

# Export Superstars

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## Abstract

This paper shows that the top 1 percent of exporters critically shape trade patterns, using firm-level data from 32 countries. In particular, variation in average firm size (the intensive margin) explains over two thirds of the variation in the sector distribution of exports across countries, the remaining share is explained by variation in the number of firms (the extensive margin). Variation in average firm size across sectors is largely driven by variation in the sectoral distribution of exports from the top 1 percent of firms in a country—export superstars. In contrast, the sectoral distribution of exports from

the remaining 99 percent of firms is more similar across countries, and the distribution of the total number of firms across sectors is very similar across countries. This paper also finds that current export superstars typically entered the export market relatively large, reached the top 1 percent after less than three years of exporting, and account for more than half of a country's total exports, export growth and diversification. The results underscore the role of individual firms in determining both trade volumes and trade patterns.

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# Export Superstars

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## 1. Introduction

Large firms define exports. There are well known examples, such as Nokia in Finland, Samsung in Korea, and Intel in Costa Rica, each of which accounts for around 20 percent of the country's total exports. But patterns are not that different elsewhere. On average, the top firm alone holds almost 15 percent of total (non-oil) exports across 32 developing countries between 2006 and 2008. The top 1 percent of exporters accounts for 53 percent of exports on average during the same period. The remaining volume of trade is mainly concentrated in the next tier of large firms. Specifically, the top 5 percent of firms accounts for almost 80 percent of exports on average and the top 10 percent accounts for almost 90 percent. Using a novel firm-level panel, based on highly disaggregated customs data across all regions of the world, we demonstrate the importance of these "superstars" in defining trade patterns and uncover their origins.

The first contribution of this paper is revealing the importance of export superstars—the top 1 percent of firms—in defining comparative advantage. We examine the role of large firms in determining trade patterns in two ways. We begin by exploring their influence on the variation in the sectoral distribution of total exports and of the number of firms across countries. The distribution of exports by product group (HS 2-digit) is very different across countries, as would be expected given comparative advantage. For example, some countries export more footwear and others more fertilizer. Surprisingly, however, the distribution of the number of firms across sectors looks strikingly similar in all countries. In the example above, this implies that despite differences in the total values exported of footwear relative to fertilizers, the number of footwear exporters relative to fertilizer exporters is very similar across countries.

To show this we calculate all country-pair correlations on the number of firms and on the total exports by product-group. The average correlation across country pairs on the distribution of the number of firms by sector is 0.56 and highly significant, while the average correlation of distributions of export size by sector is 0.15 and only occasionally significant. This means that the wide variation in sectoral trade patterns across countries is driven to a greater extent by average firm size as opposed to firm count. As a consequence, some firms or all firms must be relatively larger in sectors with revealed comparative advantage. We show that large firms drive this result. Excluding the values exported by the top 1 percent of firms in a given country raises the average correlation of export patterns across country pairs by two thirds. In sum, while the distribution of exports from the largest firms across export product groups varies widely by country, the distribution of exports from the remaining (smaller) firms looks remarkably similar.

Taking this a step further, we decompose the variation in sectoral export shares across countries and industries into the part due to firm size (intensive margin) and the part due to firm count (extensive margin). We find that variation in the average firm size accounts for two-thirds of the variation across countries in export shares, with the remaining one-third explained by variation in firm concentration. We further show that the variation in average exporter size comes largely from the exports of superstars—other exporters are more similar across countries and industries. The results imply that revealed comparative advantage is driven to a greater extent by having a few giants than by having more firms.

Our second contribution is to show the importance of superstars for export growth and diversification. Over the latest period available of three consecutive years, superstars account for over half of total export growth and of the growth driven by product-markets new to the country

(the extensive margin) during that period. Thus, stimulating trade growth and diversification largely depends on creating an environment where large firms can thrive.

Our third and final contribution is to explore the origin of new superstars. New superstars are defined as firms that entered the export sector during the period for which we have data and grew to be superstars by the end of period. Using the most recent period of three consecutive years for which we have available data in 18 countries, we find that over 80 percent of the new superstars entered the export sector very large—in the top 5 percent of exporters. For three countries where the time series allow analysis over a decade (Costa Rica, Peru and Morocco), we also find that superstars are born relatively large and they grow quickly into the top 1 percent. In particular, over half of the new exporters that became superstars during the decade, entered the export sector in the top 5 percent of exporters and on average they grew into superstars within three years of entry. In addition, the incumbent superstars were nearly all large one decade ago—so the cases of exporters that transitioned slowly from the bottom to the top of the size-distribution are extremely rare. These results imply that superstars start as large exporters and grow fast—implying that they are already highly productive when they enter the export sector and there is not a long period of learning before becoming a superstar.

Unfortunately, the data do not allow us to systematically examine superstars *before* they began exporting to learn about their potential previous experience in domestic markets. However, for three countries where we can identify the superstars by name (Jordan, Peru and Tanzania), we research their origins in order to understand how they start as exporters. Specifically, this allows us to determine whether they grew slowly in the domestic market before becoming exporters, whether they are domestic or foreign owned, and it also alleviates potential

concerns about traders (non-producers) in the sample.<sup>3</sup> We find that the majority of superstars are foreign owned, began operations as exporters, and a very small fraction are traders exclusively. This further supports the argument that superstars are unique—they are born as large exporters, they did not learn from domestic production or exporting to become superstars. Coupled with the large foreign share in ownership of superstars, this also highlights the role of multinationals in exports.

Our results have important implications for trade theory. Comparative advantage is at the heart of gains from trade. The typical assumption is that for each country there exists a sector where relative production costs are lower than in other countries, and products from that sector will be exported by any firm. The incredibly skewed firm-size distribution in any given country, where a group of very large firms stand out from the rest suggests that this is not the entire story. Specifically, in comparative advantage sectors there are some firms that have a much lower production cost, which are large, while other firms are more similar across countries. This could be achieved in a heterogeneous firm framework with firms having a small probability of getting a very high productivity draw in comparative advantage sectors. Alternatively, it could be evidence of returns to scale in many tradable sectors. In either case, the results suggest that models that treat individual firms as insignificant are not consistent with the evidence, as large firms do significantly impact export levels, export growth, diversification, and sectoral trade patterns. Given that superstars tend to start large and grow fast, and that a large share is foreign owned, it implies that they are inherently different from other exporting firms.

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<sup>3</sup> There could be many producers that export, but an intermediary firm that coordinates the process and thus appears in the data as a large exporter. This would have implications about the interpretation of the results in terms of accurately capturing firm-level production for the export sector.

Three related theoretical papers that explore such issues are Neary (2010), di Giovanni and Levchenko (2010), and Eaton, Kortum and Sotelo (2012). Eaton, Kortum and Sotelo (2012) is the most closely related, as it develops a model where shocks to individual firms can have aggregate effects. They further show that this model performs well in explaining both the extreme skewness in trade volumes and zeros in international trade. In contrast, Di Giovanni and Levchenko (2010) use a more standard heterogeneous model framework with a continuum of firms. They show that if productivities follow a Zipf's law—a fat-tailed distribution—there are important welfare consequences. In particular, entry costs are relatively less important than variable trade costs, because infra-marginal firms make up the bulk of exports. Neary (2010) shows that the importance of large firms in trade can be explained by various forms of oligopoly. This leads to the implication that generating exports is not about promoting domestic entrepreneurship, but rather, about attracting large multinationals. Given the broad, global scope of our empirical results, our analysis supports this type of theoretical work, highlighting the need for international trade theory to match a world where superstar firms largely define export volumes, growth, and trade patterns.

On an empirical front, this paper also relates to the large and growing body of work on exporting firms, which finds that exporters are larger and more productive firms than their domestic counterparts (Bernard et al 2007). Recently, evidence of the skewed distribution of exporters has also been highlighted in a several studies of individual countries.<sup>4</sup> While much of the original literature focused on documenting how exporters are distinct from non-exporters, in terms of productivity, size, and wages—the evidence presented here shows an additional

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<sup>4</sup> See, for example, Bernard, Jensen, Redding and Schott (2007) on the U.S. and Eaton, Eslava, Kugler and Tybout, (2007) on Colombia. Similarly, Mayer and Ottaviano (2008) analyze the firm-size distribution in seven European countries and also find that a small number of exporters hold the largest shares of exports in all countries.

pronounced split *within* exporters between the handful of large firms that drive trade volumes, trade growth, trade patterns, and diversification, and the rest.

This paper is organized as follows. In Section 2 we introduce the data utilized in the paper. Section 3 highlights the role of superstars in comparative advantage and characterizes those exporters we consider "Superstars". In Section 4 we analyze superstars' contribution to export growth and diversification. Section 5 delves into the origin of superstars. Finally Section 6 concludes.

## **2. Data on Firm Exports in 32 Countries**

The data used for this paper are exporter-level information on non-oil exports from 32 countries in different regions of the world, mostly for the period 2004-2008.<sup>5</sup> This information has been gathered as part of the World Bank Export Dynamics Database.<sup>6</sup> In most cases, the data have been collected directly from Customs Authorities, Ministries of Finance or Commerce and National Statistics Institutes. In other instances, the data have been collected indirectly through think tank institutions (Egypt) or purchased from a private company based on inputs from customs authorities (Chile, Colombia and Ecuador).

