Do domestic market characteristics influence firms' export intensity?

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Abstract

Purpose – The purpose of this study is to analyze the influence of the firms' external environment on their export intensity. More specifically, it assesses whether domestic market characteristics such as domestic demand and general export environment related to tradability across borders affect firms' export intensity.

Design/methodology/approach – The authors use a sample of 29,266 firms from nine European countries, for the period of 2010–2016, and test several estimation methods (random effects models, Tobit models, and Heckman's selection models).

Findings – Results show that external factors such as domestic demand and ease of trade across borders are important determinants of firms' export intensity. Moreover, results reveal that firm's internal characteristics such as age, size and productivity also play an import role.

Originality/value – Studies about the influence of the firms' external environment on firms' export intensity are scarce because most of them are confined to a single country context. In this way, the present study contributes to the body of knowledge on the influence that external factors can have on firms' export performance by analyzing firms from nine European countries, which has important policy implications.

Keywords Export performance, Export intensity, European firms, Domestic market characteristics

Paper type Research paper

1. Introduction

When approaching a new foreign market, firms are faced with the strategic and difficult task of choosing an entry mode. As such, firms tend to resort to entry modes where the level of resource commitment needed is relatively low. As the firm gains experience and acquires knowledge of an overseas market, it tends to leverage a greater sum of its resources, increasing its risk level, whilst acquiring more control, return on sales and gradually increasing its international involvement from exporting, to owning a wholly owned subsidiary in a foreign market (Beleska-Spasova, 2014; Johanson and Vahlne, 1977). It is therefore not surprising that exports are the most common foreign market entry mode [1].

According to Berthou *et al.* (2015), European firms' sales strongly depend on export revenue as export sales represented 46% of their revenue (estimate generated based on a population of exporters of 15 European countries). Moreover, as the domestic market becomes saturated, firm's expansion into foreign markets is crucial to ensure its growth and long-term survival (Gupta and Chauhan, 2021). Despite their higher exposure to demand and supply shocks

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induced by the COVID-19 pandemic, firms engaged in international trade have shown to be more resilient (e.g. they were less likely to lay off workers or file for bankruptcy) than domestic firms (Borino *et al.*, 2021). In this way, it is crucial to understand the determinants of export performance in order to provide policy and decision makers with the tools and information needed to make assertive and pondered macro and microeconomic decisions.

According to Katsikeas *et al.* (2000), a firm's export performance depends on internal factors and the external forces it is exposed to. In this regard, the internal factors (such as firms' resources and capabilities) refer to the resource-based view of the firm and the external variables (such as the characteristics of the domestic and foreign markets) refer to the institutional-based view (Chen *et al.*, 2016; Sousa *et al.*, 2008).

The research in the field of determinants of firms' export performance has been a central topic of research in the International Business area. Research in this field started over 50 years ago with Tookey (1964) pioneering research (as cited in Beleska-Spasova, 2014). Both Chen *et al.* (2016) and Katsikeas *et al.* (2000) focus on more than 100 articles highlighting the importance of the research in this field. In addition, Gemunden (1991) showed that more than 700 variables have been brought forward to the study of determinants of export performance and Sousa *et al.* (2008) highlighted the inconsistent influence of these variables on export performance. In this way, it is not difficult to understand why it is considered to be a complex and discorded phenomenon (Katsikeas *et al.*, 2000; Sousa *et al.*, 2008; Tan and Sousa, 2011; Zou and Stan, 1998).

Despite the fact that export performance is considered to be "one of the most widely researched (. . .) areas of international marketing" (Sousa *et al.*, 2008, p. 344), most studies have focused on internal factors (Chen *et al.*, 2016), such as firms' capabilities like innovation, networking and marketing (e.g. Yi *et al.*, 2013; Tyagi and Nauriyal, 2017; Carboni and Medda, 2020; Gupta and Chauhan, 2021), human and technology-related factors (e.g. Gashi *et al.*, 2014), characteristics of top management teams (e.g. Agnihotri and Bhattacharya, 2015), and firms' characteristics such as size, age and productivity (e.g. Bashiri Behmiri *et al.*, 2019; Bekteshi, 2020; Faria *et al.*, 2020).

Indeed, research on the impact of external factors on a firm's export performance is relatively scarce because most of the studies are confined to a single country context. Moreover, the few existing studies have focused on the characteristics of the industry (e.g. Reis and Forte, 2016) or on factors related to a country's financial development and the degree of investor protection (e.g. Castellani *et al.*, 2022) and to political instability, informal competition and corruption (e.g. Krammer *et al.*, 2018), neglecting the potential role of other domestic country characteristics. As highlighted by Tsukanova (2019), the influence of domestic country factors on firm's exports deserves further investigation. "Region of origin determines the contextual settings regarding institutions and other country-/region-specific characteristics that either challenge or facilitate SME exports." (Paul *et al.*, 2017, p. 337). In this way, the present work proposes to tackle this field based on a sample of 29,266 firms spread across nine European countries over the period of 2010–2016 and making use of several estimation methods (random effects models, Tobit models, and Heckman's selection models) [2].

Through the estimation of an econometric model we intend to find a relationship between a firm's domestic market characteristics (namely domestic demand and general export environment related to tradability across borders) and its export performance, hereby filling in the gap in the literature on determinants of firms' export performance. Understanding to what extent firms' export performance can be affected by the characteristics of their domestic market is extremely important not only form firms but also from the policy makers' point of view.

The present work is structured in four sections beyond the introduction. Section 2 presents a literature review on this topic and research hypothesis. In section 3 we present the methodology followed in this study and a brief descriptive analysis of the data and variables. Section 4 presents and discusses the main empirical results, and in the last section, we synthesize the main conclusions, as well as limitations and recommendations for future studies.

2. Literature review and research hypothesis

2.1 Definitions and measures of export performance

Cavusgil and Zou (1994, p. 4) describe export performance as being "the extent to which a firm's objectives, both economic and strategic, with respect to exporting a product into a foreign market, are achieved through planning and execution of export marketing strategy". In short "a strategic response by management to the interplay of internal and external forces" (Cavusgil and Zou, 1994, p. 3). Reaching further into the definition, Beleska-Spasova (2014) defines a firm's export performance as its ability to utilize its assets and capabilities in a global setting at a given point in time.

The study of firms' export performance goes back over 5 decades and has shown little unanimity in its measurement (Chen *et al.*, 2016), making it difficult to compare the findings of the different studies (Oliveira *et al.*, 2012). A great number of export performance measures have been used, which can be characterized in terms of their nature and objectivity. Sousa (2004) categorized export performance measures as being objective and subjective: the objective measures are those which rely on absolute values, referring to export intensity (the ratio between export sales and total sales), export sales volume and export market share as examples while the subjective measures derive from "perceptual or attitudinal performance" (Sousa, 2004, p. 8), exporting success and overall export performance being some examples.

