

**Export status and SME
productivity: learning-to-export
versus learning-by-exporting**

ERC Research Paper 71

May 2018

Export status and SME productivity: learning-to-export versus learning-by-exporting

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The Enterprise Research Centre is an independent research centre which focusses on SME growth and productivity. ERC is a partnership between Warwick Business School, Aston Business School, Imperial College Business School, Strathclyde Business School, Birmingham Business School and Queen's University School of Management. The Centre is funded by the Economic and Social Research Council (ESRC); Department for Business, Energy & Industrial Strategy (BEIS); Innovate UK, the British Business Bank and Intellectual Property Office. The support of the funders is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

ABSTRACT

Exporting offers firms the opportunity both to maximise profits from their existing products and services and, through 'learning-by-exporting', to identify new innovation opportunities. In this paper, we exploit a unique data source to examine the strategic choices of smaller firms in terms of exporting or non-exporting. We pay particular attention to a substantial group of export-capable firms which state that they have products or services suitable for exporting but have no 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). Our ability to separately identify export-capable and domestically-focused firms provides new insight into the nature of learning-to-export and learning-by-exporting effects. There are four key results. First, the direct effect of innovation on the probability of exporting is strong, and works exclusively through product innovation. However, the key influence of product innovation is in helping firms to become export-capable rather than in moving from export capability to actually exporting. Second, alongside this direct innovation effect, there is a clear relationship between growth ambition, export-capability and exporting. Third, to the extent that there is any indirect effect of innovation on exporting via productivity, it tends to be negative: export-capable firms exhibit a short-term decline in productivity relative to DFFs, an effect which does not persist into the exporting phase. This may link to (negative) potential disruption effects to productivity from innovation noted in other innovation studies. Fourth, in our analysis there is clear evidence of learning-by-prior-exporting effects on productivity, regardless of firms' current export status. For current exporters, this means that previous exporting experience provides a boost to productivity compared to other exporting firms without prior export experience. Finally, there is some evidence that export-capable firms with previous export experience are more productive than other-non-exporters due to their prior export experience. This again suggests a learning-by-prior-exporting effect.

Keywords: SME, Exporting, Learning-by-exporting, Learning-to-export

JEL codes: D22, D23, D24

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1. INTRODUCTION

Exporting offers firms the opportunity both to maximise profits from their existing products and services and, through ‘learning-by-exporting’, to identify new innovation opportunities (Love and Roper 2015). For smaller firms, 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 firms’ growth or profit objectives (Esteves and Rua 2015). Uncertainty around currency fluctuations or future trading relationships, may also lead smaller firms to focus on developing purely domestic market opportunities.

In this paper, we exploit a unique data source to examine the strategic choices of smaller firms in terms of exporting or non-exporting. We pay particular attention to a substantial group of export-capable firms which state that they have products or services suitable for exporting but have no 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, non-exporter – each represent strategic positions consciously adopted by firms. Innovation plays a key role in our analysis, enabling firms to develop export-ready products and services, and can boost productivity sufficiently to allow firms to compete effectively in export markets (Cassiman et al. 2010). We also want to learn more about 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.

Our analysis suggests the limitations of standard models of international trade for smaller firms. For example, 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, i.e. learning-by-exporting. While these two processes are not mutually exclusive (Love and Mansury 2009), and there is obvious interest in which process is more significant,

and in how these processes come about (Wu and Miranda 2015). Even where self-selection occurs, there is still the issue of how this arises. Does self-selection on the basis of productivity begin with random technological shocks over which firms have little control (Melitz 2003), or does it happen as a result of strategic pre-export activities such as ramping up productive capacity and product and service quality in anticipation of potential market entry (Bustos 2011; Eliasson et al. 2012)?

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 2012). Clearly firms which are export capable, but which do not export, may exhibit conscious self-selection, 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 demonstrate clearly that the direct effect of innovation does not occur in the move to exporting, but in the lead up to export capability – an issue hitherto not explored. Thus, the previously identified direct effect of innovation on exporting (Cassiman et al. 2010; Máñez-Castillejo et al. 2009) may be mistaken in attributing the nature of this effect – it actually occurs earlier in the learning-to-export process. Third, 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 (c.f. Bellone et al. 2008). This effect may be related to the negative short-run effect of innovation on productivity identified in some other firm level studies (Roper et al. 2008). Thus ‘conscious self-selection’ occurs, but not necessarily in the way envisaged by previous literature (Cassiman and Golovko 2011).

Distinguishing between the ‘learning-to-export’ and ‘learning-by-exporting’ effects has both theoretical and practical implications. Despite the large body of empirical research which exists on the determinants or antecedents of internationalisation in general, and exporting in particular (Wagner 2007, 2012), recent literature has drawn attention to a notable lack of research on firm behaviour in the pre-internationalisation stage (Tan et al. 2007; Martineau and Pastoriza 2016). In the specific case of exporting – often the first stage of internationalisation, especially

for SMEs – although we know a great deal about the factors distinguishing exporters from non-exporters, including the important roles of productivity, innovation and management experience (e.g. Ganotakis and Love 2011; Love and Ganotakis 2013), this literature typically treats non-exporters as a homogeneous group. As a result, we still know relatively little about the factors that help firms move from being non-exporters to becoming ‘export capable’ before making the ultimate move into international markets.

Our analysis is based on a unique dataset of over 7,000 UK-based SMEs taken from the first two waves of the Longitudinal Small Business Survey (LSBS). We model simultaneously the determinants of firms’ market position (i.e. whether they are exporting, export capable, or DFFs) and productivity. This allow 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 both the direct and indirect (i.e. via productivity) effects of innovation on exporting (Cassiman et al. 2010). Section 2 of the paper outlines previous studies on which we build. 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.

