The importance of the top exporter in regional exports

Juan de Lucio, Raúl Mínguez, Asier Minondo, Francisco Requena

Available on the website: https://investigacionesregionales.org/numeros-y-articulos/consulta-de-articulos

Additional information:

The importance of the top exporter in regional exports

Juan de Lucio*, Raúl Mínguez**, Asier Minondo***, Francisco Requena****

ABSTRACT:

We use Spanish firm-level data over the period 1998-2018 to examine the importance of the top exporter in each province (NUTS-III) exports. We find that: (1) the top exporter in each province represents about one fifth of total exports per year; (2) it contributes significantly to province´s export growth whilst on its way towards the top position; and (3) shocks to the top exporter of a province explain the fluctuations in aggregate exports growth.

KEYWORDS: Top exporter; export concentration; export growth; granularity; Spanish provinces.

JEL CLASSIFICATION: D22; L11; L25; F12; F14.

La importancia de la empresa top exportadora en las exportaciones regionales

RESUMEN:

Este trabajo examina la importancia de la principal empresa exportadora de cada provincia española a lo largo del periodo 1998-2018. Los resultados son: (1) el principal exportador concentra en promedio el 20% de las exportaciones de una provincial cada año; (2) estas empresas contribuyen significativamente al crecimiento total de las exportaciones de su provincial hasta alcanzar la primera posición; (3) las perturbaciones idiosincrásicas que experimenta el principal exportador explican las fluctuaciones en el crecimiento de las exportaciones agregadas de la mayoría de provincias españolas.

PALABRAS CLAVE: Empresa top exportadora; concentración exportadora; crecimiento; granularidad; provincias españolas.

CLASIFICACIÓN JEL: D22; L11; L25; F12; F14.

1. INTRODUCTION

Studies show that only a few firms explain the bulk of a country's exports. Bernard et al. (2009) find that 1% of the top exporters in the United States is responsible for 80% of total export value. Freund and Pierola (2015) show that the top-five exporters explain about one-third of the variation in sectoral exports and almost a half of export growth in many developing countries. De Lucio et al. (2017) show that the largest exporter accounts for 2.3% of total Spanish goods exports.

An increasing body of empirical research examines the role of large firms on aggregate fluctuations,

* Universidad de Alcalá, Alcalá de Henares. Spain. juan.delucio@uah.es
** Chamber of Commerce of Spain and Universidad Antonio de Nebrija, Madrid. Spain. rminguez@nebrija.es
*** Deusto Business School, University of Deusto, Donostia-San Sebastián. Spain. aminondo@deusto.es
**** Department of Economic Structure, University of Valencia. Valencia. Spain. francisco.requena@uv.es
Corresponding author: francisco.requena@uv.es

the so-called granular effect. Gabaix (2011) shows that idiosyncratic movements of the top 100 US firms constitute about one-third of the variations in output growth. Blanco et al. (2018) find that the idiosyncratic shocks of the 100 largest companies are responsible for more than half of the variability in Spanish GDP over the period 1999-2014.

The above-mentioned studies investigate the role of the output (exports) of large firms at the country level. However, it is reasonable to expect that the concentration of exports among top firms and the impact of idiosyncratic shocks on the aggregate exports of the top exporter are likely to be larger at the regional level than at the national one. Using Spanish firm-level export data at province (NUTS-III) disaggregation, the goal of this paper is to analyze whether this is in fact the case.

We show that the top exporter in each province represents about one fifth of total exports. Second, firms that reach the top position at the end of the decade contribute about one quarter to total export growth. Finally, we find that shocks to the top exporter of a province correlate with the variations in aggregate exports growth. These granular effects are greater for provinces with higher firm export concentration.

We make two contributions to the literature. For the first time, we provide evidence of the effect that the top exporter has on regional export concentration, export growth, and export fluctuations. Furthermore, the analysis based on regions cancels out the effect that country-level variables, such as market and trade regulations, may have on the effect exerted by the top exporter on export fluctuations. Our second contribution is the analysis of the top exporter in each region instead of a group (top 5) or a share of top exporters (top 1%). Using only the top exporter makes granularity more noticeable, specific and measurable, facilitating a more precise identification of the target for policy measures.

2. THE IMPORTANCE OF THE TOP EXPORTER IN PROVINCE EXPORT CONCENTRATION AND GROWTH

We use data from Spanish Customs on the population of exporters over the 1998-2018 period. Our analysis accounts for the fact that firms may be exporting from several locations. For each establishment of a firm, we have information on the value of its exports from the province where the transaction originates. Therefore, exporters can sell abroad from more than one province.

