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Export Status and SME Productivity: Learning-to-export versus learning-by-exporting

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Abstract
We examine the strategic (pre-) exporting choices of UK micro, small and medium enterprises (SMEs) and their links to productivity. This involves considering not only exporters and non-exporters, but also an intermediate category of export-capable firms. Such categorisations help to identify learning effects occurring in the pre- and post-export phases. Indeed, we find evidence of both learning-to-export and learning-by-exporting effects among SMEs, and that firms consciously select their export status based on current productivity performance. Innovation plays a key role, and its effect does not occur exclusively in the transition to exporting, but also in building up export capability. Product and process innovation have different effects on export capability and exporting, respectively. The effect of product innovation on productivity is negative at least in the short-term. Growth ambition and planned future innovation are key determinants of both export capability and exporting.

Keywords: SMEs, Exporting, Innovation, Learning-by-exporting, Learning-to-export

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1. Introduction

Exporting is the most common foreign market entry mode – and often the first stage of internationalisation – employed by small and medium-sized enterprises (SMEs), due to its relatively low risk, high degree of flexibility and low commitment of resources (Leonidou & Katsikeas, 1996). Exporting therefore offers SMEs the opportunity both to maximise profits from their existing products and services and identify new innovation opportunities (Love & Roper, 2015). SMEs make up 99% of all total private sector firms in the UK and they employ about 60% of all private sector employees (Barrett, Shahiduzzaman & Kowalkiewicz, 2018). For smaller firms within the SME population, however, exporting may pose particular challenges related to their lack of managerial or marketing resources, financial constraints or lack of export market knowledge (Kahiya, 2013). Smaller firms may also be discouraged from exporting where domestic market opportunities or growth are sufficiently large to satisfy their growth or profit objectives (Esteves & Rua, 2015). Uncertainty around currency fluctuations or future trading relationships may also lead smaller firms to focus on developing purely domestic market opportunities.

Despite the considerable body of evidence examining the factors distinguishing exporters from non-exporters (e.g. Morgan, Kaleka & Katsikeas, 2004), it has nevertheless proved difficult to determine the nature of the process that allows small firms to move from focusing on domestic markets to becoming export capable. Is developing export capability a random process over which non-exporting firms have little control? Or, is it the result of strategic pre-export activities such as improving productivity and service quality (Bustos, 2011; Eliasson, Hanson & Lindvert, 2012)?

It is well established in the empirical literature that exporters are consistently more productive than non-exporters (Wagner, 2007, 2012). This 'export premium' may come from a process by which higher productivity firms self-select into exporting, or by a process in which productivity rises as a result of knowledge and experience gained from exporting. While these two processes are not

mutually exclusive (Love & Mansury, 2009), there is obvious interest in which process is more significant, and in how these processes come about (Wu & Miranda, 2015). At least some of the uncertainty over these two effects is because empirical research typically distinguishes only between exporting and non-exporting firms, and does not separately identify firms which have taken steps to ready themselves for exporting but which have not yet become exporters. Indeed, there is a notable lack of research on firm behaviour in the pre-internationalisation stage (Tan, Brewer & Liesch, 2007; Martineau & Pastoriza, 2016). Exceptions are Wiedersheim-Paul, Welch & Olson (1978), and Cavusgil (1980), which provide theoretical argumentation as to why the pre-export phase should be considered part of firms' internationalisation strategy. Empirically, research defining and investigating firms' export readiness includes the work of Caughey & Chetty (1994), Tan, Brewer & Liesch (2007, 2018) and more recently Gerschewski, Scott-Kennel & Rose (2020). However, the focus of this – still under-developed – research stream is more concerned with the conceptualisation of firms' export readiness and the development of indices that incorporate various manager-specific and firm characteristics rather than the process through which firms' shift their interest from the domestic market to become export capable and eventually 'move' to exporting.

Specifically, there is a gap in our understanding about what happens during the pre-export phase. What are the steps non-exporting SMEs need to take, and the capabilities they need to develop, in order to become ready to enter (more competitive) export markets? In this paper we explore the difference between heterogeneous groups of non-exporting SMEs, differentiating those which are exclusively oriented towards domestic markets, from those which are export capable but not yet exporters. Based on this original distinction, we consider three research questions: (i) Whether firms self-select into an exporting mode prior to becoming exporters, i.e. whether the process of internationalisation starts in the pre-export phase where firms initiate their export strategy by improving their performance in anticipation of entering foreign markets; (ii) whether learning effects occur both at the pre-export (i.e. learning-to-export) phase and as a result of successfully transitioning to exporting ('learning-by-exporting'); and, (iii) the extent to which such learning effects are associated with prior strategic investments in innovation.

We therefore pay particular attention to the substantial group of export-capable firms which state that they have products or services suitable for exporting but have no (immediate) intention to export. We are able to differentiate these firms from both exporters and other non-exporters (who do not have products/services suitable for exporting) which we term 'domestically-focused firms' (DFFs). This enables us to test the proposition that that these alternative market positions – i.e. exporter, export capable, domestically focused – each represent strategic positions consciously adopted by firms based on their productivity levels. In turn, this permits us to examine both the existence and drivers of learning-by-exporting and learning-to-export effects on SMEs. Innovation plays a key role in our analysis, enabling firms to develop export-capable products and services, thus boosting productivity sufficiently to allow firms to compete effectively in export markets (Cassiman, Golovko & Martinez-Ros, 2010). We also examine the attributes and characteristics that can help to distinguish between firms which are ready to export (but have not yet done so) and firms which say that they are in no position to consider entering export markets.

Identifying 'export capable' firms which have not had the opportunity to learn *from* exporting, but through their investment in innovation and therefore in products and services potentially suitable for export, have built the capability *to* export, has several benefits. First, it allows us to separately identify the 'learning-to-export' effect from the 'learning-by-exporting' effect on productivity (Eliasson, Hanson & Lindvert, 2012). Clearly firms which are export capable but which do not export, may exhibit 'conscious' self-selection (i.e. learning-to-export), but will not have benefitted from any learning from previous exporting activity. We show that both effects occur and are demonstrable in different groups of firms. Second, we find that the effect of innovation does not occur exclusively in the move to exporting, but also in the lead up to export capability – an issue hitherto not explored. Third, we provide evidence that the effect of product innovation in the previous period on productivity can be negative (Bellone, Musso, Nesta & Quere, 2008). We also find that growth ambition is a key factor distinguishing export capable firms from other non-exporters.

Our empirical analysis is based on an unbalanced panel dataset of UK-based SMEs taken from the Longitudinal Small Business Survey (LSBS) for the period 2015-2017. We model simultaneously the determinants of firms' market position (i.e. whether they are exporting, export capable, or DFFs) and productivity. This allows us to identify both the (conscious) self-selection involved in the learning-to-export process and any learning-by-exporting effects. We also allow for the effect of strategically investing in innovation both on productivity and exporting (Cassiman, Golovko & Martinez-Ros 2010), and for the effects of other forms of planned investment activities. Section 2 of the paper outlines our conceptual framework and develops hypotheses. Section 3 provides an overview of our data and analytical approach, while Section 4 describes the main empirical results. Section 5 provides a summary and identifies key policy implications while Section 6 concludes.

2. Theory and hypotheses

2.1. Pre-export phase and conscious self-selection

While considerable research and policy attention has been paid to firms' internationalisation strategies and corresponding participation in global value chains, less research effort has focused on the period before firms commence exporting, i.e. the pre-export stage. Typically, in the export-related literature a broad non-exporters category bundles together firms who are able to export even if they do not engage in exporting, and firms not capable of initiating internationalisation activities. This leads to a misleading impression that non-exporting firms form a homogeneous group and creates potential measurement distortions when comparisons are made. Should non-exporting businesses decide to internationalise, their bounded rationality, in terms of market opportunities along with high uncertainty of how internal and external changes will affect their eventual export outcome, may lead to a gradual internationalisation process (Johanson & Valhne, 1977). Put differently, the internationalisation process starts not when businesses actually enter foreign markets but in the *pre-export stage* (Johanson & Wiedersheim-Paul, 1975; Welsh & Wiedersheim-Paul, 1980; Cavusgil, 1980). This is a crucial stage during which failure to export, or a withdrawal from export-related ambition, is most likely to occur (Welsh & Wiedersheim-Paul, 1980).

