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FULL ARTICLE

A matter of life and death? Knowledge intensity of FDI activities and domestic enterprise

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Abstract

There is no overall agreement on the relationship between foreign direct investment (FDI) and domestic enterprise, this may reflect different effects from various types of FDI. A panel data regression approach is adopted to examine the impact of knowledge intensive FDI on both new firm formation and the deaths of enterprises. Jobs created by FDI are found to not influence firm births, but influence domestic enterprise through deaths. Renewal knowledge intensive activities reduce firm deaths, but routine or compliance knowledge intensive activities increase the death rate. This means policy seeking to attract FDI must distinguish even within different types of knowledge intensive activities.

KEYWORDS
FDI, firm births, firm deaths, knowledge intensive activities

JEL CLASSIFICATION
L26, F21

1 | INTRODUCTION

Regardless of whether a developed or developing, core or peripheral region, the attraction of foreign direct investment (FDI) is frequently a policy considered to encourage economic development and renewal (Jude & Silaghi, 2016). It is perceived to provide benefits through employment creation (Williams, 2003), creation of

aggregate demand (Markusen & Venables, 1999), and knowledge spillovers leading to innovation and productivity improvements (Fu, 2012). At the same time FDI has been recognized as being potentially footloose, and where less knowledge intensive, many of the benefits listed will not be present (Mata & Freitas, 2012). This can make incentives provided by local and regional policy-makers relatively poor value for money (Driffield, 2004). Because many of the influences of FDI listed above affect domestic enterprise, there is a stream of literature that has considered the impact of FDI on firm births and the activities of existing entrepreneurs (Danakol et al., 2017; Thompson & Zang, 2018; Wach & Wojciechowski, 2016). FDI can provide opportunities for the local firms to supply intermediate goods to foreign firms (Berrill et al., 2020), to increase the demand for domestic products (Markusen & Venables, 1999) and to generate knowledge spillover effects (Acs et al., 2013). However, foreign firms can negatively influence domestic enterprise through a competition effect with the local firms in the product market for customers and in the factor market for labour and other inputs (Barbosa & Eiriz, 2009). These inputs can include the entrepreneurs themselves who elect to work as employees in well paid jobs rather than run their own business (Distel et al., 2022; Grossman, 1984). It is also argued that not all types of FDI are equally valuable. In particular, less knowledge intensive investments, associated with a branch plant approach, have been regarded as less beneficial with fewer opportunities for knowledge spillovers (Acs et al., 2012). However, when examining this result previously, knowledge intensity is usually based on the sector of investment rather than the activities that take place.

This study seeks to explore the relationship between FDI and domestic enterprise in terms of both firm births and deaths in localities corresponding to the unitary authorities and counties of Great Britain. Using data drawn from the fDi Market dataset[1], the number of jobs created and investment that are associated with different types of FDI activity in each locality are captured. As well as distinguishing between more and less knowledge intensive activities, we contribute to the literature by disaggregating the more knowledge intensive activities into three categories; routine or compliance (administration); networking (knowledge exchange); and renewal (innovation). Although previous studies have examined the importance for entrepreneurship of the knowledge intensity of FDI this has frequently been captured by the parent company's sector (Amoroso & Müller, 2018) or patents held (Belitz & Mölders, 2016) which may not correspond to the activities undertaken by the subsidiary. Alternatively, studies concentrate on a very small number of activities associated with R&D (Ito et al., 2012; Todo, 2006; Todo et al., 2006). To the authors' knowledge the current study is the first paper to distinguish the knowledge intensity of FDI based on a wider set of activities as captured by the OECD (2006) typology of knowledge-intensive service activities.

Another contribution is to examine the impact of different FDI knowledge intensive activities on both firm births and firm deaths to allow a more rounded appreciation of how FDI affects domestic entrepreneurship. FDI not only affects the entry of new firms, but also the exit of existing firms as shocks weed out weaker firms improving the quality of domestic entrepreneurship (Kitson, 1995). However, at the same time by reducing the numbers of small and medium sized enterprises (SMEs) present this may hinder the creation of new entrepreneurs as it is these smaller businesses that are often regarded as the seedbeds for the creation of new ventures (Fritsch & Wyrwich, 2015; Politis, 2008; Uhlaner & Thurik, 2007).

A panel data regression approach is utilized to understand the impact that FDI has on domestic enterprise. In order to account for unobserved influences and clarify issues of causal direction, lagged measures of FDI are utilized in fixed effects regressions. Jobs created by FDI are found to not influence firm births, but influence domestic enterprise through deaths. Renewal knowledge intensive activities reduce firm deaths, but routine or compliance knowledge intensive activities increase the death rate. This means policy seeking to attract FDI must distinguish even within different types of knowledge intensive activities.

The remainder of the paper is structured as follows. Section 2 provides a review of the literature relating to the relationship between different types of FDI and domestic enterprise to develop hypotheses. The data and methods used to examine these relationships are outlined in Section 3. The panel regression analysis is presented in Section 4, and conclusions and implications for policy are then outlined in the final section.

2 | RELATIONSHIPS BETWEEN FDI AND DOMESTIC ENTERPRISE

This review initially draws upon the studies considering the choice for an entrepreneurial career and how the theoretical linkages with FDI might affect these choices. Empirical work will be drawn upon to ascertain the expected signs of these relationships. From these theoretical and empirical insights attention will then turn to the work that has specifically looked at the knowledge intensity of FDI, allowing hypotheses to be developed.

2.1 | Entrepreneurial career choices and theoretical Links from FDI

A number of key mechanisms exist linking FDI to domestic enterprise. The following review of the literature identifies these mechanisms and brings them together in a single model. Many of these arguments are based around Grossman's (1984) model of entrepreneurship as an occupational choice where entrepreneurship will be pursued if the relative returns, including those of a non-pecuniary nature, are sufficiently greater than those from waged employment. This is outlined in Figure A1 of the online Appendix. The individual mechanisms through which FDI influences entrepreneurship through altering these relative returns from entrepreneurship and waged employment are presented separately in the online Appendix Figures A2 to A5 and Figure 1 brings together all the mechanisms in the form of a complete model.

Figure 1 and Appendix Figure A2 consider that in terms of new venture creation it can be argued that FDI competes for entrepreneurial resources or inputs. These shift the balance of rewards in favour of waged employment. The key input foreign firms compete for are the entrepreneurs themselves, who may choose to work for them rather than run their own business (Grossman, 1984). This is reflected in mechanism 1a where the wages for entrepreneurial individuals within foreign affiliates rise (Martins, 2011). For those engaged in entrepreneurship, they will be hurt as shown by mechanism 1b where skilled labour is drawn into multinationals and out of local enterprises reducing their profitability (Girma et al., 2001).

