Exporters in Africa: What Role for Trade Costs?

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ABSTRACT

This paper investigates the role of trade costs in exporter dynamics in Africa. In comparison to exporters from other regions, African exporting firms are fewer, smaller and relatively less diversified in terms of products and destinations. African countries also display the highest rates of entry, exit and turnover of exporting firms, exporting products and export destinations. This suggests that Africa's exporting activity is volatile and subject to a lot of experimentation, with exporters having difficulties in maintaining trade relationships. The analysis also confirms that trade costs are a crucial factor in explaining exporter performance in Africa vis-à-vis other regions, but also among African countries. Trade costs play a disproportionate role in affecting the size of new exporters and the survival of exporters in Africa in comparison to other regions. Also, trade costs differences across African countries are a relevant factor in explaining the lower market diversification of exporters from landlocked countries. A key implication is that the African Continental Free Trade Agreement can entail large benefits in the medium-term, especially in terms of export flows and destination markets. Yet, the diversification of export products will likely remain limited without strengthening productive capacities.

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CONTENTS

I   Introduction

Exports are a major driver of growth fluctuations and development trajectories, significantly shaping the evolution of living standards over time. In the short-term, exports are a major source of foreign exchange that encourage economic activity and reduce balance of payments constraints. In the medium term, the diversification of exports leads to higher and more sustainable growth rates (Hausmann and Rodrik, 2007; Hesse, 2008). In addition, exports are a crucial source of productivity growth through the accumulation of technological capabilities and "learning by exporting" (De Loecker, 2013; Cimoli *et al*, 2009). In fact, the efficiency gains for less productive firms associated to "learning by exporting" seem relevant in developing countries, where exporters are further away from the technological frontier.[1] Not surprisingly, the strengthening of the export sector has been a crucial factor in developing countries that significantly improved their living standards in the last half-century, especially in Asia.

From an aggregate perspective, the export performance in Africa has experienced significant swings in recent decades. In particular, Africa's export growth was strongly influenced by the commodity boom-and-bust cycle between the early 2000s and 2014. African exports have also remained largely dependent on a few commodities like oil, gold, minerals and agricultural products, and the insertion of exporters in global value chains continues to be limited. Only a few countries have made some progress on expanding manufacturing exports, but remain largely concentrated on low-technology products such as textiles and apparel. Despite the proliferation of Africa's regional economic communities, trade integration also remains relatively low. The share of intra-African exports is less than 20%, substantially lower than in Europe (68%) and Asia (59%) (UNCTAD, 2019).

A critical aspect that shapes the performance and competitiveness of exports is trade costs. Trade costs are shaped not only by multiple policies, including tariffs, tariff equivalents of quotas and non-tariff trade barriers and regulations, but also by structural characteristics including connectivity, logistics, and cultural and historical aspects. Regarding regulations, for instance, substantial transaction costs might arise from incomplete enforcement of contracts across borders[2]. Despite trade costs having declined substantially in recent decades, they continue to be relevant, especially in developing regions. Elevated trade costs restrain comparative advantages by making exports uncompetitive, limit access to technology and intermediate inputs, and prevent the participation in global value chains, making economic diversification more difficult[3]. In addition, changes to trade costs can exert vast influence on trade, investment and innovation decisions at firm level, with effects on productivity as well[4]. In brief, as emphasized by Anderson and Wincoop (2004), "*the death of distance is exaggerated…trade costs are large, even aside from trade-policy barriers and even among highly integrated economies*".

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1   Recent research has also emphasized that firms take the choice of entering or expanding their operations in foreign markets together with decisions on investment, technology adoption, product-mix, R&D and innovation, affecting thus productivity growth (Aw, 2011).

2   For example, when one party reneges on a written contract, local courts may be unwilling and international courts unable to enforce a contract signed between residents of two different countries (Rodrik, 2000).

3   Marel (2017), for example, shows that non-tariff barriers and restrictions of services on inputs are a crucial barrier that impede export performance in developing countries.

4   For example, lower trade costs due to lower tariffs can generate changes in firm productivity and induce magnifying effects on trade flows through firm decisions on export and import products and markets (Bernard *et al.*, 2018). Also, Dennis and Shepherd (2011) suggest that a 10% reduction in trade costs could lead to a 3% to 4% increase in the number of export products, promoting economic diversification in developing countries.

Remarkably, trade costs are relatively large in Africa, not only in comparison to developed countries but also to other developing countries (World Bank, 2015; Arvis et al., 2016)[5]. Lack of transport infrastructure, inefficient law enforcement and related property rights institutions, poor business services and logistics, and deficient regulations are particularly acute. In some cases, trade costs between neighbouring African countries are extremely high. In fact, it is often cheaper for African exporters to trade with developed countries that are far away, rather than with neighbouring economies.

In this respect, the continent is undergoing a massive trade integration initiative, spearheaded by the African Union, aiming to establish a continental free trade area. Officially termed African Continental Free Trade Agreement (AfCFTA), it has been signed by all 54 African states. Once fully implemented, 90% of goods tariff lines between African countries will have a zero duty, but there will also exist new harmonized rules covering services trade, investment, competition and intellectual property rights. The agreement is thus expected to significantly reduce trade costs across the continent, creating a single African market for goods and services which, once finalized, will cover 1.2 billion consumers with an aggregate income of $2.5 trillion[6]. Under the AfCFTA, the rules of origin – the criteria needed to define the national source of a specific product – will play a crucial role in fostering the nexus between trade and industrialization and the emergence of regional value chains (UNCTAD, 2019)[7].

The literature on trade costs in Africa has made considerable progress in recent years, especially in relation to the role of trade facilitation measures. For example, Geda and Seid (2015) show that there is an immense potential for the expansion of trade within Africa, but this is constrained by high trade costs and lack of productive capacities. Likewise, Hoekman and Shepherd (2015) and Hoekstra (2013) highlight that trade facilitation measures can significantly improve African exporters' participation in global value chains. Meanwhile, Seck (2016) stresses that improving customs clearance, and energy and telecommunication infrastructure rise the likelihood of African firms entering into foreign markets as well as the extent of their trading activity. Interestingly, the results from that paper also suggest that African firms tend to respond more strongly to changes in trade costs due to the greater constraints they face. Brenton et al. (2012) discusses that the low survival of African firms in export markets is largely explained by high trade costs. Finally, Iwanow and Kirkpatrick (2009) and Clarke (2005) show that the performance of African exporters is limited by poor infrastructure and unfriendly regulations, particularly inefficient customs administration.

In this paper, we first describe aggregate characteristics regarding exporter dynamics in African countries, including number and size of exporters, and the patterns of entry, exit and survival of exporters, export products and export destinations. Analysing these features is relevant, as entry into and exit from exporting activity by individual firms is a key driver of trade flows (Eaton et al., 2004; Bernard et al., 2007). For instance, more than half of Colombia's exporters are new exporters, and most of these new exporters will exit foreign markets by the following year (Eaton et al., 2008). Also, entry and exit of export destinations is a remarkable feature of exporting firms. For example, Blum et al. (2013) show that most continuing exporters in Chile enter and exit specific

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5   Porteus (2019), using monthly grain prices and production, estimates that median trade costs in sub-Saharan Africa are over five times higher than elsewhere in the world.

