and finance (Etemad 1999), thereby increasing the firm's susceptibility to the inherent risks of international markets. On the flipside, the structural simplicity of small firms, the speed of decision making, the flexibility of response and a lower degree of risk-aversion can encourage smaller firms to invest in riskier environments (Woo 1987). In contrast, larger firms with greater scale of operation and more risk-aversion are exposed to bigger potential losses (Rasciute and Downward 2017).

Some variation of effect can also occur across industries. For example, Manova *et al* (2015) suggest foreign-owned affiliates and joint ventures tend to operate in sectors that are highly reliant on costly external finance. Put another way, multinational firms are more likely to operate in financially vulnerable sectors.

2.4 Hypotheses

In summary, while the literature suggests a weak financial system and a fragile business environment restrains foreign equity participation, their effects can differ depending on specific firm characteristics. Insofar as domestic firms tend to be more credit-constrained than their foreign-owned counterparts, it follows that firms with only minority foreign ownership will have less access to finance compared with full or majority foreign-owned firms. More generally, firms with minority foreign ownership, firms of smaller size and firms operating in the more financially vulnerable manufacturing sector tend to be more susceptible to a weak financial system, against firms with full outright or majority foreign

ownership, or their larger counterparts operating in the services sector. In terms of the broader business environment, however, firms with full or majority foreign ownership, firms of larger size and services-based firms tend to be more exposed to risky environmental conditions. Accordingly, the following hypotheses are formulated, noting that the predicted effects on industry are less clear cut:

H1a. Limited access to finance lowers the probability of foreign equity participation.

H1b. The negative effect of limited access to finance on the probability of foreign equity participation is likely to be greater for minority foreign-owned firms, smaller firms and manufacturing firms.

H2a. An underdeveloped infrastructure lowers the probability of foreign equity participation.

H2b. The negative effect of an underdeveloped infrastructure on the probability of foreign equity participation is likely to be greater for fully or majority foreign-owned firms, larger firms and services-based firms.

H3a. A weak institutional environment lowers the probability of foreign equity participation.

H3b. The negative effect of a weak institutional environment on the probability of foreign equity participation is likely to be greater for fully or majority foreign-owned firms, larger firms and services-based firms.

3. DATA AND METHOD

3.1 Data

To assess the effects of the different aspects of the business environment on foreign equity participation in ten African countries, data are obtained from the World Bank's Enterprise Surveys (WBES). Subjective measures that rank firms' perceptions of the business environment are proxied by index variables ranging from one (no obstacle) to four (major obstacle).

Data are available for three sets of structural constraints relating to (1) finance, (2) infrastructure and (3) institutions. The financial environment, *FIN*, is measured by a firm's access to finance. Infrastructural factors, *INFRAS*, refer to firm's perceptions of transport, electricity and telecommunications. The institutional factors, *INST*, reflect a firm's ability to register land and buildings; the ease with which licences and permits can be acquired; the payment of taxes and tax administration; customs and trade regulations; the extent of corruption involving demands for informal payments, protection payments, gifts and bribes; and whether the court system is fair, impartial and uncorrupted.

The WBES also provides information on different firm characteristics, namely the degree of foreign ownership, the size of the firm, and the industry in which the firm operates. The degree of foreign ownership of a subsidiary's stock includes

Table 1: Distribution of firms by industry, firm size, ownership and country^a

	Manufacturing			Total Manufacturing	Services			Total Services
	Small	Medium	Large		Small	Medium	Large	
Domestic firms								
Namibia	398	146	-	544	-	-	-	-
Tanzania	270	161	-	431	248	90	-	338
Ghana	263	43	28	372	155	47	9	233
Kenya	124	246	-	370	197	124	-	321
Uganda	204	126	-	330	223	99	-	322
Zambia	173	122	-	295	168	54	-	222
Senegal	155	87	9	251	102	85	93	280
Malawi	45	88	27	160	62	116	82	260
Burundi	38	22	8	68	28	8	22	58
Sudan	39	10	-	49	373	24	-	397
Total domestic firms	1709	1051	72	2870	1556	647	206	2431
Foreign firms								
Zambia	40	64	-	104	60	39	-	99
Sudan	51	22	-	73	180	39	-	219
Ghana	38	16	14	73	6	17	18	42
Uganda	9	59	-	68	24	18	-	42
Malawi	8	51	8	67	10	21	5	36
Kenya	12	50	-	62	12	16	-	28
Namibia	17	19	-	36	-	-	-	-
Senegal	6	21	4	31	14	16	9	39
Tanzania	8	18	-	26	11	7	-	18
Burundi	10	11	4	25	1	-	5	6
Total foreign firms	199	331	30	565	318	173	37	529

Source: World Bank Enterprise Surveys (WBES).

^a The industry classifications are aggregated into the manufacturing and services sectors. The size classification is based on the number of employees. Small firms have 5-19 employees, medium-sized firms have 20-99 employees and large firms have 100 or more employees. Note that firms of unknown size also exist, implying the total value can exceed the sum of the (three) firm size classifications.

full outright ownership (100 per cent), majority ownership of a half or more (50–99 per cent) and minority ownership of less than a half (10–49 per cent). The classification of a firm's size is based on the number of employees. Small firms have between five and 19 employees, medium-sized firms have between 20 and 99 employees and large firms have 100 or more employees. Information by industry is available for both the manufacturing and services sectors.

