

## **Exporters' characteristics and the margins of trade**

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### **Abstract**

This paper investigates the influence of exporting countries' characteristics on the number of exporters (extensive margin) and the average exports value per firm (intensive margin). For that purpose, we use a new database compiled by the OECD and Eurostat in the year 2005, which allows the calculation of trade margins in bilateral relationships involving a large number of exporting and importing countries. We find that there is almost a one-to-one relationship between exporters' GDP and the number of firms that participate in export markets. This proportionality remains when we decompose GDP into an employment component and a labor productivity component. Our results also show that exporters' labor productivity is positively linked with the intensive margin of exports.

*Keywords:* trade margins, gravity equation, trade costs, exporting firms, OECD

*JEL Classification Codes:* F12, F14, F23

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### **1. Introduction**

The exploitation of firm-level data has shown that there is a large heterogeneity in export status across firms (Bernard and Jensen, 1995). Studies report that only a small percentage of firms export and among the exporters the percentage of sales dedicated to international markets is small (Bernard et al., 2007). To explain the differences in trade status across firms, two key elements are introduced by the new generation of trade models: differences in productivity across firms and the extra-barriers that firms have to face when they operate in foreign markets (Melitz, 2003). In this setting, only the most productive firms are able to overcome the extra barriers of selling in foreign markets and, still, obtain profits.

An important result of these models is that total exports are the results of two margins: the number of firms that participate in exports, the extensive margin, and the

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amount exported by each firm, the intensive margin. During the last years, different empirical studies have analyzed which factors explain the differences in the extensive and intensive margins across bilateral trade relationships (Bernard et al., 2007; Lawless, 2010). These studies show that the size of the importing country and the distance between partners have a much larger effect on the extensive margin of exports than on the intensive margin of exports. However, empirical studies have not analyzed the role that exporting countries' characteristics, such as GDP, population and GDP per capita, might play in explaining the differences in the margins across bilateral flows. This limitation is due to the fact that previous studies use data from a single exporting country.

In this paper we address this limitation using a novel database compiled by the OECD and Eurostat, which allows the calculation of trade margins for a large number of bilateral relationships involving different exporting and importing countries. The analysis of exporters' characteristics is relevant to explain how large economies export more than small economies. In particular, we analyze whether large economies export more because they have a higher number of exporters or because they export more per firm. This analysis complements the seminal study by Hummels and Klenow (2005) which used product-level data rather than firm-level data to determine how large countries export more than small countries.

Our results show that that exporters' GDP has almost a one-to-one relationship with the number of firms that participate in trade and a small impact on the intensive margin of trade. This result confirms that the extensive margin explains why large countries export more than small countries. The proportionality between GDP and the extensive margin remains when we decompose GDP into an employment and a labor productivity component. We also find that exporter countries' labor productivity is positively correlated with the intensive margin of trade.

The rest of the paper is organized as follows. The next section explains the empirical model and the characteristics of the database. Section 3 presents our results and Section 4 summarizes the main findings of the paper.

## 2. The empirical model

Following Bernard et al. (2007), we base our empirical analysis on a gravity model of trade. Algebraically,

$$\ln X_{ij} = \alpha + \beta_1 \ln GDP_i + \beta_2 GDP_j + \beta_3 dist_{ij} + \sum_k \beta_k G_{ij}^k + e_{ij} \quad (1)$$

where  $X_{ij}$  are total exports from country  $i$  to country  $j$ ,  $GDP_i$  and  $GDP_j$  are the gross domestic product in country  $i$  and country  $j$  respectively,  $dist_{ij}$  is the distance between country  $i$  and country  $j$ ,  $G_{ij}^k$  is a vector of standard gravitational dummy variables (common border, common language, colonial links, European Union zone membership and Euro zone membership) that influence bilateral trade costs and  $e_{ij}$  is the error term.

To understand the effect of exporting countries' characteristics on the extensive and intensive margins of trade, we decompose total value of bilateral exports ( $X$ ) into two different parts. We denote the number of exporting firms as  $N$  and the average value of exports per firm as  $(X/N)$ . Then we can implement the following decomposition:  $X=N*(X/N)$ . Since OLS is a linear regression method, regressions of  $\log(N)$  and  $\log(X/N)$  on the set of the explanatory variables used in equation (1) additively decompose their effects on the two export margins.

Gravity equations usually include a dummy variable for the exporting country and a dummy variable for the importing country to control for multilateral resistances (Anderson and van Wincoop, 2003). However, this inclusion precludes the estimation of other coefficients, such as GDP, that are exporter or importer-specific. As the aim of this paper is to analyze the influence of exporter countries' characteristics on the margins of trade, we do not control for multilateral resistances in the estimation. Nevertheless, we analyzed whether our results were robust to the introduction of pseudo-multilateral resistances, named remoteness measures (Nitsch, 2000), that do not preclude the estimation of other exporter and importer specific variables. Results were not altered.