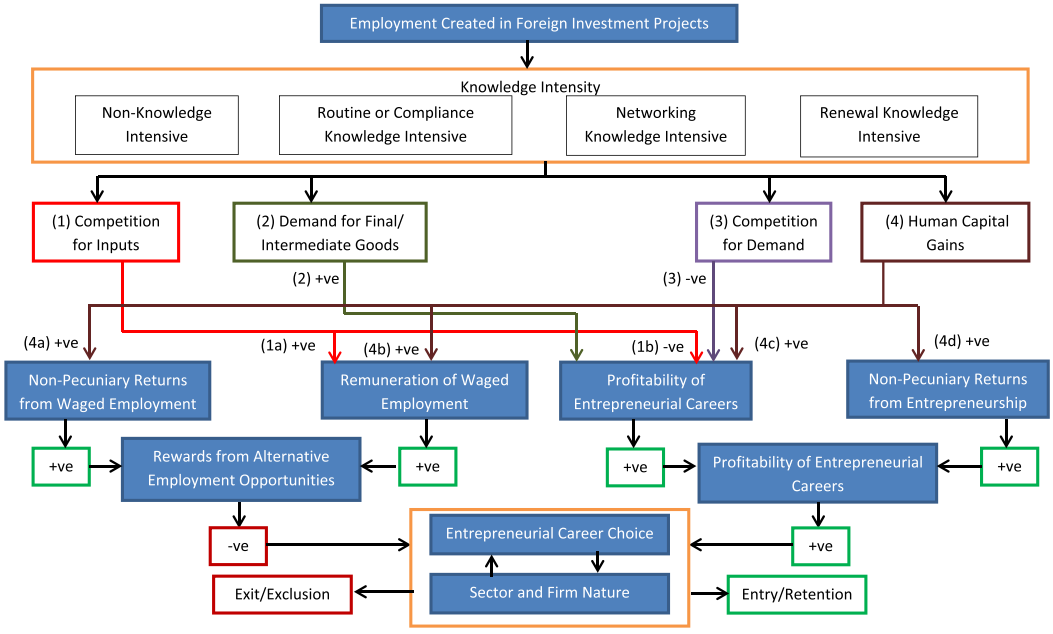

FIGURE 1 The Entrepreneurial Career Choice and the Role of FDI

However, mechanism 2 shows (see also Figure A3) there are positive influences on domestic enterprise where a demand effect sees foreign affiliates boost local aggregate demand thereby raising the returns to entrepreneurial careers (Barbosa & Eiriz, 2009). More directly foreign affiliates may require inputs from local firms in upstream sectors and services provided by those downstream sectors (Markusen & Venables, 1999). However, as well as generating new demand, foreign affiliates may compete for customers as shown in mechanism 3 (De Backer & Sleuwaegen, 2003; Figure A4). This additional competition will reduce the financial rewards of an entrepreneurial career.

As well as the new entrepreneurial opportunities foreign affiliates may create as noted in the discussion of mechanism 2, other knowledge spillovers, which may allow both new and existing entrepreneurs to operate more efficiently through the adoption of different management techniques (Kim & Li, 2014). This is reflected in the generation of human capital noted in Figure A5. Again, for those with the absorptive capacity to access the different types of knowledge it will boost their performance as either existing or new entrepreneurs relative to other employment opportunities (mechanism 4c) (Jacobs et al., 2016). It may allow more ambitious entrepreneurial opportunities to be targeted with greater feelings of self-fulfilment (mechanism 4d). But at the same time such skills will also make waged employment opportunities better remunerated (mechanism 4b) and the types of role filled more fulfilling and secure (mechanism 4a), which by elevating the rewards from waged employment makes more marginal entrepreneurship less attractive (Allen & Curington, 2014). As such this mechanism may affect the balance between waged employment and entrepreneurial rewards in an uncertain fashion.

Given the theoretical links outlined above and brought together in Figure 1, there is no clear overall relationship between FDI and entrepreneurship that can be predicted. Given this it is understandable that the empirical literature, as discussed in the next subsection, is also far from in agreement with regard to the nature of the overall relationship and therefore the wider impact on the local or regional economy. This in part reflects the data and differing approaches used to capture the relationship.

2.2 | Empirical evidence of the overall relationship

Much of the empirical analysis that considers the relationship between domestic enterprise and FDI is conducted at a country or at best regional level, reflecting the data that is available (Camarero et al., 2020). However, studies such as Figlio and Blonigen (2000) and Xu and Sheng (2012) have noted that even analysis at a regional level will miss the impact on local labour markets that are relevant for entrepreneurship.

We start by considering the international studies that have sought to determine the overall relationship between FDI and domestic enterprise at the country level. Goel (2018) suggests that the negative crowding out effect (mechanisms 1a, 1b and 3 in Figure 1) is dominant in an international sample of countries. Wach and Wojciechowski (2016) find a positive relationship between FDI and entrepreneurship in four Visegrad countries, but this relationship differs in strength. One explanation that has been proposed is that the relationship depends on the strength of institutions present, where the positive effect of FDI has more of an impact if institutions are weaker (Kim & Li, 2014). Potentially of relevance when considering knowledge intensity of FDI, Slesman et al. (2021) suggest that the opposite is true and knowledge spillovers are only beneficial where institutions are stronger. A number of studies (Bermpei et al., 2019; Moore et al., 2020; Peter & Pierk, 2021; Yay et al., 2018) have found that FDI overall does not significantly affect new firm creation. Indeed, Hong et al. (2021) carry out a meta analysis using 47 studies that examine the relationship between FDI and entrepreneurship and find an insignificant impact of FDI on entrepreneurial activity. Overall and consistent with the lack of a significant relationship being found by a large number of studies, this would suggest in the UK context, foreign investments overall will tend to have no significant relationship with firm creation.

Albulescu and Tămăşilă (2014) indicate that part of the problem of examining the relationship between FDI and new venture creation is related to the measure of entrepreneurship used. While a majority of studies have

concentrated on new venture creation (Danakol et al., 2017), others have noted that in competing for resources FDI can lead to the weakening and exit of existing SMEs, so that firm deaths become just as important (De Backer & Sleuwaegen, 2003; Thompson & Zang, 2015). The entrepreneurial quality effect, whereby the average quality of entrepreneurship can rise after shocks weed out weaker firms (Kitson, 1995), also provides another reason for questioning studies that purely concentrate on firm births. In other words, there is a need to consider both the possible decision outcomes included at the bottom of Figure 1 as a reduction in the domestic SME sector may be found.

2.3 | Knowledge intensity of FDI and entrepreneurship

Previous studies have frequently classed the knowledge intensity of investments on the sector of the parent firm (Amoroso & Müller, 2018), or patents held by the firm (Belitz & Mölders, 2016). In many countries policies seeking to attract more beneficial investments have to a degree also followed a similar blunt approach of targeting particular sectors without regard for the actual knowledge this will provide access to (Harding & Javorcik, 2011). Anwar and Sun (2015) use a similar approach based on sector and found "FDI in R&D" does not have a significant impact on the likelihood of domestic entry in China's transport equipment and electrical machinery manufacturing industries, but instead significantly encouraged the exit of smaller domestic firms as competition increased (mechanism 3). However, it is unclear if the actual investments being made are knowledge intensive and if they are, whether they are based around R&D or other knowledge intensive activities. Nevertheless, the existing literature does provide some insights with regard to how different types of knowledge intensive FDI may affect domestic firm entry and exit as depicted in Figure 1.

We further divide the knowledge intensive FDI activities into three types according to the definition of OECD (2006): routine or compliance (administration), renewal (innovation) and network (knowledge exchange). Please see the online Appendix Table A1 for more details.