Table 1 shows the breakdown of firms operating in the manufacturing and services industries according to firm size (small, medium and large) and ownership (domestic or foreign) across ten African countries. Broadly, firms are split evenly in number across both industries, tend to be small in size and are overwhelmingly of domestic origin. Indeed, only a fifth of all firms are classified as foreign.

A more detailed breakdown by ownership and firm size suggests that nearly two-thirds of domestic firms are classified as small firms (with fewer than 19 employees). Among foreign-owned firms, medium-sized firms (with 20 to 99 employees) dominate the manufacturing sector while small firms prevail in the services sector. Clearly, the data illustrate the limited presence of foreign-owned firms among the ten African countries and hence, the importance of putting in place appropriate policies to enhance the business environment.

3.2 Logit estimation

Given the dichotomous nature of the dependent variable, estimation is carried out using the logit model. In its general form, the logit model can be expressed as follows:

$$Prob(Foreign = 1|x) = \frac{\exp(\beta_0 + \beta_1 x)}{1 + \exp(\beta_0 + \beta_1 x)} \quad (1)$$

where the left-hand side represents the probability of foreign equity participation (*Foreign*), which takes the value of one when at least ten per cent of the firm's capital structure is foreign-owned and zero otherwise. The right-hand side refers to a set of explanatory variables, x , which includes a set of structural constraints, X_{fic} , a set of control variables comprising firm characteristics, Z_{fic} , and fixed effects in two dimensions, summarised as follows:

$$Prob_{fic} = \frac{\exp(\beta_1 FIN_{fic} + \beta_2 INFRAS_{fic} + \beta_3 INST_{fic} + \lambda_1 Z_{fic} + \eta_i + \omega_c)}{1 + \exp(\beta_1 FIN_{fic} + \beta_2 INFRAS_{fic} + \beta_3 INST_{fic} + \lambda_1 Z_{fic} + \eta_i + \omega_c)} \quad (2)$$

where the probability of foreign equity participation by firm f operating in industry i in country c ($prob_{fic}$) depends on various financial, infrastructural and institutional constraints (FIN_{fic} , $INFRAS_{fic}$ and $INST_{fic}$); a set of firm characteristics (Z_{fic}) which includes the quality of human capital, the age of the firm and dummies capturing the size of the firm (small, medium and large); and fixed effects to control for heterogeneity across industries and countries (η_i and ω_c). Maximum likelihood estimation is used to generate the parameter values.

4. EMPIRICAL RESULTS

The logit regression results on the linkages between the subjective measures of the business environment and the probability of foreign equity participation are first discussed in relation to the full sample of firms (Section 4.1). To check the sensitivity of the results, several robustness tests are undertaken in Section (4.2). Section (4.3) presents the breakdown of the results according to various firm characteristics, namely the degree of foreign ownership, the size of the firm and the industry in which the firm operates.

4.1 Full sample logit regression results

Table 2 presents the logit regression results using subjective measures of the business environment. Columns (1) to (3) incrementally expand the set of structural constraints with indicators of finance, infrastructure and institutions. As the main explanatory variables are based on the perceived obstacles of firms, the results describe associations between the reported business environment constraints and foreign equity participation. Note that a positive coefficient indicates that a foreign firm is more likely to report these constraints or that it operates in a sector or a location where these constraints are more apparent. Column (4) additionally includes country fixed effects (FE) to account for unobservable variation of characteristics across countries.⁵ Column (5), referred to as the full FE model, additionally includes industry fixed effects (and the full set of firm characteristics), making it the preferred model specification.

The results suggest access to finance is negatively associated with the probability of foreign equity participation, in support of hypothesis H1a. Although multinational firms may be less susceptible to credit constraints, they are not insensitive to them. Much research has shown that limited access to appropriate financing mechanisms constrains firm performance in African countries (Beck *et al* 2006; Fowowe 2017). In many African countries, the number of financial institutions is limited and the linkages between the banking sector and firms are tenuous. Limited access to finance increases risk and reduces profit opportunities for foreign investors (Kinda 2010). For example, restricted financial services for loans and overdraft facilities can limit business opportunities, restrain credit decisions on commercial feasibility and reduce borrowing for investment projects. The informal economy can also act as a key structural impediment to the financial system (Adams *et al* 2014). Where the informal economy is large, entrepreneurs will often resort to informal borrowing from friends and family to plug the demand for money.⁶

Of the three infrastructure indicators, telecommunications is the only significant constraint on foreign firm operations, but in the full FE model its effect becomes marginally significant, likely reflecting the spread of mobile phones – even in the continent's poorest countries. Leapfrogging over old technologies (i.e. landline telephones), mobile money services that enable people to send money from their phones have in effect created personal bank accounts, thereby helping to make up for the shortcomings of the formal banking system.