Furthermore, export performance measures can be conceptually divided into two broad categories: economic/financial and non-economic/non-financial measures (Katsikeas *et al.*, 2000). As such, economic/financial measures include two categories, sales-related (e.g. export intensity, export intensity growth, export sales volume, export sales growth) and market-related measures (e.g. export market share, export market share growth), while non-economic/non-financial measures can be subdivided into general (e.g. export success, how competitors rate firm's export performance) and miscellaneous measures (e.g. achievement of objectives regarding response to competitive pressures, building awareness and image overseas, customer satisfaction) (Beleska-Spasova, 2014).

In spite of the large number of export performance measures, literature on this topic has shown that some measures are used more than others. In terms of economic/financial measures export intensity, export sales return on investment, export sales volume and export sales growth are the most commonly used measures, while export success and the overall export performance are the most widely employed non-economic/non-financial measures (Chen *et al.*, 2016; Sousa, 2004).

2.2 Export performance determinants: conceptual framework

In Chen *et al.* (2016) literature review, the authors found that in the 124 articles analysed, the most commonly utilized theories are the resource-based view (RBV), the institutional-based view (IBV), the contingency theory and the organizational learning theory (OLT), as evidenced in Figure 1.

The RBV describes a firm as being a unique entity which holds a set of valuable tangible and intangible resources that due to their imperfect imitability and the fact they cannot be transferred allow the firm to sustain a competitive advantage in export markets (Barney, 1991; Barney *et al.*, 2001). In turn, the IBV analyses the impact of the industry conditions and the institutional environment on a firm's strategic decisions and export performance (Porter, 1998). Bearing in mind that exporting firms are faced with multiple institutional environments both in the domestic and export markets, the comprehension of the effect of these forces grows exponentially (Peng *et al.*, 2008).

Deriving from the two previous theories but not limiting the study of export performance to the firm's resources or institutional context, the contingency theory requires a broader
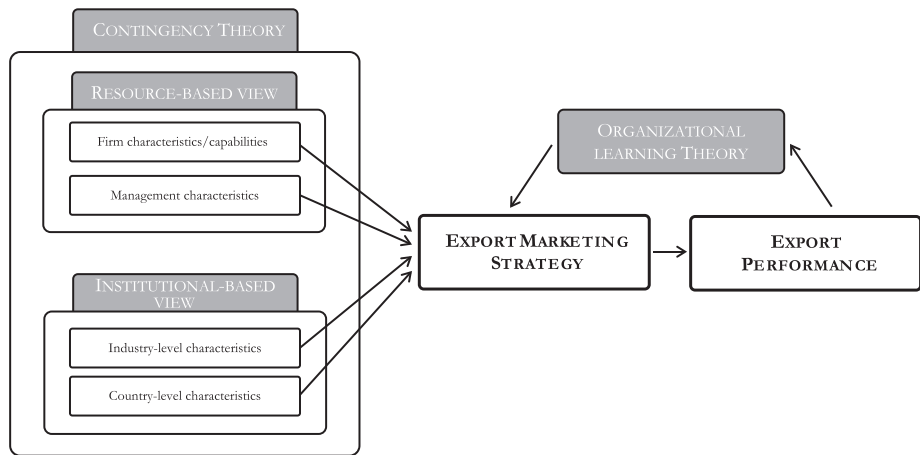
Source(s): Adapted from Chen *et al*. (2016)

knowledge of the firm context (Chen *et al.*, 2016). In short, a firm's competitive advantage is the result of the unique combination of its internal resources and the external forces it is exposed to (Harrigan, 1983). Finally, the OLT argues that a firm learns by exporting (Loecker, 2013). According to this theory, a firm's export strategies and export performance are the result of previous and continuous exporting activities. As a result, experienced export managers can look back at their previous export encounters and be able to foresee the numerous outcomes of any given strategy due to their acquired understanding of the surrounding conditions (Peng *et al.*, 2008).

The four theories mentioned above hereby prescribe that a firms' export performance is the composite result of their export marketing strategy, which in turn is influenced by numerous factors. The export performance, competitive advantage and export marketing strategy of a firm are influenced by internal and external factors (Chen *et al.*, 2016; Katsikeas *et al.*, 2000; Sousa *et al.*, 2008; Zou *et al.*, 1998). On the one hand, the RBV and OLT advocate that the firms' internal factors influence their export performance; on the other hand, the IBV proposes that it is the external forces, and the contingency theory prescribes that a firm's export performance is the result of both.

Multiple internal factors have been appointed to be potential determinants of export performance. Chen *et al.* (2016) subgroup these factors into four categories: firm characteristics, firm capabilities, management characteristics and export marketing strategy. In terms of the firm characteristics, size, exporting experience, age and many other characteristics have been mentioned as possible determinants (Sousa *et al.*, 2008). Concerning the firm capabilities, these have also been considered to influence the export performance of a firm, in particular the firms' market orientation (Chen *et al.*, 2016). Firms that are market-oriented show better export performance due to their ability to respond to the different markets' needs, being able to adapt and take advantage of the opportunities that arise in today's global market (Sousa *et al.*, 2008). Moreover, the managers' characteristics also play an important role in the firm's export performance, as their decisions and strategic market diversification strategies guide firms' export marketing strategy (Katsikeas *et al.*, 2000), which is measured by the capacity of the firm to adapt to the different export environments (Chen *et al.*, 2016).

With regard to external factors, which cannot be controlled by the firm (Chen *et al.*, 2016; Sousa *et al.*, 2008; Zou and Stan, 1998), Chen *et al.* (2016) divides them into two categories: industry-level characteristics and country-level characteristics.

In terms of industry-level characteristics, it is expected that industries with lower concentration levels, greater technological development or better capacity to adapt to foreign markets tend to have better export performance (Clougherty and Zhang, 2009). Low industry concentration levels resulting in firm rivalry, pressure firms to innovate and improve processes which result in technological development, production efficiency and product sophistication (Porter, 1990). The positive effect that firm rivalry has on individual export performance is enhanced by the spillovers which result from employees changing jobs (Hollis, 2003). Technological development allows for lower production costs, better production reliability and greater production flexibility hereby contributing to the export performance of the firm.

In regards to the country-level characteristics, an analysis of the domestic-market and foreign-market factors should be done separately. The domestic-market factors include several aspects such as the infrastructure, legal and political environment and the domestic demand (Chen *et al.*, 2016). Out of these, the export assistance and environmental hostility have been found to have an effect on the export performance of a firm (Sousa *et al.*, 2008). Lages and Montgomery (2005) found that export assistance has a positive effect on export performance, and Alvarez (2004) discusses the environmental hostility of the exporting country, referring the negative impact it has on the firm's export performance. Tariff and non-tariff barriers, for example, may lead firms to exit exporting markets. The foreign-market factors include political and social-cultural factors such as the legal and political environment of the exporting market, cultural similarity, market competitiveness, environmental hostility [3], access to distribution channels and customer exposure (Sousa *et al.*, 2008).

