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DRIVING A FIRM'S EXPORT PROPENSITY AND EXPORT INTENSITY: THE ROLE OF EXPERIENCE, INNOVATION, AND INTERNATIONAL MARKETNG STRATEGY

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Abstract
Moving from the hypothesis of firm heterogeneity, we analyze whether the firm's experience, product and process innovation as well as a clear international marketing strategy affect firms' probabilities of entering export markets and their export intensities (sales achieved abroad). The paper provides further knowledge on the determinants of both the decision to address foreign markets (firm export propensity) and the degree of penetration in those foreign markets (export intensity), by integrating the three above-mentioned streams of research usually approached as distinctive ones. Even though there is a large set of studies dealing with an analysis of export determinants, there is still a lack of theoretical and empirical investigation on how firm's innovation (product to be developed, process improvement) and marketing strategy (commitment, marketing investments) interplay in the international business processes, taking into account any prior experience of the firm in general terms as well as in the international scenario. Specifically, the paper empirically investigates how experience, innovation and international marketing strategy influence export behavior at the firm level in order to explore how these determinants act as export drivers for a firm and the consequences measured in terms of export intensity. We carried out a quantitative analysis based on a dataset on 582 Italian manufacturing firms observed over the three-year periods 2001–2003 and 2004–2006.As far as export propensity is concerned, it emerges that the main drivers affecting the firm's decision to enter foreign markets are related to its internal productivity level, innovation capabilities in terms of product innovation as well as an explicit marketing strategy oriented to foreign markets (establishing collaborations with foreign firms or direct commercial investment abroad). Thus, experience can be interpreted as the capability of a firm to manage internal processes (managerial experience) efficiently rather than in terms of knowledge cumulated through years of economic activities (captured through the age variable) or transferred from other partners or foreign ownership. When considering export intensity, two main elements arise from the analysis. The first one is that the shift from product to process innovations affects exports. This result can be explained by the firm's capability to efficiently change its internal processes to face the demand arising from foreign clients. The second important element refers to the remarkable role of direct commercial investment in influencing export intensity. This result confirms that the firm gains in terms of value captured by controlling directly its distribution channel.

Keywords: experience, innovation, international marketing strategy, export intensity, Italy

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1. INTRODUCTION

International business studies have widely analyzed firms' exports from multiple angles (e.g. Zou and Stan, 1998; Sousa et al, 2008; Leonidou et al, 2010). Firms can grow by entering new markets and exporting becomes a key process in this respect. An important area of interest researchers have explored is the relationship between the firm's characteristics and its export behavior and performances. On one hand, many studies have considered the role of age and size in influencing the firm's ability to successfully carry out this process. As far as size is concerned, the research addresses how small and medium-sized firms, compared with large companies, can efficiently and effectively manage export activities and obtain positive outcomes due to the limitations and constraints related to their size (e.g. Coviello and McAuley, 1999; Wagner, 2001). These analyses have been rooted in the resource-based view of the firm and in considering the firm's capabilities that can be activated for exporting. Other studies have instead analyzed firm exports within the firm lifecycle, by adopting and testing either the stage model of internationalization (e.g. Johanson and Vahlne, 1977) or the born global approach (Casillas and Acedo, 2012). In this respect, firm internationalization is not necessarily related to a cumulative process (of competences, of knowledge), but could rather be explained through an entrepreneurial attitude or managerial intentionality (Hutzschenreuter et al, 2007) toward internationalization.

Another area of research is devoted to explain the linkages among technological evolutionary trends, innovation processes and internationalization (e.g.Cassiman et al, 2010; Damijan et al, 2010). Technological trends and product innovation can lead to exporting activities due to the opportunities for exploiting the technology or product lifecycle on a

broader scale. Moreover, firms that are more able to innovate are also those that perform better in terms of export results. The possible need to adapt the firm product to foreign markets can be sustained by the innovation capabilities developed at the firm level and its ability to manage product innovation over time to exploit differentiation in international demand such as at the country level. Innovation can also reduce internationalization-related risks since the firm gains in terms of differentiation and stronger sources of competitive advantage compared with indigenous competitors (Pla-Barber and Alegre, 2007).

Among prior research in firm's export behavior, scholars have focused on the firm's marketing strategies and their implications on its internationalization behavior and performance. These studies support the idea that firms with strong managerial capabilities as well as an effective marketing attitude have higher export performance and international success (Dhanaraj and Beamish, 2003). Hooley et al (2005) described the performance impact of marketing resources, underlining how market orientation and market-based resources positively influence firm performance. Morgan et al (2009) showed that market orientation and marketing capabilities are complementary assets that support a firm's superior performance. In international business studies, Kotabe et al (2002) linked firm performance to the degree of multinationality by evaluating how R&D and marketing capabilities influence overall performance.

The present paper provides further knowledge on the determinants of both the decision to address foreign markets (firm export propensity) and the degree of penetration in those foreign markets (export intensity), by integrating the three above-mentioned streams of research– firm's characteristics, innovation, and firm's marketing strategies –usually approached as distinctive ones. Even though there is a large set of studies dealing with an analysis of export determinants (i.e. Leonidou et al, 2010), there is still a lack of theoretical and empirical investigation on how firm's innovation (product to be developed, process

improvement) and marketing strategy (commitment, marketing investments) interplay in the international business processes, taking into account any prior experience of the firm in general terms as well as in the international scenario. Specifically, this contribution includes in the theoretical framework research done in the economic field on firm heterogeneity (Helpman et al, 2004), by embracing a measure of productivity into the evaluation of firm's experience and consequently on firm's export behavior. Moving from the assumption of firm heterogeneity, we analyze whether the firm's internal experience of production management and internationalization, product and process innovation as well as a clear international marketing strategy affect its probability of entering export markets and its export intensity in terms of salesachieved abroad.