Table 1 exhibits some descriptive statistics. Export value almost tripled during the 2 decades analyzed, moving from EUR 99 billion to EUR 279 billion. This increase in exports is explained by an increase of 53% in the number of exporters (from 75,067 to 114,520) and an increase in the average exports by firm (84%). This increase is shared by all provinces, as shown by the positive evolution of: the number of firms (131% growth during the period) and the exports for the median province (187% increase).
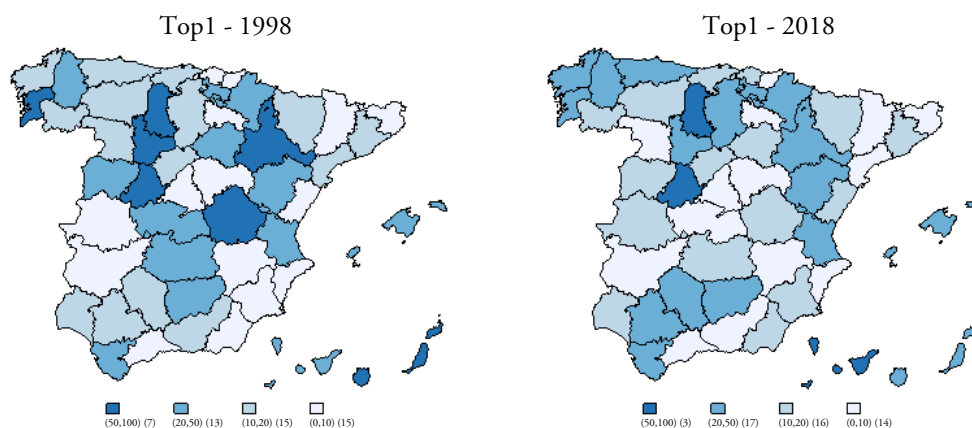
TABLE 1.
Basic database descriptive statistics

	1998	2008	2018	Growth 1998-2018
Total Spain				
Total exports (€ billion)	99	187	279	181%
Number of firms	75067	96069	114520	53%
Average export by firm (€ thousand)	1323	1948	2436	84%
Average by Province				
Total exports	759033	1393988	2177407	187%
Number firms	515	893	1188	131%

Source: own elaboration using the Customs' database.

Map 1 presents the value of provincial exports accounted for by the top exporter in 1998 and 2018. The darker the color, the higher the concentration of exports in the top exporter. In 1998 and 2018, twenty provinces out of fifty had a top exporter representing more than 20% of aggregate exports. In 1998, there were seven provinces whose top exporter accumulated more than 50% of aggregate exports. Twenty years later, the number reduces to only three provinces. Nevertheless, the number of provinces in which the top exporter's share is greater than 20% remains stable (20 provinces) for both years.

MAP 1.
Share of top exporter by province and year

Top1 - 1998

Top1 - 2018

(50,100) (7) (20,50) (13) (10,20) (15) (0,10) (15)

(50,100) (3) (20,50) (17) (10,20) (16) (0,10) (14)

Source: Own elaboration using Spanish Customs.

The share of exports concentrated in the top exporter at the subnational level is greater than at the national level. For the Spanish case, in 2018 the top exporter represented about 2.3% of Spanish exports. At the provincial level, the top exporter represented on average 21.9% of total exports and the top exporter concentrated more than 50% of total exports in three provinces. There is a negative correlation between the share of the top exporter and the economic size of a province.

Next, we compute the contribution of the intensive and extensive margins to aggregate exports following the methodology proposed by Bernard et al. (2009). The intensive margin captures the change in the value of exports of existing trade relationships between the initial and the final year of the period of analysis. The extensive margin refers to the value of new trade relationships. For periods with different length (5, 10 and 20 years), Figure 1 shows the average contribution of the top exporter in the last year of the period to a province´s export growth margins. The top exporter is the firm with the largest exports in the last year. For the 20-years-period, the average contribution of the top exporter to a province's export growth is 19.7%. The contribution to the extensive margin (11.1%) is larger than the one to the intensive margin (8.6%). For the 10- and 5-years-period, the overall contribution of the top exporter was 26.6% and 28.1%, respectively, with the contribution to the extensive margin (6.0%) being smaller than the one for the intensive margin (22.1%). In line with de Lucio et al. (2011), the contribution of the top exporter to the extensive margin diminishes relative to that of the intensive margin as the period analyzed becomes shorter.