6   Other regional integration policies will likely augment the power of this agreement, such as the Protocol on Free Movement of Persons in Africa, which should remove the restrictions on Africans' ability to travel and work, including through the use of an African Passport, and the Single African Air Transport Market. Currently, only two African countries provide visa-free access to all African citizens (Benin and Seychelles).

7   The rules of origin should encourage African firms to use the preferences established in the AfCFTA. However, the requirements and procedures of rules of origin can entail costs for exporting firms with major effects on trade and investment flows, and thus on productivity growth.

destinations multiple times, and about 70% of firms that export for more than a year exit and re-enter exporting to a given country one or more times[8].

Then, we investigate how trade costs affect the size and survival of exporting firms in Africa vis-à-vis other regions. From a theoretical standpoint, lower trade costs can facilitate the emergence, survival and expansion of new exporters. For example, theoretical and empirical contributions from the "new" new trade theory have emphasized that when trade costs fall, less productive exporters exit, while more productive exporters expand, a process that promotes aggregate productivity growth (Melitz, 2003). Thus, as trade costs are relatively high in Africa, we expect trade costs to play a disproportionate role in affecting the size and survival of exporters. Finally, we examine whether differences in trade costs among African countries are systematically related to diversification in terms of products and destinations. This is particularly relevant, as the continent is attempting to promote trade across African countries.

The contribution of this paper is threefold. *First*, it compares African exporter dynamics s vis-à-vis the rest of the world. As such, it discusses distinctive features of the African exporters. *Second*, this paper identifies specific mechanisms of how trade costs affect exporter dynamics in Africa in comparison to other regions. While the relevance of trade costs on firms' exports is widely known, cross-country comparisons for African countries are scarce. *Third*, this study provides evidence on how trade costs relate to export diversification across African countries. Yet, it is important to note that the empirical framework and the nature of the data prevent strong inferences on the *causality* between changes on trade costs and the different export dimensions. The paper is organized as follows. Section 2 describes the data used for the empirical analysis. Then, section 3 describes some characteristics of exporter dynamics in Africa. Section 4 presents the empirical approach for the econometric analysis and section 5 discusses the main results. Finally, section 6 discusses the implications and provides concluding remarks.

II Data

The statistical information regarding exporter dynamics comes from the *Exporter Dynamics Database*[9]. This database compiles firm level merchandise export information from national customs agencies, covering the universe of all exporter transactions (Fernandes *et al.*, 2016)[10]. It contains information for 40 developing countries and 10 developed countries between 1997 and 2014. The sample includes 15 African countries, namely Botswana, Cameroon, Ethiopia, Gabon, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Senegal, South Africa, Uganda and Zambia. Two levels of disaggregation were used in this analysis: the country-year level and the country-year-sector level. Sectoral level information was used at the 2-digit level of the Harmonized System (HS) 2002 Classification[11] for 95 sectors, excluding oil sector exports (HS chapter 27).

The database contains information at country and sectoral level regarding: i) basic characteristics of exporters (number of exporters and average exporter size in export value); ii) export concentration/diversification (average number of products and destinations per exporter); iii) firm dynamics (exporter entry, exit and first-, second-, and third-year entrant (new exporter in year *t*) survival rates); iv) firm-product dynamics (product entry, exit and survival rates for incumbent exporters (firms who exported in the year prior to analysis); and v) firm-destination dynamics (destination entry, exit and survival rates for incumbent exporters).

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8   Similarly, Lawless (2009) shows that the entry and exit to destination markets is a significant component of export flows in Irish exporting firms.

9   For details about the database, see http://www.worldbank.org/en/research/brief/exporter-dynamics-database.

10   Fernandes *et al.* (2016) presented the *Exporter Dynamics Database*, paying attention to how exporter dynamics are linked to country size and level of development.

11   https://unstats.un.org/unsd/tradekb/Knowledgebase/50043/HS-2002-Classification-by-Section

Our proxy for trade costs comes from the ESCAP-World Bank Trade Cost database[12]. This trade cost measure, based on Novy (2012), describes average bilateral trade costs by country and year. It captures all the additional costs involved in trading goods bilaterally relative to those involved in trading goods domestically, in ad valorem equivalent form. It thus can be said to include a diverse set of trade costs, including international shipping and logistics costs, tariff and non-tariff costs (indirect and direct costs associated with trade procedures and regulations), and even additional costs from differences in language, culture or currencies. The formal definition of this measure can be found in Annex A2.

Though trade costs are declining over time across most countries and regional groups, the measure reveals that, between 2010 and 2012, developing countries exhibited on average higher trade costs than developed countries, with African countries displaying the highest level of trade costs (figure 1). Yet, there is some heterogeneity across countries. South Africa and Kenya display, for instance, lower trade costs than the average Asian countries or the average Latin American countries in our sample, being even comparable to European countries. On the contrary, Ethiopia, Madagascar and Uganda exhibit among the largest trade costs in the sample.

Figure 1
Average trade costs, 2010–2012
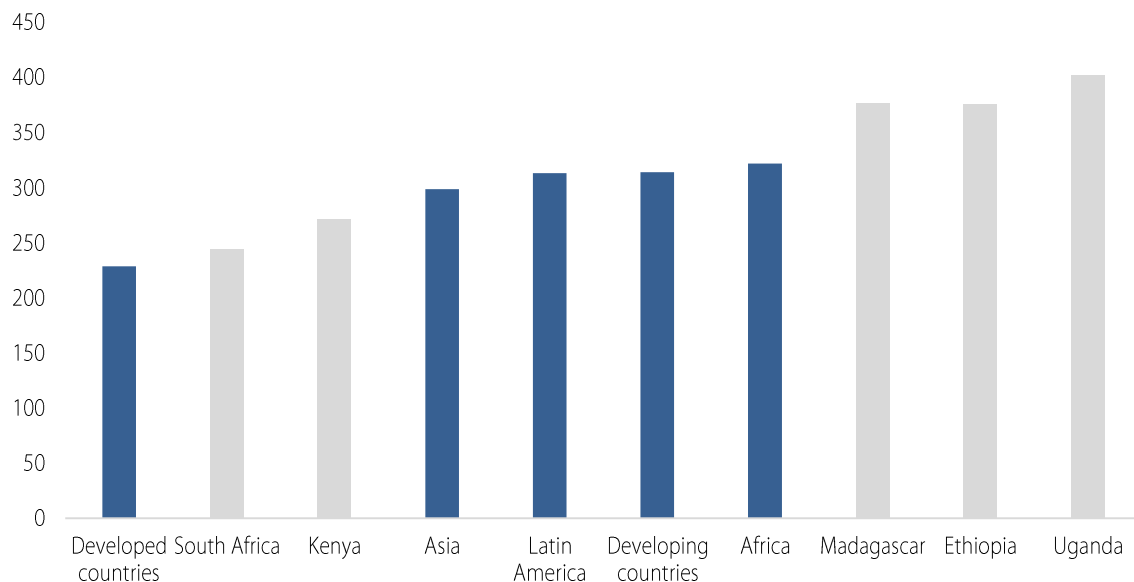
Source: Authors' calculations based on data from ESCAP-World Bank Trade Cost database. Data covers 44 countries.

