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Identifying the determinants of South Africa's extensive and intensive trade margins: A gravity model approach

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Background: The significance of the paper is twofold. Firstly, it adds to the small but growing body of literature focusing on the decomposition of South Africa's export growth. Secondly, it identifies the determinants of the intensive and extensive margins of South Africa's exports – a topic that (as far as the authors are concerned) has not been explored before.

Aim: This paper aims to investigate a wide range of market access determinants that affect South Africa's export growth along the intensive and extensive margins.

Setting: Export diversification has been identified as one of the critical pillars of South Africa's much-hoped-for economic revival. Although recent years have seen the country's export product mix evolving, there is still insufficient diversification into new markets with high value-added products. This is putting a damper on export performance as a whole and, in turn, hindering South Africa's economic growth.

Methods: A Heckman selection gravity model is applied using highly disaggregated data. The first stage of the process revealed the factors affecting the probability of South Africa exporting to a particular destination (extensive margin). The second stage, which modelled trade flows, revealed the variables that affect export volumes (intensive margin).

Results: The results showed that South Africa's export product mix is relatively varied, but the number of export markets is limited. In terms of the extensive margin (or the probability of exporting), economic variables such as the importing country's GDP and population have a positive impact on firms' decision to export. Other factors affecting the extensive margin are distance to the market (negative impact), cultural or language fit (positive impact), presence of a South African embassy abroad (positive impact), existing free trade agreement with Southern African Development Community (positive impact) and trade regulations and costs (negative impact). In terms of the intensive margin (or the factors influencing the volume of exports), there are strong parallels with the extensive margin, with the exception being that the time involved in exporting has more of an impact than documentary requirements.

Conclusion: Among the factors contributing to South Africa's exports having largely developed in the intensive margin are a general lack of market-related information, infrastructural weaknesses (both of a physical and technological nature) and a difficult regulatory environment – all of which add to the cost and time involved in exporting. Policymakers have long spoken about the need for the country to diversify its export basket, but now talk about needs to give way to action. The government and its economic partners need to arrive at a common vision of an export sector that will be able to expand into new products and markets, be an active participant in global value chains and deliver sustainable jobs.

Introduction

Since the first democratic elections were held in 1994, the South African government has been intent on boosting employment in the country by encouraging higher and more inclusive economic growth. Industrialisation and export diversification have been part and parcel of this goal (Viviers et al. 2014). The Department of Trade and Industry (DTI) (2013:16) states:

> … the growth and diversification of South African exports has been weak, with over half of all exports derived from the mining value chain. In order to stabilise growth it is important to diversify exports, including into higher value-added activities, and to improve overall competitiveness.

The World Bank (2014), in its analysis of South Africa's export competitiveness, states that it may be difficult for the country to revitalise its export sector. Firstly, South African exports have been

underperforming, especially compared with its emerging market peers. Secondly, while the composition of South Africa's exports is changing, there is insufficient diversification into new and higher value products. Indeed, Matthee, Idsardi and Krugell (2016) reveal that since 1994, the highest export growth has been in non-fuel primary commodities (38%), while medium-skill, technology-intensive manufactures have grown by 22%. Resource-intensive manufactures have shown a serious decline in exports (around 50%). Furthermore, the bulk of South Africa's export growth (more than 70%) has been in the intensive margin (i.e. exports to existing trade partners) and the remainder in the extensive margin (i.e. diversification in terms of exporting firms, products or destinations) (Bezuidenhout et al. 2015; Matthee et al. 2016).

The above scenario is the result of both broad structural problems in the South African economy and largely uncontrollable global influences, such as the continuous decline in commodity prices in recent years and waning demand in traditional markets. In addition, various market access barriers, including the distance to export markets and high transport costs, have conspired to erode South Africa's export competitiveness and weakened the country's export growth potential (Steenkamp, Grater & Viviers. 2015).

This paper aims to investigate a wide range of market access determinants that affect South Africa's export growth. The significance of the paper is twofold. Firstly, it adds to the small but growing body of literature focusing on the decomposition of South Africa's export growth. Secondly, it identifies the determinants of the intensive and extensive margins of South Africa's exports – a topic that (as far as the authors are concerned) has not been explored before.

The study's empirical framework is derived from the influential Melitz (2003) model, which is based on assumptions of firm heterogeneity in productivity and fixed costs when trade margins are analysed. More productive firms self-select into export destination markets (i.e. the extensive margin). In this regard, as firms exhibit heterogeneity in their productivity, only the more productive ones are able to generate sufficient operating profits in a destination market to cover the associated fixed costs and serve the market through exports (see also Chaney 2008; Crozet & Koenig 2010; Helpman, Melitz & Rubenstein 2008). Chaney (2008) states that a decrease in the fixed bilateral costs of trade (e.g. start-up costs) would positively affect the extensive margin (number of firms), while a decrease in the variable trade costs (e.g. transport costs) would increase both the extensive and intensive margins.

This paper uses the gravity model to analyse the pattern of South African exports at the product-level. Detailed product-level data are used to determine the impact of trade costs and barriers on the number of firms exporting to different markets and the volume of exports to each market. To this end, the product-level data are decomposed per industry, and the impact of different aspects relating to market access

(i.e. market capacity, trade facilitation and trade barriers) are assessed in terms of the authors' gravity model definition. This specification is estimated using the two-stage sample selection procedure proposed by Heckman (1979).

The rest of the paper is structured as follows: The next section discusses a brief literature overview. The 'Empirical specification' section presents the data and methodology used in the study. The 'Extensive and intensive margins of South African exports' section summarises the results of the empirical analysis and the 'Summary of key findings and concluding remarks' section summarises the key findings and provides some concluding remarks.

Brief literature overview

The heterogeneous nature and performance of firms has become a key focus area in international trade research (Melitz & Redding 2012). According to Chaney (2008), firms are heterogeneous in their productivity levels. Moreover, when firms decide to export, they face both fixed and variable costs. Given that there is a threshold productivity level below which zero profits are yielded, only the more productive firms will find it profitable to export. On the one hand, a reduction in variable trade costs will affect both the intensive and extensive margins positively, because the threshold productivity level will drop and both the volume of export of existing exporting firms and the number of new exporting firms will increase. On the other hand, a reduction in fixed trade costs will not affect the intensive margin (the existing exporters have already paid this cost), but will induce new firms to enter the export field. In other words, it will have a positive effect on the extensive margin. Consequently, zero trade flows result from the impossibility of overcoming fixed costs that are necessary to establish trade.