Average contribution of the top exporter to a Spanish province export growth margins
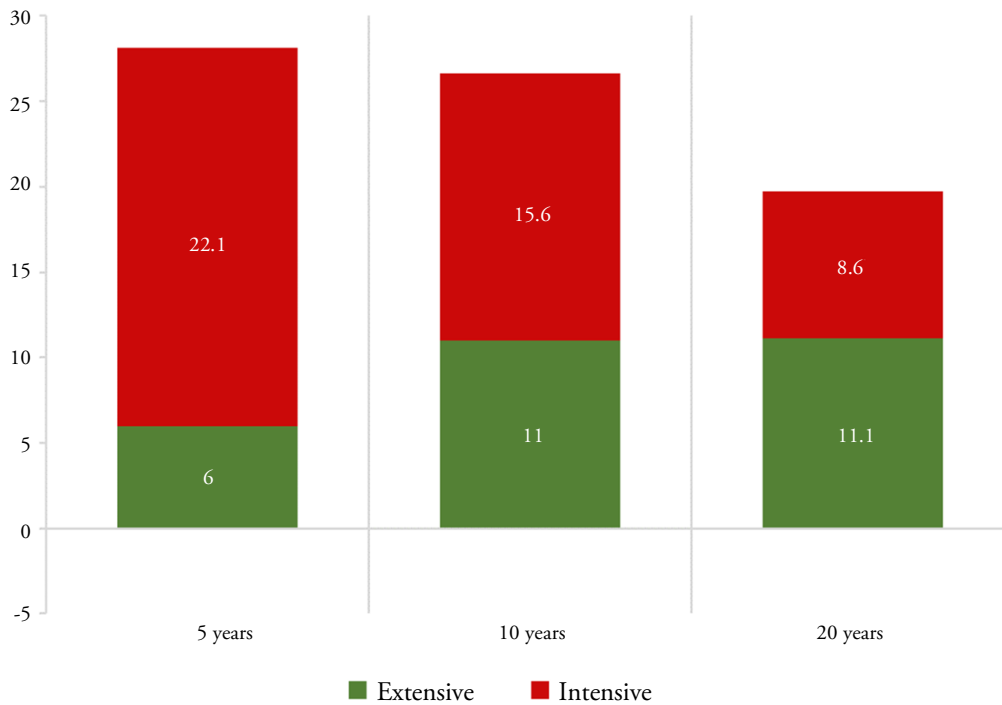
Note: The top exporter is the firms with the largest exports in the last year of the period. Source: own elaboration using Spanish Customs.

3. THE IMPORTANCE OF THE TOP EXPORTER IN REGIONAL EXPORT GROWTH VOLATILITY

The granular hypothesis states that idiosyncratic firm-level shocks to the largest firms in the economy have a significant impact on aggregate fluctuations (Gabaix, 2011). Transferring this concept to the field of international trade, if top exporters are "big grains", idiosyncratic shocks to top exporters may have a significant impact on aggregate export fluctuations. We apply the methodology proposed by Gabaix (2011) to calculate the contribution of the granular residual of the top exporter to the variation in regional export growth.

Firstly, for each province j, we define $X_{i,t}$ as the value of exports of firm i from province j in year t. For each firm in the province, we calculate the mid-point annual growth of exports as follows:

$$g_{ij,t} = \frac{X_{ij,t} - X_{ij,t-1}}{(X_{ij,t} + X_{ij,t-1})/2} \tag{1}$$

We also calculate the average firm growth rate in the province j as:

$$\bar{g}_{j,t}^{Q} = \frac{\sum_{ij \in Q} g_{ij,t}}{N_{j,t-1}^{Q}} \tag{2}$$

where $N_{j,t-1}^{Q}$ is equal to a given number of exporters (Q) in province j at the beginning of the period. In the regression analysis, we will consider two definitions of Q: the total number of exporters in the province (Q=all) and the top 100 exporters in the province (Q=100).

