

Export starters and exiters: Do innovation and finance matter?

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ABSTRACT

Using European Central Bank restricted-access biannual data on European small- and medium-sized enterprises (SMEs) over the period 2014–2017, we analyze the impact that innovation, financial constraints, and an efficient regulatory environment exert on the probability of switching from the status of nonexporter to exporter and *vice versa*. We find that either the use of finance for innovation or undertaking product innovation increases the likelihood of starting to export and lowers the likelihood of stopping exporting. Although SMEs' financial frictions are negligible for foreign market entry, they matter for increasing the probability of exiting. We also document that a friendly regulatory environment is conducive to start—but not to stop—exporting. Our findings provide empirical support for the recent European Commission policies on both SMEs' internationalization and access to finance.

1. Introduction

Since the seminal contributions of Roberts and Tybout (1997), Bernard and Jensen (1999, 2004), and Besedes and Prusa (2006), a growing amount of empirical studies has analyzed the drivers of international market entry and exit. Here, entry means establishing new operations in a foreign industry, overcoming the barriers that protect incumbents. Exiting means reducing revenue opportunities within the production possibility available to a firm. Under the assumption of costless international trade, opening up to foreign markets mainly depends on an increase in aggregate demand rather than on firms' decisions and market structures. However, the assumption of a costly trade yields sharply different predictions. A fixed export cost generates selection into foreign markets such that only the most productive firms sell abroad. In this context, according to the “new-new” trade theory, participation in the international arena is based on firms' heterogeneity and the costs of entering foreign markets (e.g., Melitz, 2003; Helpman, 2006; Melitz and Redding, 2014; Alborno et al., 2016). Some papers

within this theory address the links between firms' internationalization and innovation activities (Constantini and Melitz, 2008; Atkeson and Burstein, 2010; Impulliti and Licandro, 2018). Innovation is crucial in maintaining a competitive advantage in foreign markets because only firms that succeed in maintaining their competitive advantage are likely to survive in the global arena although a causal link between internationalization and innovation may run in both directions (e.g., Aw et al., 2007; Constantini and Melitz, 2008). Finally, imperfections in financial markets may drastically restrict international trade flows because exporting companies often require external capital on a regular basis to function. Financial frictions and trade intermediation have also been incorporated into heterogeneous-firm models to show the selection between domestic production and exporting (Manova, 2013; Chan, 2019).

The bulk of this literature provides a theoretical mechanism that unveils that export market entry and exit is, from one side, driven by firms' heterogeneity in productivity and, on the other side, driven by external enablers, such as access to external finance, countries' financial development, and measures of doing business, among others.

Branching out from these contributions, our study investigates the internal and external drivers shaping firms' entry and exit deci-

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sions, using for both the entry and exit choices the same explanatory variables in a similar fashion to the “new-new” trade theory. Our empirical setting does not directly use productivity to frame companies’ export decisions, instead relying on indirect drivers of firms’ productivity. We consider that innovation affects productivity and, therefore, is correlated with a firm’s performance and growth (Love and Roper, 2015; Di Cintio et al., 2017). Specifically, we test whether the use of finance for developing and launching a new product (which is meant to be a proxy for research and development (R&D) activities), the types of innovation, and the access to external credit affect foreign market entry or exit for European small- and medium-sized enterprises (SMEs). We also check whether operating in a context where institutions, regulations, and public support are crucial. Additionally, to consider firm and country heterogeneity, we include a large set of firm- and country-level controls.

There are two reasons that show the relevance of our research. First, understanding which factors shape firms’ competitiveness in the international arena is of the utmost importance during periods of strong international competition and trade slowdowns. These factors are particularly relevant for European SMEs that traditionally have had a high dependency on local markets, with a modest engagement in global trade (European Commission, 2010). Second, European policy makers are interested in knowing how to frame actions designed to encourage innovation, foster competitiveness, and enhance total factor productivity to avoid the lost decade scenario (Filos, 2017).

In the current paper, we use restricted-access biannual data drawn from the European Central Bank’s (ECB) Survey on the Access to Finance of Enterprises (SAFE). SAFE tenders the appropriate information to investigate the composite relations between the decision to become an exporter or an export exiter, the decision to innovate, and the firm’s financial constraints. Although SAFE does not include data from balance sheets, it offers several relevant advantages. First, a self-assessment of the firms is often the only way to capture qualitative information that does not appear in any externally validated measure. We can trace firms’ share of exports over time, allowing us to capture the change in their export status. Then, we can assess whether firms have used external or internal finance for developing and launching new products and services, and we can also disentangle across several types of innovation. Furthermore, SAFE provides qualitative information on the declared financial frictions and problems faced by SMEs in accessing credit. Finally, SAFE provides homogenous information for a very large sample of European SMEs, enabling us to also account for cross-country heterogeneity.

Our paper contributes to the literature in several ways. First, we analyze the change over time in the firm’s export status—from nonexporter to exporter and from exporter to nonexporter—by using a unified and symmetric framework that takes into account a set of critical drivers that simultaneously affect those switches. In this respect, we complement the existing literature, which deems these enablers separately by jointly accounting for the role of innovation, access to credit, and the regulatory environment. We believe that the interplay between these variables is relevant to understanding the change in SME export status. Indeed, small companies often suffer from constrained access to external finance, which hampers innovation, and they are more likely to be affected by the negative externalities of an inefficient regulatory environment. Second, we rely on two measures of innovation to assess their impact on the change in export status. The first, which can be interpreted as a proxy for R&D expenses (innovation input), captures how using external or internal finance for the purpose of innovation affects firms’ probability of starting or stopping to export. The second, which is obtained by disentangling different types of innovation (i.e., product, process, and organizational), has the ad-

vantage of providing direct information on the innovation carried out by firms (innovation output) rather than relying on R&D expenses data, which do not necessarily turn into actual innovation. Third, we explicitly consider how the perceived problems in access to finance—which is normally not reported in balance sheet data—affect the change in export status, providing brand new evidence on how a subjective measure of credit constraint influences global engagement. Fourth, unlike most empirical papers that have focused on single countries, we consider how cross-country heterogeneity in institutional quality affects foreign market entry and exit. Finally, we cope with potential endogeneity issues by making use of three different econometric techniques, that is, a one-period-lagged variables panel probit model, an instrumental variable (IV) probit, and a system generalized method of moments (SYS-GMM).

Our results can be summarized as follows: We find evidence that firms that have used their obtained financing to develop or launch new products and services enjoy a higher probability of starting to export and a lower likelihood of exiting foreign markets compared with their peers that have not. We also show that undertaking product innovation matters for both the probability of starting and stopping to export, while process innovation influences only the likelihood of starting to export. Moreover, our estimates show that difficulties in accessing external finance do not influence firms’ likelihood of changing their status from nonexporter to exporter. On the contrary, exporters facing problems in accessing external finance are more likely to exit the international arena. As far as country heterogeneity is concerned, some external drivers, such as an efficient regulatory environment, play a role in affecting the switch from nonexporter to exporter (Commander and Svejnjar, 2011; Besley, 2015). Conversely, a friendly business environment does not alter the likelihood of exiting, which is possibly more driven by firm-level choices, financial constraints, and the regulatory environment in the destination country. Our investigation also documents that some specific firm controls, such as sources of funding, performance, and types of ownership, play a role in affecting the change in export status.

The present paper is organized as follows: In the next section, we discuss the empirical literature and formulate our research hypotheses. Section 3 describes the data, model, and methodology. Section 4 shows the results, while Section 5 concludes the paper and provides policy recommendations.

2. Related literature and research hypotheses

Several studies in the field of international trade have investigated the determinants of firms’ inclination to access and survive in foreign markets. A number of articles have also looked into firms’ strategies for export market entry and exit, relying on the same set of explanatory variables to explain both decisions, where total factor productivity represents the seminal building block for the empirical proof of the “new-new” trade theory predictions.

In his seminal contribution, Melitz (2003) indicates that opening up to trade implies paying sunk entry costs to overcome trade barriers. Only the most productive companies can cope with these sunk costs and, hence, can exploit the benefits of selling abroad. In equilibrium, only those companies that are above the “export productivity cutoff” threshold will gain from exporting. Conversely, the least productive firms, that is, those below the “zero-profit productivity cutoff” threshold are forced to exit, while the less productive ones will operate in the domestic market only. This prediction, indicating that exporters display a productivity advantage before engaging in exporting, is also known as the self-selection hypothesis. Constantini and Melitz (2008) develop a model to assess how firms adjust to trade liberalization by jointly considering the decisions of export market entry, exit, and innovation.

Constantini and Melitz (2008) assume that firm-level productivity evolves stochastically, and as in Melitz (2003), they take into account the sunk nature of market entry costs for both the domestic and export market; they show that the path of liberalization impacts the timing with which companies decide to start to innovate and export. Along this reasoning, Melitz and Redding (2014) argue that firm productivity stems from exogenous factors, such as external shocks, and from endogenous determinants, such as innovation or technology adoption choices. Within their framework, the opening up to trade is tightly connected with undertaking innovation or investing in technology. In equilibrium, the prediction of how firms enter and exit from foreign markets stems from companies' heterogeneity in realized productivity, which is in line with Melitz's (2003) model.

Manova (2013) derives a model that yields interesting predictions about the relationships among credit constraints, the level of regulation, and a firm's production structure. According to this framework, financial frictions might generate distortions that affect the probability of becoming an exporter. The idea is that the more efficient producers are, the more they are likely to have larger revenues and profits, hence receiving more funding from credit institutions because they are more likely to pay them back and guarantee higher returns. Moreover, the regulatory environment matters for international trade as a heavier bureaucratic burden, which increases the costs of doing business, may discourage firms from entering foreign markets.

Looking at financial constraints, Azkenazy et al. (2015) develop a theoretical model that predicts the effects of liquidity constraints on a firm's decision to enter and exit a foreign market. Azkenazy et al. (2015) expect financial frictions to hamper firms' entry into foreign markets by reducing the possibility of financing sunk entry costs, as well as increasing the probability of exit because maintaining the export position in a foreign market implies reoccurring costs.

The abovementioned contributions unveil the theoretical mechanism that affects the decisions of both foreign market entry and exit. Yet there is also a vast amount of empirical literature that has focused on the relationship between firm export engagement and i) innovation, ii) financial constraints or iii) the institutional environment.