2. CONCEPTUAL FRAMEWORK

2.1. Experience, internationalization and firm heterogeneity

Many scholars within the international business studies put at the core of their analyses the role of international experience in explaining firms' international behavior. Empirical evidence on the relationship between experience (measured as firm age) and export behavior is not univocal and conclusive: in fact, some researchers find that older firms are more export-intensive (Majocchi et al, 2005), while others find no evidence of a positive relationship between age and export at the firm level (Moen and Servais, 2002). From a different angle, by focusing explicitly on international experience, "stage-based" theories (among them Johanson and Vahlne, 1977) and models (Cavusgil, 1980; Cavusgil et al, 2012) describe international expansion as a progressive reduction in the cognitive distance between domestic and foreign markets. This reduction is specifically due to the accumulation of information and knowledge (experience) about international markets that decreases a firm's costs and enhances its international results, since it allows the firm to better face similar markets. In general, these

studies have confirmed the existence of a positive relationship between the firm's experience and its export performances (e.g. Dean et al, 2000).

Such experience can be acquired directly but also can be gained through the firm's involvement into a group. Foreign-owned firms are expected to be more likely to export and to perform better in foreign markets since the presence of foreign capital can help them in terms of greater knowledge about international business opportunities, higher export experiences, better access to information about foreign markets and greater logistics and commercial resources (Wignaraja, 2002). Studies on international new ventures (INVs) (Mudambi and Zahra) highlight that foreign entrant with a higher level of international experience has a higher probability of survival. Firms can benefit from synergies among the resources of the firms involved in the group (Brioschi et al, 2002), which also help overcome the limit of a firm's size (improving firm's productivity). Following Basile (2001) and Roper and Love (2002), belonging to a business group increases a firm's probability of exporting since it allows firms to overcome the problem of lacking the resources necessary to export by favoring the intra-company transfer of financial, technological, physical and human resources.

Additional valuable contributions in describing the internationalization of firms through export come from the economic literature.Since the second half of the 1990s, a new theoretical stream analyzing international trade has arisen, beginning from the pioneering contribution of Bernard and Jensen (1995), which explored firm heterogeneity in relation to internationalization from a different theoretical angle compared to existing theoretical contributions. The novelty of so-called new trade theory is that it dismisses the traditional determinants of trade and firm internationalization – such as the comparative advantage at the country level, industry-level characteristics, commercial barriers and transport costs – in order to explain the nature and determinants of internationalization processes based on firm-specific characteristics (Yi and Wang, 2012). The contributions of Bernard and Jensen (1995; 1999),

the subsequent formalization of Melitz (2003) and the developments of Helpman et al (2004) are based on the assumption of asymmetry and heterogeneity across firms operating in the same industry and highlight the existence of a relationship between firm-specific characteristics – in particular, productivity levels – and their involvement in international markets. This economic approach can be linked to the managerial studies that described firms according to the resource-based view (Barney, 2001). Following Barney (2001), this assumes firms are unique bundles of productive resources that allow them to generate sustainable competitive advantages through which they can access and compete in both domestic and international markets (Fernández Olmos, 2011).

The rationale of the hypothesis of firm heterogeneity (Helpman, 2006) is the assumption of a self-selection process into international markets of the most productive firms, which have at their disposal the internal resources necessary and sufficient to cover the fixed and sunk costs related to the internationalization process (Bernard and Jensen, 1999). More generally, following Helpman et al (2004), the key prediction is that firms with different levels of productivity internationalize through different modes due to their different sunk costs.The hypothesis of firm heterogeneity and the assumption that internationalization processes are mainly driven by firm-specific characteristics have been widely investigated in economic studies. Many works have empirically studied the relationship between exporting and firms' *ex ante* productivity differentials in order to explain the mechanism underlying the process of the self-selection of firms into international markets. Among these works, Aw et al (2000) for the Taiwanese case, Bernard and Jensen (1999) and Helpman et al (2004) for the US case, Girma et al (2005) for the UK case, López (2009) for the Chilean case and Antonietti and Cainelli (2010) for the Italian case show that exporting firms have *ex ante* higher productivity levels than firms serving only the domestic market.

From those studies, we maintain that the disparity in firm productivity reflects firms' differences in internal resources and capabilities and the experience the firm has in managing internal (i.e. more efficient production activities) as well as external processes (i.e. more efficient relations with the market). Hence, we state that these differences (based on cumulative learning processes) affect firms' export behavior (export propensity) and export results (export intensity). To summarize, we propose the following hypotheses:

H1a. The higher the firm's cumulative experience based on age and productivity in managing firm's activities, the higher the probability it engages in exporting.

H1b. The higher the firm's cumulative experience based on age and productivity in managing firm's activities, the higher the share of turnover it realizes abroad (export intensity).

H2a. Whenever the firm belongs to an international group, the probability it engages in exporting increases.

H2b. Whenever the firm belongs to an international group, the share of turnover it realizes abroad increases (export intensity).

2.2. Linking product and process innovation with firm'sexport behavior

Within the framework of the resource-based view of the firm, another stream of studies discusses the relationship between firm's international behavior and firm's innovation. Following Rodríguez and Rodríguez (2005), firms can have both tangible and intangible resources available. Among intangible resources, technological ones represent a key source of competitive advantage: in fact, they constitute the base of a firm's innovative capacity that fosters its competitiveness in domestic and international markets (Buckley and Casson, 1991; Dhanaraj and Beamish, 2003).

In particular, technological resources can generate two main types of competitive advantage for a firm: (i) advantages based on differentiation and (ii) advantages in costs (Rodríguez and Rodríguez, 2005). The former can be obtained by means of product innovations that allow firms to increase product quality or to provide customized products. Product innovation can consist of both upgrading existing products and introducing new products, and it is the key feature of a differentiation strategy through which firms can better compete in highly competitive international markets. By contrast, firms can obtain cost-based competitive advantages through the introduction of process innovation. This implies the development of more efficient production processes and allows a firm to reduce the costs of production and, consequently, prices (Rodríguez and Rodríguez, 2005).