Secondly, we calculate the idiosyncratic component of the "top" firm in the province j for each year, $ic_{top,j,t}$, as the difference between the top firm's growth rate and the average firm's growth rate in the province:

$$ic_{top,j,t} \ = \ g_{top,j,t} \ - \ \bar{g}_{j,t}^{Q} \qquad (3)$$

Thirdly, we calculate the granular residual, $r_{top,j,t}$, as the idiosyncratic component of the top firm weighted by the share of the top firm in total exports in the province j at the beginning of the period ($share_{top,j,t-1}$):

$$r_{top,j,t} \ = \ ic_{top,j,t} \ share_{top,j,t-1} \qquad (4)$$

Finally, we regress the change in aggregate exports on the granular residual of the top exporter:

$$g_{j,t} \ = \ \alpha + \ \beta_1 r_{top,j,t} + \beta_2 r_{top,j,t-1} \ + \ \varepsilon_{j,t} \qquad (5)$$

Where α is a constant, $\varepsilon_{j,t}$ is the error term and $r_{top1,j,t-1}$ is the lagged granular residual.

Table 2 provides the estimation results of equation (5) after pooling all the observations. We run the regressions using two samples of exporters (Q=all and Q=100) to calculate the average firm's export growth by province. Province fixed effects (columns 2, 3, 5 and 6) control for relative economic size and other time invariant province-level characteristics. In all regressions, the granular residual coefficient is positive and highly statistically significant, suggesting a positive correlation between shocks to the top exporter and fluctuations in aggregate provincial exports. When we introduce a one-year lag granular residual, the estimated coefficient is not statistically different from zero. The adjusted R^2 statistic ranges from 39% to 42%, which confirms the importance of the top exporter in explaining the fluctuation of export growth at the regional level. De Lucio et al. (2017) investigated the importance of top national exporters at the product-destination level and found that the top exporter in each trade relationship (product-destination) explained around 29% of the variation in exports. Our finding confirms that smaller economies have larger granular effects.

TABLE 2.
Pooled regression analysis of the granular hypothesis

	(1)	(2)	(3)	(4)	(5)	(6)
Granular residual	0.990***	1.016***	1.018***	0.943***	0.975***	0.979***
	[0.0373]	[0.0383]	[0.0390]	[0.0373]	[0.0383]	[0.0390]
Lagged Granular residual			0.0256			0.0438
			[0.0386]			[0.0386]
Constant	0.0295***	0.0290***	0.0297***	0.0485***	0.0486***	0.0501***
	[0.00348]	[0.00350]	[0.00365]	[0.00349]	[0.00350]	[0.00358]
Q firms	All	All	All	100	100	100
Observations	1000	1000	950	1000	1000	950
FE Province	No	Yes	Yes	No	Yes	Yes
Adjusted R2	0.413	0.406	0.410	0.390	0.384	0.391

Note: Standard errors in brackets. *** p<0.01, ** p<0.05, * p<0.1

Next, we run 50 separate regressions with 20 observations each, over the period 1998-2018. We report the adjusted R^2 statistic obtained from estimating equation (5) for each province. We are interested in the value of the R^2 statistic as a measure of the goodness-of-fit, that is, the part of the variance of the dependent variable explained by the variation of the independent variable(s). Figure 2 shows that all but 5

provinces have positive adjusted R² statistics, with values ranging from zero to 0.82. This reveals that the validity of the granular hypothesis varies by provinces. In 21 provinces the adjusted R² statistic is above 0.40, indicating that shocks to the top exporter are strongly correlated with fluctuations in export growth in several provinces.

