

Research Report

Rural family businesses and exporting behaviour

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Abstract

Driven by the importance of exporting for growth, this report examines the exporting behaviour of UK small firms in rural and urban locations. Analysing data from five waves of the Longitudinal Small Business Survey from 2015 to 2019, the report examines the development by firms of goods or services that are suitable for exporting and the subsequent decision to export, either consistently or intermittently. Overall, we find significant differences between rural and urban firms in terms of exporting, where firms located in sparse, dispersed areas were more likely to export, although less likely if they declared themselves as family businesses. We also find that some types of firms, BAME-owned and women-owned businesses, are much less likely to develop tradeable goods and services. We demonstrate how the role of advice seems specifically connected to the decision to develop tradeable goods and services, rather than exporting per se. The research confirms the importance of productivity and innovation on both exporting and developing tradeable goods and services. We propose a future research agenda on the exporting practices of rural family businesses and women-owned enterprise, and on the role of exporting advice.

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Executive summary

The research findings are based on an analysis of the Longitudinal Small Business Survey (LSBS) 2015-2019. The LSBS is a large-scale survey of small business owners in the UK, commissioned by the Department for Business, Energy and Industrial Strategy (BEIS), first conducted in 2015 and repeated every year to create a longitudinal track. It was delivered through computer-assisted telephone interviews (CATI). In the sample firms 26% of firms exported, while 40% had tradeable goods or services they were either exporting or were capable of being exported.

The analysis splits the shift into exporting into two distinct processes. The first process is to develop a good or service that is suitable for exporting i.e. it is tradeable. Those firms that have tradeable goods and services we define as export capable (Gkypali, Love and Roper, 2021). Conditional on being export-capable (having a tradeable product or service suitable for exporting which were 39.9% of firms), the second process is to export that good or service (which 25.7% of firms do). Moreover, exporting firms might consistently export (17.8% of firms) or only intermittently (amounting to 6.2% of sample).

We found both urban and rural firms with tradeable goods and services had higher turnover, found competition to be an obstacle to their objectives, were more likely if home-based businesses and/or with limited liability, had high expectations of future growth, were heavily involved in innovation, and were actively taking advice on the topic of exports. We also found that significantly fewer women-owned or BAME-owned firms were export-capable.

Our findings also show some significant differences between rural and urban firms overall with respect to exporting behaviour. Firms in sparse rural areas are more likely to be constant exporters, although this finding is tempered by a lower likelihood of family businesses exporting in sparse rural areas.

The research also found an ambiguous effect of advice-taking on exporting behaviour for both urban and rural firms. On the one hand, we found a positive effect of advice- in helping firms to become export capable. On the other hand, once firms supply export capable goods or services, then taking advice on export matters was negatively associated. One may interpret this as advice having a stronger association with export capability rather than exporting.

We highlight several areas for future research including:

1. We need to know more about the impact of location on exporting behaviour, including a more fine-grained comparison of rural and urban family businesses. Understanding the exporting constraints facing rural family businesses is important given they constitute a substantial proportion, well over half, of rural enterprises.
2. Further investigations are needed specifically on the role of exporting advice to support exporting. We found strong positive association between taking formal advice and developing tradable goods, but this advice was negatively associated with the likelihood of firms going on to export. Since firms that continued to take advice once they had developed tradeable goods were

significantly less likely to export, one interpretation might be to point to problems that these firms experience, another that the association is stronger with the earlier stage of export capability. In addition, we found some complementarity in advice, where for example advice on technology and tax had significant impacts.

3. In addition, we found a lower likelihood of women-owned businesses being export-capable. Understanding the drivers for women-owned businesses to develop tradeable goods would be useful because our study showed no difference in the exporting propensity of women-owned firms once they had developed the tradeable goods and/or services.

1. Introduction and background

In light of the UK having left the EU, it becomes all the more important to understand both the exporting behaviour of current exporters, and the exporting potential of non-exporters to build the national profile and the competitive advantage of the UK. As the UK pursues a Global Britain policy and positions itself as an open trading partner, there is a need to spread exporting behaviour more widely across UK businesses.

Small businesses have an important role to play in this broadening of the export base. SME exporters account for around one-in-five employer SMEs in the Longitudinal Small Business Survey in 2019. As the size of the business increases, in terms of employment, firms are more likely to export. Whereas only 19% of micro-businesses (1-9 employees) exported in 2019, one-in-four small businesses (10-49 employees) and one-in-three medium-sized businesses (50-249 employees) exported. The 2018 survey reported similar proportions. The LSBS has higher levels of exporting behaviour in its sample than other studies estimate. See for example the estimate of 9% of UK SMEs by BIS, (2016). The study compares the exporting behaviour of small firms in both urban and rural areas. Previous studies established how the rural disadvantage of constrained local market opportunities pushed some rural firms, who had suitable goods and services, towards extra-local markets leading them to take advantage of export markets (North and Smallbone, 1996; Phillipson et al., 2019). Thus, more rural firms were export-orientated (Phillipson et al., 2019).

This report explores both exporting behaviour of UK SMEs and the movement towards exporting, where the firm becomes export capable i.e. possessing a tradeable good or service.

We ask:

1. What factors in terms of type of firms, their location (urban-rural), challenges, innovation performance and advice-taking behaviour are linked to the ability of the firm to generate a tradeable good?
2. How are these factors linked to the ability of the firm to export a tradeable good?

The report begins with a brief review of the existing literature focusing the exporting behaviour of SMEs. Next, we describe the empirical approach and research methods. Then, we present findings before concluding and discussing the implications for future research.

1.1 Exporting among SMEs: the existing evidence

Studies of entry into export behaviour of firms have focused on both the external and internal environment of the firm (e.g. Paul, Parthasarathy and Gupta 2017). The external environment refers to macro-economic aspects, including industrial and political factors over which the individual firm has little control. However research highlights the importance of the internal firm-level determinants such as resource availability and management actions (Johanson and Vahlne 1977) over which the firm has strategic choice (Katsikeas, Leonidou and Morgan 2000).

Extant reviews (e.g. Paul et al. 2017) link a variety of factors to SME exporting including resource constraints and capabilities, particularly innovation. SMEs are encouraged to formulate responses to identified barriers to exporting (Kahiya and Dean 2016, Yu, Yan and Assimakopoulos 2015), where barriers include human resources and organisational capabilities (Cahen, Lahiri and Borini 2016) and resource constraints – which are most constraining for the smallest firms (Wood, Logar and Riley Jr 2015). Capability constraints include productivity and technology-based capability (Wei et al. 2014). Export success depends on the firm's innovation capabilities (Golovko and Valentini 2011, Love, Roper and Zhou 2016) and innovations can boost the positive effect of exports on firm productivity (Cassiman and Golovko 2011).

The literature also indicates the importance of SME leadership, including entrepreneurial leadership and skills (Dikova et al. 2016), highlighting the desirability of a strategic entrepreneurial orientation associated with growth and the expectation of future growth (Hagen et al. 2012). Reference is made to a 'global mindset', which is influenced by the entrepreneur's education level, satisfaction with domestic company performance and the potential for domestic market growth (Kyvik 2011). That is to say that managers may intend to grow the business through developing export markets. Moreover, previous work suggests SME leadership should identify and effectively make use of government support and promotional incentives (Landau et al. 2016, Paul and Shrivatava 2016, Torres, Clegg and Varum 2016) to improve the probability of export success.

However, longstanding criticisms have also been made of the binary distinction between exporters versus non-exporters, without consideration of sub-groups such as uninterested non-exporters or those exporters with intermittent exporting behaviour (Leonidou, Katsikeas and Piercy 1998, Gkypali, Love and Roper 2021).

1.2 Locational effects on internationalisation

The role of location on internationalisation is not as straightforward as one might expect. There are competing influences on firms located in rural areas. More complex exporting products are more often located in urban areas (Zhu, Yu and He, 2020). Rural firms are constrained by the lower population density of their local geographical market. Therefore, to gain a similar sales turnover to their urban counterparts will require the firm to market further afield. Consequently, the problem of marketing to extra-local markets may turn into an advantage as rural firms may be more likely to develop export markets than their urban counterparts (North and Smallbone, 1996; Phillipson et al., 2019). Rural firms may have poorer access to resources, but rural exporters can overcome resource constraints through networks including Chambers of Commerce (Tiwasing and Sawang, 2021). Research highlights the importance of extra-local networks for rural internationalizing businesses (Dubois, 2016). Consequently, as evidence. using the longitudinal small business survey (LSBS) for the UK in 2015 revealed, rural firms may export more than their urban counterparts (Phillipson et al., 2019).

1.3 Types of business and internationalisation

Business owner characteristics play a significant role in firms' decisions to export and internationalise (Bolzani and Boari, 2018; Jones et al., 2011; Martineua and Pastoriza, 2016). Research has identified the direct effect of entrepreneurs' characteristics on the

outcomes of internationalisation (Jones et al., 2011, Ruzzier et al., 2006; Martineau and Pastoriza, 2016). In particular, how entrepreneurs evaluate opportunities is strongly related to internationalisation, and past research indicates that entrepreneurs' characteristics influence this evaluation (Bolzani and Boari, 2018).

1.4 Family business in urban and rural areas

The internationalisation of family firms (defined as having a majority of ownership from one family) is an under-researched field of study (e.g. Casillas and Acedo, 2005; Crick, Bradshaw & Chaudhry, 2006; Jones, Coviello, & Tang, 2011; Segaro *et al.*, 2014). But it is one that is especially important for rural economies given the proportional significance of family-based firms within the rural business population. Some studies have identified the local embeddedness of family firms as a barrier to internationalisation (e.g. Kontinen & Ojala, 2011), whereas others found family firms to be more entrepreneurial in identifying opportunities in international markets (e.g. Eddleston, Kellermanns, & Zellweger, 2012). Reasons identified include their socio-emotional wealth (Gomez-Mejia et al., 2011) and organisational culture; in particular, management flexibility and experience of the management team combined with a stewardship, employee, customer and long-term orientation, (Alessandri et al., 2018, Gomez-Mejia et al., 2007, Miller et al., 2008; Segaro et al., 2014), all of which have a positive impact on internationalisation. On the other hand, a culture of family commitment and an internal orientation has also been found to operate against internationalisation (Segaro *et al.*, 2014).