2.3.1 | FDI with routine or compliance (administration) knowledge intensive functions

In terms of the positive benefits of FDI to domestic enterprise these are assumed to come from knowledge spillovers generated by knowledge intensive FDI, as depicted by mechanism 4c in Figure 1 (Amoroso & Müller, 2018; Fu, 2012). But at the same time knowledge intensive foreign investments are also more likely to create attractive employment opportunities as depicted by mechanisms 1a and 1b in Figure 1 (Martins, 2011).

Looking at the reasons behind the overall relationships found, Abolhassani and Danakol (2019) using Dutch data find that FDI by increasing wages discourages new firm formation (mechanism 1a Figure 1). At the same time this tends to reduce the level of competition present in a sector, which has a positive effect on entry, but not sufficiently so to overcome the negative wage effect to leave a small overall negative impact. Where foreign investment creates skilled knowledge intensive employment in large numbers rather than outsourcing, such as administrative, accounting or law functions an increase in local salaries available will reduce switching to entrepreneurial careers (Sorgner & Fritsch, 2018). This will particularly be the case if those taking up employment with foreign affiliates are in routine activities as these will not provide managerial experience which is associated with shifts into entrepreneurship (Laffineur et al., 2020). This leads to the first set of hypotheses:

H1a. FDI with routine or compliance (administration) knowledge intensive functions will reduce new firm creation.

H1b. FDI with routine or compliance (administration) knowledge intensive functions will increase firm exits.

2.3.2 | FDI with renewal (innovation) knowledge intensive functions

Cai et al. (2007) indicate that foreign firms transfer advanced knowledge to potential domestic entrepreneurs through R&D activities in the form of learning by doing through employment in foreign firms R&D centres (mechanism 4c in Figure 1, although indirectly caused through mechanisms 4a and 4b), R&D cooperation between foreign firm/institutions (mechanism 4c in Figure 1), and technical assistance outsourcing from foreign firms to domestic firms (mechanism 2 in Figure 1). Todo (2006) and Todo et al. (2006) find that R&D activities performed by foreign firms increase the productivity of domestic firms, but the production activities of foreign firms do not. Similarly, Todo and Miyamoto (2006) indicate the existence of knowledge spillovers from R&D performing foreign firms to domestic firms, but no knowledge spillover effect is found from non-R&D performing foreign firms in Indonesia. In addition, Ito et al. (2012) find evidence of inter-industry spillovers of foreign firms' R&D activity on the productivity of domestic firms.

Changes in the productivity of domestic enterprise should theoretically boost domestic enterprise by making the returns to entrepreneurial careers relatively greater. However, a limited number of studies have investigated these relationships with knowledge intensive FDI. Cai et al. (2007) find that R&D activities of foreign firms in an industry stimulate the entry of domestic firms in the same industry through knowledge diffusion in China. But non-R&D activities of foreign firms have no impact on domestic firm births. Amoroso and Müller (2018) find a positive impact of knowledge intensive greenfield FDI on firm births if the domestic industry is either highly technology intensive or is dynamic in terms of a higher churn rate. It therefore appears that knowledge intensive activities associated with R&D activities, and the management of these activities, are more likely to boost productivity and boost the rewards associated with entrepreneurial careers. As human capital may be acquired by working for the foreign affiliates there may be a time lag, but in general the following can be hypothesized:

> **H2a.** FDI with renewal (innovation) knowledge intensive functions will be positively associated with new firm creation.

It might also be argued that where knowledge spillovers have created firms with competitive advantages they are likely to be better placed to adapt to shocks and other market changes compared to SMEs that have developed to serve more basic needs of large firms in general, and foreign branch plants in particular, resulting in a form of dependent self-employment (Fritsch & Wyrwich, 2015; Román et al., 2011). Such competitive advantage is suggested to come from either innovative or managerial capabilities gathering from these knowledge spillovers (Blalock & Gertler, 2008). This might be manifested in higher levels of innovative outputs in sectors where knowledge intensive FDI investments have been made locally (Antonietti et al., 2015; Ascani et al., 2020).

> **H2b.** FDI with renewal (innovation) knowledge intensive functions will be negatively associated with firm exit.

2.3.3 | FDI with networking (knowledge exchange) knowledge intensive functions

Access and management of knowledge are considered key factors in the success of firms (Bagley, 2019). This is further emphasized by recent trends in innovation requiring firms to work within systems rather than alone (Lechner & Dowling, 2003). Firms generated by entrepreneurs skilled in knowledge exchange activities would also be expected to boost local and regional growth (Huggins & Thompson, 2017). Therefore, it would be expected that those activities associated with transferring, accessing knowledge and managing the data created would increase the rewards to entrepreneurship through mechanism 4c in Figure 1 (Audretsch et al., 2020).

> **H3a.** FDI with networking (knowledge exchange) knowledge intensive functions will increase firm entry.

Even if not creating new knowledge themselves, where the skills to acquire such knowledge have been obtained from employment in foreign affiliates (mechanisms 4a and 4b in Figure 1), along with multiple industry specific contacts (O'Malley & O'Gorman, 2001) firms should be better placed to withstand shocks (Bagley, 2019). As with Hypothesis 2b the need to acquire skills through employment within foreign affiliates initially may mean any positive relationship may only appear over time (Jacobs et al., 2016).

H3b. FDI with networking (knowledge exchange) knowledge intensive functions will reduce firm exit.

Having outlined how FDI might affect a model of entrepreneurial choice, this section has considered the literature on knowledge intensity and how the particular links from FDI to entrepreneurship might be strengthened or weakened. What is apparent is that traditional measures of knowledge intensity often do not capture the impact on the local labour market with regard to the alternative employment created and human capital gains available. The next section will outline how this study provides more insight into the relationships hypothesized above.

3 | DATA AND METHODS

In order to examine the impact of the knowledge intensity of FDI on entrepreneurship in terms of firm entry and exit the nature and location of FDI projects have to be identified. The data, analysis approach and control variables used in this study are also outlined below.

3.1 | Unit of analysis

This paper examines the relationship between FDI and domestic enterprise at the local level in the UK. Entrepreneurship is found to be strongly influenced by the alternatives available in the local labour market (Grossman, 1984; Martins, 2011; Van der Sluis et al., 2008) and local aggregate demand (Huggins et al., 2017), making local social and economic conditions highly important rather than those at the wider regional or national level. In addition, there is evidence that FDI is very unevenly spread within regions (Driffield & Munday, 2000). Therefore, FDI will affect both local input and labour markets to a greater extent than regional data implies (Figlio & Blonigen, 2000; Xu & Sheng, 2012). With these concerns in mind the disaggregated data is used from the fDi Market dataset. The fDi Market data identifies the location of investments by area that closely corresponds to English counties and unitary authorities, Welsh unitary authorities and Scottish council areas. These localities closely correspond to the NUTS 3 regions, although in some cases a number of smaller unitary authorities are combined in the NUTS 3 classification. This gives 164 areas covering England, Scotland and Wales (see further details in the Appendix Note A1).

3.2 | FDI data and measures

We concentrate on FDI projects in Great Britain and consider these at the local level as discussed above using the fDi Market dataset. Recognizing the findings of studies such as De Backer and Sleuwaegen (2003) and Barbosa and Eiriz (2009) that some of the relationships between FDI and domestic enterprise occur over a longer period of time we not only look at FDI in the previous year, but also the average over the preceding five years.