2. LITERATURE REVIEW

While there is general agreement on the productivity premium enjoyed by exporters, there is little agreement in the research literature about whether this is the result of firms’ own strategic actions – i.e. learning-to-export effects (Eliasson et al. 2012) - or through learning-by-exporting. Broadly, the evidence on the importance of learning-to-export effects is strong but the evidence on learning-by-exporting is more mixed (Wagner 2007, 2012; Ganotakis and Love 2011; Love and Ganotakis 2013).

In terms of learning-by-exporting, some studies do find a positive link between exporting and subsequent productivity growth (Baldwin and Gu 2004; Van Biesebroeck 2005; Aw et al 2007; Love and Mansury 2009). However, others find no evidence of such effects (Bernard and Jensen 1995, 1999, 2004; Castellani 2002; Greenaway et al. 2005; Arnold and 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 effects (Silva et al. 2012).

Learning-to-export effects arise where firms invest in the development of enhanced products or services and/or delivery capabilities to generate positive productivity effects before entering export markets (Eliasson 2012). These productivity gains may help to offset the costs of export market entry, but may also help to counter the increased competition which firms face in export markets (Alvarez and Lopez 2005). A substantial body of empirical evidence now exists which identifies the importance of this learning-to-export effect, suggesting that it is more productive firms which enter export markets rather than exporting itself which is increasing productivity (Wagner 2007, 2012). The sunk (i.e. irreversible) costs of such pre-exporting initiatives - such as market research, setting up new distribution networks, negotiating with potential new partners - favour larger, firms, however, and may be less applicable in the case of smaller companies such as the SMEs which are the focus of our study (Love and Ganotakis 2013).

Where self-selection or learning-to-export effects do arise there is still the question of how these come about. Do they arise simply from an exogenously determined distribution of productivity which permits more productive firms to overcome the fixed costs of exporting, or do they represent the outcome of a strategic process by would-be exporters? In the former case, it is simply a random draw, while in the latter case firms consciously ramp up productivity in the period immediately before foreign market entry in anticipation of exporting: a process of learning-to-export. Early theoretical and empirical work on firm heterogeneity and trade did not explain the nature of such heterogeneity, simply assuming that interfirm productivity differences arise from random technological shocks (e.g. Bernard et al. 2003; Melitz 2003). More recently, attention has shifted to the likelihood that heterogeneity in levels of productivity arise, at least in part, from strategic choices made by firms in their levels of technological investment (Yeaple 2005): these choices alter firms' productivity and in turn make exporting more or less likely as a result.

Bustos (2011), for example, extends the Melitz (2003) model to allow not only for productivity differences arising from random exogenous draws, but also for the possibility that firms invest in (innovation) inputs both to upgrade their technology and to reduce the marginal cost of production. Firms that innovate are therefore also more likely to export, both because of the benefits of product or service upgrading, and because of the lower costs of production and hence lower selling prices that innovative firms are able to charge (Ganotakis and Love 2011). Several studies find support for this 'conscious self-selection' or learning-to-export hypothesis. For example, Alvarez and 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. And, in a study of 14,000 manufacturing SMEs from Sweden over the period 1997 to 2006, Eliasson et al. (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. Since they also find that the productivity gap between export-entrants and non-exporters does not continue to grow after market entry, Eliasson et al. (2012) conclude that small firms learn-to-export, but do not exhibit learning-by-exporting.

Research on the nature of pre-export investment has, in turn, led to a renewed interest in the role of innovation in exporting, and its links to productivity. Traditionally, economic approaches to export performance have viewed firms' competitive advantage as being based on factor endowments or the quality of firms' products or services (Roper and Love 2002). In both of these approaches 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 and Roper 2015). However, reflecting the literature on learning-to-export effects, Cassiman and 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. Perhaps of more interest is the potential indirect effect, in which innovation is a productivity-enhancing investment, and this in turn leads to (conscious) self-selection into export markets and learning-

to-export effects. In an accompanying piece, Cassiman et al. (2010) point out that both effects 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; in other words, once previous innovation performance is allowed for, the positive association between exporting and productivity is weakened, but is still present. Thus, empirical support is found for both the direct and indirect effects of innovation on exporting¹. The key relationships identified in the economics literature are summarised in Figure 1. Here, productivity and exporting are clearly endogenous, and innovation plays a key role. Innovation has both a direct (1) and indirect effect on exporting (2), with the latter occurring via learning-to-export effects on productivity (i.e. conscious self-selection). In turn, exporting can enhance productivity through the learning-by-exporting effect (3).

However, while the economics literature goes some way to explaining how firm heterogeneity with respect to productivity is linked to exporting, and the role that is played by innovation in this, there is relatively little consideration about the actual process by which this happens. By contrast, the small business internationalization literature puts a strong emphasis on the process of internationalization, including exporting. Should non-exporting businesses decided to pursue the internationalisation avenue, their bounded rationality in terms of market opportunities along with high uncertainty of how internal and external changes will affect the eventual export outcome may lead to a gradual internationalisation process (Johanson and Valhne 1977). At any given pre-export stage firms may exhibit various degrees of export capability and choose either to move forward with, postpone or even abandon their exporting plans (Tan et al., 2007). 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 et al. 2007, 2018; Martineau and Pastoriza 2016). In contrast with the economics literature's emphasis on productivity, the small business approach puts more emphasis on

¹ Bellone et al. (2008) argue that, due to the investments carried out prior to the benefits of sales in foreign markets, export entrants may experience a (temporary) decrease in productivity before entry. This is an issue which we are able to test empirically.

managerial attitudes, ambition and strategy (Tan et al. 2017). This suggests that non-exporting firms are heterogeneous in terms of their long-term goals and the strategies which they adopt to achieve these goals. Both may in turn be reflected in differential productivity levels. Put differently, it may be the case that, at any given time, non-exporting firms may or may not be willing or able to export, and this may not simply be reflected in levels of productivity. For example, there is evidence that some non-exporting firms make a strategic decision not to export but still achieve high productivity (Gkypali and Tsekouras 2015).