Although both product and process innovation represent a source of firm competitiveness, some scholars have highlighted that differentiation-based advantages play a greater role in the case of international expansion compared with cost-reducing advantages (McGuinness and Little, 1981; Madsen, 1989; Styles and Ambler, 1994). Product differentiation and customization are particularly important at the starting point of exporting (Cavusgil and Zou, 1994; Roper and Love, 2002) because upgraded and new products allow a firm to differentiate its supply from rival firms and to account for variations in international demand. Moreover, it can be stated that product innovation has a positive effect on firms' export intensities because innovative products can improve firm image and upgrade their positions in foreign markets already entered.Looking at cost-based advantages, process innovation can promote a firm's export decision by increasing its efficiency and, consequently, its productivity, thus allowing it to enter foreign markets and to face international competition. By contrast, process innovation can also improve firms' export performances, providing them a greater international price-based competitiveness. Moreover, as underlined by Caves (1982), innovating firms have greater incentives than non-innovating

ones to expand abroad in order to recover and to earn higher profits from their investments in innovation activities.

The empirical literature finds, in general, a positive effect of innovation on firms' export behavior: the results show that both product and process innovation positively affect both firms' probabilities of exporting and their export intensity. For instance, Basile (2001) found that the introduction of product and/or process innovations, as well as investment in R&D or new capital equipment, increases firms' probabilities of exporting. Moreover, the results show that innovative firms record higher levels of export intensity than do non-innovative firms. Higón and Driffield (2011) analyzed the relationship between innovation and export performance in a large UK sample of small and medium-sized firms in 2004. Their results showed that, when considered separately, both product and process innovations positively affect firms' decisions to export. However, when the interaction between the two forms of innovation was considered, the results suggested that process innovation does not increase firms' probabilities of exporting beyond that of product innovation. Overall, it emerged that product innovation, rather than process innovation, plays an important role in promoting firms' export orientations.Our interest here is to expand this relationship by decoupling the role of product and process innovation in both the steps of exporting and foreign market penetration (export intensity) over time. In our view further research is needed to disentangle this relationship between innovation outcomes and firm's export behavior by considering the implication of innovation on firm's export behavior in different time periods.

H3a. Both product and process innovation positively affect firms' probabilities of exporting, even though product innovations have a greater impact compared with process innovations.

H3b. Both product and process innovation positively affect firms' export intensities, even though process innovations have a greater impact compared with product innovations.

2.3. A firm's internationalization marketing strategy, commitment and exports

In addition to experience and innovation outputs, a firm's export results can be influenced by an explicit internationalization marketing strategy, where the level of a firm's commitment to export can increase its export performance. Export-committed firms obtain better export results (Bonaccorsi, 1992). From this viewpoint, studies of marketing capabilities have highlighted how they can positively influence export behavior and internationalization performance (Kotabe et al, 2002). The presence of differences among foreign markets forces firms to adapt their marketing strategies to the specific emerging context, otherwise failure to adapt to the specific context could be fatal (Lim et al, 2006). Hence, having internal marketing capabilities and orienting them toward the acquisition of new global markets can increase the firm's success at the export level. From this point of view, managerial intentionality (Hutzschenreuter et al, 2007) is crucial in developing a direct approach to internationalization. This is the reason why we include in our explanatory model of firm's export behavior the explicit internationalization marketing strategy besides the reasoning on experience (cumulative learning process that impacts on productivity, knowledge flows within international groups) and on innovation (signaling the dynamism of the firm in terms of product or process innovation, new knowledge created and new inputs also in terms of international offering).

A commitment to export "refers to the degree to which organizational and managerial resources are allocated to exporting ventures" (Lages and Montgomery, 2004, p. 1193). From our point of view, export commitment can reflect the firm's interest in either controlling directly the distribution channels abroad or developing contractual agreements with domestic or foreign firms in order to enter international markets, going beyond a passive and reactive approach toward exporting. In this respect, the firm shows a strategic intent toward the

development of international markets, usually connected with specific goals to be achieved internationally (i.e. augmented market share). Zhou and Stan (1998) also stated that an export marketing strategy is positively linked in international business studies to export performance, where investment in specific resources and capabilities increases the benefit for a firm export-wise.

In their research on forms of internationalization beyond exporting, Grandinetti and Mason (2012) highlighted the positive relationship between export performance and the firm's development of internationalization modes focused on foreign direct investment or joint ventures (i.e. Beamish et al, 1999). The development of agreements (such as through export consortia) with other firms can increase the firm's ability to enter and maintain its presence in international markets, overcoming the limits of its size and resources, such as in the case of small and medium-sized firms (i.e. Fernández and Nieto, 2005). Firms that collaborate with foreign firms and/or have realized commercial operations in already entered foreign markets have the advantage of being present in the local market, thus having better knowledge and more direct control of local demand, with the consequent probability of increasing their sales abroad.To conclude, our hypotheses are as follows:

H4a.Whenever the firm develops non-equity forms of collaboration with other firms oriented to internationalization, the probability it engages in exporting increases.

H4b. Whenever the firm develops non-equity forms of collaboration with other firms oriented to internationalization, the share of turnover it realizes abroad increases (export intensity).

H5. Whenever the firm develops commercial investments abroad, the share of turnover it realizes abroad increases (export intensity).