At any given pre-export stage firms may exhibit various degrees of export capability and choose to move forward with, postpone, or even abandon their exporting plans (Tan, Brewer & Liesch, 2007). This kind of choice depends on the extent to which non-exporting firms successfully adopt a pre-internationalisation strategy in order to overcome export related barriers and gradually build their export-related capabilities (Johanson & Wiedersheim-Paul 1975; Cavusgil, 1980; Morgan & Katsikeas, 1997; Alvarez & Lopez, 2005). Cavusgil (1980) introduced the I-model of internationalisation in which a pre-export phase is explicitly modelled as part of firms' internationalisation process; during the pre-export stage, firms discover external and internal stimuli which make the prospect of internationalisation attractive. Nonetheless, firms lack sufficient knowledge on 'how to enter foreign markets' (i.e. costs involved, anticipated barriers, and foreign competition). Thus, firms need to carefully plan their strategic pre-export activities such as improving product and service quality in anticipation of potential market entry (Bustos, 2011; Eliasson, Hanson & Lindvert, 2012).

The pre-export phase has also been studied through the prism of export readiness, i.e. "firms' preparedness and propensity to commence internationalization [activities]" (Tan, Brewer & Liesch, 2007:302). In this context, emphasis is placed on the decision-making process during the pre-export phase where managerial attitudes, ambition, strategy and resistance to change (Tan, Brewer & Liesch, 2007; 2018) rule pre-exporting behaviour and commitment, especially with regards to SMEs (Martineau & Pastoriza, 2016). Here, our concern is principally with the actions taken by the firm in the pre-export phase rather than with the previous experience or orientations of the firm's principals: we therefore concentrate on the firm's actions and planning in anticipation of possible future exporting. The outcome of this decision-making process in the pre-export phase is bound to be reflected in firm performance subsequently. This in turn suggests that non-exporting firms are heterogeneous in terms of their managerial ability to form long-term internationalisation goals and strategies and accordingly adjust their production processes (Tan, Brewer & Liesch, 2018; Gerschewski, Scott-Kennel & Rose, 2020). Put differently, at any given time, non-exporting firms' productivity levels may be associated with their export readiness status. For example, there is

evidence that some non-exporting firms consciously make a strategic decision not to export, but still achieve high productivity (Gkypali & Tsekouras, 2015).

Boosting productivity levels may be an important driver not just for exporting firms but also for non-exporting firms[1]. Non-exporting firms may be preparing to compete both in the domestic market with already exporting firms but also with competitors in foreign markets (Gerschewski, Scott-Kennel & Rose, 2020). According to international trade models of heterogeneous firms (Melitz, 2003; Greenaway & Kneller, 2007), only firms above the export productivity level (a sort of "export threshold") sell both domestically and abroad. This in turn implies that the process of gearing up to exporting requires firms to be productive; but in order to export firms need to become even more productive. Put differently, firms in the pre-export phase need to invest in boosting their productivity levels so as to enter foreign markets. If productivity gains are high enough, firms will 'cross' the productivity threshold and start exporting (Lileeva & Trefler, 2010). On the contrary, if investing in boosting productivity does not yield the desired outcomes, firms will need to focus their efforts solely at the domestic market. Firms which are already exporting and have successfully overcome the entry costs of foreign markets, may invest in improving productivity to further secure their exporting position. As Bellone, Musso, Nesta & Quere (2008, p. 640) argue "firm performance before entry is endogenous to the decision to export. According to this view, the firm's decision to start exporting is more than simply deciding to seize a new sales opportunity for a specific up-front cost. Rather, the export decision [….] is at the heart of its ability to expand and survive in the long run". This leads us to our first hypothesis:

Hypothesis 1: Export readiness and Productivity
H1: Firms self- select into a (pre-) exporting status based on their current productivity levels.

2.2. Learning-to-export and Learning-by-exporting

[1] There is ample theoretical and empirical evidence on how and why exporters are more productive than non-exporters, but this discussion goes beyond the scope of this paper which is to establish how improved productivity is reflected in the gradual gearing up to exporting. Indicatively see Wagner (2007) for a detailed literature review

It may be the case that a continuous strategic learning process is present across the pre-export and the actual export phase with different learning outcomes[2]. The early work of Wiedersheim-Paul, Welch & Olson (1978) which placed emphasis on small firms' pre-export or pre-internationalisation behaviour, and specifically on a pre-export learning process, argued that firms increase their knowledge of export markets, their understanding of market requirements and of the practical barriers to exporting. Following this argument, Liesch & Knight (1999) then highlight the importance of the availability and accessibility to relevant information during SMEs' internationalisation process. Eaton, Eslava, Krizan, Kugler & Tybout (2008) also suggest a pre-export learning phase where firms go through a 'search and learning' process where they are uncertain about product appeal (though they gain information through research and observing rival firms' behaviour) until they export to a given market. Therefore, access to richer information facilitates better decision making, while the composition and capability of firms' leadership teams may strongly influence the value of such information (Costa, Soares & Sousa, 2016; Tan, Brewer & Liesch, 2007). Pre-export learning has been linked to entrepreneurial orientation (Kollmann & Christofor, 2014), the international orientation of the entrepreneur (Wiedersheim-Paul, Welch & Olson, 1978), business leaders' proficiency in foreign languages (Cannone & Ughetto, 2014), and existing and prospective networks (Castellacci, 2014; Costa, Soares & Sousa, 2016). Pre-export learning may also lead to a perceived reduction in the barriers to exporting (Suarez-Ortega, 2003) and encourage export-oriented investments in products/services or other capabilities (Peluffo, 2016) with the potential for positive productivity gains.

Furthermore, Bustos (2011), extends the Melitz[3] (2003) model to allow for the possibility that firms invest in inputs both to upgrade their technology and to reduce the marginal cost of production and thus, be able to overcome export entry barriers. Alvarez & Lopez (2005) and Lopez (2009) both find evidence from Chilean manufacturing plants that an increase in investment (before export entry) raises the subsequent probability of exporting. They argue that pre-export boosts in productivity – via investments in tangible and intangible assets – are the result of firms' strategic intent to become

[2] We owe this comment to an anonymous referee.
[3]According to the Melitz (2003) model of new "new international trade", potential exporters must be sufficiently productive to overcome the entry costs of foreign markets

exporters. In other words, learning (innovation) investments during the pre-export phase may be reflected in improved productivity subsequently. Alvarez & Lopez (2005) proposed a learning-to-export mechanism: learning-to-export effects arise where firms strategically invest in the development of enhanced products or services and/or delivery capabilities to generate positive productivity effects before entering export markets (Eliasson, Hanson & Lindvert, 2012). The learning involved in this process will be of a different kind to that acquired from international markets: by definition it cannot be experiential learning[4], For example, adapting new technologies may require some learning and mastery (Lopez 2009), and some *ex ante* learning about new markets is a natural precursor to foreign entry.

This preemptive strategy may help firms to offset the anticipated costs of export market entry (i.e. market research, setting up new distribution networks, negotiating with potential new partners), but may also help them to counter the increased competition in export markets (Alvarez & Lopez, 2005). In a study of 14,000 manufacturing SMEs from Sweden over the period 1997 to 2006, Eliasson, Hanson & Lindvert (2012) find evidence that small firms' probability of exporting is related to prior productivity, and that export-entrants increase productivity relative to other firms shortly before entering export markets, possibly via higher investment in physical capital. The importance of this learning-to-export effect lies in that it is more productive firms which enter export markets rather than exporting itself which is increasing productivity (Wagner, 2007; 2012).

Once a firm starts exporting it may run into challenges that could also affect its productivity levels. More specifically, exporting firms compete in markets where they are met with different customer attitudes and preferences from those in the domestic market, cultural and institutional distance, differences in exchange rates, and global/regional economic uncertainty. In order to respond to these issues, firms establish new mechanisms and routines that are put in place to support the exporting process (D'Angelo, Ganotakis & Love, 2020). In this way firms can effectively manage market-

[4] For this reason some writers prefer to use the terminology 'conscious self selection' (Alvarez, & Lopez, (2005); Bellone, Musso, Nesta & Quere (2008). 'Learning to export' has nevertheless come to be the standard terminology in the literature, as a counterpoint to 'learning by exporting'

related and technology-related external knowledge flows, both of which can help improve future performance (Love & Ganotakis, 2013; Salomon & Shaver, 2005). Thus, learning-by-exporting should result in superior post-entry productivity performance of exporters compared to non-exporters. Evidence of learning-by-exporting effects – a positive link between exporting and subsequent productivity growth – come from Baldwin & Gu (2004), Van Biesebroeck (2005), Aw, Roberts & Winston (2007) and Love & Mansury (2009). However, other studies find no evidence of such effects (Bernard & Jensen, 1995; 1999; 2004; Castellani, 2002; Greenaway, Gullstrand & Kneller, 2005; Arnold & Hussinger, 2005). It is perhaps not surprising that the empirical literature on learning-by-exporting effects suggests ambiguous results: exporting is only one factor in productivity gains, and one that is often difficult to differentiate from other factors, even in a dynamic setting. For example, there may be accompanying changes in firm ownership or changes in attitude towards the risks of internationalisation, and so any productivity gains may be the result of changes in management or strategy rather than learning-by-exporting per se (Silva, Afonso & Africano, 2012). Or, it may be that since the productivity gains of exporters are always relative to non-exporters' productivity performance, not distinguishing between firms at the pre-export phase and those solely focused in the domestic market (DFFs) may obscure the effects of learning-by-exporting on productivity.