In the small business literature on pre-export or pre-internationalisation behaviour, the emphasis since the early work of Wiedersheim-Paul et al. (1978) has been on the learning process, as firms increase their knowledge of export markets, their understanding of market requirements and of the practical barriers to exporting. It is argued that richer information may facilitate better decision making (Knight 2002), while the composition and capability of firms' leadership teams may strongly influence the value of such information (Costa 2016; Tan 2007). Pre-export learning has been linked to entrepreneurial orientation (Kollmann and Christofor 2014), the international orientation of the entrepreneur (Wiedersheim-Paul 1978), business leaders' proficiency in foreign languages (Cannone and Ughetto 2014), and existing and prospective networks (Castellacci 2014; Costa 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.

In our analysis we draw on both the economics and small business literatures to examine export capability, conscious self-selection or learning-to-export effects, and leaning-by-exporting. In doing so we not only examine exporters and non-exporters, but also consider an intermediate category of export-capable firms. This categorisation helps to identify the direct and indirect role of innovation and the other determinants of firm heterogeneity and its links to export capability, issues which tend to be obscured when simply comparing exporters with (all) non-exporters. Figure 2 illustrates our augmented model, which incorporates the insights from the small business literature on export capability. Here, the direct effect of innovation may directly help exporting (1), but may also encourage firms to achieve export capability. For example, innovation may allow better market

penetration in domestic markets, thus giving the firms the confidence to consider taking innovative products abroad. Innovation boosts productivity making increasing firms' export capability (2), meaning that a key test of the significance of the learning-to-export effect (conscious self-selection) hypothesis is that this indirect effect of innovation should operate on export capability rather than directly on the decision to export. Finally, it is other aspects of firm heterogeneity such as attitudes towards growth which determines which export-capable firms actually make the move into export markets (3). As before once in export markets, learning by exporting effects may then have a further productivity enhancing effect (4).

3. DATA AND METHODS

3.1 The Longitudinal Small Business Survey

Our data is taken from the UK Longitudinal Small Business Survey (LSBS) and covers the two-year period 2015 to 2016. The LSBS has been commissioned by the Department for Energy, Business, Innovation and Skills (BEIS) and is the largest small business survey undertaken in the UK. The survey for both waves was conducted using Computer Assistance Telephone Interviews (CATI) between July 2015 and January 2016 (1st wave) and August 2016 and January 2017 (wave 2) by BMG Research Ltd. 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 for unregistered businesses with zero employees². We focus here on the sample of 7,279 SMEs which responded to both the first and second waves of the LSBS.

The structure of the LSBS questionnaire for both 2015 and 2016 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 (Figure 3). 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

² Dun & Bradstreet contacts were screened out if it was found that they either had employees on their payroll or paid VAT, as these would have duplicated contacts found within the IDBR.

products or services suitable for exporting. If they responded positively they were considered 'export-capable'. A negative response placed a firm in the group of DFFs.

In addition to data on firms' export status the LSBS provides detailed information about the background of the business, employment and turnover, business capabilities (in terms of innovation, exporting, technology use, training of employees, etc.), access to finance, business support and firms' strategic ambitions. However, it is worth noting that the LSBS includes very few indicators specific to the central entrepreneur or owner-manager in each firm which has been considered an important aspect of the pre-export model (Wiedersheim-Paul et al. 1978).

3.2. Empirical model

The identification of export-capable and DFFs within the group of non-exporting firms allows us to explore how innovation and capital investments boost productivity and influence firms' export capability (Yeaple 2005). In this respect, the internationalisation process starts not at the time businesses enter foreign markets but in the pre-export stage. This is a crucial phase during which failure to export, or withdrawal from export-related ambition, is most likely to occur (Welsh and Wiedersheim-Paul 1980). The idea here is that during the pre-export phase firms have a lack of knowledge about markets, anticipated barriers and competition, which translate as risk and uncertainty. In order to reduce such risk and uncertainty SMEs may adopt a stepwise internationalisation strategy by investing in new technologies and capital and thus, gradually build their export-related capabilities (Johanson and Wiedersheim-Paul 1975; Alvarez and Lopez 2005). For example, Gkypali and Tsekouras (2015) propose that firms discount and compare their potential productivity gains from staying in the domestic market versus going abroad and provide empirical evidence that firms' innovation strategy is the ruling factor in the decision to export.

To examine this process of self-selection, related learning-to-export benefits, and the direct and indirect effects of innovation we estimate four versions of a recursive system of two equations each of which focusses on how productivity influences firms' export status (i.e. whether they are an exporter, are 'export capable' or a DFF). Specifically, we construct three binary variables to examine the relationship

between exporters and different groups of non-exporters (*EXPSTATUS*): taking the value of 1 if the firm is an exporter, and 0 if firm is (i) a non-exporter, (ii) export capable or (iii) a DFF. We construct a fourth binary variable to examine the relationship between export capable and DFFs. and one binary variable which takes the value of 1 if firm is export capable and 0 otherwise. We measure productivity (*PRODUCTIVITY*) using a continuous variable capturing firms' labour productivity (turnover per employee), and prior innovation activity using two binary variables indicating whether firms have introduced a product (*PRODINN*) or process (*PROCINN*) innovation in the previous three years. Our model is then:

$$\begin{aligned}
 EXPSTATUS_t &= a_0 + a_1 PRODUCTIVITY_t + \alpha_2 PRODINN_t + \alpha_3 PROCINN_t + \mathbf{a}_z \mathbf{X}_{z,t} + \varepsilon_{exp} \\
 PRODUCTIVITY_t &= \beta_0 + \beta_1 EXPSTATUS_{t-1} + \beta_2 PRODINN_{t-1} + \beta_3 PROCINN_{t-1} + \mathbf{\beta}_k \mathbf{X}_{k,t-1} + \varepsilon_{prod} \\
 \varepsilon &= (\varepsilon_{exp}, \varepsilon_{prod})' \sim N(\mathbf{0}, \mathbf{\Sigma}) \\
 \mathbf{\Sigma} &= \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}
 \end{aligned}$$