2.3 Empirical studies on firm's export intensity
In this section we look into 20 recent empirical studies published since 2016 [4] in order to identify if there are common trends among these studies. Based on SCOPUS database, and using "firms export performance" and "firms export intensity" as the search criteria in the article title we were able to find 120 papers. However, several papers were excluded either because they are based on other measures of export performance, namely export propensity (e.g. Forte and Sá, 2021) or subjective measures (e.g. Dung and Giang, 2021; Mostafiz *et al.*, 2021), or because the focus of the work was not on the determinants of export performance. Thus, only 20 studies remain, which resort to secondary data and export intensity as an export performance measure [5]. These studies, organized by chronological order, are summarized in Table 1.

Considering the studies analysed, 17 look at the export intensity data of firms in a single country and only three (Krammer *et al.*, 2018; Carboni and Medda, 2020; Castellani *et al.*, 2022) focus on more than one country. In terms of the countries studied, there is a clear tendency to study emerging markets (thirteen out of the 20 studies). China is the most studied country (four out of the 20 studies focus on this country), which is not surprising considering that China is the world's biggest exporter (He and Wei, 2013) and the fact that Chinese exports have gradually shifted from high labour-intensity products to high value-added products (Yi *et al.*, 2013). Regarding European firms, Portugal is the most analysed country (covered in three studies). However, two studies about this country only analyse firms from the wine sector (Bashiri Behmiri *et al.*, 2019; Faria *et al.*, 2020).

Moreover, most of the studies refer to single year data or to multiple isolated periods. In terms of sample size, it ranges between 53 and 19,504 firms. Nevertheless, the majority of studies rely on sample sizes with less than 2,000 firms. Bearing this in mind and considering

Author (year)	Country (period)	Number of firms	Estimation method	Explanatory variables	Control variables
Kim and Hemmert (2016)	Korea (2010)	1,733	Tobit model	Technological, marketing and financial resources; Executives' managerial capabilities; Subcontracting network ties	Firm's age, size and financial performance; Industry dummies
Reis and Forte (2016)	Portugal (2010–2013)	19,504	Tobit model; RE; HE	Industry characteristics (capital intensity, R&D intensity, concentration, export orientation and labour productivity)	Firm's age, size and labour productivity
Gajewski and Tchorek (2017)	Poland (2013)	More than 730	OLS; Huber–White Sandwich estimator	Family control, firm size, foreign control, introduction of innovative products and processes (all binary variables)	Year of birth; Number of declared non-cost factors of success (quality of products, diversified product offer, brand recognition, developed distribution chain, post sales services); Firm run by owner (dummy variable)
Tyagi and Nauriyal (2017)	India (2000–2014)	Top 91 publicly listed firms	GMM	Innovative activities (R&D intensity); Past innovative output (patents)	Firm's age and size
Zucoloto et al. (2017)	Brazil (2001–2003, 2003–2005 and 2006–2008)	1,639 observations	OLS; FE	IP-related appropriation strategies (invention patents, utility models, industrial designs and trademarks)	Firm's characteristics such as origin of capital (national/foreign), size, innovative expenditures and age; Industry dummies
Krammer et al. (2018)	BRIC countries (2015)	16,748 firms	HE	Political instability, informal competition and corruption; Firm capabilities (skill level of the workforce, managerial capabilities, external technological capabilities)	Firm's age, size, ownership (foreign, public, quality of workforce; Country and industry dummies
Nam et al. (2018)	Korea (2001–2007)	642 non-financial listed firms	HE	Board directors' work experience in government and MNEs; Proportion of outside directors	Firm's characteristics such as size, number of board members, R&D over total sales, advertising expenditures over total sales and leverage; Year and industry dummies
Bashiri Behmiri et al. (2019)	Portugal (2014/2015)	214/213	OLS; Tobit model	Firm characteristics (size, age and productive efficiency)	The type of produced wines (Port wine/Douro wine)

(*continued*)

Table 1.
Summary of empirical studies on firms' export intensity

Author (year)	Country (period)	Number of firms	Estimation method	Explanatory variables	Control variables
Chung et al. (2019)	China (2004/2006)	229	n.a	Prior export sales intensity	Firm's age, size, financial performance, innovation; Dummy variables to control for manufacturing firms, high-tech firms, firms transformed from a state-owned enterprise, and managing structure
Bekteshi (2020)	Republic of Kosovo (2012)	500	Tobit model	Firm's size	-
Carboni and Medda (2020)	7 European countries (2007/2009)	14,797	System equation regressions; HE	Innovation and tangible investment	Firm's age and size; Dummy variables indicating: whether the firm had exported before, if the firm is part of a group and if the firm is head of a group; Country and industry dummies
Faria et al. (2020)	Portugal (2014–2016)	412 wine-producing firms	HE; Fractional probit and two-part fractional response model	Firm characteristics (size, age, labour productivity); Dummy variable to control for the benefits of public funding	Firm's debt capacity; Country-wide level of exports to control for the dynamics of export activity
López Rodríguez et al. (2020)	Spain (2014)	1,525 manufacturing firms	Logit and tobit models	Firms' general and specific human capital	Firm's age, size, R&D intensity; Dummy variables to control for: belonging to a business group and participation of foreign capital; Industry dummies
Sharma et al. (2020)	China (2006–2010)	1,945 firms listed on Shanghai and Shenzhen stock exchanges	Multiple regression analysis	Political connections (political relationships of all board members)	Firm characteristics (size, age, leverage, ratio of market to book values of equity, total factor productivity); Firm's ownership type; Competitive pressure (Herfindahl index); Industry and year dummies
Woo et al. (2020)	Korea (2015)	1,968	Multiple regression analysis and hierarchical regression analysis methods	Firm capabilities (entrepreneurship, marketing capability, network capabilities, customer capability, product differentiation, human resources, financial, and R&D)	Firm's age and size

(*continued*)

Table 1.

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Author (year)	Country (period)	Number of firms	Estimation method	Explanatory variables	Control variables
Charoenrat and Amornkitvikai (2021)	China (2012)	1,500	Tobit model	Firm size, skilled labour, % of foreign ownership; Dummy variables for firm location, female CEO, R&D, innovation and technology import	(*)
Dong et al. (2021)	China (2008–2017)	1,156 listed private firms	Tobit model	Performance feedback (i.e. a focal firm's performance relative to its industry peers); Institutional development and political connections	Chairman age, female CEO and top management team overseas experience; Firm size, state share, foreign ownership, firm slack, firm location (special economic zone or open coastal city); Industry competition (Herfindahl index) and industry export orientation
Haddoud et al. (2021)	Poland (2019)	409	Non-linear partial least squares structural equation modelling FE	Environmental commitment, product and process innovation	Firm size, sector and region
Talukder and Tripathi (2021)	India (2009/2010 to 2018/2019)	Top 53 firms from pharmaceutical industry	FE	Supply chain performance (return on supply chain fixed assets, return on working capital, all expenditures involved with the supply chain, including the purchasing costs and the selling and distribution costs, and raw material import intensity)	-
Castellani et al. (2022)	46 countries (2015)	13,131	Ordered logit model	Early-stage financing diversity (financing diversity index); Institutional context in terms of financial development and investor protection	Managerial education, managerial experience, number of firm owners, technological level, reasons for starting a business activity; Competition; Country dummies

Note(s): (*) the authors did not distinguish between explanatory and control variables; BRIC - Brazil, Russia, China and India; CEO – Chief executive officer; FE – Fixed effects model; GMM – Generalized method of moments; HE - Heckman two-stage method; IP - Intellectual property; R&D – Research and development; RE – Random effects model

the size of most of these markets (e.g. China, India, Brazil), some sample sizes can be considered relatively small. In regards to the method used to estimate the econometric models, the Tobit model is the most used, however other methods such as the OLS regression and the Heckman two-stage method are also used.