1.5 Ethnic minority business

Previous research suggests that ethnic minority entrepreneurs, in particular first-generation migrants, have a greater likelihood of engaging in internationalisation than host society entrepreneurs (Hayer and Ibeh, 2006). This is due to the 'developmental' experience of successful migration, as they can rely on international networks and associated intercultural skills, and also experiences in working in the country of origin (Crick et al., 2001; Kloosterman, 2010). Yet, these findings are not applicable to all ethnic minority entrepreneurs, and particularly not to second generation individuals. Yet a study of first-generation immigrant entrepreneurs to Italy in new technology-based firms found that the 'migrant condition' is negatively related to the perceived feasibility of exporting. Here the perception of environmental barriers might have overshadowed the positive characteristics of the 'migrant condition' (Bolzani and Boari, 2018).

However, the relationship between ethnic minority businesses and exporting is largely considered to be positive. In general, the network theory of internationalisation posits that firms can overcome the uncertainty associated with exporting to a new market through personalised links with that market (Ashourizadeh, Li and Wickstrøm 2020). Ethnic minority businesses are highly likely to have these other networks and links (Czinkota, Khan and Knight 2021). This expectation is rooted in research findings that ethnic minority entrepreneurs benefit from diaspora networks. This diaspora network link to the country of origin and to those countries where fellow expats have moved (Tajeddin and Carney, 2019).

1.6 Women-owned business

Women-owned businesses are generally underrepresented amongst exporting firms (UNCTAD and UN Women, 2020). Policy makers have recently paid a lot more attention to women-led firms and their exporting behaviour, highlighting how increasing women's exporting behaviour can positively impact economic growth and sustainable development (UNCTAD and UN Women, 2020). Currently, exporting for women-owned businesses involves overcoming more constraints than for male-owned businesses. However, if women-owned firms are owned by women migrants they are more likely to export than other women-owned businesses (Orser et al. 2010).

Identified barriers for women and export include their tendency to choose less risky growth strategies to balance family and work responsibilities (e.g. Boler et al., 2018), as well as internal financial constraints and access to external finance (e.g. Sabarwal & Terrell, 2008; Shepherd and Stone, 2019). Most recently, the role of networks in accessing advice has been identified as relating positively to export activity. Women directors and partners not seeking networking advice were less likely to export (Idris and Saridakis, 2020).

1.7 Learning-to-export and learning-by-exporting

A key gap in the literature and our understanding concerns what happens during the pre-export phase. This stage is important because there is a significant gap between businesses with export potential (those with tradeable goods and services but who do not export) and exporters. This gap is more pronounced in rural area. with Phillipson et al., (2019) finding 18.3% of rural firms and 15.0% of urban firms in England's to be potential exporters.

Two prominent but not mutually exclusive perspectives in the literature on exporting and its impact on business performance are learning-by-exporting and learning-to-export (Eliasson et al., 2012). Via *learning-by-exporting*, exporters achieve higher productivity performance than their non-exporter counterparts. This is because once firms export, they face more intense competition in the international market. These firms also obtain new knowledge from their international customers and current and potential rivals. The international condition pushes exporters to become more productive and efficiently utilise their resources. Exporters are therefore likely to be more productive and innovative, compared to non-exporters. Consequently, the learning process happens after the firm enters the international market.

This approach, however, is subject to self-selection bias because exporting firms have distinctive characteristics compared with non-exporting firms (Eliasson et al., 2012, Love and Roper, 2015). The selection problem means that export firms may have higher productivity than non-export firms even before they export, which is associated with the second view – *learning-to-export*. From this view, when firms intend to export their products to international markets, they will start to prepare their businesses. Eliasson et al. (2012) imply that firms prepare themselves for exporting by consciously increasing productivity. Gkypali et al., (2021) highlight process innovation in learning to export. As such, the learning process occurs before export activities start, and learning can continue after exporting begins. For example, compared to non-exporters, both pre-exporters and

exporters have higher productivities and are more likely to introduce product innovation (Gkypali et al., 2021).

2. Research design and methodology: sample

The study uses five waves of the Longitudinal Small Business Survey (2014-2019), a large-scale survey of small business owners in the UK, commissioned by the Department for Business, Energy and Industrial Strategy (BEIS). It was first conducted in 2015 and repeated every year to create a longitudinal track delivered through computer-assisted telephone interviews (CATI). Interviews are conducted with owner-managers or other senior directors of the firm. The sampling frame for the LSBS is taken from the registered businesses in the UK government's Inter-Departmental Business Register (IDBR) and from Dun and Bradstreet for unregistered businesses. The stratified sample aims to achieve a balance between non-employers, micro-businesses (1-9 employees), small businesses (10-49 employees) and medium-sized businesses (50-249 employees). In the first wave (year 2015), the data set included around 15,000 firms. In the second year, about 9,000 firms were interviewed, including both re-surveyed (about 6,000 firms) and topped-up firms. In the third year, about 6,600 firms participated in the survey. The number of interviews was boosted to 15,000 firms and 11,000 firms in years 2018 and 2019, respectively, to maintain the longitudinal track.

The data produced an unbalanced¹ panel sample of 10,127 observations from five waves with all the SMEs present at least twice in the dataset. The data cleaning process dropped observations which had missing values for the dependent and independent variables. Data were dropped where the observations were for just one of the waves. On average, firms appeared 2.29 times in the dataset.

Although exporting is an important factor explored by the survey, the LSBS tends to be firm-orientated rather than entrepreneur-orientated, as it focuses on a range of business operations. Consequently, it does not focus on the owner-manager, something that previous research suggested is an important part of the pre-export stage (Ganotakis and Love 2012, Wiedersheim-Paul, Olson and Welch 1978). Nonetheless, there are a wide number of firm characteristics in the survey including the size of the management team, the type of business such as whether they are a family firm, major obstacles towards the achievement of objectives, access to finance, business support and some capabilities in terms of training and innovation.

The LSBS enables the research to distinguish between types of exporters and non-exporters. Specifically, following Gkypali, Love and Roper (2021), non-exporting firms responded to a question asking them whether they had any product or service suitable for exporting. Firms which declared exportable products or services were deemed export-capable. Export-capable plus exporters make up a tradeable group. In addition, exporters were also asked whether there were some years where they had not exported. Those which responded positively to this question might be considered intermittent

¹ The panel data has some missing years for some cross-sectional units. If the reason that the firm leaves the sample is essentially random this has no effect on the analysis.

exporters. Detailed variable definitions and descriptive statistics of the variables employed in the empirical estimation over the 10,127 firms in the dataset can be found in the appendix table 1.

The summary statistics of dependent and independent variables used in this study show that almost 40% of total firms have some goods/services suitable for export – the tradeable group. Within this tradeable group, approximately 69% of them did export in the last 12 months, which accounts for 25.7% of total firms. Among those exporters, 80% are constant exporters (i.e., they have been exporting each year over the last five years) and 20% are occasional exporters (i.e., they exported in the last 12 months but in some years did not export). Naturally, the exporter amount changes from year to year because intermittent exporters 'come and go'.

The average firm in the sample has 22.8 employees, although the median sample value was six employees, and was more than 11 years old, which means that a typical firm is small but mature. Limited liability businesses account for 66.5% of the sample. Firms are relatively equally distributed into sectors, with more than 10% of the sample in manufacturing, wholesale and professional services. One in four firms in the sample (28.8%) locate in a rural area. Approximately two-thirds are family businesses, and one in four firms are home-based businesses. Regarding the owner's demographics, the proportions of women-led business and ethnic minority-led business are 13.5% and 3.5%, respectively. A half of businesses report competition as a major obstacle to their business, while 17.9% of firms evaluate premises as a major obstacle. Formal management training is taken on by 31.8% of firms. Meanwhile, 9.2% of firms claimed that they need finance, whilst 16.7% tried to obtain external finance in the last 12 months. On average, in the last five years, firms in the sample obtained or tried to obtain external finance three times. A higher proportion of firms conducted goods/services innovation than process innovation. Surprisingly, more innovation is 'new to the market innovation', rather than just new to the business. 26.5% of firms claimed that some innovations are new to the market, with only half of this number introducing innovation just new to the business.

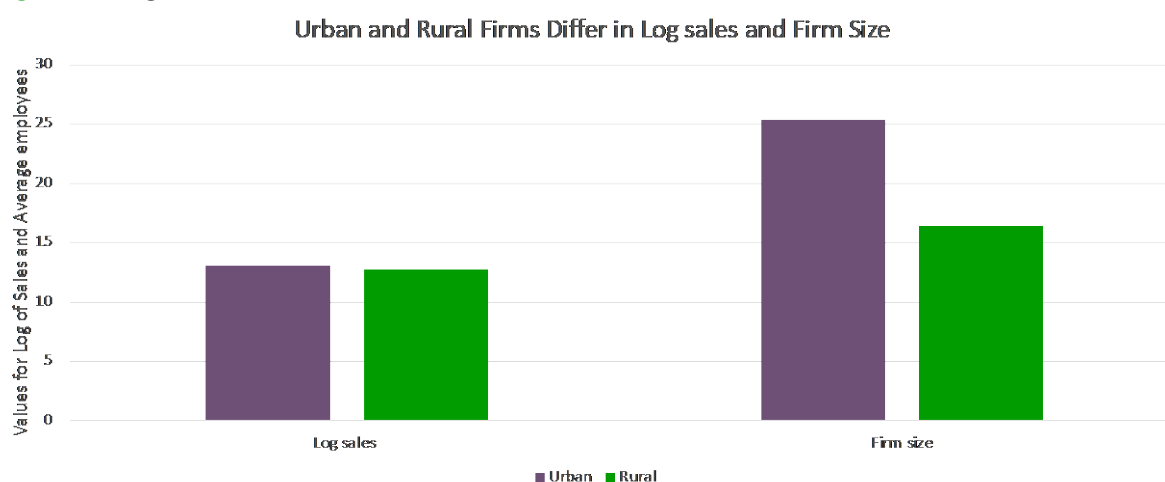
The number of firms expecting high growth in the next three years accounts for one fourth of the sample. Nearly seven-in-ten firms plan to improve their workforce skills over the next three years, and 47% of firms plan to increase leadership capability of their managers. Meanwhile, a fixed asset investment plan is relatively less important, with only 43.6% of SMEs planning to develop one, with a similar percentage planning to introduce new products/services – 42.9%. Some 39.8% of firms have a business plan. However, the proportion of firms taking advice on tax, technology and exporting in any one year is surprisingly low, with 4.2%, 2.3%, and 0.8%, respectively.²

² The reliability of econometric estimates would be improved if more businesses in the survey had taken advice. Nevertheless, the absolute numbers are sufficiently high to make inferences.