Where $\mathbf{a}_z \mathbf{X}_{z,t}$ and $\mathbf{\beta}_k \mathbf{X}_{k,t-1}$ are a set of firm and sector level controls while ε_{exp} and ε_{prod} are random errors assumed to be independently and identically distributed following a bivariate normal and multivariate normal distribution with unitary variance; ρ measures the endogeneity of *PRODUCTIVITY* in the *EXPSTATUS* equation. For if ε_{exp} is uncorrelated with ε_{prod} so is *EXPSTATUS* conditional on *PRODINN*, *PROCINN* and \mathbf{x} . We estimate the model using the CMP module in Stata14³.

In principle, we could allow for a feedback loop in our system of equations, i.e. a direct effect of current export status on firms' labour productivity; however, a consistency problem arises (Roodman 2011, p.179). Our assertion is instead that previous export status influences current levels of productivity levels through learning-by-exporting (Lopez and Alvarez 2005; Eliason et al. 2012). In the same direction, we allowed a lagged effect of innovation on labour productivity as there may be a delayed manifestation of the effect of innovation on firms' productivity levels (Máñez-Castillejo et al. 2009) which in turn are reflected in the current

³ 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).

relationship between productivity and exporting status. Finally, in all models we allow for clustering of errors due to the non-independence of observations within the same firm capturing at least part of any unobserved heterogeneity.

3.3. Control Variables

We include a number of control variables in both the export status and productivity models. In the export status equations we control for firm size, age, sector and location⁴ but we also include a dummy variable capturing firms' profitability (Gkypali and Tsekouras 2015) and whether they are family owned (Lopez-Fernandez et al. 2016; Fernandez and Nieto 2006). In addition, we include variables capturing firms' growth ambition and investment intentions reflecting arguments made in the small business internationalisation literature (Johanson and Wiedersheim-Paul 1975; Alvarez and 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.

In the productivity equation we again control for firm size, age, sector and location. Furthermore, in order to capture the effect of firms' business capabilities on productivity levels we use four binary measures reflecting firms' subjective evaluation of the capability of their business in terms of: (i) developing and implementing a business plan and strategy; (ii) developing and introducing new products or services; (iii) accessing external finance; and, (iv) operational improvement, e.g. adopting industry best practice. Where a capability was said to be 'well-developed' variables take the value of 1 and 0 otherwise. We also control for whether firms were multi-site or single site businesses and whether or not they offered employees on-site or off-site training. Finally, based on responses regarding firms' ICT use, we include a set of four binary indicators capturing whether firms: (i) have access to the internet; (ii) have their own website; (iii) use third party websites for promotion; and, (iv) keep and maintain a social media profile.

⁴ Due to space limitations descriptive statistics for industry and location dummies are not presented here but are available upon request.

4. RESULTS

Estimates are reported in Tables 2 and 3 reflecting firms' choice of export status and the determinants of productivity. In each column the first set of results is a probit analysis of the determinants of a given exporting state, while the lower set of results are the determinants of (labour) productivity. Column 1 compares exporters with all non-exporters, implicitly assuming that non-exporters are a homogenous group. Table 2, Columns 2, 3 and 4 respectively compare exporters with DFFs (Column 2); exporters with export-capable firms (Column 3); and export-capable firms with DFFs (Column 4). In each of the models, statistically significant error correlations suggest the endogeneity of productivity in firms' choice of exporting status, and the value of modelling the two equations simultaneously. Table 3 provides marginal values.

In each model, allowing for endogeneity, current productivity is positively associated with an orientation towards export capability and exporting. Higher productivity increases the probability that firms are exporters rather than non-exporters (Columns 1-3) and, in addition, higher productivity is associated with export capability (rather than being a DFF) (Table 2, Column 4). This suggests an element of self-selection on productivity not just into exporting, but also into export capability (this is examined in more detail below). Exporters are also more likely to be product innovators than non-exporters in general (Table 2, Column 1), but are no more innovative than export capable firms (Table 2, Column 3). Unsurprisingly, this means that export-capable firms are much more likely to be innovative than DFFs (Table 2, Column 4). This pattern of results, and the relative size of the innovation coefficients, suggest that the direct effect of innovation identified by Cassiman and Golovko (2011) takes place not directly on exporting, but in the process of becoming export-capable: i.e. innovation helps firms develop products suitable for export markets, whether or not the firm actually takes the step into exporting.

A number of other factors also prove important in shaping firms' export status. Exporters are more likely to be larger and younger than all non-exporters (Love 2016). Growth ambition also plays a key role in distinguishing between exporting states, with both exporters and export-ready firms exhibiting significantly higher levels of growth ambition than DFFs. However, reflecting comparable levels of innovation activity, 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. 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 and O' Brien 2017). Finally, DFFs are, perhaps surprisingly, more 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 no ambition to change this situation.

