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Article abstract

This article investigates how the export status—incumbent vs. new exporter—affects SMEs' ability to reap productivity gains. We conduct regression analysis using panel data of Spanish manufacturing SMEs from the PITEC database. Our evidence confirms that the combination of the status of incumbent exporters and of the open search strategy allows SMEs to improve their productivity. This effect is particularly acute when firms are domestically-owned and when they acquire market-oriented information. We contribute to the literature on the relationship between export and productivity by showing that export status matters, and by introducing openness into the discussion.

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ABSTRACT

This article investigates how the export status —incumbent vs. new exporter— affects SMEs' ability to reap productivity gains. We conduct regression analysis using panel data of Spanish manufacturing SMEs from the PITEC database. Our evidence confirms that the combination of the status of incumbent exporters and of the open search strategy allows SMEs to improve their productivity. This effect is particularly acute when firms are domestically-owned and when they acquire market-oriented information. We contribute to the literature on the relationship between export and productivity by showing that export status matters, and by introducing openness into the discussion.

Keywords: Exporting, productivity, search strategy, openness, SMEs

Résumé

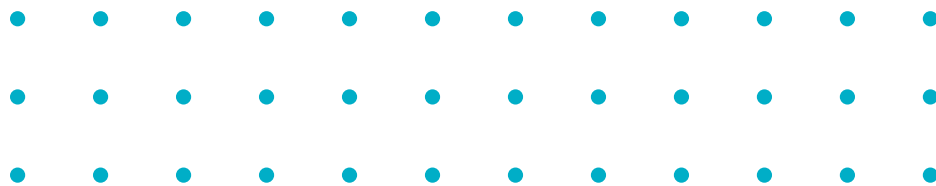
Cet article étudie l'influence du statut d'exportateur — ancien ou nouvel exportateur — sur la capacité des PME à bénéficier de gains de productivité. Nous effectuons une analyse de régression en utilisant des données de panel de PME manufacturières espagnoles de la base de données PITEC. Nos résultats confirment que la combinaison du statut d'ancien exportateur et d'une stratégie de recherche ouverte permet aux PME d'accroître leur productivité. Cet effet est particulièrement important lorsque les entreprises sont exclusivement détenues par du capital domestique et qu'elles acquièrent des informations axées sur le marché.

Mots-Clés : exportation, productivité, stratégie de recherche, ouverture, PME

Resumen

El estatus de exportador —en empresas establecidas versus nuevas exportadoras— afecta la habilidad de las PYMES para conseguir productividad. El análisis de regresión múltiple utiliza los datos de panel de las PYMES en la base de datos PITEC. La combinación del estatus de exportadores establecidos y la estrategia de búsqueda abierta permite a las PYMES incrementar la productividad. Esta relación es importante cuando las empresas son de propiedad local y cuando además adquieren información del mercado. Contribuimos a la investigación de la relación entre productividad y exportación mostrando la importancia del estatus de exportación, y mediante la introducción del nivel de apertura.

Palabras Clave: Exportación, productividad, estrategia de búsqueda, nivel de apertura, PYMES



Compared to large firms, small and medium-sized enterprises (SMEs) often face more constraints when it comes to growth and development prospects. In particular, barriers from the external environment and limitations due to internal factors curb SME prosperity in international markets (Leonidou, 2004; Ferreras-Méndez, Fernández-Mesa, and Alegre 2019; Martínez Villar, 2021; OECD, 2008). Fewer resources, limited capabilities, and less market power (Mina *et al.*, 2021) disadvantage SMEs when they scrutinize information available abroad, leading them to suffer from information inefficiencies (Leonidou, 2004). However, while exporting, firms expose themselves to information, knowledge, and technologies in foreign markets (Ahimbisibwe *et al.*, 2016; Colovic, 2022; Villar, Alegre, and Pla-Barber, 2014). The opportunity of identifying and assimilating valuable external information often enables technology adoption and knowledge transfer, leading to improved performance in the long run (Love and Ganotakis, 2013). Thus, SMEs benefit in particular when they offset their constraints by leveraging exporting to increase their productivity (Lee *et al.*, 2010).

Despite a rich literature, the link between exporting and productivity (defined as the overall efficiency in the production process, typically measured by the amount of output generated per unit of input) remains far from conclusive (Gkypali, Love, and Roper, 2021). While some authors argue that productive firms self-select into foreign markets (Bernard and Jensen, 1999; Máñez-Castillejo, Rochina-Barrachina, and Sanchis-Llopis, 2009), others find that exporting increases firm productivity (Baldwin and Gu, 2004; Love and Mansury, 2009). Although the debate on self-selection vs. productivity gains from exporting is certainly valuable, our aim here is not to participate in the debate. Rather, we aim to extend the discussion about the latter—the relationship between exports and productivity enhancement. Whilst prior research finds support for productivity gains from exporting (De Loecker, 2013; Evenson and Westphal, 1995; Gkypali *et al.*, 2021), empirical evidence shows that the productivity effect is not universal, and that exporters benefit from it to a different degree (Damijan, de Sousa, and Lamotte, 2009; Gkypali *et al.*, 2021; Silva, Afonso, and Africano, 2012; Wagner, 2007). This suggests that a mere presence in foreign markets does not necessarily lead to improved productivity. That is, such productivity gains only occur under certain conditions (Delgado, Farinas, and Ruano, 2002; Ferreras-Méndez *et al.*, 2019; Harris and Li, 2008).

Indeed, previous studies have discussed the requisite conditions and mechanisms for such productivity gains to occur; however, most of them compare exporters with non-exporters. Seeking to go further, we are interested in understanding how SME exporters can enjoy productivity gains given their different export status. In particular, we compare the status of new vs. incumbent exporters. The former are firms that have started exporting recently, and the latter are firms that have been exporting for a longer period of time. We, therefore, address the following research question: *How does the export status (incumbent vs. new exporter) affect SMEs' ability to reap productivity gains*

from exporting? This is the main research question that we aim to answer in our study. In addition, as the literature has identified certain factors affecting the extent to which exporters can benefit from exporting, we further investigate how some of these contingencies impact the gains from exporting, specifically concerning productivity. Our additional research question is: *What are the contingencies affecting the extent to which SME exporters reap the productivity gains from exporting?*

Different mechanisms have been proposed to drive productivity gains from exporting (Castellani and Fassio, 2019; D'Angelo, Ganotakis, and Love, 2020; Golovko and Valentini, 2014; Ferreras-Méndez *et al.*, 2019). Focusing on the driver of knowledge transfer and technology adoption, we identify three potentially relevant contingencies. First, we suggest that compared to new exporters, incumbent exporters are more likely to have developed absorptive capacity (Cohen and Levinthal, 1990; Zahra and George, 2002), namely, to identify and utilize valuable information available in the foreign market due to their familiarity and experience in that market (Johanson and Vahlne, 1977; Martínez Villar, 2021). Like Laursen and Salter (2006), we also consider an open search strategy, which indicates that firms are actively seeking and willing to use external information. Thus, we argue that the combination of the incumbent exporter status and the adoption of an open search strategy would enable productivity gains from exporting.