Efforts to improve productivity levels may thus be present both in the pre-export and exporting phase. Nonetheless, while firms at the pre-export phase may direct their efforts to boost productivity towards becoming exporters, exporting firms have a different orientation, that is to maintain their exporting position and perhaps further expand their operations. Thus, a firm's export readiness, i.e. how ready is a firm to take up exporting activities, should reflect *temporal* differences in terms of productivity levels (e.g. Bernard & Jensen, 1999;2004; Melitz, 2003). For example, Girma, Greenaway & Kneller (2004) using a large panel sample of UK manufacturing firms provided empirical evidence that productivity boosts occur not only before export entry, but also that exporting activities further increase firms' productivity. They argue that pre-export productivity boosts occur because of firms' efforts to overcome sunk costs of export entry, but post-export productivity boosts are associated with

learning from different technological country/sectoral frontiers. Based on the above we formulate the following hypotheses:

Hypothesis 2a: Learning-to-export (LTE)
H2a: Export capable firms in period t-1 improve their productivity levels in period t.
Hypothesis 2b Learning-by-exporting (LBE)
H2b: Exporting firms in period t-1 improve their productivity levels in period t.

2.3. Strategic investment in innovation

The awareness of export opportunities generates the intention to export that eventually leads firms to determine whether and how much of their resources to invest in developing and acquiring new export-related knowledge and capabilities (Reid, 1981). To this end, strategic investment in innovation allows the gradual accumulation of new knowledge and capabilities that direct firms' foreign commitment decisions. Research on the nature of pre-export investment has sparked an interest in the role of innovation in the process of becoming export ready and productivity improvement. For example, the analysis of Alvarez & Lopez (2005) and Lopez (2009) both indicate that investment activity precedes and encourages export entry, while Peluffo (2016) finds that investment in capital expenditure and R&D precede exports "which indicates the firm is making a deliberate active effort to break into foreign markets and built-in capacity". The key issue here is that while such investments may be taken in anticipation of entry into exporting, not all firms which undertake such investments will eventually become exporters: the role of such investments is to increase firms' export capability. Therefore, firms may have specific strategic intentions to invest further in capacity-building activities in the process of becoming more 'export ready'.

Traditionally, the implied (positive) link runs from R&D/innovation to exporting, and a recent review of the literature indicates that there is indeed a substantial body of literature pointing to a positive relationship of this type (Love & Roper, 2015). Nonetheless, the importance of innovation during firms' gradual transition to export capability and productivity remains under-explored (Tan, Brewer & Liesch, 2007). Specifically, in the presence of potential export opportunities, firms may recognise the

necessity to have unique and superior advantages in terms of product quality, or cost efficiency, or both at an international scale (Becker & Egger, 2013; Lopez-Rodríguez & García-Rodríguez, 2005).

The process of becoming export capable requires firms to modify and adapt their production processes, abandon established organisational practices, learn new forms of organisation and production methods (Baum, Schwens & Kabst, 2015). In this context, it is reasonable to assume that the adoption of new process innovations would make firms more 'export capable' in terms of their ability to deliver competitive advantages (Daniels & Robles, 1987). Moreover, through process innovation(s) smaller firms can become more productive by decreasing unit costs of production and/or delivery, and are thus, able to attain the minimum efficiency level needed to compete internationally (van Beveren & Vandenbussche, 2010).

In the face of expanding market size and customer base, firms may also need to improve or upgrade the quality of their products to match the differentiated demands of both domestic and foreign customers. Investing in product innovation would create a competitive advantage based on product differentiation which, inter alia, allows innovative firms to overcome foreign competition and strengthen their foreign presence (Tavassoli, 2018). Cassiman & Golovko (2011) point out that innovation may have two rather different effects on the likelihood of exporting, one direct and the other indirect, via productivity. The direct effect arises as firms seek new markets for new products, both because innovative products may provide the potential entry point to hitherto untapped markets, and because selling in new markets allows the firm to spread the costs of R&D and innovation costs over a larger sales volume. Firms that innovate are therefore also more likely to export, both because of the benefits of product or service upgrading, and because of the cost advantage which allow them to set lower selling prices (Ganotakis & Love, 2011).

Perhaps of more interest is the potential effect of innovation on productivity, in which innovation is a strategic investment aimed at (conscious) self-selection into export markets. As Mohnen & Hall, (2013) suggest, putting a new product on the market creates a new source of demand, which can give rise to scale economies in its production or to improved productivity. In this context, Cassiman,

Golovko & Martinez-Ros (2010) point out that productivity boosts and export commitment are more likely to be linked to product than to process innovation. Using data on a sample of Spanish SMEs, they conclude that the strong positive association between exporting and productivity is largely moderated through (product) innovation. Nonetheless, introducing new products may impact established product lines leading to an ambiguous effect on firm productivity. On one hand selling both new and established products in parallel may lead to economies of scale in the distribution of goods. More negatively, new products may have a crowding out effect, reducing sales of more established product lines and reducing their profitability. Crucially, however, we argue that innovation helps firms (i) become export capable before exporting, and (ii) assists in ensuring that export capable firms go on to become exporters. Based on the above we formulate the following hypotheses:

Hypothesis 3: Strategic Investment in Innovation

H3a: Past introduction of product innovations positively influences both productivity and firms' (pre-) exporting status.
H3b: Past introduction of process innovations positively influences both productivity and firms' (pre-) exporting status.

{Insert Figure 1 around here}

Figure 1 illustrates our theoretical model, which incorporates the above insights on export capability. The key point is that our model differentiates between exporting firms and those which are export capable but not yet exporting, thus preventing non-exporters being considered as a homogeneous group and shedding new light on the process of becoming an exporter. More specifically, we argue that firms consciously self-select to an exporting status (H1), i.e. domestically focused firms (DFFs), are distinguished from export capable firms and of course exporters, based on their current productivity levels.

Furthermore, based on firms' firm (pre-) export status, potential learning-to-export (H2a) and learning-by-exporting (H2b) effects are identified on productivity. In common with most studies in

the area, we adopt an indirect approach to the link between exporting and learning. "If exporting affects learning, learning then affects subsequent productivity, it would be valuable to test this directly using data on exporting, learning, and productivity growth. Since the LBE effect is not directly measurable, all studies are forced to study the relation between exports and subsequent productivity" (Segarra-Blasco, Teruel & Cattaruzzo, 2020, p. 2). Finally, past product and/or process innovation shapes firms' internationalisation strategy by influencing both current productivity levels and export status (H3a and H3b).

3. Data and Methods

3.1 The Longitudinal Small Business Survey

Our data are taken from the UK Longitudinal Small Business Survey (LSBS) and cover the three-year period 2015 to 2017. The LSBS is an official UK government survey, commissioned by the Department for Business, Energy and Industrial Strategy (BEIS), and is the largest small business survey undertaken in the UK. The survey for all three waves was conducted using Computer Assistance Telephone Interviews (CATI) between July 2015 and January 2016 (1st wave), August 2016 and January 2017 (2nd wave) and August 2017 and January 2018 (3rd wave) by BMG Research Ltd, reaching a response rate of over 56% for all repeated waves. All interviews were conducted with owner/proprietors, Managing Directors or other senior directors in UK-based enterprises. In order to derive a sampling frame stratified by firm size (in terms of number of employees), region and industry sector, two sources were used: for registered businesses, the Inter-Departmental Business Register (IDBR) was used and this was augmented from Dun & Bradstreet's database for unregistered businesses with zero employees[5]. We focus here on the sample of 4,165 SMEs which responded to all three waves of the UK LSBS and form a balanced panel of 12,495 observations.