When determining the most relevant measure of FDI there are a number of alternatives. Some studies have utilized the overall stock of FDI (Albulescu & Tămăşilă, 2014). Good quality reliable data of this type is often hard to

access as many earlier investments are not captured (Billington, 1999). Other studies utilizing measures based around the stock of FDI have utilized the number of foreign owned firms (Görg & Strobl, 2002), or employment associated with these investments (Barbosa & Eiriz, 2009; Keller & Yeaple, 2009). Others wishing to establish the impact of incoming FDI have used the investment received annually by an area (Kim & Li, 2014) or the jobs created (Wren & Jones, 2011). As noted above the decision to be an entrepreneur has been modelled as a comparison of relative payoffs (pecuniary and non-pecuniary) of entrepreneurship and employment for others (Grossman, 1984). All of the measures above can be argued to capture one or more of the mechanisms discussed in subsection 2.1, but none is superior in all regards. For example, jobs created might better capture the alternative employment that sucks in entrepreneurial individuals (Martins, 2011). However, in terms of the demand effect and increased returns from firm formation, particularly for industries with large economies of scale present, investment might provide a better picture (Barbosa & Eiriz, 2009). Although if a small number of capital intensive export focused investments are made then the number of projects might be better (Amoroso & Müller, 2018). Given that those impacts through the labour market might be considered as some of the most important in this study we focus on the jobs created, but consider investments made as an alternative measure. Utilizing the average jobs created in the previous five years might also better capture knowledge spillovers achieved from prior work experience within the foreign affiliate as well as the potential to employ staff with such knowledge (Fu, 2012; O'Malley & O'Gorman, 2001).

3.3 | Knowledge intensity

As discussed in subsection 2.3 above many studies and policies considering the knowledge intensity of FDI focus on the sector firms are based in (Keller & Yeaple, 2009). However, as noted when discussing the previous literature, the problem with this is that FDI is often accused of having fewer benefits than predicted because it is often in the form of branch plants (Acs et al., 2012). This means that measures that better capture the knowledge intensity of activities such as those incorporating R&D are more appropriate (Todo, 2006).

In this study we take advantage of the main activity of the investment being captured by the fDi Market data. This means that where for example an investment is made by a firm in a sector traditionally defined as high-technology, the potential for knowledge spillovers can be established by examining whether the investment will have, for example, an R&D function or sales function. In order to classify the activities as knowledge intensive or otherwise we draw upon the OECD (2006) typology of knowledge-intensive service activities. This classifies four types of knowledge intensive activities: renewal services – related to innovation, such as, R&D and strategic management; routine services—management of organizational subsystems, for example, accounting; compliance services—to aid working within legal and regulatory frameworks, such as, auditing and legal services; and network services—facilitating knowledge exchange and flexible resource allocation, such as, production related networks (see online Appendix Table A1 for the list of activities for each service).

We use four categories: renewal; networking; routine or compliance (these groups of knowledge intensive activities are hard to distinguish from one another see online Appendix Table A1 for more detaisl); and non-knowledge intensive. Potentially controversially we are defining activities such as manufacturing as non-knowledge intensive as without an R&D function the opportunities for knowledge spillovers will tend to be reduced with a much more branch plant nature being present (Acs et al., 2012).

3.4 | Measures of entrepreneurship

This study recognizes that for policy-makers the relationship between FDI and entrepreneurship is not just about new venture creation as exit can be just as important for creating local competitiveness (Thompson & Zang, 2015, 2018). This means that we utilize measures of new venture creation and firm deaths drawn from the ONS

Business Demography series. This draws upon the Inter-Departmental Business Register (IDBR), which includes information on businesses in all sectors that are registered for value added tax (VAT) and/or Pay As You Earn (PAYE) income tax purposes. It therefore covers all, but the smallest businesses and is supplemented with further information from the registry of companies (Companies House) and surveys undertaken by the Office for National Statistics (ONS) and Dun and Bradstreet (Office for National Statistics, 2022). A firm is deemed to be active if it had turnover or employment during a year. A firm birth is identified as a business that was present in the current year, but did not exist, in terms of being active, in the previous two years. A firm death is defined as a business that was on the active file in the current year, but was no longer present in the active file in the following two years. Geographical transfers would be classed as births and deaths, which is unfortunate, but unavoidable given it would not be possible to distinguish between new business creation and movement of existing businesses for smaller firms.

3.5 | Analysis approach

The nature of the data allows a panel to be produced covering the period 2003 to 2018. As any investments are unlikely to have an immediate impact on decisions as to whether to become or cease to be an entrepreneur, we lag the FDI data and other controls by a year. This also reduces the potential for reverse causality:

$$Entre_{it} = \beta_0 + \beta_1 FDI_{i,t-1} + \beta_2 Control_{i,t-1} + \beta_3 Year_t + \beta_4 Area_i + \epsilon_{it}, \quad (1)$$

where $Entre_{it}$ is the measure of entrepreneurship, either firm births or firm deaths for area i in period t. $FDI_{it\text{-}1}$ is the measure of FDI used, which can be the jobs created or investment in the preceding year, or when using the longer term measure the five-year average from the previous year. $Control_{i,t\text{-}1}$ are a set of characteristics of the area's population and industrial sectors as described in the following subsection. As macroeconomic factors such as the state of the national and international business cycles are likely to alter FDI flows and entrepreneurship we include time dummies ($Year_t$). To account for any unobserved factors not captured by the controls both fixed effects and random effects were considered.

The areas in the study being based on administrative responsibility are not similarly sized geographically, economically or in terms of population. To avoid results being skewed by larger areas where relevant, which includes the entrepreneurship and FDI measures, we scale by the working age population. Again, this approach is used rather than scaling by the number of firms present because of our interest on how members of the population react in terms of their career choices.

3.6 | Control variables

The control variables included in the regressions fall into three main groups: the industrial structure; labour force structure; and local economic conditions. Some studies have suggested that manufacturing firms may experience greater productivity increases than service-based firms from knowledge spillovers, although service FDI may be the source of these manufacturing gains (Rojec & Knell, 2018). Manufacturers may also gain most from the demand effect by providing inputs for foreign affiliates (Thompson & Zang, 2018). As entrepreneurs often start businesses in the same industry as their previous employment, we use data from the Annual Population Survey (APS) to capture the proportion of employment in the manufacturing sector. Population density (population per square kilometre) from the midyear population estimates is used to capture benefits associated with urban agglomeration economies for local entrepreneurship, such as higher local demand and greater access to universities and research labs (Power et al., 2019). Anyadike-Danes et al. (2005) and Campbell et al. (2007) find that both firm births and firm deaths are

positively correlated with population density in the UK, potentially reflecting the competition created in these denser more dynamic markets.

Rocha (2013) suggests that where clusters exist entrepreneurship is greater as the networks formed allow greater knowledge spillovers generating opportunities for firm formation, as is consistent with the knowledge spillover theory of entrepreneurship (Acs et al., 2013). To capture this, we employ Fotopoulos's (2014) measures of industry diversity and industry specialization. In the case of industry diversity, this is based on Theil's (1972) entropy measure. Industry specialization is reflected through a relative specialization index. To generate these measures employment in SIC 4-digit sectors is utilized drawn from the Business Register and Employment Survey (BRES) and its predecessor the Annual Business Inquiry (ABI). Fotopoulos and Spence (2001) find that industry specialization is negatively related with both firm births and deaths in the UK. Moreover, a number of studies find that both industry diversification and specialization reduce firm deaths (Basile et al., 2017; Cainelli et al., 2014; Power et al., 2019). This relates to the competing forces of additional competition and access to resources such as pools of specialized labour and knowledge networks.