The Melitz (2003) model makes it possible to endogenously calculate the number of firms that decide to export, which has created a new way of decomposing the observed trade flows into the extensive margin of trade (the number of exporting firms) and the intensive margin of trade (the volume of trade per exporter). This decomposition offers a coherent explanation for why only the most productive firms are involved in international trade. Because the study considers product-level exports to importing countries, zero trade flows arise when no firms in South Africa are productive enough to export to a particular destination.

A gravity model approach is used in the empirical analysis presented in this paper. The gravity model has been used in a plethora of empirical studies involving trade margins (see, e.g. Amurgo-Pacheco & Pierola 2008; Crozet & Koenig 2010; Felbermayr & Kohler 2006; to name a few). These studies have used different adaptations of the model, estimators and focus points. For example, Lawless (2010) focuses on trade costs, Debaere and Mostashari (2010) on tariffs, Dutt, Mihov and Van Zandt (2011) on the World Trade Organization, Baier, Bergstrand and Feng (2013) on economic integration agreements and Johannsen and Martínez-Zarzoso (2014) on

international arms transfers. Of more relevance to this particular study, Greenaway, Gullstrand and Kneller (2009) apply a Heckman sample selection gravity model to control for possible self-selection into exporting using firm-level data on the Swedish food and beverage sector. Crozet and Koenig (2010), in turn, examine the impact of distance on the probability of exporting and on export levels, using French manufacturing firm-level data. Belenkiy (2010) applies the two-stage Heckman procedure to estimate determinants of the extensive margin of exports from Organisation for Economic Cooperation and Development (OECD) countries to non-OECD countries and Portugal-Perez and Wilson (2012) apply it in terms of export performance of developing countries. Finally, Christen, Wolfmayr and Pfaffermayr (2013) examine the determinants of service exports in Austria at the firm/destination country-level using a Heckman sample selection gravity model.

Finally, there are a few papers that have studied the determinants of African trade using a gravity model. However, none of them has explored the role of extensive and intensive trade margins. Eita (2008) analyses the determinants of Namibian exports using a gravity model framework. Similarly, Jordaan and Eita (2011) investigate the determinants of South Africa's exports of wood and articles of wood using a gravity model approach. The results of the latter analysis suggest that there is unexploited trade potential among some of South Africa's trading partners such as Canada, the United States, Comoros, Germany, Greece, Italy, Ireland, New Zealand, Russia and Tanzania. Márquez-Ramos (2007) explores the determinants of trade for South Africa and Ghana, respectively, using disaggregated data by sector. The author asserts that technological innovation and geographical and social factors play a key role in South Africa's trading relationships with other countries.

Empirical specification
Data

This paper uses South African exports disaggregated by product in 2012, with the data sourced from the United Nations' Comtrade Database. This database provides export data from a particular exporting country to an importing country disaggregated by product up to Harmonised System 6-digit level (HS6). Export data are classified per HS cluster, similar to the approach in Smet (2007). The groupings of HS6-level products are listed in Table 1.

Table 1 presents the range of products that South Africa exported in 2012, classified by industry and export value. It can be observed that South Africa exports more than 95% of the 5039 products classified in chapters *Foodstuff* and *Plastics and rubbers* and exports less than 78% of *Mineral products* and *Raw hides, skins, leather and furs.* Although South Africa exports a wide variety (around 87%) of products according to the HS6 classification, the value of many of the products in the export mix is very low. Indeed, only 53.7% of the products exported are valued at more than US$100 000, while only 24.8% of products are valued at more than US$1 000 000.

Table 2 presents the percentage of positive export flows by product category. Given a total of 196 importing countries and 5039 products (987 644 possible export flows), South Africa delivers only 93 592 positive export flows (9.5%).

Detailed results of export flows in terms of products and destinations show that other African countries such as Zimbabwe, Zambia, Mozambique and the Democratic Republic of Congo are the recipients of more than 67% of South Africa's exports, while countries such as Yemen, Puerto Rico, Sudan and Palau are not among South Africa's export

TABLE 1: Varieties of products exported by industry (2012).

Industry (HS chapters)	Total products	Products with positive exports	%	Products with exports > US$100 000	%	Products with exports > US$1 000 000	%
Animal and animal products (0100–0599)	194	177	91.2	95	49.0	48	24.7
Vegetable products (0600–1599)	323	285	88.2	159	49.2	82	25.4
Foodstuffs (1600–2499)	181	173	95.6	132	72.9	79	43.6
Mineral products (2500–2799)	170	131	77.1	84	49.4	55	32.4
Chemicals and allied industries (2800–3899)	760	664	87.4	372	48.9	172	22.6
Plastics and rubbers (3900–4099)	189	185	97.9	139	73.5	65	34.4
Raw hides, skins, leather and furs (4100–4399)	74	51	68.9	36	48.6	15	20.3
Wood and wood products (4400–4999)	228	189	82.9	128	56.1	54	23.7
Textiles (5000–6399)	809	640	79.1	201	24.8	37	4.6
Footwear and headgear (6400–6799)	55	47	85.5	28	50.9	4	7.3
Stone and glass (6800–7199)	190	175	92.1	117	61.6	52	27.4
Metals (7200–8399)	587	508	86.5	373	63.5	198	33.7
Machinery and electrical (8400–8599)	762	709	93.0	548	71.9	264	34.6
Transportation (8600–8999)	132	123	93.2	106	80.3	70	53.0
Miscellaneous (9000–9799)	385	320	83.1	186	48.3	55	14.3
Total	5039	4377	86.9	2704	53.7	1250	24.8

TABLE 2: Percentage of non-zero export flows by industry (2012).

Industry	Flows	Positive	%
Animal and animal products	38 024	2 073	5.5
Chemicals and allied industries	148 960	10 460	7.0
Foodstuffs	35 476	4771	13.4
Footwear/headgear	10 780	1246	11.6
Machinery/electrical	149 352	21 384	14.3
Metals	115 052	12 142	10.6
Mineral products	33 320	1920	5.8
Miscellaneous	75 460	8651	11.5
Plastics/rubbers	37 044	5031	13.6
Raw hides, skins, leather and furs	14 504	1285	8.9
Stone/glass	37 240	3478	9.3
Textile	158 564	8674	5.5
Transportation	25 872	3107	12.0
Vegetable products	63 308	5049	8.0
Wood and wood products	44 688	4321	9.7
Total	**987 644**	**93 592**	**9.5**

destinations.[1] Indeed, South Africa exports more than 20% of the product categories to only 27 out of 196 countries and less than 5% of the product categories to 111 importing countries – pointing to a varied export product mix but a concentrated collection of export destinations.[2] Clearly, there is potential for South Africa to expand the number of export markets. To this end, the determinants of South Africa's extensive margin should be identified.