3. DATASET AND ECONOMETRIC MODELING

3.1. Dataset

In order to test our hypotheses we carried out a quantitative analysis using the 9th and 10th waves of the Survey of Manufacturing Firms run by Unicredit-Capitalia on the population of Italian manufacturing firms. The two waves cover, respectively, the periods 2001–2003 and 2004–2006. They collect qualitative and quantitative information on ownership structure and business relationships, investments, labor force, innovation, internationalization, finance and market for, respectively, 3,452 and 5,137 Italian manufacturing firms. Furthermore, each survey reports the balance sheet data of interviewed firms for the three-year period covered.[1]

In order to exploit the panel structure of the data the two waves were merged: the result was a balanced panel dataset of 878 firms observed over the period 2001–2006. The sample was then cleaned to remove firms with incomplete information and missing values on export and innovation activities, year of establishment, ownership structure, belonging to business groups and membership of export consortia, among others. Moreover, firms with incomplete or inconsistent balance sheet data in terms of value added, total cost of labor, intermediate inputs and fixed capital were removed. The resulting sample included 582 firms. Our balanced panel dataset thus resulted in 1,164 observations, i.e. 582 firms observed for two consecutive three-year periods – i.e., $t_1 = 2001–2003$ and $t_2 = 2004–2006$. Moreover, the dependent variables that capture firms' export propensities and intensities referred to 2003 and 2006. Hence, as it will be discussed in Section 3.2.1, all time-varying explanatory variables were considered over the three-year period prior to the dependent variables.

As shown in Table 1, exporting firms represent more than half of the sample – 82.3% and 77.5%, respectively, in 2003 and 2006. Interestingly, the share of exporting firms diminishes from 2003 to 2006. In terms of size, firms were classified into three categories: small, medium-sized and large firms. Medium-sized firms represent about 59% of the sample,

while large firms represent less than 9% of the sample. In particular, the number of large exporters is steady, while the number of both small and medium-sized exporters diminishes from 2003 to 2006.Firms were then split into four categories according to the Pavitt classification (Pavitt, 1984). Supplier-dominated firms constitute about half the sample (50.86%), while science-based firms comprise only 2.06%; furthermore, exporters are mainly supplier-dominated firms (about 50% of the sample) and specialized suppliers (about 34% of the sample) both in 2003 and in 2006.

[Table 1 here]

3.2. Econometric modeling

Two econometric approaches were adopted to test whether experience, introduction of product and/or process innovations and internationalization marketing strategy positively affect firms' export activities in terms of their decision to export and their export performance in terms of export sales relative to total sales.

Owing to the nature of the data, we first checked for the existence of sample selection bias. In fact, simple OLS estimation of the determinants of firms' export intensity– for those firms which export –can lead to biased parameters estimates if firms self-select into the exporting activity or if exporters are oversampled. Specifically, we performed two-step Heckman selection models on both cross-sections (2001–2003 and 2004–2006) and the pooled sample. The results did not stress such a problem– in all cases, we found non-statistically significant Inverse Mills Ratios–thus allowing us to conduct the econometric analysis by distinguishing between export propensity and export intensity and by performing two distinct regression models.

The first question to answer concerned a firm's probability of exporting. In order to empirically address this issue random effects probit models were used. The dependent

variable capturing firms' export propensities (EX_PROP_{it}) is a binary one assuming only two possible values:a value equal to zero if the firm sells its products only in the domestic market and equal to one if it exports at least a part of its production – in 2003 and/or in 2006:

$$EX\_PROP_{it} = \begin{cases} 0, & if the firm does\ not\ export \\ 1, & if the firm exports \end{cases} \quad (1)$$

Let be $i = 1, \ldots, N$ and $t = 1, \ldots, T$, respectively, the number of firms and the periods under observation. Formally, the model can be specified as follows (Greene, 2003):

$$Y_{it}^{*} = X_{it}^{'}\beta + u_{it} \quad , \quad u_{it} = \alpha_i + \eta_{it}$$

$$Y_{it} = \begin{cases} 0, & if Y_{it}^{*} \leq 0 \\ 1, & if Y_{it}^{*} > 0 \end{cases} \quad (2)$$

where Y_{it}^{*} is a latent variable, $X_{it}^{'}$ is a set of explanatory variables, $\alpha_i \sim N(0, \sigma_{\alpha}^{2})$ and $\eta_{it} \sim iidN(0,1)$ are the two components of the error term (u_{it}), and Y_{it} is a dummy variable capturing a firm's export propensity.

The second part of the empirical analysis focuses on the relationship between experience, introduction of product and/or process innovations and internationalization marketing strategy and firms' export performances. The dependent variable that captures firms' export performances (EX_INT_{it}) is the share of turnover realized abroad in 2003 and in 2006. Hence, it is naturally bounded between 0 and 1 and has values at the boundaries ($0 \leq EX\_INT_{it} \leq 1$):

$$EX\_INT_{it} = \frac{export\ sales_{it}}{total\ sales_{it}} \quad (3)$$

In order to model such a variable we apply the so-called fractional response model (Papke and Wooldridge, 2008). We estimate models using a generalized estimating equation (GEE) and specifying a logit link function and an exchangeable correlation matrix; moreover, we compute robust standard errors and include in the regressions a time dummy variable referring to the period 2004–2006 in order to control for systematic period effects. Such a

model allows us to account for the presence of potential serial correlation and heteroskedasticity. Formally, we can assume that

$$E(EX\_INT_{it}|X_{it}^{'},\alpha_i) = G(x_{it}^{'}\beta + \alpha_i)(4)$$

where $X_{it}^{'}$ is a set of explanatory variables, α_i represents the unobserved effect introduced in the logistic function which can be specified as $G(z) \equiv \Lambda(z) \equiv \exp(z)/[1 + \exp(z)]$ and that satisfies the condition $0 < G(z) < 1$ for all $z \in R$ (Papke and Wooldridge, 2008).

3.2.1. Explanatory variables

Following the theoretical and empirical literature on firms' internationalization processes, a broad set of explanatory variables was included in the regressions performed.