A thriving SME sector can provide a seedbed for new enterprises (Uhlaner & Thurik, 2007) and source of role models for budding entrepreneurs (Politis, 2008), leading to a persistence in SME formation rates (Fritsch & Wyrwich, 2015). The greater presence of SMEs will also affect firm deaths as there will be a larger pool of existing entrepreneurs who may decide to exit. The final industrial structure variable is therefore the number of small and medium sized enterprises (SMEs) per working age population.

The labour market characteristics controlled for are: the percentage of the population in the prime age group (35 to 44 years); proportion of the population holding university degree level or equivalent qualifications or higher, in other words National Vocational Qualifications (NVQ) level 4 or higher; and employment in the public sector. Both the prime age and NVQ level 4 measures are accounting for human capital to a degree as entrepreneurs need to gain experience and other resources before starting their businesses (Collins et al., 2004). Human capital availability may also reduce firm deaths as Abowd et al. (2009) find firms in three American states that employ more high skilled workers are less likely to close. However, both can provide incentives to not enter entrepreneurship or to exit existing activities by increasing the number of employment alternatives available (Berrill et al., 2020; Van der Sluis et al., 2008). The age profile of the population is taken from the ONS population estimates and the proportion holding NVQ level 4 + qualifications from the APS.

Employment from the public sector can locally support demand through public procurement (Murray, 2009). However, an over-reliance on the public sector is associated with reduced creativity and flexibility thereby stifling entrepreneurship (Williams & Vorley, 2014). The theory of the dissatisfied entrepreneur would suggest that entrepreneurial individuals would wish to remain as business owners rather than join a more bureaucratic and less dynamic labour market reducing firm deaths (Noorderhaven et al., 2004). The data are drawn from the APS.

Traditionally it has been disputed whether there is a positive or negative effect from stronger economic conditions. A positive prosperity pull relationship can be present where the returns from entrepreneurship are boosted (Mata, 1996), or a negative recession push where entrepreneurship increases as it is seen as a potential escape from unemployment (Santarelli et al., 2009). We account for both of these potential effects by controlling for average income growth, which as a pull factor will increase spending power in the local economy (Saridakis et al., 2013). This is measured as the increase in median gross full-time income over the preceding five years using data from the Annual Survey of Hours and Earnings (ASHE). For the recession push we capture through the short-term impact of rising unemployment limiting alternative employment options (Santarelli et al., 2009). We use the change in unemployment as a proportion of the population compared to the average for the preceding five years to capture this. Campbell et al. (2007) find that a higher unemployment rate associated with falling aggregate demand is linked to more firm deaths. However, Bradbury (1994) also notes where self-employment is a refuge from unemployment this is likely to be temporary and unwound as conditions improve and waged employment alternatives become available.

4 | RESULTS

The summary statistics of the domestic enterprise measures and the FDI measures are shown in Table 1. All the skewness data are positive indicating that the distribution for all variables is skewed to the right. The positive and high kurtosis numbers show that all distributions have heavy tails. As fixed effects are employed this is accounted for in the intercepts.

Table 2 presents the correlation matrix of the domestic enterprise measures and the FDI measures. Firm births appear to be positively correlated with more knowledge intensive measures of FDI only, but the association is quite low. However, some of the same measures of FDI are also linked to firm deaths.

The correlations among different knowledge intensive FDI measures are quite low indicating that attracting one type of FDI does not necessarily mean other types are also likely to be present. The correlations between non-knowledge intensive FDI and FDI including all activities are very high, indicating that the non-knowledge intensive FDI represents the majority of FDI activities. Indeed, both jobs created by non-knowledge intensive FDI and non-knowledge intensive FDI investment account for about 76% on average of the total jobs created by FDI and the total FDI investment respectively. Importantly, the correlations between the job creation and investment-based measures for each type of activity are all below 0.7. Whereas it might have been expected the measures might be nearly perfectly correlated given they are capturing the same FDI activities, this is not the case. This suggests that they are

TABLE 1 Summary statistics of firm births, firm deaths and FDI measures

	Mean	Standard deviation	Minimum	Maximum	Median	Skewness	Kurtosis
Firm Births	63.151	21.966	21.209	321.262	59.699	2.513	19.682
Firm Deaths	54.509	18.153	19.952	300.000	52.461	3.598	38.916
FDI non-knowledge intensive (jobs created)	10.234	23.612	0	372.648	2.609	6.758	73.354
FDI non-knowledge intensive (investment)	5.684	18.175	0	276.039	0.659	7.697	83.040
FDI routine or compliance knowledge intensive (jobs created)	0.749	3.165	0	56.952	0	9.429	120.688
FDI routine or compliance knowledge intensive (investment)	4.184	17.325	0	276.039	0.020	8.820	102.362
FDI networking knowledge intensive (jobs created)	0.078	0.915	0	28.608	0	19.735	484.406
FDI networking knowledge intensive (investment)	0.247	3.587	0	129.855	0	25.104	770.555
FDI renewal knowledge intensive (jobs created)	1.354	5.146	0	105.268	0	10.461	156.344
FDI renewal knowledge intensive (investment)	0.385	1.354	0	23.227	0	7.746	87.991
FDI all knowledge intensive (jobs created)	2.182	6.528	0	123.776	0	7.939	98.840
FDI all knowledge intensive (investment)	0.818	3.984	0	130.849	0	19.123	515.788
FDI all activities (jobs created)	12.416	24.864	0	372.648	4.240	5.883	58.881
FDI all activities (investment)	6.502	18.623	0	276.039	1.195	7.274	75.684