[5] Dun & Bradstreet contacts were screened out whether firms either had employees on their payroll or paid VAT, as these would have duplicated contacts found within the IDBR.

The structure of the LSBS questionnaire allows us to go beyond the normal distinction between exporters and non-exporters, and assign non-exporters to distinct groups based on their export capability. This was done in two stages: first, firms were assigned to the group of exporters or non-exporters; non-exporting firms were subsequently asked whether they had any products or services suitable for exporting. If they responded positively, they were considered 'export-capable'[6]. A negative response placed a firm in the group of domestically focused firms (DFFs). The LSBS does not provide specific indicators related to the central owner/manager which have been considered an important aspect of the pre-export model (Wiedersheim-Paul, Welch & Olson, 1978; Ganotakis & Love, 2012). Instead, the assignment to a non-exporters group is based on the assessment of the firm's product portfolio which reflects key strategic management decisions related to the outcome of combining all available resources to invest in product diversification and innovation in order to get the greatest possible rewards (Kang & Montoya, 2014). The sample comprises 25.6% exporters, 10.5% export-capable firms, and 63.9% domestically-focused firms (DFFs).

In addition to data on firms' export status the LSBS aims at providing crucial information to a wide range of stakeholders and thus, covers a wide spectrum of business operations. Specifically, it provides detailed information on the characteristics of SMEs such as the number of sites they occupy, the number of owners, whether they have separate business premises, etc.; the characteristics of UK SMEs owners and leaders; employment and turnover growth and expectations, major obstacles that prevent SMEs fulfilling their potential, business capabilities (in terms of innovation, training of employees, etc.), access to finance, business support and firms' strategic ambitions[7]. Table 1 and Table I in the Appendix section include more detailed variables definitions and basic descriptive statistics of the variables employed in the empirical estimations, as well as a snapshot of the actual questions contained in the LSBS questionnaire of the variables employed in the empirical estimation.

[6] The LSBS survey also includes a question on plans to start exporting/ licensing outside the UK in the next 12 months. While information about another pre-export phase would shed more light in the pre-export phase heterogeneity, unfortunately the response rate for the three year period is very low and with very low variability which in turn created serious estimation issues. Thus, this pre-export status is excluded rather than merged with export capable firms.

[7] Full details of the LSBS questionnaire and panel structure can be found at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/720346/LSBS_2017_technical_report.pdf

3.2. Empirical model

With the adopted model we depart from the standard exporters vs. non-exporters distinction and we focus on further differentiating firms which are export capable but not yet exporting and firms' which are solely focused on the domestic market. The identification of export capable and DFFs within the group of non-exporting firms allows us to explore whether firms' consciously prepare to enter foreign markets by improving their productivity levels. Empirically, our aim is to model the determinants of the three identified exporting states (Figure 1), while allowing for the endogeneity of productivity and the corresponding effects of innovation: this in turn permits a nuanced understanding of the process of conscious self-selection towards exporting and associated learning, effects which are generally confounded when the pre-export phase cannot be explicitly modelled.

Therefore, we estimate a system of two equations which focus on: i) Whether productivity and firms' (pre-) export status (i.e. whether they are an exporter, are 'export capable' or a DFF) are endogenously related as the conscious self-selection process dictates; ii) identifying potential learning to/by exporting effects through the relationship of firms' past exporting status and productivity levels; and, iii) the role of innovation as a strategic investment aimed at strengthening firms' export strategy and productivity performance. Specifically, for the first equation aimed at modelling firms' export status, we construct a multinomial categorical variable that takes the value of zero (0) for firms belonging to the DFF group, the value of one (1) for firms assigned to the export capable group, and two (2) for firms engaged in exporting activities. Prior innovation activity is approximated by two binary variables indicating whether firms have introduced a product (PRODIN) or process (PROCIN) innovation in the previous three years. We model the multivariate probit equation as follows,

$$EXPSTATUS_{mt} = a_0 + a_1 PRODIN_{mt-1} + a_2 PROCIN_{mt-1} + \boldsymbol{a_m X_{mt-1}} + \varepsilon_{mt} \quad (1a)$$

where m = DFF status (0), export capable status (1) and, export status (2); ε_m are the error terms distributed as multivariate normal, each with a mean of zero and $t = 1, \ldots . T$ is a time indicator

capturing the three-year panel structure of the data. Eq. (1a) has a structure similar to that of a seemingly unrelated regression (SUR) model, except that the dependent variables are binary indicators, i.e. the specified equation is expanded to a group with one 'status' equation for each possible state. All equations to be estimated include the same set of regressors, except for the first which corresponds to the lowest value of $EXPSTATUS_{mt}$ (i.e. DFF), and is taken as the base alternative. Moreover, each export status is independent and mutually exclusive from the alternative states, and thus no correlation is allowed between the error terms of different statuses. We then model productivity (PRODUCTIVITY) using as a dependent variable the firms' labour productivity, approximated by turnover per employee, and the following equation,

$$PRODUCTIVITY_t = \beta_0 + \beta_1 EXPSTATUS_{t-1} + \beta_2 PRODIN_{t-1} + \beta_3 PROCIN_{t-1} + \boldsymbol{\beta_z X_{zt-1}} + \varepsilon_{prod} \quad (1b)$$

$\boldsymbol{a_m X_{mt-1}}$ in equation (1a) and $\boldsymbol{\beta_k X_{k,t-1}}$ in equation (1b) are firm specific and time invariant controls, while ε_{prod} is the random error assumed to be independently and identically distributed following a multivariate normal distribution with unitary variance.

We estimate $EXPSTATUS_{mt}$ and $PRODUCTIVITY_t$ jointly in order to capture the covariance between them: indeed, this is essential to testing Hypothesis 1. In this vein, we allow the error term of Eq. (1b) to be correlated with the error terms of the different export statuses in Eq. (1a) but no correlation is allowed among export statuses, as they are mutually exclusive. The error terms are assumed to follow a multivariate normal distribution with Covariance matrix $\boldsymbol{\Sigma_3}$

$$(\varepsilon_{export\ capable},\ \varepsilon_{export}, \varepsilon_{prod}) \sim MN(0, \Sigma_3)$$

where, the dimension of the Multivariate Normal distribution is: 3 (the number of multinomial alternatives for each export status) -1 (for normalization purposes) + 1 (error term of the continuous regression), and $\tilde{\varepsilon}_j = \varepsilon_j - \varepsilon_{dff}$, $(j = expcap,\ exp,\ prod)$. Normalization is necessary because in

discrete choice models the level and the scale of utility are irrelevant. In this case, normalization is achieved through the base status of domestically focused firms (DFFs).

Our assertion is that previous export status influences current levels of productivity levels through learning-to-exporting and learning-by-exporting effects (Alvarez & Lopez, 2005; Eliasson, Hanson & Lindvert, 2012). In the same direction, we introduce a one-period time lag of innovation activities to better reflect the potential results from strategic investment in innovation as there may be a delayed manifestation of the effect of innovation not only on firms' productivity levels (Máñez-Castillejo, Rochina-Barrachina & Sanchis-Llopis, 2009) but also on firms' (pre-) export status as innovation is a means to compete internationally (Chetty & Campbell-Hunt, 2003). We estimate the model using the CMP module in Stata 16[8] but as there is no explicit routine to estimate multivariate panel probit fixed effects, we introduced fixed effects in estimating equations (1a) and (1b) through the inclusion of sectoral, regional and time dummies, as well as through the clustering of errors due to the non-independence of observations within the same firm capturing at least part of any unobserved heterogeneity.

In sum, H1 is based on whether the correlation coefficients of the error terms between the export status equation (i.e. multinomial probit) and productivity are statistically significant, i.e. H1: $\left(\left(Cov\left(\varepsilon_{export\ capable}, \varepsilon_{export}, \varepsilon_{prod}\right) \neq 0\right)\right.$. Hypotheses H2a and H2b are based on the statistical significance of effect of the previous year export status on current productivity performance i.e. H2a: $(b_{expcapable_{t-1}} > 0)$ and H2b: $(b_{exporters_{t-1}} > 0)$. Finally, H3 is based on the statistical significance of effect of the previous year product and process innovation on current export status and productivity, respectively, i.e. H3: $a_1, a_2 \neq 0$ and $\beta_2, \beta_3 \neq 0$.