Experience.This construct has been explored by considering three explanatory variables described in the managerial and economic literature. To capture the firm's cumulative experiencewe include, in logarithmic form, a variable capturing firm age (AGE_{it}) calculated as the years of the observation of the dependent variables minus the year of firm set-up. Firm-specific characteristics are also captured including a dummy variable for belonging to business groups ($GROUP_{it}$) and specifically we include a dummy that captures the presence of foreign capital (FOR_OWN_{it}) in firms' ownership structures to consider the knowledge flows the firm can access to and the synergies it can exploit. This variable equals one if there is a foreign owner and if this foreign owner directly controls the firm's activities.[2]Following the literature on the hypothesis of firm heterogeneity – which assumes that exporting firms present *ex ante* higher productivity levels than do domestic firms – we include a variable capturing firms' Total Factor Productivity (TFP, henceforth)as a regressor in order to evaluate the impact of existing productivity differentials across firms on export behavior (to capture the experience in managing firm's activities). Firms' TFP (TFP_{it}) is estimated by implementing the semi-parametric approach proposed by Levinsohn and Petrin (2003); this

methodology allows us to control for unobservables using intermediate inputs as proxies in order to solve the problem of simultaneity between productivity shock and input choices. Specifically, TFP is estimated as the residual of a two factor Cobb–Douglas production function, which – taking logarithms – can be expressed as follows:

$$lnY_{it} = \gamma + \alpha lnL_{it} + \beta lnK_{it} + \omega_{it} + \eta_{it} \quad (5)$$

where $i = 1,\ldots,582$ and $t = 2001,\ldots,2006$ and where Y_{it}, L_{it} and K_{it} represent, respectively, value added, labour input and capital input of firm i at time t; ω_{it} is a state variable which indicates the part of productivity that is known by the firm and η_{it} is a white noise component. Raw materials and consumption of services are included as proxy variable. TFP is included in regressions in logarithmic form as mean values over the two three-year periods. The balance sheet data used in the TFP estimation are deflated with the corresponding two-digit price indexes calculated using ISTAT (Italian National Institute of Statistics) data. According to the hypothesis of firm heterogeneity, we can hypothesize that TFP has a positive and significant effect on both firms' export probabilities and intensities.

Innovation. We analyze the relationship between innovation and export behavior by referring to an output measure of innovation, and in particular distinguishing between product and process innovation. In doing this, we follow recent empirical studies of the innovation-export relationship that investigate the role of innovation by looking at its output side, rather than at its inputs. In fact, following Sterlacchini (1999), R&D-based measures of innovation can be assumed to be inadequate and sometimes misleading in analyzing firms' export activities. It can be difficult to capture fully firms' R&D efforts, while investments in R&D may not lead to innovations. Further, some firms, in particular small ones, innovate without explicitly investing in R&D. We capture firm innovativeness by including two dummy variables referring, respectively, to the introduction of product ($PROD\_INN_{it}$) and process ($PROC\_INN_{it}$) innovations.[3] Each variable equals one if the firm has introduced product or

process innovations during the two three-year periods and zero otherwise. These variables are used as regressors both singularly and together: in fact, as shown in Table A.1 in the Appendix, the correlation between them is lower than 0.35.

International marketing strategy. A dummy variable is included in order to consider membership to export consortia (EX_CONS_{it}).Two internationalization-specific dummies are included to capture, respectively, if the firm has signed commercial agreements with foreign firms ($CAFF_{it}$) and if it has realized commercial investments abroad (this include operations such as sales outlets, sales through local traders, sales arrangements with firms belonging to the group and other promotional initiatives) (CIA_{it}) during the two three-year periods.

The regressions include three dummy variables to capture firm size (small – medium – large), four geographic dummies to capture the effects of belonging to macro-areas characterized by different levels of economic development and industrialization as well as four dummies corresponding to the four Pavitt sectors that capture firms' different technological regimes.Moreover, a set of dummies referring to the importing areas (Europe/North America/Australia –Asia and Latin America– Africa) has been included in the regressions to analyze whether different characteristics of the importing countries can influence firms' foreign market penetration degree (affecting the export intensity). Table 2 presents the descriptive statistics of the variables considered.

[Table 2 here]

4. EMPIRICAL RESULTS

The determinants of firms' export propensities and export intensities are analyzed separately. Table 3 reports the results of the random effects probit models estimated to evaluate the impact of experience, the introduction of product and/or process innovations and international marketing strategy on firms' export propensities.

[Table 3 here]

Looking at specification (1), estimated without including the innovation variables and international marketing strategy, we find a positive and statistically significant impact of the variable for firms' TFP on the export decision. This result also seems to be robust when the other variables are included in the regressions, thus confirming previous findings on the hypothesis of firm heterogeneity, namely that exporting firms outperform – in terms of productivity – domestic firms.

Age and foreign ownership are instead not significant concerning export propensity. On one hand, the negative output concerning age highlights that firms can internationalize even though they are young. On the other hand, the coefficients of the variables for belonging to business groups and foreign ownership are not statistically significant, although they are positive.From this point of view, it seems that no knowledge flows ‐ experience– within the international group can increase the firm's export propensity. A firm's decision to become an exporter may not be influenced by the advantages linked to a networking strategy as well as those arising from the internal presence of foreign decision-makers, but rather by firm-specific internal characteristics (productivity).Hence, our results partially confirm hypothesis H1awhile H2a is not supported.

Focusing now on the innovation-export relationship, it emerges that firms' decisions to export are positively influenced by the introduction of both product and process innovations. In fact, the coefficients of both innovation variables show positive signs and are statistically significant when analyzed separately: comparing specifications (2) and (3), it emerges that product innovations have a greater impact than process innovations on the probability of serving foreign markets. Moreover, looking at specification (4), it emerges that process innovation does not increase a firm's probability to become an exporter beyond that of

product innovation. Hence, the results confirm hypothesis H3a, namely that the introduction of product innovations has a greater impact on firms' decisions to export compared with the introduction of process innovations.