Table 2: Constraints to foreign equity participation using subjective data^a

Regressors	Finance	Infrastructure	Institutions	Country FE	Full FE
<i>Structural constraints</i>					
Access to finance	-0.09*** (0.02)	-0.10*** (0.02)	-0.11*** (0.02)	-0.13*** (0.02)	-0.11*** (0.02)
Electricity	-	0.14*** (0.03)	0.13*** (0.03)	0.09*** (0.03)	0.06** (0.03)
Transport	-	0.04* (0.02)	0.01 (0.02)	-0.02 (0.02)	-0.02 (0.02)
Telecommunications	-	-0.06*** (0.02)	-0.09*** (0.02)	-0.04 (0.03)	-0.05* (0.03)
Access to land	-	-	-0.05*** (0.02)	-0.06*** (0.02)	-0.06*** (0.02)
Licensing and permits	-	-	0.06*** (0.02)	0.04* (0.02)	0.05* (0.03)
Tax rates	-	-	0.40×10 ⁻² (0.03)	-0.02 (0.03)	-0.01 (0.03)
Tax administration	-	-	0.04 (0.03)	0.07** (0.03)	0.07** (0.03)
Customs and trade regulations	-	-	-0.10*** (0.02)	-0.08*** (0.02)	-0.07*** (0.02)
Corruption	-	-	-0.02 (0.02)	-0.03* (0.02)	-0.03** (0.02)
Courts	-	-	-0.02** (0.01)	-0.02** (0.01)	-0.02** (0.01)
<i>Firm characteristics</i>					
Skilled workforce	0.05*** (0.02)	0.04** (0.02)	0.03 (0.02)	0.03 (0.02)	0.03 (0.03)
Age	-0.40×10 ⁻² (0.00)	-0.40×10 ⁻² (0.00)	-0.40×10 ⁻² (0.00)	0.01*** (0.00)	0.01 (0.00)
Firm size: Small	-	-	-	-	0.37 (0.46)
Firm size: Medium	-	-	-	-	1.31*** (0.46)
Firm size: Large	-	-	-	-	1.26*** (0.48)
<i>Fixed effects</i>					
Industry:	-	-	-	-	0.30***
Manufacturing	-	-	-	-	(0.08)
Country FE	No	No	No	Yes	Yes
Constant	-1.42*** (0.06)	-1.66*** (0.08)	-1.66*** (0.08)	-2.34*** (0.14)	-3.33*** (0.48)
No. of obs	6 192	6 192	6 192	6 192	6 192
Pseudo R ²	0.13	0.13	0.13	0.13	0.13

^a Logit estimation of the probability of foreign equity participation, where the dependent variable takes the value of one when at least ten per cent of the firm's capital structure is foreign-owned and zero otherwise. The subjective measures of the business environment are proxied by index variables ranging from 1 = no obstacle to 4 = major obstacle. The set of firm characteristics includes the quality of human capital, the age of the firm and dummies capturing the size of the firm (small, medium and large). The fixed effects control for heterogeneity across industries and countries. Robust standard errors are shown in parentheses.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

The institutional framework matters for international business, but some aspects are more important than others. For the preferred model, foreign equity participation is significantly constrained by access to land, customs and trade regulations, corruption and the judicial system. Unlike rich countries where property rights are secure and legal titles facilitate the purchase, sale and development of land, legal ownership of land remains unclear in much of Africa. Over two-thirds of Africa's land is still under customary ownership with rights to land neither written down nor legally recognised. Indeed, private ownership of land in rural areas is rare. Where a system of land rights exists, it can be costly and poorly run. In Kenya, for example, the government has not maintained a registry and many of its citizens cannot afford to update titles. No surprise then that without formal recognition of land rights (customary or titled), the threat of expropriation without compensation can overshadow a firm's (and an individual's) decisions; where registers for land rights are in place, additional transaction costs are incurred.

Africa has a mixed record on freeing up trade. On the one hand, tariffs have fallen in line with myriad intra-African trading blocs.⁷ On the other hand, opposition to free trade is mainly political as governments face the prospect of reduced tariff revenues and less control over industrial policy, the former particularly important in countries where the unemployment rate is high, the informal economy is large and taxes are hard to collect. A potentially bigger obstacle to trade is the array of non-tariff barriers (NTBs) being erected. While customs clearance and border delays increase transit time,⁸ requirements under various product standards and rules of origin can stifle trade outright. For example, to qualify for preferences, the rules that require clothes to be manufactured and sourced among the SADC countries have severely restricted trade in garments. In so far as customs and trade regulations increase trade-related costs, they also impede foreign equity participation.

Corruption is endemic to the way of life in much of Africa. Bribes are typically paid to officials when starting a business, getting permission to build on land and much else besides. At the highest level, government control of strategic sectors and public services can mask the ingrained culture of paying and taking bribes. Rewarding party loyalists with top positions in state-owned firms, for example, can bring personal rather than societal gains. In this context, the consequence of state interference can be to repel foreign investment.

The judicial system is also found to be a significant constraint on foreign equity participation. The judiciary is an essential institution in interpreting and enforcing the law, developing anti-corruption policies and overseeing commercial disputes. Without certainty in the application of a country's laws and the guarantee of a fair hearing, the proceeds of future investment can be claimed by corrupt officials in the event of a dispute (Mauro 1997). A feeble court system that is unable to uphold the law in a consistent manner can deter investment by firms (Du and Girma 2012).