[8] CMP is specifically designed to estimate such mixed models by computing the corresponding mixed likelihood functions. For a more detailed presentation on the computation of the likelihood function for such a mixed model see Roodman (2011; p. 172-176).

3.3. Control Variables

In addition to the lagged effects of innovation indicators, we apply a one-year lag to all control variables in both equations to avoid potential endogeneity. Given data availability and the lack of indicators focused on the central owner/manager, the selection of the rest of the control variables, for both equations, serves the purpose of strengthening our theoretical and empirical setting. More specifically, we have argued that firms consciously anticipate their transition towards exporting, or staying in domestic market, and thus, they become goal-oriented implementing their strategic planning (Li & Jones, 2015).

In the export status equation (1a) we control for firm size, age, sector and location[9] but we also include a dummy variable capturing firms' profitability (Gkypali & Tsekouras, 2015) and whether they are family owned (López-Fernández, Serrano-Bedia & Pérez-Pérez, 2016; Fernandez & Nieto, 2006). In addition, we incorporate variables capturing firms' growth ambition and strategic planning intentions reflecting arguments made in the small business internationalisation literature (Johanson & Wiedersheim-Paul, 1975; Alvarez & Lopez, 2005). Specifically, we include firms' three-year sales growth expectations as well as firms' intentions to develop the skills of their workforce, product and organisation innovation and fixed capital in the next three-year period[10].

In the productivity equation (1b), we allow for the possibility that other effects may also affect productivity. Besides controlling for firm size, age, sector and location we follow De Loecker, (2013) and account for the simultaneous effect of physical investments or human requirements on productivity dynamics. We allow for this explicitly by including planned investments in skills and capital in our estimations, so that we are more confident that we are catching the productivity effects of learning-to-export and learning-by-exporting. Furthermore, to capture the effect of firms' business

[9] Due to space limitations descriptive statistics for industry and location dummies are not presented here but are available upon request.

[10] The LSBS survey includes information on whether exports are to the EU or non-EU countries. Although this could be important information in our research context unfortunately it is not available for the three-year period used to conduct empirical estimations.

capabilities on productivity levels we employ a dummy variable capturing whether SMEs maintain a business plan. We also control for whether firms are multi-site or single site businesses and whether they offered employees on-site and/or off-site training. Basic descriptive statistics along with variables definitions are shown in Table 1 and correlation coefficients in Table 2.

4. Results

The first issue is whether there is evidence that firms consciously self-select into an exporting status based on their current productivity levels (H1). Statistically, this is demonstrated by the joint determination of productivity and firms' export status. Empirical results indicate clear support for our first hypothesis. Specifically, Table 3 (bottom panel) shows that correlation coefficients of the error terms between (i) being export capable and the productivity ($\rho_{expcap,prod}$) equations, and (ii) exporting status and the productivity ($\rho_{export,prod}$) equations are statistically significant (ρ-values of 0.081 and 0.155 respectively), thus confirming the inextricable relationship between firms' productivity and (pre-) internationalisation strategy. This finding suggests that both export capable and exporting firms consciously begin and sustain their internationalisation path by adjusting their productivity levels so as to include in their production processes anticipated fixed entry costs and knowledge flows related to future and current export markets (Gerschewski, Scott-Kennel & Rose, 2020).

This process of consciously self-selecting into a (pre-)export state becomes more evident if we consider the effect of past learning effects on productivity through firms' previous export status (H2a, H2b) and strategic investments in innovation (H3). More specifically, according to estimation results presented in column [3] of Table 3 there is a statistically significant and positive effect of past export status on firms' productivity: being export capable in one year leads to higher productivity in the next year, while exporters also improve their productivity in subsequent years. Since the adopted estimation strategy includes lagged control variables and allows for the endogeneity of productivity, it seems unlikely that these results are mere correlations. Based on these findings we argue that learning

is a continuous process occurring at both at the pre-export and actual export period. Export capable firms are not (yet) exporters, and so this is by nature a learning-to-export effect rather than learning from exporting. Note that there is also evidence of learning-by-exporting: exporters in one period have higher productivity in the next. The relative size of the coefficients involved suggest that learning-by-exporting effects on productivity are substantially larger than those of learning-to-export.

To understand more fully the nature of any self-selection and learning effects related to the pre- and actual export phase, we consider the effect of product and process innovation on export capability and exporting, respectively. Estimation results of the marginal effects of the past introduction of product and process innovation on the probability a firm falls either in the 'export capable' status or the export status are presented in Table 4. As suggested by Cassiman & Golovko (2011), product innovation has a positive and statistically significant effect on being an exporter, thus strengthening the learning-by-exporting effect. However, it is process innovation that encourages export capability – product innovation has no effect, i.e. the effect of learning-to-exporting comes from introducing innovative features in the firm's production processes. This suggests that the effect of process innovation occurs earlier in the exporting process than hitherto recognised, affecting not exporting *per se* but rather the move towards becoming export capable. Firms' in the pre-export phase seem to place more emphasis in implementing cost-reducing strategic investments while exporting firms, that have crossed the export threshold, are able to focus more on product proliferation and/or diversification. In other words, during the pre-export phase firms direct their learning objectives towards overcoming export related barriers and gradually build their export-related capabilities (Morgan & Katsikeas, 1997; Kahiya, 2013).

Selling in new markets allows the firm to spread the costs of R&D and innovation costs over a larger sales volume. The productivity estimates (Column [3], Table 3) indicate that lagged product innovation has a negative effect on the productivity of both export-capable firms and exporters. This effect, noted before by Bellone, Musso, Nesta & Quere (2008), has been attributable to the short-term disruption effect of product innovation (Roper, Du & Love, 2008). Process innovation has no significant effect on productivity. In short, we find no positive effect from any kind of innovation on

productivity, suggesting that, for this sample of UK SMEs, while learning-to-export effects do occur they are not the result of productivity-enhancing innovation.

What other factors prove important in shaping firms' export status? Having ambitious plans for sales growth is a positive determinant of becoming export capable (Table 4). However, this factor is also an important determinant of becoming an exporter, suggesting that while growth ambitions differentiate both types of SMEs from DFFs, they do little to distinguish export-capable firms from those actually engaged in exporting. Specifically, there is no difference in growth ambition between exporters and export-capable firms, suggesting this is an attribute that distinguishes those firms which simply have no capacity or desire to export from those which at least have suitable products to do so. Moreover, planning to invest in future product innovation is important only for exporting firms suggesting that learning-by-exporting flows provide stimuli and potential to invest in new market/technology segments.

The inter-firm heterogeneity which determines the differences between export-capable firms and exporters are not so much related to growth, but more structural factors such as age, size and whether or not the firm is a family business (Table 4). Exporters are more likely to be larger and younger than all non-exporters (Love & Roper, 2015). Intriguingly, export-capable firms are more likely to be family-owned businesses than either exporters or DFFs. This is consistent with recent evidence on Australian family firms which suggested that family-owned firms may seek to build long-term competitive advantage but then see expansion in the domestic market as a strategic and less risky alternative than exporting (Alonso & O' Brien, 2017). Finally, and perhaps surprisingly, DFFs are no less profitable than either of the other groups. Coupled with their relative lack of productivity, this suggests that many firms in this category occupy a relatively comfortable position in their domestic market, remaining profitable without being unduly productive, and with little ambition to change this situation.

5. Discussion

Our ability to separately identify export-capable and domestically-focused firms provides new insight into firms' internationalisation strategies and the nature of learning-to-export and learning-by-exporting effects. More specifically, we provide evidence of a conscious path towards internationalisation which begins before firms enter a new foreign market. Both learning effects prove important in helping to explain why exporters are more productive than both categories of non-exporters, and why export-capable firms are more productive than firms which are in no position to contemplate exporting. The research has implications both for theory and public policy.

5.1. Theoretical contributions

There are four implications for theory. First, the findings suggest that less attention should be paid simply to the dichotomy between exporters and non-exporters, and more to the process of becoming 'export ready' in preparation for exporting. This is reflected in the early literature on pre-internationalisation behaviour and 'export readiness' (Bilkey and& Tesar, 1977; Cavusgil, 1980; Reid, 1981), and a more recent literature which examines in detail the nature of pre-exporting behaviour and commitment, especially with regards to SMEs (Tan, Brewer & Liesch, 2018; Martineau and & Pastoriza 2016; Gerschewski,; Scott-Kennel & Rose, 2020). However, the role of productivity, and productivity-enhancing investments, has been little researched in this area. We find that it is export capable firms which exhibit learning-to-export effects, while exporting firms exhibit learning-by-exporting effects; SMEs which are export capable are subsequently more productive compared to their domestically focused (DFFs) competitors but not productive enough so as to 'cross' the productivity (export) threshold to enter foreign markets. Thus, both export capable and exporting firms consciously self-select into an export status because of their attained productivity levels. This suggests that deeper analysis and theory of the factors which permit export capable firms to initiate this productivity enhancing behaviour would be fruitful (Freixanet, Rialp & Churakova, 2019).