III   African exporter dynamics

Exporter dynamics in Africa exhibit some well-defined characteristics in comparison to the rest of the world. In general, African exporters are fewer, smaller and relatively less diversified (table 1). African countries display the lowest average number of exporting firms. They also display the smallest size of exporting firms and size of new exporters. In addition, export products per firm are few, only 6.1 in average, in comparison to 8.3 export products in developed countries. Furthermore, without including South Africa (with 15.2 export products per exporter, on average), African export products average just 5.5 per exporter. African countries also exhibit the lowest number of destinations per exporter. On average, African exporters send their products to only 2.4 market destinations, in comparison to 4 destinations in developed countries.

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12   For details about the database, see https://www.unescap.org/resources/escap-world-bank-trade-cost-database

These findings are not unexpected and they can be largely attributed to factors such as countries' size, level of development and technological capabilities. These descriptive statistics are in line with previous evidence regarding how the number and size of exporters relate to countries' size and level of development. Fernandes *et al.* (2016), for example, confirm that larger and more developed countries have more and larger exporters. In addition, Vergara (2020) shows that exporters from countries with higher productive and technological capabilities are larger, more diversified and charge higher prices for their products.

Table 1
Characteristics of African exporter firms, 2010–2012

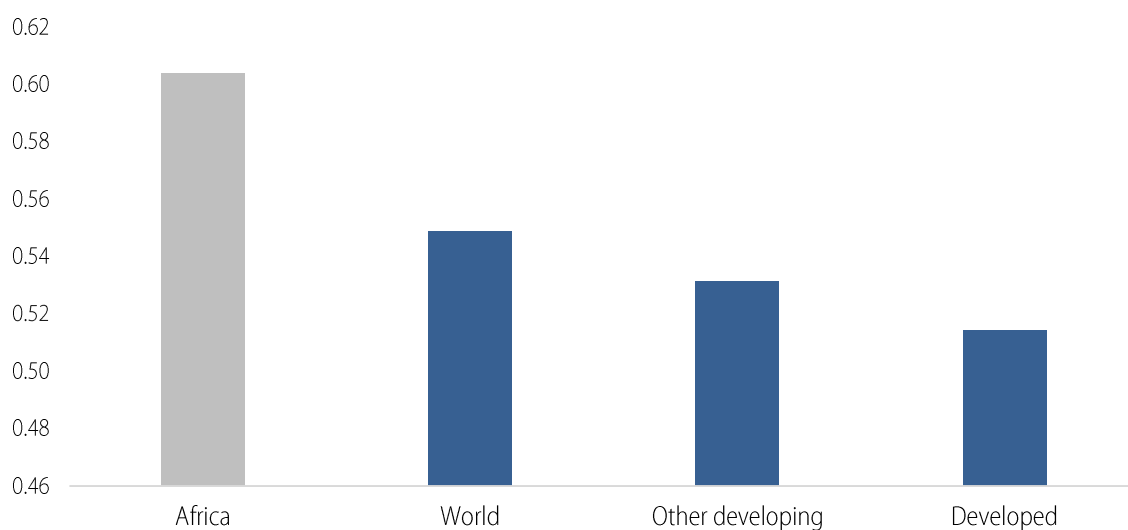|	Africa	Other developing countries	Developed countries
Average number of exporters	3,679	8,983	22,460
Average number of exporters per capita	10.51	9.00	201.27
Export value per exporter	$2.1M	$3.4M	$4.3M
Export value per new exporter	$240,091	$293,927	$380,579
Export products per exporter	6.1	5.5	8.3
Median products per exporter	5.5	4.7	9.1
Export destinations per exporter	2.4	3.0	3.9

Source: Authors' calculations based on data from *Exporter Dynamics Database.*
Notes: Africa includes Botswana, Cameroon, Ethiopia, Gabon, Guinea, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Senegal, South Africa, Uganda and Zambia. Developed countries include Belgium, Croatia, Denmark, Estonia, Norway, Portugal, Romania and Spain. Other developing countries comprise Albania, Bangladesh, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, Georgia, Guatemala, Jordan, Kuwait, Kyrgyzstan, Laos, Lebanon, Mexico, Nicaragua, Pakistan, Paraguay, Peru, Thailand, Turkey, Uruguay and Yemen.

Interestingly, African countries display higher rates of entry and exit of exporting firms. This high turnover means that many firms in Africa begin exporting frequently but stop almost immediately. For instance, in Guinea, Malawi and Uganda, on average between 2010 and 2012 over half of exporting firms had not exported the year prior, either due to being first time exporters or to returning to exporting activity after at least a year of inactivity. In developed countries, by contrast, just over a third were in the same situation.

African countries also exhibit higher rates of entry and exit of exporting products. In Botswana, between 2010 and 2012, over 70% of exported products among incumbents (firms who exported in the year prior to analysis) had not been exported the year prior, on average. At the same time, over 70% of products that were exported the year prior were not exported the following year. This contrasts with rates of only about 40% of products in developed countries for both the former and latter. In addition, entry and exit (turnover) of export destinations is also higher in Africa (figure 2). For example, in Guinea and Senegal about 40% of markets were new destinations (not explored the year prior) in a given year between 2010 and 2012, while, at the same time, about 40% of export destinations used in the year prior were not used again the following year. This compares with rates of well under 20% for countries like Mexico and Slovenia.

Figure 2
Average destination turnover rate

Source: Authors' calculations based on the *Exporter Dynamics Database*.
Note: Turnover is the sum of entry and exit rates. 'Other developing' refers to all developing countries in the sample apart from African countries.

Notably, African countries also exhibit the lowest entrant survival rate of exporting firms, as a result of relatively high entry rates and a very low number of firms exporting for more than a year. The average first year survival rate for entrants is particularly low for the group of African countries without South Africa, only 36 per cent (figure 3). For example, in Cameroon, Guinea and Malawi, on average, less than 30% of firms continue exporting after their first year, in comparison to 41% in developed countries. This pattern is similar for longer time spans. For example, in Bangladesh and Turkey, 30% of entrants manage to export for 3 years or more, but less than 15% do so in Botswana and Kenya. These figures are largely consistent with other comparisons of export survival in Africa with other developing and developed regions (Brenton *et al.*, 2012). The same behaviour is also observed among African firms regarding the survival of export products. In six African countries (Botswana, Kenya, Malawi, Senegal, South Africa and Zambia), less than a quarter of export products continue being exported after one year (comparing to 31% in developed countries).