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<sup>5</sup> Although exporter-level data is available for years before and after this period we focus on these years for two main reasons. First, this period is covered in all countries in our sample (whether fully or partially). Data for years before 2004 are scarce across countries and for years after 2008 they include the trade collapse in 2009. Second, for consistency purposes in our cross-country comparisons, it is important to have a similar period across all countries. However, in the analysis of the origin of superstars, which requires a longer period, we also use data from 2000 to 2010 for three countries with available data.

<sup>6</sup> See Cebeci, Fernandes, Freund and Pierola (2012) for a detailed description of the data and the cleaning process operated in it. This cleaning process includes the use of a "consolidated" product classification that takes into account the transformations made to product codes according to the HS classification throughout the years. In addition, in order to mitigate the risk of including transactions that correspond to the shipping of samples or personal belongings, we dropped the observations corresponding to exporters that, in a given year, had total sales below \$1,000. We also dropped all the observations belonging to Chapter 27 according to the HS classification –Mineral fuels, oils and product of their distillation; etc.

To assess the quality of the data, we compare the total values obtained from aggregating the customs data at the country level with the total values obtained at the country level from Comtrade. We dropped the years in which the total values obtained from the customs data represented less than 70 percent or more than 130 percent of the total values obtained from Comtrade aggregates. Table 1 has the full list of countries and periods included in the final sample used in this paper and the complete list of countries and years for which data are excluded can be found in Table A1 in the Appendix.

Table 1 also shows the summary statistics with annual averages for the years available from 2004 to 2008. There is significant variation in the number and size of exporters across countries and also within countries. For example, Cambodia (KHM) has a relatively small number of exporters, yet they are relatively large on average. In contrast, Bulgaria (BGR) has a relatively large number of exporters that are relatively smaller. The correlation between number and size is 0.36. Within countries, we also observe a large difference between the median and the mean values per exporter—the mean values are, on average, 51 times larger than the median values per exporter. This reflects the incredibly skewed distribution of firm size.

Figure 1 shows the distribution of the 200 largest firms by size on average across countries in the sample. Figure 1.i shows firm rank against cross-country average exporter size on a log-log scale for year 2008.<sup>7</sup> We find that the relationship is nearly linear—the Pareto exponent (the slope of the regression of  $\log(\text{rank})$  on  $\log(\text{export size})$ ) is 1.05, which is consistent with Zipf's law.<sup>8</sup> Figure 1.ii highlights the skewed distribution in simpler terms. It records the average share per exporter by rank in total exports. The top firm across countries accounts for

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<sup>7</sup> We tried estimations for other years (2005, 2007) and results are very similar.

<sup>8</sup> Following Gabaix and Ibragimov (2012), we also calculated the slope using their modification (firm rank -  $\frac{1}{2}$ ) against average export size. The results are very similar with a slope of 1.09.

almost 15 percent (equivalent to 1.9 USD billion) of total exports, on average. This is a striking number for one firm. The number two ranked firm holds a share of 6 percent on average, still a large share for one firm, but less than half as much as the number one firm.<sup>9</sup>

In sum, we find that a small number of very large firms co-exist with a large number of smaller firms. This distribution is almost identical regardless of the country or year we consider.

### **3. Superstars and Trade Patterns**

The evidence above highlights the extremely skewed distribution of exporters in all countries. In this Section, we examine how large firms influence trade patterns. We look at three things: (i) the similarity in distributions of total values exported and the number of firms by product groups across country pairs; (ii) average firm size (intensive margin) versus firm count (extensive margin) as determinants of sectoral export shares, and superstars' contribution to average size; and (iii) the similarity in the relative size of non-superstar firms across countries or sectors.

#### *Bilateral Correlations*

We begin by looking at simple correlations to compare how countries export, using available data from 2006 to 2008 averaged across country-product groups (at HS 2-digits). Averaged data has the advantage of reducing potential noise in the data from a particular year. As we mentioned above, we use this period because all of the countries in the sample have data around this time period. This creates a cross-section of data on total values exported, average firm size and firm number by country-product group, averaged for this period.

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<sup>9</sup> We also made this calculation for a sample considering only manufacturing products and the results are very similar.

For each country, we take the distribution of firms across the 96 product groups and generate a simple correlation with the same variable in each of the other 31 countries. We also perform the same exercise for the distribution of total exports across sectors in each country. For the 32 countries, there are 496 bilateral correlations  $(32*32-32)/2$ . Bilateral correlations for each country pair, for both number of firms and total exports, are reported in Appendix Table A2.

Table 2 reports the average country-pair correlations for the number of exporters and the total values exported per product group. Each entry in Table 2 is an average the nearly 500 bilateral correlations. As comparative advantage would suggest, the total values exported per product group are quite different on average across country pairs. The average correlation is 0.15 and only 31 percent of the correlations coefficients are significant at the 5 percent level (Row 1). This means most countries do not concentrate exports in the same product groups. In contrast, the distribution of the total number of firms by product group is extraordinarily similar across countries: the average correlation is 0.56 and 86 percent of all correlations coefficients are highly significant.

This result is somewhat paradoxical. Given differences in comparative advantage sectors/products across countries, we would have expected that both the distribution in the number of firms and the values exported per product group would have followed different patterns across countries, precisely to reflect these differences. Instead, it appears that product-group characteristics drive the distribution of firms across sectors but not the distribution of exports across sectors. This means that firm size, as opposed to firm count, largely explains the variation in trade patterns across countries and implies two possible scenarios. Either there are differences in the size of all the exporters in a given country-product group, or there are differences in the size of only some exporters in a given country-product group.

To explore this, we generate these correlations using only exports of the top 1 percent of exporters—the superstars. The correlation on total exports is even lower, 0.11 and only 21 percent are significant. The total exports of superstars exports look more different across countries than of all firms (though they still tend to be more concentrated in some of the same sectors—average correlation 0.45).

We next look at correlations excluding the large firms, specifically, how the correlations change as we drop firms, starting by dropping the largest firms. The remaining rows in Table 2 report the average evolution of the correlations of the number of exporting firms and total values exported per product group starting from an scenario where we include absolutely all exporters—the top row—and moving towards scenarios where we drop successive percentiles of top (larger) firms in every country.

We find that dropping the top 1 percent of firms in each country increases the average coefficient on total exports by two thirds (to 0.25 from 0.15) and more than half of the correlations become highly significant. The average bilateral correlation among export distribution of 99 percent of firms (0.25) is more than twice that of the superstars (0.11). This implies that the top 1 percent of firms are driving specialization to a greater degree than the bottom 99 percent.

As we continue to drop large firms, the average coefficient rises, but at a slower rate, implying export patterns are more similar across countries. By the time we drop the total values exported by the firms in the top 10 percent, the average correlation of the total values exported per product group more than doubles (from 0.15 to 0.33). Then, the average correlation continues going up as we drop successive deciles but at a much slower pace, until reaching

average levels close to those observed in the distribution of the number of firms. Therefore, there is an alignment in export structures across countries when we drop the largest firms.<sup>10</sup>

In sum, once we drop the top 1 percent of firms, the distribution of the values exported in a given product group looks remarkably more similar across countries. The top exporters, or what we call “superstars”, are the ones generating the main differences in trade patterns across countries.

### *Variance Decomposition*

The correlations above suggest that the firm-size (intensive) margin, as opposed to the firm-count (extensive) margin, is more important for explaining overall trade patterns. To explore this in more detail, we again use the averaged data from 2006-2008 and decompose the variance of the log of a product group share in the total exports of a given country into the log of firm-size and the log of firm-count margins for that same country-product group. In particular, we have:

$$(1) \quad \frac{\text{var}\left[\ln\left(\frac{x_{ic}}{x_c}\right)\right] + \text{Cov}\left(\ln\left(\frac{x_{ic}}{x_c}\right), \ln\left(\frac{N_{ic}}{N_c}\right)\right)}{\text{var}\left[\ln\left(\frac{x_{ic}N_{ic}}{x_cN_c}\right)\right]} + \frac{\text{var}\left[\ln\left(\frac{N_{ic}}{N_c}\right)\right] + \text{Cov}\left(\ln\left(\frac{x_{ic}}{x_c}\right), \ln\left(\frac{N_{ic}}{N_c}\right)\right)}{\text{var}\left[\ln\left(\frac{x_{ic}N_{ic}}{x_cN_c}\right)\right]} = 1.$$

where  $X$  is total exports,  $x$  is average firm exports,  $N$  is the number of exporters,  $i$  is a product group subscript and  $c$  is a country subscript.<sup>11</sup> Equation (1) decomposes the variance of the log

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<sup>10</sup> We also explore whether these results hold over the sample of firms operating only in the manufacturing sector to ensure that the results are not driven by large firms operating in sectors driven by natural resources (recall oil is excluded). We find the same pattern. The calculations for manufacturing sector included all the products that correspond to divisions 15-37 of the International Standard Industrial Classification of All Economic Activities (ISIC), Rev.3. The table used for concordance between the HS Classification and the ISIC Rev3 was taken from <http://wits.worldbank.org/wits/>

<sup>11</sup> Equation (1) is derived from the standard variance decomposition for a sum of variables:

$$\left(\text{Var}\left[\ln\left(\frac{x_{ic}}{x_c}\right)\right] = \text{Var}\left[\ln\left(\frac{x_{ic}N_{ic}}{x_cN_c}\right)\right] = \text{Var}\left[\ln\left(\frac{x_{ic}}{x_c}\right)\right] + \text{Var}\left[\ln\left(\frac{N_{ic}}{N_c}\right)\right] + 2\text{Cov}\left(\ln\left(\frac{x_{ic}}{x_c}\right), \ln\left(\frac{N_{ic}}{N_c}\right)\right)\right).$$

of the sectoral (product group) export share in a given country into the portion due to the variance of the log of the relative firm size (intensive margin) and the portion due to the variance of the log of the relative number of firms (extensive margin).