Counter to hypothesis H3a, the results suggest firms' perceptions of electricity, tax administration and getting a license make it more likely that foreign firms will report these constraints or that they operate in sectors or locations where these constraints are more apparent, albeit only marginally significantly for the latter. A greater mix of energy sources to generate electricity (hydropower, fossil fuels and renewable energies) can help combat the effects of expensive, unreliable or unavailable power supplies. Technology and the process of automating services – invaluable towards offering a simplified and transparent taxation system – is essential for efficiency of administration and time. What is good for tax administration is also good for business!

A neutral effect is obtained in relation to transport and tax rates. Africa's relatively underdeveloped transport network does not materially constrain foreign equity participation.⁹ The neutral effect of tax rates is explained by two main factors. First, relatively high corporation tax rates are coming down, implying higher profits for domestic and foreign firms alike. Second and potentially more important, foreign investors can gain from tax exemptions and tax avoidance, the latter commonly undertaken through transfer pricing. The practice of transfer pricing by multinationals can lead to an insignificant tax effect on foreign investment (Barba Navaretti and Venables 2004). This is because the transfer price of transactions within a firm, for example, to supply components between subsidiaries, can be used to minimise the payment of tariffs or move profits from a high-taxation country to a low-taxation country.

Several firm-level characteristics are also important towards increasing the probability of foreign equity participation. In particular, the size of the firm and the type of industry matter; foreign owned firms tend to be medium or large in size and usually cluster in the manufacturing sector. Although the positive effect of skilled labour suggests an educated and trained workforce complements foreign equity participation, its insignificant coefficient in the full model likely reflects labour market shortages as professionals and the highly-qualified migrate to former colonies in Europe and elsewhere. Indeed, Africans are probably the most mobile among populations in the world (IOM, 2019).

4.2 Robustness checks

Several robustness tests are undertaken to check the sensitivity of the results. First, to check the sensitivity of the results across different subsamples of countries, the group of ten countries is split according to their ease of getting credit (based on the World Bank's ease of doing business rankings), an important indicator of financial depth. Accordingly, the first subsample comprises the better performing countries in this category (Ghana, Kenya, Namibia, Uganda and Zambia) and the second subsample includes the countries that performed poorly (Burundi, Malawi, Senegal, Sudan and Tanzania).

Second, the model is reestimated using an instrumental variables (IV) technique to control for possible endogeneity arising from reverse causality. The causality between foreign equity participation and the financial environment is not

necessarily unidirectional; the reverse can also hold true. For example, firms might complain about restricted access to external finance even where access is restricted because of the firm's own poor performance (Ayyagari *et al* 2008). To relieve the potential endogeneity problem arising from reverse causality, an instrumental variables approach is typically used. When exogenous external instruments for the potentially endogenous variable are not available, Lewbel (2012) proposes a heteroskedasticity-based estimator that is generated from within the model. The post-regression tests shown in Table 4 (Cragg-Donald F-statistic and the Hansen J statistic) provide supporting evidence in favour of the IV estimator.

Finally, the results may suffer from endogeneity bias arising from measurement error. Whereas subjective measures rely on the extent to which firms *complain* about issues such as finance and electricity, objective measures of the business environment capture time and monetary costs *experienced* by the firm, for example, access to bank loans or the costs associated with power outages (Aterido *et al* 2011). Using objective measures, the potential structural constraints are defined as follows. First, the finance-related measures refer to a firm's history of credit or loans with a financial institution and whether its financial statements have been checked and certified by an external auditor. Second, the infrastructure variables refer to the number of power outages experienced in a typical month and the associated losses as a share of sales. Third, the institutional environment is proxied by the frequency of inspections and requirements for meetings with tax officials.

The results for the robustness checks, shown in Table 3, broadly accord with the main results based on the full FE model. In brief, access to finance remains a significant impediment to foreign equity participation for both subgroups of countries (columns 1 and 2), for the alternative estimator (columns 3) while the objective measures suggest a negative effect from auditing (column 6).

In terms of the infrastructure variables, the negative effect of telecommunications is borne out for the second subsample of countries, in keeping with the main results. While the subjective measure of electricity indicates a positive effect for the second subgroup of countries (column 2) and similarly using the alternative estimator (column 3), the objective measures suggest losses from power outages constrain foreign equity participation (column 6).

Regarding the subjective measures of institutions, the business environment constraints are found to depend on the specific sample of countries; while customs and trade regulations and the judicial system are significant for the first subgroup of countries (column 1), access to land is significant for the second subgroup of countries (column 2). Although somewhat smaller in magnitude, the Lewbel results (column 3) broadly corroborate the full FE estimates.

4.3 Logit regression results by firm characteristics

Extending the analysis, the breakdown of the results according to different firm characteristics (the degree of foreign ownership, the size of the firm and the industry in which the firm operates) are shown in Table 4.