Figure 3
Average entrant first-year survival rate
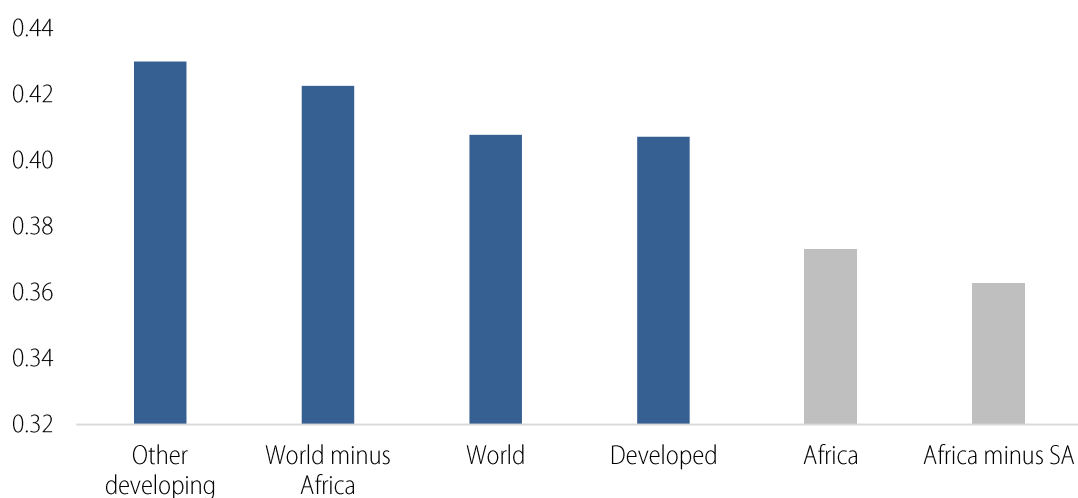
Source: Authors' calculations based on data from *Exporter Dynamics Database*.

The differences observed for exporter dynamics in Africa with respect to other regions, while not very large in some cases, all point out in the same direction, reflecting a distinctive pattern. African exporting activity across firms, products and destinations is dynamic and volatile. Furthermore, there seems to exist a lot of experimentation, as firms become exporters and non-exporters easily and as they continuously change and adjust their export products and export destinations. As such, African exporters seem to have difficulties in maintaining trade relationships.

Different factors may be contributing to this. Firms may be in export learning paths which naturally lead them to experimentation, both on the profitability of exporting in general and to certain destinations, or they could be seeking to maintain foreign market relationships to keep open the possibility of longer, more stable relationships (Blum *et al.*, 2012). African firms may also be constrained by market inefficiencies and low level of productive capabilities, which can affect the quality of their exporting products. In addition, firms may be lacking the business and market expertise to discern which markets are best for the company and if exporting will be profitable at all, creating profit uncertainties.

IV Empirical approach

This section describes the empirical strategy to analyse the role of trade costs in Africa. In order to investigate the role of trade costs on the size and survival of exporters, we specify the following empirical equations:

$$Size_{ijt} = \alpha_i + \delta_t + \theta Trade\ Costs_{jt} + \gamma Trade\ costs_{jt} * Africa_j + \beta X_{jt} + \varepsilon_{ijt} \tag{1}$$

$$Survival_{ijt} = \alpha_i + \delta_t + \rho Size_{ijt} + \theta Trade\ Costs_{jt} + \gamma Trade\ costs_{jt} * Africa_j + \beta X_{jt} + \varepsilon_{ijt} \tag{2}$$

where *i*, *j*, and *t* represent the sector, country and year, respectively. In equation (1), the dependent variables (*Size*) are the log of the average exports per exporter and the log of the average exports per entrant at sectoral level. Thus, this allows to examine the connection between trade costs and the intensive margin of exports. In equation (2), the dependent variables *Survival* are the 1-year and 3-year (average) survival rate of new exporters in foreign markets at sectoral level. The variable *Trade costs*, as discussed in section 2, is a proxy that measures all costs involved in trading goods bilaterally relative to those involved in trading goods domestically, including international shipping and logistics cost, tariff and non-tariff costs – indirect and direct costs associated with trade procedures and regulations, and additional costs from differences in language, culture and currencies (Novy, 2012). This variable is defined at the country level. In order to test for specific effects of trade costs for Africa in comparison to other regions, we include a multiplicative variable between *Trade costs* and *Africa*, a dummy variable that takes the value 1 for African countries.

The vector X encompasses several control variables that have been identified in the literature to potentially play a relevant role in exporter dynamics across countries: *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. These two variables control for the size of the economies and their level of development (Fernandes *et al.*, 2016). *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development that summarizes information regarding financial depth, access and efficiency (Sahay *et al.*, 2015). The development of the financial sector can be a relevant factor in explaining the performance and behaviour of exporters in foreign markets, as it can reduce credit constraints and facilitate large-scale investments and high-return projects that can allow firms to initiate or expand export activities (Beck, 2002).

The variable *Exchange rate* is an index that measures the fluctuations of the real effective exchange rate[13], a major factor that affects profitability of exporters, thus shaping their growth performance and size (Berman *et al.*, 2009). *Commodity-Dependent* is a dummy variable that takes the value 1 for commodity dependent countries. In the case of survival, we also include the size for exporters as an additional control variable (*Size*). The size of exporters has actually been identified as a major determinant of survival in foreign markets (Volpe and Carballo, 2009). Finally, α_i and δ_t correspond to sectoral and year effects. The equations (1) and (2) are estimated by Ordinary Least Squares (OLS) and Generalized Linear Models (GLM)[14], respectively, using robust standard errors adjusted by "clustering" at country level.

To investigate whether differences in trade costs across African countries are correlated to differences in diversification in terms of products and destinations, we specify the following empirical equation:

$$Diversification_{ijt} = \alpha_i + \delta_t + \rho Size_{ijt} + \theta Trade\ Costs_{jt} + \gamma Trade\ costs_{jt} * Landlocked_j +$$

$$\varphi Productive\ Capacities + \beta X_{jt} + \varepsilon_{ijt} \qquad (3)$$

where *i*, *j*, and *t* represent the sector, country and year, respectively. The dependent variables are the i) *Products per exporter* (log of the average number of products per exporter – products defined at 6-digits of the HS 2002 classification); and ii) *Destinations per exporter* (log of the average number of destination countries per exporter). In order to analyse the role of trade costs, we include the variable *Trade costs* and the multiplicative variable between *Trade costs* and a dummy that takes the value 1 for landlocked countries. In fact, landlocked African countries could be relatively more affected by higher trade costs. There is ample evidence showing that landlocked economies are affected by high cost of freight services and unpredictability in transportation time owing to physical constraints, rent-seeking activities, and severe flaws in the transit systems (Arvis *et al.*, 2010). In our sample of 15 African countries, there are 6 landlocked economies, namely Botswana, Ethiopia, Malawi, Mali, Uganda and Zambia. As expected, these countries display higher trade costs, and it could be argued that they disproportionally affect trade in these economies (World Bank, 2014, Arvis *et al.*, 2010).