When considering the presence of an explicit international marketing strategy (specifications (5)– (8)), the results show a strong role for direct investment and collaboration with foreign partners and export propensity. Instead, belonging to export consortia has no effect. Hence, H4a (at least when foreign firms are involved) can be supported. When considering the whole model, our analysis shows that the main variables influencing export propensity are internal productivity, product innovation, commercial agreements with foreign firms and commercial foreign direct investment.

[Table 4 here]

Table 4 explores the determinants of export intensity. Concerning the role of experience in affecting export intensity, as in the previous case, only the TFP results are significant, while the other variables are not. It emerges that firm productivity positively influences the share of foreign sales: the coefficients of the TFP variable are positive and statistically significant in all specifications estimated, thus partially confirming hypothesis H1b (as far as the productivity is concerned), while H2b is not supported. As in the estimates aimed at analyzing the determinants of export propensity, the coefficients of firm age are negative and not significant, while those for belonging to a business group, membership to an export consortium and foreign ownership are positive but not significant. For the relationship between innovation and export intensity (specifications (2)–(4)), the results show that only the introduction of process innovations positively affects firms' export intensities, while the coefficients of the introduction of product innovations, although positive, are not statistically significant in all specifications estimated. Hence, hypothesis H3b is partially confirmed.

Forspecifications (5)–(8), the results show that the realization of commercial penetration operations abroad has a positive and statistically significant impact on export intensity (H5supported), while export intensity is not influenced by commercial agreements signed with foreign firms. H4b is thus not supported.The robustness of these results is confirmed also when accounting for the heterogeneity of the importing areas – see specification (9).

4.1 Discussion

Our analyses on the determinants of export behavior show interesting results. As far as export propensity is concerned, it emerges that the main drivers affecting the firm's decision to enter foreign markets are related to its internal productivity level, innovation capabilities in terms of product innovation as well as an explicit marketing strategy oriented to foreign markets (establishing collaborations with foreign firms or direct commercial investment abroad). Thus, experience can be interpreted as the capability of a firm to manage internal processes (managerial experience) efficiently (TFP) rather than in terms of knowledge cumulated through years of economic activities (captured through the age variable) or transferred from other partners or foreign ownership. In this respect, our results are different from other studies on export behavior and highlight that firms may act independently from other firms of the same group or that foreign owners do not influence a firm's decision to internationalize. On the contrary, our study stresses the role of product innovation as one of the driver for firm's decision to export. Interestingly, our analysis also highlights the relevance of commitment in setting and managing a pro-active international marketing strategy through both equity and non-equity forms.

When considering export intensity, two main elements arise from the analysis. The first one is that the shift from product to process innovations affects exports. This result can be explained by the firm's capability to efficiently change its internal processes to face the

demand arising from foreign clients. While the decision to enter new foreign markets is driven by new products or products that can be adapted to international needs, export intensity in our analysis is more influenced by process innovation. We have no information about which kind of process innovation has been carried out within the firm, but we could argue that this may be related not only to manufacturing processes (operations), but also to other organizational or marketing activities (i.e. customer relationship management).

The second important element refers to the remarkable role of direct commercial investment in influencing export intensity. This result confirms that the firm gains in terms of value captured by controlling directly its distribution channel. On one hand, these investments show the level of commitment of a firm to internationalize (clear international marketing strategy) and, on the other hand, they become the source for increasing the effective presence of the firm in foreign markets and the knowledge the firm can also obtain from them (in addition to direct sales). On the contrary, the development of commercial agreements with foreign firms can be seen as a strategy to explore new (and often unknown) foreign markets by reducing the risk of direct exposure at the international level, but not necessarily the driver of export-driven turnover over time (export intensity). Despite the attention to export consortia in the literature (such as in the case of Italy, when small firms are concerned) it is interesting to note that the firm belonging to export consortia is not significant for the analyses of both export propensity and intensity.

5. CONCLUSIONS

The present paper examines the drivers of both the export propensity and the export intensity of a firm by including in the framework different perspectives proposed in the literature on firm internationalization. We tested our hypotheses through an extended empirical analysis of Italian manufacturing firms in order to define whether experience,

innovation strategy and international marketing strategy affect a firm's export behavior, by adopting a panel methodology to analyze those drivers over time.

Our results show that the internal capabilities of a firm to efficiently manage internal processes (productivity) together with a proactive marketing strategy toward internationalization influence the decision to enter new foreign markets and to effectively obtain positive performances (export intensity). According to our study, there is no direct role of knowledge sharing within the group a firm may belong to or a positive influence of foreign ownership. Moreover, the firm does not address internationalization by collaborating with other firms at the domestic level (export consortia). On the contrary, a more effective factor affecting export behavior is collaborations with foreign firms that help the firm overcome the risks of internationalization. However, a hierarchical form of internationalization more positively affects the firm's capability to gain sales from foreign markets, than a collaborative form of internationalization does.

Our analysis attests to the role of managerial experience in influencing both the export attitude and the results of the firm, while firm age does not seem to be relevant in these processes. Moreover, experience (captured in terms of productivity) is related to innovation strategies, specifically to process innovation to sustain export intensity. While export propensity can be supported by the availability of a firm's new products that can be offered to new markets, our empirical research shows that, on the contrary, process innovation facilitates the firm's internationalization. This is also related to a clear strategic orientation toward internationalization, which affects export results. However, firms combine collaboration strategies and hierarchical solutions to address foreign markets, where the latter are more effective in terms of export intensity.

A main limitation of the study is related to the dataset used in the analysis and the difficulties in obtaining more detailed information about the export histories of firms and the

areas of internationalization due to the structure of the questionnaire used. Further research should be devoted to better explore the interrelation between experience and commitment to exporting in order to clarify whether cumulative experience or managerial and entrepreneurial intentionality are sources of export behavior. In addition, further attention should be paid to the different forms of process innovations in order to increase understanding of the implication of a firm's internationalization at the internal level of the organization.