Second, there is a contribution to the international business theory and empirical research on the link between innovation and internationalization. Existing theory and evidence suggests a strong link between the two (Cassiman and & Golovko, 2011; Love and & Ganotakis, 2013), but rarely considers

the role of innovation in the intermediate stage of building export capability. We find that the effect of innovation on the probability of exporting is strong, but does not work exclusively through product innovation, as suggested by Cassiman, Golovko & Martinez-Ros, (2010). It is process innovation that differentiates export-capable firms from other non-exporters (i.e. DFFs), while the key influence of product innovation is in helping firms in moving from export capability to actually exporting. In other words, process innovation improves export capability rather than directly encouraging the move to exporting – an issue hitherto not explored. Thus, the previously identified direct effect of innovation on exporting (Cassiman, Golovko & Martinez-Ros, 2010; Máñez-Castillejo, Rochina-Barrachina & Sanchis-Llopis, 2009) may be incomplete in attributing the nature of this effect – it actually occurs in part earlier during the learning-to-export process.

In addition, we demonstrate that under some circumstances the indirect effect of product innovation on exporting (i.e. via productivity) can be negative, and this effect also occurs before exporting occurs i.e. in moving towards export readiness. This result is consistent with the findings of Bellone, Musso, Nesta & Quere, (2008) that product innovation investments can lead to a temporary decrease in productivity regardless of the (pre-) export state into which a firm falls. Taken together these results suggest the importance of conscious self-selection and learning to- and by- exporting effects as a continuous learning process, although it is clear that these learning effects are more complex than typically approached and analysed, and that they involve other forms of investments and capabilities beyond innovation. Thus 'conscious self-selection' occurs, but not necessarily in the way envisaged by previous literature (Cassiman and& Golovko, 2011).

Third, our study adds to the literature by identifying a clear relationship between growth ambition, export-capability and exporting. Previous research indicates the importance of growth ambition among exporting SMEs (Colclough, Moen, Hovd & Chan, 2019), but has little to say on the role of export capability in this relationship. We find that export-capable firms have stronger growth ambitions than DFFs, but exporters have no greater levels of ambition than export-capable firms. The implication is that growth ambition pushes firms to develop export-related capabilities regardless of whether firms then go on to achieve growth either in the domestic or foreign markets. Our results also

help to identify those factors which shape SMEs' transitions from non-exporter, through export-capability, to exporter. In strategic terms these transitions are important given the productivity differentials between groups of SMEs, i.e. the relatively low productivity of firms in the DFF category and higher productivity among export capable and exporting firms. Sales growth ambition and process innovation prove important direct drivers of firms' transitions towards export-capability and higher productivity, although not the subsequent transition from export-capability to exporting: it is product innovation that differentiates exporters from all non-exporters. It is also worth noting that, for both export-capable firms and exporters, the findings confirm the theoretical proposition that investment in training activities boosts productivity among internationalizing firms (Aw, Roberts & Winston, 2007).

Finally, the research has implications for the literature on internationalization in family-owned businesses. The existing literature indicates that family firms are typically more reluctant to internationalize than their non-family counterparts (Gómez-Mejía, Makri & Larraza-Quintana, 2010), but that they may learn more from exporting since they are more able to take advantage of the experiential knowledge and technical resources accessed through exporting (De Massis, Frattini, Majocchi & Piscitello, 2018; Freixanet, Monreal & Sanchez-Marin, 2018). Much of this literature focusses on the innovation-exporting nexus: for example, Sanchez-Marin, Pemartin & Monreal‐Perez (2020) find that a greater level of family involvement in management is beneficial for exporting's effect on product innovation, up to a maximum of 2.45 family members involved in managing the company. By contrast, Bahl, Lahiri & Mukherjee, (2021) find evidence of a negative association between internationalisation and innovation among entrepreneurial firms in transition economies. Our findings shed further light on this debate. Export-capable firms are more likely to be family-owned businesses than either exporters or DFFs. This suggests that family-owned firms have little difficulty in developing new products suitable for exporting, or in achieving the necessary productivity improvements which distinguish them from purely domestically-focused firms: despite this, however, they are still less likely to actually enter exporting markets. This suggests in turn a need for research to focus on issues that prevent internationalization among family firms despite their capacity for

innovation (De Massis, Frattini, Pizzurno & Cassia, 2015), perhaps adopting a more systems approach to the links between innovation, exporting and performance among family firms (Freixanet, Rialp & Churakova 2019; Lahiri, Mukherjee & Peng, 2020).

5.2. Managerial implications

Both the pre-export and actual export phase are distinct phases with their specific investment, strategy, and knowledge requirements. At the pre-export phase, SMEs' managers/owners lack important competences and basic information regarding the costs involved in exporting, the way collection and exchange risks will be handled, the distribution channels to be arranged, and existing staff have no prior experience (Cavusgil, 1980). Thus, attention should be placed in finding ways of making their business export capable, i.e. become more cost competitive, while at the same, time developing learning-to-export and production capabilities. For example, investing in process innovation may bring new methods of organising their internal business operations, production processes and facilities which enable firms to handle a future rise of demand for their products. Moreover, since export-capable firms are also more likely to be family-owned firms, SMEs owners may consider the possibility of moving beyond their distrust of external advisors and use external experts to raise their awareness and knowledge of target markets, and devise an export strategy plan for successful foreign market entry. (Lahiri, Mukherjee & Peng, 2020).

Exporting firms' managers have successfully crossed the productivity threshold and are present in foreign markets. To preserve and augment their competitive position, managers need to invest in developing a new set of capabilities, which are different from the learning-to-export type. Managers need to utilise learning-by-exporting knowledge flows to upgrade and diversify the quality and variety of their products, to match the needs of both domestic and foreign customers. Nonetheless, this is not a straightforward process, as potential investments in product innovations have potentially ambiguous effects on productivity. Especially looking at the short-term perspective, the adjustment and marketing costs to promote both old and new products may bring upheaval in current and future

business planning. Finally, managers' of domestically focused firms, before anything else, need to develop and sharpen their absorptive capacity so as to better evaluate external stimuli for potential opportunities abroad. Acquiring an ambition to expand in foreign markets should be accompanied by awareness of export opportunities but also of the associated costs of this endeavour.

5.3 Public policy implications

In most countries export promotion policies focus on the move into exporting – by facilitating and supporting firms' internationalisation strategies (Gerschewski, Scott-Kennel & Rose, 2020). These may involve building firms' understanding of international market requirements and legislation, providing finance or insurance for international transactions and supporting the development of new exportable products or services (Ahmed & Brennan, 2019). The transition to exporting may also be supported by innovation policy which, in the UK at least, has emphasised product or service innovation rather than process improvement (Turner, Roper & Hewitt-Dundas, 2020). Our results also suggest the potential productivity benefits of measures designed to help firms build export capability prior to the transition to exporting. This pre-export stage has typically received less attention in terms of both policy and evaluation. For example, a recent review of UK export support by the Department of International Trade and UK Export Finance includes the following comment: "DIT requires a good understanding of export capability in UK industry including robust data" (National Audit Office, 2020, p. 24). Subsequent analysis in the report, however, focuses on systems and policies to support exporters with no consideration being given to the value of developing firms' capabilities pre-exporting.

Other areas of policy-making suggest an approach which may be valuable in ensuring that support measures address both export capability building and the transition into exports. For example, in technology and innovation policy, interventions are often structured around 'technology readiness levels' or TRLs which provide an indication of the maturity of particular technologies and help to position the technological capabilities of individual businesses (Wang, Wang & Fan, 2018). TRLs

therefore provide a framework both for structuring technology policies and ensuring their coherence and may be used as an eligibility criterion for specific firms to receive support. Our results here suggest the potential value of an analogous framework – 'export capability levels' perhaps - to help ensure the consistency of policy measures to support export capability and exporting and that firms receive appropriate levels of support given their level of export capability. Building capability pre-exporting is unlikely to involve direct engagement with international markets or building market understanding. Instead, our results suggest, this should focus on process and potentially managerial improvements which can increase productivity sufficiently to allow firms to compete internationally.