We also hypothesize that domestically-owned firms are more likely to enjoy such a productivity gain because foreign-owned firms have other opportunities to discover the available information in foreign markets, namely through internal information channels (Sun and Hong, 2011). Indeed, such firms can learn about foreign markets from their foreign owners, from the headquarters located in foreign countries, or from the internal company network. Further, we suggest that, among the various external information sources, information from actors in foreign markets (i.e., market-oriented information) is particularly beneficial for incumbent exporters. This is because interacting with international buyers, competitors, and suppliers has been identified as a channel through which firms can acquire new technological and market knowledge (Blalock and Gertler, 2004; Ferreras-Méndez *et al.*, 2019; López, 2005; Liu and Buck, 2007; Love and Ganotakis, 2013).

Our empirical analysis uses the Technological Innovation Panel (PITEC), which is the Spanish part of the Community Innovation Survey (CIS), a survey taking place mainly in European Union countries since 1992. In all EU countries, SMEs play a significant role in generating prosperity for their domestic economies. In Spain, SMEs count for 99% of all enterprises, generating about 60% of total value added and 70% of employment (European Commission, 2019). The Small Business Act for Europe (SBA) has recognized internationalization as a policy priority (European Commission, 2008) for SMEs. This is particularly relevant for the Spanish economy because the internationalization of its SMEs ranked below the EU average in 2019 (European Commission, 2019).

We study manufacturing SMEs exclusively for two reasons. First, we are focusing on exporting, and not internationalization in general. Due to their service nature, some firms are not able to “export” their services although they can internationalize through other entry modes. This is the case for inseparable services, whose production and consumption are simultaneous, such as hospitals and hotel services (Erramilli and Rao, 1993). Second, studying productivity gains for exporters in the manufacturing sector is a convention in the literature (Wagner, 2012). By following this convention, we can better position our study in the on-going debate.

Our analysis applies a three-year window to define incumbent exporters as the literature suggests (Giordano and Lopez-Garcia, 2019; CompNet, 2018). This operationalization gives us an unbalanced panel data of 12,915 firm-year observations, from 2005 to 2016, across 23 industries in the manufacturing sector. Following the literature (Silva *et al.*, 2012), we measure the productivity gains using revenue-based productivity, which is a proxy for total factor productivity. Productivity is the overall efficiency when transforming inputs into outputs. It can be explained by a combination of factors such as the allocation of labor and capital, firm ownership, internationalization (Hsieh, 2015), management practice (Syverson, 2011), and managers’ experience (Bertrand and Schoar, 2003). Analyzing the panel data using a regression approach, we find evidence supporting all our hypotheses. The results are also robust under alternative specifications.

This article is novel and has practical implications. It contributes to the literature by examining how the export status affects productivity gains, rather than examining whether export enables productivity enhancement, as is the case in previous studies. It also introduces the element of openness (Laursen and Salter, 2006) into the relationship between exports and productivity, where the findings remain inconclusive (Gkypali *et al.*, 2021). Due to their limited abilities to scrutinize opportunities in foreign markets, SMEs sometimes make suboptimal decisions (Buckley and Ghauri, 1999) and refrain from internationalization. Yet by limiting their operations to domestic markets, SMEs miss an opportunity to acquire knowledge from and about foreign markets (Ferrerias-Méndez *et al.*, 2019) and reduce their potential to improve productivity (Van Biesebroeck, 2005). Showing SMEs that they can enhance their productivity when operating in foreign markets is likely to incentivize them to internationalize. Moreover, uncovering the conditions facilitating this benefit could help SMEs to make informed decisions and adjust their choices accordingly.

Theoretical background and hypotheses

Exporting is the preferred foreign market entry mode for SMEs due to its low cost (Leonidou, 2004; Leonidou and Katsikeas, 1996), high degree of flexibility, and low levels of commitment and risk (Lu and Beamish, 2006). In addition, exporting often leads to productivity gains (Baldwin and Gu, 2004; Love and Mansury, 2009). Several mechanisms have been put forward to explain the productivity gains from exporting, including stimuli due to intensified competition and different customer preferences (Bernard and Jensen, 1999; Castellani and Fassio, 2019; D’Angelo, Ganotakis, and Love, 2020; Wagner, 2007), opportunities to exploit economies of scales (Golovko and Valentini, 2014), and access to advanced technologies and knowledge (Evenson and Westphal, 1995; Ferrerias-Méndez *et al.* 2019; Wagner, 2007).

Among all these mechanisms, we believe the mechanism of accessing valuable external information is particularly relevant for SMEs because of their limited resources and capabilities for scrutinizing information in external environments (Mina *et al.*, 2021; Leonidou, 2004). Tapping into the advanced technologies and knowledge available in foreign markets helps SME exporters improve efficiency and identify new innovation opportunities (Evenson and Westphal, 1995; Love and Roper, 2015; Wagner, 2007). Lileeva and Trefler (2010) thus demonstrate that Canadian exporters are more likely to adopt advanced technology than non-exporters. Chongvilaivan (2012) finds similar results for the case of Singaporean firms. Analyzing a matched sample of Turkish firms, Yasar and Paul (2008) show that technology transfer enhances exporters’ productivity. Technological information notwithstanding, access to rich external information allows firms to make better decisions, approach foreign markets appropriately, and consequently reap the benefits from exporting (Costa, Soares, and Sousa, 2016).

To benefit from external foreign information, prior knowledge and relevant experience are indispensable (Cohen and Levinthal, 1990; Ferrerias-Méndez *et al.*, 2019). As Johanson and Vahlne’s (1977) seminal work, known as the Uppsala model, suggested, internationalization is a process of gradual knowledge accumulation. Compared to new exporters, incumbent exporters are more experienced in international markets and are therefore more likely to have relevant prior knowledge for identifying and utilizing information discovered in foreign markets (Martinez Villar, 2021). In other words, incumbent exporters are more likely to have developed absorptive capacity, which allows them to recognize and exploit the value in external knowledge (Ahimbisibwe *et al.*, 2016; Ferrerias-Méndez *et al.*, 2019). This is in line with Zahra and George’s (2002) practice-oriented view of absorptive capacity—the practice of exporting allows firms to build an absorptive capacity that helps them assimilate and utilize external information and knowledge. Analyzing data from a panel of Argentinian firms, Albornoz and Ercolani (2007) confirm that firms’ experience in international markets determines the extent of gains from exporting. Consistent with this finding, Pisu (2008) argues that productivity improvement due to exporting is unlikely to occur in the first exporting year as it takes some time to realize the benefits of incorporating external knowledge. Studying the role of experience in approaching psychically distant markets by Spanish SMEs, Martinez Villar (2021) finds that when SMEs have obtained enough international experience, they tend to venture into more complex, psychically distant countries.

However, external information is not given to exporters, and productivity enhancement is not automatic (Albornoz and Ercolani, 2007). Firms’ willingness and ability to use external information is essential. Chesbrough (2003) introduced the term “openness”, referring to organizations opening their boundaries, allowing external information to flow in and internal information to flow out. He suggests that firms that actively engage in exchange with external constituents are able to better exploit information, technology, and knowledge. That is, openness can improve firm performance. Laursen and Salter (2006) operationalize the concept of openness using firms’ information search strategy. Following these authors, we also consider that firms’ information search strategy indicates their openness: firms with an open search strategy are those seeking and willing to use external information. This is because search is not costless—firms will search for information only if they are interested in and willing to use such information. Thus, an open search strategy is associated with proactive behavior, suggesting a high

motivation to scrutinize the external environment, including foreign markets (Gkypali *et al.*, 2021). When adopting such a strategy, SMEs intentionally look for information, best practices, and advanced technology as solutions to their problems. Hence, SMEs that actively search for external information, meaning they adopt an open search strategy, are prone to utilizing it as well.