ENDNOTES

1. The Survey of Manufacturing Firms is one of the largest firm-level databases available for Italy and it includes all Italian manufacturing firms with more than 500 employees while a stratified sample of manufacturing firms with a number of employees between 11 and 500. The representativeness of the smaller firms is guaranteed by a stratification procedure which consists in dividing the universe of firms in different strata in terms of gross product per employee, geographic area of location, size class and Pavitt taxonomy. The Neyman's formula, which allows to minimize the sample variance, is used to obtain the size and the composition of each stratum. Moreover, the effectiveness of the Unicredit-Capitalia dataset is confirmed by the large number of empirical researches on the performance and behavior of Italian manufacturing firms which have employed it. Therefore, the Survey of Manufacturing Firms can be considered representative of the whole population of Italian manufacturing firms with more than 10 employees.

2. We consider the presence of foreign owners with direct control on the firm and its strategic intent (i.e. internationalization). Foreign investors without decisional power tends to have a financial nature.

3. Product innovation consists in the introduction of at least a new or significantly improved product. Process innovation consists in the adoption of at least a new or significantly improved production process (Capitalia, 2002).

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Table 1: Sample distribution by size, Pavitt taxonomy and international involvement.

	Exporters						Domestic Firms						Total sample		
	2003			2006			2003			2006					
	a.v.	% (a)	% (b)	a.v.	% (a)	% (b)	a.v.	% (a)	% (b)	a.v.	% (a)	% (b)	a.v.	% (a)	% (b)
	Size (c)														
Small (<50)	144	76.19	30.06	127	67.20	28.16	45	23.81	43.69	62	32.80	47.33	189	100.00	32.47
Medium(50–249)	288	84.21	60.13	277	80.99	61.42	54	15.79	52.43	65	19.01	49.62	342	100.00	58.76
Large (>249)	47	92.16	9.81	47	92.16	10.42	4	7.84	3.88	4	7.84	3.05	51	100.00	8.76
Total Firms	479	82.30	100.00	451	77.49	100.00	103	17.70	100.00	131	22.51	100.00	582	100.00	100.00
	Pavitt taxonomy (d)														
SD	239	80.74	49.90	227	76.69	50.33	57	19.26	55.34	69	23.31	52.67	296	100.00	50.86
SI	66	68.75	13.78	59	61.46	13.08	30	31.25	29.13	37	38.54	28.24	96	100.00	16.49
SS	163	91.57	34.03	155	87.08	34.37	15	8.43	14.56	23	12.92	17.56	178	100.00	30.58
SB	11	91.67	2.30	10	83.33	2.22	1	8.33	0.97	2	16.67	1.53	12	100.00	2.06
Total Firms	479	82.30	100.00	451	77.49	100.00	103	17.70	100.00	131	22.51	100.00	582	100.00	100.00

Note: (a) Percentage values are expressed as raw totals; (b) percentage values are expressed as column totals. (c) Number of employees defining the category is given in parentheses. (d) SD denotes supplier-dominated firms, SI denotes scale-intensive firms, SS denotes specialized suppliers, SB denotes science-based firm

Table 2: Descriptive statistics of dependent and main explanatory variables.

Variable		Mean	Std. Dev.	Min.	Max.
EX_PROP_{it}	overall	0.799	0.401	0	1
	between		0.351	0	1
	within		0.195	0.299	1.299
EX_INT_{it}	overall	0.370	0.313	0	1
	between		0.296	0	1
	within		0.101	-0.130	0.870
TFP_{it} (log)	overall	3.092	0.365	1.524	6.156
	between		0.340	1.996	5.011
	within		0.133	1.946	4.237
AGE_{it} (log)	overall	3.310	0.669	0	5.447
	between		0.662	0.693	5.440
	within		0.098	2.617	4.004
$GROUP_{it}$	overall	0.298	0.458	0	1
	between		0.408	0	1
	within		0.208	-0.202	0.798
FOR_OWN_{it}	overall	0.056	0.230	0	1
	between		0.188	0	1
	within		0.133	-0.444	0.556
$PROD\_INN_{it}$	overall	0.527	0.500	0	1
	between		0.387	0	1
	within		0.316	0.027	1.027
$PROC\_INN_{it}$	overall	0.498	0.500	0	1
	between		0.372	0	1
	within		0.334	-0.002	0.998
EX_CONS_{it}	overall	0.010	0.101	0	1
	between		0.071	0	0.500
	within		0.072	-0.490	0.510
$CAFF_{it}$	overall	0.154	0.361	0	1
	between		0.270	0	1
	within		0.239	-0.346	0.654
CIA_{it}	overall	0.287	0.453	0	1
	between		0.341	0	1
	within		0.298	-0.213	0.787

Notes: No. of Observations = 1,164; No. of Groups = 582; No. of Time Periods = 2.

Table 3: Determinants of export propensity.

