



POLICY NOTE OF WP4.19

FIRM EXPORTS, INNOVATION, ... AND REGIONS. Lessons from Spain.

**Enrique López-Bazo, Elisabet Motellón
AQR-University of Barcelona**

1. OBJECTIVES OF RESEARCH

Empirical studies exploiting firm-level data have provided wide evidence supporting the role played by productivity and other sources of firm heterogeneity in explaining firm export activity. Particularly, several recent papers have compared the export performance of innovative and non-innovative firms, concluding that there is a causal effect of innovation on exports, particularly in the case of product innovations. Nonetheless, all the studies that have analysed the link between innovation and firm exports so far have neglected the role of space. That is to say, they conclude on the effect of firm's innovation on its exports regardless of the particular location of the firm. However, a bunch of recent studies recognise the potential role played by agglomeration economies and other regional factors, and add them to the list of firm-level characteristics when explaining firm export performance. Their results indicate that exports of otherwise similar firms depend on the characteristics of the regions in which they are located. Nevertheless, none of these studies have put the stress on the role of innovation and, in particular, in studying if regional differences in the firm's propensity to innovate are behind those observed for the extensive and intensive margins of exports. In fact, all of them assume that the change in the propensity, and intensity, of exporting as a result of increasing firm's innovative activity is the same in all locations.

In contrast, our starting point in this study is that such a response is shaped by regional factors, which causes the effect of innovation on firm exports to be regionally heterogeneous. The main objective of this paper is to provide evidence on the regional effect of firm's innovation (product and process) on both the propensity to export and the export intensity for exporting firms. Results from the sample of Spanish firms, and from each of the Spanish NUTS2 regions, allow us to derive implications for the likely effectiveness of policies aiming at promoting exports in the ENC, and for the expected evolution of spatial disparities within each of these countries.

2. SCIENTIFIC METHOD

The study provides evidence on the effect of firm's innovation on both the propensity to export –extensive margin– and the export intensity for exporting firms –intensive margin, in each of the Spanish NUTS2 regions for 2005. It does so by exploiting firm-level data from the Innovation in Companies Survey (ICS), undertaken by the Spanish Statistical Office. The ICS provides detailed information on technological and non-technological innovations following a methodology based on the OCDE Oslo Manual. Interestingly, the ICS also provides information on firm performance, including sales abroad, total sales, number of employees, employees with tertiary education, and the firm's sector of activity. The ICS sample is designed to guarantee representativeness at the regional level. Specifically, it contains samples that represent the population of firms in each of the NUTS II regions in Spain

The regional effects of innovation on the extensive margin are estimated from probit (under the assumption of exogeneity of the measures of innovation) and biprobit (controlling for endogeneity of the measures of innovation) models for the probability of exporting. In turn, least square (under the assumption of exogeneity) and instrumental variables (to control for endogeneity) estimators are used to estimate the regional effects of innovation on the intensive margin from a linear specification of the share of exports in firm's total sales on the set of firm characteristics. In selecting instruments for firm's innovation we follow the recent literature, which suggests using as instruments measures of education, training, and firm's investment strategy, impulses and obstacles to the innovative activity, and public support to R&D. Instrumenting for innovation prevents the bias in the estimates caused by bilateral causation and by unobservable characteristics simultaneously affecting firm's innovation and export activity. In that regard, it should be mentioned that the cross-section sample used in our analysis does not allow us controlling for unobservable firm effects, though it is rich enough to guarantee the inclusion of a large set of controls in the specifications used to estimate the effect of innovation on firm export activity (such as productivity, size, and sector of activity).

The estimated coefficients in each region are combined with the sample values of firm characteristics to compute counterfactual margins of exports in each region, under different scenarios for the propensity to innovate in products and in processes. Comparison of actual and counterfactual regional margins allows more intuitive assessment of the impact of regional differences in innovation on those observed in export performance.

3. MAIN RESULTS

The paper provides evidence on the effect of firm innovation on export performance from a regional viewpoint. Using firm-level data, we have shown that:

- 1) There are substantial disparities across regions in the firm export performance. Regional differences in the extensive and intensive margins of exports are as

large as those observed between EU Member States. Regions also differ in terms of the firm propensity to innovate.

- 2) Innovative firms are more prone to export than otherwise similar non-innovative firms, in all Spanish NUTS2 regions. However, the effect of innovation is far from regionally uniform. On the contrary, the increase in the propensity of exporting due to innovation has been estimated to be larger in regions where the extensive margin of exports is high; this result being robust to the alternative measures of innovation considered in the analysis.
- 3) Regional disparities have been reported also for the effect of innovation on the share of sales abroad by exporting firms. However, the impact of innovation on the intensive margin of exports is moderate, and even negligible, in most regions, which lead us to conclude that the regionally differentiated effect of innovation on exports is due mostly to differences in its effect on the extensive margin.

All in all, our results confirm the key role played by firm's innovative activity and suggest that the particular location of the firm should be considered when assessing its contribution to stimulate firm's export propensity.

4. POLICY VALUE-ADDED

From a general perspective, results in the paper suggest that regional differences in export sunk costs might be causing differences across regions in the export's response to innovation. Innovation contributes to raising future firm's productivity and/or to having more attractive products, and thus to making easier for the firm to face the extra costs of exporting. Even under the assumption that firms in all regions are similarly effective in translating innovation into higher productivity and competitiveness, it is sensible to think that geography, agglomeration, and certain regional endowments cause differences across regions in sunk costs. As a result, the benefits of innovation allow covering extra exporting cost for firms in some regions but not in others. This argument can explain the greater effect of innovation on export status estimated for regions with a high extensive margin of exports. Therefore, policies aiming at increasing the number of exporting firms in regions with a low extensive margin of exports should encourage generation and/or adoption of innovation by non-exporting firms and, simultaneously, compensate in some way the location disadvantage of these areas.

More specifically, results from the sample of Spanish firms, and from each of the Spanish NUTS2 regions, allow us to derive some implications for the likely effectiveness of policies aiming at promoting exports in the ENC:

- 1) The stimulus of firm's innovation (in products and in processes) can be an effective policy to increase the share of exporting firms in the ENC in the medium and long term. Innovation, developed by firms within the ENC or generated elsewhere but adopted by firms in these countries, increases competitiveness and thus the chances to sale abroad, raising the volume of exports from ENC.
- 2) To be effective, direct policies aiming at stimulating exports in the short run, should focus on innovative firms from the ENC with a level of productivity

above a given threshold. They are the group of firms with the highest chances of success in foreign markets and therefore they should be the target of such direct policies designed to facilitate sales abroad (by means of providing information, credits, easing contacts with potential costumers, etc).

Finally, our results warn of a sort of regional or spatial divide in the ENC as a result of the increase in the export potential of these countries. The increase in the number of exporting firms is expected to be more pronounced in certain areas within each ENC, which will cause polarization in the spatial distribution of production and income in these economies. This is in line with the evidence in the recent literature regarding the link between openness and within-country regional inequality. In combination with certain country-specific conditions, trade has a positive and significant association with regional disparities. Since such an effect has been proved to be significantly higher for low- and middle-income countries, this should be a concern for the group of ENC.