Table 3a reports results from this calculation. The variance in the log of relative firm size contributes two-thirds of the variance of the log of sectoral export share, with the remaining one-third explained by variation in the log of the relative number of firms. This confirms that firm size is more important in defining export patterns than firm count.

We also perform this exercise on each country and product group separately in order to determine how relative firm size and firm count affect export shares within a country and within a product group. Results for average country and product group decompositions are reported in the second and third columns of Table 3a. The results are similar to those for overall shares, though firm size is even more important for within product group variation (over three-quarters of the variation is a result of firm size), implying that countries with higher export shares in a given product group tend to have them because of relatively larger firms in the product group, as opposed to because of a higher concentration of firms in that given product group. Thus, it is relative firm size and not firm distribution that is driving trade patterns across countries.

Next, we want to determine the importance of superstars in relative sectoral (product group) firm size. We perform the variance decomposition of relative sectoral firm size on the share due to superstars (*SS*) and the share due to the remaining firms (*NSS*). The decomposition is derived from the following:  $\frac{x_{ic}}{x_c} = \frac{Share_{SS} * x_{ic}}{x_c} + \frac{Share_{NSS} * x_{ic}}{x_c}$ , where  $x$  is average firm exports,  $Share_{SS}$  is the share of exports by superstars in total country-product group exports,  $Share_{NSS}$  is

the share of other firms,  $i$  is a product group subscript and  $c$  is a country subscript. This says that relative (average) sectoral firm size is determined by the amount of exports accounted for by superstars plus the amount accounted for by non-superstars in the sector. This yields the following decomposition:

$$(2) \quad \frac{\text{Var}\left[\frac{\text{Share}_{SS}^{*x_{ic}}}{x_c}\right] + \text{Cov}\left(\frac{\text{Share}_{SS}^{*x_{ic}}}{x_c}, \frac{\text{Share}_{NSS}^{*x_{ic}}}{x_c}\right)}{\text{Var}\left[\frac{x_{ic}}{x_c}\right]} + \frac{\text{Var}\left[\frac{\text{Share}_{NSS}^{*x_{ic}}}{x_c}\right] + \text{Cov}\left(\frac{\text{Share}_{SS}^{*x_{ic}}}{x_c}, \frac{\text{Share}_{NSS}^{*x_{ic}}}{x_c}\right)}{\text{Var}\left[\frac{x_{ic}}{x_c}\right]} = 1,$$

The first term is the share of the variation in relative sectoral firm size due to the share of exports by superstars and the second term is the share due to non-superstars. The results on overall relative size are recorded in the first column of Table 3b. They imply that the variation in relative exporter size due to superstars accounts for 95 percent of the variation in relative average size.

Again, we redo the exercise on countries and product groups separately. The results are similar, exports of the superstars are more important for both, product group and country variation in relative size than the exports of other firms. In this case, however, superstars are somewhat less important both across product groups and countries than across the full data. This reflects that the variation in relative firm size is much lower within countries or within sectors than across all countries and industries (eg. textiles in Bulgaria compared with vegetables in Peru).

The importance of superstars in sectoral export shares can be found by examining their contribution to variation in relative average size (Table 3b) in conjunction with the contribution of variation in relative size to the variation in export shares (Table 3a). Specifically, variation in

the share of superstars contributes to between 0.44 and 0.60 of the variation in export shares.<sup>12</sup> This compares favorably with the overall contribution of relative firm number (by superstars and non-superstars) to variation in export shares, which ranges from 0.22 to 0.33. In terms of revealed comparative advantage, we can focus on variation in country-level export shares within a product group (column 3), which reflects how important the product group is to each country. We have 44 percent of the variation in export shares within a product group across countries is due to variation in the relative size of superstars, 34 percent to variation in the relative size of other firms, and 22 percent to variation in the relative number of firms. The importance of variation in the exports of superstars in determining variation in export shares across sectors and/or countries is therefore greater than the importance of variation in the number of firms or of the average size of non superstars.

As a final robustness to the evidence on the importance of superstars in determining country-product group trade, we focus on the similarity of non-superstars across countries and product groups. To do this, we perform an analysis of variance on the number of exporters and values exported in a given product group, country and year (Table 4). Note that for this exercise, we do not average the data across years as above, for each country, we use all available years from 2006-2008. We decompose the variance of these two variables into country, product group and year effects. If we include all exporters, we observe that country and product group effects explain little of the variation in the values exported—6 and 5 percent respectively—and more of the variation in the number of exporters—27 and 17 percent respectively—though most of the variation in this variable is contained in the residual. However, if we drop the top 1 percent of

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<sup>12</sup> This is calculated from the product of the contribution of variation in the share of superstars to variation in relative average firm size and relative size's contribution to variation in export shares ( $0.44 = 0.57 \cdot 0.78$  and  $0.60 = 0.95 \cdot 0.67$ ).

firms, country and product variations suddenly explain significantly more of the total variation in the total values exported per product group—13 and 7 percent, respectively—while the variance decomposition in the number of firms remains unchanged. And dropping the top 5 percent of firms more than doubles the explanatory power of product groups. In other words, in the absence of superstars and large firms, country and product characteristics are far more relevant. This implies that the other (non superstar) firms conform more to typical product group and country characteristics.

This exercise also addresses another potential concern about the data, which has to do with the fact that the sample varies by year across countries. As noted above, we use averaged data from 2006-2008, to control for this, but there is still some variation since not all countries have data for the full period. If this variation was important, year effects would show a significant share in the variance decomposition. As shown in Table 4, the variation due to time effects is null in all cases.

In sum, from this first analysis of the data, we identify superstars—a very unique group of firms—and their importance in defining trade patterns at the country level. We begin with the observation that the relative number of firms by product group is similar across countries, but the relative exports by product groups are different across countries. We then show that the explanation is that while most firms in a sector are similar in terms of relative size across countries, superstars are very different and can be found in different sectors across countries, driving sectoral trade patterns. We also show that relative firm size, which is largely determined by superstars, explains about two-thirds of the variation in trade patterns and firm count explains the remaining one-third. The results imply that a small group of firms have important

implications for a country's trade patterns, which are more important than the total number of firms in a sector.

#### **4. Export Characteristics and Dynamics of Superstars**

We have identified superstars—the top 1 percent of the firms in each country—as a group of firms remarkably different from the others in the same country. They explain a disproportional share of the differences we observe in export/production structures across countries. In this section, we examine the characteristics of superstars, including size and sectoral distribution and their contribution to export growth and diversification.

##### *Export Characteristics*

Table 5 records summary statistics on superstars using the 2006-2008 averaged data. Depending on the size of the country and therefore the size of its export base, the number of superstars varies from a handful of firms, as it is the case of many African countries, to 324 in Mexico, the largest exporter in our sample. These firms are remarkably larger than the non-superstars. In fact, the median firm is on average, nearly 40 times larger. And despite being a relatively small number of firms (28 if we consider the median number of superstars), they represent, on average, over 50 percent of exports, whether in all trade or only manufacturing.

Superstars are also more diversified. Figure 2 shows the average number of product and destinations by type of exporter—superstars in red dots vs. non-superstars in black dots. We observe that in any given country, the group of superstars always exports more products and

serves more markets than their “non-superstars” counterparts. On average across countries, the group of superstars exports 20 more products and serves 12 more markets than non-superstars.

Superstars are everywhere. We next look at the distribution of superstars by broad sectors defined based on the existing Sections in the HS classification. We find that on average across countries superstars are in various sectors, not particularly or disproportionately concentrated in one or a group. While a larger share of them participates in machinery, metals and apparel they can also be found in other products like plastics, wood, chemicals, textiles, and foodstuffs (Table 6).

#### *Export Dynamics*

Superstars are the main driver of export growth. Table 7 shows their contribution to overall export growth and to the growth observed in each margin of trade—intensive and extensive—for the most recent period of three consecutive years for which data are available in 21 countries with positive export growth.<sup>13</sup> Regarding overall growth, we observe that, despite being a small group, superstars’ export growth represents over half of the overall export growth observed across countries.