The interplay between innovation and export has been largely analyzed in the empirical literature with different nuances (e.g. Roper and Love, 2002; Atkeson and Burstein, 2010; Golovko and Valentini, 2011; Love and Roper, 2015). A number of papers have analyzed the relationship between innovation and export through an analysis of R&D, given that there is a strong association between innovative outcomes and research efforts (Aw et al., 2008; Love and Roper, 2015). For instance, Wakelin (1998) shows that the number of innovations recorded by British companies at both the industry and firm levels increases the likelihood of starting to export but has no effect on export intensity. More recently, Dosi et al. (2015) and Di Cintio et al. (2017) in an Italian context and Esteve-Pérez and Rodríguez (2013) in a Spanish context show a strong interdependence between export engagement and R&D activities. Other papers have disentangled the types of innovation to investigate their impact on the firm's export engagement. Roper and Love (2002) observe that product innovation affects both the extensive and intensive margins of exports, but these are different in the UK and in Germany. Similar results are obtained by Caldera (2010), who finds both product and process innovation exert a positive impact on the extensive margin of exports in Spain. Analogous outcomes are provided by Esteve-Pérez and Rodríguez (2013), who also provide evidence that product innovation matters more than process innovation. Also working in the context of Spain, Cassiman et al. (2010) find strong evidence that product innovation, not process innovation, affects productivity and induces

Spanish nonexporting SMEs to enter the export market. For Turkish firms, Lo Turco and Maggioni (2015) confirm these results. Using a sample of German companies, Becker and Egger (2013) highlight how product innovation matters more than process innovation when it comes to increasing the likelihood of exporting, while Lejpras (2015) finds that product innovations and patent applications enhance exporting participation.

Another strand of empirical literature focuses on the link between financial constraints and firms' export engagement. Credit constraints hamper firms' possibility to enter into foreign markets because of the high sunk costs of exports that can lead to self-selection (Bellone et al., 2010; Minetti and Zhu, 2011; Temouri et al., 2013; Demirhan, 2016; Secchi et al., 2016; Serrano and Myro, 2019). In this direction, Görg and Spaliara (2014) show that export starters and exiters are more severely hit by a change in credit conditions than firms that continuously export or have never exported. Using data for UK firms, Spatareanu et al. (2018) show that worsening bank health, induced by the financial crisis, negatively affects UK firms' exports. Yet other studies argue that companies already internationally active enjoy easier access to finance, widening the sources of credit they can rely on. Different from these mainstream outcomes, Greenaway et al. (2007) show that financial health is not a prerequisite to entry into a foreign market for UK manufacturing firms, but instead, it is the result of companies' trade engagement with foreign partners. This evidence is in line with Stiebale (2011), who finds no effect of financial constraints on either the extensive or the intensive margins of exports in a French context. Similar findings are obtained by Wagner (2019) who showed that the access to finance is seldom a problem for the export engagement for a large sample of European SMEs.

The empirical literature has also recognized the importance of a friendly business environment when it comes to enhancing foreign market performance (Besley, 2015). Legal, institutional, and regulatory systems have been widely recognized as relevant drivers for economic growth, which also explains firms' performance. Barriers to doing business are heterogeneous across regions and countries, and they affect aggregate performance, along with the operations in foreign markets (Commander and Svejnar, 2011).

Our analysis builds on the abovementioned theoretical and empirical contributions. Although the links between either innovation efforts and export market entry or access to external finance and export entry have received sufficient attention in the literature, the role of innovation on foreign market exit and credit constraints on export survival have been less investigated, particularly for micro-sized firms. To the best of our knowledge, the associations between innovation, financial constraints, ease of doing business and export have not been jointly analyzed in a single framework.¹ We fill this gap by providing a unified setting that describes the mechanism behind the switch from nonexporter to exporter and *vice versa*, not merely for European SMEs but also for micro-sized companies.

Hence, we formulate the following hypotheses:

H1. *SMEs face a higher probability of becoming an exporter or a lower probability of becoming an exiter if they have undertaken any type of innovation.*

¹ Indeed, our model extends the setting of Rossi et al. (2018) that only focuses on the impact that venture capitalists or business angels exert on the probability of starting to export for European SMEs. Also, Altomonte et al. (2016) employ a unified empirical strategy to study the link between R&D investments, credit constraints, total factor productivity, and exporting. However, the latter work does not consider the change of status from exporter to nonexporter, whereas the former work considers only the probability of starting to export.

H2. SMEs face a lower probability of becoming an exporter or a higher probability of becoming an exiter if they declare that access to external finance has been a relevant problem.

H3. SMEs face a higher probability of becoming an exporter or lower probability of becoming an exiter if they operate in an efficient regulatory environment.

3. Data, model, and methodology

3.1. Data

Our main source of data is SAFE, a survey administrated every six months by the ECB and the European Commission (EC). The dataset is harmonized and homogeneous and supplies micro-level information about SMEs' experience in accessing finance, their specific financial needs, and firm-level characteristics that are based on self-assessed statements and perceptions. The interviewed firms in each survey round of the SAFE (called a *wave*) are nonfinancial SMEs and large companies that are randomly selected from Dun & Bradstreet data. Specific weights are used to ensure size, sector, and country representativeness.

SAFE started in 2009, but only in 2014 did it begin to supply data on firms' export activity. Using this information, we concentrate our investigation from the 11th wave onwards. Moreover, we chose the European countries for which the relevant data are available during the entire time span of our interest.² Finally, to control for the large cross-country heterogeneity in the macroeconomic and structural characteristics of our sample, we rely on country-level data from the World Bank (cf. Section 3.3).

3.2. Dependent variables: Export Starter and Export Exiter

To build our dependent variables, we use the share of a firm's export on its total sales (ranging from 0 to 100), which is provided in question D7 of SAFE. By using this piece of information, we generate a dummy variable (Exp_{it}) equal to 1 if the firm i at time (*wave*) t exports and 0 otherwise. To detect the firm-level change over time in the export status, we rely on the panel structure of our dataset. In a similar fashion to Rossi et al. (2018), we capture the change in the export status by using the first difference of the abovementioned variable, that is, $Exp_{it} - Exp_{it-1}$. This difference generates three possible results: *i*) +1, which captures the change from nonexporter to exporter (i.e., firm i exports at time t and did not export at time $t-1$); *ii*) 0, which indicates that the firm has not changed its status over time; and *iii*) -1, which accounts for the change from exporter to nonexporter (i.e., if the firm i does not export at time t and exported at time $t-1$). To generate our key variables we employ the two outcomes stemming from *i*) and *iii*).

The first one, $Export\ Starter_{it}$ —which captures the change from nonexporter to exporter and classifies a company as a new exporter—is a dummy taking the value of 1 if the outcome of the difference $Exp_{it} - Exp_{it-1}$ is equal to +1, while it takes the value of 0 if a firm has never exported. The firms that stop exporting—that is, the outcome of the difference is -1—are excluded from the sample. The second key variable, $Export\ Exiter_{it}$ —which captures the change from exporter to nonexporter, thus identifying the status of an export market exiter—is a dummy taking the value of 1 if the outcome of the difference $Exp_{it} - Exp_{it-1}$ is equal to -1, while it takes the value of 0 if the firm has been continuously exporting.

² The countries included in our sample are as follows: Albania, Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Italy, Ireland, Hungary, Latvia, Lithuania, Luxembourg, Macedonia, Malta, Montenegro, Poland, Portugal, Romania, Slovenia, Spain, Sweden, the Netherlands, and the UK.

Thus, in this case, firms that start exporting—that is, the outcome of the difference is +1—are not included in the sample.

3.3. Model and variables

To frame the change in the firm's export status, we employed a symmetric model that relies on the same set of variables to analyze export entry and exit choices. Therefore, we test our hypotheses (H1–H3), employing the following two equations.

To examine the probability of turning into an exporter (versus nonexporters), we opt for the following panel data model:

$$\Pr(Export\ Starter_{it}) = F(Innovation_{it}, Finance_{it}, OP_{it}, X_{it}, W_{jt}) \quad (1)$$

where i , j , and t indicate the firm, country, and time, respectively.

Then, we analyze the probability of becoming an export exiter versus continuous exporters:

$$\Pr(Export\ Exiter_{it}) = F(Innovation_{it}, Finance_{it}, OP_{it}, X_{it}, W_{jt}) \quad (2)$$

To proxy for the innovation efforts of the i -th firm, we rely on two alternative measures for $Innovation_{it}$. The first, called $Innovation\#1_{it}$, is a proxy for R&D expenses (innovation input) and is a dummy that indicates that a firm has used the obtained finance to develop or launch new products and services; this variable takes the value of 1 if the firm states it had used its obtained finance for that purpose and 0 otherwise.³

The second, $Innovation\#2_{it}$, captures different types of innovations (innovation output),⁴ and it is employed as a robustness check of our estimates (see Section 4.3). Specifically, we estimate separate regressions to assess the effect of product, process, and organizational innovation on the likelihood of firm entry or exit. To this aim, we employ the following variables: $Product\ Innovation_{it}$ (a dummy equal to 1 if the firm declared as having undertaken product innovation and 0 otherwise), $Process\ Innovation_{it}$ (a dummy equal to 1 if the firm declared as having undertaken process innovation and 0 otherwise), and $Organizational\ Innovation_{it}$ (a dummy equal to 1 if the firm declared as having undertaken organizational innovation and 0 otherwise). A positive sign of the coefficient about $Innovation_{it}$ in model (1) and a negative value in model (2) would support H1.

To capture a firm's experience in accessing finance, we use $Finance_{it}$, which is a vector of several variables. The first, $Finance\ Problem_{it}$, is a dummy equal to 1 if the firm reported that access to finance represents a relevant problem and 0 otherwise. A negative sign of the coefficient about $Finance\ Problem_{it}$ in model (1) and a positive value in model (2) provide support to H2. The rationale behind this is that exporting firms need to rely on more working capital financing than peers, which serve only the domestic market because international trade correlates with longer time lags (Amiti and Weinstein, 2011).

In addition, we use dummies to consider the relevance of the different financing channels for the i -th firm. These are $Internal\ Funds_{it}$, $Bank\ Loans_{it}$, $Credit\ Lines_{it}$, $Grants\ or\ Subsidies_{it}$, $Trade$

³ To build $Innovation\#1$, we use question Q6A in SAFE, which reads as follows: "For what purpose was financing (external and internal) used by your enterprise during the past six months?" The possible answers are: "1) Investments in property, plant or equipment; 2) Inventory and other working capital; 3) Hiring and training of employees; 4) Developing and launching of new products or services; 5) Refinancing or paying off obligations; 6) Other." By using the answer for option 4, we build our variable $Innovation\#1$. It is worth underlining here that for this question, SAFE does not allow for the company to disentangle the finance obtained through external sources from funds internally generated by the enterprise.