FIGURE 2.
Province-specific adjusted R-squared
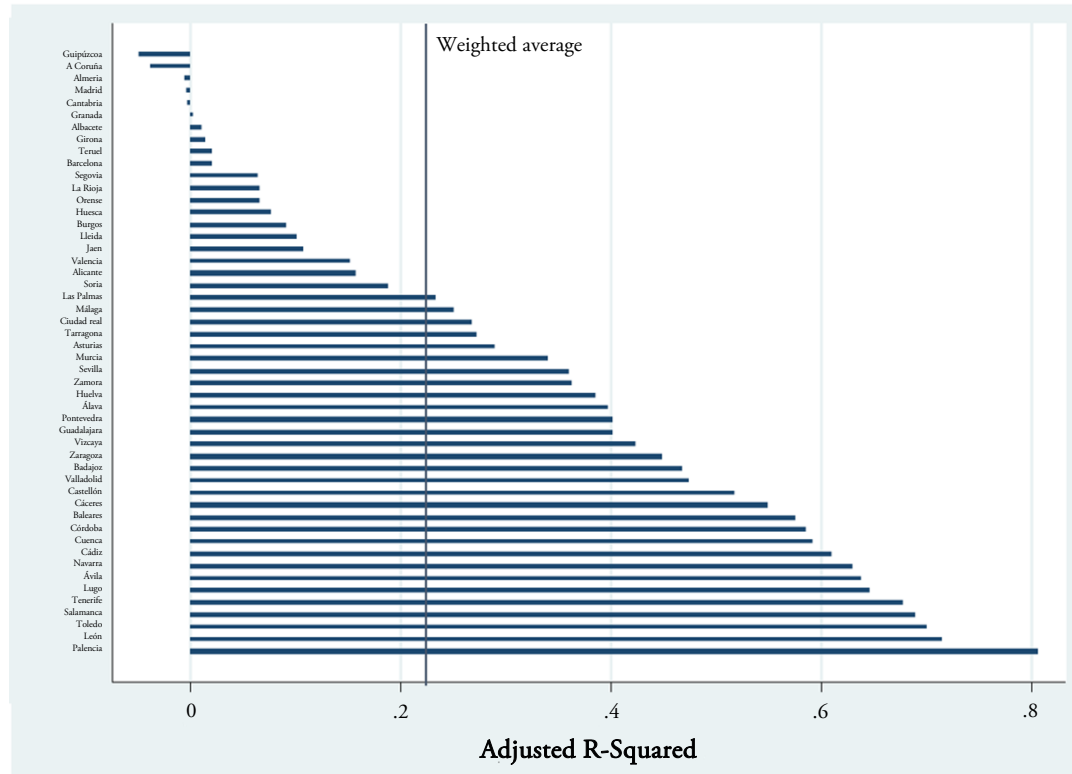
Note: Based on estimates of equation (5) province-by-province with Q=all. The vertical line represents the weighted average of the 50 province´s "granular" components whose value is 0.219; the weights are the province´s export shares over the period. Source: own elaboration using Spanish Customs.

4.   CONCLUSIONS

We use firm-level data for 50 Spanish provinces over the period 1998-2018 to show that the role of the top exporter at subnational level is very relevant for the purpose of explaining export concentration, export growth and export growth volatility. For the majority of provinces, the top exporter´s idiosyncratic shocks are strongly correlated with the fluctuations in aggregate export growth.

From a policy maker perspective, our analysis suggests that regional promotion policies could have an impact on aggregate export growth and volatility. Local governments need to know the characteristics of the export base of each territory, paying particular attention to large companies and their role in the aggregate volume of local exports. That is, it is important to adjust export support policies to local singularities, in order to avoid medium and long-term vulnerabilities linked to the granular influence of certain companies. Diversifying the base of exporting companies could thus contribute towards generating a level of stability in export flows, reducing excessive dependence and any associated risks.

ACKNOWLEDGEMENTS

REFERENCES

Bernard, A. B., Jensen, J. B., Redding, S. J., & Schott, P. K. (2009). The margins of US trade. *American Economic Review*, *99*(2), 487-493. https://doi.org/10.1257/aer.99.2.487

Blanco-Arroyo, O., Ruiz-Buforn, A., Vidal-Tomás, D., & Alfarano, S. (2018). On the determination of the granular size of the economy. *Economics Letters*, *173*, 35-38.

de Lucio, J., Mínguez, R., Minondo, A., & Requena, F. (2011). The extensive and intensive margins of Spanish trade. International *Review of Applied Economics*, *25*(5), 615-631. https://doi.org/10.1080/02692171.2011.557051

de Lucio, J., Mínguez, R., Minondo, A., & Requena, F. (2017). The granularity of Spanish exports. *SERIEs: Journal of the Spanish Economic Association*, *8*(3), 225-259. https://doi.org/10.1007/s13209-017-0157-x

Freund, C., & Pierola, M. D. (2015). Export superstars. *Review of Economics and Statistics*, *97*(5), 1023-1032. https://doi.org/10.1162/REST_a_00511

Gabaix, X. (2011). The granular origins of aggregate fluctuations. *Econometrica*, *79*(3), 733-772. https://doi.org/10.3982/ECTA8769

ORCID

Juan de Lucio	https://orcid.org/0000-0002-9335-6000
Raúl Mínguez	https://orcid.org/0000-0003-0613-6948
Asier Minondo	https://orcid.org/0000-0001-8566-1278
Francisco Requena	https://orcid.org/0000-0003-1043-0277