3. Comparing urban and rural firms overall: descriptive statistics

This section charts the significant differences between urban and rural firms in the unbalanced panel in the LSBS. In the data the average log of sales is significantly higher in the urban sample (13.1) compared to the rural (12.8) ($t=7.67, p=.000$) and the urban firms have on average more employees (25.4) compared to their rural counterparts (16.4) ($t=11.2, p=.000$) see figure 1.

Figure 1 Log Sales and Firm Size: Urban and Rural Firms



There are no significant differences between the number of firms with tradeable goods (40.1% in urban versus 39.5% in rural) or services nor between the number of exporters (26.2% in urban versus 24.5% in rural). However, there were fewer consistent exporters in rural areas, ($t=2.233, p=0.026$). This finding may indicate a policy need to support greater consistency in rural exporting (see Figure 2).

Figure 2 Exporting: Urban and Rural Firms

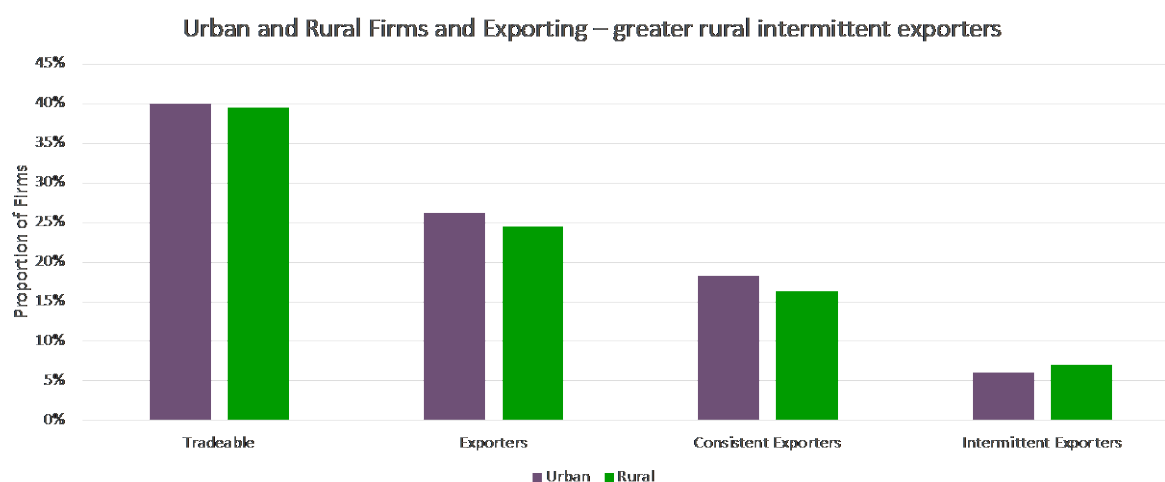
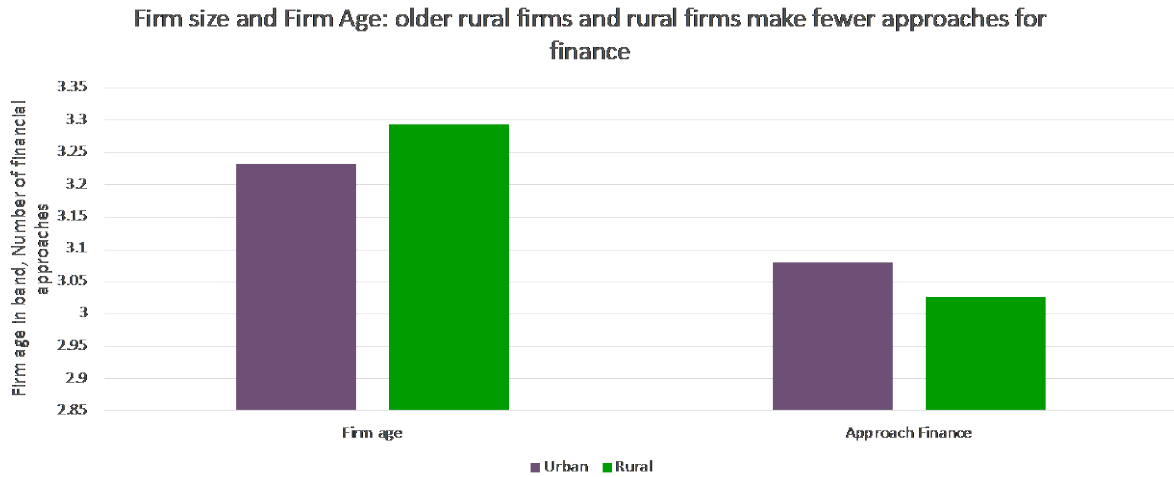


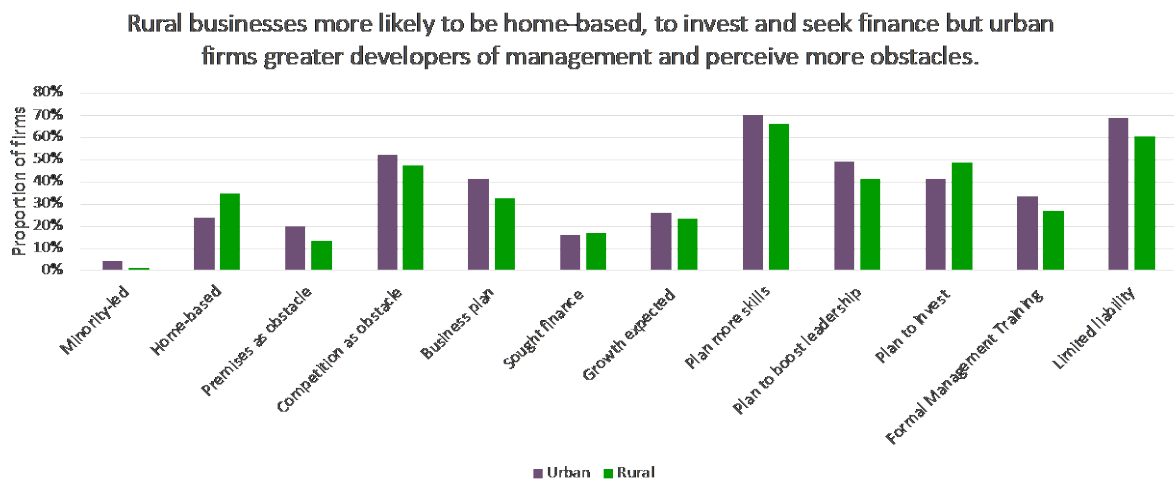
Figure 3 shows rural firms to be older than urban ($t=2.161, p=.003$), which is in line with expectations, with rural firms making slightly fewer approaches to external finance ($t=2.177, p=.03$).

Figure 3 Urban and Rural Firms: size, age and number of approaches for seeking finance over the previous 12 months



Significant differences exist in the characteristics of firms and their behaviour between rural and urban businesses in the LSBS sample. Far fewer minority-led businesses operate in rural areas ($t=9.317, p=.000$), but more home-based businesses are found in rural areas ($t=10.648, p=.000$). More urban businesses cite either premises or competition as an obstacle to their business goals ($t=4.21, p=.000$). Urban firms are more likely to have a business plan ($t=8.054, p=.000$), undertake formal management training ($t=6.748, p=.000$) and plan to boost their leadership ($t=7.505, p=.000$). More urban firms have limited liability ($t=7.983, p=.000$). Despite the obstacles, urban firms are more likely to expect future growth ($t=2.606, p=.000$). Rural firms are more likely to plan to invest ($t=6.867, p=.000$). More rural firms sought finance ($t=1.152, p=.249$) though the difference is not statistically significant (see Figure 4).