Moreover, utilizing external information requires prior knowledge and relevant experience, or an absorptive capacity, defined as “a firm’s ability to recognize the value of new external information, assimilate it, and apply it to commercial ends” (Cohen and Levinthal, 1990, p. 128). Compared to firms that have just started to export (i.e., the new exporters), firms having engaged in exporting for a longer period (i.e., the incumbent exporters) are more experienced in international markets, which facilitates their understanding and accumulation of foreign information and knowledge (Johanson and Vahlne, 1977; Martinez Villar, 2021). In other words, incumbent exporters will have already developed absorptive capacity, allowing them to fully exploit information in foreign markets and improve productivity.

Drawing on these ideas, we contend that a firm’s openness could prove decisive in profiting from exporting. Taking together the benefit of external information, and the necessity of having the absorptive capacity to utilize it, our first hypothesis posits that continuous engagement in exporting leads to higher productivity if combined with an open search strategy, as compared with a relatively recent engagement in exporting, regardless of the presence of an open search strategy. We refer to exporters that have not yet accumulated significant experience in exporting as “new exporters”. We use the term “new” because exporting represents a new activity for them. We therefore hypothesize a two-way interaction for incumbent SME exporters:

Hypothesis 1a. Incumbent SME exporters that adopt an open search strategy will exhibit higher productivity than incumbent SME exporters without an open search strategy.

Hypothesis 1b. Incumbent SME exporters that adopt an open search strategy will exhibit higher productivity than new SME exporters with an open search strategy.

While exporting grants SMEs access to valuable information abroad, firms can also obtain valuable foreign information without exporting. This is particularly the case when firms are foreign-owned (Sun and Hong, 2011). Analyzing the Belgian Community Innovation Survey (CIS), Veugelers and Cassiman (2004) find that foreign subsidiaries are more likely to acquire technology abroad. Since foreign capital is often driven by exploiting superior firm-specific assets (Caves, 1996), the foreign parent company is expected to transfer its technologies and knowledge to its subsidiaries. That is to say, foreign-owned companies are advantaged in accessing valuable information owned by their foreign parent companies (Dachs and Peters, 2014; Ho, Wu, and Xu, 2011). Not limited to the parent company’s proprietary knowledge, being affiliated with a foreign company also makes the focal firm part of an international network, which often involves knowledge exchange among subsidiaries across different countries (Gupta and Govindarajan, 2000; Zanfei, 2000). This further enhances the opportunities for foreign-owned firms to access valuable information abroad.

In addition, foreign investors can provide focal firms with relevant prior knowledge to identify and utilize valuable information discovered abroad. Analyzing a panel of Taiwanese firms, Ho *et al.* (2011) found that foreign investors’ expertise helps small

firms reap returns from adopting advanced information technology; this expertise helps SMEs to a much greater extent than it helps the large firms. Ho *et al.* (2011) interpret this as foreign investors bringing in expertise that would not have been available to small firms otherwise. Ramachandran (1993) builds a formal model, predicting that a foreign parent company will invest greater resources in transferring technology to its subsidiaries than to other independent firms. Such resources could include access to advanced R&D facilities and knowledge of the foreign technology market (Vishwasrao and Bosshardt, 2001).

Therefore, it is likely that foreign-owned firms can benefit from external information even if they do not engage in exporting. In other words, accessing foreign information through exporting should be particularly beneficial to those firms not exposed to foreign assets otherwise. Consequently, we suggest that the productivity effect of exporting resulting from accessing foreign knowledge should be greater for domestically-owned than for foreign-owned firms. As Sun and Hong (2011, p. 1210) argue, “if knowledge spillover from foreign counterparts is the main force behind productivity improvement, foreign-owned firms have already benefited such spillovers internally and there is no reason to boost further productivity through a much indirect way as export-market participation.” In line with these insights, we formulate our second hypothesis:

Hypothesis 2. The positive productivity effect of an open search strategy on incumbent SME exporters is more likely to occur when the incumbent SME exporters do not have foreign ownership.

The pattern of search strategy not only informs us about whether firms are open toward external information, but it also reflects the kind of information firms acquire. As Laursen and Salter (2006, p. 134) argue, “the search activities of different firms in an industry are subject to considerable variety, and this variety is a product of different (past and present) managerial choices...”. Knowledge can flow in from different sources, and market-related information is highly valuable for SMEs (Golovko and Valentini, 2014). Analyzing UK exporters, Crespi, Criscuolo, and Haskel (2008) demonstrate that using buyers’ information leads to exporters’ productivity growth. Studying a sample of Chinese exporting SMEs, Williams, Colovic, and Zhu (2016) find that foreign market knowledge positively impacts firm performance.

When information emanates from customers, competitors, suppliers, or consultants, we consider it information from market-oriented sources, based on the framework of the Community Innovation Survey. We argue that acquiring information from market-oriented sources is decisive for productivity enhancement due to exporting because interacting with actors on the international market catalyzes knowledge transfer (Ahimbisibwe *et al.*, 2016). Reviewing evidence from case studies, López (2005) concludes that foreign buyers assist exporters in refining their product design, increasing production efficiency, and optimizing the factory layout. Blalock and Gertler (2004) examine how international buyers provide technical assistance to Indonesian exporters. Managers from textile and garment firms reveal that engineers sent by Japanese and German buyers help them improve the production process, including cost reduction and capacity expansion. Maintaining relationships with international buyers enables exporters to break into a larger industry network (Egan and Mody, 1992; Ford and Håkansson, 2006). Similarly, linkages with suppliers also allow knowledge transfer to occur (Liu and Buck, 2007).

Moreover, productive competitors in the foreign market serve as a benchmark for exporters. By understanding their competitors, exporters acquire information about the availability of new machinery and its embedded technology. Examining products offered by international competitors informs exporters about quality requirements and customer preferences. Liu and Buck (2007) suggest the possibility of reverse engineering as a channel through which exporters obtain information from their competitors. Fierce competition in international markets stimulates exporters to improve their product design or introduce new products. Taking into account that using external information requires prior knowledge and relevant experience, we hypothesize a two-way interaction effect, where both continuous engagement in exporting (i.e., being an incumbent exporter) and acquiring market-oriented information act in conjunction, leading to greater productivity enhancement. Figure 1 depicts our research model with the three sets of hypotheses.

Hypothesis 3a. Incumbent SME exporters that acquire market-oriented information will exhibit higher productivity than incumbent SME exporters that do not acquire market-oriented information.

Hypothesis 3b. Incumbent SME exporters that acquire market-oriented information will exhibit higher productivity than new SME exporters that acquire market-oriented information.