Methodology

The gravity model has been the empirical approach to analysing the determinants of bilateral trade flows. The basic form of this model assumes that trade between countries can be equated to the gravitational pull between two objects because it is directly related to countries' size and inversely related to the distance between them.

Similar to the approach in Greenaway et al. (2009) and Christen et al. (2013), the empirical model in this paper is derived from the seminal paper of Helpman et al. (2008) whose model is based on the premise that firms are heterogeneous (as theorised by Melitz 2003), without using firm-level data. The gravity model is estimated with a two-stage sample selection model using the estimation procedure proposed by Heckman (1979). For implementation purposes, two different equations are defined. The first equation (selection equation) addresses the zeros directly by modelling trade participation. This equation provides the variables that affect the extensive margin of trade, that is, factors that affect the probability that South Africa will export a product to a particular country. The second equation (outcome equation) models trade flows conditional on participation. This equation is specified as a traditional gravity model and explores the variables that affect the intensive margin of trade, that is, volume of export of a product to a particular country. Moreover, the Heckman procedure requires an identification variable that influences the probability of exporting, but not the volume, to comply

with the exclusion restriction. In line with Helpman et al. (2008) and supported by Martin and Pham (2008), an independent variable associated with the fixed trade costs of establishing trade flows (such as country-level data on regulations for establishing a new firm) was omitted from the outcome equation.[3] Specifically included, though, were the cost (as a % of countries' GDP per capita), the number of documents and the time required to establish a new firm.

The first stage in the model consists of a probit regression which explains the probability that South Africa will export to country i (selection equation), where the dependent variable is a dummy that is equal to 1 if South Africa exports to country i. A latent variable E_{it}^* is defined to declare that South Africa is exporting ($E_i^* = 1$) or not ($E_i^* = 0$) a particular importing country i. The second stage consists of a gravity equation estimated in logarithmic form, which explains the volume of exports from South Africa to i (outcome equation) and incorporates a term based on estimates of the first stage, the inverse Mills ratio (IMR), to correct for the non-random prevalence of zero trade flows. In this second stage, the dependent variable is $LnExp_{i_*}$ – that is, the logarithm of the volume of exports from South Africa to an importing country i. The database used in the study covers 196 importing countries in the year 2012.[4]

The selection (Eqn 1) and the outcome (Eqn 2) equations are as follows:

$$E_i^* = \beta'Z_i + \varepsilon_i \qquad \text{[Eqn 1]}$$

$$Exp_i = \begin{cases} \gamma'W_i + \eta_i, \text{ if } E_i^* = 1 \\ 0, \text{ if } E_i^* = 0 \end{cases} \qquad \text{[Eqn 2]}$$

where W_i is a set of explanatory variables of the outcome equation with its corresponding parameters γ' while Z_i are the explanatory variables included in the selection equation with the corresponding set of parameters β'.

Included in vector Z_i are both the explanatory variables in W_i plus an exclusion restriction that affects only the fixed costs of exporting, not the variable trade costs – that is, a variable that determines the probability of exporting to a particular destination but not the volume of exports. As in previous studies, this study uses (as an exclusion restriction) a variable relating to firm entry cost in the importing country.[5] Finally, ε_i and η_i are independent and identically distributed disturbance terms in the selection and outcome equations, respectively.

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1. These results are available on request.

2. Table A2 in the appendix presents the main trading partner by industry.

3. Santos Silva and Tenreyro (2006) propose the Poisson Pseudo-Maximum Likelihood estimator to deal with heteroscedastic residuals and the prevalence of zeros in the dependent variables, which are undefined when the dependent variable is converted into logarithmic form. However, as shown by Martin & Pham (2008), the Heckman sample selection procedure provides better estimates when an appropriated excluded variable is used in the first stage, such as the cost of establishing a new firm.

4. List of importing countries are presented in Table A1 in the appendix.

5. The main difficulty in this approach is to find an exclusion variable for the probit model (selection equation) that is exogenous to the trade value. Alternatively, religious similarity has also been considered as exclusion restriction and results are very similar. Estimates are available upon request.

The error terms have a bivariate normal distribution with zero means, standard deviation σ_ε and σ_η and correlation ρ.

For exporting firms, the conditional expectation of the volume of exports can be derived as follows:

$$\mathrm{E}[\mathrm{Exp}_i \mid E_i^* \geq 0] = \alpha'\mathrm{W}_i + \rho\sigma_\varepsilon\lambda(\hat{\beta}`Z_i) \qquad \text{[Eqn 3]}$$

where $\lambda(\hat{\beta}`Z_i)$ is the IMR. By including λ in the outcome equation, there is control for sample selection bias. In particular, the proposed two-stage Heckman procedure adjusts the second stage of the regression for sample selection bias by incorporating the IMR to the gravity equation.

Table 3 presents a summary of the variables included in the analysis. The explanatory variables have been classified into eight categories: (1) *Economic variables*, which include importing country real GDP per capita and population to control for the extent of demand in the country; (2) *Geographical variables*, which affect trade costs such as the distance between South Africa and the importing country, whether the importing country shares a common land border with South Africa and whether it is an island or landlocked; (3) *Cultural variables*, which are used as a proxy for the cultural affinity between South Africa and the importing country. As the three main official languages in South Africa are Zulu, Afrikaans and English but the first two are largely only spoken within the country, the common language dummy variable considers countries where English is one of the official languages. Moreover, sharing a colonial background (i.e. with Namibia, the Netherlands and the United Kingdom) and a religion similarity index

TABLE 3: Variable definitions and sources.