Our data comes from the OECD-Eurostat Trade by Enterprise Characteristics Database (Araújo and Gonnard, 2011), that reports total exports, and the number of firms that participate in bilateral exports for years 2005, 2006 and 2007. We select year 2005 for the analysis because the number of observations is maximized in that year. Our sample covers 19 exporting countries and 33 importing countries.<sup>1</sup> Data on GDP is obtained from the Penn World Table Version 7.0 (Heston et al., 2011). Bilateral distances and the standard gravitational dummy variables were obtained from the CEPII database (Head et al., 2010).

### 3. Results of the empirical analysis

Table 1 presents the results of the regressions. Column 1 presents the results when the (log) of total exports is the dependent variable. As shown in Column 1, the GDP of the exporting country and the GDP of the importing country have a positive effect on total exports, with elasticity close to one. Distance has a large negative effect on trade. We can also see that speaking the same language, having a common colonial history and sharing the same currency have a positive effect on total exports. Columns 2 and 3 presents the results when exports are decompose in the extensive and intensive margins. As shown in Column 2, we find that the positive effect of exporting countries' GDP on trade is mainly transmitted through the extensive margin. Moreover, according to our estimate there is almost a one-to-one relationship between the size of the exporting country and the number of exporters: a 1% increase in the exporter country's GDP raises the number of exporters by 0.9%. This one-to-one relationship between the size of the exporting country and the number of exporters is in line with the predictions of models with monopolistic competition, both in trade theories based on a representative firm (Krugman, 1981), and in trade theories based on heterogeneous firms (Melitz, 2003). On its hand, the exporting country' GDP has a mild positive effect on the intensive margin of trade. These results show that large economies export more than small economies because they have a larger number of exporters, confirming the key role of the extensive margin in explaining the differences in the amount of exports across countries (Hummels and Klenow, 2005).

On the import side, we observe a positive correlation between importers' size and the number of exporting firms. We also find a positive effect of importer country's GDP on

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<sup>1</sup> The exporting country set is composed by Austria, Canada, Czech Republic, Denmark, Estonia, Finland, France, Germany, Hungary, Italy, Latvia, Lithuania, Norway, Poland, Portugal, Slovakia, Slovenia, Sweden and the United States. The importing country set is composed by the former countries plus Belgium, Bulgaria, China, Greece, India, Ireland, Japan, Mexico, Netherlands, Russia, Spain, Switzerland, Turkey and United Kingdom. Due to their small size, we exclude Cyprus, Luxembourg and Malta from the analysis. Although all trade flows are positive, for small value trade flows the database might not provide data on the number of exporting firms due to confidentiality problems.

the average exports per firm. In fact, the influence of importer country's GDP is more evenly distributed along margins than exporter country's GDP. Finally, we find that distance has almost a twice larger negative effect on the extensive margin than on the intensive margin of trade. We also find that having a common colonial history and sharing the euro are positively correlated with the extensive margin of trade, whereas speaking the same language and being part of the European Union are positively correlated with the intensive margin.

Table 1. Results of the econometric analysis

	(1)	(2)	(3)	(4)	(5)	(6)
	Log Total exports	Log Number of firms	Log Average exports per firm	Log Total exports	Log Number of firms	Log Average exports per firm
Distance (Log)	-1.523 (0.069)***	-1.030 (0.050)***	-0.492 (0.050)***	-1.520 (0.064)***	-1.029 (0.049)***	-0.491 (0.048)***
Importer GDP (Log)	0.947 (0.026)***	0.467 (0.021)***	0.480 (0.020)***	0.948 (0.025)***	0.467 (0.021)***	0.481 (0.019)***
Exporter GDP (Log)	1.017 (0.027)***	0.884 (0.018)***	0.132 (0.019)***			
Exporter employ. (Log)				0.893 (0.030)***	0.833 (0.021)***	0.060 (0.022)***
Exporter GDP per worker (Log)				1.665 (0.111)***	1.154 (0.072)***	0.511 (0.079)***
Common border	0.053 (0.131)	0.095 (0.114)	-0.042 (0.087)	0.092 (0.129)	0.111 (0.114)	-0.019 (0.086)
Language	0.441 (0.162)***	0.174 (0.110)	0.268 (0.157)*	0.387 (0.162)**	0.151 (0.109)	0.236 (0.158)
Colony	0.280 (0.161)*	0.312 (0.140)**	-0.031 (0.110)	0.254 (0.160)	0.300 (0.142)**	-0.047 (0.107)
European Union	0.067 (0.154)	-0.170 (0.109)	0.237 (0.111)**	0.074 (0.147)	-0.167 (0.109)	0.242 (0.106)**
Euro	0.215 (0.092)***	0.253 (0.068)***	-0.038 (0.081)	0.161 (0.091)*	0.231 (0.069)***	-0.070 (0.078)
Adj. R-square	0.847	0.859	0.499	0.858	0.863	0.520
Observations	596	596	596	596	596	596

Note: Standard errors clustered by exporter and importer (two-way) in parentheses. \*\*\*, \*\*, \*: statistically significant at 1%, 5% and 10% respectively.