In addition, a proxy for productive capacities is included in the equation, as they play a crucial role on export diversification (Hausmann *at al.*, 2011). We use the Economic Complexity Index (ECI) as a proxy for productive capacities. The ECI measures the multiplicity of productive knowledge in an economy by combining information on the diversity of a country's exports and the ubiquity of its products. While including a variable that is built upon product diversification can generate estimation doubts in equation (3) when using product diversification as a dependent variable, we believe this is not problematic. First, the ECI measures the "stock of productive knowledge" at country level, while product diversification (average number of exported products per exporter) is defined at the sector level. Second, as discussed by Mealy *et al.* (2018) and Kemp-Benedict (2014), the ECI seems to be orthogonal to diversity, and it captures information on what type of products and capabilities countries are competitive in. The vector X encompasses a set of control variables, namely *GDP*, *GDP per capita*, *Trade over GDP*, *Financial sector*, and *Exchange rate*. Again, equation (3) is estimated by Ordinary Least Squares (OLS), using robust standard errors adjusted by "clustering" at country level.

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13   The data for real effective exchange rate comes from the UNCTAD database (https://unctadstat.unctad.org).

14   Given that the dependent variable (survival) ranges between 0 and 1, the (binomial) GLM estimation is implemented using a Logit link function.

V   Econometric results

Table 2 presents the estimation results on how trade costs correlate to the size of exporters, including regression for three different categories: all exporters, new exporters and surviving new exporters. Columns (1), (3) and (5) provide the baseline estimations with the control variables, while (2), (4) and (6) display the regressions including the trade costs variable. For all exporters, the coefficient associated to the variable *Trade costs* is not significant. This suggests that size differences are not systematically and significantly related to differences in trade costs. In addition, there seem to be no specific effect related to countries in Africa. However, the size of the economies, and how open they are to international trade, are relevant to explain the size of exporters. Thus, sectors in countries that are larger and more open to international trade tend to have larger exporters.

The subsequent regressions show that trade costs are a relevant dimension to explain the size of new exporters and surviving new exporters. The coefficients on trade costs are sizeable, negative and significant, as shown in columns (4) and (6). Thus, sectors from countries that face higher trade costs tend to have smaller exporters, even controlling for all other dimensions. On average across sectors and *ceteris paribus*, new exporters and surviving new exporters from a country with trade costs that are 20% lower are about 12% and 17% larger, respectively, than their counterparts from the other country. While most relevant factors explaining firm size are likely to be country and sector-specific, the existence of sectoral differences that can be explained by trade costs across countries is compelling about their continuing importance.

Notably, the multiplicative variable of trade costs and the dummy African countries is also significant at 5% for the sample of new exporters and surviving new exporters. This suggests that, in the comparison across sectors, trade costs play a disproportionate role in affecting the smaller size of new exporters and new surviving exporters in Africa in comparison to exporters from other regions. This is consistent, as the previous section described, with larger trade costs in African countries. For example, if trade costs in an African country decline by 20% -which in the middle of the distribution would imply a change in the trade costs of a country in the 25% percentile to the value of a country in the 75% percentile, the size of new exporters and new surviving exporters would increase by 14% and 19%, on average and *ceteris paribus*. These magnitudes, while informative on the relevance of trade costs, should be taken with caution, as the empirical framework and nature of the data prevent strong inferences on causality. Also, it is important to consider that the response of a reduction in trade costs would be heterogeneous across sectors[15].

Similar to the case of all exporters, differences in the size of the economies and in trade openness are also significantly, and positively, correlated to differences in the size of new exporters. Interestingly, the development of the financial sector is also a relevant dimension associated to the size of new exporters. Thus, sectors from countries with more developed financial sectors tend to have smaller exporters. Intuitively, the development of the financial sector and adequate access to credit can facilitate smaller firms to become exporters.

Table 3 displays the results on how trade costs relate to the survival of exporters in foreign markets. Like the previous regressions, columns (1) and (3) provide the baseline estimations with only the control variables, while columns (2) and (4) show the regressions including the trade costs variables. Regarding the role of trade costs, they seem not to be a relevant aspect in survival explaining differences across regions. Yet, trade costs do play a role for the specific case of Africa, as the multiplicative variable is negative and significant for the 1-year and 3-year survival regressions. Thus, in the comparison across sectors, exporters from Africa display lower rates of survival in foreign markets vis-à-vis other regions. On marginal terms, the estimated coefficients suggest that if

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15   Exploiting sectoral differences on the effect of trade costs can be an interesting extension for this paper. It might be argued that trade costs affect sectors differently, depending on their technological intensity or dependency on foreign inputs.

trade costs decline by 20%, then the 1-year and 3-year survival probability for new exporting firms would increase by 0.5% and 0.8%, respectively. While these numbers might seem small, it is worth emphasizing that trade costs play a relevant role in export survival only in African countries in our analysis. This result is in line with other studies showing how trade integration efforts to reduce trade costs have increased export survival for Africa firms. For example, Socrates *et al.* (2020) shows that the Common Market for Eastern and Southern Africa (COMESA) increased the export survival of Kenyan firms.

As expected, the regressions also show the size of exporters is a crucial dimension associated to the survival in foreign markets, consistent with previous literature. In the comparison across sectors, larger exporters are associated to higher survival rates in foreign markets. Also, sectors from countries that are more open to international trade have exporters with higher survival rates. Finally, the exchange rate, a major determinant of the profitability of exporting activity, also seems to play a role in the survival of exporters. As expected, a depreciation of domestic currencies is positively associated to survival rates, as the depreciation should rise the profitability of export activity.

Table 4 displays the results regarding trade costs and diversification across products and destinations among African countries. Alike the previous estimations, columns (1) and (3) display the baseline regressions, and columns (2) and (4) the regressions with the trade costs variable. The regressions show that the size of exporters is a crucial aspect to explain diversification even within a sample of African countries, consistent with previous empirical literature. Larger exporters tend to be more diversified, in the comparison across sectors.

The estimations also show that, in general, differences in trade costs are not significantly correlated to differences in product and market diversification. However, trade costs play a role when making the comparison between landlocked and non-landlocked countries. In fact, the multiplicative variable of trade costs with the dummy for landlocked countries is negative and significant. This shows that sectors from landlocked countries in Africa have, on average, exporters that are less diversified in terms of destinations. Thus, trade costs are an important dimension to explain the reduced market diversification in these economies with respect to non-landlocked countries. The size of the estimated coefficient is small, but this is likely due to the distribution of the dependent variable, which is heavily skewed to the left. In the estimation sample at sectoral level, the average number of destinations per exporter among African countries is only 1.5, with a median of 1.3 and a maximum value of 23.5. Yet, the negative and significant effect of trade costs is intuitive, as landlocked countries usually face immense challenges in developing their trade activity due to the lack of territorial access to the sea and the geographical remoteness from international markets[16].