We also evaluate superstars’ contribution to export growth by margins of trade. For that purpose, we define the intensive and the extensive margin in the following way: for a comparison between Year 1 and Year 3 within the period considered for each country, the intensive margin is composed of all those export flows at the country-product (HS6-digit)-

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<sup>13</sup> Regarding the period selected in each country, it is worth noting that since we want to observe the evolution of firms across three consecutive years, our sample of 32 countries is reduced to 23. The latest period available for most countries is from 2006 to 2008—although in the case of Albania, Bulgaria, Cambodia, Cameroon and Mexico we consider the period 2004-2006 due to either data availability or to existing breaks in the firm coding that do not allow the identification of the same firm across all three years. We exclude Botswana and Mauritius because of negative trade growth and negative growth in both margins of trade, which makes it difficult to consider contributions of superstars and non-superstars in the same way as for the other countries.

destination-year level that existed in Year 1 and Year 3. All other flows at the product-market level that disappear or appear in Year 3 (with respect to Year 1) are considered the extensive margin. Thus, this is about developing new goods or markets at the *country* level. This classification allows us to determine how much of export diversification is driven by superstars.

The results are reported in Table 7. The second and third columns show the export growth decomposition by margin for each country. Considering the median within our sample, we note that superstars are the main contributors to the growth in both the intensive and extensive margins. They contribute with more than half in both cases. Overall, results for extensive margin and total exports are more pronounced in favor of superstars if we consider the sample of firms operating exclusively in the manufacturing sector.

## **5. Origin of Superstars**

Given their role in defining comparative advantage, export growth and diversification we consider it important to understand superstars' origins. For that purpose, we look at the three countries where we have a longer time series—Costa Rica, Peru, and Morocco—and we analyze the origin of superstars within a decade. Table 8 presents the distribution of the superstars of 2009, in terms of their size in 2000, for Costa Rica and Peru, and of superstars of 2010 in 2002 for Morocco. Table 8a shows that the top 1 percent of firms in 2009 for Costa Rica and Peru and 2010 for Morocco, were either a) already large firms operating 10 years ago, or b) new firms that appeared in the sample sometime during the years within. Twenty-two percent of 2009/2010's superstars were superstars almost 10 years before in Costa Rica and the share is even higher for Morocco and Peru, 48 and 36 percent, respectively. Also, in all countries, there is a non-trivial

percent of superstars that appeared sometime within the sample period evaluated.<sup>14</sup> This percent reaches 41 percent in Costa Rica. Digging deeper into these “new” superstars, we observe that over half of them started as large firms—52 percent of the superstars “born” within the period analyzed in the three countries were born straight into the top 5 percent of exporters (Table 8b).

Finally, we identify superstars in the beginning of the period and evaluate how they develop over time, i.e. in which group they end up in 2009/2010. Table 8c shows that most of the superstars of 2000 in Costa Rica and Peru and of 2002 in Morocco remained large and within the top 5 percent in the end of the period. In the case of Morocco and Peru the staying power is the highest; over 80 percent of superstars of the past remained in the top 5 percent in recent years. In Costa Rica, it is not the case that superstars shrink, rather there are a considerable number of exits from exporting within the superstars group.<sup>15</sup> In contrast, the exits within the group of superstars are not high for the other two countries.

In any case, the evidence indicates that superstars are born large, also, they stay large or exit; shrinking is rare.<sup>16</sup> All these results are similar if we take into the consideration the firms in the manufacturing sector only.

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<sup>14</sup> Table A3 in the Appendix includes the tables with the full percent distribution for the firms in the remaining percentile categories, for each of the three countries.

<sup>15</sup> There is a potential concern that the high percentage of exits and entrants are in fact the same firms, after changing firm IDs. We examine this possibility for Costa Rica, where the problem is potentially more severe, by comparing the export sectors of the large firm exits and the superstar entrants. With the exception of one firm, there is little similarity, suggesting that these are in fact new superstars. Moreover, the firms seem to grow upon entry in a manner consistent with a new strong entrant. In Peru, we are able to do a more complete account because we have firm names. We research the new superstars and find that all are indeed new firms. Seven out of fifteen are mining firms. We also find that a large number are tied to FDI—eight out of fifteen are subsidiaries of multinationals.

<sup>16</sup> Another feature that can be observed from the full distribution in Table A3 in the Appendix is that there seems to be little rotation between the different percentile groups analyzed. Judging by the concentration of firms along the diagonal in the tables, most firms stay in their same percentile group regardless of the time. The vast majority of large firms were already large 10 years ago, the same way that most of the small firms stayed small. There is also more churning (firms that go out of the exporting sector and other that come in) within the lower quartiles in the distribution.

Although we are limited by the length of the time series available for each country, it is worth noting that the patterns observed are very similar in the three countries analyzed above, regardless of their differences in terms of size and geographical location.

From these results we have learned that most superstars of the present were already superstars/large firms in the past or simply new firms that became superstars. Regarding the latter, we also analyze the speed at which the firms that entered into the sample sometime after 2000 became superstars. We find that in Costa Rica, for all firms that were superstars in 2009 but did not exist in the sample in 2000, it typically took 2.5 years to reach the top 1 percent. The pace was 3 years on average for the new superstars firms in Peru. In Morocco, it took new firms 1.5 years to reach superstar status in 2010. Again, these results reflect that in three countries located in different regions; patterns are similar and the superstars of the present were born relatively large and grew fast.

On this last point and as a final test to the validity of this observation across countries, we also analyzed the distribution of the new superstars that appear in the sample sometime within the three-consecutive year period evaluated in Table 7. Table 9 shows the distribution of these new superstars across countries—upper table. We find once again that most of the firms that appear in Year 2 or Year 3 of the period in analysis enter at a relatively large size. In fact, in the aggregate, over 80 percent of them appeared within the top 5 percent of firms. The cases of firms that started small and then became superstar are rare. These results hold for the sample including manufacturing exporters only.

### *Superstar Characteristics*

Unfortunately, the data do not allow us to observe superstars *before* they begin exporting, as we do not have information on domestic sales or how they became exporters. However, given that in

a number of countries it was possible to identify the superstars by name, we selected three countries from our sample—each from a different region: Jordan, Peru and Tanzania—and contacted their superstars –from the last year in their sample- to learn more about who they are and how they started exporting.<sup>17</sup> Table 10 presents a summary of the findings from this investigation.<sup>18</sup> In the three cases, we learned that the overwhelming majority of the superstars are either a producers or manufacturers—only in Peru we find a few traders.<sup>19</sup> This result is consistent with evidence from Bernard, Jensen, Redding and Schott (2010) and Ahn et al. (2011), who find that that the most productive firms or largest firms export directly.

We also find that superstars are very linked to the presence of foreign capital and this association seems to be stronger in the countries with lower GDP per capita. Finally, while the evidence is somewhat mixed, most of them become exporters almost immediately after they begin operations. The case of successful domestic firms that turn to export markets and become superstars over time is important only in the case of Tanzania; in Jordan and Peru, most are born to be exporters.

To sum up, the group of superstars is a unique group of firms, they explain most of the export growth and diversification observed across countries, they drive comparative advantage, and they are born big or very rapidly become so. The cases of small firms making it to the top are rare.

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<sup>17</sup> The years used in the identification of the superstars were 2009 in the case of Peru and Tanzania and 2010 in the case of Jordan. The total sample of firms that fall under the “superstars” category are 25 in Jordan, 69 in Peru and 16 in Tanzania.

<sup>18</sup> Table A4 in the Appendix has the percent of superstars whose information was accounted for in each of the issues investigated and presented in Table 9.

<sup>19</sup> For the purpose of this investigation, we consider a firm a trader if it only acts as an intermediary, without engaging in any activity that implies any type of transformation of the merchandised traded. If a firm engages in packaging or basic processing of goods (for example, sorting or drying) we consider that firm a “transformer” and it is not counted as a trader.

## 6. Conclusions

Using a novel dataset containing firm-level information on exports from a very diverse group of 32 developing countries, this paper contributes to the literature on firm-level analysis of trade by providing compelling evidence on a striking feature of the distribution of firms. Exports are dominated by a small group of very large exporters: Superstars.

Superstars are part of a unique group. Superstars are remarkably larger and more diversified than the rest of firms; as a group they account for more than half of export volumes, growth and diversification; they are often linked to foreign capital; and a good part of them are born to be exporters. Most importantly, superstars are important in defining the export structures. Superstars themselves do not grow as the result of a lengthy process. In fact, they seem to be born large and when they are not, it does not take them long to become superstars.

This implies that creating an environment where future or potential superstars can thrive is fundamental to promote export growth and diversification. In that sense, measures that aim at reducing variable trade costs are likely to have a larger impact than reducing fixed costs to exporting, since marginal firms are relatively unimportant in trade. In fact, on this latter point, given the evidence on the very rare occurrence of small exporting firms thriving to superstar levels, policies that disproportionately allocate resources to export programs in support of SMEs might prove to be a misguided effort if the quest is to achieve higher levels of export development and diversification. On the same line of thought, costly regulations that disproportionately target large firms will also hold back export growth. Finally, policies to attract large multinational firms are likely to be crucial for small countries interested in expanding exports and diversifying their export base.