Furthermore, concerning the explanatory variables employed in the studies, most of them focus on internal variables such as firms' capabilities/characteristics (e.g. Tyagi and Nauriyal, 2017; Bashiri Behmiri *et al.*, 2019; Bekteshi, 2020; Faria *et al.*, 2020; Carboni and Medda, 2020; Gupta and Chauhan, 2021), and only three studies (Reis and Forte, 2016; Krammer *et al.*, 2018; Castellani *et al.*, 2022) address the role of external factors [6]. Reis and Forte (2016) focused on the characteristics of the industry and the other studies focused on factors related to the institutional context such as a country's financial development and the degree of investor protection (e.g. Castellani *et al.*, 2022) and political instability, informal competition and corruption (e.g. Krammer *et al.*, 2018). Looking into a sample of firms from BRIC Krammer *et al.* (2018)' results suggest that both firm-specific capabilities (such as skill level of the workforce, managerial capabilities, external technological capabilities) and its home institutional environment (namely political instability, informal competition and corruption) influence firm's export performance: the former are important determinants of export intensity while the latter has robust effects on firm's export propensity. In turn, drawing on a sample of firms from 46 countries, Castellani *et al.* (2022) analyse the relationship between early-stage financing diversity (measured by the number of types of formal and informal external sources that provided the firm's seed capital) and firm's export intensity, and the moderating role of a country's financial development and degree of investor protection. More specifically, the authors concluded that early-stage financing diversity is positively related with firms' export intensity of both startups and established firms and that "the benefits of early-stage financing diversity are indeed lower in countries with greater financial development and better investor protection." (Castellani *et al.*, 2022, p. 5).

To sum up, with regards to the external variables few were used in the pool of studies analysed, which validates the disregard of the firms' external environment in the literature. In this way, the present study intends to fill this gap and to contribute to the body of knowledge on the influence that external factors can have on firms' export performance.

2.4 Research hypothesis

As mentioned in previous sections the determinants of export intensity can be divided into internal and external but the literature has focused on the former. In this way, the influence of external factors, namely domestic market factors, on firm's exports deserves further investigation (Tsukanova, 2019). The characteristics of the local market shape the environment regarding institutions and other country characteristics that may hamper or facilitate firms' exports (Paul *et al.*, 2017). As highlighted by Chen *et al.* (2016), the domestic-market factors include various characteristics such as the domestic demand, quality of infrastructures, legal and political environment. So, the present investigation focuses on the role of two characteristics of the domestic market that can be expected to have an effect on firms' export performance: the domestic demand and the general export environment related to tradability across borders.

Very few studies have been interested in the impact of domestic demand on firms' exports and most of them are macroeconometric studies instead of microeconometric. The few who have analysed this question (e.g. Gül, 2021; Esteves and Rua, 2015; Almunia *et al.*, 2018) argue that it is likely that domestic demand influence firms' willingness or ability to export, particularly in a context of capacity (or production) constraints. Indeed, in periods of pressure from domestic demand (periods of strong growth) firms may not have enough productive capacity to export (production can be mainly sold on the domestic market, thus reducing

firms' export intensity) while during a domestic recession firms can devote more resources to exports and offset the reduction in domestic demand (Esteves and Rua, 2015). Furthermore, according to Fakih and Ghazalian (2014), firms from larger economies, with high domestic demand, tend to focus more on local markets than foreign ones. Greater domestic demand translates into greater business opportunities internally which, in the short run (with capacity constraints), may encourage firms to divert their sales to the domestic market, thus presenting lower export levels. As stated by Bobeica *et al.* (2015), the relationship between domestic demand and exports is determined by firms' behaviour and their sales to different markets: there is usually a trade-off between sales to different markets which induces a negative relationship between domestic demand and exports. As such, the first hypothesis to be tested is:

H1. Firms' export intensity is negatively related with the size of domestic demand and its growth.

Concerning the general export environment, this factor is drawn on the institutional based view which posits that "institutional factors lie behind a country's 'rules of the game' and standards" (Hernández *et al.*, 2022, p. 2). These institutional factors can be divided into three categories: regulatory, normative and cognitive-cultural factors (Scott, 2001; *cit in* Hernández *et al.*, 2022). As stated by the same authors, although the three categories of factors are relevant, the regulatory ones are particularly important because they affect the context in which firms do business. These institutional factors related to country-level laws and regulations are widely recognized as representing a source of transaction costs (Peng *et al.*, 2008). In this context, an important aspect to consider refers to the ease of trading across borders. According to Beize-Zee and Rammer (2006, p. 211) "tradability refers to the general export environment for a firm's products that enable or hinder exports, such as tariff and non-tariff barriers to trade and trade impairing transaction or transportation costs". This issue impacts the international competitiveness of firms and, consequently, their export performance. In this way, the second hypothesis is:

H2. Firm's export intensity is positively related with the general export environment in the domestic country.

Figure 2 synthetises the hypotheses to be tested.

3. Methodology
3.1 Econometric model and variables
The goal of the present study is to test whether the firm's domestic market characteristics influences its export performance. According to Sousa *et al.* (2008) and Chen *et al.* (2016), export intensity, expressed by the ratio of export sales over the total sales of the firm, is
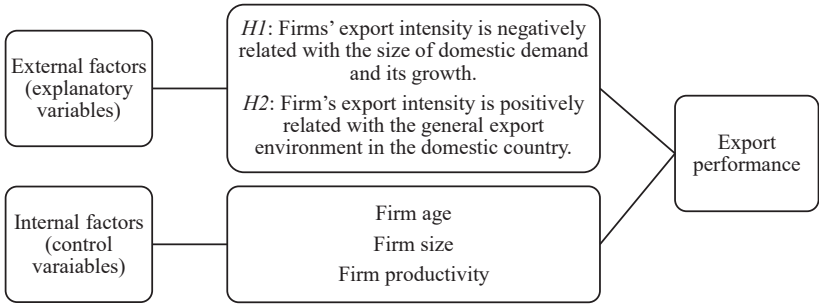
one of the most commonly used measures of export performance. In this way, we decided to use export intensity as our dependent variable. Similar to the studies reviewed in section 2.3., we use multivariate estimation techniques to analyse the effect of the domestic country characteristics on export intensity. The econometric model to be estimated is expressed by [7]:

$$Export\_Intensity_{ijt} = \alpha + \beta_1 Population_{ijt} + \beta_2 GDP\_Growth_{ijt} + + \beta_3 Ease\_Trade_{ijt}$$
$$+ \beta_6 Age_{ijt} + \beta_7 Size_{ijt} + \beta_8 Firm\_Prod_{ijt} + Sector_{Dummies}$$
$$+ Country_{Dummies} + Year_{Dummies} + \varepsilon_{it} \qquad (1)$$

Where population ($Population$) and gross domestic product growth (GDP_Growth) are the variables related to the size of domestic demand and its growth; ease of trading across borders ($Ease\_Trade$) intends to measure the general export environment of the domestic market. Moreover, we introduce three control variables related to internal factors: Age refers to firm's age, $Size$ represents firm's size, and $Firm\_Prod$ concerns firm's productivity. ε_{it} is the disturbance term. Lastly, we also add sector dummies, country dummies, and year dummies in order to capture the effects of sector-specific fixed effects, other country-specific fixed effects and unobserved macroeconomic shocks, respectively.