The regressions also suggest that sectors from countries with more productive capacities tend to have significantly more diversified exporters in terms of products and destinations. The coefficients associated to productive capacities are significant at 5% in both cases, illustrating their crucial role on both dimensions of diversification. Overall, these results show that while trade liberalization reforms and reduced trade costs can open new markets and encourage trade flows, promoting the diversification of export products will likely remain limited without strengthening productive capacities[17].

Several robustness checks were implemented. A key aspect to consider is to what extent the results could be driven by the estimation sample, which is not balanced across countries. Some countries are observed in the database for longer periods of time (Annex A1). To address this issue, we follow

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16   This is reflected in the diversification measures. African exporters from landlocked countries export, on average, less than five products to less than two destinations, while African exporters from non-landlocked countries export about seven different products to more than 2.5 destinations.

17   This is also the experience in other developing regions. For example, trade liberalization reforms in Latin America, including regional trade agreements, have not promoted the diversification of exports in recent decades.

a twofold strategy. First, the estimations are implemented on a restricted sample where countries have at least 700 observations[18]. With this approach, countries with fewer observations are left out from the estimations, approximately 20% of the sample. Second, we estimate the equations with a balanced sample containing the same number of observations per country. Thus, the "additional" observations for some countries, in comparison to countries with fewer observations, are left out from the sample. These estimations are presented in the Annexes A3.1-A3.2 and the results regarding the role of trade costs are confirmed. Finally, we use another proxy variable for trade costs. We use the export cost variable from the World Bank's World Integrated Trade Solutions[19]. This is a country-level variable that measures the official fees associated with completing administrative and transport procedures to export or import of goods, in US dollars per container. Similarly, to the previous robustness checks, the estimations largely confirm the results presented in Tables 2, 3 and 4[20].

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18   These estimations results are available upon request.
19   This variable includes the costs for documents, administrative fees for customs clearance and technical control, custom broker fees, terminal handling charges and inland transport. For more details, see https://wits.worldbank.org/.
20   These estimations are available upon request.

Table 2
Trade costs and size of exporters

	All exporters (1)	All exporters (2)	New exporters (3)	New exporters (4)	Surviving new exporters (5)	Surviving new exporters (6)
GDP	0.599 (6.86)***	0.479 (5.59)***	0.515 (7.57)***	0.375 (6.94)***	0.599 (7.14)***	0.417 (6.25)***
GDP per capita	0.110 (1.13)	0.108 (1.39)	-0.151 (2.22)**	-0.161 (3.56)**	-0.162 (2.00)**	-0.170 (3.61)**
Trade over GDP	0.014 (5.69)***	0.110 (3.70)**	0.015 (7.58)***	0.011 (6.19)***	0.016 (6.89)***	0.010 (5.37)***
Financial sector	-0.481 (1.80)*	-0.211 (-0.80)	-0.810 (4.06)***	-0.567 (2.85)**	-0.963 (4.77)***	-0.634 (3.89)***
Commodity-Dependent	0.374 (2.42)**	0.294 (1.95)*	0.056 (0.43)	-0.058 (0.53)	-0.009 (0.07)	-0138 (1.47)
Trade costs		-0.552 (1.11)		-0.633 (1.94)*		-0.862 (2.24)**
Trade costs* Africa		-0.509 (1.38)		-0.060 (2.58)**		-0.073 (3.43)**
Sectoral Dummies	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.46	0.47	0.37	0.37	0.33	0.34
Number of countries	50	46	49	45	48	44
Observations	33,162	30,309	30,082	27,511	24,046	22,100

Source: Authors' own elaboration.
Notes: The dependent variable is *Size of exporters*, defined as log of the (mean) exports per exporter at sectoral level for each category (all exporters, new exporters and surviving new exporters). *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development and *Commodity-Dependent* is a dummy variable that takes the value 1 if the country is a commodity dependent economy. *Trade costs* is the log of the mean of the trade costs variable, and *Africa* is a dummy variable that takes the value 1 for African countries, zero otherwise. OLS estimations at sector level (HS 2-digit codes). t statistics with robust standard errors adjusted by clustering at country level in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 3
Trade costs and survival of exporters

	1-year survival (1)	1-year survival (2)	3-year survival (3)	3-year survival (4)
Size of exporters	0.085 (11.66)***	0.082 (10.11)***	0.114 (11.22)***	0.112 (9.39)***
GDP	0.030 (1.16)	0.023 (0.82)	0.045 (1.23)	0.029 (0.51)
GDP per capita	0.014 (0.48)	0.000 (0.02)	0.028 (0.63)	0.004 (0.09)
Trade over GDP	0.002 (3.33)**	0.002 (2.83)**	0.003 (3.29)**	0.003 (2.00)**
Financial sector	-0.100 (1.12)	0.012 (0.12)	-0.059 (0.67)	0.093 (0.77)
Commodity-Dependent	-0.016 (0.28)	0.013 (0.24)	0.036 (0.45)	0.065 (0.80)
Exchange rate	0.002 (1.66)*	0.002 (1.63)*	0.003 (1.83)**	0.003 (1.72)*
Trade costs		-0.081 (0.35)		-0.160 (0.38)
Trade costs* Africa		-0.026 (2.96)**		-0.043 (3.73)***
Sectoral Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
AIC	0.85	0.85	0.53	0.53
Number of countries	48	44	43	39
Observations	25,848	23,575	17,451	15,833

Source: Authors' own elaboration.
Notes: The dependent variable is the 1-year and 3-year survival rates of new exporters (entrants) per sector. *Size of exporters* is the log of the (mean) exports per exporter. *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development and *Commodity-Dependent* is a dummy variable that takes the value 1 if the country is a commodity dependent economy. *Exchange rate* is an index that measure the fluctuation of the real effective exchange rate. *Trade costs* is the log of the mean of the trade costs variable, and *Africa* is a dummy variable that takes the value 1 for African countries, zero otherwise. OLS estimations at sector level (HS 2-digit codes). t statistics with robust standard errors adjusted by clustering at country level in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Table 4
Trade costs and diversification in Africa