In addition to providing a framework for extending policy support beyond the move into exporting, our analysis also suggests an approach for targeting policy support. Export capable firms in our analysis are characterised by their ambition, process capabilities and willingness to invest. It is this group of firms which should be targeted by measures to encourage the move into exports. This may be particularly important for family-owned, export-capable businesses which our analysis suggests are less likely to independently make the transition to exporting. Measures to support export capability can likewise be focused on those DFFs which have ambition but lack the process and organisational capabilities to make them export capable.

6. Conclusions

Using data from the UK Longitudinal Small Business Survey we are able to distinguish between non-exporting firms which have products/services which are suitable for exporting and those which do not. We find that while export-capable (non-exporting) firms have significantly higher productivity than DFFs there remains a significant productivity premium from exporting. Rather different factors influence the transition from being domestically focused to being export-capable and from export-capability to exporter, requiring different policy approaches. Our analysis sheds new light on the diversity of non-exporters and the importance of both learning-to-export and learning-by-exporting effects on productivity.

A key limitation of our analysis relates to the lack of data on managerial background, experience and diversity within the Longitudinal Small Business Survey. Previous studies have suggested that managers' international work experience, diversity and exporting experience can all shape firms' (pre-) export strategies and success. New survey data is likely to be required to address this issue. In addition, our data are restricted to three time periods. While this helps considerably in dealing with inter-firm heterogeneity, it is possible that, for example, the effects of product and process innovation may have longer time lags than we are able to allow for. Future analysis might consider the determinants of the transition between DFF, export-capable and exporter in more detail. In addition, a future research avenue might explore if and how the UK's EU Referendum (Brexit) influenced firms' (pre-) export behaviour and/or their strategies for boosting productivity. In addition, it would be interesting to investigate whether the same findings hold for larger firms as well. It may be the case that export capable SMEs due to their limited resources and production scale, need to invest primarily in process innovation and develop in-house learning-to-export capabilities. Our results also suggest that the particular characteristics of family firms and how these influence export capability and exporting are worthy of further study. Specifically, we find that family firms frequently become export-capable, but find it difficult to overcome the hurdle to actual exporting. There is therefore a need for clearer information on whether it is a lack of suitable products (i.e. innovation) for exporting or a difficulty in improving productivity in anticipation of exporting that has this effect.

Figure 1: Theoretical model and hypotheses

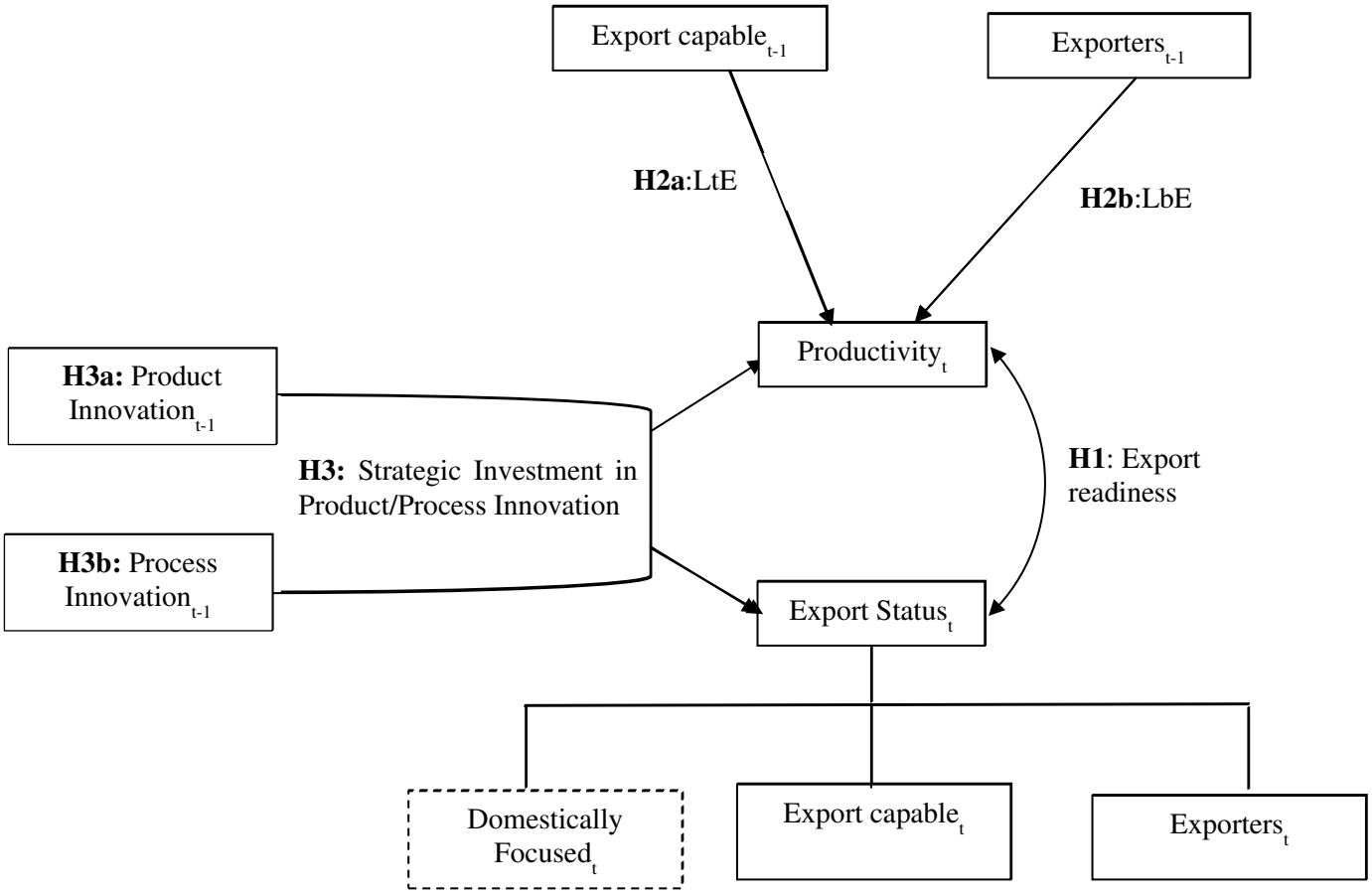

Table 1: Descriptive statistics and variable definitions

Label	Variable definition	Mean	SD
Dependent Variables			
Export Status=0	DFF: Whether firm is neither an exporter nor has suitable products/services to export	0.639	-
Export Status=1	Export Capable: Firms reporting to have suitable goods/services to export but remain non-exporters	0.105	-
Export Status=2	Exporters: Firms that are engaged in exporting activities	0.256	-
Productivity	Sales to employee ratio (cont./log)	11.122	1.088
Control Variables			
Profitability$_{t-1}$	Whether firms achieved surplus (0/1)	0.853	-
Family Business $_{t-1}$	Whether firm is family owned (0/1)	0.598	-
Firm size $_{t-1}$	Total number of employees (cont. log)	2.536	1.443
Firm size sq. $_{t-1}$	Employment square (cont. log)	8.514	7.563
Firm age $_{t-1}$	Firm's age (cont.)	28.064	23.111
Product innovation $_{t-1}$	Whether firms introduced product/service innovation in previous 3 years (0/1)	0.450	-
Process innovation $_{t-1}$	Whether firms introduced process innovation in previous three years (0/1)	0.294	-
Growth Ambition $_{t-1}$	Sales ambition: Expected percentage of sales increase/decrease	21.726	25.374
Skills investment plan $_{t-1}$	Whether the firm intents to invest in human resources in the future 3yr period (0/1)	0.799	-
Capital investment plan $_{t-1}$	Whether the firm intents to invest in capital in the future 3yr period (0/1)	0.496	-
Product innovation investment plan $_{t-1}$	Whether the firm intents to invest in product innovation in the future 3yr period (0/1)	0.492	-
Organizational innovation investment plan $_{t-1}$	Whether the firm intents to invest in organisation innovation in the future 3yr period (0/1)	0.536	-
1.Export Capable $_{t-1}$	Firms reporting to have suitable goods/services to export but remain non-exporters in the previous year	0.128	-
2.Exporters $_{t-1}$	Exporters: Firms that are engaged in exporting activities in the previous year	0.269	-
Business Plan $_{t-1}$	Whether firms maintains a business plan (0/1)	0.837	-
Multiple business premises $_{t-1}$	Whether the firm operated in multiple business premises (0/1)	0.604	-
Training activities $_{t-1}$	Whether firm employees received onsite or offsite training (0/1)	0.853	-

Source: Descriptive statistics are for the estimation sample (n=8,117 observations). Data from LSBS 2015-2017.