Variable	Definition	Source
Economic variables		
Log of GDPpc	Logarithm of real GDP per capita of importer country i	World Development Indicators (2011).
Ln of Pop	Logarithm of population of importing country i	
Geographical variables		
LnDist	Logarithm of distance (in km) between South Africa and importing country	GeoDist Database (Mayer & Zignago 2011).
Border	Dummy variable: value of 1 if South Africa shares a common land border with importing country, 0 otherwise	Rose (2011). Data available on Andrew K. Rose's website.
Landl	Dummy variable: value of 1 if importing country is landlocked, 0 otherwise	
Island	Dummy variable: value of 1 if importing country is an island, 0 otherwise	
Cultural variables		
Language	Dummy variable: value of 1 if importing country has English as one of its official languages, 0 otherwise	Data from World FactBook by the Central Intelligence Agency (2015).
Religion	Religious similarity index	
Colony	Dummy variable that takes the value 1 if the importer country has a colonial relationship with South Africa, 0 otherwise	GeoDist Database (Mayer & Zignago 2011).
Political variables		
Political stability	Political stability Indicator of destination/origin country. Ranges from -4 (less political stability) to 2 (more political stability)	Worldwide Governance Indicators (Kaufmann, Kraay & Mastruzzi 2010).
Embassies	Dummy variable: value of 1 if South Africa has an embassy in importing country, 0 otherwise	Rose (2005) completed with data from Department of International Relations and Cooperation.
RTAs		
EFTA	Dummy variable: value of 1 for European Free Trade Association (EFTA) countries since the RTA entered into force, 0 otherwise	RTA database by World Trade Organization (2012).
EU	Dummy variable: value of 1 for European Union (EU) countries since the RTA entered into force, 0 otherwise	
SADC	Dummy variable: value of 1 for Southern African Development Community (SADC) countries since the RTA entered into force, 0 otherwise	
Trade regulation		
Log of cost	Logarithm of official, administrative fees in dollars per imported container in country i in year t	World Bank's Doing Business Survey (Djankov, Freund & Pham 2010).
Log of time	Logarithm of number of calendar days required to move a shipment from South Africa through importing country i's port in year t	
Log of document	Logarithm of number of documents required to move a shipment from South Africa through importing country i's port in year t	
Regions		
North America	Dummy variable: value of 1 if importing country is in North America, 0 otherwise	United Nations' Classification.
South America	Dummy variable: value of 1 if importing country is in South America, 0 otherwise	
North Africa	Dummy variable: value of 1 if importing country is in North Africa, 0 otherwise	
South Africa	Dummy variable: value of 1 if importing country is in South Africa, 0 otherwise	
East Europe	Dummy variable: value of 1 if importing country is in East Europe, 0 otherwise	
Asia	Dummy variable: value of 1 if importing country is in Asia, 0 otherwise	
Oceania	Dummy variable: value of 1 if importing country is in Oceania, 0 otherwise	
Entry cost		
Cost	Dummy variable: value of 1 if relative cost to start a business is greater than the median for importing country i, 0 otherwise	World Bank's Doing Business Survey (Djankov et al. 2010).
Days and Documents	Dummy variable: value of 1 if sum of number of days and procedures to start a business is greater than the median for importing country i, 0 otherwise	

RTA, Regional trade agreements; EFTA, European Free Trade Association; EU, European Union; SADC, Southern African Development Community.

are included[6]; (4) *Political variables*, which consider an instability index in the importing country. This variable reflects perceptions about the likelihood of political instability and/or politically motivated violence, including terrorism, in the importing country. The existence of a South African embassy in the importing country, which could help facilitate new trade relationships and provide support to existing exporters, is also considered; (5) *Regional trade agreements* (RTAs), which control for existing trade agreements to which South Africa is a party; (6) *Trade regulations*, which influence the time and cost involved in moving a standard consignment of goods by sea from South Africa through the port of an importing country, and the number of documents needed to effect the transaction. Because the impact of the explanatory variables on South African trade margins is being estimated, it is not possible to add country-pair or importing country fixed effects to the equation because all explanatory variables are importing country-specific, so they would be absorbed by these fixed effects. An alternative is used, that is, (7) *Regions*, which denote various regions' fixed effects, using the United Nations' classification and with East Europe as the excluded category.

Finally, the Heckman procedure depends on a prior assumption of the validity of the exclusion restriction which is included in W_i ut not in Z_i. As with Helpman et al. (2008) or Portugal-Perez and Wilson (2012), fixed regulation costs of firm entry are used (in the importing country), which should not affect a firm's export volumes and, furthermore, satisfies the exclusion restrictions of the two-stage Heckman estimation method because it is excluded from the outcome equation in the second stage. Thus, a final category is included, called (8) *Entry costs*, which are considered in the selection equation only. Entry costs are measured by their effect on the number of days, the number of legal procedures and the relative cost (as a percentage of GDP per capita) involved in an entrepreneur legally starting up a business. *Cost* is defined as a binary indicator that equals 1 if the relative cost of starting a new business is greater than the median for the importing country i, 0 otherwise. *Days and Documents* is defined as a binary indicator that equals 1 if the sum of the number of days and procedures needed to start a business is greater than the median for the importing country i, 0 otherwise. The results of the empirical analysis are presented according to this disaggregation.

The Heckman procedure used in this paper, as in Helpman et al. (2008), presents the main limitation that is estimated for a cross-section. Consequently, time variation is not addressed, which may yield interesting results in terms of evaluating different trade policies such as reducing regulations or signing new trade agreements. Martinez-Zarzoso, Vidovic and Voicu (2014) adapt the Helpman et al. (2008) procedure to a panel data framework, and this can be considered as an extension for further research.

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6. Religion Similarity Index is $Relig_i = \sum_{R=1}^{5} R_{SA} R_i$ where R is the percentage of affiliated population to each of the five major religions in South Africa and each importing country, respectively.

Extensive and intensive margins of South African exports

As mentioned in an earlier section, products are classified by HS cluster, giving rise to 15 different sectors. Given a total of 987 644 country-pair observations (3059 products × 196 countries), 93 592 of these present positive export flows (9.5% of the sample). Although South Africa exports around 87% of the products, these are concentrated in just a few countries that vary depending on the type of product exported. So, a challenge for South Africa is to increase the number of export destination countries.

As a starting point, the Heckman procedure is applied to estimate export flows from South Africa disaggregated by industry. The model is estimated by maximum likelihood, and robust standard errors are computed.

Tables 4 and 4 Bis show the results of the estimate from the first stage (selection equation) of the Heckman procedure for all sectors pooled to the sample and the results disaggregated by sector. Marginal effects are reported. In general, the sign and significance of the coefficients are as expected. The economic variables that affect the extent of demand, namely GDP per capita and population, show a positive impact on the probability of exporting for all industries. Indeed, for all industries, a 1% increase in GDP per capita or population in the importing country would increase the probability of exporting to that country by 0.034% and 0.038%. In terms of geographical variables, the distance variable (suggesting higher transport costs) presents the expected negative sign. However, for some industries, distance either has no impact or even has a positive impact, such as *Plastics and rubbers* or *Textiles.* This result can be explained by the fact that the main trading partners for these products (such as China and the United States) are located far from South Africa. Moreover, when it comes to regional variables, the fact that the importing country is an island has a positive impact in some sectors, but if it is a landlocked country, there is the expected negative impact on the extensive margin. South Africa uses sea transport extensively for export purposes, so if an importing country has no port, the probability of South Africa exporting to that country is greatly reduced.