	Destinations per exporter (1)	Destinations per exporter (2)	Products per exporter (3)	Products per exporter (4)
Size of exporters	0.081 (15.03)***	0.081 (15.33)***	0.024 (7.79)***	0.025 (7.01)***
GDP	0.060 (2.13)**	0.018 (0.88)	0.022 (0.74)	0.034 (1.11)
GDP per capita	-0.068 (1.91)*	-0.025 (1.94)*	0.026 (1.05)	0.027 (1.16)
Trade over GDP	0.002 (2.41)**	0.000 (1.58)	0.000 (0.37)	0.000 (0.41)
Financial sector	-0.009 (0.13)	0.013 (0.30)	0.075 (2.07)*	0.086 (2.27)**
Exchange rate	-0.000 (0.24)	-0.000 (1.06)	0.001 (3.08)**	0.001 (3.35)**
Productive capacities	0.090 (1.66)	0.082 (2.66)**	0.123 (3.21)**	0.140 (3.41)**
Trade costs		0.042 (0.44)		0.291 (1.54)
Trade costs* Landlocked		-0.016 (2.59)**		-0.007 (1.08)
Sectoral Dummies	Yes	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes	Yes
R-squared	0.52	0.54	0.60	0.61
Number of countries	15	14	15	14
Observations	9,213	8,305	9,213	8,305

Source: Authors' own elaboration.
Notes: *Destinations* and *Products per exporter* are the log of the (mean) number of destinations and products per exporter, respectively. *Size of exporters* is the log of the (mean) exports per exporter at sectoral level. *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development. *Exchange rate* is an index that measure the fluctuation of the real effective exchange rate. *Productive capacities* correspond to the Economic Complexity Index. *Trade costs* is the log of the mean of the trade costs variable and *Landlocked* is a dummy variable that takes the value 1 for landlocked countries, zero otherwise. OLS estimations at sector level (HS 2-digit codes). t statistics with robust standard errors adjusted by clustering at country level in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

VI Concluding remarks

This paper shows that Africa's exporter dynamics display idiosyncratic features vis-à-vis the rest of the world. Intuitively, African exporters are fewer, smaller and relatively less diversified than exporters from other regions. This can be largely explained by the smaller size of their economies and their lower level of development. More interestingly, African countries have the highest rates of entry and exit of exporting firms, exporting products and export destinations. As such, African countries also exhibit the lowest probability of survival of exporting firms, products and destinations. Therefore, Africa's exporting activity is volatile, with a lot of experimentation, and African exporters exhibit difficulties in maintaining trade relationships.

While this experimental environment resonates with the Schumpeterian "creative destruction" process as a major engine for innovation, the case is different here. This environment is likely more associated to structural problems and weaknesses in African economies. Intuitively, the reasons behind this could be related to market inefficiencies, profit uncertainties, lack of information of foreign markets and limited productive capacities at the firm level, or to a combination of these factors. Further research at country level is needed to be more conclusive and to discuss policies recommendations in this regard.

The paper confirms that trade costs are a crucial dimension in explaining exporter dynamics not only in Africa vis-à-vis other regions but also within Africa. In fact, trade costs play a disproportionate role in affecting the size and survival of new exporters in Africa in comparison to exporters from other regions. A reduction of 20% in trade costs could imply an increase on the size of new exporters and new surviving exporters by 14% and 19%, respectively, and an increase in the 1-year and 3-year survival probability by 0.5% and 0.8%, respectively. Together with the evidence on the size and entry of exporters, this suggests that Africa's exports are more constrained by the size of exporters, rather than by the number of exporters. In addition, the paper shows that differences in trade costs across African countries are a relevant factor in explaining the lower market diversification of exporters from landlocked countries. This highlights the need to make further progress on the Vienna Program of Action for landlocked countries, for example in the areas of transport and information and communication technology infrastructure and trade facilitation. The empirical results also show that productive capacities play a major role on product and market diversification among African exporters.

A key implication is that reducing trade costs through the measures enacted by the AfCFTA can entail large development benefits in the medium-term in terms of export flows and destination markets. Productivity gains might also arise as a result of the expansion of more productive exporters and the exit of less productive ones. Furthermore, as a result of the ongoing COVID-19 pandemic and the collapse of global trade flows, promoting regional value chains proves to be even more relevant as an engine for exports and diversification and for building economic resilience. Yet, a critical message is that medium-term effects of the AfCFTA on product diversification and industrial upgrading will likely remain limited without strengthening productive capacities. This is consistent with the long-standing development view that, while trade liberalization can encourage benefits by exploiting comparative advantages and promoting labour and capital reallocations within countries, they are insufficient to create conditions conducive for a substantial export diversification and structural change. This is also exemplified in other trade integration efforts in developing regions, which have not been able to promote diversification and industrial upgrading, for example in Latin America.

Implicitly, this paper also emphasizes the need to modify the framework of the international support given to many African economies, particularly least developed countries. So far, international support has been focussed on duty-free, quota-free market access to developed and developing countries, under the assumptions of the Washington Consensus. This approach has

yielded very limited success in recent decades, and there is an increasing need to revise it, particularly at times when the Istanbul Programme of Action 2011-20 comes to an end. As discussed by Gay (2020), international support to least developed countries, most of them in Africa, should critically encompass the development of productive capacities, for example by provisioning special funds for productivity-enhancing investments on infrastructure, opening policy space and promoting technology and technical transfers.

Thus, there is a need for a much broader, strategic and targeted set of productive and industrial policies in areas such as infant industry, foreign direct investment, innovation, science and technology, and labour markets, which should be designed according to national development priorities. These policies can promote input sourcing from within Africa and thus support intra-regional trade of intermediate and final goods, encouraging African exporters to better exploit domestic and regional markets (Mold, 2017). While each country needs to define policies according to its own characteristics, proactive industrial policies can play a major role in promoting economic growth and technological upgrading, unavoidable tasks if African countries want to make meaningful progress towards development.

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Annex A1
Database - Distribution of observations across countries, 2002–2012

Country	Frequency	Per cent	Cum.
Albania	834	1.91	1.91
Bangladesh	943	2.16	4.07
Belgium	1,520	3.48	7.54
Botswana	1,034	2.37	9.91
Bulgaria	570	1.30	11.22
Cambodia	804	1.84	13.06
Cameroon	1,429	3.27	16.33
Chile	950	2.17	18.50
Colombia	665	1.52	20.02
Costa Rica	1,407	3.22	23.24
Croatia	570	1.30	24.55
Denmark	1,140	2.61	27.15
Dominican Republic	1,201	2.75	29.90
Ecuador	1,206	2.76	32.66
El Salvador	760	1.74	34.40
Estonia	888	2.03	36.43
Ethiopia	422	0.97	37.4
Gabon	93	0.21	37.61
Georgia	926	2.12	39.73
Guatemala	855	1.96	41.69
Guinea	280	0.64	42.33
Jordan	896	2.05	44.38
Kenya	855	1.96	46.34
Kuwait	188	0.43	46.77
Kyrgyzstan	654	1.50	48.26
Lao People's Dem. Rep.	377	0.86	49.12
Lebanon	475	1.09	50.21
Madagascar	559	1.28	51.49
Malawi	613	1.40	52.89
Mali	336	0.77	53.66
Mauritius	1,037	2.37	56.04
Mexico	1,235	2.83	58.86
Morocco	1,140	2.61	61.47
Nicaragua	1,177	2.69	64.16
Norway	1,615	3.70	67.86
Pakistan	855	1.96	69.82
Paraguay	473	1.08	70.90
Peru	1,520	3.48	74.38
Portugal	1,425	3.26	77.64
Romania	665	1.52	79.16
Senegal	1,173	2.68	81.84
South Africa	1,138	2.60	84.45
Spain	950	2.17	86.62
Sri Lanka	95	0.22	86.84
Sweden	855	1.96	88.80
Thailand	285	0.65	89.45
Turkey	1,140	2.61	92.06
Uganda	785	1.80	93.85
Uruguay	1,116	2.55	96.41
Yemen	397	0.91	97.32
Zambia	1,173	2.68	100.0
Total	43,699	.	.