⁴ As for $Innovation\#2$ we use question Q1 in SAFE. This question is supplied in the survey every two waves because it relates to the previous 12 months. Therefore, we convert this information at the wave round only for those firms present in consecutive waves.

Credit_{it}, *Family or Friends Loans_{it}*, and *Other Loans_{it}*, which are dummies that are equal to 1 if the respective source of finance is perceived as relevant by the interviewed firm and 0 otherwise. We control for firm heterogeneity by relying on the below set of variables.

First, OP_{it} is a vector of dummies capturing either the different ownership types (i.e., *Family_{it}*, *Business Association_{it}*, *Public Company_{it}*, *Venture Capitalists and Business Angels (VC_{it})*, *Other_{it}*)⁵ or the change in firm's performance. The inclusion of the former is in line with the literature that investigates the link between firm trade internationalization and ownership (see, among others, [Zahra et al., 2007](#); [Paul et al., 2017](#)). As for the latter, because SAFE does not provide enterprises' balance sheet data, we cannot compute proper measures of productivity; therefore, we can only capture variations in performance in the last six months by employing the following four dummies: i) *Competition_{it}*, which takes the value of 1 if the firm states that competition is a major obstacle, either attributable to changes in market conditions or to a loss in internal efficiency, and 0 otherwise; ii) *Growth up_{it}*, which equals 1 if the firm indicates that the number of its employees has risen and 0 otherwise; iii) *Production Cost_{it}*, which is equal to 1 if the firm declares that the cost of production became a major problem and 0 otherwise; iv) *Profit up_{it}*, which takes the value of 1 if the firm's profit has gone up and 0 otherwise.

We additionally control for a vector of standard firm features, X_{it} , including firm size, age, and sector. As for firm size, we employ three dummies: *Micro_{it}*, which equals 1 if the firm has between one and nine employees; *Small_{it}*, which equals 1 if the firm has between 10 and 49 employees; and *Medium_{it}*, which equals to 1 if the firm has between 50 and 249 employees. Regarding firm's age, we utilize the following dummies: *Very young_{it}*, which equals 1 if the firm is less than two years old; *Young_{it}*, which takes the value of 1 if the firm is between two and four years old; *Old_{it}*, which equals 1 if the firm is between five and nine years old; and *Very old_{it}*, which equals 1 if the firm is 10 years old or more. As for the sector composition, we use four dummies for *Industry_{it}*, *Construction_{it}*, *Trade_{it}*, and *Services_{it}* that equal 1 when the firm operates in the areas of industry, construction, trade, and services, respectively.⁶

W_{jt} is a vector of firm-invariant controls. We control for the country and wave dummies, as well as for the variables *Distance to Frontier_{jt}* and *Credit to GDP_{jt}*. *Distance to Frontier*, which is obtained from the Doing Business dataset of the World Bank, is a widely adopted index to proxy the general context for business ([Besley, 2015](#)); it measures the distance of a given nation in a year to the best performance (frontier) in terms of public sector activity and efficiency in institutions and regulations.⁷ We employ this variable to account for the effect of the quality in the regulatory environment on trade internationalization. *Credit to GDP_{jt}*—drawn from the World Bank—indicates the domestic credit to the private sector by banks as a percentage of GDP and is included as a measure of country-level financial development ([Breitenlechner et al., 2015](#)).

⁵ The controlling group is *Single owner_{it}* firms.

⁶ Although SAFE provides data also for large enterprises, those firms are not included in our analysis because we focus only on SMEs. We are not using age and size as continuous variables because SAFE supplies only information on the size and age classes (i.e., less than 10 employees, etc., less than two years old, etc.). As for the sector, SAFE releases information only at the NACE 1-digit. Finally, *Medium_{it}*, *Very old_{it}*, and *Services_{it}* are the controlling groups for size, age, and sector, respectively.

⁷ *Distance to Frontier_{it}* takes values between 0 and 100, where 0 represents the lowest performance and 100 represents the frontier. A score of 100 would require that the economy is on the frontier in all the dimensions that go into this ranking.

3.4. Descriptive statistics

Because we employ two different dependent variables, we rely on two samples of the original observations on SMEs from 30 countries collected across six waves from the 11th to the 16th, that is the period from April 2014 to March 2017. In [Table 1](#), we report the summary statistics of the variables included in our analysis for both the samples of export starters and exiters (Panels A and B, respectively). Although [Table A1](#) reports the distributions of the observations by country,⁸ the correlation matrices between the regressors and description of the variables and sources are reported in the Appendix in [Tables A2, A3, and A4](#), respectively.

Looking at the dependent dummy variable *Export Starter* ([Table 1](#), Panel A), we count 15,968 firm-level observations. These observations include 1,801 new exporters (11% of our sample)—for which the dummy *Export Starter* is equal to 1—and 14,167 continuous nonexporters—for which the dummy is equal to 0.

As for the dependent dummy variable *Export Exiter* ([Table 1](#), Panel B), we obtain 14,710 observations: 1,992 are export exiters (about 14% of our sample)—for which the dummy is equal to 1—and 12,718 are continuous exporters—for which the dummy is equal to 0.

Interestingly enough, by looking at the variable *Innovation#1*, SMEs employ external funds to develop or launch new products and services in about 11% and 21% of the cases for starters and exiters, respectively. When we disentangle for the types of innovation, we observe that on average, the gap between starters and exiters is still present. Indeed, product innovation has been undertaken by about 22% and 35% of *Export Starter* and *Export Exiter*, respectively, process innovation by about 16% and 25%, and organizational innovation by about 21% and 27% (see [Table 1](#), Panels A and B, respectively). As far as the variable *Finance Problem* is concerned, it represents a relevant concern in about 16% and 15% of the cases for the two samples, respectively.

Noticeably, if we look at the sources of financing, we observe that the bank channels (i.e., *Bank Loans* and *Credit Line*) and *Other Loans*—which include some innovative financing sources, such as crowdfunding, factoring, leasing, and debt securities—are employed more than others, as documented by the mean values. *Grants or subsidies*, which was one of the most common measures implemented by governments after the 2008 financial crisis ([Ferrando et al., 2017](#)), have been used in more than one-third of the observations in both Panels A and B.

Our data also show that for more than half of the firms, *Competition* and *Production Cost* are the most relevant concerns. Although only about 21% of the enterprises in the sample of export starters exhibit an increase in the number of employees in the last six months, this percentage rises to 29% in the panel of export exiters. More than 28% and 36% of the observations for Panels A and B, respectively, recorded a rise in profit.

Looking at the ownership types, *Family* and *Single Owner* companies represent the largest groups in our dataset, as displayed by the mean values in [Table 1](#) (Panel A and B), while VC account only for a very small share of SMEs in both samples. These figures are consistent with the fact that more than 80% of the companies in both panels belong to the age class of *Very old*. Although micro-sized firms represent more than half of the observations in the sample of export starters, medium-sized enterprises account for 40% of the observations in the sample of export exiters.

If we look at firms' sector of activity, companies belonging to *Service* are the largest group for the sample of entrants, while *In-*

⁸ Specifically, in [Table A1](#) in the Appendix, we display the sample size for the full SAFE dataset and for the samples of both export starters and exiters by country. The figures show that our samples are not biased because they largely maintain the same proportion of firms by country, as in the original SAFE dataset.

Table 1
Summary statistics for the variables employed in our analyses.

Variables	Panel A Export Starters			Panel B Export Exiters		
	Obs	Mean	Std. Dev.	Obs	Mean	Std. Dev.
Dependent variables						
Export Starter	15,968	0.113	0.316			
Export Exiter				14,710	0.135	0.342
Key regressors						
Innovation#1	15,968	0.112	0.315	14,710	0.213	0.409
Innovation#2:						
Product Innovation	12,225	0.222	0.416	11,612	0.352	0.478
Process Innovation	12,225	0.155	0.362	11,612	0.249	0.433
Organizational Innovation	12,225	0.213	0.409	11,612	0.265	0.441
Finance Problem	15,968	0.159	0.366	14,710	0.148	0.355
Bank Loans	15,968	0.531	0.499	14,710	0.564	0.496
Credit Lines	15,968	0.566	0.496	14,710	0.606	0.489
Grants or Subsidies	15,968	0.323	0.467	14,710	0.385	0.487
Trade Credit	15,968	0.377	0.485	14,710	0.456	0.498
Family or Friends Loans	15,968	0.211	0.408	14,710	0.241	0.427
Other Loans	15,968	0.537	0.499	14,710	0.621	0.485
Internal Funds	15,398	0.266	0.442	14,215	0.353	0.478
Firm-level controls						
Competition	15,968	0.620	0.485	14,710	0.643	0.479
Production Cost	15,968	0.648	0.478	14,710	0.665	0.472
Growth up	15,968	0.212	0.409	14,710	0.294	0.456
Profit up	15,968	0.286	0.452	14,710	0.360	0.480
Family	15,968	0.457	0.498	14,710	0.494	0.500
Business Association	15,968	0.088	0.283	14,710	0.153	0.360
Public Company	15,968	0.011	0.104	14,710	0.022	0.146
VC	15,968	0.004	0.063	14,710	0.011	0.103
Other	15,968	0.030	0.170	14,710	0.027	0.162
Single owner	15,968	0.410	0.492	14,710	0.293	0.455
Micro	15,968	0.518	0.500	14,710	0.272	0.445
Small	15,968	0.300	0.458	14,710	0.324	0.468
Medium	15,968	0.182	0.386	14,710	0.404	0.491
Very young	15,968	0.010	0.099	14,710	0.006	0.078
Young	15,968	0.047	0.211	14,710	0.029	0.168
Old	15,968	0.129	0.335	14,710	0.108	0.311
Very old	15,968	0.813	0.390	14,710	0.856	0.351
Industry	15,968	0.118	0.323	14,710	0.428	0.495
Construction	15,968	0.164	0.370	14,710	0.062	0.241
Trade	15,968	0.300	0.458	14,710	0.246	0.431
Service	15,968	0.418	0.493	14,710	0.264	0.441
Country-level controls						
Distance to Frontier	15,968	75.332	3.838	14,710	75.343	3.914
Credit to GDP (in percentage)	15,968	91.364	25.217	14,710	90.714	25.633

Source: our elaboration on SAFE and World Bank data.

dustry displays the largest number of observations for the panel of exiters.