Data and method

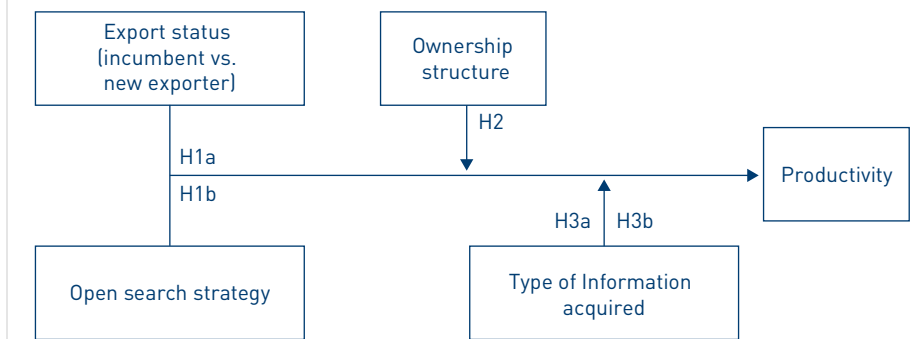
We use the data from the Technological Innovation Panel (PITEC), which is the Spanish part of the Community Innovation Survey (CIS). Based on the framework of the Oslo Manual (OECD and Eurostat, 2005, 2018), PITEC collects information regarding firms' innovation-related activities. It also contains information about firms' basic characteristics, including export activities. PITEC is an annual survey, which started in 2003. Because of the changing sampling method, the cross-year comparison is possible from 2005. After excluding firms that went through events such as a merger, split up, or shut down, we obtain a balanced sample of 5,662 firms for the period from 2005 to 2016.

The European Union (EU recommendation 2003/361) defines a small and medium-sized enterprise (SME) as a firm that “employs fewer than 250 people and has an annual turnover not exceeding 50 million euros, and/or an annual balance sheet total not exceeding 43 million euros”. Since PITEC does not provide information on the balance sheet, we qualify firms as SMEs using the criteria of the number of employees and the annual turnover in 2005. Among the 5,662 firms, we identify 3,580 SMEs across the manufacturing and service sectors.¹ We further drop observations that are not in the manufacturing sector and exclude observations with missing values. This leaves us with 25,415 observations for the period from 2005 to 2016.² This article aims to clarify the conditions under which exporters reap productivity gains, rather than examine whether the productivity effect occurs. Since the literature which we build upon is based largely on the analysis of manufacturing firms, we decided to follow the

1. Some firms have changed their industry during the 12-year observation period.

2. PITEC changed its industry coding in 2008. We matched the new coding with the old one to obtain a panel from 2005 to 2016. However, we were not able to do so for all observations. We then treated observations without an industry code as missing values and dropped them. This operation left us with an unbalanced panel with 25,415 observations. Among these observations, 1,893 SMEs have 12 year observations, 102 SMEs have 11 year observations, 69 SMEs have 10 years observations, and 142 SMEs have number of year observations ranging from 1 to 9 years.

FIGURE 1
Research model illustrating all the hypotheses



same convention in order to join the on-going debate and discussion. As stated by Wagner (2012, p.23), “we have evidence on the links between international trade and productivity in manufacturing firms from a large number of empirical studies published during the past 15 years”.

Our dependent variable is “productivity”. PITEC provides no information about the quantities of inputs and outputs; therefore, we use revenue-based productivity. Since PITEC records firms' gross sales, rather than value-added sales, we proxy revenue-based total factor productivity by the residuals obtained from regressing gross sales on capital stock and the number of employees. Exports and productivity are linked in a two-way relationship. On the one hand, productive firms self-select into exporting. On the other hand, firms increase their productivity after starting to export. To avoid the compounding effect of self-selection, we focus on the latter and explore how the export status affects productivity enhancement. We compare the productivity between the incumbent and new exporters, rather than between exporters and non-exporters. If exports enhance productivity, firms that have been exporting for a longer period (incumbent exporters) would enjoy a productivity premium, compared with firms that have just started exporting (new exporters).

Following literature and practice, we use a three-year window to define incumbent and new exporters (Giordano and Lopez-Garcia, 2019; CompNet, 2018).³ The “incumbent exporter” variable takes the value of one when an observation is an incumbent exporter and zero when an observation is a new exporter. Incumbent exporters are SMEs that exported for three consecutive years from year $t-2$ to t . New exporters are those who

3. The CompNet (The Competitiveness Research Network) is a network originally founded by the European System of Central Banks. Its members include institutions and organizations such as the European Commission, the European Bank for Reconstruction and Development, the Halle Institute for Economic Research, or the European Investment Bank. CompNet provides a standard micro-founded dataset covering export activities across European countries. In their dataset, incumbent exports are defined as firms that export for three consecutive years.

did not export in the previous two years ($t-2$ and $t-1$), but exported in year t . Applying this operationalization, we further dropped 12,500 observations, including 4,034 observations without export information for three years and 8,466 observations not qualified as incumbent or new exporters.⁴ Our final working sample is an unbalanced panel, including 12,915 firm-year observations from Spanish SMEs in the manufacturing sector from 2007 to 2016. The number of SMEs for each year ranges from 1,115 to 1,479. On average, each SME has seven year observations.

PITEC asks firms to rate the importance—ranging from high, medium, low, to not relevant—of information from different sources or search channels used in their innovation activities. It also classifies external information sources into three categories: market-oriented, institution-based, and other channels. Like Laursen and Salter (2006), we consider that a firm has an open search strategy when it rates as highly important at least one external information source. We define the variable “open search” as a continuous variable ranging from zero to three, indicating the variety of external information sources considered highly important. It takes the value of zero when a firm does not consider as highly important any external information source; it takes the value of three when a firm considers all the three external information sources as highly important.

Our first set of hypotheses posits a two-way interaction. The combination of being incumbent and using an open search strategy would allow SME exporters to improve their productivity. We test this set of hypotheses by estimating an interaction term between “incumbent exporter” and “open search”. PITEC does not distinguish the geographic location of the information sources. We acknowledge that our operationalization may capture the situation in which firms adopt an open search strategy toward domestic external information sources and not necessarily foreign ones. However, we hypothesize a two-way interaction effect. If firms were open to only domestic external information sources, the benefits or costs of such a search strategy would not need the status of exporter to activate them. Facing a similar constraint, Crespi *et al.* (2008) use the UK Community Innovation Survey to illustrate how acquiring information from customers drives exporters’ productivity growth.

Taking into account unobservable firm heterogeneity, we estimate the coefficients of the interaction term using firm fixed effects. This approach allows us to explore the within firm productivity enhancement. The result of the Hausman test also favors a fixed effect model over a random effect model. We control for product and process innovation because innovation affects the link between productivity and exporting (Cassiman, Golovko, and Martínez-Ros, 2010; Fassio, 2018; Love and Roper, 2015; Máñez-Castillejo *et al.*, 2009). To account for the impact of new products, we define the variable “new product sales” as the logarithm of sales (in thousand euros) generated from new products. We use a binary “process innovation” to indicate whether firms introduce a new process.

Firms’ ability to utilize external information depends on their absorptive capacity (Cohen and Levinthal, 1990; Ferreras-Méndez *et al.*, 2019). While developing Hypothesis 1, we point out that compared to new exporters, incumbent exporters are likely to have higher absorptive capacity to identify and utilize information in the foreign markets because of their continuous engagement in exporting activities. In order to make sure that our regression results capture this process-oriented part of absorptive capacity

(Zahra and George, 2002), we further control for the technological aspect of absorptive capacity (Cohen and Levinthal, 1990) by calculating firm R&D stock per employee. We use the perpetual inventory method (PIM) to calculate firm R&D stock based on their annual internal R&D expenditure with a constant depreciation rate of 20% (Jäger, 2017). Then we divide the R&D stock by the number of employees. This variable is named “R&D stock intensity”, expressed in logarithmic form. Using both “incumbent exporter” and “R&D stock intensity” allows us to reflect the technological- and process-oriented views of absorptive capacity. That is, we capture the concept of absorptive capacity not only through “R&D stock intensity”, but also through the variable of “incumbent exporter”.