To determine whether the self-selection into both exporting and export-readiness arises from 'conscious' self-selection and learning-to-export via innovation, we examine the indirect effect of innovation on export status, i.e. its effect on through productivity. The productivity estimates indicate that lagged product innovation has a negative effect on the productivity of export-ready firms, noted before by Bellone et al. (2008), and attributable to the short-term disruption effect of innovation (Roper et al. 2008). The fact that the same negative effect is visible in the comparison of exporters with all non-exporters (Table 2, Column 1) but not between exporters and non-export-ready firms (Table 2, Column 2) reinforces this point. 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.

So what does boost productivity in exporting and export-ready firms? Here, the coefficients on the prior exporting terms in the productivity models are informative, suggesting the importance of learning-by-exporting. The standard exporters versus non-exporters estimation (Table 2, Column 1) demonstrates the existence of a learning-by-exporting effect: lagged exporting leads to higher subsequent productivity. Further evidence of learning-by-exporting is obtained from comparing exporters with export-capable firms (Table 2, Column 3). Here, we are able to distinguish between whether firms were exporters or export-capable in the previous year and the subsequent effect on productivity. Only being an exporter in the previous year leads to higher productivity: there is no such effect from being

export-capable, which strongly suggests a learning-by-exporting effect. Clearly, we must be circumspect about putting too much emphasis on this finding: we do not have the complete export histories of the firms in our sample, and our data extend over just two annual observations. However, the results do consistently suggest that, regardless of the current export status of the firms concerned, prior experience of being an exporter is associated with higher productivity.⁵

5. DISCUSSION

Our ability to separately identify export-capable and domestically-focussed firms provides new insight into the nature of learning-to-export and learning-by-exporting effects. Both effects prove important in helping to explain why exporters are markedly 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. There are four key empirical results.

First, the direct effect of innovation on the probability of exporting is strong, and works exclusively through product innovation, as suggested by Cassiman et al. (2010). However, the key influence of product innovation is in helping firms to become export-capable rather than in moving from export capability to actually exporting. In other words, product innovation improves export capability rather than directly encouraging the move to exporting. Second, alongside this direct innovation effect, there is a clear relationship between growth ambition, export-capability and exporting. 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-capable products regardless of whether firms then go on to achieve growth either domestic or export markets. Third, to the extent that there is any indirect effect of innovation on exporting via productivity, it tends to be negative: export-capable firms exhibit a short-term decline in productivity relative to DFFs, an effect which does not persist into the exporting phase. This result is consistent with the findings of Bellone et al. (2008) that investments made in the pre-export phase can lead to

⁵ Note that this also applies to the very small number of firms which were export-capable in 2016, but had previously exported in 2015. Such firms demonstrate a clear productivity premium relative to other-non-exporting firms (Table 2 column 4).

a temporary decrease in productivity before export entry is actually attempted. Taken together these results suggest the importance of self-selection and learning-to-export effects although it is clear that these effects are more complex than typically imagined, and that they involve other forms of investments and capabilities beyond innovation.

Fourth, in our analysis there is clear evidence of learning-by-prior-exporting effects on productivity, regardless of firms' current export status. For current exporters, this means that previous exporting experience provides a boost to productivity compared to other exporting firms without prior export experience. The nature of the learning-by-prior-exporting effect becomes even clearer, however, when exporters' productivity is compared with that of the two categories of non-exporters. The learning-by-prior-exporting effect is evident, but less pronounced, when comparing exporters with export-capable firms. In addition, as exporters which were previously export-capable do not exhibit this effect, it must be learning-by-prior-exporting effects which are driving productivity differences. Finally, there is some evidence that (the small number of) export-capable firms with previous export experience are more productive than other-non-exporters due to their prior export experience. This again suggests a learning-by-prior-exporting effect.

Our results also help to identify those factors which shape SMEs' transitions from non-exporter, through export-capability, to exporter (Figure 4). In policy – and potentially strategic - terms these transitions are important given the differentials in productivity between groups of SMEs, i.e. the relatively low productivity of firms in the 'other-non-exporting' category and higher productivity among export capable and exporting firms (Table 1). Sales growth ambition and product innovation prove important direct drivers of firms' transitions towards export-capability and higher productivity although not the subsequent transition from export-capability to exporting (Figure 4). As noted earlier, both elements of (lagged) capability and prior export status have indirect effects through productivity on the other-non-exporter to export-capable transition (Figure 4). A wider range of factors prove significant determinants of the indirect effect of productivity on the export-capability to exporter transition including again past export status, capability and internet access. Here, the indirect effects of innovation through productivity are negative (Bellone et al. 2008).

In policy terms our analysis suggests the limitations of the standard binary categorisation of firms as exporters or non-exporters. A more useful distinction for policy design and targeting is between exporters, export-capable and DFFs: Boosting productivity and developing export-ready products/services requires capability improvement and innovation among non-exporting firms; export-capable firms may then benefit from more traditional export promotion initiatives. More specifically, our analysis also suggests the capabilities of family firms which are more likely to be export-capable but less likely to be exporting than non-family-firms. Given the positive export premium on productivity this suggest the potential value of targeted policy initiatives to support export market entry for export-capable family firms.

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 other-non-exporter to export-capability 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. We also find some evidence of a positive learning-by-prior-exporting effect on productivity which persists beyond the exporting period.

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 international work experience, diversity and exporting experience can all shape firms' export strategies and success. New survey data is likely to be required to address this issue. Future analysis might consider the determinants of the transition between other-non-exporter, export-capable and exporter in more detail. Our results also suggest that the particular characteristics of family firms and how these influence export capability and exporting are worthy of further study.