Finally, when looking at country-level controls, the data show that many nations in our samples are not far from the best performers because the mean value of the *Distance to Frontier* is about 75 in both panels. In addition, we notice that for *Credit to GDP*, the average values slightly exceed 90% in both samples. This evidence shows that the economies under scrutiny are within the boundaries of the optimal level of financial development, amounting to approximately 80% of the private credit to GDP ratio (Breitenlechner et al., 2015).

3.5. Methodology and endogeneity issues

Taking stock of the characteristics of our samples, we adopt the following empirical strategy. To estimate Eqs. (1) and (2), we use a random effects panel probit model; this method is suitable when the dependent variable is binary. Indeed, using both qualitative and quantitative regressors is allowed with this technique, which employs the maximum likelihood to handle the regression's function.

There is a decent consensus in the literature on the view that the propensity to export and choice of innovation might not be fully exogenous (see, among others, Constantini and Melitz, 2008; Van Beveren and Vandenbussche, 2010). Thus, any potential cor-

relation between the innovation efforts and our two dependent variables may be spurious. Specifically, when analyzing the interplay between firms' innovative efforts and their choice to embark on exports, three types of endogeneity issues may emerge (Van Beveren and Vandenbussche, 2010): a *simultaneity bias* because innovation and exports are often complementary strategies for SMEs' growth (Golovko and Valentini, 2011); a *causality bias* if previous firms' exporting pattern is not taken under consideration (Aw et al., 2007); and an *anticipation bias*, which may occur when firms anticipate their entrance into foreign markets by undertaking innovation (Filipescu et al., 2013). Similar concerns may also emerge regarding financial health and export engagement. Better financial health may help firms self-select into export markets (Bellone et al., 2010), but already being an exporter is conducive to a stronger financial position (Greenaway et al. 2007).

To formally cope with these potential endogeneity issues, we employ three econometric strategies. First, we use a random effects panel probit model with lagged variables, as in Bratti and Felice (2012). Lagging innovation, finance problems, financing sources, performance, and distance to frontier may be useful in addressing the potential problems of reverse causality and controlling for any potential lagged effect that might emerge. Second, we use an IV probit method, which requires the identification of an instrument that has to be correlated with the key explanatory vari-

able but not with the error term. We identify the R&D expenses as a percentage of GDP by sector of activity (i.e., industry, construction, trade, service) as a good instrument for our measures of innovation.⁹ Indeed, the ratios, which are drawn from Eurostat, are available at the country and sector level. Third, to corroborate our outcomes, we employ a SYS-GMM (Blundell and Bond, 1998; Roodman, 2009). We are aware that the application of a GMM with a dichotomous dependent variable may be problematic, but its use finds support in the literature (Wooldridge, 2005; Greenaway et al., 2007), and we rely on it only as a robustness check.¹⁰

Finally, our empirical setup also includes calibrated weights that adjust our sample to reflect the characteristics of the population, which is similar to Ferrando et al. (2017). We correct the standard errors to address heteroskedasticity and cluster them at the country level to reduce any potential bias affecting the estimates.

4. Empirical results

To study the probability of becoming an export starter and export exiter, we rely on proxies for innovation plus several covariates that measure the access and use of finance while controlling for a large set of variables at the firm and country level.¹¹ We first estimate equations (1) and (2) via a random effects panel probit.¹² To cope with endogeneity concerns, we employ the three econometric strategies described in Section 3.5, whose results are reported in Table 2.

As far as the IV probit is concerned, we tabulate the results of the final stage of our two-step approach. We notice that in both models (1) and (2), the use of the IV method leads to a decrease in the sample size to 15,130 and 14,359 observations, respectively, because the information on the instrumental variable is not always available for all countries. Regarding the SYS-GMM approach, we assume that all the firm-invariant controls and the sector dummies are exogenous, while all other variables at the firm level are considered endogenous. The diagnostic tests displayed in Table 2 show that the model is correctly specified, and they rule out the presence of second-order autocorrelation. Nevertheless, given the dimension of our panel, we are inclined not to rely on the Sargan J test, which, in a case like ours, might over-reject the null hypothesis of instrument validity (Benito, 2005).

4.1. Probability of becoming an export starter

Following our econometric strategy, we discuss the results of model (1), which is displayed in Columns 1–4 of Table 2. To test

⁹ We are aware that we should also use an instrument for the *Finance Problem* variable. Admittedly, in this case, it is difficult to find an appropriate instrument that satisfies these well-known requirements. For this purpose, we rely on the one-period lagged probit model and the SYS-GMM.

¹⁰ For the sake of completeness, we have also employed OLS regressions by adding several sets of interactions between our time variable, wave, and different groups of variables (countries and the following firm standard controls: size, industry, age). Although we are aware that the OLS technique is not suitable when the dependent variable is a dummy, our estimates are stable throughout the different specifications. The results of these additional tests for both the samples of export starters and exiters are available upon request.

¹¹ To take into account the combined effect of innovation and financial friction, we employed the interaction between the variables *Innovation* and *Finance Problem* in both models (1) and (2). The results that show that these interactions are never significant are not reported here for the sake of brevity but are available upon request.

¹² One may pose some doubts about the reliability of the estimates of both models (1) and (2) because of the use of contemporaneous covariates. However, we can rely on our approach because the information provided by SAFE on performance, innovation, financing needs, and access to finance is based on the firms' self-assessment referred to the previous six months or year time span. In addition, the construction of our dependent variables (*Export Starter* and *Export Exiter*) stems from a first-differentiation process.

H1, we use the variable *Innovation#1*, which presents, as expected, a positive and significant coefficient, indicating that those firms that have used funds to develop or launch new products and services face a higher likelihood (almost 5%) of switching from nonexporter to exporter compared with peers that have not. Our result is in line with the literature (e.g., Wakelin, 1998; Cassiman et al., 2010; Love and Roper, 2015) and is robust across the four estimation techniques. This indicates that financing innovation—which is often difficult to achieve for SMEs because of the uncertainty and riskiness of innovative activities (Acharya and Xu, 2017)—is crucial for enterprises to gain a strategic advantage over competitors.

We test hypothesis H2 by looking at the coefficient of the variable *Finance Problem*, which captures the perceived difficulties of the firms in accessing external finance. Contrary to our expectations, our estimates reveal that this covariate does not play a relevant role in the likelihood of becoming a new exporter, even when we control for potential endogeneity issues (Columns 2–4 of Table 2). The insignificant coefficients for the variables measuring financial constraints may depend on the heterogeneity in firms' distribution of both productivity and liquidity, which may reduce the impact that financial constraints have on trade. Starters must pay the sunk cost of foreign market entry, which the firm may face by resorting to internal funds, thus veiling the presence of possible credit frictions. Our outcome is consistent with Stiebale (2011), who finds that financial constraints do not matter for export decisions for a sample of French firms. It is also similar to the evidence provided by Wagner (2019) who documented that the access to finance is rarely a problem for the intensive and extensive margins of export for a large sample of European SMEs. Furthermore, our evidence is also in line with the results of Greenaway et al. (2007), who document that there is no clear financial advantage of future exporters, here with financial health being a result of export engagement and not a determinant of entry.¹³

As far as the financing sources vector is concerned, our findings show that only *Grants or Subsidies* and *Other Loans* are positive and significant, albeit not consistently through all the specifications (Columns 1–4 of Table 2).

Turning our attention to the measures of firm performance, the probit model estimates suggest that the SMEs that reported an increase in employees (*Growth up*) and those that stated a rise in profits (*Profit up*) show a higher probability of becoming an exporter. Consistently, the coefficient of *Production Cost* is negative and significant, indicating that companies declaring that the cost of production is relevant have, *ceteris paribus*, a smaller probability of changing their status because they might suffer from low efficiency in production. In a nutshell, our results—revealing a positive impact of innovation and selected proxies of performance on export—provide tentative support for the *self-selection* hypothesis and are in line with a number of relevant contributions (e.g., Cassiman and Golovko, 2011; Temouri et al., 2013).

As far as the ownership controls are concerned, none of the selected types are significant, save for VC, which exerts a non-negligible influence on the likelihood of starting to export compared with single owners (the omitted group). Although this finding is confirmed by the outcomes of the IV probit only, it hints at a possible association between venture capital ownership and engagement in export activities, as suggested by Lockett et al. (2008), Park et al. (2015), and Rossi et al. (2018).

Turning our attention to firm-invariant controls, our evidence supports hypothesis H3. The results show that the firms located

¹³ Greenaway et al. (2007, p. 390, footnote 31) run a probit regression to check for the association between lagged financial variables and the probability that a nonexporter becomes an exporter. They find no statistically significant association between lagged liquidity/lagged leverage and the probability to become an exporter.

Table 2
Estimations of the probability of starting and stopping to export.

	Export Starters				Export Exiters			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit - Marginal Effect	Probit - Marginal Effect with lagged variables	IV Probit	SYS-GMM	Probit - Marginal Effect	Probit - Marginal Effect with lagged variables	IV Probit	SYS-GMM
<i>Innovation#1</i>	0.0489***	0.0159*	1.1453***	0.0276**	-0.0366***	-0.0292***	-1.6822***	-0.0371***
<i>Finance Problem</i>	-0.0024	-0.0038	-0.0001	-0.0025	0.0186***	-0.0019	0.0636***	0.0322***
<i>Internal Funds</i>	0.0020	-0.0190**	0.0257	0.0260**	-0.0230***	-0.0062	-0.0788**	-0.0155**
<i>Bank Loans</i>	-0.0010	0.0024	0.0076	0.0218**	0.0083	0.0078	0.0290	-0.0020
<i>Credit Line</i>	-0.0006	-0.0018	-0.0099	0.0007	-0.0159***	-0.0017	-0.0527***	-0.0133*
<i>Grants or Subsidies</i>	0.0124**	0.0058	0.0828**	0.0023	0.0014	-0.0037	-0.0199	0.0030
<i>Trade Credit</i>	0.0039	0.0111	0.0069	-0.0249**	-0.0128*	-0.0155**	-0.0919***	0.0082
<i>Family and Friends Loans</i>	0.0042	0.0031	0.0244	0.0053	-0.0195***	-0.0104	-0.0463**	-0.0452***
<i>Other Loans</i>	0.0114**	0.0014	0.0539*	0.0135	-0.0064	-0.0066	-0.0185	0.0069
OP								
<i>Competition</i>	-0.0050	-0.0043	-0.0311	0.0083	-0.0035	0.0029	-0.0250	-0.0420***
<i>Production Cost</i>	-0.0113**	-0.0165**	-0.0578**	-0.0085	0.0016	0.0063	0.0057	-0.0125**
<i>Growth up</i>	0.0145***	0.0040	0.0665**	0.0162	-0.0047	-0.0005	-0.0045	-0.0077
<i>Profit up</i>	0.0084**	0.0080	0.0530**	-0.0021	-0.0111**	-0.0093	-0.0370*	-0.0050
<i>Family</i>	0.0013	-0.0017	0.0096	-0.0191	-0.0146**	-0.0161**	-0.0680***	-0.0102
<i>Business Association</i>	-0.0056	-0.0039	-0.0030	-0.0478*	-0.0391***	-0.0594***	-0.1255***	-0.0824***
<i>Public Company</i>	0.0100	0.0331	0.0823	-0.0126	-0.0235	-0.0465	-0.1058**	-0.0499
<i>VC</i>	0.0673**	0.0341	0.3764**	0.0263	-0.0415	-0.0266	-0.1464*	-0.2186***
<i>Other</i>	-0.0188	-0.0234	-0.1100	-0.0145	-0.0080	-0.0033	0.0619	-0.0191
W								
<i>Distance to Frontier</i>	0.0097***	0.0044**	0.0586***	0.0292***	-0.0033	0.0007	-0.0144	0.0017
<i>Credit to GDP</i>	0.0003	0.0010	0.0013	0.0005	0.0002	-0.0004	0.0008	0.0050***
Country	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Wave	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X								
Size	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Age	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N. of Observations	15,969	9,281	15,130	15,968	14,710	8,622	14,359	14,710
Number of firms	9,856	5,473		9,855	8,874	4,959		8,874
Sargan (p-value)				0				0
AR(1) p-value				0				0.0024
AR(2) p-value				0.9360				0.6420