In terms of cultural variables, cultural proximity (expressed in terms of language and religion) has, for almost all sectors, a positive impact on the extensive margin. However, having a shared colonial history has no impact or even a negative impact on the probability of South Africa exporting goods from a range of sectors. When it comes to political variables, political stability in an importing country has a negative effect on the probability of exporting to that country. Such results can be somewhat controversial because they imply that South Africa is more likely to export to countries that are perceived to present a lower likelihood of political instability and/or politically motivated violence. However, on closer inspection of the data, it is evident that some of South Africa's main trading partners are in fact countries that have political

TABLE 4: Extensive margins of trade (selection equation).

Variables	All	Animal and animal products	Vegetable products	Food stuffs	Mineral products	Chemicals and allied industries	Plastics/Rubbers	Raw hides, skins, leather and furs	Wood and wood products	Textiles	Footwear/Headgear	Stone/Glass	Metals	Machinery/Electrical	Transport	Miscellaneous
Economic variables																
Ln of GDPpc	0.034***	0.026***	0.033***	0.046***	0.019***	0.020***	0.045***	0.039***	0.033***	0.024***	0.056***	0.045***	0.034***	0.047***	0.041***	0.045***
Ln of Population	0.038***	0.026***	0.031***	0.041***	0.030***	0.029***	0.051***	0.041***	0.039***	0.026***	0.051***	0.045***	0.043***	0.052***	0.044***	0.048***
Geographical variables																
Ln of Distance	-0.007***	-0.009*	-0.006	-0.018**	-0.006	0.005	0.018**	-0.002	-0.005	0.005*	-0.012	0.006	0.001	0.034	-0.009	0.018***
Landlocked	-0.019***	-0.017***	-0.032***	-0.054***	-0.019***	-0.015***	-0.031***	-0.021***	-0.021***	-0.010***	-0.017*	-0.021***	-0.021***	-0.018***	-0.015***	-0.012***
Island	0.002**	0.008*	0.003	0.018***	-0.001	0.000	-0.003	0.000	0.003	0.002	0.01	0.001	0.002	-0.001***	0.012*	0.002
Cultural variables																
Language	0.029***	0.001***	0.024***	0.058***	0.015***	0.023***	0.037***	0.040***	0.031***	0.026***	0.044***	0.032***	0.028***	0.034***	0.025***	0.036***
Colony	-0.021***	-0.033***	-0.013*	-0.014	-0.010	-0.017***	-0.027**	-0.033***	-0.013	-0.039***	-0.028	-0.019***	-0.008	-0.029***	0.026***	-0.028***
Religion	0.069***	0.122***	0.145***	0.126***	0.020	0.051***	0.055***	0.029	0.109***	0.084***	0.116***	0.075***	0.032***	0.042***	0.048**	0.070***
Political variables																
Political stability	-0.007***	-0.008***	-0.005**	-0.007**	-0.001	-0.010***	-0.009***	-0.005	-0.002	-0.002**	-0.012**	-0.009***	-0.006***	-0.011***	-0.012***	-0.006***
Embassies	0.010***	-0.011**	0.001	0.012***	0.003	0.009***	0.014**	0.005	0.010*	0.006**	-0.014	-0.010***	0.018***	0.027***	0.002	0.009**
RTAs																
EFTA	-0.007**	-0.001	0.015	0.052***	-0.009	-0.016*	-0.062***	0.034	0.004	-0.012*	0.034	-0.004	-0.028***	-0.041***	0.005	0.014
EU	0.001	-0.006	-0.024***	0.009	-0.009	0.007	0.012	0.026	0.007	-0.021***	-0.005	-0.012	0.003	0.013**	0.042***	0.006
SADC	0.096***	0.084***	0.106***	0.106***	0.077***	0.096***	0.135***	0.051***	0.079***	0.067***	0.071***	0.099***	0.091***	0.119***	0.109***	0.096***
Regions																
North America	0.001	-0.009	-0.029***	0.018	-0.008	-0.008	0.000	-0.027	-0.018	-0.008	-0.03	-0.013	0.021**	0.014	0.062***	0.002
South America	0.021***	-0.023**	-0.053***	0.016	0.014	0.015**	0.065***	-0.030	0.006	0.001	-0.015	-0.01	0.048***	0.059***	0.089***	0.017*
North Africa	0.038***	0.011	0.041***	0.007	-0.002	0.034***	0.081***	-0.027	0.045***	0.033***	0.066***	0.019	0.026***	0.058***	0.070***	0.046***
South Africa	0.256***	0.158***	0.193***	0.315***	0.133***	0.178***	0.371***	0.186***	0.266***	0.178***	0.345***	0.268***	0.280***	0.382***	0.310***	0.330***
North Europe	0.050***	0.029***	0.038***	0.037***	0.043***	0.029***	0.075***	0.013***	0.039***	0.053***	0.046**	0.059***	0.058***	0.071***	0.060***	0.062***
Asia	0.055***	0.056***	0.058***	0.097***	0.036***	0.040***	0.086***	0.011	0.062***	0.037***	0.054**	0.037***	0.060***	0.069***	0.088***	0.057***
Oceania	0.095***	0.071***	0.044***	0.115***	0.072***	0.077***	0.143***	0.044	0.088***	0.072***	0.108***	0.088***	0.119***	0.123***	0.177***	0.105***
Trade regulation to import																
Ln of time	-0.013***	0.004	-0.006*	-0.025***	-0.004	-0.011***	-0.010*	-0.023***	-0.026***	-0.010***	-0.018**	-0.013***	-0.013***	-0.016***	-0.020***	-0.023***
Log of Document	-0.004***	-0.010**	-0.009*	0.015**	-0.019***	-0.007**	-0.001	-0.019*	-0.004	-0.005*	-0.001	-0.006	-0.008**	-0.001	-0.006	0.011**
Starting a new business																
Time and document	-0.013***	-0.012***	-0.013***	-0.014***	-0.007**	-0.011***	-0.024***	-0.013***	-0.003	-0.011***	-0.021***	-0.014***	-0.011***	-0.017***	0	-0.018***
Observations	861 669	33 174	55 233	30 951	29 070	129 960	32 319	12 654	38 988	138 339	9405	32 490	100 377	130 302	22 572	65 835

RTA, Regional trade agreements; EFTA, European Free Trade Association; EU, European Union; SADC, Southern African Development Community.

Robust standard errors are computed: *, $p < 0.1$; **, $p < 0.05$; ***, $p < 0.01$. Marginal effects are reported.

instability episodes, including China, India, Zambia, Zimbabwe and Mozambique.