Table 3: Robustness checks^a

	Subsamples		Alternative estimator	Objective data		
	(1) Subsample (1)	(2) Subsample (2)	(3) Lewbel	(4) Finance	(5) Infrastructure	(6) Institutions
<i>Structural constraints</i>						
Access to finance	-0.11*** (0.02)	-0.11*** (0.03)	-0.01** (0.01)	-	-	-
Electricity	-0.60×10 ⁻² (0.04)	0.13*** (0.04)	0.01** (0.00)	-	-	-
Transport	-0.00 (0.04)	-0.02 (0.03)	-0.20×10 ⁻² (0.00)	-	-	-
Telecommunications	0.00 (0.04)	-0.09** (0.04)	-0.01 (0.00)	-	-	-
Access to land	-0.04* (0.03)	-0.07** (0.03)	-0.01*** (0.00)	-	-	-
Licensing and permits	0.05 (0.04)	0.04 (0.03)	0.01* (0.00)	-	-	-
Tax rates	0.01 (0.05)	-0.01 (0.04)	-0.10×10 ⁻² (0.00)	-	-	-
Tax administration	0.11** (0.05)	0.04 (0.05)	0.01** (0.00)	-	-	-
Customs and trade regulations	-0.09*** (0.03)	0.03 (0.03)	-0.01*** (0.00)	-	-	-
Corruption	-0.04* (0.02)	-0.02 (0.03)	-0.40×10 ⁻² * (0.00)	-	-	-
Courts	-0.04*** (0.01)	0.01 (0.02)	-0.30×10 ⁻² ** (0.00)	-	-	-
Credit or loan	-	-	-	0.29*** (0.10)	0.31** (0.13)	0.14 (0.15)
Audit	-	-	-	-0.91*** (0.09)	-0.97*** (0.13)	-0.90*** (0.15)
Number of power outages	-	-	-	-	0.30×10 ⁻² (0.00)	0.30×10 ⁻² (0.01)
Losses from power outages	-	-	-	-	-0.01*** (0.00)	-0.01*** (0.01)
Tax inspections	-	-	-	-	-	-0.01 (0.01)

<i>Firm characteristics</i>						
Skilled workforce	-0.02 (0.03)	0.07* (0.04)	0.30×10 ⁻² (0.00)	-0.01 (0.03)	-0.01 (0.05)	-0.40×10 ⁻² (0.06)
Age	0.20×10 ⁻² (0.00)	0.01** (0.01)	0.10×10 ⁻² (0.00)	0.01 (0.00)	0.01 (0.00)	0.01 (0.00)
Firm size: Small	0.14 (0.47)	-0.47* (0.24)	0.04 (0.04)	0.50 (0.47)	0.73 (0.73)	1.33 (1.01)
Firm size: Medium	1.02** (0.47)	0.46** (0.22)	0.16*** (0.04)	1.35*** (0.48)	1.63** (0.73)	2.08** (1.02)
Firm size: Large	2.18*** (0.51)	-	0.15*** (0.05)	1.39*** (0.49)	1.64** (0.75)	2.21** (1.03)
<i>Fixed effects</i>						
Industry: Manufacturing	0.06 (0.11)	0.58*** (0.13)	0.04*** (0.01)	0.33*** (0.09)	0.34*** (0.12)	0.41*** (0.14)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-2.83*** (0.50)	-2.51*** (0.26)	-0.03 (0.04)	-2.82*** (0.53)	-3.13*** (0.79)	-3.34*** (1.07)
No. of obs	3 448	2 744	6 192	5 583	2 592	1 800
Pseudo R ²	0.17	0.17	0.12	0.10	0.10	0.10
Cragg Donald F-statistic ^b	-	-	68.84** (11.40)	-	-	-
Hansen J-statistic ^c	-	-	39.15*** (0.20)	-	-	-

^a Columns (1) and (2) show the results for the subsamples of countries with greater ease of getting credit (Ghana, Kenya, Namibia, Uganda and Zambia) and lower ease of getting credit (Burundi, Malawi, Senegal, Sudan and Tanzania). Column (3) shows the results using an instrumental variables approach (Lewbel 2012) to control for possible endogeneity arising from reverse causality. Columns (4), (5) and (6) report the results using objective measures of the business environment including finance-related measures, infrastructure variables and tax inspections. The set of firm characteristics includes the quality of human capital, the age of the firm and dummies capturing the size of the firm (small, medium and large). The fixed effects control for heterogeneity across industries and countries. Robust standard errors are shown in parentheses.

^b A test for the validity of the instruments. A rejection of the null hypothesis suggests that the instruments are relevant. The critical value (10%) is reported in parentheses.

^c An endogeneity test. A rejection of the null hypothesis that the instruments are exogenous suggests they are endogenous, providing evidence in support of the IV estimator. The critical value (10%) is reported in parentheses.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

^a Columns (1) and (2) show the results for the subsamples of countries with greater ease of getting credit (Ghana, Kenya, Namibia, Uganda and Zambia) and lower ease of getting credit (Burundi, Malawi, Senegal, Sudan and Tanzania). Column (3) shows the results using an instrumental variables approach (Lewbel 2012) to control for possible endogeneity arising from reverse causality. Columns (4), (5) and (6) report the results using objective measures of the business environment including finance-related measures, infrastructure variables and tax inspections. The set of firm characteristics includes the quality of human capital, the age of the firm and dummies capturing the size of the firm (small, medium and large). The fixed effects control for heterogeneity across industries and countries. Robust standard errors are shown in parentheses.