Source: our elaboration on SAFE and World Bank data.

This table reports the regression results of equation (1) for newly exporting companies (Export Starters, Columns 1-4) and equation (2) for firms that have stopped exporting (Export Exiters, Columns 5-8).

Columns (1) and (5) show the marginal effects estimated through a panel probit model. Columns (2) and (6) report the panel probit estimates with one lagged variable exception made for the standard firm controls (X) and for country and wave dummies. The IV estimates are derived from a two-stage maximum likelihood panel probit model in which the R&D expenses by sector (% GDP) are used to instrument *Innovation#1* (Columns (3) and (7)). The SYS-GMM estimates are as reported in Columns (4) and (8).

Significance levels: ***p<0.01, **p<0.05, *p<0.10.

in nations that score higher for the measure of *Distance to Frontier* (which indicates a narrower distance between the economy of the country under scrutiny and the frontier) exhibit a greater probability of starting to export. Companies seem to benefit from the presence of an environment that eases their business activities, which may translate into a lean and more efficient public apparatus. This may lead to higher firm efficiency and larger productivity, enabling these companies to sustain the sunk costs needed to start exporting. Our result is robust across all specifications and corroborates the literature that stresses the relevance of a friendly business environment in supporting firm operations both in the domestic market and global arena (Commander and Svejnar, 2011; Besley, 2015).

To check the robustness of our results, we controlled for country-time interactions. The estimates are not reported here for the sake of brevity but show that our results are robust to the use of country-wave effects, where the coefficient of *Distance to Frontier* is still positive and significant.

4.2. Probability of becoming an export exiter

In a mirroring fashion, here, we assess the determinants affecting the probability for SMEs to change their status from exporters to nonexporters.

The results of the estimation of model (2) via a random effects panel probit, random effects panel probit with one-period lagged covariates, IV probit, and SYS-GMM are reported in Columns 5–8 of Table 2.

As predicted by H1, the marginal effect of *Innovation#1* is negative and highly significant, indicating that firms that used their obtained finance to develop and launch new products and services show a lower probability (about 4%) of exiting from the export markets compared with their peers that did not. This negative association is detected and persistently significant across all four estimation methods (Column 5–8 of Table 2).

As far as the variable *Finance Problem* is concerned, the estimates for three out of four estimation techniques seem to provide

support for H2 because the coefficient carries a positive and significant sign. Its marginal effects indicate that firms facing problems in access to finance have a higher probability (about 2%, Column 5) of being pushed out of export markets, which is in line with the literature that documents how financial distress affects firms' export performance (Amiti and Weinstein, 2011). Firms that show a weaker balance sheet have less capacity to borrow; therefore, their likelihood of becoming export exiters will increase. This is a likely outcome because SMEs that trade globally are probably affected by tougher competition than what they face domestically, which may lead to potential and temporary financial distress.

Looking at the variables accounting for the several financing sources, the results display a negative and significant sign for *Internal Funds*, *Credit Lines*, *Trade Credit*, and *Family or Friends Loans*. These results are consistent in three out of the four estimation techniques, documenting that SMEs that resort to informal forms of finance, such as trade credit and family/friends, have a lower probability of exiting the export markets. This is not a trivial result because it indicates that these might be the only channels of financing that SMEs have access to, reinforcing the claim of constrained access to formal means (Du et al., 2015).

Turning our attention to the measures of firm performance, the evidence from the probit estimates shows that none of the selected variables, save for *Profit up*, exerts an influence on the likelihood of exiting the export markets. This finding is in line with Albornoz et al. (2016), who show that the probability of firm survival is not affected by performance shifters. However, if the firm declares that its profit has increased in the last semester, it will more likely survive in the foreign arena. Such a finding is also consistent with Demirhan (2016), who shows that more profitable and less credit-constrained firms are more likely to survive in export markets. When looking at firm-varying controls, we observe that *Family*, *Business Association*, and, in some instances, *VC* exert a significant effect in reducing the probability of export exit compared with the omitted group, that is, *Single Owner*, a result that is robust to potential endogeneity. On the one hand, this finding may indicate that for SMEs owned by a family, resorting to the financial resources required to operate abroad matters. On the other hand, being owned by other entities, such as a holding or a limited liability company, may supply firms in distress with the needed capital through internal finance. Finally, our result documents that a more innovative form of shareholder, such as *VC*, may provide better corporate strategies and credit funding. In addition, *VCs* are more inclined to build networks and supply innovative tasks to compete in the international arena (Park et al., 2015; Rossi et al., 2018).

In contrast to the estimates of model (1), the coefficient of *Distance to Frontier* is not significant, thus indicating that H3 is not supported. This evidence may suggest that although an efficient regulatory environment is associated with a higher likelihood of foreign market entry, it does not seem to affect the probability of exiting, which may be driven more by firm-level choices, financial constraints, and the regulatory environment of the destination country. Indeed, the literature has indicated that the market and institutional conditions of the host country may be relevant for a firm's exit decision (see also Chen et al., 2019; Demir and Hu, 2020).¹⁴

Our findings are robust when we re-estimate equations (1) and (2) on a subsample of micro-sized firms. The results are reported in the Appendix in Table A5.

¹⁴ We are aware that this information may play a role in export exit strategies. Unfortunately, SAFE does not provide these data. We acknowledge this point as a limitation in the conclusions section.

4.3. Robustness checks: Testing the impact of different types of innovation—*Innovation#2*

Here, we test models (1) and (2) by employing the second set of proxies for innovation, that is, the vector *Innovation#2*, as described in Section 3.3. Due to data restrictions on this variables (see footnote 4), there is a drop in the number of observations from 15,968 to 12,225 for the export starters and from 14,710 to 11,612 for the export exiters. Hence, we rely on this set of variables only as a robustness check of our main estimations. Table 3 shows the marginal effects of a panel probit model, where Columns 1–3 describe the impact of product, process, and organizational innovation on the likelihood of starting to export, whereas Columns 4–6 show the impact of the very same variables on the probability of exiting from the export market.

The results on the probability of starting to export show that the firms that have undertaken either product or process innovation are more likely to enter into the foreign markets, with a likelihood between 3.2% and 3%, while no significant effect is recorded for organizational innovation. These findings are generally consistent with previous studies (Caldera, 2010; Dosi et al., 2015), supporting the view that for SMEs, product and process innovation seem to be more important than organizational innovation (Hwang et al., 2015; Azar and Ciabuschi, 2017). This is also consistent with the results in Esteve-Pérez and Rodríguez's (2013) study, which shows a larger effect of product than process innovation on the likelihood of exporting.

The outcomes on the likelihood of exiting the export market (Columns 4–6 of Table 3) instead show that the firms that declared as having undertaken product innovation display a lower probability of leaving the export market compared with their peers that have not. Only product innovation contributes to firms' survival, decreasing companies' probability of exit by almost 2.2%. These results support H1, showing that the type of innovation differently affects the probability of exiting. Interestingly, the estimated marginal effects for a subsample of micro-sized enterprises display that product innovation lowers the probability of exiting from the export markets by about 6%, a larger magnitude than that recorded for SMEs. Moreover, we also document that organizational innovation decreases the probability by about 6% of becoming an export exiter. This comes as a novelty—compared with the sample of SMEs—because it documents that for micro-sized firms, organizational innovation (e.g., hiring a skilled manager) can make a difference for firms' survival in international markets. The results for the subsample of micro-sized firms are reported in Table A6 in the Appendix.

Consistent with the previous estimates displayed in Table 2, we observe that the key variable *Finance Problem* (H2) is not relevant to enter the export markets, but it is when exiting from them. The declared presence of financial problems apparently does not affect firms' internationalization choices, as in Greenaway et al. (2007), Stiebale (2011), and Wagner (2019), but it seems more relevant for leaving the international arena.

Once we consider the quality of institutions, regulations, and public sector efficiency, we can see that the companies located in countries that perform better are also more likely to start exporting (H3). The sign and significance of all the other covariates are largely consistent with the previous analysis.

Finally, to rule out the possible presence of endogeneity stemming from reverse causality, simultaneity, and omitted variable bias, we re-estimate models (1) and (2) for the set of variables in *Innovation#2* by using a SYS-GMM. The unreported results—which are available upon request—confirm our findings.

Table 3

Estimations of the probability of starting and stopping to export: robustness check (Innovation #2) – Marginal effects.