Figure 1: Standard (economics) model

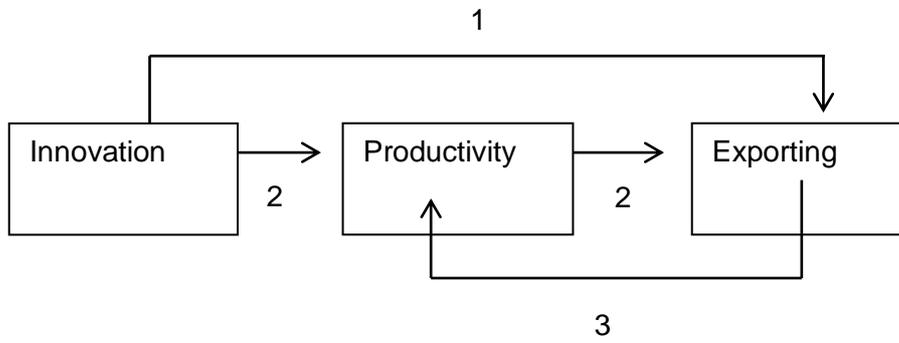


Figure 2: Augmented model

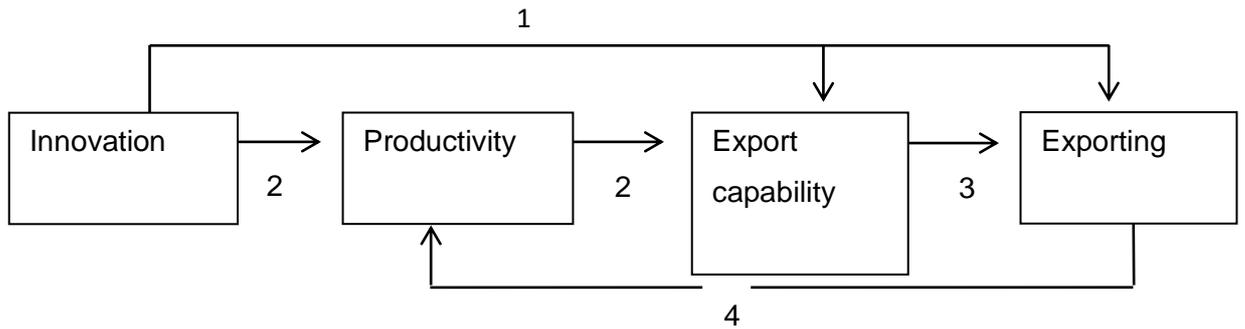


Figure 3: Identifying those firms able to export in the LSBS

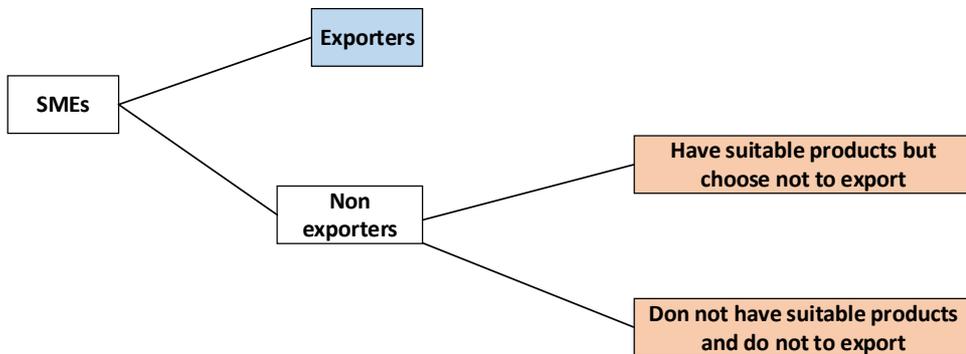


Figure 4: Summary of key empirical results

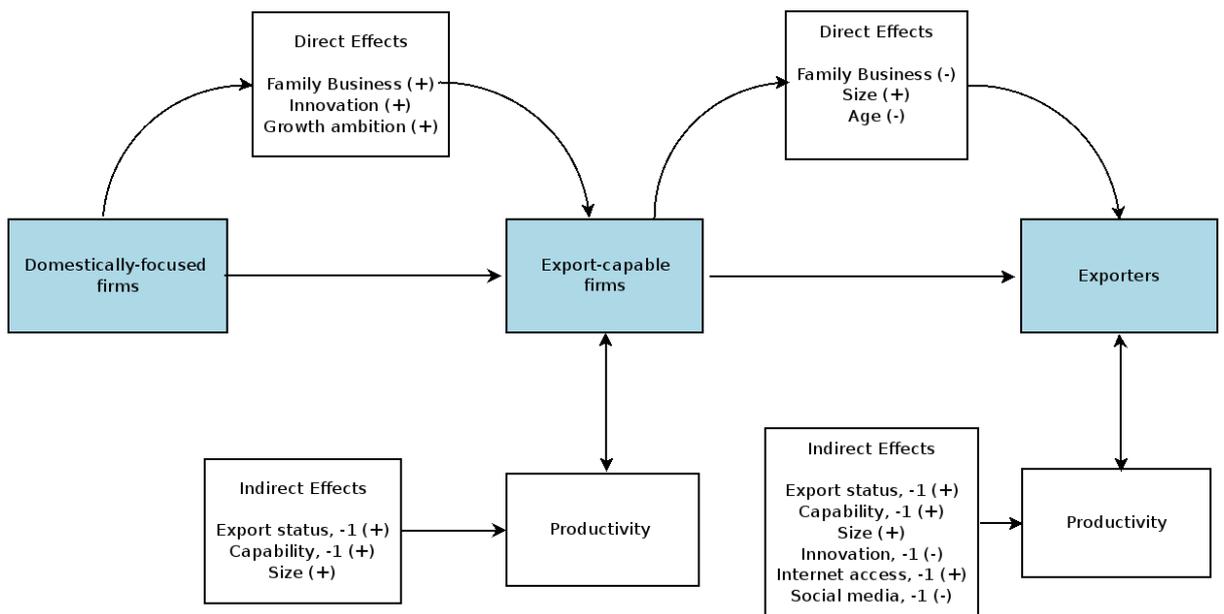


Table 1: Descriptive statistics

Label	Variable definition	Mean	SD
Dependent Variables			
Exporter	Exporters/Non-exporters (2016, 0/1)	0.253	0.435
Exporters v DFFs	Exporters/Domestically-focussed firms (2016, 0/1)	0.305	0.460
Exporters v export-capable firms	Exporters/Export-capable firms (2016, 0/1)	0.723	0.448
Export-capable firms v DFFs	Export capable/ Domestically-focussed firms (2016, 0/1)	0.144	0.351
Productivity	Sales to employee ratio (2016, log)	11.079	1.070
Export Status equation: Control Variables			
Profitability	Whether firms achieved surplus (2016, 0/1)	0.837	0.370
Family Business	Whether firm is family owned (2016, 0/1)	0.579	0.494
Employment (log)	Total number of employees (2016, log)	2.776	1.388
Employment Sqr. (log)	Employment square (2016, log)	9.634	7.784
Vintage	Firm age (2016)	20.553	7.818
Product/Service Innov	Whether firms introduced product/service innovation in previous 3 years (2016, 0/1)	0.410	0.492
Process Innov.	Whether firms introduced process innovation in previous three years (2016, 0/1)	0.275	0.447
Growth Ambition	Sales ambition: Expected percentage of sales increase/decrease (2016)	21.484	25.203
Future HR Skills	Whether the firm intents to invest in human resources in the future 3yr period (2016, 0/1)	0.797	0.402
Future Capital Investment	Whether the firm intents to invest in capital in the future 3yr period (2016, 0/1)	0.526	0.499
Future Product Innov.	Whether the firm intents to invest in product innovation in the future 3yr period (2015, 0/1)	0.460	0.498