We also control for the relevance of export activities by including the share of exports in overall turnover. We name this variable “export intensity”. Other control variables include age, size, industry, and year. “Age” is the number of years (in log) since the firm was established. Firm “size” is measured by the number of employees (in log). To account for curvilinear effects, we also include “age2” and “size2”, or the quadratic term of “age” and “size”. Since some firms changed industries during the observation period, we include industry dummies. Our industry classification is based on two-digit NACE codes, namely, the statistical classification of economic activities in the European Community. We also include year dummies to account for possible shocks that affect all firms in the same year.

We further hypothesize that productivity enhancement due to exports is more likely to occur for SME exporters without foreign ownership than for those with foreign ownership. Since whether a firm has foreign ownership or not is likely to be time-invariant, it is infeasible to estimate the effect of such a variable using firm fixed effects. Thus, we split the sample into two subsamples: SMEs exporters without and with foreign ownership, based on firms’ response to the survey question regarding the ownership structure. We then estimate the coefficients of the interaction term between “incumbent exporter” and “open search” using firm fixed effects, including the same set of control variables.

Our third set of hypotheses suggests that acquiring information from market-oriented sources is critical for incumbent exporters to benefit from an open search strategy. Thus, we create a binary variable for each of the three external information sources: “market source”, “institution source”, and “other source”. These variables take the value of one when firms rate the corresponding information source as highly important. For example, the variable of “market source” takes the value of one when firms consider highly important information from any of the following channels: customers, competitors, suppliers, or consultants. Similarly, “institution source” is coded one when information from universities, research institutions, or technology centers is considered highly important. “Other source” refers to other search channels such as conferences, journal publications, or associations. We summarize the variable definitions in Table A1 and present their descriptive statistics in Table A2 in the appendix.

To test Hypotheses 3a and 3b, we replace “open search” with the three binaries representing external information sources in the regression. We interact “incumbent exporter” with “market source” and use “institution source” and “other source” as control variables. This approach allows us to interpret the coefficient of the interaction term of the productivity enhancement due to acquiring information from a market-oriented source, and keeping constant firm openness toward information from the institution-based source and other channels. We estimate the coefficient using firm fixed effects, including the same set of control variables.

4. The 4,034 observations include 2,000 observations in year 2005 and 2,034 observations in 2006.

Results

Table 1 shows the correlation coefficients of the main variables. Because of the operationalization of the variables, the correlation between “open search” and variables indicating the external information sources—“market source”, “institution source”, and “other source”—are moderate to high. “Open search” takes the value of one when any of the information source variables also takes the value of one. Since we use them in different regression equations, their correlations do not raise the issue of multicollinearity. Except for this, the correlations among other variables are low to moderate.

TABLE 1
Correlation coefficients

Variables	1	2	3	4	5	6	7	8	9	10	11
1 Productivity											
2 Incumbent exporter	.062										
3 Open search	.037	.014									
4 Market source	.052	.015	.768								
5 Institution source	.000	-.012	.600	.161							
6 Other source	.015	.024	.668	.256	.182						
7 New product sales	.159	.057	.223	.228	.084	.121					
8 Process innovation	.036	-.004	.155	.158	.063	.080	.217				
9 R&D stock intensity	.029	.040	.226	.190	.145	.118	.269	.084			
10 Export intensity	.107	.132	.054	.023	.044	.049	.057	-.017	.130		
11 Age	.027	.073	-.023	-.027	-.027	.009	-.012	-.018	-.091	-.026	
12 Size	.163	.077	.002	.003	.002	-.001	.156	.129	-.218	-.004	.227

N=12,915

We present the results of the main analysis in Table 2. All models are estimated using firm fixed effects with robust standard errors. Model 1 is the baseline model. The coefficient of “incumbent exporter” is insignificant. We do not observe productivity gain due to incumbent exporter status when comparing within the same SME. This confirms our arguments above, namely, that exporting alone does not make a difference when it comes to within-firm productivity enhancement. The productivity enhancement effect due to exports has to be studied in conjunction with other factors. The coefficient of “open search” is positive and significant, consistent with the literature that openness increases firm performance. The coefficient of “new product sales” is also positive and significant. Productivity increases when firms innovate.

Model 2 includes the interaction between “incumbent exporter” and “open search” to test Hypotheses 1a and 1b. The coefficient of the interaction term is positive and significant. Being an incumbent exporter with an open search strategy enhances the firm’s productivity by 2.5% compared to new exporters without an open search strategy. To gain support for Hypotheses 1a and 1b, we then test the significance of the coefficients.

TABLE 2
Results of the main analysis

Dependent variable: Productivity						
Model	(1)	(2)	Foreign ownership		(5)	(6)
			(3) No	(4) Yes		
Independent variable						
Incumbent exporter	-0.009	-0.030**	-0.027**	0.019	-0.008	-0.030**
	(0.009)	(0.010)	(0.010)	(0.028)	(0.009)	(0.010)
Open search	0.007*	-0.018	-0.016	0.009		
	(0.003)	(0.010)	(0.011)	(0.017)		
Incumbent exporter		0.025*	0.025*	-0.001		
X Open search		(0.010)	(0.011)	(0.017)		
Market source					0.010*	-0.034*
					(0.004)	(0.017)
Incumbent exporter						0.046**
X Market source						(0.017)
Institution source					0,011	0,011
					(0,006)	(0,006)
Other source					-0.002	-0.002
					(0.006)	(0.006)
New product sales	0.002*	0.002*	0.002	-0.001	0.002*	0.002*
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)
Process innovation	-0.006	-0.006	-0.005	-0.020	-0.006	-0.006
	(0.005)	(0.005)	(0.005)	(0.013)	(0.005)	(0.005)
R&D stock intensity	0.008	0.007	0.012	-0.014	0.007	0.007
	(0.006)	(0.006)	(0.006)	(0.015)	(0.006)	(0.006)
Export intensity	0.000	0.000	0.000	-0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)
Age	0.184	0.184	0.332	-0.826	0.187	0.189
	(0.188)	(0.187)	(0.179)	(0.773)	(0.188)	(0.187)
Age2	-0.038	-0.039	-0.074	0.198	-0.039	-0.039
	(0.045)	(0.045)	(0.044)	(0.180)	(0.045)	(0.045)
Size	-0.082	-0.079	-0.116	-0.049	-0.082	-0.080
	(0.063)	(0.063)	(0.065)	(0.192)	(0.063)	(0.063)
Size2	0.006	0.006	0.011	-0.001	0.006	0.006
	(0.007)	(0.007)	(0.008)	(0.021)	(0.007)	(0.007)
Constant	0.346	0.370	0.299	1,400	0.347	0.364
	(0.234)	(0.233)	(0.224)	(0.787)	(0.234)	(0.233)
Industry dummy	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,915	12,915	10,775	2,140	12,915	12,915
R ²	0.087	0.088	0.095	0.146	0.087	0.088

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

The F statistics confirm a significant difference between the coefficient of incumbent exporters with an open search strategy and incumbent exporters without an open search strategy. Thus, Hypothesis 1a is supported. Similarly, the coefficients are significantly different between incumbent exporters with an open search strategy and new exporters with an open search strategy, so Hypothesis 1b is also supported. It can be noted that the coefficient of “incumbent exporter” is negative and significant. We interpret the decreased productivity as the disappearance of the one-time and short-lasting scale effect. As claimed by Damijan and Kostevc (2006, p. 608), “[i]t may be that the initial productivity hike is solely a consequence of a scale effect whereby the firm takes advantage of a larger market to place its additional output”. When taking into account the hypothesized two-way interaction effect between “incumbent exporter” and “open search”, this initial productivity hike is revealed.