	Export Starters			Export Exiters		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Product Innovation</i>	0.0316***			-0.0219***		
<i>Process Innovation</i>		0.0303***			-0.0088	
<i>Organizational Innovation</i>			0.0093			-0.0088
<i>Finance Problem</i>	0.0017	0.0017	0.0013	0.0193***	0.0188***	0.0189***
<i>Internal Funds</i>	0.0025	0.0026	0.0028	-0.0204***	-0.0208***	-0.0206***
<i>Bank Loans</i>	-0.0075	-0.0078	-0.0075	0.0053	0.0059	0.0057
<i>Credit Line</i>	-0.0029	-0.0025	-0.0030	-0.0134***	-0.0130***	-0.0128***
<i>Grants or Subsidies</i>	0.0187***	0.0185***	0.0200***	-0.0013	-0.0018	-0.0017
<i>Trade Credit</i>	0.0063	0.0071	0.0068	-0.0112	-0.0115	-0.0115
<i>Family and Friends Loans</i>	-0.0033	-0.0028	-0.0025	-0.0152***	-0.0152***	-0.0149***
<i>Other Loans</i>	0.0088	0.0091	0.0096*	-0.0043	-0.0042	-0.0041
OP						
<i>Competition</i>	-0.0090	-0.0087	-0.0089	-0.0058	-0.0060	-0.0057
<i>Production Cost</i>	-0.0102	-0.0103	-0.0097	-0.0003	-0.0005	-0.0004
<i>Growth up</i>	0.0200***	0.0209***	0.0214***	-0.0006	-0.0014	-0.0013
<i>Profit up</i>	0.0092	0.0088	0.0102*	-0.0124**	-0.0130**	-0.0130**
<i>Family</i>	-0.0070	-0.0069	-0.0071	-0.0129**	-0.0126**	-0.0127**
<i>Business Association</i>	-0.0018	-0.0016	-0.0029	-0.0330***	-0.0323***	-0.0319***
<i>Public Company</i>	-0.0224	-0.0188	-0.0204	-0.0248	-0.0269	-0.0264
<i>VC</i>	0.0654**	0.0715***	0.0707**	-0.0427	-0.0429	-0.0413
<i>Other</i>	-0.0170	-0.0170	-0.0182	-0.0010	-0.0018	-0.0018
W						
<i>Distance to Frontier</i>	0.0101***	0.0101***	0.0102***	-0.0028	-0.0027	-0.0027
<i>Credit to GDP</i>	0.0008	0.0007	0.0007	0.0001	0.0000	0.0000
<i>Country</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Wave</i>	Yes	Yes	Yes	Yes	Yes	Yes
X						
<i>Size</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Age</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>N. of Observations</i>	12,225	12,225	12,225	11,612	11,612	11,612
<i>Number of firms</i>	8,319	8,319	8,319	7,748	7,748	7,748

Source: our elaboration on SAFE and World Bank data.

This table reports the marginal effects estimated through the panel probit model for equation (1) for newly exporting companies (Export Starters, Columns 1–3) and for equation (2) for firms that stop exporting (Export Exiters, Columns 4–6).

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

5. Conclusions

The current paper relies on large samples of European SMEs that are drawn from SAFE to study how undertaking innovation, firms' perceived financial constraints, and the efficiency of the regulatory environment affect the switch from a firm's status of being a nonexporter to exporter and vice versa.

To assess the probability of this switch, we exploit the panel structure of our data and employ a unified empirical model that uses a common set of variables to frame foreign market entry and exit decisions. Our results rely on several econometric techniques that address potential endogeneity concerns, that is, a panel probit, a panel probit with lagged independent covariates, an IV probit, and a SYS-GMM. Our analysis leads to at least three relevant results.

First, innovation seems to matter not only for firms' entry, but also to survive in foreign markets, supporting the idea that having the capabilities to undertake innovation is crucial for succeeding in the global arena, as advocated, among others, by Melitz and Redding (2014) and Impulliti and Licandro (2018). SMEs, as well as micro-sized firms, that have declared as having used their finance to launch new products and services display a higher (lower) probability of starting (stopping) exporting. Our finding supports the knowledge that financing R&D investments is conducive to increase productivity and to gain a strategic advantage over competitors, which in turn affect both the probability to start exporting and the probability of export survival. From one side, this evidence seems to support the self-selection hypothesis, while from the other side,

it signals that a productivity advantage is also essential to maintain a strategic position in foreign markets.

This view is further confirmed when we disentangle the types of innovation outputs: we show that introducing new products and processes is beneficial for companies that wish to enter into foreign markets. Product innovation also matters in reducing the likelihood of stopping to export, regardless of firm size. Conversely, organizational innovation lowers the probability of exiting from export markets but only for micro-sized enterprises. This evidence may signal that when compared with their larger peers, micro-sized businesses, which are usually endowed with scarce skilled human resources, may benefit more from organizational innovation as a lever to survive in the export markets (Paul et al., 2017).

Second, our finding that finance problems do not matter for foreign market entry is less obvious and only partially supportive of the existing knowledge. We argue that unobserved heterogeneity in both firm's productivity and liquidity, might dilute the impact that financial constraints have on trade. Conversely, the fact that the perceived problems of finance increase the probability of stopping to export, for both SMEs and micro-sized companies, is consistent with our expectations. Our results may indicate that the large financial efforts and reoccurring costs required to operate abroad may harm credit-distressed firms, threatening their export market survival (Azkenazy et al., 2015). Our evidence is also in line with Amiti and Weinstein (2011), who show that exporters greatly depend on access to finance much more than purely domestic firms because the former are more sensitive to liquidity shocks because of the higher working capital requirements stem-

ming from international trade activities. Financial distress will first reduce access to credit, mostly for SMEs, and the consequent lack of finance may push some firms out of foreign markets.

Third, we document that companies located in more efficient countries display a greater probability of starting to export. This result supports the view that a friendly business milieu boosts domestic and foreign economic activities, an outcome that matters for all firms, indicating that a better institutional context may ease companies' engagement, regardless of their size. On the contrary, we find that a conducive business environment does not affect the probability of exiting from export markets. This could signal that leaving the export market might depend on the regulatory environment of country where the exports are going to.

All in all, our results help in understanding the mechanisms behind firms' response to opening up to trade. Firms' heterogeneity in productivity, innovation, and access to finance, alongside external drivers, might unveil "winners" and "losers" from trade, thus supporting policy makers in devising the most appropriate and effective interventions to foster firms' developments in foreign markets.

Our analysis comes with some policy implications. First, policy makers should devise measures aimed at providing companies with the appropriate means to foster innovation, not only at the product, but also at the process and organizational level, because it is innovation that promotes internationalization and increases the likelihood of survival in foreign markets. One example could be to strengthen the policy measures targeted to upgrade the skills needed to sustain investment in R&D. In this direction, policy should also promote tailored apprenticeship programs that enhance a broad spectrum of capabilities and that can lead to successful export strategies (Love and Roper, 2015). Another instance would be to support programs that facilitate research cooperation for a fruitful transfer of knowledge among academic institutions, innovation centers, and SMEs. The EU initiatives that encourage tailored services and actions for innovation providers, in the spirit of the EC's *Horizon 2020*, are fruitful examples to nurture.

Second, another implication of our results is that the measures to promote access to finance are also important to guarantee SMEs' presence in the export markets. In this direction, policy makers should differentiate the support for firms that aim at entering foreign markets from those already exporting. This might be relevant especially in relation to credit access. Our results show that financial distress might particularly affect exporting firms. Because SMEs are unlikely to resort to the bond market, policy makers should implement measures targeted at the credit system to correct inefficiencies and rationing phenomena. This is particularly important in periods of credit crunch. When access to finance is severely restricted, as it was during the 2008 global financial crisis or the Euro crisis; an appropriate policy response should try to alleviate the dearth of available funding for SMEs. This may be achieved via *ad hoc* loan programs or grants directed at those companies that suffer the most (Görg and Spaliara, 2018; Ertan et al., 2020).

Third, our results emphasize the importance of the environment within which companies operate, which encompasses private markets and public institutions. Policy makers should enforce better laws, regulations, and institutions to provide a friendly business environment where new entrant firms going into a foreign market can find a suitable context to achieve their full potential. European regulations and efficient market institutions could help reduce the sunk costs stemming from bureaucratic burdens to allow firms to compete fairly in the international arena. This is especially relevant for SMEs, which may suffer more than their larger peers from the bureaucratic burden, particularly in low-productivity countries.

Although our analysis did not specifically tackle the presence of foreign markets' sunk entry costs related to informational bar-

riers, policy makers should tailor export promotion strategies. For example, export promotion agencies could help reduce those sunk costs by providing information on foreign market conditions (Sørensen, 2020). Knowledge of new markets may affect SMEs' international orientations because this would enhance their understanding about "global scenarios and trends, foreign markets and institutions, and global industry trends" (Paul et al., 2017, p. 337).

Although our evidence is robust across different specifications and econometric strategies, we acknowledge some limitations of our analysis, which might set the agenda for future research.

First, we cannot control for the role of the regulatory environment of the destination country of export and for other elements that shape the extent of informational barriers (e.g., socio-cultural differences, the level of competition in foreign markets, etc.) because of data limitations. We acknowledge that the market and institutional conditions of the host country may be relevant in the exit decision (Chen et al., 2019; Demir and Hu, 2020). Unfortunately, SAFE does not provide information on the destination country of export.

Second, given the anonymity of the firms in SAFE and the impossibility of linking company-level data to any other external firm-level data, we relied on firms' self-reported measures for most of our variables. Although we are aware that using more objective measures, instead of self-reported perceptions, could be more informative, we believe this limitation marginally affects our investigation because we took advantage of qualitative and punctual data provided by SAFE, which are usually not available in balance sheet data.

Declaration of Competing Interest

None

CRediT authorship contribution statement

Stefania Patrizia Sonia Rossi: Conceptualization, Methodology, Investigation, Formal analysis, Project administration, Validation, Writing - original draft, Writing - review & editing. **Graziella Bonanno:** Data curation, Software, Writing - original draft, Investigation, Methodology, Writing - review & editing, Formal analysis. **Marco Giansoldati:** Writing - original draft, Investigation, Writing - review & editing. **Tullio Gregori:** Writing - original draft, Investigation, Writing - review & editing.

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Appendix

Tables A1-A6

Table A1
Frequencies by country.