Our results are consistent with recent work using census data, which also points to a critical role for large firms. In particular, Hsieh and Klenow (2012) show that an important difference in firm dynamics in India, Mexico, and the US relates to the ability for firms to grow large. Firms in the US are much larger, and weak life-cycle dynamics have constrained productivity in Mexico and India by an estimated 25 percent. Similarly, Haltiwanger, Jarmin, and Miranda (2012) show that young, fast-growing and large firms are the primary job creators in the US. Our work implies similar dynamics exist for trade, with highly productive firms growing quickly into large firms that dominate exports. Taken together this implies that jobs, productivity, export growth, and diversification all rely heavily on the ability of an economy to foster the development of large firms. Further research is needed in order to understand the process of how such superstars are born and what factors are most important in their evolution.

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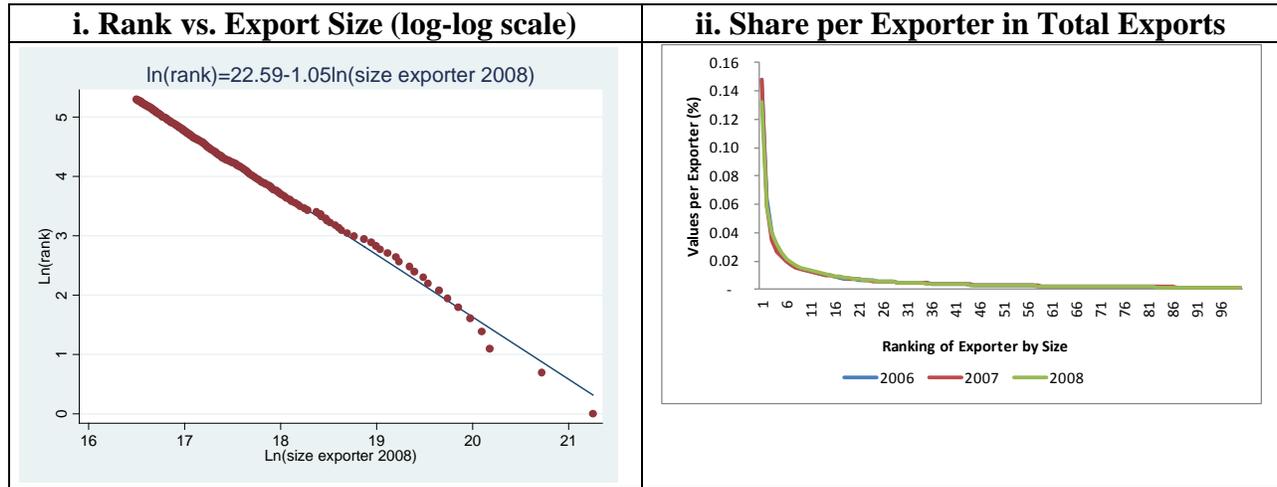
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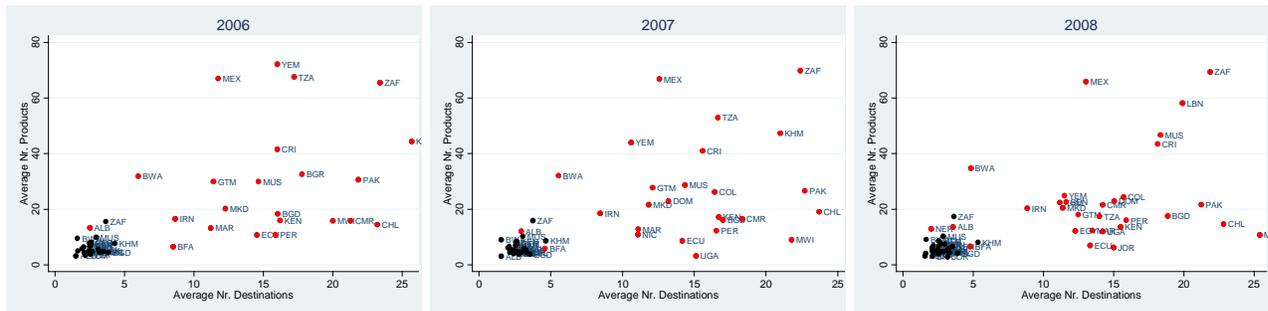
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**Figure 1: Size Distribution of Exporters –Average Values Exported by Rank**



**Figure 2: Average Number of Products and Destinations, by Type of Exporter**



**Table 1: Sample and Summary Statistics**

Country	Period	Nr. Firms	Total Exports (US\$ millions)	Median Value per Exporter (US\$)	Average Value per Exporter (US\$)
Albania (ALB)	2004 - 2008	1,561	904	51,248	569,113
Bangladesh (BGD)	2004 - 2008	5,636	10,066	300,730	1,727,897
Botswana (BWA)	2004 - 2008	1,025	4,245	11,576	4,135,269
Bulgaria (BGR)	2004 - 2006	11,920	10,825	35,644	909,326
Burkina Faso (BFA)	2005 - 2008	375	450	46,211	1,230,219
Cambodia (KHM)	2004 - 2008	548	2,760	562,908	5,008,879
Cameroon (CMR)	2004 - 2008	755	1,540	34,242	2,030,908
Chile (CHL)	2004 - 2008	6,998	51,308	63,373	7,210,810
Colombia (COL)	2007 - 2008	10,435	19,716	48,435	1,889,322
Costa Rica (CRI)	2004 - 2008	2,526	7,787	78,516	3,068,453
Dominican Republic (DOM)	2007 - 2008	2,642	4,743	37,654	1,811,882
Ecuador (ECU)	2006 - 2008	2,822	5,735	36,148	2,019,939
Egypt (EGY)	2008 - 2008	7,881	18,132	104,921	2,300,722
Guatemala (GTM)	2004 - 2008	4,072	5,743	47,288	1,404,071
Iran (IRN)	2006 - 2008	13,466	12,886	94,482	968,244
Jordan (JOR)	2008 - 2008	2,111	4,700	78,610	2,226,479
Kenya (KEN)	2006 - 2008	4,471	3,979	26,573	899,536
Lebanon (LBN)	2008 - 2008	5,120	3,465	40,418	676,835
Macedonia (MKD)	2006 - 2008	2,710	2,215	30,269	811,453
Malawi (MWI)	2006 - 2008	473	629	15,984	1,389,175
Mauritius (MUS)	2004, 2006 - 2008	1,946	2,850	33,143	1,465,816
Mexico (MEX)	2004 - 2008	32,584	205,528	51,157	6,314,737
Morocco (MAR)	2004 - 2008	5,151	13,167	104,689	2,568,212
Nicaragua (NIC)	2004 - 2005, 2007	1,086	950	28,079	868,812
Niger (NER)	2008	143	346	29,535	2,416,470
Pakistan (PAK)	2004 - 2008	14,243	15,304	64,283	1,070,787
Peru (PER)	2004 - 2008	5,867	20,703	43,035	3,463,227
Senegal (SEN)	2008 - 2008	765	1,177	91,199	1,538,503
South Africa (ZAF)	2004 - 2008	19,280	51,326	38,690	2,647,761
Tanzania (TZA)	2004 - 2008	1,498	1,983	31,340	1,309,037
Uganda (UGA)	2004 - 2005, 2007 - 2008	692	963	34,283	1,375,414
Yemen (YEM)	2006 - 2008	461	393	64,358	852,033

**Table 2: Average Country-Pair Correlations**

Sample	Total Exports by HS2		Number of Firms by HS2	
	Average Correlation	Share significant	Average Correlation	Share Significant
All	0.15	0.31	0.56	0.86
Only top 1%	0.11	0.21	0.45	0.80
No top 1%	0.25	0.53	0.56	0.86
No top 2%	0.26	0.54	0.55	0.86
No top 3%	0.27	0.56	0.55	0.86
No top 4%	0.28	0.59	0.55	0.86
No top 5%	0.29	0.61	0.55	0.86
No top 6%	0.29	0.61	0.55	0.86
No top 7%	0.30	0.63	0.55	0.86
No top 8%	0.31	0.65	0.55	0.86
No top 9%	0.32	0.66	0.55	0.86
No top 10%	0.33	0.68	0.55	0.86
No top 20%	0.37	0.74	0.55	0.87
No top 30%	0.41	0.76	0.54	0.87
No top 40%	0.45	0.80	0.54	0.87
No top 50%	0.48	0.78	0.53	0.85
No top 60%	0.49	0.80	0.52	0.84
No top 70%	0.48	0.79	0.50	0.84
No top 80%	0.46	0.75	0.48	0.81
No top 90%	0.42	0.74	0.45	0.78

Note: The first column reports the average country-pair correlation for the variables total exports across HS2 categories and the third column reports the average country-pair correlation for the variable number of firms by product group. Actual country-pair correlations are reported in Table A2 in the Appendix.