Future Org. Innov.	Whether the firm intents to invest in organisation innovation in the future 3yr period (2015, 0/1)	0.520	0.500
Productivity equation: Control Variables			
Exporter, lag	Previous export status (2015, 0/1)	0.270	0.444
Export capable, lag	Export capable firm, 2015	0.154	0.361
Exporter, lag	Exporter, 2015	0.293	0.455
Innov. Capability, lag	Whether firm has a well-developed innovation capability (2015, 0/1)	0.605	0.489
Operational Capabil., lag	Whether firm has a well-developed operational management capability (2015, 0/1)	0.710	0.454
Ext. Finance Capabil, lag	Whether firm has a well-developed external finance capability (2015, 0/1)	0.517	0.500
Strategy Capabil., lag	Whether firm has a well-developed operational strategy capability (2015, 0/1)	0.662	0.473

Employment (log, lag)	Employment: total number of employees (2015, log)	2.763	1.403
Employment Sqr (log, lag)	Employment square (2015)	9.602	7.699
Vintage, lag	Firm age (2015)	19.553	7.818
Product/Service Innov, lag	Whether firms introduced product/service innovation (2015, 0/1)	0.505	0.500
Process Innov., lag	Whether firms introduced process innovation (2015, 0/1)	0.343	0.475
Multi-plant, lag	Whether firm is multi-plant (2015, 0/1)	0.868	0.339
Intends capital investment, lag	Whether the firm intends to invest in capital in the future 3yr period (2015, 0/1)	0.586	0.493
On-site training, lag	Whether firm employees received offsite training (2015, 0/1)	0.701	0.458
Off-site training lag	Whether firm employees received onsite training (2015/1)	0.651	0.477
Website, lag	Whether the firms owns a website (2015, 0/1)	0.892	0.310
3 rd Party Web, lag	Whether the firm uses a third-party website for promotion (2015, 0/1)	0.196	0.397
Internet, lag	Whether the firm has access to internet for work (2015, 0/1)	0.982	0.132
Social media, lag	Whether the firm has a social media profile (2015, 0/1)	0.674	0.469

Source: Descriptives are for the estimation sample. Data from LSBS 2015 and 2016.