Source: Author's own elaboration based on *Exporter Dynamics Database*.
http://www.worldbank.org/en/research/brief/exporter-dynamics-database.

In line with Novy (2012), the World Bank-ESCAP measure for trade costs calculates the geometric average bilateral trade cost (φ_{ijkt}) between country i and country j in sector k at time t, as the product of country i's intra-national trade (x_{ii}) and country j's intra-national trade (x_{jj}) divided by the product of country i's trade flows to country j, (x_{ij}), and country j's trade flows to country i, (x_{ji}), scaled by a sector specific elasticity of substitution between sectors.

$$\varphi_{ijkt} = \left(\frac{x_{iikt}x_{jjkt}}{x_{ijkt}x_{jikt}}\right)^{\frac{1}{2(\sigma_k-1)}} - 1$$

Following this approach, the ad-valorem trade cost measure can be interpreted as follows: trade costs are inferred as higher when countries trade more domestically than they do internationally, and lower when they trade more internationally than they do domestically. This is because if trade costs vis-à-vis another country falls, then some of the production which was consumed domestically will be shipped overseas. For more details, see Duval *et al.* (2016).

Trade costs and size of exporters – Balanced database

	All exporters (1)	New exporters (2)	Surviving new exporters (3)
GDP	0.467 (4.97)***	0.379 (7.72)***	0.424 (6.67)***
GDP per capita	0.128 (1.37)	-0.094 (1.88)*	-0.110 (2.45)**
Trade over GDP	0.008 (2.44)**	0.010 (4.78)***	0.010 (4.67)***
Financial sector	-0.174 (0.52)	-0.771 (3.28)**	-0.781 (3.06)**
Commodity-Dependent	0.235 (1.53)	-0.119 (1.03)	-0.147 (1.68)*
Trade costs	-0.288 (0.41)	-0.192 (0.35)	-0.598 (1.21)
Trade costs* Africa	-0.048 (1.24)	-0.501 (1.97)*	-0.068 (2.91)**
Sectoral Dummies	Yes	Yes	Yes
Year Dummies	Yes	Yes	Yes
R-squared	0.42	0.33	0.30
Number of countries	35	35	34
Observations	10,705	9,399	7,639

Source: Authors' own elaboration.
Notes: The dependent variable is *Size of exporters*, defined as log of the (mean) exports per exporter at sectoral level for each category (all exporters, new exporters and surviving new exporters). *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development. *Commodity-Dependent* is a dummy variable that takes the value 1 if the country is a commodity dependent economy. *Trade costs* is the log of the mean of the trade costs variable, and *Africa* is a dummy variable that takes the value 1 for African countries, zero otherwise. OLS estimations at sector level (HS 2-digit codes). t statistics with robust standard errors adjusted by clustering at country level in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Annex A3.2
Trade costs and survival of exporters – Balanced database

	1-year survival (1)	3-year survival (2)
Size of exporters	0.072 (7.23)***	0.107 (7.02)***
GDP	0.041 (1.27)	-0.029 (0.56)
GDP per capita	0.021 (0.53)	0.043 (0.65)
Trade over GDP	0.003 (2.92)**	0.000 (0.35)
Financial sector	-0.045 (0.38)	0.236 (0.84)
Commodity-Dependent	0.018 (0.24)	0.002 (0.02)
Exchange rate	0.004 (2.04)**	0.003 (1.39)
Trade costs	-0.074 (0.23)	-0.275 (0.50)
Trade costs* Africa	-0.017 (1.90)*	-0.043 (3.63)***
Sectoral Dummies	Yes	Yes
Year Dummies	Yes	Yes
AIC	0.85	0.51
Number of countries	34	25
Observations	8,318	6,703

Source: Authors' own elaboration.

Notes: The dependent variable is the 1-year and 3-year survival rates of new exporters (entrants) per sector. *Size of exporters* is the log of the (mean) exports per exporter. *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development. *Commodity-Dependent* is a dummy variable that takes the value 1 if the country is a commodity dependent economy. *Exchange rate* is an index that measure the fluctuation of the real effective exchange rate. *Trade costs* is the log of the mean of the trade costs variable, and *Africa* is a dummy variable that takes the value 1 for African countries, zero otherwise. OLS estimations at sector level (HS 2-digit codes). t statistics with robust standard errors adjusted by clustering at country level in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.

Annex A3.3
Trade costs and diversification in Africa – Balanced database

	Destinations per exporter (1)	Products per exporter (2)
Size of exporters	0.079 (13.06)***	0.024 (5.65)***
GDP	0.014 (0.74)	0.037 (1.15)
GDP per capita	-0.034 (1.80)*	0.040 (1.55)
Trade over GDP	0.001 (1.92)*	0.000 (0.56)
Financial sector	-0.024 (0.64)	0.100 (2.94)*
Exchange rate	-0.002 (3.06)**	0.001 (2.44)**
Productive capacities	0.087 (2.46)**	0.171 (3.79)**
Trade costs	-0.055 (0.41)	0.401 (1.40)
Trade costs* Landlocked	-0.010 (2.47)**	-0.006 (1.14)
Sectoral Dummies	Yes	Yes
Year Dummies	Yes	Yes
R-squared	0.55	0.60
Number of countries	14	14
Observations	3,868	3,868

Source: Authors' own elaboration.
Notes: *Destinations* and *Products per exporter* are the log of the (mean) number of destinations and products per exporter, respectively. *Size of exporters* is the log of the (mean) exports per exporter. *GDP* is the log of GDP in constant US dollars and *GDP per capita* is the log of GDP per capita in constant US dollars. *Trade over GDP* is total merchandise exports and imports over GDP. *Financial sector* is an index of financial development. *Exchange rate* is an index that measure the fluctuation of the real effective exchange rate. *Productive capacities* correspond to the Economic Complexity Index. *Trade costs* is the log of the mean of the trade costs variable and *Landlocked* is a dummy variable that takes the value 1 for landlocked countries, zero otherwise. OLS estimations at sector level (HS 2-digit codes). t statistics with robust standard errors adjusted by clustering at country level in parentheses. * Significant at 10%; ** Significant at 5%; *** Significant at 1%.