An analysis of the impact of RTAs on the extensive margin of South African exports yields interesting results. Only the SADC Free Trade Agreement has had a significant and positive impact on the probability of South Africa exporting to other SADC members. This is not surprising, given their close proximity. Trade agreements with the EU and EFTA, in contrast, have not had a positive effect on the extensive margin. Considering that the excluded category is East Europe, countries located in Asia and Oceania show a higher probability of importing from South Africa.

Trade regulation variables generally have a negative impact on the probability of exporting. The more time-consuming and costly it is to export, the more difficult it is for local companies to be competitive and to access international markets. The time it takes to export is a decidedly negative factor for almost all industries, yet documentary requirements are not a significant obstacle for many industries. Moreover, it can be observed how the exclusion restriction in terms of time and documentation has the expected extremely negative impact on export-extensive margins in almost all industries. A trade facilitation drive aimed at shortening the time to export and reducing the documentary burden would generate new trading partners for South Africa.

The estimation results for the second stage, the outcome equation, are presented in Tables 5 and 5 Bis. The significant correlation (ρ) highlights that the selection of firms for export purposes is systematic and needs to be considered in the econometric specification to consistently estimate the export flows. Sigma (σ) is the estimator of the standard error of the residual in the outcome equation. The IMR is computed as $IMR = \rho * \sigma$. As can be observed, ρ is significant for 6 out of 15 industries. The Mills ratio is positive for all industries combined, as well as for 5 individual industries, while the ratio is negative for the remaining 10 industries. It is important to note that when the coefficient of the Mills ratio is positive, 'positive selection' is said to have occurred; if the coefficient is negative, then 'negative selection' is the result. Indeed, positive selection means that, without the correction, the estimate of the parameters of the outcome equation would have been upward biased, while negative selection would have resulted in a downward-biased estimate. In any case, the significance of the Mills ratio is that sample selection bias exists and needs to be controlled.

In general, the variables that affect the extensive margin of trade also affect the intensive margin, although many of these variables are not significant, depending on the industry considered. As predicted by the gravity model, the economic size of the importing country, measured in terms of GDP per capita and population, is an important factor in explaining the volume of South Africa's exports. However, these variables produce a negative impact on some sectors, such as *Mineral products, Plastics and rubbers* or *Machinery and electrical*

products. In this regard, the main trading partners for these industries are not necessarily countries with high per capita income levels, that is, China, India, Georgia, Hungary or Czech Republic.

When all industries are considered, geographical variables present the expected negative sign; however, differences in the significance of the coefficients can be observed by industry. As for the extensive margin, distance and being an island present the expected negative sign when the variables are significant, while being a landlocked country (which rules out sea transport) negatively affects the volume of exports. Regarding cultural variables, having a common language or religion has a positive effect on the volume of exports if the variables are significant. Sharing the same colonial background has a negative impact when all industries are considered, but interestingly, the sign of the coefficients changes for some industries when the sector classification is used.

Political instability has a negative effect on all industries when the variable is significant, while having an embassy in the importing country has no effect or even a negative effect on export volumes. In similar vein to the extensive margin, the only trade agreement that delivers a positive effect on export volumes is the SADC Free Trade Agreement, and only in respect of some industries. Jordaan and Eita (2011), for example, found that the EU and NAFTA trade agreements have not led to an increase in South African exports. Finally, trade regulations that influence the time to export have a negative impact on the volume of exports if the variable is significant. Conversely, the number of documents required to export has a positive impact on some industries where the variable is significant. This contradictory result might be because of both the trade regulation variables being highly correlated, suggesting that the most important variable affecting the volume of exports is time to export. Consequently, the South African government should give priority attention to streamlining the regulatory aspects of export logistics.

The analysis reveals the most relevant determinants of exports by industry, offering a useful platform from which policymakers can formulate appropriate strategies for what they consider to be high-priority sectors and products.

Summary of key findings and concluding remarks

South Africa's DTI has long been of the view that South Africa needs to boost and diversify its exports – in other words, expand exports in both the intensive and extensive margins. The paper set out to reveal the key determinants influencing South Africa's extensive and intensive trade margins, thereby highlighting key opportunity areas and overarching shortcomings in the country's policy, regulatory and physical environments. This was done by employing a Heckman selection gravity model, using highly disaggregated data for 2012 (at HS6 level). The first

TABLE 5: Intensive margins of trade (outcome equation).