It is interesting to compare our results on the role of the importing country, distance and the additional standard gravitational variables with those reported in Bernard et al. (2007) and Lawless (2010). These authors also find that the size of the importing country has a positive effect on both the extensive and intensive margins of trade. However, contrary to our results, they find that the effect on the extensive margin is larger than on the intensive margin. With respect to distance, Bernard et al. (2007) and Lawless (2010) also find that the negative effect on the extensive margin is larger than the effect on the intensive margin.<sup>2</sup> Contrary to our results, Lawless (2010) finds that that language has positive effect on the extensive margin rather than on the intensive margin.

In Column 4 to 6 we decompose the exporting country GDP into an employment and a GDP per worker component. In Column 4, we can see that GDP per worker has a

<sup>2</sup> Bernard et al. (2007) decompose the intensive margin in two components: number of exported products per firm and export value per product per firm. Hence, their coefficients are not directly comparable with Lawless (2010) or with our paper. However, Lawless (2010) reruns the regressions of Bernard et al. (2007) using only one intensive margin: export value per firm, and finds that the coefficients for importing country GDP and distance are very similar to those obtained in her benchmark results.

larger influence on total exports than employment. Moreover, we find that employment and GDP per worker have almost a one-to-one relationship with the number of exporting firms. These results are in line with the predictions of Chaney (2008), who derives gravity equations for the extensive and intensive margin of exports based on the new generation of trade models. Interestingly, we also find that GDP per worker has a strong positive effect on average exports per firm. This result is in line with the predictions of Arkolakis (2010). In this model, firms face different entry-cost depending on the number of consumers they want to reach in foreign markets. As part of the marketing effort is done in the exporting country, this model predicts a positive relationship between the wage level in the exporting country, which is correlated with GDP per capita, and the intensive margin of trade.

#### 4. Conclusions

Using a novel database compiled by the OECD and Eurostat, this paper estimates the impact of exporter countries' characteristics on the extensive and intensive margins of trade. We find that there is almost a one-to-one relationship between the GDP of the exporting country and the extensive margin of trade. This one-to-one relationship remains when we decompose GDP into an employment and a workers' productivity component. Our estimations also show that workers' productivity has a significant effect on the intensive margin of trade.

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#### References

- Anderson, J.E. and Van Wincoop, E. (2003) Gravity with gravitas: a solution to the border puzzle, *American Economic Review*, 93(1), 170-192.
- Araújo, S. and Gonnard, E. (2011) Selling to foreign markets: a portrait of OECD exporters, *OECD Statistical Brief*, 16.
- Arkolakis, C. (2010) Market penetration costs and the new consumers margin in international trade, *Journal of Political Economy*, 118(6), 1151-1199.
- Bernard, A.B. and Jensen, J.B. (1995) Exporters, jobs and wages in U.S. manufacturing, 1976-87, *Brookings Papers on Economic Activity*, 67-119.
- Bernard, A.B., Jensen, J.B., Redding, S.J. and Schott, P.K. (2007) Firms in international trade, *Journal of Economic Perspectives*, 21(3), 105-130.
- Chaney, T. (2008) Distorted gravity: the intensive and extensive margins of international trade, *American Economic Review*, 98(4), 1707-1721.
- Head, K., Mayer, T. and Ries, J. (2010) The erosion of colonial trade linkages after independence, *Journal of International Economics*, 81(1), 1-14.
- Heston, A., Summers, R. and Aten, B. (2011) *Penn World Table Version 7.0*, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.
- Hummels, D. and Klenow, P.J. (2005) The variety and quality of a nation's exports, *American Economic Review*, 95(3), 704-723

- Krugman, P.R. (1981) Intraindustry specialization and the gains from trade, *Journal of Political Economy*, 89(5), 959-973.
- Lawless, M. (2010) Deconstructing gravity: trade costs and the extensive and intensive margins of trade, *Canadian Journal of Economics*, 43(4), 1149-1172.
- Melitz, M.J. (2003) The impact of trade on intra-industry reallocations and aggregate industry productivity, *Econometrica*, 71(6), 1695-1725.
- Nitsch, V. (2000) National borders and international trade: evidence from the European Union, *Canadian Journal of Economics*, 33(4), 1091-1105.