Dependent Variable = EX_PROP_{it}								
Estimation Method = Random Effects Probit								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
TFP_{it} (log)	0.590**	0.557**	0.580**	0.554*	0.505*	0.498*	0.512*	0.503*
	(0.283)	(0.281)	(0.286)	(0.283)	(0.291)	(0.288)	(0.292)	(0.288)
AGE_{it} (log)	-0.158	-0.137	-0.157	-0.140	-0.078	-0.067	-0.079	-0.070
	(0.170)	(0.161)	(0.167)	(0.161)	(0.158)	(0.155)	(0.159)	(0.156)
$GROUP_{it}$	0.012	0.011	0.019	0.015	-0.040	-0.033	-0.029	-0.028
	(0.216)	(0.212)	(0.216)	(0.213)	(0.213)	(0.211)	(0.213)	(0.211)
FOR_OWN_{it}	0.110	0.038	0.034	0.005	0.225	0.175	0.178	0.155
	(0.432)	(0.428)	(0.439)	(0.432)	(0.430)	(0.427)	(0.435)	(0.430)
$PROD\_INN_{it}$	…	0.503***	…	0.427**	…	0.352**	…	0.301*
		(0.161)		(0.171)		(0.165)		(0.176)
$PROC\_INN_{it}$	…	…	0.366**	0.223	…	…	0.250	0.149
			(0.159)	(0.166)			(0.162)	(0.170)
EX_CONS_{it}	…	…	…	…	0.279	0.243	0.309	0.265
					(0.922)	(0.917)	(0.912)	(0.912)
$CAFF_{it}$	…	…	…	…	1.422***	1.408***	1.417***	1.405***
					(0.409)	(0.405)	(0.411)	(0.407)
CIA_{it}	…	…	…	…	1.717***	1.634***	1.689***	1.629***
					(0.298)	(0.294)	(0.297)	(0.294)
Size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Locationdummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pavitt dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. Obs.	1164	1164	1164	1164	1,164	1,164	1,164	1,164
No. Groups	582	582	582	582	582	582	582	582
Log Likelihood	-482.215	-477.336	-479.527	-476.425	-441.691	-439.419	-440.486	-439.032
Wald $\chi 2$	42.681	50.229	46.265	51.407	64.263	67.778	65.166	68.020
Prob. > $\chi 2$	0.0001	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
ρ	0.757	0.740	0.755	0.740	0.716	0.705	0.716	0.706

Notes: * p<0.10; ** p<0.05; *** p<0.01. Standard errors are shown in parentheses. The regressions also include a constant term and a time dummy for the period 2004–2006. Coefficients and standard errors for Size, Location and Pavitt dummies are omitted, but are available from the authors upon request.

Table 4: Determinants of export intensity.

Dependent Variable = EX_INT_{it}									
Estimation Method = Fractional Logit (GEE)									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
TFP_{it} (log)	0.318**	0.317**	0.306**	0.306**	0.308**	0.307**	0.297**	0.297**	0.208*
	(0.125)	(0.124)	(0.123)	(0.123)	(0.122)	(0.121)	(0.121)	(0.121)	(0.109)
AGE_{it} (log)	-0.058	-0.059	-0.055	-0.055	-0.055	-0.055	-0.052	-0.053	-0.058
	(0.077)	(0.076)	(0.076)	(0.076)	(0.076)	(0.076)	(0.076)	(0.076)	(0.073)
$GROUP_{it}$	0.065	0.064	0.065	0.064	0.061	0.060	0.061	0.061	0.023
	(0.078)	(0.078)	(0.077)	(0.077)	(0.079)	(0.079)	(0.078)	(0.078)	(0.076)
FOR_OWN_{it}	0.074	0.067	0.045	0.045	0.092	0.087	0.066	0.065	0.149
	(0.108)	(0.107)	(0.107)	(0.107)	(0.108)	(0.108)	(0.107)	(0.107)	(0.115)
$PROD\_INN_{it}$	…	0.076	…	0.034	…	0.051	…	0.013	-0.054
		(0.053)		(0.056)		(0.053)		(0.056)	(0.059)
$PROC\_INN_{it}$	…	…	0.136**	0.125**	…	…	0.120**	0.116**	0.100*
			(0.054)	(0.056)			(0.054)	(0.056)	(0.054)
EX_CONS_{it}	…	…	…	…	0.220	0.222	0.237	0.237	0.086
					(0.193)	(0.195)	(0.190)	(0.191)	(0.186)
$CAFF_{it}$	…	…	…	…	0.024	0.024	0.021	0.021	0.025
					(0.070)	(0.070)	(0.070)	(0.069)	(0.077)
CIA_{it}	…	…	…	…	0.215***	0.208***	0.201***	0.200***	0.124*
					(0.066)	(0.065)	(0.066)	(0.065)	(0.064)
Size dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Location dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pavitt dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Importing Area dummies	...	...	...	...	...	...	...	...	Yes
No. Obs.	1,164	1,164	1,164	1,164	1,164	1,164	1,164	1,164	1,164
No. Groups	582	582	582	582	582	582	582	582	582
Wald χ^2	90.158	95.652	99.006	100.724	106.285	108.057	112.530	112.747	311.624
Prob. > χ^2	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: * p<0.10; ** p<0.05; *** p<0.01. Semi-robust standard errors are shown in parentheses (Stata® labels standard errors resulting from the estimation of a GEE model that requires the robust option "semi-robust" instead of "robust"). The regressions also include a constant term and a time dummy for the period 2004–2006. Coefficients and standard errors for Size, Location, Pavitt and Importing Area dummies are omitted, but are available from the authors upon request.

Appendix

Table A.1: Correlation matrix of main explanatory variables.

Variable		[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
TFP_{it} (log)	[1]	1								
AGE_{it} (log)	[2]	0.0292	1							
$GROUP_{it}$	[3]	0.2719	-0.0681	1						
FOR_OWN_{it}	[4]	0.0845	-0.0621	0.1687	1					
$PROD\_INN_{it}$	[5]	0.0745	0.0065	0.0687	0.0582	1				
$PROC\_INN_{it}$	[6]	0.0915	0.0357	0.0529	0.1093	0.3426	1			
EX_CONS_{it}	[7]	-0.0203	0.0157	-0.0107	-0.0248	0.0116	-0.0337	1		
$CAFF_{it}$	[8]	0.0545	-0.0738	0.0554	0.0415	0.0894	0.0801	0.0036	1	
CIA_{it}	[9]	0.0910	-0.0325	0.0558	-0.0054	0.1716	0.1199	0.0293	0.3350	1