Variable	All	Animal and animal products	Vegetable product	Foodstuffs	Mineral products	Chemicals and allied industries	Plastics/Rubbers	Raw hides, skins, leather and furs	Wood and wood products	Textiles	Footwear/Headgear	Stone/Glass	Metals	Machinery/Electrical	Transport	Miscellaneous
Economic variables																
Ln of GDPpc	0.199****	0.540***	0.0209	0.286***	-0.667****	0.222***	-0.222**	0.271	0.161**	0.0710	0.118	0.126	0.0366	-0.337***	0.209**	0.103
Ln of Population	0.396****	0.371***	0.0851	0.323***	-0.762****	0.327****	-0.108	0.350	0.369****	0.0756	0.272***	0.0724	0.346****	-0.128***	0.476****	0.191**
Geographical variables																
Ln of Distance	-0.505***	-1.488***	-0.0703	-0.406	-0.350	-0.297*	-0.913***	-0.135	-0.691***	-0.266*	-0.376	-0.704**	-0.595***	-0.915***	-0.879***	-0.433*
Landlocked	-0.129***	-0.562***	0.513***	0.250	0.176	-0.0458	0.0409	0.0144	-0.167	-0.108	-0.189	0.0518	-0.254***	0.00834	-0.332**	-0.0832
Island	-0.305****	0.0377	-0.549***	-0.289*	-0.0659	-0.274**	-0.455***	-0.419	-0.540***	-0.366***	-0.587***	0.0864	-0.317***	-0.452***	-0.242	-0.287***
Cultural variables																
Language	0.125***	0.166	-0.755***	-0.303*	-1.002***	0.217**	-0.0921	0.186	0.312*	0.0708	0.161	-0.0316	-0.0141	-0.0830	0.267*	0.0227
Colony	-0.124*	-1.042**	0.991***	-0.299	1.293*	0.00381	-0.700**	0.538	-0.0187	0.0361	-0.161	-0.342	-0.599***	0.416**	-0.576**	0.0686
Religion	0.327****	0.247	-2.192***	0.224	-2.671***	0.202	-0.00364	-0.0830	1.552***	-0.211	0.273	1.333**	1.128***	-0.314	0.168	0.474
Political variables																
Political stability	-0.0812****	-0.0727	-0.134*	-0.0562	0.322	-0.0211	-0.203**	-0.166	-0.283***	-0.160***	-0.0201	-0.157	-0.113**	0.0270	0.0211	-0.0242
Embassies	-0.0991**	-0.612*	-0.291	-0.0753	-0.148	0.151	-0.539***	-0.897	-0.122	0.180	-0.263	-0.624**	-0.0390	-0.464***	-0.578***	-0.128
Regional trade agreements																
EFTA	-0.562***	0.00107	-1.442***	-0.853	0.952	-0.881*	-0.683	-0.290	-1.506**	-0.821***	-1.755*	-0.409	-1.452***	-0.215	0.646	0.0153
EU	-0.506***	0.0863	-0.184	-0.570	0.312	0.0344	-0.716*	-0.0855	-0.910**	-0.788***	-1.507**	-0.617	-0.967***	-0.452**	-0.287	-0.428
SADC	1.247***	0.730**	0.866**	1.777***	-2.422***	0.914***	0.220	1.427	1.926***	0.696***	1.559***	0.924**	1.515***	0.0322	1.095***	0.794***
Regions																
North America	-0.277**	0.941	-0.414	-0.766	0.137	0.554	-1.093*	-0.954	0.290	-1.246**	-0.495	-0.295	-0.407	-0.375	-1.020	-0.129
South America	-0.361***	0.0716	-1.134**	0.550	-0.320	1.806***	-1.202**	-0.407	0.211	-0.707	-1.253	-1.444**	-0.581	-1.092***	-2.369***	-0.892**
North Africa	-0.515***	1.554	-1.200*	-1.635*	-0.143	1.308****	-1.181*	-1.456	0.937	-1.580***	-0.506	-1.692**	-1.990***	-1.297***	-0.472	-0.699
South Africa	0.0836	0.219	-3.055***	-0.372	-6.914***	0.773*	-3.701***	-0.970	1.386***	-1.397***	-0.329	-3.013***	-0.839**	-3.901***	-1.367*	-0.824**
North Europe	0.141	0.790	-0.242	0.168	-2.414***	0.294	-0.992**	-1.282	1.370***	-0.722*	0.403	-0.420	0.433	-0.950***	-0.586	-0.176
Asia	-0.00644	1.326**	-0.658	0.0572	-0.846	1.379***	-1.893***	-0.279	1.316**	-1.127**	-0.642	-0.545	0.165	-1.223**	-1.342**	-0.628*
Oceania	0.454***	1.347*	-1.182**	0.424	-2.914***	1.233***	-1.147	-0.565	1.768**	-0.970*	0.238	-1.246*	0.249	-0.900***	-0.639	-0.0789
Trade regulation to import																
Log of time	-0.478***	-1.086***	-0.738***	-0.271	-0.183	-0.640***	-0.198	-0.845	-0.726***	-0.269	-0.434	0.0827	-0.385**	-0.323***	-0.334	-0.211
Log of documents	0.0361	0.702***	0.409***	-0.00668	0.378	0.219**	-0.0903	0.177	-0.0246	0.174**	0.187	0.331*	-0.0627	0.243***	0.00801	0.126
ρ (rho)	0.0637***	0.0851	-0.254	0.0356	-1.240***	0.0355	-0.789***	-0.415	0.0185	-0.169**	-0.00371	-0.367*	-0.0854***	-0.987***	0.0166	-0.236
lnσ (sigma)	1.089****	1.087***	1.147***	1.144***	1.757***	1.127***	1.271***	1.061	1.139***	0.956***	0.898***	1.144***	1.146***	1.259***	1.097***	1.005***
λ (Mills)	0.189	0.252	-0.783	0.112	-4.899	0.110	-2.344	-1.135	0.058	-0.437	-0.009	-1.102	-0.268	-2.663	0.050	-0.633
Observations	92 519	2042	5010	4671	1896	10 349	4946	1262	4284	8608	1234	3450	12 014	21 130	3043	8580

RTA, Regional trade agreements; EFTA, European Free Trade Association; EU, European Union; SADC, Southern African Development Community.
Robust standard errors are computed: *, $p < 0.1$; **, $p < 0.05$; ***, $p < 0.01$. Marginal effects are reported.

stage of the process revealed the factors affecting the probability of South Africa exporting to a particular destination (extensive margin). The second stage, which modelled trade flows, revealed the variables that affect export volumes (intensive margin).

The key results from the study indicate that South Africa exports an extensive range of products to a limited number of countries, which reinforces the benefit of performing a trade (and especially export) margin analysis. The specific results, in turn, reveal how a wide range of market access determinants affect South Africa's export growth and potential exporter profitability. In terms of the probability to export, or the extensive margin, economic variables such as the importing country's GDP and population have a positive impact on the firms' decision to export. This highlights the importance of firms focusing their exporting endeavours on export markets with growing demand. In order to do so, it is important that they have access to reliable and affordable information about export opportunities in growing markets. Here information support systems such as the Decision Support Model, which identifies realistic export opportunities for South African exports, is a useful tool for both regional and national export promotion agencies (for details, see Cuyvers, Steenkamp & Viviers 2012).

Other factors affecting the extensive margin are distance to the market (negative impact), cultural/language fit (positive impact), presence of a South African embassy abroad (positive impact), existing free trade agreement with SADC (positive impact) and trade regulations and costs (negative impact). These results firstly emphasise the importance of investing in transport infrastructure in order to reduce the transport cost burden of exporting to distant markets. At the same time, trade facilitation initiatives (e.g. more streamlined trade regulations) should be rolled out to stimulate export growth in South Africa. This would also contribute to the deepening of trade within SADC and help to exploit 'the untapped potential to develop a system of regional value chains', as proposed by the World Bank (2014:37). Finally, industry-specific assistance from embassies based in foreign markets, especially those that are culturally distant, would help to give momentum to firms' export efforts.

In terms of the intensive margin (or factors influencing the volume of exports), there are strong parallels with the extensive margin, with the exception that the time involved in exporting has more of an impact than documentary requirements. This is also heavily dependent on the state of the infrastructure, the complexity of the regulatory apparatus and other factors such as congestion at ports and borders. This is in line with the World Bank's recommendations in 2014 that South Africa needed to seriously tackle its infrastructural bottlenecks [both of a physical and ICT (information and communication technology) nature] if it was to enhance its export competitiveness from a time and cost perspective and provide an environment in which small and medium-sized exporters could flourish and grow.