Full SAFE dataset			Sample of export starters			Sample of export exiters		
Countries	Frequencies	%	Countries	Frequencies	%	Countries	Frequencies	%
Albania	395	0.23	Albania	25	0.16	Albania	8	0.05
Austria	8,049	4.66	Austria	636	3.98	Austria	1,002	6.81
Belgium	8,059	4.66	Belgium	636	3.98	Belgium	795	5.4
Bulgaria	2,727	1.58	Bulgaria	155	0.97	Bulgaria	145	0.99
Cyprus	614	0.36	Cyprus	25	0.16	Cyprus	23	0.16
Czech Republic	2,656	1.54	Czech Republic	84	0.53	Czech Republic	193	1.31
Germany	18,859	10.91	Germany	1,710	10.71	Germany	1,604	10.9
Denmark	2,728	1.58	Denmark	54	0.34	Denmark	70	0.48
Estonia	611	0.35	Estonia	16	0.1	Estonia	27	0.18
Spain	18,444	10.67	Spain	2,073	12.98	Spain	1,628	11.07
Finland	6,819	3.95	Finland	657	4.11	Finland	521	3.54
France	19,038	11.01	France	2,240	14.03	France	1,426	9.69
Greece	8,030	4.65	Greece	892	5.59	Greece	782	5.32
Croatia	1,205	0.70	Croatia	58	0.36	Croatia	72	0.49
Hungary	2,736	1.58	Hungary	142	0.89	Hungary	149	1.01
Ireland	6,822	3.95	Ireland	682	4.27	Ireland	517	3.51
Italy	19,029	11.01	Italy	2,176	13.63	Italy	2,084	14.17
Lithuania	1,612	0.93	Lithuania	59	0.37	Lithuania	86	0.58
Luxembourg	607	0.35	Luxembourg	14	0.09	Luxembourg	46	0.31
Latvia	1,113	0.64	Latvia	67	0.42	Latvia	42	0.29
Montenegro	496	0.29	Montenegro	48	0.3	Montenegro	40	0.27
Macedonia, FYR	392	0.23	Macedonia, FYR	11	0.07	Macedonia, FYR	14	0.1
Malta	602	0.35	Malta	28	0.18	Malta	27	0.18
Netherlands	9,747	5.64	Netherlands	1,107	6.93	Netherlands	1,011	6.87
Poland	6,429	3.72	Poland	462	2.89	Poland	387	2.63
Portugal	8,259	4.78	Portugal	721	4.52	Portugal	811	5.51
Romania	2,769	1.60	Romania	225	1.41	Romania	89	0.61
Sweden	2,728	1.58	Sweden	138	0.86	Sweden	179	1.22
Slovenia	911	0.53	Slovenia	33	0.21	Slovenia	75	0.51
Slovak Republic	3,718	2.15	Slovak Republic	440	2.76	Slovak Republic	530	3.6
United Kingdom	6,643	3.84	United Kingdom	354	2.22	United Kingdom	327	2.22
Total	172,847	100	Total	15,968	100	Total	14,710	100

Source: our elaboration on SAFE data.

Table A2

Correlation matrix for the sample of export starters (Obs = 15,968).

	<i>Innovation#1</i>	<i>Product Innovation</i>	<i>Process Innovation</i>	<i>Organizational Innovation</i>	<i>Finance Problem</i>	<i>Bank Loans</i>	<i>Credit Line</i>	<i>Grant or Subsidies</i>	<i>Trade Credit</i>	<i>Family or Friends Loans</i>	<i>Other Loans</i>	<i>Internal Funds</i>	<i>Competition</i>	<i>Production Cost</i>	<i>Growth up</i>	<i>Profit up</i>	<i>Distance to Frontier</i>	<i>Credit to GDP</i>	
<i>Innovation#1</i>	1																		
<i>Product Innovation</i>	0.185	1																	
<i>Process Innovation</i>	0.115	0.460	1																
<i>Organizational Innovation</i>	0.066	0.295	0.324	1															
<i>Finance Problem</i>	0.048	0.031	0.027	0.069	1														
<i>Bank Loans</i>	0.025	0.027	0.047	0.058	0.153	1													
<i>Credit Line</i>	0.030	0.031	0.022	0.049	0.123	0.332	1												
<i>Grant or Subsidies</i>	0.078	0.061	0.071	0.062	0.140	0.286	0.188	1											
<i>Trade Credit</i>	0.042	0.058	0.018	0.054	0.138	0.216	0.204	0.183	1										
<i>Family or Friends Loans</i>	0.038	0.059	0.037	0.051	0.096	0.085	0.093	0.042	0.105	1									
<i>Other Loans</i>	0.068	0.050	0.054	0.060	0.056	0.185	0.184	0.111	0.138	0.127	1								
<i>Internal Funds</i>	0.043	0.032	0.039	0.056	-0.008	0.106	0.069	0.058	0.116	0.115	0.147	1							
<i>Competition</i>	-0.001	0.010	-0.010	0.031	0.073	0.047	0.046	0.045	0.091	0.015	0.023	0.025	1						
<i>Production Cost</i>	0.009	0.016	0.035	0.058	0.116	0.097	0.092	0.117	0.104	0.025	0.037	0.014	0.236	1					
<i>Growth up</i>	0.066	0.072	0.064	0.097	-0.021	0.041	0.023	0.030	0.047	0.006	0.096	0.048	-0.023	0.029	1				
<i>Profit up</i>	0.029	0.058	0.060	0.043	-0.065	0.009	0.027	-0.024	-0.022	0.026	0.063	0.066	-0.067	-0.069	0.227	1			
<i>Distance to Frontier</i>	-0.007	-0.014	-0.021	-0.061	-0.153	-0.025	0.065	-0.151	-0.120	0.064	0.141	0.055	-0.048	-0.088	0.034	0.134	1		
<i>Credit to GDP</i>	0.002	-0.031	-0.016	0.009	0.017	0.032	-0.040	0.031	0.072	-0.006	0.009	-0.042	0.044	0.021	0.005	-0.030	-0.060	1	

Source: our elaboration on SAFE and World Bank data.

Table A3

Correlation matrix for the sample of export exiters (Obs = 14,710).

	Innovation#1	Product Innovation	Process Innovation	Organizational Innovation	Finance Problem	Bank Loans	Credit Line	Grant or Subsidies	Trade Credit	Family or Friends Loans	Other Loans	Internal Funds	Competition	Production Cost	Growth up	Profit up	Distance to Frontier	Credit to GDP
<i>Innovation#1</i>	1																	
<i>Product Innovation</i>	0.213	1																
<i>Process Innovation</i>	0.114	0.461	1															
<i>Organizational Innovation</i>	0.065	0.291	0.317	1														
<i>Finance Problem</i>	0.033	0.021	0.025	0.069	1													
<i>Bank Loans</i>	0.015	0.007	0.055	0.049	0.143	1												
<i>Credit Line</i>	0.014	0.019	0.030	0.047	0.101	0.351	1											
<i>Grant or Subsidies</i>	0.075	0.061	0.080	0.081	0.136	0.331	0.210	1										
<i>Trade Credit</i>	0.033	0.042	0.022	0.058	0.121	0.226	0.179	0.158	1									
<i>Family or Friends Loans</i>	0.059	0.027	0.024	0.052	0.092	0.052	0.103	0.007	0.070	1								
<i>Other Loans</i>	0.028	0.031	0.070	0.076	0.072	0.211	0.204	0.145	0.137	0.127	1							
<i>Internal Funds</i>	0.053	0.047	0.038	0.040	-0.020	0.088	0.062	0.077	0.110	0.087	0.123	1						
<i>Competition</i>	-0.002	-0.014	-0.030	0.007	0.051	0.042	0.033	0.033	0.078	0.001	0.030	0.047	1					
<i>Production Cost</i>	0.023	0.011	0.044	0.045	0.102	0.071	0.068	0.100	0.068	0.008	0.021	0.022	0.240	1				
<i>Growth up</i>	0.053	0.064	0.081	0.062	-0.027	0.043	0.034	0.056	0.028	0.001	0.088	0.053	-0.023	0.030	1			
<i>Profit up</i>	0.046	0.058	0.049	0.020	-0.066	0.008	0.034	-0.013	0.009	0.028	0.050	0.042	-0.070	-0.046	0.230	1		
<i>Distance to Frontier</i>	0.045	0.011	0.001	-0.037	-0.134	-0.069	0.103	-0.117	-0.149	0.113	0.142	0.064	0.001	-0.058	0.046	0.110	1	
<i>Credit to GDP</i>	0.011	-0.030	-0.028	0.028	0.036	0.035	-0.046	0.033	0.122	-0.020	0.010	-0.045	0.050	-0.006	-0.006	-0.011	-0.043	1

Source: our elaboration on SAFE and World Bank data.

Table A4
Variable descriptions and sources.