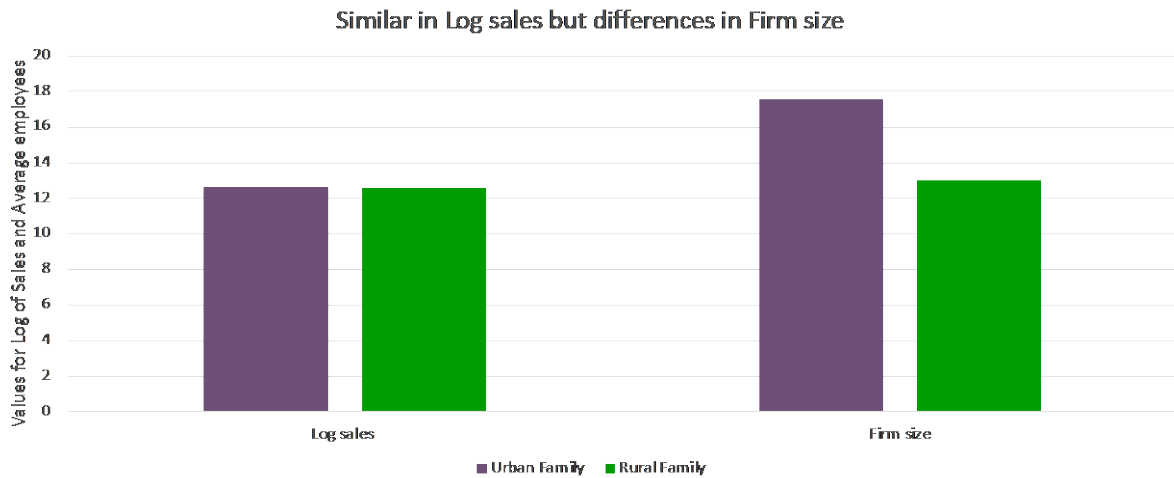
Figure 4 Urban and Rural Firms: differences in proportions



4. Comparing urban and rural family firms: descriptive statistics

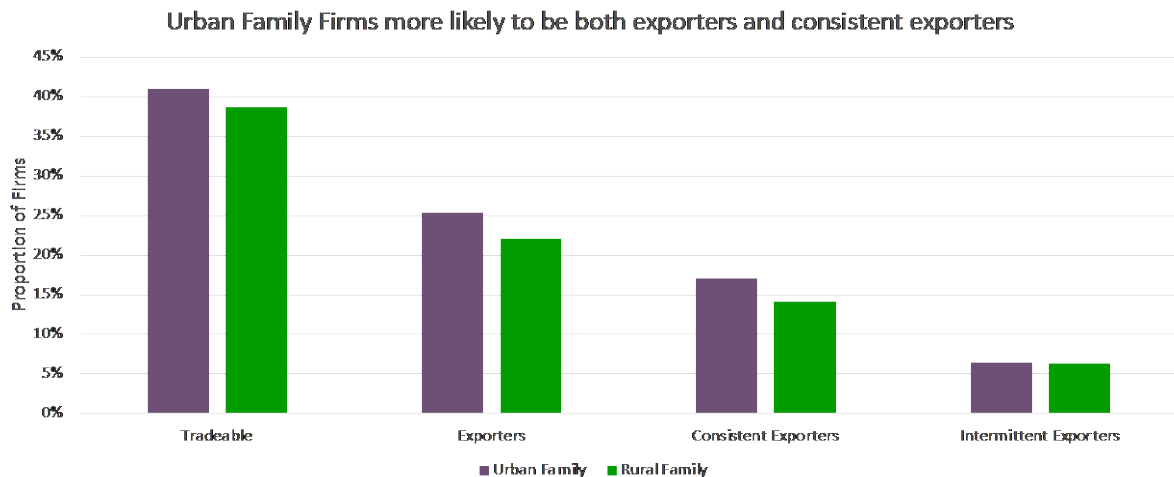
Family firms (defined as majority-owned by one family) comprise over two-thirds of the LSBS sample, which includes 3,159 urban and 1,540 rural family firms. In terms of sales performance, similar log sales are indicated for urban and rural family firms ($t=0.818$, $p=.99$). Urban family firms are on average larger with 17.6 employees compared to 13.1 employees for rural family firms ($t=5.012$, $p=.000$).

Figure 5 Log Sales and Firm Size: Urban and Rural Family Firms



The LSBS shows greater differences on exporting between family firms with 25.4% of urban family firms exporting compared to 22.1% of rural family firms. The differences in the proportion of tradable goods and services are only weakly significant ($t=1.88$, $p=.059$). Urban family firms are more likely to be involved in exporting ($t=2.94$, $p=.003$), and more likely to be consistently exporting ($t=2.978$, $p=.003$). Intermittent exporters show insignificant differences ($t=.009$, $p=.413$).

Figure 6 Exporting Family Firms: Urban and Rural



Family firms in rural areas are on average older ($t=4.61$, $p=.000$). Rural family firms made fewer approaches for finance ($t=4.162$, $p=.000$) (see Figure 7).

Figure 7 Urban and Rural Family Firms: age and approaches to finance

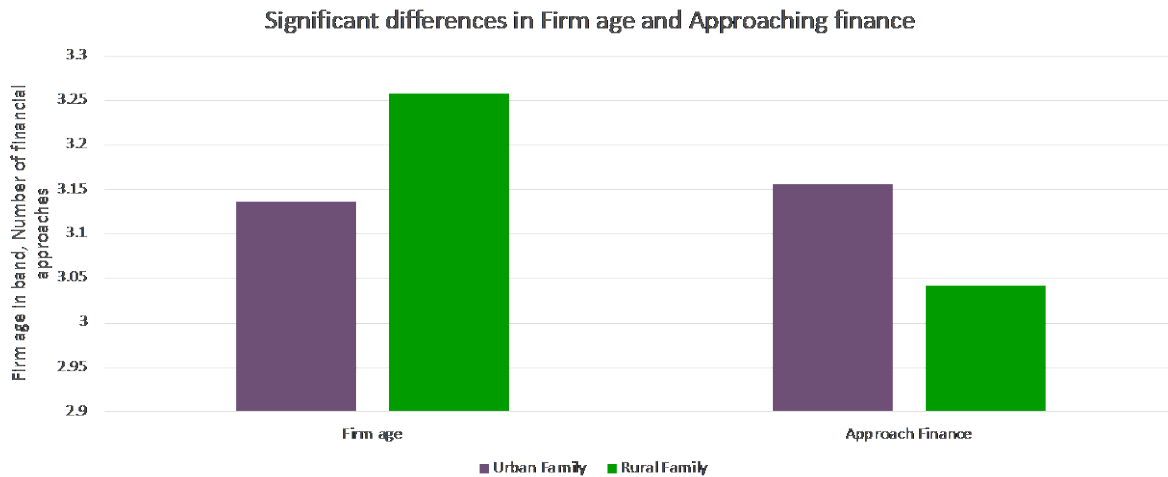
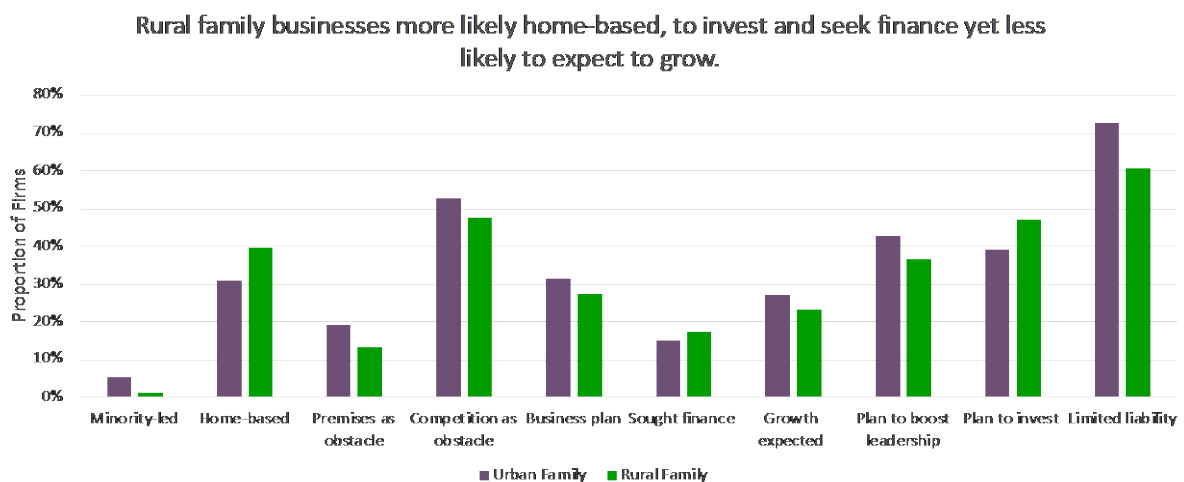


Figure 8 displays a range of other characteristics of rural and urban family firms. Fewer ethnic minority-led family businesses are found in rural areas ($t=7.900$, $p=.000$) but there are more home-based family businesses ($t=7.040$, $p=.000$). Like urban firms more generally, urban-based family businesses report more obstacles from premises ($t=5.860$, $p=.000$) and competition ($t=4.173$, $p=.000$) than their rural counterparts. More urban family firms have a business plan ($t=3.460$, $p=.001$). In terms of finance, the situation is more complex. A higher proportion of rural family firms sought finance ($t=2.610$, $p=.009$) and planned to invest in the next three years ($t=6.174$, $p=.000$), yet they made relatively fewer approaches to financial providers than urban family firms ($t=4.162$, $p=.000$). More urban family businesses had growth expectations ($t=3.250$, $p=.001$) and planned to boost their leadership ($t=4.710$, $p=.000$). A higher proportion of limited liability family businesses were found in urban areas ($t=10.253$, $p=.000$). The charts do not show aspects associated with either innovation or advice because these did not differ between urban and rural family firms.

Figure 8 Urban and Rural Family Firms: differences in proportions



5. Analysis

In general, a small firm does not simply decide to export, although on rare occasions an order from overseas may appear, rather it may prepare or have circumstances that are conducive to exports. Therefore, not all firms are equally likely to export. To deal with the complications that arise from this point, we estimated models using two stages. The first stage estimates this preparation or conducive situation for exporting where firms had goods or services that they saw as tradeable. The results of this stage are in section 6. In the second stage, we incorporate this preparation into models of different exporters in section 7. The next section 6.1 explains our reasoning, and is a little technical, so readers may skip this section if they so desire.

5.1. Modelling approach

The modelling is based on three main considerations.

First, the decision to export requires the firm to have a good or service that is exportable. Second, appropriate panel data techniques must be chosen. And third, it is necessary to test for potential biases from endogeneity (i.e. when the explanatory variables are correlated with the error term of the model).