**Table 3: Variance Decomposition - Intensive vs. Extensive, Superstars vs. Non Superstars**

a) Log Sectoral Export Share:  $\text{Var}(\ln(X_{ic}/X_c))$

Share:	Overall	By country <sup>1</sup>	By HS2 <sup>2</sup>
Intensive	67%	63%	78%
Extensive	33%	37%	22%

b) Relative Firm Size:  $\text{Var}(x_{ic}/x_c)$

Share:	Overall	By country <sup>1</sup>	By HS2 <sup>2</sup>
Superstars	95%	79%	57%
Non-Superstars	5%	21%	43%

1. Average across countries. 2. Average across product groups.

**Table 4: Variance Decomposition – Country, Product and Year Effects**

	All Exporter-Sectors		Dropping Top 1 Percent		Dropping Top 5 Percent	
	Total Exports	Nr. Exporters	Total Exports	Nr. Exporters	Total Exports	Nr. Exporters
Country	6%	27%	13%	27%	12%	26%
Product	5%	17%	7%	17%	12%	17%
Year	0%	0%	0%	0%	0%	0%
Residual	89%	58%	80%	58%	77%	58%

Total exports and number of exporters are at the country-HS2-year level.

**Table 5: Size of Superstars**

Country	Nr. Exporters		Average Size per HS2		Share in Exports (Top 1%)	
	Superstars	Non-Superstars	Superstars	Ratio SS/N-SS	All Sectors	Manuf.
ALB	17	229,403	3,238,061	14	32%	33%
BFA	5	170,317	15,229,290	89	64%	39%
BGD	62	964,394	14,602,055	15	21%	21%
BGR	119	166,422	6,488,243	39	58%	59%
BWA	11	63,876	39,411,980	617	94%	84%
CHL	74	794,429	131,600,720	166	80%	80%
CMR	8	511,664	12,502,805	24	42%	48%
COL	105	385,924	12,594,754	33	53%	52%
CRI	28	494,211	14,488,068	29	56%	61%
DOM	27	328,187	10,076,700	31	50%	49%
ECU	29	422,595	21,509,174	51	44%	47%
EGY	79	411,685	15,774,980	38	49%	52%
GTM	42	244,016	7,698,031	32	41%	41%
IRN	135	131,421	8,580,523	65	53%	59%
JOR	22	598,467	46,558,184	78	55%	53%
KEN	45	128,394	6,245,577	49	45%	47%
KHM	6	1,972,240	17,285,994	9	17%	16%
LBN	52	92,022	2,911,962	32	55%	52%
MAR	51	491,210	31,555,798	64	51%	49%
MEX	324	782,810	31,322,038	40	67%	66%
MKD	28	136,448	6,729,140	49	61%	65%
MUS	20	160,256	7,196,062	45	54%	58%
MWI	5	172,579	14,151,860	82	62%	67%
NER	2	480,116	11,088,888	23	58%	92%
NIC	12	217,094	8,458,952	39	42%	47%
PAK	146	242,372	7,996,560	33	40%	40%
PER	63	287,176	59,711,968	208	77%	74%
SEN	8	246,022	5,984,540	24	45%	48%
TZA	17	215,622	7,856,388	36	60%	63%
UGA	9	398,444	21,463,764	54	37%	44%
YEM	5	228,436	2,111,738	9	37%	42%
ZAF	197	127,142	19,634,168	154	78%	80%
<b>Average</b>	<b>55</b>	<b>384,231</b>	<b>19,439,343</b>	<b>71</b>	<b>53%</b>	<b>54%</b>
<b>Median</b>	<b>28</b>	<b>245,019</b>	<b>12,548,780</b>	<b>39</b>	<b>53%</b>	<b>52%</b>

Note:

1. SS= Superstars; N-SS= Non-Superstars
2. The averages in this table correspond to the period between 2006 and 2008.

**Table 6 Distribution of Superstars across Industries**

Industry	Share
Machinery	0.11
Apparel	0.10
Metals	0.10
Plast. Rub	0.09
Misc.	0.08
Wood	0.08
Chemicals	0.07
Foodstuffs	0.06
Textiles	0.06
Vegetable	0.05
Mineral	0.05
Glass	0.04
Transport	0.03
Animal	0.03
Leather	0.02
Prec. Met	0.02

**Table 7: Superstars' Share in Export Growth (Intensive, Extensive, All)**

	Share in Total Growth						Total Growth
	Int NSS	Int SS	Ext NSS	Ext SS	Total NSS	Total SS	
ALB	0.83	0.29	(0.09)	(0.03)	0.74	0.26	21.66%
BFA	1.54	(1.59)	0.26	0.78	1.80	(0.80)	9.37%
BGD	1.04	(0.09)	0.03	0.02	1.07	(0.07)	14.83%
BGR	0.23	0.56	0.04	0.17	0.27	0.73	40.93%
CHL	0.25	0.76	0.02	(0.03)	0.27	0.73	25.14%
CMR	(0.57)	0.58	0.56	0.43	(0.01)	1.01	9.52%
CRI	0.52	0.40	0.05	0.04	0.56	0.44	15.27%
ECU	0.44	0.38	0.11	0.07	0.55	0.45	46.42%
GTM	0.41	0.48	0.06	0.05	0.46	0.54	29.30%
IRN	0.17	0.68	(0.00)	0.15	0.17	0.83	34.46%
KEN	0.37	0.53	0.06	0.04	0.44	0.56	47.46%
KHM	0.73	0.19	0.08	0.00	0.81	0.19	35.05%
MAR	0.22	0.66	0.02	0.10	0.24	0.76	59.65%
MEX	0.27	0.71	0.01	0.01	0.28	0.72	28.11%
MKD	0.25	0.61	0.08	0.07	0.33	0.67	67.94%
MWI	0.19	0.47	0.09	0.25	0.28	0.72	54.39%
PAK	0.51	0.35	0.06	0.08	0.58	0.42	24.47%
PER	0.28	0.75	0.03	(0.06)	0.31	0.69	27.27%
TZA	0.42	0.38	0.17	0.03	0.59	0.41	56.10%
YEM	0.47	0.15	0.30	0.08	0.77	0.23	40.96%
ZAF	0.16	0.74	0.01	0.09	0.17	0.83	45.32%
<b>Median ALL</b>	<b>0.37</b>	<b>0.48</b>	<b>0.06</b>	<b>0.07</b>	<b>0.44</b>	<b>0.56</b>	<b>34%</b>
<b>Median Manuf.</b>	<b>0.27</b>	<b>0.52</b>	<b>0.07</b>	<b>0.10</b>	<b>0.36</b>	<b>0.64</b>	<b>28%</b>

Note:

1. Negative values are in parenthesis.

2. Int=Intensive; Ext=Extensive; NSS=Non-Superstars ; SS=Superstars.

3. The averages in this table correspond to the period from 2006 to 2008 for each country; except in the case of Albania, Bulgaria, Cambodia, Cameroon and Mexico where the period taken is from 2004 to 2006. This latter choice is due to data availability or due to breaks in the exporter codes used throughout the period. The restriction to three consecutive years of data explains the more reduced sample of countries with respect to the full sample in previous tables.

**Table 8: Origin of Superstars – Costa Rica, Morocco and Peru**

a. What type of firms were 2009/2010's Superstars in 2000/2002?

	<b>ALL</b>			<b>Manufacturing</b>		
	Costa Rica	Morocco	Peru	Costa Rica	Morocco	Peru
top 1	22%	48%	36%	25%	47%	34%
top 02-05	22%	7%	32%	30%	9%	33%
top 06-25	15%	9%	6%	5%	11%	8%
quart 26-50	0%	5%	3%	0%	4%	5%
quart 51-75	0%	2%	1%	0%	2%	0%
bottom 25	0%	0%	0%	0%	0%	0%
NE	41%	29%	22%	40%	28%	20%

b. Size Distribution of 2009's and 2010's New Superstars at their Entry

				<b>All Sectors</b>	
	CRI	MAR	PER	Total	Percent
top1	3	3	1	7	17%
top 02-05	2	4	9	15	36%
top 06-25	5	2	3	10	24%
quart 26-50	1	4	2	7	17%
quart 51-75		1		1	2%
bottom25		2		2	5%

c. What happened with 2000/2002's Superstars in 2009/2010?