Variables	Description	Source
Dependent variables		
<i>Export Starter</i>	Dummy variable equal to 1 if the firm declares to be exporting at time t and nonexporting at time $t-1$ and equal to 0 when the firm declares to have never exported.	SAFE
<i>Export Exiter</i>	Dummy variable equal to 1 if the firm declares to be nonexporting at time t and exporting at time $t-1$ and equal to 0 when the firm declares to have always exported.	SAFE
Key regressors		
<i>Innovation#1</i>	Dummy variable equal to 1 if the firm used its obtained financing to develop or launch new products and services in the past six months and 0 otherwise.	SAFE
<i>Innovation#2:</i>		
<i>Product Innovation</i>	Dummy variable equal to 1 if the firm declares to have undertaken product innovation in the past 12 months and 0 otherwise.	SAFE
<i>Process Innovation</i>	Dummy variable equal to 1 if the firms declare to have undertaken process innovation in the past 12 months and 0 otherwise.	SAFE
<i>Organizational Innovation</i>	Dummy variable equal to 1 if the firms declare to have undertaken organizational innovation in the past 12 months and 0 otherwise.	SAFE
<i>Finance Problem</i>	Dummy variable equal to 1 if access to finance represents a problem for the firm and 0 otherwise.	SAFE
<i>Internal Funds</i>	Dummy variable equal to 1 if internal sources of financing are relevant for the firm and 0 otherwise.	SAFE
<i>Bank Loans</i>	Dummy variable equal to 1 if bank loans are relevant for the firm and 0 otherwise.	SAFE
<i>Credit Lines</i>	Dummy variable equal to 1 if credit lines are relevant for the firm and 0 otherwise.	SAFE
<i>Grants or Subsidies</i>	Dummy variable equal to 1 if grants or subsidies are relevant for the firm and 0 otherwise.	SAFE
<i>Trade Credit</i>	Dummy variable equal to 1 if trade credit financing is relevant for the firm and 0 otherwise.	SAFE
<i>Family or Friends Loans</i>	Dummy variable equal to 1 if loans from family or friends are relevant for the firm and 0 otherwise.	SAFE
<i>Other Loans</i>	Dummy variable equal to 1 if a residual category of loans not included above is relevant for the firm and 0 otherwise.	SAFE
Firm-level controls		
<i>Competition</i>	Dummy equal to 1 if the firm reports that the “problem of competition”—either because of external market conditions or an internal loss in firm efficiency—has become more relevant in the last six months and 0 otherwise.	SAFE
<i>Growth up</i>	Dummy equal to 1 if the firm declares that the number of its employees has increased in the past six months and 0 otherwise.	SAFE
<i>Production Cost</i>	Dummy equal to 1 if the company states that the cost of production turned into a major obstacle in the past six months and 0 otherwise.	SAFE
<i>Profit up</i>	Dummy variable equal to 1 if a firm experienced an increase of the net income after taxes in the past six months and 0 otherwise.	SAFE
<i>Single Owner</i>	Dummy variable equal to 1 if the firm is owned by one owner only and 0 otherwise.	SAFE
<i>Family</i>	Dummy variable equal to 1 if the firm's owner is a family and 0 otherwise.	SAFE
<i>Business Association</i>	Dummy variable equal to 1 if the firm's owner is another enterprise or business associate and 0 otherwise.	SAFE
<i>Public Company</i>	Dummy variable equal to 1 if the firm's owner is a public company and 0 otherwise.	SAFE
<i>VC</i>	Dummy variable equal to 1 if the firm's owner belongs to the categories of venture capitalists or business angels and 0 otherwise.	SAFE
<i>Other</i>	Dummy variable equal to 1 if the firm's owner belongs to a residual category not mentioned above and 0 otherwise.	SAFE
<i>Micro</i>	Dummy variable equal to 1 if the firm has between 1 and 9 employees and 0 otherwise.	SAFE
<i>Small</i>	Dummy variable equal to 1 if the firm has between 10 and 49 employees and 0 otherwise.	SAFE
<i>Medium</i>	Dummy variable equal to 1 if the firm has between 50 and 249 employees and 0 otherwise.	SAFE
<i>Very young</i>	Dummy variable equal to 1 if the firm is less than 2 years old and 0 otherwise.	SAFE
<i>Young</i>	Dummy variable equal to 1 if the firm is between 2 and 4 years old and 0 otherwise.	SAFE
<i>Old</i>	Dummy variable equal to 1 if the firm is between 5 and 9 years old and 0 otherwise.	SAFE
<i>Very old</i>	Dummy variable equal to 1 if the firm is 10 years old or more and 0 otherwise.	SAFE
<i>Industry</i>	Dummy variable equal to 1 if the firm's main activity in industry (which includes manufacturing, mining and electricity, gas and water supply) and 0 otherwise.	SAFE
<i>Construction</i>	Dummy variable equal to 1 if the firm's main activity is construction and 0 otherwise.	SAFE
<i>Trade</i>	Dummy variable equal to 1 if the firm's main activity is wholesale or retail trade and 0 otherwise.	SAFE
<i>Services</i>	Dummy variable equal to 1 if the firm's main activity is services and 0 otherwise.	SAFE
Country-level controls		
<i>Distance to Frontier</i>	Score of the general context for business activity as a proxy for the effect of the institutional and regulatory context at the country level.	Doing Business, World Bank
<i>Credit to GDP</i>	Ratio between domestic credit to private sector by banks and GDP (%).	World Bank

Table A5
Estimations of the probability of starting and stopping to export for micro-sized enterprises.

	Export Starters				Export Exiters			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Probit - Marginal Effect	Probit - Marginal Effect with lagged variables	IV Probit	SYS-GMM	Probit - Marginal Effect	Probit - Marginal Effect with lagged variables	IV Probit	SYS-GMM
<i>Innovation#1</i>	0.0550***	0.0231*	1.3335***	0.0399**	-0.1368***	-0.0549**	-1.7092***	-0.1149***
<i>Finance Problem</i>	0.0070	-0.0032	0.0428	0.0221	0.0398*	0.0324	0.0498	-0.0011
<i>Internal Funds</i>	-0.0030	-0.0155	-0.0014	-0.0083	-0.0515***	-0.0484*	-0.1152***	-0.0130
<i>Bank Loans</i>	0.0058	0.0121	0.0442	0.0206*	-0.0119	0.0405	-0.0091	-0.0479***
<i>Credit Line</i>	0.0034	-0.0132	0.0272	0.0162	-0.0282	-0.0102	-0.0447	0.0185
<i>Grants or Subsidies</i>	0.0026	0.0065	0.0104	-0.0168	0.0338*	0.0233	0.0657*	0.0377**
<i>Trade Credit</i>	0.0068	0.0170*	0.0231	-0.0308**	-0.0556**	-0.0283	-0.1643***	-0.0085
<i>Family and Friends Loans</i>	-0.0055	-0.0016	-0.0254	-0.0023	-0.0572***	-0.0129	-0.0981***	-0.1004***
<i>Other Loans</i>	0.0052	-0.0133	0.0261	0.0258**	-0.0215	-0.0607**	-0.0420	0.0333**
OP								
<i>Competition</i>	-0.0109	-0.0010	-0.0630	-0.0188	0.0002	0.0201	-0.0245	-0.0475***
<i>Production Cost</i>	-0.0065	-0.0038	-0.0462	-0.0228**	0.0469*	0.0390*	0.0523	-0.0186
<i>Growth up</i>	0.0143**	0.0115	0.0818**	0.0212	0.0151	0.0358	0.0254	0.0236
<i>Profit up</i>	0.0136*	0.0192**	0.0728	-0.0030	-0.0144	-0.0383	-0.0131	0.0416***
<i>Family</i>	-0.0018	-0.0061	0.0013	-0.0501**	-0.0339	-0.0582**	-0.0912**	-0.0729***
<i>Business Association</i>	0.0044	0.0067	0.0491	-0.0358	-0.1414**	-0.2196***	-0.2429**	-0.1345***
<i>Public Company</i>	0.0100	-0.0339	0.1021	-0.2164***	-0.1092	-0.3097	-0.0567	-0.2582**
<i>VC</i>	0.0601	0.0709	0.3866	0.0903	0.1095	0.3750	0.2466	-0.2238
<i>Other</i>	0.0100	0.0032	0.0970	-0.0270	-0.0322	0.0298	0.0275	-0.1174
W								
<i>Distance to Frontier</i>	0.0059***	0.0066**	0.0478***	0.0096	-0.0128	-0.0098	-0.0277	0.0029
<i>Credit to GDP</i>	0.0003	0.0008	0.0036	0.0020	0.0033	0.0024	0.0059	0.0036
<i>Country</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Wave</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
X								
<i>Size</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Age</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<i>N. of Observations</i>	8,261	4,852	7,893	8,261	4,007	2,365	3,896	4,007
<i>Number of firms</i>	5,298	2,985		5,298	2,727	1,540		2,727
<i>Sargan (p-value)</i>				0				0
<i>AR(1) p-value</i>				0				0.0983
<i>AR(2) p-value</i>				0.904				0.609

Source: our elaboration on SAFE and World Bank data.

This table reports the regression results of equation (1) for newly exporting companies (Export Starters, Columns 1-4) and equation (2) for firms that stop exporting (Export Exiters, Columns 5-8).

Columns (1) and (5) show the marginal effects estimated through a panel probit model. Columns (2) and (6) report panel probit estimates with one lagged variable exception made for the standard firm controls (X) and for country and wave dummies. The IV estimates derive from a two-stage maximum likelihood panel probit model in which the R&D expenses by sector (% GDP) are used to instrument Innovation#1 (Columns (3) and (7)). The SYS-GMM estimates are reported in (4) and (8).

Significance levels: ***p<0.01, **p<0.05, *p<0.10.

Table A6

Estimations of the probability of starting and stopping to export for micro-sized enterprises: robustness check (Innovation #2) – Marginal effects.

	Export Starters			Export Exiters		
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Product Innovation</i>	0.0285***			-0.0648***		
<i>Process Innovation</i>		0.0407***			-0.0389	
<i>Organizational Innovation</i>			0.0162			-0.0597**
<i>Finance Problem</i>	0.0145	0.0140	0.0130	0.0569***	0.0558***	0.0573***
<i>Internal Funds</i>	0.0006	-0.0006	0.0008	-0.0487***	-0.0521***	-0.0485***
<i>Bank Loans</i>	0.0023	0.0023	0.0022	-0.0269	-0.0236	-0.0244
<i>Credit Line</i>	-0.0043	-0.0034	-0.0043	-0.0447*	-0.0456**	-0.0447*
<i>Grants or Subsidies</i>	0.0128**	0.0124**	0.0144**	0.0463*	0.0446*	0.0451*
<i>Trade Credit</i>	0.0090	0.0100	0.0096	-0.0531***	-0.0545***	-0.0526***
<i>Family and Friends Loans</i>	-0.0133	-0.0131	-0.0127	-0.0485**	-0.0488**	-0.0470**
<i>Other Loans</i>	0.0072	0.0065	0.0071	-0.0194	-0.0187	-0.0171
OP						
<i>Competition</i>	-0.0151*	-0.0150	-0.0150*	-0.0005	0.0002	0.0004
<i>Production Cost</i>	-0.0027	-0.0034	-0.0028	0.0363	0.0348	0.0366
<i>Growth up</i>	0.0189**	0.0191**	0.0192**	0.0331	0.0336	0.0336
<i>Profit up</i>	0.0155	0.0139	0.0171	-0.0149	-0.0180	-0.0170
<i>Family</i>	-0.0094	-0.0087	-0.0092	-0.0375	-0.0382	-0.0375
<i>Business Association</i>	0.0057	0.0069	0.0041	-0.1252**	-0.1247**	-0.1215**
<i>Public Company</i>	-0.0784	-0.0733	-0.0771	0.0080	0.0001	-0.0061
<i>VC</i>	0.0309	0.0419	0.0377	0.0796	0.0838	0.0760
<i>Other</i>	0.0116	0.0116	0.0112	-0.0064	-0.0099	-0.0112
W						
<i>Distance to Frontier</i>	0.0061***	0.0062***	0.0062***	-0.0126	-0.0128	-0.0120
<i>Credit to GDP</i>	0.0012*	0.0013**	0.0012*	0.0036	0.0037	0.0035
<i>Country</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Wave</i>	Yes	Yes	Yes	Yes	Yes	Yes
X						
<i>Size</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Age</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>Industry</i>	Yes	Yes	Yes	Yes	Yes	Yes
<i>N. of Observations</i>	6,323	6,323	6,323	3,151	3,151	3,151
<i>Number of firms</i>	4,435	4,435	4,435	2,319	2,319	2,319

Source: our elaboration on SAFE and World Bank data.

This table reports the marginal effects estimated through the panel probit model for equation (1) for the newly exporting companies (Export Starters, Columns 1–3) and for equation (2) for firms that stop to export (Export Exiters, Columns 4–6).

Significance levels: *** p<0.01, **p<0.05, *p<0.10.

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