In conclusion, the dearth of adequate market-related information and other noted shortcomings in South Africa's infrastructure and regulatory environment (which add to the cost and time to export) could explain why the country's exports have largely developed in the intensive margin. If South Africa is to make sustainable inroads into more markets and expand its product offerings, the government and its economic partners need to seriously address the obstacles standing in the way, while also adopting an industry-based approach to export policymaking and promotion. Dissecting the industry-specific results would be an important part of this process and future research would involve developing counterfactual scenarios to assess the expected reaction of potential exporting firms' trade flows to changes in key exogenous determinants. Additionally, industry-specific research (that focuses on obtaining firm-level information) on market access and trade barriers would help industry-based approaches in policymaking as suggested above.

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Authors' contributions

M.M. constructed the introduction, literature review and conclusion. M.S-G. constructed the empirical specification, methodology and results.

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Appendix 1

TABLE 1-A1: List of importing countries.

Afghanistan	Denmark	Kuwait	Puerto Rico
Albania	Djibouti	Kyrgyz Republic	Qatar
Algeria	Dominica	Lao PDR	Romania
American Samoa	Dominican Republic	Latvia	Russian Federation
Andorra	Ecuador	Lebanon	Rwanda
Angola	Egypt, Arab Republic	Lesotho	Samoa
Antigua and Barbuda	El Salvador	Liberia	San Marino
Argentina	Equatorial Guinea	Libya	Sao Tome and Principe
Armenia	Eritrea	Liechtenstein	Saudi Arabia
Australia	Estonia	Lithuania	Senegal
Austria	Ethiopia	Luxembourg	Seychelles
Azerbaijan	Faeroe Islands	Macao	Sierra Leone
Bahamas, The	Fiji	Madagascar	Singapore
Bahrain	Finland	Malawi	Slovak Republic
Bangladesh	France	Malaysia	Slovenia
Barbados	French Polynesia	Maldives	Solomon Islands
Belarus	Gabon	Mali	Somalia
Belgium	Gambia, The	Malta	Spain
Belize	Georgia	Marshall Islands	Sri Lanka
Benin	Germany	Mauritania	Sudan
Bermuda	Ghana	Mauritius	Suriname
Bhutan	Greece	Mexico	Swaziland
Bolivia	Greenland	Micronesia	Sweden
Bosnia and Herzegovina	Grenada	Moldova	Switzerland
Botswana	Guam	Monaco	Syrian Arab Republic
Brazil	Guatemala	Mongolia	Tajikistan
Brunei	Guinea	Morocco	Tanzania
Bulgaria	Guinea-Bissau	Mozambique	Thailand
Burkina Faso	Guyana	Myanmar	Togo
Burundi	Haiti	Namibia	Tonga
Cambodia	Honduras	Nepal	Trinidad and Tobago
Cameroon	Hong Kong	The Netherlands	Tunisia
Canada	Hungary	New Caledonia	Turkey
Cape Verde	Iceland	New Zealand	Turkmenistan
Cayman Islands	India	Nicaragua	Turks and Caicos
Central African Republic	Indonesia	Niger	Tuvalu
Chad	Iran	Nigeria	Uganda
Chile	Iraq	Northern Mariana	Ukraine
China	Ireland	Norway	UAE
Colombia	Israel	Oman	Ukraine
Comoros	Italy	Pakistan	USA
Congo	Jamaica	Palau	Uruguay
Congo, Democratic Republic	Japan	Panama	Uzbekistan
Costa Rica	Jordan	Papua New Guinea	Vanuatu
Cote d'Ivoire	Kazakhstan	Paraguay	Venezuela
Croatia	Kenya	Peru	Vietnam
Cuba	Kiribati	Philippines	Yemen
Cyprus	Korea	Poland	Zambia
Czech Republic	Korea, Democratic Republic	Portugal	Zimbabwe

TABLE 2-A1: Main importing countries by industry.

All		Animal and animal products		Vegetable products		Foodstuffs	
Country	Average exports	Country	Average exports	Country	Average exports	Country	Average exports
China	10 485	Spain	2548	Mexico	53 049	Niger	3094
Japan	7812	Italy	2433	Bangladesh	6299	Algeria	2755
India	3892	Cameroon	2120	The Netherlands	5865	Japan	2672
USA	3818	Portugal	2082	Russia	5353	Sweden	2612
Korea	3488	Fiji	1838	UK	3401	Germany	2229
The Netherlands	2416	Hong Kong	1674	Malaysia	2983	UK	2140
Germany	2360	Australia	1069	Hong Kong	2791	Syria	2024

Mineral products		Chemicals and allied industries		Plastics/rubbers		Raw hides, skins, leather and furs	
Country	Average exports	Country	Average exports	Country	Average exports	Country	Average exports
China	214 858	USA	3289	Brazil	2431	Italy	2577
India	61 668	Belgium	3052	China	1627	China	1543
Finland	48 581	Brazil	2395	Paraguay	1396	Korea	1402
Korea	42 897	The Netherlands	2019	Zambia	1176	Bulgaria	1366
Israel	40 964	Thailand	1894	Venezuela	1015	Thailand	925
Japan	38 113	Japan	1673	Zimbabwe	965	Vietnam	793
The Netherlands	33 291	Lithuania	1656	Congo, Democratic Republic	824	Brazil	740

Wood and wood products		Textiles		Footwear/headgear		Stone/glass	
Country	Average exports	Country	Average exports	Country	Average exports	Country	Average exports
Indonesia	11 852	Czech Republic	3763	Argentina	307	Japan	72 918
Japan	5956	China	2876	Brazil	287	Switzerland	34 228
China	4789	Bangladesh	1013	Zimbabwe	206	Hong Kong	17 385
Thailand	3832	Indonesia	962	Hong Kong	204	USA	16 502
Belgium	1538	India	531	Zambia	187	Belgium	15 007
India	1234	Italy	452	Lebanon	179	UK	14 325
Argentina	952	Bulgaria	412	Indonesia	173	Israel	12 791

Metals		Machinery/electrical		Transportation		Miscellaneous	
Country	Average exports	Country	Average exports	Country	Average exports	Country	Average exports
Japan	10 564	Georgia	2555	USA	35 635	Bulgaria	7141
China	7848	Germany	2438	Algeria	23 192	Germany	1020
Korea	7697	Hungary	1453	Russia	23 002	USA	812
USA	4393	Czech Rep.	1420	Germany	19 180	Brunei	396
India	4053	USA	1395	Japan	10 497	Czech Republic	286
Malaysia	3566	Poland	1227	Tunisia	6918	Spain	272
The Netherlands	3361	Zambia	1177	Belgium	6618	Zambia	252