Concerning the variables related to the firms' domestic market, analogously to Fakih and Ghazalian (2014), the $Population$ variable was introduced to depict the size of domestic demand, being measured by the number of inhabitants. Moreover, founded on the macroeconomic principle that when there is an increase in GDP, the nation's income rises leading to the increase domestic demand, we include the GDP_Growth variable to account for increases in such demand. The inclusion of this variable is also supported by the "growth-led-export hypothesis". "Economic growth leads to enhancement of skills and technology, with this increased efficiency creating a comparative advantage for the country that facilitates exports." (Tsen, 2007, p. 61). As reported in hypothesis 1, it is expected a negative relationship between a country's population and GDP growth, and export intensity. Finally, we include the variable $Ease\_Trade$ which aims to measure the ease of trading across borders. $Ease\_Trade$ is measured through the cost to export score provided by $Doing Business$. This score benchmarks countries in relation to the best regulatory practices in the indicator and ranges from 0 to 100: 0 corresponds to the worst regulatory performance (the worst general export environment) and 100 corresponds to the best regulatory performance (the best general export environment). In this way, a positive relationship with export performance is anticipated (as formulated in hypothesis 2).

In light of the previous literature review, we included three control variables related to firms' characteristics (internal factors): age, size, and firm productivity. The firm's age is commonly used in the studies reviewed (e.g. Kim and Hemmert, 2016; Reis and Forte, 2016; Tyagi and Nauriyal, 2017; Krammer *et al.*, 2018). This variable was obtained using the same criteria as Reis and Forte (2016): number of years in activity. The relationship between the firm's age and its export intensity is expected to show ambiguous results (positive or negative). The first theories on the relationship between export performance and the firm's age, show that firm's learn by exporting (Johanson and Vahlne, 1977), being export performance and age positively related. Nevertheless, according to Love *et al.* (2016) firm's age may be associated with reactive thinking, inflexibility and adversity to change, showing a negative relationship with export performance. The firm's size is also frequently used in the studies reviewed (e.g. Krammer *et al.*, 2018; Chung *et al.*, 2019; Haddoud *et al.*, 2021). Larger firms tend to have greater access to finance, human resources, production capabilities and lower risk levels than smaller firms (Sousa *et al.*, 2008), so a positive relationship between the

firm's size and export intensity is anticipated. This variable was measured considering the number of employees, in accordance with Reis and Forte (2016). Finally, similarly to Buck *et al.* (2007) and Reis and Forte (2016) the labour productivity variable was included in the estimation. According to Guner *et al.* (2010) and Buck *et al.* (2007), firms with higher labour productivity levels, should be better prepared to compete in the international markets. Also Wagner (2007) argues that firms with higher labour productivity tend to be more competitive in the international markets presenting better export performance. Similarly to Buck *et al.* (2007) and Reis and Forte (2016), who measured firm productivity considering the sales revenue per employee, we measured this variable considering the firm's turnover per employee.

The explanatory and control variables, as well as the respective proxies and expected effect on the export intensity, are summarized in Table 2.

3.2 Data source and sample

We retrieved European firm's microdata from Bureau Van Dijn's Amadeus database in February 2018 [8]. Since most firms on this database are micro firms (firms with 10 or less employees) and are considered to be less likely to export (Bertrand, 2011), we opted to exclude them from our sample reducing significantly the pool of firms. We further limited the pool of firms by excluding firms which did not provide data for the export revenue, operational revenue or number of employees for the period of 2014–2016 [9]. We were then faced with a sample of 202,617 firms from 17 European countries. Since some of these countries were poorly represented, we opted to eliminate 371 firms from 8 different countries. Finally, with the use of Microsoft Excel, the remaining data was analysed, in order to obtain a balanced

	Variable	Proxies	Expected impact on export intensity
Domestic market characteristics (explanatory variables)	Population	Number of inhabitants (million people)	−
	GDP_Growth	Gross domestic product growth (%)	−
	Ease_Trade	Cost to export score (0–100)	+
Firm characteristics (control variables)	Age	Number of years in activity	+/−
	Size	Number of employees	+
	Firm_Prod	Turnover per employee (thousand Euros)	+

Table 2.
Explanatory and control variables, proxies and expected result

Country	ISO ALPHA-2 code	Number of firms	%
Bosnia and Herzegovina	BA	866	2.96
Germany	DE	588	2.01
Estonia	EE	1,094	3.74
France	FR	7,885	26.94
United Kingdom	GB	6,370	21.77
Greece	GR	4,156	14.20
Croatia	HR	5,667	19.36
Hungary	HU	2,576	8.80
Ireland	IE	64	0.22
Total		29,266	100.00

Table 3.
Number of firms by country

panel with the necessary data to estimate the model. By excluding the firms that did not provide data for export revenue or for the number of employees for one or more of the years during the 2010 to 2013 period and firms with 10 or less employees in any of the years, our sample size significantly reduced. The final sample consists of 29,266 firms from nine European countries, as shown in Table 3. The seven-year period considered resulted in a balanced panel data set with 204,862 firm/year observations, of which 74,173 correspond to firm/year observations in which the export intensity variable assumes the value zero, that is, the firm did not export in this year.

In order to complement our study, we also accessed the World Bank's DataBank for country-related variables such as *Population* and *GDP_Growth*. *Ease_Trade* variable was provided by *Doing Business*.

3.3 Descriptive analysis of the model's variables

In order to understand the behaviour of the variables, it is useful to analyse their descriptive statistics, both at a global, country and sector level. These descriptive statistics are portrayed in Table 4, Tables A1 and A2 in Appendix, respectively. By analysing Table 4, we find sizable discrepancies between the country variables and the firms' variables. These discrepancies are also present when analysing the variables at a country level (Table A1) and sector level (Table A2).

The dependent variable, export intensity, has a mean of 20.203%, i.e. on average, exports represent 20.203% of firms' total sales. At a country level (see Table A1), France is the country whose firms present the lowest mean (only 7.80%) and Ireland is the country who shows the highest export intensity level (61.51%).