In dealing with the first consideration, we observe whether the firms are potential exporters because they have a good or service capable of being exported (or they are already exporting). Therefore, we add a selection model to explain what are the determinants that make a business likely to be 'selected' as capable of exporting. In this selection model, known as the Heckman selection approach, all variables of interest are introduced, and it is estimated by a probit using panel data, enabling an unobserved effect to be estimated for each firm.

How the unobserved effects are dealt with leads to the choice of panel data methods. Generally, random effects estimation is more efficient than a pooled OLS estimation and therefore more efficient than a probit on pooled data. However, the random effects estimation can be biased when the unobserved differences are correlated with the explanatory variables (Wooldridge 2013). To account for this potential bias, we also estimated a model with correlated random effects. Correlated random effects estimation includes a unit-specific time average variable, which we called 'x_bar_selCRE'. Including this in the equation controls for the interaction between unobserved differences and explanatory variables to make the analysis in effect a fixed-effects analysis (Wooldridge 2013). In addition, this allows us to include variables that do not change, such as rural location, family business etc. Hence, we estimate two probit models one with random effects and the other with correlated random effects. Consequently, in figures 9-12 random effects are indicated by the green bars and purple bars indicate correlated random effects.

The third aspect is testing for potential biases from endogeneity from, reverse causality or simultaneity. Reverse causality means that the dependent variable (the exporter or exportable status) might impact firm turnover and/or the uptake of advice. In the case of firm turnover, a shock like the failure of a foreign competitor, might increase the likelihood of a business to export. Therefore, an increase in exporting would increase firm turnover. Similarly, the changing status of the business from non-exporter to exporter could be

what drives the advice for export when, say, a business receives an export order for the first time, and in order to deal with it the business seeks advice. Whilst reverse causality is not the only way that endogeneity might threaten the results, the models have plenty of control variables making omitted variable bias unlikely.

We tested for endogeneity using a four-step approach (see Wooldridge, 2013). First, we found variables that were both correlated with the potentially endogenous variable but uncorrelated with the outcome variable. Then using an equation that includes all the variables we estimate the potentially endogenous variable. We obtain the residuals from this equation. Next, we add the residual as a variable into the main structural equation. Finally, we examine the t statistic from the variable and test whether it is significantly different from zero. If the t statistic indicates that the variable is significant, we conclude that the variable is indeed endogenous.

We performed the test on both 'exporter' and 'tradeable' status. The value for ln turnover on export status was insignificant ($t=-0.04$, $p=0.967$) and it was also insignificant for firms with tradeable goods ($t=-0.78$, $p=0.433$). Therefore, we cannot reject the null hypothesis that the variable is not endogenous. Similarly, for the impact of export advice on exporter status was insignificant ($t=-0.16$, $p=0.875$) and it was also insignificant for tradeable ($t=0.80$, $p=0.423$).

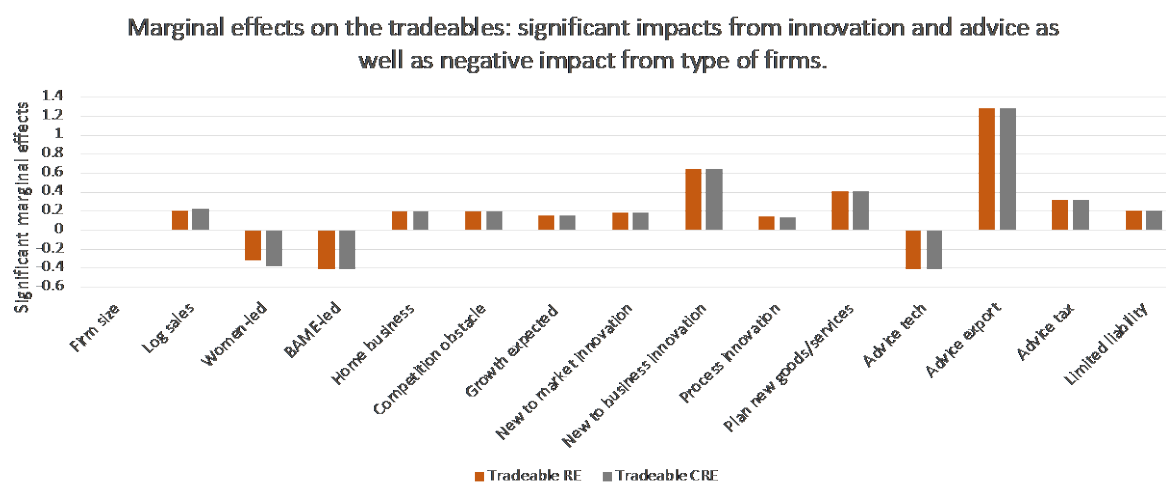
6. Findings: modelling firms that have tradeable goods

We, first of all, consider the factors that lead to a business having the potential to export by having a good or services that is capable of being exported. From the non-panel sample of the LSBS by year we can identify the differences between the number of firms reporting tradeable goods and services but who do not export. These numbers vary between 11.2% and 15.4%; moreover, a consistent pattern of greater numbers of rural firms reporting having tradeable goods but not exporting ranging from 1% to 2.6% with an average of 1.7%. The chart (see figure 9) reports significant marginal effects from two models. The first, as shown in the green bars, reports the marginal effects from a random effects model to predict the likelihood that a firm has a tradeable good or service. This displays significant positive effect of log sales, of home businesses, having competition as an obstacle, expecting future growth, undertaking innovation (new to the market, new to the business and process), having future plans for new goods and services, taking advice on exports, taking advice on tax and having limited liability. The green bars show a negative effect of firm size, although the marginal effects are small. The green bars show further negative effects from being a women and/or BAME-led business and of seeking advice on technology, on the likelihood of having a tradeable good or service.

The second model is shown in the purple bars which reports the marginal effects from a correlated random effects model. This model has an extra variable labelled x_bar_CRE . The purple bars show similar positive and negative impacts as the green bars previously. The unit specific average variable (x_bar_CRE) was insignificant. This indicates that the random effects model shown in the green bars is to be preferred. Nonetheless since both

models produce very similar results, save for the impact of firm size, this gives us some confidence that these results are robust.

Figure 9 Marginal effects on the tradeable



These significant effects are largely consistent with previous literature. Given labour productivity is often modelled as turnover over employees (e.g. Gkypali, Love and Roper 2021) and our equations include both the positive effect of turnover controlling for firm size, it follows that there is a positive impact of labour productivity. The role of innovation is also consistent with previous literature on the topic (e.g. Love and Roper, 2015). The strong influence of advice on exporting is a novel finding.

7. Modelling types of exporters

Having considered the factors impacting on the businesses' likelihood to have tradeable goods and services, the next step is to become an exporter. We examine three types of exporters. First, those who export in the year previously (exporters); second, those who export every year in the dataset (constant exporters); and third, those who export in some years but not in others (intermittent exporters). We show the significant factors from each of the models in bar charts in Figures 10, 11 and 12. The tables in the appendix report the coefficients, whilst the charts report the incremental increase in export probability for one unit change in those factors (i.e., marginal effects of those factors on export). The tables on which these are based are to be found in the appendix³.

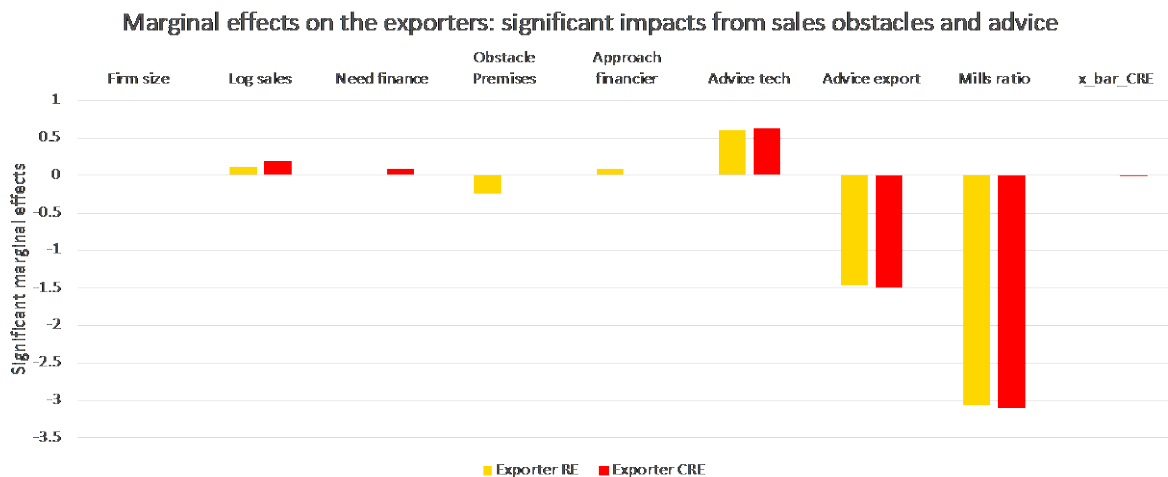
³ See Appendix. Tables 4 and 5 show a probit model for predicting exporting firms, constant exporters, and occasional exporters, including the Mills ratio to control for selection. In the appendix, table 5 includes the Mills ratio and a unit specific time average variable.

7.1 Exporters

We begin with the marginal effects on the exporters in Figure 10. The green bars show the model based on random effects and the purple bars show the correlated random effects model. Examining the green bars, first of all there is a positive impact of log sales (turnover), showing those companies with higher turnovers are more likely to export. The second impact is having premises as an obstacle, which reduces the likelihood of firms being exporters, possibly because of production constraints. Those who export are also more often seek finance. Taking advice on technology is positively associated with being an exporter, However, taking advice on exports is negatively associated with being an exporter.

Turning to the correlated random effects shown in the purple bars. There are similarities with the effects in the green bars for, premises as an obstacle, advice effects and the Mills Ratio (selection effect). Approaches for finance, and premises as an obstacle are insignificant factors, but firm size and the need for finance are. Since the X_bar_CRE variable is significant the model illustrated in the purple bars is to be preferred. Overall, therefore we find impacts from turnover, finance and advice.