^b A test for the validity of the instruments. A rejection of the null hypothesis suggests that the instruments are relevant. The critical value (10%) is reported in parentheses.

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*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

Table 4: Constraints to doing business by ownership, firm size and industry using subjective data^a

	Ownership (%) ^b			Firm Size ^c			Industry ^c	
	100	50-99	10-49	Small	Medium	Large	Manufacturing	Services
<i>Structural constraints</i>								
Access to finance	-0.11*** (0.02)	-0.11*** (0.02)	0.11*** (0.02)	-0.14*** (0.03)	-0.08*** (0.03)	-0.18*** (0.07)	-0.14*** (0.03)	-0.07*** (0.03)
Electricity	-0.10×10 ⁻² (0.04)	0.07** (0.03)	-0.05 (0.03)	0.05 (0.04)	0.13*** (0.05)	-0.21 (0.13)	0.04 (0.04)	0.08* (0.04)
Transport	-0.06** (0.03)	-0.03 (0.03)	0.04 (0.03)	0.01 (0.04)	-0.02 (0.04)	-0.36*** (0.13)	-0.01 (0.04)	-0.03 (0.03)
Telecommunications	-0.02 (0.04)	-0.02 (0.03)	0.04 (0.03)	-0.07* (0.04)	-0.06 (0.04)	0.10 (0.13)	0.01 (0.05)	-0.11*** (0.04)
Access to land	-0.05** (0.02)	-0.06*** (0.02)	0.04** (0.02)	-0.03 (0.03)	-0.07** (0.03)	-0.09 (0.07)	-0.09*** (0.03)	-0.03 (0.03)
Licensing and permits	0.05 (0.04)	0.03 (0.03)	-0.01 (0.03)	0.01 (0.03)	0.10** (0.04)	0.10 (0.15)	0.10*** (0.04)	-0.00 (0.03)
Tax rates	0.02 (0.04)	0.01 (0.03)	-0.03 (0.03)	0.30×10 ⁻² (0.04)	-0.03 (0.05)	-0.15 (0.12)	-0.03 (0.05)	0.03 (0.04)
Tax administration	0.05 (0.04)	0.08** (0.03)	-0.06 (0.03)	0.06 (0.04)	0.08 (0.05)	0.27* (0.15)	0.04 (0.04)	0.10** (0.04)
Customs and trade regulations	-0.06** (0.03)	-0.06** (0.02)	0.05** (0.02)	-0.08*** (0.03)	-0.05 (0.03)	-0.24* (0.12)	-0.04 (0.03)	-0.10*** (0.03)
Corruption	-0.05*** (0.02)	-0.04*** (0.02)	0.04*** (0.02)	-0.04 (0.03)	-0.02 (0.03)	-0.16** (0.07)	0.20×10 ⁻² (0.02)	-0.07*** (0.02)
Courts	-0.04*** (0.01)	-0.03*** (0.01)	0.03*** (0.01)	-0.02 (0.01)	-0.03** (0.01)	0.01 (0.04)	-0.03** (0.01)	-0.20×10 ⁻² (0.01)

<i>Firm characteristics</i>									
Skilled workforce	0.03 (0.03)	0.03 (0.03)	-0.03 (0.03)	-0.03 (0.04)	0.04 (0.04)	0.38*** (0.13)	0.03 (0.04)	0.03 (0.04)	0.03 (0.04)
Age	-0.20×10 ⁻² (0.00)	0.20×10 ⁻² (0.00)	-0.30×10 ⁻² (0.00)	0.10×10 ⁻² (0.01)	0.01 (0.00)	0.01 (0.01)	0.20×10 ⁻² (0.00)	0.01** (0.01)	0.01** (0.01)
Firm size: Small	0.29 (0.50)	0.25 (0.46)	-0.22 (0.46)	-	-	-	0.09 (0.52)	1.08 (1.06)	1.08 (1.06)
Firm size: Medium	0.99** (0.50)	1.16** (0.46)	-1.11** (0.46)	-	-	-	1.11** (0.52)	1.97* (1.06)	1.97* (1.06)
Firm size: Large	1.12** (0.52)	1.07** (0.48)	-1.10** (0.49)	-	-	-	1.08* (0.55)	2.04* (1.09)	2.04* (1.09)
<i>Fixed effects</i>									
Industry:	0.27** (0.10)	0.26*** (0.09)	-0.32*** (0.09)	0.24* (0.12)	0.34*** (0.13)	0.49 (0.41)	-	-	-
Manufacturing									
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-4.00*** (0.55)	-3.62*** (0.50)	3.77*** (0.50)	-2.60*** (0.25)	-2.27*** (0.20)	-1.72*** (0.44)	-2.68*** (0.56)	-4.25*** (1.09)	-4.25*** (1.09)
No. of obs	6 192	6 192	6 192	3 663	2 125	338	3 338	2 854	2 854
Pseudo R ²	0.14	0.14	0.14	0.38	0.38	0.38	0.38	0.38	0.38

^a Logit estimation of the probability of foreign equity participation, where the dependent variable takes the value of one when at least ten per cent of the firm's capital structure is foreign-owned and zero otherwise. The subjective measures of the business environment are proxied by index variables ranging from 1 = no obstacle to 4 = major obstacle. The set of firm characteristics includes the quality of human capital, the age of the firm and dummies capturing the size of the firm (small, medium and large). The fixed effects control for heterogeneity across industries and countries. Robust standard errors are shown in parentheses.