Concerning the variables related to domestic market characteristics, as mentioned in section 3.1, the *Population* was included to portray the size of the domestic market. By analysing Table A1, three countries clearly stand out, Germany, with the highest number of inhabitants followed by France and United Kingdom. Estonia and Bosnia and Herzegovina are the countries with the lowest population, with less than four million inhabitants, during the time period considered. Regarding the *GDP_Growth* the nine countries present different growth levels, on average, during the period analysed. Most countries (eight of the nine) present positive GDP growth levels while Greece stands alone, as the only country with negative *GDP_Growth*, on average, during the period of 2010–2016. The last variable, *Ease_Trade*, shows average values fluctuating between 79.42 and 91.33. Estonia is the country with the highest score in *Ease_Trade*, followed by Germany and Hungary. France,

Variable	Proxy	Mean	Maximum	Minimum	Standard deviation
Export_Intensity	Ratio of export sales over the total sales of the firm (%)	20.203	100.000	0.000	29.836
Population	Number of inhabitants (million people)	37.388	82.349	1.315	29.015
GDP_Growth	Gross domestic product growth (%)	0.818	25.557	−9.132	2.621
Ease_Trade	Score (0–100)	83.186	92.605	78.666	3.908
Age	Number of years in activity	23.817	319.000	0.000	17.738
Size	Number of employees	259.321	129916.000	11.000	2217.768
Firm_Prod	Turnover per employee (thousand Euros)	296.680	214303.400	0.004	1484.545

Table 4.
Descriptive analysis of the model's variables

Croatia and Bosnia and Herzegovina are the countries which present the lower score in this variable during the period under analysis.

Regarding the firm level variables, and starting with *Age*, the global average is approximately 24 years of existence. German is the country with the oldest firms with an average of nearly 41 years in activity while Estonia is the country with the youngest firms, on average 16 years of activity. In terms of the *Size* of the firms, the global average is approximately 259 workers per firm, with firms in Ireland showing the largest number of employees (on average 1,835 employees per firm), while Estonia includes firms with the lowest average, with approximately 68 employees per firm. Finally, regarding *Firm_Prod*, the country which encompasses the firms with the lowest labour productivity is Bosnia and Herzegovina, with an average value of 85 thousand euros per employee, and the country whose firms show the highest productivity is Ireland with an average of 1,365 thousand euros.

For a more detailed analysis of the data, in Table A2 we provide the mean value of the estimation variables by sector of activity. It is noteworthy that the manufacturing sector is the one that has, on average, the highest value for export intensity and the services sector has, on average, the lowest value. This is not surprising given that several services are non-tradable.

Finally, it is important to analyse the annual evolution of the model variables (see Table A3). It should be noted that most variables recorded a slight increase between 2010 and 2016. The exception occurs with the variables *GDP_Growth* and *Firm_Prod*. The first presents several oscillations in the period considered, presenting in 2012 a negative value; *Firm_Prod* significantly increases from an average of 279 thousand Euros in 2010 to 303 in 2015 and it decreased in 2016.

4. Empirical results

4.1 Correlations

In order to complement the descriptive analysis of the variables conducted in section 3.3., a brief analysis of the correlation matrix (see Table 5) is presented in the current section to evaluate whether or not the independent variables are correlated.

Table 5 shows that although the correlation between the independent variables is statistically significant, except for the correlation between *Firm_Prod* and *Size*, the respective coefficients are very small. Indeed, since all correlation coefficients between independent variables are smaller than 0.3, which represents negligible correlation (Mukaka, 2012), they do not show multicollinearity problems.

4.2 Estimation results

The present work intends to test the influence of the firm's domestic market characteristics (*Population*, *GDP growth*, and *Ease_Trade*) on the firm's export intensity, controlling for a set

	Export_Intensity	Population	GDP_Growth	Ease_Trade	Age	Size	Firm_Prod
Export_Intensity	1.000						
Population	0.018*	1.000					
GDP_Growth	0.113*	0.254*	1.000				
Ease_Trade	0.338*	−0.177*	−0.072*	1.000			
Age	0.042*	0.263*	0.024*	0.099*	1.000		
Size	0.064*	0.053*	0.028*	0.057*	0.063*	1.000	
Firm_Prod	0.041*	0.074*	0.009*	0.031*	0.021*	−0.003	1.000

Note(s): *$p < 0.01$

Table 5.
Correlation matrix

of factors that can influence firm's export intensity (*Age*, *Size* and *Firm_Prod*). In this way, in this section a causal analysis is carried out by using multivariable econometric techniques with panel data. This procedure enables the combination of time-series with cross-sections, i.e. allowing to simultaneously explore variations over time (years) and different individuals (firms). Alike Eberhard and Craig (2013) and Reis and Forte (2016) we opted to logarithmize some variables, namely *Population*, *Ease_trade*, *Age Size*, and *Firm_Prod*.

Taking into consideration the existence of heterogeneity among the firms, and that many factors that affect their export intensity, namely those related to their internal characteristics, are not included in equation (1), the OLS method is not appropriate. Instead, two estimation methods can be used to handle panel data: the fixed effects and the random effects models (Wooldridge, 2001). Nevertheless, as we include sector and country dummies and these variables are constant over time, it is not appropriate to use the fixed effects model because characteristics of entities/individuals that do not vary over time are perfectly collinear with the dummies per individual (Torres-Reyna, 2007). Thus, we used the random effects model (RE). Furthermore, since firms can self-select into exporting, which may result in potential sample selection bias, we also make use of the Heckman's two-stage selection model (HE), similar to Reis and Forte (2016), Krammer *et al.* (2018) or Carboni and Medda (2020). Finally, similar to most studies reviewed in section 2.3., we also resort to a pooled Tobit model and a panel Tobit model. Table 6 shows the results obtained in the four models (random effects, pooled Tobit, panel Tobit and Heckman), without and with year dummies.

Analysing the results presented in Table 6, we verify that all explanatory variables are statistically significant on most models and the respective coefficient presents the expected sign.

The results related to the firm's domestic market characteristics indicate that *Population* and *GDP_Growth* ratio have a negative impact on the firm's export intensity, as expected. The domestic country's population reveals a negative relationship with the firm's export intensity, meaning that firms in larger countries tend to export less, as they have to satisfy their domestic demand. This relationship falls in line with Fakih and Ghazalian (2014), who concluded that the domestic country's size was negatively related to the firm's export performance. The *GD_Growth* variable also shows a negative effect on export intensity, i.e. an increase in the firm's nations GDP has a negative effect on its export intensity; in other words, when there is a hostile domestic environment, notably in terms of growth (domestic demand grows little or even declines), firms will tend to focus more in foreign markets. In line with what was advocated by Esteves and Rua (2015) and Almunia *et al.* (2018), reductions in domestic demand free up production capacity that firms may use to serve customers abroad, thus increasing their export intensity.