	<b>ALL</b>						
	top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25	NE
Costa Rica	30%	20%	0%	5%	0%	0%	45%
Morocco	55%	29%	4%	6%	0%	0%	6%
Peru	68%	14%	3%	0%	0%	0%	16%

	<b>Manufacturing</b>						
	top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25	NE
Costa Rica	33%	20%	0%	7%	0%	0%	40%
Morocco	54%	29%	5%	7%	0%	0%	5%
Peru	68%	10%	3%	0%	0%	0%	19%

**Table 9: First-Year Size Distribution of New Superstars**

	BFA	BGD	BGR	BWA	CHL	CRI	GTM	IRN	KEN	MAR	MEX	MKD	MWI	PAK	PER	TZA	YEM	ZAF
top1	2		6	1	3	2	1	23		3	12	1		2		1	5	9
top 02-05	1	1	4		3		2	4	2	1	9	1	1	4	2			4
top 06-25	1			1				5					1	2				
quart 26-50					1	1		1										
quart 51-75								1						1		1		
bottom25																		2

	All Sectors		Manuf.	
	Total	Percent	Total	Percent
top1	71	55%	52	50%
top 02-05	39	30%	35	33%
top 06-25	10	8%	10	10%
quart 26-50	3	2%	2	2%
quart 51-75	3	2%	4	4%
bottom25	2	2%	1	1%

**Table 10: Features of Superstars**

		Tanzania	Jordan	Peru
Type of Exporter	Producer	100%	100%	91%
	Trader	0%	0%	9%
Ownership	Foreign	81%	67%	48%
	Domestic	19%	33%	52%
Age when first exported	0 to 2 years	53%	81%	71%
	3 to 5 years	0%	14%	16%
	More than 5 years	47%	5%	14%

## Appendix

**Table A1: Countries and Years Dropped from Original Sample**

Country	2004	2005	2006	2007	2008
DOM	X	X	X		
ECU	X	X			
EGY			X	X	
JOR	X	X	X	X	
KWT					X
MKD	X	X			
MLI		X	X	X	X
MUS		X			
MWI	X	X			
NER	X	X	X	X	
NIC			X		X
SEN	X	X	X	X	
UGA			X		

**Table A2: Bilateral Correlations on Number of Firms and Total Exports across Sectors**

**a) Number of exporters**

	ALB	BFA	BGD	BGR	BWA	CHL	CMR	COL	CRI	DOM	ECU	EGY	GTM	IRN	JOR	KEN	KHM	LBN	NER	MAR	MEX	MKD	MUS	MWI	NIC	PAK	PER	SEN	TZA	UGA
ALB	1																													
BFA	0.55*	1																												
BGD	0.39*	0.07	1																											
BGR	0.92*	0.58*	0.29*	1																										
BWA	0.85*	0.63*	0.14	0.92*	1																									
CHL	0.8*	0.71*	0.06	0.86*	0.9*	1																								
CMR	0.74*	0.65*	0.01	0.78*	0.79*	0.78*	1																							
COL	0.78*	0.38*	0.42*	0.81*	0.75*	0.7*	0.54*	1																						
CRI	0.77*	0.6*	0.08	0.84*	0.81*	0.86*	0.74*	0.77*	1																					
DOM	0.68*	0.63*	0.36*	0.67*	0.59*	0.68*	0.59*	0.66*	0.79*	1																				
ECU	0.75*	0.44*	0.53*	0.72*	0.61*	0.6*	0.56*	0.73*	0.61*	0.66*	1																			
EGY	0.63*	0.62*	0.22*	0.62*	0.56*	0.61*	0.63*	0.55*	0.74*	0.85*	0.56*	1																		
GTM	0.83*	0.52*	0.25*	0.9*	0.85*	0.76*	0.7*	0.85*	0.87*	0.68*	0.72*	0.66*	1																	
IRN	0.46*	0.46*	0.02	0.43*	0.43*	0.55*	0.51*	0.36*	0.62*	0.69*	0.36*	0.79*	0.5*	1																
JOR	0.71*	0.48*	0.26*	0.73*	0.66*	0.68*	0.63*	0.73*	0.81*	0.78*	0.53*	0.81*	0.78*	0.67*	1															
KEN	0.79*	0.64*	0.14	0.86*	0.86*	0.81*	0.81*	0.76*	0.9*	0.72*	0.65*	0.74*	0.89*	0.56*	0.78*	1														
KHM	0.49*	0.13	0.94*	0.43*	0.29*	0.18	0.13	0.53*	0.17	0.4*	0.58*	0.23*	0.36*	0.04	0.32*	0.25*	1													
LBN	0.82*	0.57*	0.12	0.89*	0.89*	0.84*	0.76*	0.77*	0.85*	0.7*	0.63*	0.72*	0.89*	0.58*	0.81*	0.87*	0.24*	1												
NER	0.16	0.46*	0.07	0.09	0.08	0.15	0.16	0.09	0.18	0.32*	0.09	0.36*	0.08	0.26*	0.23*	0.16	0.04	0.12	1											
MAR	0.74*	0.39*	0.53*	0.74*	0.6*	0.53*	0.47*	0.74*	0.58*	0.65*	0.75*	0.67*	0.77*	0.47*	0.65*	0.66*	0.59*	0.7*	0.14	1										
MEX	0.83*	0.59*	0.08	0.9*	0.92*	0.9*	0.75*	0.81*	0.89*	0.66*	0.62*	0.64*	0.87*	0.51*	0.76*	0.87*	0.22*	0.9*	0.22*	0.64*	1									
MKD	0.84*	0.67*	0.13	0.86*	0.84*	0.87*	0.83*	0.69*	0.91*	0.82*	0.65*	0.85*	0.83*	0.72*	0.85*	0.88*	0.22*	0.9*	0.24*	0.66*	0.88*	1								
MUS	0.84*	0.46*	0.46*	0.91*	0.86*	0.75*	0.63*	0.89*	0.78*	0.68*	0.78*	0.58*	0.91*	0.38*	0.74*	0.83*	0.58*	0.86*	0.06	0.8*	0.86*	0.77*	1							
MWI	0.69*	0.7*	0.04	0.73*	0.77*	0.7*	0.71*	0.58*	0.63*	0.49*	0.55*	0.52*	0.77*	0.4*	0.52*	0.77*	0.15	0.74*	0.12	0.53*	0.68*	0.68*	0.63*	1						
NIC	0.78*	0.64*	0.12	0.79*	0.77*	0.77*	0.79*	0.68*	0.78*	0.73*	0.67*	0.74*	0.8*	0.57*	0.73*	0.83*	0.21*	0.84*	0.27*	0.68*	0.81*	0.85*	0.7*	0.78*	1					
PAK	0.49*	0.22*	0.71*	0.47*	0.32*	0.24*	0.17	0.58*	0.3*	0.46*	0.66*	0.37*	0.51*	0.20	0.36*	0.4*	0.74*	0.35*	0.07	0.71*	0.33*	0.32*	0.63*	0.27*	0.31*	1				
PER	0.66*	0.34*	0.64*	0.67*	0.55*	0.47*	0.44*	0.75*	0.53*	0.61*	0.9*	0.56*	0.74*	0.33*	0.58*	0.61*	0.69*	0.61*	0.09	0.79*	0.57*	0.57*	0.8*	0.52*	0.61*	0.72*	1			
SEN	0.73*	0.72*	0.02	0.78*	0.89*	0.9*	0.79*	0.66*	0.78*	0.62*	0.51*	0.6*	0.71*	0.51*	0.68*	0.81*	0.15	0.81*	0.17	0.46*	0.84*	0.81*	0.72*	0.69*	0.73*	0.20	0.4*	1		
TZA	0.79*	0.77*	0.10	0.84*	0.88*	0.85*	0.8*	0.64*	0.76*	0.62*	0.61*	0.62*	0.78*	0.46*	0.62*	0.85*	0.21*	0.82*	0.21*	0.58*	0.81*	0.8*	0.74*	0.83*	0.82*	0.3*	0.54*	0.86*	1	
UGA	0.19	0.32*	0.05	0.19	0.20	0.20	0.32*	0.24*	0.39*	0.46*	0.16	0.6*	0.37*	0.51*	0.5*	0.51*	0.03	0.34*	0.3*	0.35*	0.28*	0.42*	0.26*	0.28*	0.42*	0.26*	0.27*	0.3*	0.34*	1
YEM	0.09	0.22*	0.10	0.05	0.02	0.24*	0.13	0.15	0.26*	0.45*	0.18	0.5*	0.14	0.46*	0.36*	0.21*	0.02	0.18	0.23*	0.26*	0.15	0.28*	0.09	0.08	0.39*	0.10	0.19	0.22*	0.19	0.57*
ZAF	0.81**	0.58*	0.06	0.9*	0.97*	0.88*	0.78*	0.73*	0.85*	0.58*	0.6*	0.57*	0.86*	0.45*	0.67*	0.89*	0.2*	0.89*	0.06	0.6*	0.93*	0.84*	0.86*	0.73*	0.75*	0.31*	0.54*	0.86*	0.84*	0.23*