Figure 10 Marginal effects on exporters



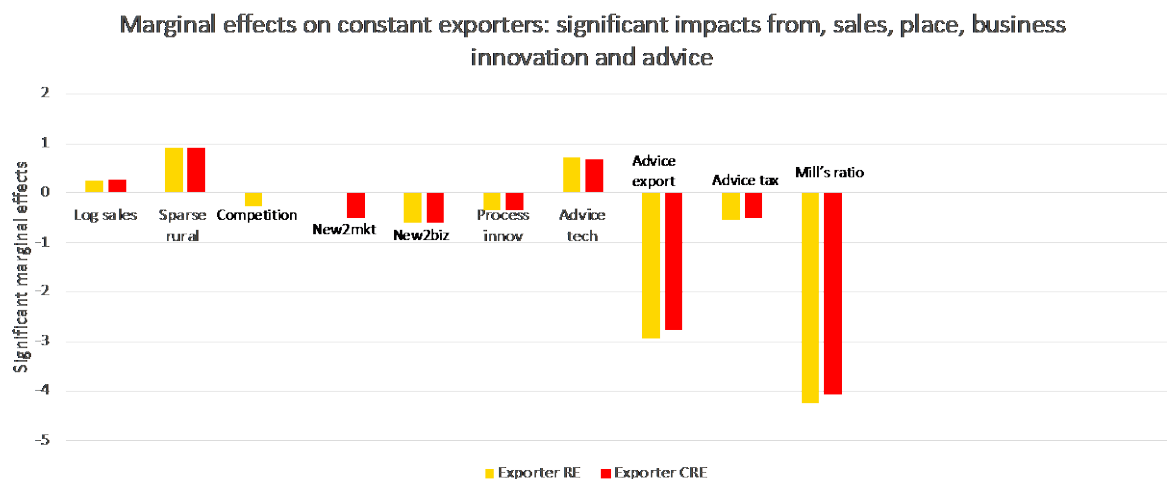
7.2 Constant exporters

Businesses that constantly export are important because these are likely to develop longer term contracts and potential expand their exporting activity. Again, the random effects model is shown in the green bars and the correlated random effects in the purple bars. We begin with the random effects model. Constant exporting is associated with a range of factors. First, log sales are shown as positively significant. Firms in sparse, dispersed rural areas are more likely to be constant exporters, although this needs to be seen in the context of a general pattern of lower propensity to export among family business in sparse rural areas (not quite significant at the 5% level but very close ($t=1.94$, $p=.052$)). There is a negative impact of competition, suggesting constant exporters are less likely to find competition as an obstacle to their ambitions. Also figure 10 displays negative

impacts of both new to the business innovation and process innovation. Perhaps this might indicate a timing issue for innovation. The figure shows a positive association between constant exporting and advice on technology and ecommerce, but there is a negative impact of export advice and tax advice. Finally, the Mills ratio is shown as significant, making selection important.

Turning to the purple bars, results are similar on log sales; for sparse, dispersed rural areas; for new to the business and process innovation; export advice and the Mill's ratio. Since our 'fixed effect' is insignificant, the random effects model in the green bars is to be preferred. Thereafter, what is significant in this model is the negative impact of new to the market innovation. In general, the constant export model is similar to the exporting model in relation to the impact of place, family business, advice and process innovation. In this instance it is the green bars that represent the better model.

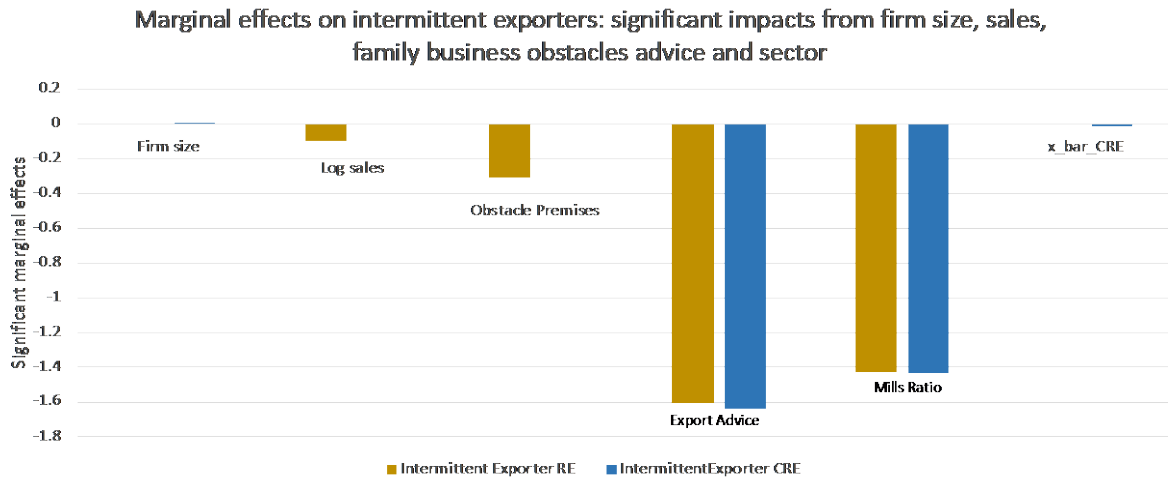
Figure 11 Marginal effects on Constant Exporters



7.3. Intermittent exporters

Intermittent exporters have shown that they can export but are either not committed or accomplished enough to export every year (Bernini, Du and Love 2016). For policy makers, these businesses represent unrealised potential. Consequently, we might want to see what leads firms to become intermittent exporters. Again, the random effects model is shown in the green bars and the correlated random effects in the purple bars. In the purple bars firm size was positive. The first significant impact in the green bars is log sales but this time as a negative value suggesting intermittent exporters have lower turnover than other businesses. The figure also shows the negative impact of premises as an obstacle. The role of export advice is again negative as it is for all the exporting models and the selection effect is significant as shown in the Mill's ratio. Finally in this case the correlated random effects factor is significant which suggests that we might prefer the correlated random effects model for intermittent exporters.

Figure 12 Marginal effects on Intermittent Exporters



Overall, the results confirm the positive impact of productivity on exporting. We found some impact from obstacles that held back exports (but not for constant exporters), Constant exporters was more likely in sparse, dispersed rural areas, although this is against the backdrop of a wider negative impact for family business in sparse rural areas.

Advice on technology was found to complement exporting, whilst exporting advice was negatively associated with exporting.

In some senses what was not significant is also important. For example, women-led businesses were no less likely to export once they were in the tradeable group (i.e. had goods of services suitable for export), and this was also the case for minority-led or home-based businesses.

8. Key conclusions and implications

8.1 Prior research

This study builds on previous work which has examined the importance of firm-level influences on exporting behaviour including firm productivity, capacity in innovation, future growth and leadership of the firm (Tan, Brewer and Liesch 2007, Henley and Son 2020). Previous research also suggests family business may perform well if they are embedded in their community, that ethnic minority businesses are also more likely to export, but that women-owned businesses are less likely (Baur, 2019; Baù et al. 2019). Prior research has also looked at the pre-export and learning to export stages, highlighting the value of process innovation in the pre-export stage, and product innovation once firms were exporting (Gkypali et al. 2021).

8.2 What have we learned

In this study, we have investigated the behaviours of pre-exporters and exporters. We also examine the differences between constant (or persistent) exporters and occasional (or intermittent) exporters. Overall, we find significant differences between rural and urban firms in terms of exporting, where firms located in sparse, dispersed areas were more likely to export, although less likely if they declared themselves as family businesses.

We find that firm sales to be positively associated with higher propensity of pre-export and export, but the impact is stronger in the pre-exporting stage. Evidence on the importance of both product and process innovation in the pre-exporting stage is also documented. Firms tend to prepare themselves by improving their productivity and reducing cost.

We demonstrate how the role of advice seems specifically connected to the decision to develop tradeable goods and services, rather than exporting per se. The research suggests that business support should be brought in early in the process of export development and that associated advice on technology and productivity improvement may also help firms to export.

In this research, we also extend our studies to understand exporting behaviours after a firm starts to export. We broaden Eliasson et al.'s (2012) study by examining behaviours of constant exporters and occasional exporters.

We find that the constant exporters are more productive, with higher turnover, than the occasional exporters.

We also find that women-owned businesses, are much less likely to develop tradeable goods and services. This finding suggests a need for improved targeting of advice and understanding barriers constraining their exporting behaviour.

9. Future research agenda

We highlight several areas for future research including:

1. We need to know more about the impact of location on exporting behaviour, including a more fine-grained comparison of rural and urban family businesses. Understanding the exporting constraints facing rural family businesses is important given they constitute a substantial proportion, well over half, of rural enterprises.
2. Further investigations are needed specifically on the role of exporting advice to support exporting. We found strong positive association between taking formal advice and developing tradable goods, but advice was negatively associated with the likelihood of firms going on to export. Since firms that continued to take advice once they had developed tradeable goods were significantly less likely to export, this might point to the role of advice at an early preparation to export stage. In addition, we found some complementarity in advice, where for example advice on technology and tax had significant impacts.
3. In addition, we found a lower likelihood of women-owned businesses being export-capable. Understanding the drivers for women-owned businesses to develop tradeable goods would be useful because our study showed no difference in the exporting propensity of women-owned firms once they had developed the tradeable goods and/or services.

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Annexes

Appendix Table 1 reports the variables and their descriptions and descriptive statistics for the sample.