TABLE 2 Correlation matrix of firm births, firm deaths and FDI measures

	1. Firm births	2	3	4	5	6	7	8	9	10	11	12	13
2. Firm deaths	0.680 (0.000)												
3. FDI non-knowledge intensive (jobs created)	−0.012 (0.539)	−0.008 (0.680)											
4. FDI non-knowledge intensive (investment)	−0.005 (0.797)	−0.001 (0.955)	0.615 (0.000)										
5. FDI routine or compliance knowledge intensive (jobs created)	0.041 (0.042)	0.035 (0.086)	0.048 (0.014)	0.037 (0.057)									
6. FDI routine or compliance knowledge intensive (investment)	−0.006 (0.751)	−0.003 (0.887)	0.544 (0.000)	0.933 (0.000)	0.057 (0.004)								
7. FDI networking knowledge intensive (jobs created)	0.105 (0.000)	0.041 (0.043)	−0.001 (0.943)	−0.007 (0.707)	0.018 (0.367)	−0.002 (0.938)							
8. FDI networking knowledge intensive (investment)	0.007 (0.745)	0.010 (0.615)	−0.003 (0.900)	−0.012 (0.547)	−0.002 (0.922)	−0.009 (0.633)	0.336 (0.000)						
9. FDI renewal knowledge intensive (jobs created)	0.123 (0.000)	0.050 (0.013)	0.045 (0.021)	0.026 (0.187)	0.103 (0.000)	0.035 (0.075)	0.195 (0.000)	0.037 (0.060)					
10. FDI renewal knowledge intensive (investment)	0.120 (0.000)	0.069 (0.001)	0.043 (0.028)	0.030 (0.126)	0.074 (0.000)	0.034 (0.081)	0.137 (0.000)	0.063 (0.001)	0.658 (0.000)				
11. FDI all knowledge intensive (jobs created)	0.131 (0.000)	0.062 (0.002)	0.059 (0.003)	0.037 (0.056)	0.568 (0.000)	0.055 (0.005)	0.303 (0.000)	0.075 (0.000)	0.865 (0.000)	0.574 (0.000)			
12. FDI all knowledge intensive (investment)	0.057 (0.005)	0.043 (0.035)	0.019 (0.323)	0.005 (0.818)	0.153 (0.000)	0.013 (0.523)	0.352 (0.000)	0.921 (0.000)	0.272 (0.000)	0.409 (0.000)	0.338 (0.000)		
13. FDI all activities (jobs created)	0.047 (0.019)	0.009 (0.654)	0.965 (0.000)	0.594 (0.000)	0.195 (0.000)	0.531 (0.000)	0.078 (0.000)	0.017 (0.373)	0.270 (0.000)	0.191 (0.000)	0.318 (0.000)	0.107 (0.000)	
14. FDI all activities (investment)	0.007 (0.713)	0.008 (0.685)	0.604 (0.000)	0.977 (0.000)	0.069 (0.000)	0.914 (0.000)	0.068 (0.001)	0.186 (0.000)	0.083 (0.000)	0.117 (0.000)	0.109 (0.000)	0.218 (0.000)	0.602 (0.000)

Notes: $N = 2{,}460$; p-values in parentheses.

capturing quite different types of investment, which is likely to impact domestic enterprise in different manners and as discussed in subsection 3.2 there is value in considering FDI measures based both on job creation and investment.

The Hausman tests suggest fixed effect estimations are more appropriate for all model specifications. All regressions are jointly significant according to F tests. Subsections 4.1 and 4.2 will discuss the effects of different FDI activities on firm births and firm deaths respectively.

4.1 | Firm births

Table 3 presents the results for firm births using one-year lagged jobs created by FDI as the independent variable. Given previous studies, such as those covered by the meta-analysis of Hong et al. (2021) it is not surprising that FDI in general is not statistically related to new firm creation. This would be reasonable where any demand effect is cancelled out by a competition effect (Barbosa & Eiriz, 2009). In particular, recent work has suggested that FDI is better at creating waged employment in countries with higher levels of education such as the UK than entrepreneurs (Berrill et al., 2020). This would be consistent with the findings of the existing studies that non-R&D activities of foreign firms have no impact on overall domestic firm births (Cai et al., 2007).

In terms of knowledge intensive FDI it was suggested that knowledge spillovers might be greater and assist with the creation of more entrepreneurship as captured by the Hypotheses 1a, 2a and 3a. However, none of the variables associated with knowledge intensive FDI are significantly related to firm births. One explanation for this is that knowledge intensive FDI is only found to have a positive impact on firm births in sectors that are dynamic or R&D intensive (Amoroso & Müller, 2018). As knowledge intensive startups are unevenly distributed in the UK with a small number of localities accounting for a majority of this type of startup often in close proximity to research focused universities (Soetanto & Jack, 2013). This implies the presence of knowledge intensive jobs created by FDI in other localities may have a limited impact.

The controls are consistent with expectations. This means agglomeration economies, persistence of entrepreneurial cultures, positive economic conditions and more of the population in the prime age group are associated with firm births. There is less evidence of an unemployment push effect.

Allowing for long-run effects by using the five year average of jobs created as the measure of FDI does not alter the results found (Appendix Table A2). Similarly, although not presented here for preservation of space (but available from the authors on request) using investment based measures of FDI also results in no significant relationships with firm births.

Although variation in the impact of FDI on firm births across different types of local economies is not the focus of this study, we did explore whether splitting the sample by the presence of knowledge intensive businesses (as a share of all businesses) in an area influenced the results. Whether businesses are knowledge intensive or not is based on the definition used by Huggins et al. (2021). It was possible to determine the presence of knowledge intensive businesses in the areas considered from 2010 onwards in a comparable fashion. We defined areas as being knowledge intensive if in all years since 2010 the share was above the UK average. This strict definition yields 36 areas with greater business knowledge intensity that might be consistent with the combined implications of Amoroso and Müller (2018) and Soetanto and Jack (2013). These are presented in the Appendix Tables A3 and A4 where the results in Panel A of each table are all insignificant for the larger number of less knowledge intensive business areas. This is also the case in Table A3 Panel B where a lag of one year is considered for the jobs created in more knowledge intensive business areas. In Table A4 Panel B where longer run effects are considered by using the 5 year moving average of the jobs created by FDI, it is interesting to note that a demand effect may be present as all jobs created is significant, and there is weak evidence that non-knowledge intensive jobs also have a positive effect. These non-knowledge intensive jobs might boost the local economy, but would not compete for entrepreneurial individuals. There is also weak evidence that in the long-run, experience working in renewal focused jobs for foreign investors also provides the skills and abilities to create new enterprises. This result may only be significant at the

TABLE 3 The impact of one-year lagged jobs created by FDI on firm births

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
All jobs created by FDI	0.0064 (0.556)						
Non-intensive jobs created by FDI		0.0090 (0.420)					0.0088 (0.431)
All intensive jobs created by FDI			−0.0315 (0.451)				
Routine or compliance intensive jobs created by FDI				−0.0199 (0.794)			−0.0181 (0.811)
Networking intensive jobs created by FDI					−0.0787 (0.800)		−0.0526 (0.867)
Renewal intensive jobs created by FDI						−0.0380 (0.469)	−0.0355 (0.502)
NVQ4 + qualifications	0.1786 (0.156)	0.1790 (0.155)	0.1794 (0.154)	0.1790 (0.155)	0.1800 (0.153)	0.1777 (0.158)	0.1799 (0.154)
Wage growth	0.1162*** (0.001)	0.1168*** (0.001)	0.1153*** (0.001)	0.1149*** (0.001)	0.1151*** (0.001)	0.1156*** (0.001)	0.1172*** (0.001)
Unemployment	−2.5613*** (0.000)	−2.5525*** (0.000)	−2.5869*** (0.000)	−2.5819*** (0.000)	−2.5867*** (0.000)	−2.5915*** (0.000)	−2.5588*** (0.000)
Manufacturing employment	−0.1145 (0.514)	−0.1122 (0.523)	−0.1134 (0.518)	−0.1161 (0.509)	−0.1168 (0.506)	−0.1150 (0.512)	−0.1090 (0.535)
Public sector employment	0.0906 (0.514)	0.0920 (0.507)	0.0899 (0.517)	0.0886 (0.523)	0.0882 (0.525)	0.0899 (0.517)	0.0933 (0.502)
Population density	3.1850*** (0.000)	3.1911*** (0.000)	3.1954*** (0.000)	3.1822*** (0.000)	3.1960*** (0.000)	3.1876*** (0.000)	3.2096*** (0.000)
Industrial specialization	−35.8334** (0.033)	−35.8772** (0.032)	−35.8868** (0.032)	−35.7217** (0.033)	−35.7848** (0.033)	−36.0454** (0.032)	−36.0420** (0.032)