^b The degree of foreign ownership of a subsidiary's stock includes full outright ownership (100 per cent), majority ownership of a half or more (50-99 per cent) and minority ownership of less than a half (10-49 per cent).

^c The subgroup analysis is undertaken for the different sized firms and industries. The classification of a firm's size is based on the number of employees. Small firms have between 5 and 19 employees, medium-sized firms have between 20 and 99 employees and large firms have 100 or more employees. The industry data refer to the manufacturing and services sectors.

*** denotes significance at the 1% level; ** denotes significance at the 5% level; * denotes significance at the 10% level.

4.3.1 Results by degree of foreign ownership

In terms of the degree of foreign ownership, similar results are obtained for firms that are fully or majority owned by the foreign firm. Specifically, access to finance remains an important constraint and similarly for land access, customs and trade regulations, corruption and the judicial system. Africa's relatively underdeveloped transport network is also an issue for fully-owned foreign firms. On the other hand, majority foreign-owned firms are positively associated with electricity and tax administration, the former likely reflecting the use of own generators.

Firms with smaller foreign equity participation (of less than 50 per cent) tend to accrue opposite coefficient signs. Counter to hypotheses H1b, access to finance is found to be positively associated with minority foreign-owned firms. In some African countries, the benefits of minority ownership include informal networks, informal contractual mechanisms and credit (Ramachandran and Shah 1999). In other words, the benefits of the informal economy take precedence over the financing constraints of the formal economy as firms with greater local knowledge can tap into personal sources of finance including friends and family.

Informality may also play a role in explaining the positive coefficient for customs and trade regulations. In the East African Community (EAC), for example, traders often prefer to use unofficial *panya* routes even though local farm produce with duty-free access makes up the bulk of goods crossing borders. Minority foreign-owned firms are also better placed to understand the local system of land rights and customary ownership. Similarly, understanding the practice of handing over unofficial payments to corrupt officials and the judiciary can help bypass unwieldly bureaucracy and other obstacles to doing business. Taken together, the coefficients for the institutional variables are consistent with hypothesis H3b, that the downside of a weak institutional environment on the probability of foreign equity participation should be greater for foreign firms with full or majority ownership.

4.3.2 Results by firm size

Irrespective of size classification, access to finance is an important constraint for all firms. Of the three infrastructure indicators, transport is the only binding constraint for large firms, consistent with hypothesis H2b. Clearly, good roads and railways that link the major urban areas with international connections are needed to facilitate the transport of large volumes of goods across borders. The significance of the institutional constraints depends on the size of the firm: customs and trade regulations for small-sized firms (unfriendly business rules and regulations can jeopardise a small firm's survival) and the judiciary and corruption for medium-sized firms and large firms respectively (the payment of substantial bribes to win contracts or resolve commercial disputes can become part of the normal running costs of a business). Insofar as larger firms can be more sensitive to riskier environments, these results are consistent

with hypothesis H3b. At the same time, other institutional factors (electricity and the ease of obtaining a licence) are found to be positively associated with medium-sized firms.

4.3.3 Results by industry

In examining the sensitivity of foreign equity participation to the business environment across the manufacturing and services industries, financing is found to be an obstacle for both industries, although to a greater extent for manufacturing, consistent with hypothesis H1b. The other significant barriers to foreign equity participation in the manufacturing industry are land and the judiciary. In a continent where disputes over title are common, the acquisition of land can be complicated with knock-on effects often felt at the start-up phase of foreign investment. Questions over judicial impartiality and uncertainty of a fair hearing can also deter foreign investors (Mauro 1997). Once these hurdles are crossed, obtaining a business license is more straightforward, as indicated by the positively signed and significant coefficient for licensing and permits.

For the services industry, telecommunications infrastructure is introduced as an additional constraint, consistent with hypothesis H2b. Although the spread of mobile phones and various apps have improved Africa's telecommunications, many governments actively discourage the spread of technology and impose taxes on mobile phone and internet companies at punitive rates. The services-related institutional constraints comprise customs and trade regulations as well as corruption.

5. CONCLUSIONS

In recognition of the benefits of foreign investment – an important channel through which resources, human capital and technological progress are transferred between countries – understanding the determining factors of direct investment remains an important issue from a developing country perspective. Until recently, the study of foreign investment has largely omitted insights from corporate finance and the role of financing constraints for MNEs.

Drawing on insights from corporate finance, this study uses firm-level survey data for a sample of ten African countries to examine the effects of potential constraints on foreign equity participation. The effects of the finance-related factors and other aspects of the business environment on the probability of foreign equity participation are also examined according to different firm characteristics, namely the degree of foreign ownership, the size of the firm and the industry in which the firm operates.