Except for splitting the sample into two subsamples, namely, firms with and without foreign ownership, Models 3 and 4 estimate the same regression equation as Model 2. On one hand, Model 3 shows that the coefficient of the interaction term between “incumbent exporter” and “open search” is positive and significant. On the other hand, the interaction term estimated in Model 4 is not significant. These results support Hypothesis 2 that the positive effect of open search on incumbent exporters is more likely to be observed when firms have no foreign ownership.

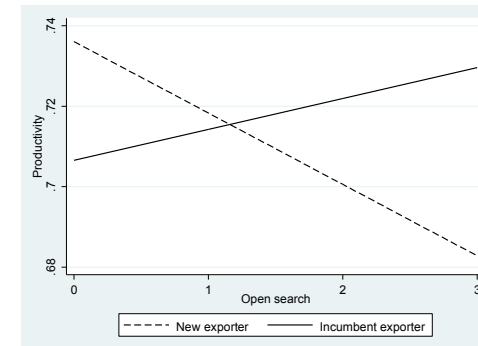
Model 5 is the baseline model of Model 6, which tests Hypotheses 3a and 3b. Compared to the previous four models, we replace “open search” with “market source”, “institution source”, and “other source”. Except for this, all other variables are the same as in previous models. The estimated coefficients in Model 5 reveal the same patterns as those in Model 1. The coefficient of “incumbent exporter” is negative and insignificant. “Market source” is positive and significant, indicating the benefits of market-oriented information. Model 6 includes the interaction between “incumbent exporter” and “market source”. The interaction term is positive and significant. The result of F test supports Hypothesis 3a. The coefficients between incumbent exporters acquiring market-oriented information and incumbent exporters not acquiring market-oriented information are significantly different. Similar support is found for Hypothesis 3b. There are significant differences between the coefficient of incumbent exporters acquiring market-oriented information and new exporters acquiring market-oriented information. While the coefficient of the interaction term is positive and significant, the coefficient of “market source” becomes negative and significant. This highlights the costs of open search. While being an incumbent exporter and using market-oriented information enhances productivity, searching for market-oriented information is not without costs.

Figure 2 visualizes the estimation in the regression analysis. Panel A displays the interaction effect estimated in Model 2. The x axis is “open search”, indicating the variety of external information sources considered highly important. The y axis is productivity. The figure shows a crossover interaction. The effect of open search is the opposite for incumbent exporters and new exporters. On the one hand, the conjunction of open search and incumbent exporters enhances within-firm productivity. On the other hand, the open search reduces new exporters’ productivity. This is consistent with our argument that exporters must have prior knowledge and relevant experience to benefit from information from international markets. Without sufficient absorptive capacity, the costs of the open search may offset its benefits. As demonstrated by Laursen and Salter (2006), over-search leads to decreased performance.

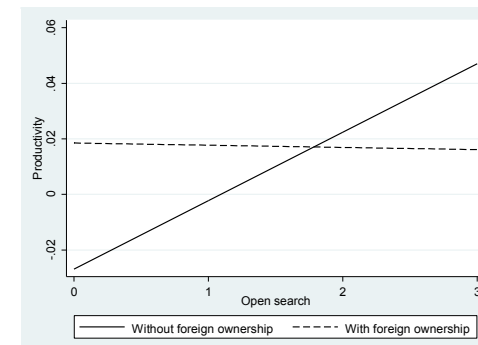
FIGURE 2

Visualization of the estimation in the main analysis

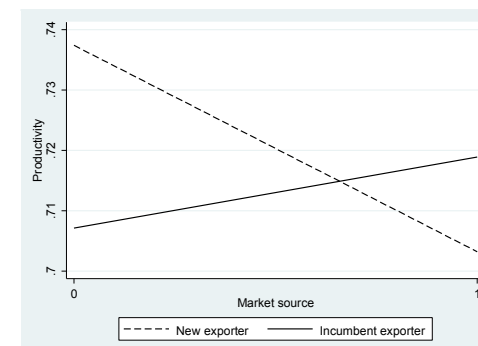
Panel A Interaction effect estimated in model 2



Panel B Marginal effect of open search on incumbent exporters estimated in models 3 and 4



Panel C Interaction effect estimated in model 6



Panel B shows the marginal effect of open search on incumbent exporters for firms with and without foreign ownership, as estimated in Models 3 and 4. The dashed line reveals the estimation for firms with foreign ownership. It is almost a horizontal line, indicating that open search does not increase the productivity of incumbent exporters with foreign ownership. Conversely, the solid line shows a positive productivity effect of the open search for incumbent exporters without foreign ownership. Panel C depicts the estimation in Model 6. It shows again a crossover interaction between “incumbent exporter” and “market source”. Acquiring market-oriented information is beneficial only for incumbent exporters. New exporters may bear the costs of open search with little benefits, if any.

We use alternative measures to check the robustness of our results. Instead of using a three-year window to define incumbent exporters vs. new exporters, we use a four-year window to operationalize the concept. The variable of “incumbent exporter 2” takes the value of one when a firm exported for four consecutive years from t-3 to t. It takes the value of zero when a firm did not export in years t-3 and t-2, but exported in years t-1 and t. Compared to “incumbent exporter”, “incumbent exporter 2” is a more restrictive measure, leaving us with 10,734 firm-year observations from 2008 to 2016. Apart from replacing “incumbent exporter” with “incumbent exporter 2”, all other variables are the same as in the main analysis. We obtain consistent results and present them in Table 3.

In the main analysis, we consider firms adopting an open search strategy when they rate at least one external information source as highly important. As suggested by Laursen and Salter (2006), firms could also adopt an open search strategy focusing on searching broadly. Thus, we alternatively define open search as the situation in which firms use information from external sources, regardless of their importance. This is to say, as long as firms use external information, we consider that they are adopting an open search strategy. Whether such external information is considered highly important is irrelevant. We then create four variables: “open search 2”, “market source 2”, “institution source 2”, and “other source 2”. These are alternative measures for “open search”, “market source”, “institution source”, and “other source” in the main analysis. We estimate the same regression equations as in Models 2, 3, 4, and 6 with these alternative measures. The results are displayed in Table 4; they are consistent with the main analysis.