Table 2: Export status and productivity: CMP models

	Exporters and Non exporters	Exporters and DFFs	Exporters and Export-Capable	Export Capable and DFFs
	(1)	(2)	(3)	(4)
A. Export Status				
Productivity	0.910*** (0.026)	0.951*** (0.023)	0.947*** (0.034)	0.659*** (0.085)
Profitability	-0.065 (0.040)	-0.064* (0.035)	-0.039 (0.045)	-0.098 (0.067)
Family Business	-0.069** (0.028)	0.018 (0.024)	-0.082** (0.033)	0.213*** (0.055)
Employment (log)	0.225*** (0.044)	0.165*** (0.037)	0.133*** (0.049)	-0.086 (0.075)
Employment Sqr. (log)	-0.023*** (0.008)	-0.016** (0.006)	-0.019** (0.008)	0.024* (0.013)
Vintage	-0.007*** (0.003)	-0.005* (0.003)	-0.007** (0.003)	-0.003 (0.004)
Product/Service Innov	0.109*** (0.031)	0.082*** (0.026)	0.031 (0.036)	0.183*** (0.060)
Process Innov.	0.021 (0.031)	0.006 (0.025)	0.017 (0.034)	0.049 (0.057)
Growth Ambition	0.001* (0.001)	0.001** (0.000)	-0.001 (0.001)	0.003*** (0.001)
Future HR Skills	0.085** (0.040)	0.081*** (0.031)	-0.025 (0.048)	0.062 (0.067)
Future Capital Investment	-0.008 (0.029)	-0.016 (0.024)	-0.030 (0.031)	0.017 (0.052)
Future Product Innov.	0.167*** (0.034)	0.120*** (0.029)	0.076** (0.037)	0.223*** (0.065)
Future Org. Innov.	-0.074** (0.030)	-0.028 (0.025)	-0.031 (0.033)	-0.038 (0.052)
Constant	-10.633*** (0.271)	-10.674*** (0.262)	-9.862*** (0.377)	-8.626*** (0.945)
B. Productivity				
Exporter, lag	0.879*** (0.040)			
Export capable, lag		0.363*** (0.028)	0.059 (0.057)	0.805*** (0.050)
Exporter, lag		0.899*** (0.050)	0.664*** (0.052)	0.724*** (0.044)
Innov. Capability, lag	0.020 (0.025)	-0.038* (0.022)	-0.018 (0.024)	-0.039 (0.034)
Operational Capabil., lag	-0.019 (0.026)	0.020 (0.021)	0.067*** (0.023)	-0.024 (0.038)
Ext. Finance Capabil, lag	0.066*** (0.025)	0.061*** (0.022)	0.098*** (0.027)	0.111*** (0.035)
Strategy Capabil., lag	0.050* (0.026)	0.033 (0.022)	0.015 (0.026)	0.080** (0.036)
Employment (log, lag)	-0.210*** (0.038)	-0.162*** (0.036)	-0.103** (0.045)	-0.161*** (0.046)
Employment Sqr (log, lag)	0.023*** (0.007)	0.016*** (0.006)	0.009 (0.007)	0.017** (0.008)
Vintage, lag	0.008*** (0.002)	0.009*** (0.002)	0.008*** (0.002)	0.011*** (0.002)
Product/Service Innov, lag	-0.068** (0.027)	-0.040 (0.025)	-0.045 (0.029)	-0.116*** (0.036)

Process Innov., lag	-0.006 (0.027)	-0.021 (0.022)	-0.013 (0.026)	0.007 (0.038)
Multiplant, lag	0.100*** (0.039)	0.087*** (0.031)	0.063 (0.041)	0.160*** (0.053)
Intends capital investment, lag	0.011 (0.025)	-0.002 (0.022)	0.042* (0.025)	-0.013 (0.035)
On-site training, lag	0.011 (0.029)	0.004 (0.025)	0.035 (0.029)	0.029 (0.041)
Off-site training lag	0.048* (0.028)	0.027 (0.024)	0.036 (0.026)	0.080** (0.038)
Website, lag	0.119*** (0.044)	0.094** (0.038)	0.096** (0.047)	0.103* (0.059)
3 rd Party Web, lag	0.027 (0.029)	-0.006 (0.025)	0.005 (0.030)	-0.005 (0.041)
Internet, lag	0.233* (0.126)	0.080 (0.136)	0.055 (0.169)	0.305** (0.133)
Social media, lag	-0.083*** (0.026)	-0.056** (0.023)	-0.052* (0.030)	-0.148*** (0.037)
Constant term	9.854*** (0.169)	9.990*** (0.176)	9.746*** (0.199)	9.536*** (0.192)
Rho	-1.610*** (0.076)	-2.664*** (0.087)	-2.600*** (0.200)	-1.205*** (0.197)
No. of observations	4469.000	4018.000	3507.000	3862.000
chi2	1899.084	2047.127	1395.700	559.697
p	0.000	0.000	0.000	0.000
BIC	12005.408	10056.250	9343.504	10022.145

Notes: See Table 1 for variable definitions, all models include industry and regional dummies, data from Longitudinal Small Business Survey, 2015 and 2016.

Table 3: Marginal effects of the exporting status equation

	Exporters and Non-exporters	Exporters and DFFs	Exporters and Export-Capable	Export Capable and DFFs
-	(1)	(2)	(3)	(4)
Productivity	0.251*** (0.006)	0.275*** (0.005)	0.287*** (0.007)	0.174*** (0.025)
Profitability	-0.018 (0.011)	-0.019 (0.010)	-0.011 (0.014)	-0.026 (0.018)
Family Business	-0.019* (0.007)	0.005 (0.007)	-0.025* (0.010)	0.056*** (0.014)
Employment (log)	0.062*** (0.012)	0.048*** (0.011)	0.040** (0.015)	-0.023 (0.020)
Employment Sqr. (log)	-0.006** (0.002)	-0.005* (0.002)	-0.006* (0.002)	0.006 (0.003)
Vintage	-0.002** (0.001)	-0.001 (0.000)	-0.002* (0.001)	-0.001 (0.001)
Product/Service Innov	0.030*** (0.009)	0.024** (0.007)	0.009 (0.010)	0.048** (0.015)
Process Innov.	0.006 (0.008)	0.002 (0.007)	0.005 (0.010)	0.012 (0.015)
Growth Ambition	0.000 (0.000)	0.000* (0.000)	-0.000 (0.000)	0.001** (0.000)
Future HR Skills	0.024* (0.011)	0.023** (0.009)	-0.008 (0.014)	0.016 (0.018)
Future Capital Investment	-0.002 (0.008)	-0.005 (0.006)	-0.009 (0.009)	0.004 (0.014)
Future Product Innov.	0.046*** (0.009)	0.035*** (0.008)	0.023* (0.011)	0.059*** (0.016)
Future Org. Innov.	-0.020* (0.008)	-0.008 (0.007)	-0.009 (0.010)	-0.010 (0.014)
N	2869	2650	2650	2650

Source: Table 2, data from the Longitudinal Small Business Survey

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