Table 2. Correlation matrix of the employed variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
Productivity	1.00																
Expstatus	0.32	1.00															
Profitability$_{t-1}$	0.14	0.05	1.00														
Family Business $_{t-1}$	0.05	-0.02	0.09	1.00													
Firm size $_{t-1}$	-0.12	0.05	0.01	-0.22	1.00												
Firm size sq $_{t-1}$	-0.11	0.05	0.02	-0.21	0.96	1.00											
Firm age $_{t-1}$	0.01	-0.01	-0.05	-0.11	0.19	0.20	1.00										
Product innovation $_{t-1}$	0.00	0.20	-0.01	-0.07	0.09	0.08	-0.04	1.00									
Process innovation $_{t-1}$	0.04	0.14	0.03	-0.04	0.09	0.08	-0.04	0.37	1.00								
Growth Ambition $_{t-1}$	0.06	0.17	-0.01	0.01	-0.01	-0.01	-0.17	0.22	0.17	1.00							
Skills investment plan $_{t-1}$	-0.01	0.09	0.04	-0.10	0.23	0.20	-0.01	0.20	0.17	0.18	1.00						
Capital investment plan $_{t-1}$	0.05	0.10	0.07	0.03	0.22	0.22	0.06	0.14	0.13	0.16	0.24	1.00					
Product innovation investment plan t-1	0.04	0.25	-0.02	-0.07	0.09	0.09	-0.05	0.40	0.26	0.27	0.25	0.19	1.00				
Organizational innovation investment plan t-1	-0.03	0.05	0.00	-0.03	0.16	0.15	-0.04	0.20	0.24	0.19	0.33	0.21	0.28	1.00			
Business Plan $_{t-1}$	-0.04	0.04	-0.04	-0.18	0.24	0.23	0.02	0.16	0.13	0.13	0.22	0.10	0.19	0.18	1.00		
Multiple business premises $_{t-1}$	0.07	0.05	-0.01	-0.14	0.23	0.19	0.08	0.03	0.03	-0.03	0.08	0.06	0.04	0.03	0.08	1.00	
Training activities $_{t-1}$	-0.04	0.03	0.01	-0.14	0.39	0.35	0.05	0.17	0.15	0.07	0.37	0.17	0.12	0.20	0.23	0.11	1.00

Source: Data from LSBS 2015-2017.

Table 3. Estimation results with fixed and random effects

	Export Capable firms (Export status=1)	**Exporters (Export status=2)**	**Productivity**
	(1)	**(2)**	**(3)**
0.DFFs (baseline)	-	-	-
1.Export Capable$_{t-1}$	-	-	0.150*** (0.041)
2.Exporters $_{t-1}$	-	-	0.421*** (0.043)
Profitability$_{t-1}$	0.040 (0.085)	0.124 (0.078)	-
Family Business $_{t-1}$	0.091 (0.066)	-0.230*** (0.060)	-
Firm size $_{t-1}$	-0.331*** (0.068)	-0.050 (0.065)	-0.213*** (0.036)
Firm size sq $_{t-1}$	0.051*** (0.013)	0.027** (0.012)	0.023*** (0.006)
Firm age $_{t-1}$	0.003* (0.002)	0.003** (0.001)	0.002*** (0.001)
Product innovation $_{t-1}$	0.202*** (0.064)	0.435*** (0.056)	**-0.060** (0.028)**
Process innovation $_{t-1}$	0.144** (0.067)	0.119** (0.059)	**0.017 (0.030)**
Growth Ambition $_{t-1}$	0.006*** (0.001)	0.006*** (0.001)	-
Skills investment plan $_{t-1}$	0.062 (0.078)	0.065 (0.072)	-
Capital investment plan $_{t-1}$	0.014 (0.063)	0.071 (0.055)	0.055** (0.027)
Product innovation investment plan $_{t-1}$	0.313*** (0.066)	0.818*** (0.057)	
Organizational innovation investment plan $_{t-1}$	-0.097 (0.064)	-0.246*** (0.056)	
Constant	-1.052*** (0.180)	-1.341*** (0.169)	
Business Plan $_{t-1}$	-	-	0.252*** (0.042)
Multiple business premises$_{t-1}$	-	-	0.055** (0.027)
Training activities$_{t-1}$	-	-	0.109*** (0.037)
$\rho_{expcap,prod}$	0.081*** (0.025)		
$\rho_{export,prod}$	0.155*** (0.026)		
N	8,117		
chi2	2727.693		
BIC	29153.363		
Random effects Hausman Test *(Ho: difference in coefficients not systematic*)	Chi2: 8.97		
	Prob>chi2: 0.878		

Baseline is DFFs (Expstatus=0).

*, **, and *** denote significance at the 10%, 5% and 1% level respectively.

All models include time, industry and regional dummies, error terms are clustered at the observation level; data from Longitudinal Small Business Survey, 2015-2017.

Table 4. Marginal effects of multivariate probit (export status)

	Exp. Capable	**Exporters**
Profitability$_{t-1}$	-0.001 (0.011)	0.023 (0.015)
Family Business $_{t-1}$	0.023*** (0.008)	-0.051*** (0.012)
Firm size $_{t-1}$	-0.042*** (0.008)	0.006 (0.013)
Firm size sq $_{t-1}$	0.005*** (0.002)	0.003 (0.002)
Firm age $_{t-1}$	0.000 (0.000)	0.000* (0.000)
Product innovation $_{t-1}$	0.006 (0.008)	0.081*** (0.011)
Process innovation $_{t-1}$	0.014* (0.008)	0.017 (0.012)
Growth Ambition $_{t-1}$	0.000*** (0.000)	0.001*** (0.000)
Skills investment plan $_{t-1}$	0.005 (0.010)	0.010 (0.014)
Capital investment plan $_{t-1}$	-0.002 (0.008)	0.014 (0.010)
Product innovation investment plan $_{t-1}$	0.002 (0.008)	0.151*** (0.011)
Organizational innovation investment plan $_{t-1}$	-0.00 1 (0.008)	-0.045*** (0.011)
N	7401	7401

*, **, and *** denote significance at the 10%, 5% and 1% level respectively.

All models include time, industry and regional dummies, data from Longitudinal Small Business Survey, 2015-2017.

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Appendix

Table I. Snapshot of LSBS questionnaire and variables employed.

Variables	**Corresponding LSBS questions**
Exporters (Yes/No)	In the past 12 months did your business export any goods/services outside of the UK? This could include commissions, royalties and licences
Export Capable (Yes) DFFs (No)	Does your business have any goods or services that are suitable for exporting?
No of Employees (Firm Size)	Approximately, how many employees are currently on your payroll in the UK, excluding owners and partners, across all sites?
Sales	Can you please tell me the approximate turnover of your business in the past 12 months across all your UK sites?
Profitability (Yes/No)	Taking into account all sources of income in the last financial year, did you generate a profit or surplus?
Family Business (Yes/No)	Is your business a family-owned business, that is one which is majority owned by members of the same family?
Product Innovation (Yes/No)	Has your business introduced any new or significantly improved goods/services in the last three years? This excludes the resale of goods purchased from other businesses, or changes of a solely aesthetic nature.
Process Innovation (Yes/No)	Has your business introduced any new or significantly improved processes for producing or supplying goods or services in the last three years?
Growth Ambition	By approximately what percentage do you aim to have grown your sales in three years' time?
Skills investment plan (Yes/No)	Does your business plan to do any of the following over the next three years? (Increase the skills of the workforce)
Capital investment plan (Yes/No)	Does your business plan to do any of the following over the next three years? (Capital investment (in premises, machinery etc.))
Product innovation investment plan (Yes/No)	Does your business plan to do any of the following over the next three years? (Develop and launch new products/services)
Organizational innovation investment plan (Yes/No)	Does your business plan to do any of the following over the next three years? (Introduce new working practices)
Business Plan (Yes/No)	Do you have a formal written business plan?
Training activities (Yes/No)	Over the past 12 months has your business arranged or funded any formal off-the-job, or informal on-the-job, training or development for employees?
Multiple business premises (Yes/No)	How many sites in the UK does your business operate from, including your head office?

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