While testing Hypothesis 2, we split the sample based on whether a firm has foreign ownership regardless of the percentage of shares owned by foreign investors. As a robustness check, we use 50% foreign ownership to split the sample and name the variable “foreign ownership 2”. We consider that firms are controlled by foreign capital when the foreign investors own 50% or more of the shares. We then repeat the regression model as in the main analysis and obtain consistent results. The coefficient of the interaction term between “incumbent exporter” and “open search” is only positive and significant for the subsample of firms whose foreign capital is less than 50%. When firms are controlled by foreign investors, the interaction term is not significant. Table 5 presents the results.

TABLE 3
Robustness check using a four-year window to define incumbent exporter

Dependent variable: Productivity				
Model	(7)	Foreign ownership		(10)
		(8) No	(9) Yes	
Independent variable				
Incumbent exporter 2	-0.027**	-0.030**	0.001	-0.035***
	(0.010)	(0.011)	(0.023)	(0.010)
Open search	-0.011	-0.017	0.015	
	(0.009)	(0.010)	(0.019)	
Incumbent exporter 2	0.018*	0.024*	-0.007	
X Open search	(0.009)	(0.010)	(0.018)	
Market source				-0.041**
				(0.015)
Incumbent exporter 2				0.048**
X Market source				(0.015)
Institution source				0.013*
				(0.006)
Other source				0.004
				(0.006)
New product sales	0.001	0.001	-0.001	0.001
	(0.001)	(0.001)	(0.002)	(0.001)
Process innovation	-0.007	-0.005	-0.018	-0.007
	(0.005)	(0.005)	(0.013)	(0.005)
R&D stock intensity	0.009	0.015*	-0.021	0.009
	(0.007)	(0.007)	(0.017)	(0.007)
Export intensity	0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Age	0.373	0.611*	-0.717	0.380
	(0.299)	(0.274)	(0.867)	(0.299)
Age2	-0.086	-0.137*	0.153	-0.087
	(0.069)	(0.065)	(0.201)	(0.069)
Size	-0.056	-0.104	-0.229	-0.055
	(0.070)	(0.069)	(0.212)	(0.070)
Size2	0.001	0.008	0.014	0.001
	(0.008)	(0.008)	(0.024)	(0.008)
Constant	0.177	-0.017	2,100*	0.173
	(0.314)	(0.291)	(0.869)	(0.314)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	10,734	8,915	1,819	10,734
R ²	0.106	0.116	0.167	0.106

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 4
Robustness check using alternative measures of open search and information source

Dependent variable: Productivity				
Model	(11)	Foreign ownership		(14)
		(12) No	(13) Yes	
Independent variable				
Incumbent exporter	-0.048***	-0.050***	0.021	-0.045**
	(0.013)	(0.014)	(0.041)	(0.014)
Open search 2	-0.016*	-0.016*	0.000	
	(0.006)	(0.007)	(0.016)	
Incumbent exporter	0.019**	0.021**	-0.002	
X Open search 2	(0.006)	(0.007)	(0.016)	
Market source 2				-0.037*
				(0.016)
Incumbent exporter				0.045**
X Market source 2				(0.016)
Institution source 2				0.003
				(0.005)
Other source 2				-0.002
				(0.005)
New product sales	0.002*	0.002	-0.001	0.002*
	(0.001)	(0.001)	(0.002)	(0.001)
Process innovation	-0.005	-0.005	-0.019	-0.006
	(0.005)	(0.005)	(0.012)	(0.005)
R&D stock intensity	0.008	0.012	-0.012	0.007
	(0.006)	(0.006)	(0.014)	(0.006)
Export intensity	0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Age	0.180	0.324	-0.823	0.178
	(0.187)	(0.179)	(0.771)	(0.187)
Age2	-0.038	-0.072	0.196	-0.037
	(0.045)	(0.045)	(0.179)	(0.045)
Size	-0.080	-0.118	-0.034	-0.081
	(0.063)	(0.065)	(0.190)	(0.063)
Size2	0.006	0.011	-0.002	0.006
	(0.007)	(0.008)	(0.021)	(0.007)
Constant	0.390	0.333	1,352	0.389
	(0.234)	(0.225)	(0.777)	(0.234)
Industry dummy	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Observations	12,915	10,775	2,140	12,915
R ²	0.087	0.094	0.145	0.087

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

TABLE 5
Robustness check using 50% of shares to define foreign ownership

Dependent variable: Productivity		
Model	Foreign ownership 2	
	(15) No	(16) Yes
Independent variable		
Incumbent exporter	-0.027** (0.010)	0.014 (0.029)
Open search	-0.018 (0.011)	0.006 (0.021)
Incumbent exporter	0.026*	0.003
X Open search	(0.011)	(0.022)
New product sales	0.002* (0.001)	-0.000 (0.002)
Process innovation	-0.003 (0.005)	-0.018 (0.015)
R&D stock intensity	0.011 (0.006)	-0.014 (0.017)
Export intensity	0.000 (0.000)	0.000 (0.001)
Age	0.286 (0.187)	-0.329 (0.481)
Age2	-0.071 (0.046)	0.117 (0.119)
Size	-0.087 (0.064)	-0.275 (0.213)
Size2	0.007 (0.008)	0.027 (0.023)
Constant	0.390 (0.230)	1,527* (0.682)
Industry dummy	Yes	Yes
Year dummy	Yes	Yes
Firm fixed effects	Yes	Yes
Observations	11,286	1,629
R ²	0.088	0.114

Robust standard errors in parentheses. * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Discussion and conclusion

Focusing on accessing valuable information abroad as the mechanism enabling firms to reap gains from exporting, we study how the export status (incumbent vs. new exporter) affects the productivity gains and their contingencies. Our study provides empirical support for the Uppsala model (Johanson and Vahlne, 1997), suggesting that increasing engagement in exporting allows to accumulate valuable knowledge about foreign markets. Continuous involvement in exporting also allows firms to develop absorptive capacity (Cohen and Levinthal, 1990), enabling them to understand the value of external information and assimilate it to improve efficiency and develop the knowledge base. However, when it comes to exporting, as argued in our theoretical development, firms that adopt an open search strategy (Laursen and Salter, 2006) appear to be at an advantage as compared to firms that do not adopt such a strategy.

Our analysis shows that incumbent exporters with an open search strategy are more likely to benefit from the productivity gains because of their relevant prior knowledge and experience about the foreign market. Compared to foreign-owned firms, domestically-owned firms are more likely to enjoy such gains, which arise mainly from acquiring information from market-oriented sources. We believe that it is particularly critical for SMEs to leverage exports to access external information. Because of their limited resources and capabilities, SMEs might not possess the necessary knowledge internally, which means that internal search would not suffice to improve productivity considerably. Prior research has suggested that firms should search both internally and externally (Cassiman and Veugelers, 2006). According to Rothaermel and Alexandre (2009), an internal search is usually cheaper because of lower communication and coordination costs. However, despite entailing higher costs and being more difficult to implement (Terjesen and Patel, 2017), open search proves to be valuable for exporting SMEs if they have the prior knowledge to absorb it, as our findings demonstrate.

Our study is not without shortcomings that could open up avenues for future research. Prior studies have proposed different mechanisms to explain productivity gains due to exporting. We identify contingencies, including open search strategy, ownership structure, and the type of information acquired, to explain how different export status affect the productivity gains. However, the contingencies we identified are indicative and far from inclusive. It is likely that other contingencies will emerge when investigating different underlying mechanisms. For example, exporters' organizational ambidexterity (Ribau, Moreira, and Raposo, 2019) in generating explorative and exploitative innovations may affect their ability to enjoy the productivity gains driven by intensified competition. Moreover, while acknowledging that each individual search channel might affect productivity gains differently, we do not conduct such a fine-grained analysis, nor do we analyze their combinations.