Overall, the results suggest that factors relating to finance (access to finance) and institutions (land access, customs and trade regulations, corruption and the judiciary) lower the probability of foreign equity participation. The results are broadly robust to different subsamples of countries (split according to rankings of financial depth), the IV estimator proposed by Lewbel (2012) as well as objective measures of the business environment.

Disaggregating the results according to different firm characteristics, the constraining association of financing holds across all specifications except for firms with minority foreign ownership. In terms of the infrastructural factors, Africa's relatively underdeveloped transport network is found to be a binding obstacle for fully-owned foreign firms and large firms, while telecommunications constrain services-based firms. Among the institutional constraints, access to land impedes full and majority foreign-owned firms, medium-sized firms and manufacturing firms; customs and trade regulations thwart full and majority foreign-owned firms, small firms and services-based firms; corruption deters full and majority foreign-owned firms, large firms and services-based firms; and the judicial system puts off full and majority foreign-owned firms, medium-sized firms and manufacturing firms. In short, greater effort is needed to alleviate the negative associations between various business environment constraints and foreign equity participation.

The results suggest the financial environment is a priority area for reforming the business environment. At the firm-level, a good financial system is needed to facilitate the smooth operation of firms and to meet both the short-term and long-term financial requirements of investment projects. Making credit more readily available across firms of varying degrees of foreign ownership, size and industry and improving the financial management of firms via technology and automation of services would enhance the efficiency of administration and time. Efforts to reduce the size of the informal economy by tackling its causes and consequences (high unemployment, high taxes and irregular rule of law) is also important.

Other policy priorities include enhancing electricity supply through generation (power plants), transmission (the national grid) and distribution (power lines); extending land reform and title ownership; simplifying customs procedures and standardising trade regulations across the African continent; discarding an ingrained culture of corruption; and ensuring that an independent judicial system capable of applying the law in a consistent manner is in place.

Attracting more foreign equity participation requires tackling the constraints that impinge on sub-categories of foreign firms. Specifically, alleviating the constraints on large firms (improve access to finance, overhaul the severely underdeveloped transport network and root out corruption) and manufacturing firms (improve access to finance, simplify land acquisition and guarantee the independence and the separation of the judiciary from branches of government) is of paramount importance.

At the same time, the results for minority foreign-owned firms suggest the business environment is not necessarily burdensome. On the contrary, minority ownership stakes tend to come with a better understanding of local cultures, laws and ways of doing business. Therefore, more can be done to foster partnerships between local and foreign firms or firms with only minority foreign holdings and thereby alleviate the poor linkages between domestic and foreign firms in sub-Saharan Africa (Newman *et al* 2020). There is scope to

cultivate new connections with local entrepreneurs by providing incentives, for example, to set-up industrial clusters of knowledge, hire more local contractors and source more goods locally. After all, multinational firms locate activities globally, but create linkages locally.

Disclosure statement

No conflict of interest.

Data availability statement

The data that support the findings of this study are openly available in Figshare at <https://doi.org/10.6084/m9.figshare.12022917>.

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ENDNOTES

1. Department of Economics, Nottingham Trent University, Nottingham, NG1 4FQ. Email: Marie.Stack@ntu.ac.uk. We gratefully acknowledge the valuable comments provided by an anonymous referee towards improving the paper.
2. In studying the behaviour of heterogeneous firms that serve foreign markets, Helpman *et al* (2004) note that exporting or setting up operations abroad entail additional fixed costs and variable costs when compared with domestic firms.
3. This study is similar in nature to that of Stack and Amissah (2022) who analyse the effects of business constraints on foreign equity participation in Ghana.
4. Information asymmetries and agency problems are among the more important sources of financial constraints (Hubbard 1998; Stein 2003).
5. Variation of country characteristics can stem from differences in the development of financial institutions, the building of transport facilities, the amount of time it takes for businesses to acquire new skills and establish new contacts and other factors relating to the conduct of business.
6. The informal economy can be as high as 40 per cent of GDP in some African countries. Operating mostly in cash, the informal economy includes unregistered firms, registered firms with off-the-books activities and informal service enterprises such as Kenya's *jua kali* (a term describing craftsmen who have traditionally made and sold wares), Senegal's Mouride street peddlers and Uganda's motorcycle taxi drivers.
7. For example, the Tripartite Free Trade Area (TFTA) proposes to join together three trading blocs, namely the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC) and the East African Community (EAC). An all-encompassing free trade area between all African Union member countries, known as the African Continental Free Trade Area (AfCFTA), has recently been formed.
8. According to the World Bank (2019), it takes 137 hours, on average, to check border compliance on imports into sub-Saharan Africa compared with a world average of 76 hours and a ten-hour average for member countries of the Organisation of Economic Cooperation and Development (OECD).

9. Take, for example, Kigoma, which is located on the north-east of Lake Tanganyika, Tanzania. As one of the busiest ports in the region, it is equipped to handle shipping containers, but its historical railway connection to the port at Dar es Salaam on the Indian Ocean, completed in 1915 when Kigoma was part of German East Africa, is poorly maintained. Road connections linking it to other regional hubs – such as Bujumbura in Burundi, its nearest big city – are little better than gravel roads and earth tracks.

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