Average: 0.56

## b) Total Exports by Product Group (HS 2-digit)

	ALB	BFA	BGD	BGR	BWA	CHL	CMR	COL	CRI	DOM	ECU	EGY	GTM	IRN	JOR	KEN	KHM	LBN	NER	MAR	MEX	MKD	MUS	MWI	NIC	PAK	PER	SEN	TZA	UGA
ALB	1																													
BFA	-0.03	1																												
BGD	0.61*	0.02	1																											
BGR	0.51*	-0.01	0.41*	1																										
BWA	0.01	0.15	0.03	0.05	1																									
CHL	0.13	-0.03	-0.03	0.56*	0.10	1																								
CMR	0.00	0.10	-0.04	0.04	-0.04	0.02	1																							
COL	0.24*	0.05	0.19	0.36*	0.3*	0.04	0.04	1																						
CRI	0.12	-0.01	0.05	0.33*	-0.01	0.00	0.05	0.27*	1																					
DOM	0.4*	0.21*	0.36*	0.41*	0.26*	-0.04	0.02	0.35*	0.62*	1																				
ECU	0.00	-0.01	-0.01	-0.02	0.00	0.09	0.16	0.18	0.42*	0.05	1																			
EGY	0.26*	0.02	0.28*	0.55*	-0.03	0.13	0.00	0.4*	0.41*	0.33*	0.12	1																		
GTM	0.37*	0.00	0.62*	0.26*	0.01	0.04	0.06	0.55*	0.22*	0.25*	0.23*	0.33*	1																	
IRN	0.07	-0.03	-0.04	0.34*	-0.01	0.25*	0.03	0.38*	0.31*	0.11	0.42*	0.4*	0.22*	1																
JOR	0.22*	-0.03	0.42*	0.23*	0.07	-0.01	-0.01	0.16	0.09	0.16	-0.04	0.52*	0.39*	0.02	1															
KEN	0.09	-0.03	0.11	0.08	-0.02	-0.03	0.06	0.68*	0.07	0.11	0.02	0.18	0.51*	0.09	0.08	1														
KHM	0.39*	-0.02	0.74*	0.25*	0.04	-0.03	-0.03	0.14	0.02	0.15	-0.02	0.24*	0.7*	-0.02	0.52*	0.04	1													
LBN	0.13	0.10	0.00	0.37*	0.7*	0.07	0.03	0.49*	0.4*	0.5*	0.07	0.45*	0.06	0.2*	0.35*	0.09	-0.02	1												
NER	0.14	0.04	-0.03	0.01	0.32*	0.5*	-0.04	0.04	-0.04	0.03	-0.03	-0.08	0.07	0.04	-0.02	-0.03	-0.02	0.16	1											
MAR	0.46*	-0.03	0.53*	0.4*	0.01	0.03	-0.03	0.18	0.44*	0.53*	0.19	0.43*	0.27*	0.13	0.4*	0.17	0.21*	0.34*	0.00	1										
MEX	0.12	0.00	0.01	0.35*	0.03	0.00	-0.01	0.27*	0.72*	0.51*	0.13	0.3*	0.03	0.16	0.04	0.04	0.00	0.44*	-0.01	0.42*	1									
MKD	0.22*	0.01	-0.02	0.42*	-0.02	0.06	0.01	0.42*	0.10	0.22*	0.03	0.39*	0.10	0.33*	0.05	0.11	-0.02	0.29*	0.06	0.07	0.10	1								
MUS	0.39*	0.02	0.7*	0.29*	0.11	-0.03	-0.06	0.21*	0.17	0.36*	0.08	0.23*	0.64*	-0.05	0.38*	0.06	0.72*	0.15	-0.01	0.4*	0.17	-0.01	1							
MWI	0.01	0.08	0.06	0.05	-0.02	-0.04	0.01	0.08	-0.03	0.32*	-0.01	-0.03	0.19	-0.04	0.01	0.26*	0.04	-0.01	-0.03	0.00	-0.03	0.08	0.10	1						
NIC	0.00	0.02	0.05	0.00	0.17	0.01	0.01	0.45*	0.01	0.06	0.16	-0.01	0.36*	0.05	-0.04	0.51*	-0.03	0.08	0.05	0.07	-0.04	0.02	0.10	0.20	1					
PAK	0.23*	0.58*	0.47*	0.15	0.00	-0.04	0.01	0.06	-0.01	0.23*	-0.03	0.29*	0.28*	-0.04	0.16	0.01	0.36*	-0.04	-0.02	0.18	-0.02	-0.03	0.32*	0.07	-0.04	1				
PER	0.17	0.06	0.06	0.25*	0.56*	0.69*	-0.03	0.18	-0.03	0.10	0.02	0.01	0.17	0.11	0.06	0.02	0.10	0.36*	0.86*	0.04	0.00	0.04	0.09	-0.03	0.09	0.01	1			
SEN	0.04	0.07	-0.05	0.22*	0.01	0.01	0.02	0.22*	0.09	0.20	0.00	0.37*	-0.01	0.27*	0.27*	0.16	-0.03	0.36*	-0.04	0.46*	0.17	0.38*	-0.04	0.2*	-0.05	0.01	-0.02	1		
TZA	0.02	0.26*	-0.02	0.02	0.88*	0.17	0.01	0.38*	0.07	0.32*	0.14	0.00	0.11	0.04	0.05	0.17	-0.02	0.67*	0.5*	0.07	0.08	0.04	0.07	0.17	0.32*	0.08	0.67*	0.08	1	
UGA	-0.03	0.08	-0.02	-0.04	0.04	0.01	0.07	0.49*	-0.04	0.04	0.19	-0.01	0.39*	0.01	-0.03	0.77*	-0.03	0.05	0.00	0.07	-0.05	0.10	-0.02	0.3*	0.63*	0.02	0.07	0.09	0.33*	1
YEM	-0.04	-0.01	0.01	-0.06	-0.02	0.07	-0.02	0.08	0.08	0.00	0.55*	-0.01	0.10	0.09	-0.05	0.13	-0.03	-0.03	-0.03	0.17	-0.04	0.03	0.05	0.12	0.4*	-0.02	0.02	0.01	0.24*	0.58*
ZAF	0.14	0.12	-0.04	0.31*	0.69*	0.18	0.03	0.51*	0.2*	0.28*	0.13	0.24*	0.05	0.31*	0.08	0.03	-0.03	0.76*	0.42*	0.07	0.37*	0.45*	0.03	-0.04	0.09	-0.06	0.55*	0.28*	0.71*	0.05

Average: 0.15

**Table A3: Origin of Superstars– Full Size Distribution**

**a) Costa Rica**

What type of firms were 2009's firms in 2000?

		2009					
		top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25
2000	top 1	22%	4%	0%	0%	0%	0%
	top 02-05	22%	28%	2%	0%	0%	0%
	top 06-25	15%	35%	27%	3%	1%	1%
	quart 26-50	0%	2%	17%	14%	4%	2%
	quart 51-75	0%	2%	5%	7%	8%	4%
	bottom 25	0%	0%	2%	2%	3%	4%
	NE	41%	30%	48%	74%	83%	89%

What happened with 2000's firms in 2009?

		2009						
		top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25	NE
2000	top 1	30%	20%	0%	5%	0%	0%	45%
	top 02-05	8%	37%	13%	3%	0%	0%	40%
	top 06-25	1%	9%	36%	5%	2%	1%	46%
	quart 26-50	0%	0%	18%	19%	6%	3%	54%
	quart 51-75	0%	0%	5%	10%	11%	6%	68%
	bottom 25	0%	0%	2%	2%	5%	6%	85%

**b) Morocco**

What type of firms were 2010's firms in 2002?

		2010					
		top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25
2002	top 1	48%	6%	0%	0%	0%	0%
	top 02-05	7%	28%	5%	1%	0%	0%
	top 06-25	9%	19%	30%	7%	2%	0%
	quart 26-50	5%	5%	11%	16%	5%	2%
	quart 51-75	2%	3%	3%	7%	6%	5%
	bottom 25	0%	1%	1%	2%	5%	3%
	NE	29%	39%	50%	67%	82%	90%

What happened with 2002's firms in 2010?

		2010						
		top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25	NE
2002	top 1	55%	29%	4%	6%	0%	0%	6%
	top 02-05	2%	32%	31%	4%	0%	0%	31%
	top 06-25	1%	4%	35%	10%	3%	0%	47%
	quart 26-50	0%	1%	10%	19%	6%	2%	62%
	quart 51-75	0%	0%	2%	8%	7%	5%	77%
	bottom 25	0%	0%	1%	3%	6%	4%	87%

**c) Peru**

What type of firms were 2009's firms in 2000?

		2009					
		top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25
<b>2000</b>	top 1	36%	2%	0%	0%	0%	0%
	top 02-05	32%	21%	0%	0%	0%	0%
	top 06-25	6%	30%	14%	3%	1%	0%
	quart 26-50	3%	6%	8%	6%	3%	1%
	quart 51-75	1%	1%	2%	3%	4%	2%
	bottom 25	0%	1%	1%	2%	2%	2%
	NE	22%	40%	74%	85%	90%	94%

What happened with 2000's firms in 2009?

		2009						
		top 1	top 02-05	top 06-25	quart 26-50	quart 51-75	bottom 25	NE
<b>2000</b>	top 1	68%	14%	3%	0%	0%	0%	16%
	top 02-05	15%	40%	3%	1%	1%	0%	39%
	top 06-25	1%	11%	27%	8%	2%	1%	49%
	quart 26-50	0%	2%	12%	11%	6%	2%	66%
	quart 51-75	0%	0%	4%	6%	7%	5%	78%
	bottom 25	0%	0%	2%	5%	4%	4%	84%

**Table A4: Superstars Accounted in Table 9 - Percent**

	Jordan	Peru	Tanzania
Question on Producer vs. Trader	96%	96%	94%
Question on ownership structure	96%	97%	100%
Question on age at first export	84%	84%	94%
Total Nr. SS in last year in sample	25	69	16