Our sample comes from a single country—Spain. Future research could pursue our line of investigation, including SMEs from several different countries, to allow for cross-country comparison and greater generalizability. Such an analysis could also shed light on whether the characteristics of the domestic market matter for the productivity effect of exporting. Additionally, it would be interesting to study whether the similarities and differences between domestic and foreign markets play a role in affecting the strength

of the productivity effect. The role of the geographical or cultural distance between the domestic and foreign markets as a potential contingency could also be explored.

Going beyond, future studies can take a dynamic view to investigate how the link between export and productivity changes over time along SMEs' internationalization process. This research direction resonates with the on-going debates about the denaturation of SMEs. As Torrès and Julien (2005) indicate, some international SMEs transform themselves by adopting managerial practices similar to their larger counterparts and drift away from being typical SMEs. Almor and Hashai (2004) also show that small firms involved in international markets (or small multinationals) can mitigate their resource limitation by adopting suitable business models, e.g., by internalizing high-value, core capabilities, and externalizing noncore capabilities. That is, the changes over the course of internationalization are likely to affect the ability of SME exporters to improve their productivity in a dynamic manner. This could inspire future research.

Though not without its limitations, our study contributes to the literature about the link between exporting and productivity by investigating the impact of different kinds of export status and introducing the element of openness. We demonstrate that firms' open search strategy, combined with the experience of operating in foreign countries, leads to improved productivity. Furthermore, the export status of being incumbent or new exporters matters. Thus, our findings allow us to refine international business theories, particularly the Uppsala model (Johanson and Vahlne, 1977), by introducing the element of openness in the analysis of exporting benefits. Our findings are also relevant to management practice. Internationalization is a challenging strategic move for SMEs. Constrained by limited resources and knowledge about foreign markets (Leonidou, 2004), they tend to perceive higher entry barriers to foreign markets. Our article demonstrates that SMEs can benefit from productivity enhancement if they have a proper search strategy and the relevant experience to exploit the valuable information in foreign markets. Such potential post-exporting benefits call for SME managers to re-evaluate the benefits of internationalization. As the benefits of exporting increase, SMEs are less likely to make a suboptimal decision limiting their operations to the domestic market (Colovic, 2022). The emergence of firms internationalized from inception—the so-called International New Ventures (Oviatt and McDougall, 2005) or Born Global firms (Knight and Cavusgil, 2004)—demonstrate the value of venturing abroad. Given that Spanish SMEs, which constitute our sample, need to increase their presence abroad, our findings are particularly valuable insofar as they emphasize the role of open search in taking advantage of internationalization. Spanish SMEs could thus learn from the findings of our study to fully benefit from internationalization and the resulting productivity increase.

Our findings also have policy implications. Many governments are designing policies to stimulate their SMEs to export, as exporting levels among SMEs are still at a rather low level in a number of EU countries. Policy should accompany SMEs in their internationalization efforts and provide them with the necessary assistance and training so that they can make the most of exporting. In particular, as our study demonstrates, SMEs should be informed about the differential impact of exporting on their productivity, depending on their search strategy. Managers can use this insight to design their search strategy so as to reap the greatest benefits from external knowledge sources.

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APPENDIX A

Table A1 - Variable definition

Variable	Definition
Productivity	The residuals obtained from regressing gross sales on capital stock and the number of employees. It is a proxy for revenue-based total factor productivity.
Incumbent exporter	A binary: one for incumbent exporters and zero for new exporters. Incumbent exporters are firms that exported for three consecutive years (year t, t-1, and t-2); and new exporters are firms that exported in year t but did not export in year t-1, nor t-2.
Open search	A continuous variable indicating the variety of external information sources considered highly important by a firm. The three types of external information sources are market-oriented, institution-based, and other sources.
Market source	A binary indicating whether a firm considers highly important information from market-oriented sources, such as customers, competitors, suppliers, and consultants.
Institution source	A binary indicating whether a firm considers highly important information from institution-based sources, such as universities, research institutions, and technology centers.
Other source	A binary indicating whether a firm considers information from other sources as highly important, such as conferences, journal publications, and associations.
New product sales	The logarithm of sales (in thousand euros) generated from new products.
Process innovation	A binary indicating whether a firm introduced a new process in the last two years.
R&D stock intensity	R&D stock per employee.
Export intensity	Export as a share of total sales.
Age	The number of years (in log) since the firm is established.
Age2	The quadratic term of Age.
Size	The number of employees (in log).
Size2	The quadratic term of Size.
Industry	Industry dummies based on two-digit NACE codes, the statistical classification of economic activities in the European Community.
Year	Year dummies.
Foreign ownership	A binary variable indicating whether a firm has foreign capital.
Incumbent exporter 2	A binary: one for incumbent exporters and zero for new exporters. Incumbent exporters are firms that exported in four consecutive years (year t, t-1, t-2 and t-3); and new exporters are firms that exported in year t and t-1 but did not export in year t-2 nor t-3. This binary is an alternative measure of "incumbent exporter" in the main analysis.
Open search 2	A continuous variable indicating the number of different types of external information sources used by a firm. This is an alternative measure of "open search" in the main analysis.
Market source 2	A binary indicating whether a firm uses information from market-oriented sources. This is an alternative measure of "market source" in the main analysis.
Institution source 2	A binary indicating whether a firm uses information from institution-based sources. This is an alternative measure of "institution source" in the main analysis.
Other source 2	A binary indicating whether a firm uses information from other sources. This is an alternative measure of "other source" in the main analysis.
Foreign ownership 2	A binary variable indicating whether a firm has 50% or more foreign capital. It is an alternative measure of "foreign ownership" in the main analysis.

Note: Including all variables in the main analysis and robustness checks.

APPENDIX A

Table A2 - Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Productivity	12,915	.713	.312	.013	2,945
Incumbent exporter	12,915	.947	.224	0	1
Open search	12,915	.809	.853	0	3
Market source	12,915	.483	.500	0	1
Institution source	12,915	.156	.363	0	1
Other source	12,915	.170	.376	0	1
New product sales	12,915	5,193	3,807	0	12,938
Process innovation	12,915	.602	.490	0	1
R&D stock intensity	12,915	9,058	2,245	0	13,825
Export intensity	12,915	20,630	21,311	.100	100
Age	12,915	3,426	.507	.693	4,883
Age2	12,915	11,993	3,451	.480	23,842
Size	12,915	4,047	.845	.693	7,185
Size2	12,915	17,093	6,710	.480	51.63
Industry	12,915	13,009	5,669	3	25
Year	12,915	2,011,791	2,867	2007	2016
Foreign ownership	12,915	.166	.372	0	1
Incumbent exporter 2	10,734	.961	.192	0	1
Open search 2	12,915	2,188	1,058	0	3
Market source 2	12,915	.852	.355	0	1
Institution source 2	12,915	.591	.492	0	1
Other source 2	12,915	.745	.436	0	1
Foreign ownership 2	12,915	.126	.332	0	1

Note: Including all variables in the main analysis and robustness checks.