TABLE 3 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Industrial diversity	−27.9484 (0.184)	−27.9890 (0.183)	−27.6486 (0.189)	−27.6219 (0.189)	−27.6454 (0.189)	−27.9606 (0.184)	−27.9507 (0.185)
Prime age population	3.1521*** (0.000)	3.1530*** (0.000)	3.1792*** (0.000)	3.1616*** (0.000)	3.1598*** (0.000)	3.1842*** (0.000)	3.1726*** (0.000)
SMEs	0.0691*** (0.000)	0.0690*** (0.000)	0.0692*** (0.000)	0.0693*** (0.000)	0.0692*** (0.000)	0.0692*** (0.000)	0.0689*** (0.000)
N	2,296	2,296	2,296	2,296	2,296	2,296	2,296
Groups	164	164	164	164	164	164	164
Hausman test	92.49*** (0.000)	92.51*** (0.000)	91.78*** (0.000)	91.51*** (0.000)	91.53*** (0.000)	89.1*** (0.000)	90.82*** (0.000)
F-test (fixed effect)	7.9*** (0.000)	7.91*** (0.000)	7.94*** (0.000)	7.94*** (0.000)	7.93*** (0.000)	7.94*** (0.000)	7.89*** (0.000)
R^2	0.1421	0.1416	0.1419	0.1427	0.1418	0.1423	0.1405

Notes: Year dummies are included. The values in brackets are p values. *, ** and *** indicate 10%, 5% and 1% significance levels respectively.

10% level because as identified in Section 2 more knowledge intensive jobs would both provide alternative employment options as well as generate the human capital that supports enterprise.

4.2 | Firm deaths

Turning to firm deaths, Table 4 presents the results considering the relationship with one-year lagged jobs created by FDI. Evidence is found that the most knowledge intensive (renewal) jobs created by FDI are negatively related with firm deaths. Consistent with Hypothesis 2b, this is where the spillovers with the potential for new venture creation were expected to be greatest and support the resilience of ventures (Acs et al., 2012; Todo, 2006; Todo & Miyamoto, 2006). On the other hand, routine or compliance knowledge intensive jobs created increase the firm exit rate, which fits with Hypothesis 1b where competition for this skilled labour boosts relative rewards to waged employment of this type. This shows the importance of not only splitting FDI by knowledge intensity, but also by the type of knowledge being utilized. Those activities associated with innovation and management functions allows the development of entrepreneurs with flexibility and the ability to withstand shocks (Fritsch & Wyrwich, 2015; Ito et al., 2012). However, when looking at functions that are less closely associated with innovation (of all types), the knowledge intensity of jobs created appear to offer a highly rewarded alternative to entrepreneurship (Martins, 2011). The significant relationship between renewal knowledge intensive jobs and firm deaths rather than births would fit with evidence from other countries where the human capital acquired boosts the performance of SMEs created by those previously working in foreign affiliates, so that quality rather than necessarily quantity of SMEs is improved (Fu, 2012; O'Malley & O'Gorman, 2001). Finally, networking intensive jobs created by FDI do not significantly affect firm deaths, which is not in line with Hypothesis 3b. This may reflect the relative rarity of this type of employment creation from FDI (see Table 1). Another explanation is that most domestic firms might prefer to have business relationships and carry out knowledge exchange activities with other domestic firms as demonstrated in the Irish software industry (O'Malley & O'Gorman, 2001). In addition, it might be more common for the bigger firms to have business relationships or knowledge exchange activities with foreign firms (O'Malley & O'Gorman, 2001).

Of the controls, industrial specialization is negatively related to firm deaths, where clusters may allow more knowledge transfer (Rocha, 2013). However, too great a reliance on a small number of industries seems to reduce adaptability (Power et al., 2019), so concentration has the opposite effect. Other controls linked to firm deaths are population density, proportion in the prime age group and a greater presence of SMEs. All were found to boost firm births which will both generate competition, but also result in more new businesses which are most vulnerable to failure (Reynolds et al., 1995).

In terms of robustness checks, the results are similar when looking at the long-run average measure (Appendix Table A5). However, the aggregated variable of knowledge intensive jobs created by FDI has a significant and negative effect on firm deaths. Replacing the FDI measures with those considering investments finds weak evidence that non-knowledge intensive FDI increases firm deaths in one model specification (see Appendix Table A6). This would be consistent with capital intensive FDI creating competition effects which more than offset any knowledge spillover or demand effects that are limited due to less concentration on job creation (Barbosa & Eiriz, 2009). Interestingly, there is some evidence that foreign investment in routine or compliance activities reduces rather than increases firm deaths in one model specification, which is consistent with the alternative waged employment opportunities highlighted in Hypothesis 1b no longer being as evident. In addition, investments in renewal knowledge intensive activities are no longer statistically significant.

These results show the importance of using different measures of FDI to understand the effects caused through alternative employment being created and the opportunities for knowledge spillovers, as many of the choices outlined in Figure 1 work through the alternative employment created not capital investments. Linking back to the mechanisms covered in subsection 2.1, the effect of reducing firm deaths from routine or compliance investments would be consistent with the opportunity for local SMEs to provide additional business services

TABLE 4 The impact of one-year lagged jobs created by FDI on firm deaths

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
All jobs created by FDI	0.0098 (0.322)						
Non-intensive jobs created by FDI		0.0112 (0.268)					0.0110 (0.280)
All intensive jobs created by FDI			−0.0124 (0.744)				
Routine or compliance intensive jobs created by FDI				0.1619** (0.019)			0.1672** (0.015)
Networking intensive jobs created by FDI					0.1477 (0.601)		0.2357 (0.406)
Renewal intensive jobs created by FDI						−0.1010** (0.034)	−0.1075** (0.025)
NVQ4 + qualifications	0.1792 (0.117)	0.1796 (0.116)	0.1792 (0.117)	0.1740 (0.127)	0.1759 (0.124)	0.1769 (0.121)	0.1679 (0.142)
Wage growth	0.0268 (0.382)	0.0272 (0.375)	0.0251 (0.411)	0.0259 (0.397)	0.0249 (0.415)	0.0264 (0.387)	0.0294 (0.337)
Unemployment	0.6982 (0.168)	0.7027 (0.165)	0.6618 (0.190)	0.6409 (0.204)	0.6668 (0.186)	0.6442 (0.201)	0.6659 (0.187)
Manufacturing employment	−0.0860 (0.590)	−0.0840 (0.598)	−0.0887 (0.578)	−0.0997 (0.531)	−0.0910 (0.568)	−0.0845 (0.596)	−0.0891 (0.576)
Public sector employment	0.0243 (0.847)	0.0253 (0.841)	0.0214 (0.865)	0.0192 (0.879)	0.0212 (0.866)	0.0247 (0.844)	0.0282 (0.822)
Population density	1.0799** (0.023)	1.0863** (0.022)	1.0789** (0.023)	1.0587** (0.026)	1.0437** (0.029)	1.0920** (0.022)	1.0448** (0.029)
Industrial specialization	−31.2118** (0.040)	−31.2547** (0.040)	−31.1864** (0.041)	−31.7268** (0.037)	−31.1640** (0.041)	−31.8219** (0.037)	−32.5880** (0.032)

(Continues)