The *Ease_Trade* variable show a positive and significant relationship with export intensity in half of the models, meaning that firms in countries with a higher score in this variable tend to export a larger part of their production, as anticipated. Remember that this score benchmarks countries in relation to the best regulatory practices in the indicator which means higher values correspond to better regulatory performance.

Regarding the results of the control variables, *Size* and *Firm_Prod*, they show a positive and significant relationship with export intensity, following the expected pattern. In accordance with the results, the positive relationship between the firm's size and export intensity reveal that larger firms have a greater propensity to export a larger part of their sales, result which falls in line with most studies of our literature review (e.g. Chung *et al.*, 2019; Bashiri Behmiri, 2019). Furthermore, firms with higher productivity levels export a larger portion of their production, presenting higher export intensity, result also obtained by Reis and Forte (2016). In relation to *Age*, the results suggest a negative relationship with export intensity, which, according to Love *et al.* (2016), may be due to the fact that older companies are generally associated with reactive thinking, less flexibility, and some aversion

	Variable	RE		Pooled Tobit		Panel Tobit		HE	
Domestic market variables	Population	−0.059*	−0.126***	−0.165**	−0.243***	−0.134***	−0.182***	0.026	−0.047
	Gdp_growth	−0.000**	−0.001***	0.000	−0.000	−0.000*	−0.001**	−0.000	−0.001
	Ease_trade	0.169***	−0.025	0.200***	−0.098	0.096***	−0.059**	0.377***	0.112
Firm variables	Age	0.001	−0.016***	−0.026***	−0.027***	0.006***	−0.008***	−0.041***	−0.042***
	Size	0.021***	0.021***	0.039***	0.039***	0.032***	0.032***	0.024***	0.024***
	Firm_prod	0.010***	0.010***	0.058***	0.058***	0.031***	0.031***	−0.000	−0.000
Sector dummies	Manufacturing	0.101***	0.101***	0.163***	0.163***	0.160***	0.161***	0.103***	0.103***
	Mining	0.066**	0.066**	0.012	0.012	−0.011	−0.011	0.080***	0.080***
	Services	−0.031*	−0.033**	−0.092***	−0.092***	−0.117***	−0.119***	−0.037***	−0.037***
Country dummies	DE	0.300***	0.540***	0.719***	0.986***	0.699***	0.870***	0.033	0.284
	EE	0.116***	0.072*	0.178**	0.138*	0.262***	0.233***	0.153**	0.113
	FR	0.116	0.317***	0.328	0.548**	0.255***	0.396***	−0.112	0.096
	GB	0.252***	0.467***	0.675***	0.916***	0.653***	0.806***	−0.000	0.227
	GR	0.081**	0.173***	0.070	0.172**	−0.023	0.043	−0.038	0.058
	HR	0.082**	0.147***	0.142*	0.215***	0.100***	0.145***	0.002	0.071
	HU	0.113***	0.142***	0.275***	0.310***	0.326***	0.348***	0.069***	0.101***
	IE	0.373***	0.406***	0.507***	0.540***	0.583***	0.606***	0.349***	0.380***
Year dummies		No	Yes	No	Yes	No	Yes	No	Yes
Observations		130,689	130,689	204,862	204,862	204,862	204,862	204,862	204,862
Censored obs.				74,173	74,173	74,173	74,173	74,173	74,173
Uncensored obs.				130,689	130,689	130,689	130,689	130,689	130,689
Wald-χ^2		3332.92	3539.53			24616.17	24707.08	8095.75	8122.03
Sigma				0.342	0.342	58,317	58,379		
Log likelihood				−85558	−85541				
Pseudo R^2				0.3378	0.3379			0.304	0.304

Note(s): ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 6.
Estimation results – all sample

to change. Tyagi and Nauriyal (2017) or Krammer *et al*. (2018) also obtained a negative relationship between firm's age and its export intensity.

Finally, given that the sample includes countries for which all firms are exporters (Germany, Estonia, United Kingdom, Croatia and Ireland), to test the robustness of the results we decided to estimate the model excluding firms from those countries. The results are shown in Table 7.

Considering the estimation outputs provided in Table 7 we can conclude that most of the results remain unchanged, that is, although the coefficients of the variables show some changes, the sign remains unchanged.

5. Conclusions, implications and limitations
5.1 Conclusions
The globalization of the world, and especially of business, pressures firms to look beyond their domestic market in search of new opportunities, as competition amongst firms no longer has borders. The importance of firms exporting activities for growth and sustainability is generally accepted, especially for small open economies and in times of internal market stagnation and downturn. Exports are equally important to ensure economic growth. Moreover, as stated by Kutlina-Dimitrova and Rueda-Cantuche (2021), it is urgent that trade, which has been severely affected by the COVID-19 pandemic, quickly recovers as millions of European jobs dependent on exports are at stake (real job losses were prevented thanks to large exceptional support packages implemented by the European Union). Hence it is important to understand the determinants of export performance in order to provide policy and decision makers with the tools and information needed to make assertive and pondered macro and microeconomic decisions.

Despite the vast amount of literature on the determinants of export performance, most studies focus on internal factors, while external factors, in particular the domestic market characteristics, have been poorly explored (Chen *et al.*, 2016). Focusing our attention on these characteristics, the present work examines the influence of domestic market characteristics on firms' export intensity, one of the most commonly used measures of export performance found in literature.

Based on a balanced data panel of 29,266 firms from nine European countries, for the period of 2010–2016, the empirical results show that the size of domestic demand and its growth, and the general export environment related to the ease of trade across borders are important determinants of firms' export intensity. Moreover, firm's age, size and productivity also play an important role.

5.2 Implications
The results obtained in this study shed some light on the influence of the domestic market characteristics on firms' export performance. Considering the size of demand (measured by Population) we find that firms in larger countries tend to isolate themselves more, being dependent on the domestic market, evidence that corroborates both economic theory and the empirical results of Fakih and Ghazalian (2014). The estimation results also reveal a negative relationship between the growth in domestic demand, measured by GDP_Growth, and export intensity confirming our expectations. Ceteris paribus, a rise in the domestic country's economic performance (less hostile domestic environment) tends to induce a reduction in firms' export intensity. This result is in line with Gül (2021), Esteves and Rua (2015) and Almunia *et al.* (2018) who argue that in periods of strong growth of domestic demand firms may not have enough productive capacity to export while during domestic recessions firms can devote more resources to exports, thus increasing their export intensity.