Appendix Table 1 Variables and their descriptions (n=10,127)

Variable	Mean (percentage where proportion- ate)	Std. Dev.	Min	Max	Description
Exporter	25.7%	.437	0	1	1=In the last 12 months did your business export any goods/services?
Constant exporter	17.8%	.382	0	1	1=exported each 12 months in the data
Occasional exporter	6.2%	.242	0	1	1=had some years when the business did not export
Tradeable	39.9%	.490	0	1	1=business has some goods/services suitable for export
Firm size	22.829 (no employees)	41.778	0	850	Number of employees
Firm age	3.246 (scale)	1.002	1	4	1=0-5 years, 2=6-10years, 3=11-20 years, 4=more than 20
Log sales	12.992	1.912	4.605	18.421	Natural log of turnover
Rural	28.8%	.453	0	1	1=located in a rural area
Urban/rural scale	2.209 (scale)	1.055	1	4	1 = Urban conurbation, 2= urban city and town, 3= rural towns and fringe, 4= rural villages, hamlets and dispersed
Family business	67.1%	.470	0	1	1=is your business a family business (majority-owned)
Women-led	13.5%	.341	0	1	1=more than 50% owned by women

BAME-led	3.5%	.183	0	1	1=more than 50% owned by people from ethnic minority groups
Home business	26.9%	.443	0	1	1=does NOT have separate business premises from home address
Premises as an obstacle	17.9%	.383	0	1	1=see premises as a major obstacle to achieve business objectives
Competition as an obstacle	50.8%	.500	0	1	1=see competition as a major obstacle to achieve business objectives
Business Plan now	38.8%	.487	0	1	1=Have a business plan now
Sought finance	16.7%	.373	0	1	1=tried to obtain external finance in the last 12 months
Need finance	9.2%	.289	0	1	1=have you a need for finance
Approach financier	3.064 (times)	1.089	0	4	1=how many times have you applied for external finance in the last 5 years
Growth expected	25.4%	.436	0	1	1=expect more than 25% sales growth in three years
New to market innovation	26.5%	.441	0	1	1=introduced innovations new to the market
New to business innovation	13.2%	.339	0	1	1=introduced innovations just new to the business
Process innovation	24%	.427	0	1	1=have you introduced new or significantly improved processes
Plan to boost skills	68.9%	.463	0	1	1=the business plans to increase workforce skills over the next three years
Plan to boost leadership	47%	.499	0	1	1=the business plans to increase leadership capability of managers over the next three years
Plan to invest	43.6%	.496	0	1	1=business plans to increase capital (in premises,

					machinery) over the next three years
Plan new product/service	42.9%	.495	0	1	1=business plans to introduce new products/services over the next three years
Taken advice on new technology	2.3%	.149	0	1	1=taken strategic advice on new technology
Taken advice on exporting	0.8%	.087	0	1	1=taken strategic advice on exporting
Taken advice on tax	4.2%	.202	0	1	1=taken strategic advice on tax
Formal management training	31.8%	.466	0	1	1=firm has taken formal management training in the last year
Limited liability	66.5%	.472	0	1	1=firm is either limited company, PLC or limited liability partnership
Sector					
Production	4.5%	.206	0	1	Sector ABDE Primary and Production
Manufacturing	10.9%	.311	0	1	Sector C Manufacturing
Construction	8.8%	.283	0	1	Sector F Construction
Wholesale	14.2%	.349	0	1	Sector G Wholesale
Transport	3.6%	.187	0	1	Sector H Transport, Retail and Food Service
Accommodation	6.1%	.239	0	1	Sector I Accommodation
Information	6.3%	.243	0	1	Sector J Information Services
Financial	4.5%	.208	0	1	Sector KL Financial Services
Professional	16.2%	.369	0	1	Sector M - Professional services
Administration	7.1%	.256	0	1	Sector N - Administration
Education	3.6%	.187	0	1	Sector P - Education
Health	7.6%	.264	0	1	Sector Q - Health

Arts/Entertainment	3%	.172	0	1	Sector R Arts/Entertainment	-
Other Services	3.7%	.188	0	1	Sector S - Other services	

Appendix Table 2 reports the comparisons of the urban and rural businesses with means standard errors and a two-sample t test with unequal variances.

Appendix Table 2 Urban and Rural Comparisons

Variable	Urban (n=7214)		Rural (n=2913)		T	P
	Mean	Std error	Mean	Std error		
Firm size	25.423	.525	16.404	.612	11.189	.000
Firmage_bnd	3.233	.012	3.279	.018	-2.161	.003
Ln sales	13.081	.023	12.773	.033	7.669	.000
Fambiz	.628	.006	.779	.008	-15.712	.000
Women-led	.134	.004	.136	.006	-0.298	.766
BAME-led	.043	.002	.013	.002	9.317	.000
Homebiz	.238	.005	.346	.009	-10.648	.000
Premises as obstacle	.197	.005	.135	.006	7.865	.000
Competition as obstacle	.521	.006	.475	.009	4.21	.000
Business plan	.412	.006	.328	.009	8.054	.000
Sought finance	.164	.004	.173	.007	-1.152	.249
Need finance	.092	.003	.092	.005	-0.069	.945
Approach finance	3.080	.013	3.027	.021	2.177	.030
Growth expected	.261	.005	.237	.008	2.606	.009
New to market innovation	.269	.005	.255	.008	1.441	.150
New to business	.135	.004	.126	.006	1.210	.226
Process innovation	.245	.005	.228	.008	1.809	.071
Plan for skills	.700	.005	.660	.008	3.838	.000
Plan for leadership	.494	.006	.412	.009	7.505	.000
Plan to invest	.414	.006	.490	.009	-6.867	.000
Plan new goods/services	.437	.006	.410	.009	2.453	.014
Advice on technology	.023	.001	.022	.003	0.515	.607
Advice on export	.007	.001	.009	.002	-0.623	0.533
Advice on tax	.042	.002	.043	.004	-0.250	.802
Management training	.337	.006	.270	.008	6.748	.000
Limited company	.689	.005	.605	.009	7.983	.000

Appendix table 3 reports the models and coefficients that predict the likelihood of being in the tradeable group of export-capable firms. The coefficients in column 1 (tradeable_RE) are analogous to the green bars in Figure 9, which reports the marginal effects. The coefficients in column 2 (tradeable_CRE) are the same as the purple bars in Figure 9, which reports the marginal effects. Since the x-bar_CRE is significant column 2 is preferred. Significant positive effects are:

- turnover (which is included on the RHS with firm size and therefore is turnover controlling for employees)
- Having a home-based business, surprisingly
- finding competition an obstacle to the business
- having high expectations of future growth,
- innovation including having new to the market products and services, or simply new to the business products and services and adopting process innovations. This included having plans for new products or services

Advice had a positive effect including taking advice on exporting (unsurprisingly) and taking advice on tax issues. Finally, firms with limited liability were more likely to have tradeable goods or services. Significant negative effects are being BAME and women-led and taking advice on technology and e-commerce. The latter indicates some complex effects of advice.

Appendix Table 3 Selection into the tradeable group

Variable	(1) tradeable_RE	(2) tradeable_CRE
Firm size	-0.00214* (-2.35)	0.000359 (0.21)
Firm age	0.0225 (0.68)	0.0240 (0.72)
Log sales	0.211*** (8.32)	0.227*** (8.38)
Women-led	-0.281** (-3.07)	-0.281** (-3.07)
BAME-led	-0.411* (-2.42)	-0.409* (-2.41)
Home business	0.200** (2.65)	0.200** (2.64)
Premises as an obstacle	-0.0118 (-0.18)	-0.0111 (-0.17)
Competition as an obstacle	0.200*** (3.93)	0.203*** (3.98)
Business Plan now	-0.0617 (-1.01)	-0.0550 (-0.90)
Sought finance	0.0111 (0.16)	0.0140 (0.20)
Need finance	0.0442 (0.53)	0.0466 (0.56)
Approach financier	0.0133	0.0155

	(0.50)	(0.58)
Growth expected	0.151* (2.48)	0.150* (2.46)
New to market innovation	0.194** (3.28)	0.193** (3.26)
New to business innovation	0.648*** (7.98)	0.649*** (7.99)
Process innovation	0.143* (2.46)	0.137* (2.34)
Plan to boost skills	0.103 (1.60)	0.0996 (1.54)
Plan to boost leadership	0.0274 (0.46)	0.0323 (0.54)
Plan to invest	0.0479 (0.88)	0.0493 (0.90)
Plan new product/service	0.404*** (7.11)	0.405*** (7.10)
Taken advice on new technology	-0.413** (-2.68)	-0.412** (-2.67)
Taken advice on exporting	1.287*** (3.51)	1.283*** (3.49)
Taken advice on tax	0.319** (2.81)	0.325** (2.86)
Formal management training	-0.0424 (-0.68)	-0.0371 (-0.59)
Limited liability	0.206** (2.69)	0.210** (2.74)
Urban town	-0.222 (-1.76)	-0.218 (-1.72)
Rural fringe	-0.166 (-0.77)	-0.162 (-0.75)
Rural sparse, dispersed	0.0104 (0.06)	0.0154 (0.09)
Family business	0.141 (1.16)	0.144 (1.18)
Urban town*fambiz	-0.00142 (-0.01)	-0.000923 (-0.01)
Rural fringe *fambiz	-0.153 (-0.62)	-0.151 (-0.61)
Rural sparse, dispersed *fambiz	-0.159 (-0.77)	-0.154 (-0.74)
x_bar_selCRE		-0.00356 (-1.77)
x_bar_year~E		0.0141 (1.40)
constant	-3.527*** (-9.00)	-4.357*** (-6.82)
Insig2u	0.864***	0.869***

	(11.79)	(11.86)
AIC	9451.449	9450.209
BIC	9790.929	9804.134
N	10127	10127

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Having developed the selection into the tradable goods and services the next step is to become an exporter, using a probit model for predicting exporting firms (see appendix table 4), constant exporters, and occasional exporters. These models include the Mills ratio to control for selection. Column 1 shows those which export, controlling for the selection into the tradeable category. Column 2 shows those which export for every year of the data set and column 3 shows those are occasional or intermittent exporters over the period, controlling for the selection into the tradeable category. The differences between columns 1, 2 and 3 are instructive.