TABLE 4 (Continued)

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7
Industrial diversity	−55.3030*** (0.004)	−55.3020*** (0.004)	−54.9789*** (0.004)	−56.2099*** (0.003)	−55.2541*** (0.004)	−55.5402*** (0.004)	−57.4306*** (0.003)
Prime age population	1.7681** (0.018)	1.7720** (0.018)	1.7899** (0.017)	1.7848** (0.017)	1.7870** (0.017)	1.8425** (0.014)	1.8437** (0.014)
SMEs	0.1100*** (0.000)	0.1099*** (0.000)	0.1102*** (0.000)	0.1102*** (0.000)	0.1103*** (0.000)	0.1102*** (0.000)	0.1099*** (0.000)
N	2,296	2,296	2,296	2,296	2,296	2,296	2,296
Groups	164	164	164	164	164	164	164
Hausman test	107.98*** (0.000)	107.87*** (0.000)	108.56*** (0.000)	108.92*** (0.000)	109.28*** (0.000)	104.98*** (0.000)	103.92*** (0.000)
F-test (fixed effect)	7.16*** (0.000)	7.17*** (0.000)	7.18*** (0.000)	7.19*** (0.000)	7.18*** (0.000)	7.22*** (0.000)	7.21*** (0.000)
R^2	0.4049	0.4042	0.4053	0.4075	0.4091	0.4040	0.4090

Notes: Year dummies are included. The values in brackets are p values. *, ** and *** indicate 10%, 5% and 1% significance levels respectively.

(mechanism 2 Figure 1). However, there is not the same alternative employment opportunities created (mechanism 4a Figure 1) where foreign firms and domestic enterprises are effectively competing for entrepreneurial talent (Grossman, 1984). It is also understandable that the positive effect, in terms of reducing firm deaths, from renewal activities is reduced where there is not the same direct opportunity depicted by mechanism 4a of Figure 1 to acquire experience working in these roles (Cai et al., 2007).

5 | CONCLUSIONS

In this paper, we analyse how knowledge intensive FDI affects domestic firm birth and death rates using unitary authority and county level panel data for Great Britain. Corresponding with Ito et al.'s (2012) argument that the type of FDI matters in terms of the spillovers created, the paper's first contribution to the literature is in further dividing knowledge intensive FDI into three categories: routine or compliance services, network services and renewal services. Importantly these types of FDI have been defined by activity rather than measures based around industry, which may be misleading where investments and jobs created may have limited potential for positive spillovers due to their branch plant nature (Acs et al., 2012; Fritsch & Wyrwich, 2015; Román et al., 2011). Second, by considering both firm birth and death rates it has been possible to consider the impact of FDI of different types on domestic enterprise in a manner that allows a more rounded appreciation of how FDI affects local economies.

As expected overall FDI has little effect on firm births. However, there was a lack of support for Hypotheses 1a, 2a, and 3a as none of the FDI activities have a significant impact on domestic firm birth rate. Instead, there is evidence that jobs created in renewal knowledge intensive activities make a significant contribution to the domestic entrepreneurship activity by reducing the death rate of domestic firms (Hypothesis 2b), but that employment generated in routine or compliance knowledge intensive activities increase the death rate (Hypothesis 1b).

The results of this study have important implications for policy-makers with responsibility for local economies. Worldwide local and regional governments spend substantial resources in attracting inward investors in the expectation of capturing knowledge spillovers from foreign firms. Our results demonstrate that the types of FDI activities matter and understandably jobs created in renewal knowledge intensive FDI activities appear most beneficial. This means policies based on attracting firms from particular industries may not be as beneficial as hoped if such activities are not part of the investment. The lack of a positive relationship when using measures of FDI based on investment rather than jobs created also highlights the need to consider the routes through which spillovers will occur. Further, the results suggest that policy-makers may also be over optimistic if they hope that FDI will generate large numbers of new knowledge intensive ventures, but rather those created and those that are already in existence are likely to benefit from reduced exits. However, showing the nuances of the types of job created policy-makers may find that highly skilled members of the local workforce will be drawn away from domestic enterprise where routine or compliance jobs are created. This is not necessarily a negative outcome overall, but needs to be considered carefully, especially as there is some evidence that the pattern is potentially reversed where investment rather than jobs created is considered.

In addition to the traditional policy tools to attract FDI (subsidies and tax breaks), knowledge intensive FDI is attracted by high-quality skilled labour, research capabilities and innovation system including R&D laboratories, product development, industrial clusters and research institutions (OECD, 2012). This reinforces the argument that FDI is unlikely to be a transformative silver bullet on its own (Driffield, 2004), but rather will support existing domestic enterprise. This means local government may be better advised to focus on providing the relevant knowledge infrastructure and resources associated with the local/regional innovation system. Given the current UK Government's "levelling up" agenda, which focuses on reducing geographical economic disparities this is timely (HM Government, 2022). Some of the policies proposed are consistent with achieving this, such as the investment in the three new Innovation Accelerators in Manchester, the West Midlands and Glasgow seeking to replicate successful global clusters of research excellence in Silicon Valley and Greater Boston. Combined with continuing finance from the British Business Bank (BBB) for SMEs, additional investment in education such as the proposed nine new employer connected institutes of technology

focusing on science, technology, engineering and mathematics (STEM) subjects will be appropriate. The work here indicates that FDI should also play a role in supporting this through the development of human capital, which can complement the Innovation Strategy's focus on boosting managerial skills, which will strengthen domestic enterprise. However, the attraction of the right type of FDI activities (not necessarily sector of activity) will be important if the UK national and local governments are seeking to boost the strongly embedded private sector with any incentives aimed at renewal activities. Otherwise there is a danger that any benefits of the other "levelling up" activities will be drawn into the foreign affiliates. The danger with the latter is that for localities targeted for "levelling up" they would be reliant on large foreign businesses and such policies in the past have been less successful in creating regional economic resilience and often had limited short-term benefits (Simmie & Martin, 2010).

Future work might consider the lack of significance of jobs created in networking activities. There may be a need for future studies to consider the wider sector and local economy knowledge sources and how these interact with this type of employment creation, as Hypotheses 3a and 3b were not supported, but this study did not account for the knowledge the skills created made available. Further, this study just considered firm creation and exits, but not which firms exited or were created. It is possible that no change in firm creation occurs, but if the quality of start-ups increases then the impact of mechanisms 4a and 4b initially and then 4c later in Figure 1 may be of great importance as skills are acquired working in foreign affiliates and later stronger firms created. Similarly, the true benefits of reduced firm deaths may be overstated (understated) if the most (least) entrepreneurial leave business ownership. Accounting for domestic new and exiting firms' sector, level of employment, innovation and growth would provide further understanding of the impact of FDI on the long term resilience of local and regional economies.

This study has highlighted the importance of considering the true nature of FDI when considering the relationship with domestic enterprise. The findings here suggest that current approaches of seeking investment from knowledge intensive sectors may in some cases reduce domestic enterprise and that policy-makers need to consider carefully the benefits of FDI against any harm caused. The results also show that hopes of generating large numbers of new knowledge intensive domestic enterprises off the back of FDI may be unlikely to come to fruition, but from particular activities those firms created and already present may benefit.

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SUPPORTING INFORMATION

Additional supporting information can be found online in the Supporting Information section at the end of this article.

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