	Variable	RE		Tobit		Panel Tobit		HE	
Domestic market variables	Population	0.003	−0.161**	−0.391**	−0.447***	−0.258***	−0.344***	−0.282	−0.354*
	Gdp_Growth	−0.001***	−0.002***	−0.001	−0.002	−0.001***	−0.002***	−0.001	−0.002
	Ease_Trade	0.426***	−0.038	0.537**	0.170	0.362***	0.128	0.660**	0.064
Firm variables	Age	0.009**	−0.016***	−0.006***	−0.007***	0.013***	0.001	−0.025***	−0.026***
	Size	0.023***	0.023***	0.049***	0.049***	0.045***	0.045***	0.053***	0.053***
	Firm_prod	0.017***	0.017***	0.102***	0.102***	0.056***	0.056***	0.083***	0.083***
Sector dummies	Manufacturing	0.043*	0.045***	0.197***	0.197***	0.199***	0.200***	0.176***	0.176***
	Mining	−0.051	−0.048	−0.124***	−0.124***	−0.153***	−0.152***	−0.130***	−0.130***
	Services	−0.087***	−0.088***	−0.172***	−0.172***	−0.206***	−0.207***	−0.199***	−0.199***
Country dummies	FR	−0.069	0.409*	0.924**	1.081**	0.593***	0.843***	0.630	0.829
	GR	−0.013	0.200**	0.233	0.316*	0.065	0.175***	0.145	0.259
	HR	0.023	0.181**	0.364**	0.415***	0.226***	0.309***	0.277	0.340
Year dummies		No	Yes	No	Yes	No	Yes	No	Yes
Observations		55,848	55,848	130,018	130,018	130,018	130,018	130,018	130,018
Censored obs.				74,170	74,170	74,170	74,170	74,170	74,170
Uncensored obs.				55,848	55,848	55,848	55,848	55,848	55,848
Wald-χ^2		839.26	941.96			6250.14	6271	2133.87	2144.20
Sigma				0.376	0.376	7,618	7,635		
Log likelihood				−61705	−61702				
Pseudo R^2				0.170	0.170			0.410	0.410

Note(s): ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$

Table 7.
Estimation results –
reduced sample

Finally, according to our empirical results, the variable *Ease_Trade*, which reflects the country's performance in terms of general export environment, has a positive and significant relationship with export intensity, which is also in line with expectations.

Considering the results obtained, our study has two important implications. First, we proved that both internal (namely firm's age, size and productivity) and external factors (domestic demand and its growth and general export environment) are important determinants of firms' export intensity, which corroborate the importance of the resource-based view and institutional based view in explaining the firms' export performance. These results represent an important theoretical implication: to properly study the determinants of firms' export performance, studies should combine different theoretical perspectives and levels of analysis. Second, our results reveal that ease of trade across the borders boosts export intensity while domestic demand and its growth have a negative impact. These findings constitute an important practical implication as they are particularly relevant for policy makers who wish to encourage the country's exports: they suggest that to promote firms' export intensity it is important to create an overall export-friendly environment, particularly in periods of greater growth in the domestic market, as in this context firms will tend to concentrate in the domestic market.

5.3 Limitations and future lines of research

Although the results of the present study are statistically significant and contribute to the research in the field of export performance, they are far from conclusive and present some limitations. Firstly, the sample size despite being relatively large was significantly reduced due to limited access to firm's microeconomic data, namely the export revenue and other key financial variables necessary to enrich our model, which limited the amount of countries considered in the panel and the scope of the analysis. Future studies should seek alternatives sources of data in order to overcome this limitation and taking a sample with a more balanced distribution of companies by country. Secondly, as few studies analyse the domestic market characteristics, and most of them focus on the institutional context (namely political stability and corruption) it was not possible to obtain indications on the characteristics of the countries to be included in the econometric model and their respective proxy. Future research can test other characteristics and/or other proxies. Lastly, the econometric model just controls for four major sectors of firms' activities (Agriculture, Manufacturing, Mining and Services), allowing for possible distortions in the results. Applying a broader approach to the research into this topic, considering, for example, two-digit sector dummies, may prove useful in future research.

Notes

1. Using a very detailed survey data of European manufacturing firms with at least 10 employees, Békés and Muraközy (2018) found that direct export is by far the most widely used entry mode, with 56.2% of the firms conducting it. Moreover, 8% of the firms are indirect exporters. Additionally, 7.6% of the firms conduct foreign direct investment (either service or manufacturing), while only 1.8% of firms are engaged in outsourced manufacturing production.

2. The countries considered and the time period analysed were strongly influenced by the available data.

3. According to Yeoh and Jeong (1995, p. 102-103) "Hostile environments are characterized by precarious industry settings, intense competition, harsh, overwhelming business climates, and the relative lack of exploitable opportunities".

4. The choice of the year 2016 as the lower limit is due to the fact that Chen *et al.* (2016)' review includes articles published until 2015.

5. Some of the 20 studies use more than one export performance measure, export intensity being one of them.

6. Despite focusing on a large sample of firms from seven European countries, Carboni and Medda (2020) do not address the influence of external factors.

7. Indexes i, j and t refer to the firm, the country and the year respectively.

8. The Bureau Van Dijn's Amadeus database provides insight into the economic and financial data of over 24 million European firms.

9. Bureau Van Dijn's Amadeus database only allows to filter data considering three-year periods.

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Appendix

Country	Code	Export_Intensity	GDP_Growth	Population	Ease_Trade	Size	Age	Firm_Prod
Bosnia and Herzegovina	BA	13.51	1.53	3.61	80.89	114.83	16.68	85.19
Germany	DE	42.34	2.05	81.16	87.86	1055.98	40.94	720.34
Estonia	EE	42.37	3.25	1.32	91.33	67.64	16.20	151.69
France	FR	7.80	1.14	65.97	79.42	116.98	25.97	343.46
United Kingdom	GB	35.58	2.00	64.17	86.04	632.26	29.85	447.57
Greece	GR	11.61	−3.56	10.96	86.07	115.62	24.71	251.45
Croatia	HR	12.93	1.80	9.90	79.54	87.01	16.28	101.64
Hungary	HU	36.77	0.11	4.26	87.27	292.69	19.10	291.84
Ireland	IE	61.51	6.50	4.64	83.93	1834.82	26.05	1364.62
Global mean		20.20	0.82	37.39	83.19	259.32	23.82	296.68

Table A1.
Mean of the variables
of the model by country

Table A2.
Mean of firm's
variables by sector of
activity

Sector of activity	Export_Intensity	Size	Age	Firm_Prod
Agriculture, forestry and fishing	18.29	148.08	21.77	241.81
Manufacturing	33.94	252.22	27.39	210.40
Mining and quarrying	24.22	244.53	27.72	670.52
Services	13.37	265.50	22.05	337.34
Global mean	20.20	259.32	23.82	296.68

Table A3.
Mean of the variables
by year, 2010–2016

Year	Export_Intensity	GDP_Growth	Population	Ease_Trade	Size	Age	Firm_Prod
2010	19.55	0.32	36.90	81.81	245.81	20.82	279.13
2011	19.98	0.26	37.04	82.64	250.96	21.82	297.98
2012	20.22	−1.03	37.20	82.59	255.04	22.82	298.97
2013	20.32	0.65	37.37	83.47	256.57	23.82	301.40
2014	20.31	2.03	37.55	83.67	265.28	24.82	300.75
2015	20.42	1.86	37.74	83.85	270.67	25.82	302.56
2016	20.62	1.63	37.91	84.27	270.93	26.82	295.97
Global mean	20.20	0.82	37.39	83.19	259.32	23.82	296.68

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