Consequently, we examine the important factors across each column. Firm size is not significant although the sign is positive for constant exporters. The first significant positive effect is from firm turnover which has a positive sign for the exporter and constant exporter but a negative sign for the occasional exporter suggesting occasional exporters are less productive. They might be less productive since firm size is controlled for in the probit regression.

Businesses in sparse dispersed rural areas are significantly more likely to be constant exporters, although the sign on the coefficient is negative for occasional exporters. This impact needs to be read in conjunction with the negative effect for family businesses in sparse rural areas, which was very nearly significant ($t = -1.94$, $p = .052$) and which undoubtedly had an effect on the marginal effect for the business in dispersed, sparse rural areas.

There are no significant differences in the exporting from women-led, minority-led or home-based businesses.

Firms that face obstacles from trying to gain appropriate premises are less likely to export, although this effect is insignificant for constant exporters. Firms that seek finance were more likely to constantly export. Some significant impacts on constant exporters followed with negative impacts from new to the business innovation and process innovation. Thereafter some strong effects from advice are apparent. Advice on technology matters is associated with exporting but advice on export strongly negatively associated and so is tax advice for constant exporters. Finally, $\lnsig2u$ denoted the random effects co-efficient to have significant influence.

Appendix Table 4 Predicting Exporting firms with Random Effects

Variable	(1)	(2)	(3)
	Exporter	Constant Exporter	Intermittent Exporter
Firm size	0.00182 (1.35)	0.00143 (0.61)	0.00146 (1.04)
Firm age	-0.0255 (-0.44)	-0.0308 (-0.36)	0.0792 (1.28)
Log sales	0.126** (2.78)	0.263** (3.04)	-0.0980* (-2.11)
Urban town	0.00791 (0.04)	-0.00239 (-0.01)	0.00411 (0.02)
Rural fringe	0.206 (0.58)	-0.000900 (-0.00)	0.317 (0.89)
Rural sparse, dispersed	0.271 (0.90)	0.975* (2.07)	-0.430 (-1.26)
Family business	0.0177 (0.09)	-0.159 (-0.52)	0.00242 (0.01)
Urban town*fambiz	-0.226 (-0.87)	0.0261 (0.07)	-0.0313 (-0.11)
Rural fringe *fambiz	-0.443 (-1.08)	-0.148 (-0.24)	-0.276 (-0.66)
Rural sparse, dispersed *fambiz	-0.295 (-0.84)	-1.052 (-1.94)	0.589 (1.52)
Women-led	-0.143 (-0.90)	-0.0802 (-0.34)	0.0637 (0.38)
BAME-led	0.152 (0.52)	0.480 (1.13)	0.0513 (0.16)
Home business	-0.0307 (-0.24)	-0.246 (-1.25)	-0.103 (-0.74)
Premises as an obstacle	-0.247* (-2.26)	-0.0572 (-0.36)	-0.310* (-2.45)
Competition as an obstacle	-0.0534 (-0.62)	-0.253* (-2.03)	-0.0410 (-0.43)
Business Plan now	-0.0940 (-0.93)	0.0989 (0.69)	-0.196 (-1.77)
Need finance	-0.218 (-1.49)	-0.255 (-1.17)	-0.184 (-1.10)
Approach financier	0.0873* (2.06)	0.111 (1.78)	-0.0163 (-0.35)
Growth expected	0.115 (1.16)	0.233 (1.67)	-0.162 (-1.47)
New to market innovation	-0.0159 (-0.16)	0.0517 (0.36)	-0.0821 (-0.74)
New to business innovation	-0.126 (-0.86)	-0.591* (-2.39)	-0.273 (-1.82)
Process innovation	-0.0889 (-0.93)	-0.353* (-2.55)	-0.0954 (-0.90)

Plan new product/service	0.0800 (0.80)	-0.0393 (-0.24)	-0.0869 (-0.79)
Taken advice on new technology	0.610* (2.51)	0.733* (2.24)	0.200 (0.72)
Taken advice on exporting	-1.467** (-2.72)	-2.930*** (-4.51)	-1.607*** (-3.64)
Taken advice on tax	-0.121 (-0.69)	-0.544* (-2.17)	-0.137 (-0.73)
Formal management training	0.0841 (0.85)	0.0820 (0.58)	0.114 (1.03)
Limited liability	0.0827 (0.61)	-0.131 (-0.65)	0.129 (0.89)
Mill's ratio	-3.072*** (-15.93)	-4.249*** (-11.46)	-1.429*** (-9.45)
constant	-6.509*** (-9.19)	-12.01*** (-8.89)	-3.372*** (-4.58)
lnsig2u	1.987*** (25.67)	3.100*** (50.62)	1.537*** (15.40)
AIC	6034.795	4659.655	3699.549
BIC	6367.051	4977.465	4017.359
N	10127	10127	10127

Sector dummies included. t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

Again, to counter the objection of the model that they are based on random effects and as an additional test for robustness, we estimated the models with correlated random effects (CRE) (Wooldridge 2013 pp. 479-481). In addition to the incorporating the unit-specific time-invariant average variable in the selection equation, which is then in the main model as a Mills ratio. In appendix table 5 we also incorporated a unit specific time average variable \bar{x}_i which controls for the correlation between a_i and the time sequence in the main effects. This variable \bar{x}_i was significant for the exporter model and the intermittent exporters but not for the constant exporters, suggesting in two models this CRE specification is the most appropriate.

In this specification smaller firms were more likely to export, although not for constant exporters. Ln turnover was significant and positive but not for the occasional exporters. Sparse, rural firms were positively associated with the constant exporter group, although this has to be seen in conjunction with the negative impact of family firms. Firms with a need for finance were more likely to export. Constant exporters had negative impacts from innovation, although this may need to be seen in conjunction with the positive impact on the selection into the tradeable group. Innovation continues to be negatively associated with constant exporting. The advice impacts were unchanged from the random effects with a strong negative impact of taking advice on export on actual exporting and a similar effect for tax advice; yet this is complicated by positive impacts of ecommerce and technology advice.

Appendix Table 5 Predicting Exporting firms with Correlated Random Effects

Variable	(1)	(2)	(3)
	Exporter	Constant Exporter	Intermittent Exporter
Firm size	0.00812** (2.85)	0.00280 (0.80)	0.00892* (2.37)
Firm age	-0.0145 (-0.25)	-0.0272 (-0.32)	0.0962 (1.54)
Log sales	0.194*** (3.91)	0.295*** (3.62)	-0.0392 (-0.77)
Urban town	0.0212 (0.10)	-0.0393 (-0.12)	0.0193 (0.09)
Rural fringe	0.217 (0.61)	-0.0154 (-0.03)	0.331 (0.92)
Rural sparse, dispersed	0.288 (0.94)	0.926* (2.06)	-0.412 (-1.21)
Family business	0.0247 (0.12)	-0.159 (-0.54)	0.0123 (0.06)
Urban town*fambiz	-0.221 (-0.85)	0.0458 (0.12)	-0.0292 (-0.11)
Rural fringe *fambiz	-0.447 (-1.09)	-0.167 (-0.28)	-0.280 (-0.67)
Rural sparse, dispersed *fambiz	-0.292 (-0.83)	-1.016 (-1.94)	0.590 (1.52)
Women-led	-0.150 (-0.94)	-0.110 (-0.48)	0.0592 (0.35)
BAME-led	0.144 (0.49)	0.428 (1.03)	0.0480 (0.15)
Home business	-0.0222 (-0.17)	-0.228 (-1.18)	-0.0859 (-0.61)
Premises as an obstacle	-0.0472 (-0.54)	-0.227 (-1.88)	-0.0315 (-0.33)
Competition as an obstacle	-0.0768 (-0.75)	0.0953 (0.68)	-0.177 (-1.59)
Business Plan now	-0.214 (-1.46)	-0.250 (-1.16)	-0.184 (-1.10)
Need finance	0.0938* (2.20)	0.115 (1.88)	-0.0101 (-0.22)
Approach financier	0.114 (1.14)	0.242 (1.79)	-0.162 (-1.46)
Growth expected	-0.0143 (-0.15)	0.0656 (0.47)	-0.0839 (-0.76)
New to market innovation	-0.123 (-0.83)	-0.516* (-2.31)	-0.274 (-1.82)
New to business innovation	-0.126 (-0.86)	-0.591* (-2.39)	-0.273 (-1.82)
Process innovation	-0.0976 (-1.00)	-0.351* (-2.57)	-0.0951 (-0.88)

Plan new product/service	0.0796 (0.79)	0.000463 (0.00)	-0.0875 (-0.79)
Taken advice on new technology	0.624* (2.55)	0.693* (2.17)	0.206 (0.75)
Taken advice on exporting	-1.501** (-2.78)	-2.769*** (-4.60)	-1.639*** (-3.71)
Taken advice on tax	-0.103 (-0.58)	-0.511* (-2.08)	-0.132 (-0.70)
Formal management training	0.0992 (0.99)	0.0809 (0.58)	0.134 (1.21)
Limited liability	0.0865 (0.64)	-0.0923 (-0.47)	0.132 (0.90)
Mill's ratio	-3.099*** (-16.13)	-4.066*** (-14.29)	-1.434*** (-9.45)
x_bar_selCRE	-0.0108** (-3.10)	-0.00313 (-0.71)	-0.0115* (-2.46)
x_bar_year~E	0.0142 (0.85)	0.0212 (0.92)	0.00601 (0.31)
constant	-7.905*** (-7.15)	-13.20*** (-7.62)	-4.209*** (-3.41)
lnsig2u	2.006*** (27.04)	3.049*** (49.88)	1.539*** (15.53)
AIC	6034.795	4656.601	3694.674
BIC	6367.051	4988.857	4026.93
N	10127	10127	10127

Sector dummies included. t statistics in parentheses

* p<0.05, ** p<0.01, *** p<0.001

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