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**The Impact of Brexit on the
Internationalisation, Innovation
and Turnover of UK SMEs:
Implications for the UK's
Industrial Strategy and the
'Levelling Up' Agenda**

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The impact of Brexit on the internationalisation, innovation and turnover of UK SMEs: Implications for the UK's industrial strategy and the 'levelling up' agenda

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ABSTRACT

This paper provides the results of an in-depth investigation of the impact of Brexit on the internationalisation, innovation, and financial performance of SMEs. In order to capture the complex Brexit impacts across various UK industries and regions, the research utilises longitudinal data from the Longitudinal Small Business Survey (LSBS). Perceptions of Brexit as a business obstacle, the challenges to investment and internationalisation processes, and anticipations for turnover growth are investigated. The results provide unique insights into the ongoing debates regarding the success or otherwise of Brexit. Overall, the findings contribute to an understanding of the heterogeneous impacts of Brexit on UK SMEs, which could inform future policy decisions aimed at supporting these businesses.

Keywords: Brexit, UK SMEs, Internationalisation, Innovation, Financial performance, Levelling up agenda, Post-Brexit era, Longitudinal Small Business Survey (LSBS), Regional disparities.

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1. INTRODUCTION

This paper assesses the impact of (so-called) Brexit on the internationalisation, innovation, and turnover (sales revenue) of UK small and medium enterprises (SMEs). It is widely acknowledged that SMEs (all businesses with less than 250 employees) form a core part of most modern economies.¹ In the UK, SMEs account for over 99% of registered firms and 60% of total private sector employment. These SMEs face a variety of challenges related to regulation, taxation, late payment, staff recruitment and retention, accessing appropriate financial advice and funding, supply chain disruptions, competition, and more recently a global pandemic, inflation and war in Ukraine.

It is now generally accepted that the decision made by popular vote for the UK to leave the EU in 2016 followed by the eventual formal departure in January 2020, has added to these challenges, and led to increased uncertainty regarding both current and future trading conditions. Given their size, SMEs are agile and can adapt quickly to the changing circumstances brought about by Brexit. However, given their relative lack of financial and human resources, SMEs may find it difficult to adapt to the myriad of challenges brought about by Brexit, with resultant consequences for international trade (Collins, 2019), investments and productivity (Bloom *et al.*, 2019). Evidence presented for the period between the vote to leave the EU and the UK's formal departure suggests that many SMEs consider that Brexit could constitute a significant obstacle to the future vitality and sustainability of the SME sector (Brown *et al.*, 2019). More recent evidence suggests that the new EU-UK Trade and Cooperation Agreement implemented following Brexit introduces significant new barriers (such as rules of origin checks) for businesses seeking to trade with counterparts located in EU member states (Alessandrini *et al.*, 2022; Dhingra *et al.*, 2022). Set against this, a recent report suggests that Brexit provides significant opportunities by allowing the UK government to: *'...deliver bespoke UK-orientated regulation that is primarily focused on delivering growth, innovation and competition, while minimising burdens on business'* (HM Government, 2022a).

Given the general importance of SMEs for the UK economy and ongoing debates regarding impacts on the economy, there are strong empirical grounds for investigating how Brexit is affecting UK SMEs. While Brexit represents a landmark change to trading and political arrangements between the UK and the EU, the current knowledge base regarding the overall

¹ In 2015, more than 22.3 million SMEs in the European Union constituted 99.8 % of all non-financial enterprises. These SMEs employed around 90 million people and generated around 58 % of total added value (€ 3.9 trillion).

impacts on SMEs and constituent industries across the UK is limited. Consequently, the overarching objective of this paper is to assemble new empirical evidence regarding the impacts of Brexit on SMEs in terms of internationalization (Ruzzier *et al.*, 2006; Jibril & Roper, 2022; Ramdani *et al.*, 2022), innovation (Hoffman *et al.*, 1998; Deschryvere, 2014; Jibril & Roper, 2022) and financial performance (Oke *et al.*, 2007; Deschryvere, 2014). The research also aims to investigate whether there are heterogeneous impacts of Brexit on SMEs across the constituent industries and regions of the UK (McCann *et al.*, 2021). The results of the paper are of relevance to UK government departments tasked with enacting industrial strategy and delivering on the so-called levelling up agenda (HM Government, 2017, 2022b) in a post Brexit era.² These insights offer new evidence on the ongoing 'levelling up' conversations, specifically focusing on how to address regional inequalities in the UK from a business standpoint.

In order to address the aforementioned objectives, we use the Longitudinal Small Business Survey (LSBS), which is an annual representative survey of UK SMEs produced by the UK Government Department of Business, Energy and Industrial Strategy. We exploit the longitudinal nature of the data, which include data on internationalization and innovation, and take advantage of a new question introduced in the 2021 survey wave, which asks respondents whether the “*UK’s exit from the EU is affecting their expectations of turnover growth for the next 12 months.*” In addition, we use specific questions included in “Section R: future intentions” of the LSBS to assess SME plans to “*invest in R&D*” and “*Increase export sales or begin selling to new overseas markets*” over the next three years for those SMEs that consider Brexit as a major obstacle for their businesses. This provides a unique opportunity to examine the *ex-post* consequences of Brexit for SMEs in terms of internationalisation, innovation and financial performance across UK industries and regions.

By way of preview, our main findings are as follows. Descriptive statistics across survey waves from 2018 to 2021 and sectors related to internationalization, turnover and innovations of SMEs and Brexit-related issues presented in Section 4.1 elucidate the intricate and multifarious implications of Brexit on SMEs. Between 20.3% and 24.5% of SMEs identify Brexit as a major business obstacle over the period 2018 through 2021, exhibiting a fluctuating trend

² The levelling up agenda is a UK government initiative designed to tackle persistent economic and social inequalities prevalent across the UK. This is underpinned by four overarching objectives aimed at enhancing productivity, wages, employment and living standards via growth in private sector economic activity; improving access to and the provision of public services; restoring pride to community; and providing funding and support for local empowerment (Harrari & Ward, 2022; HM Government, 2022b).

across the years under study, with an upward trend during 2021. Disaggregated by sector, Transport, Retail, and Food Service/Accommodation registered the highest proportion of SMEs perceiving Brexit as a major business obstacle, followed by Business Services. Perceived impacts, range from curtailed investment to increased import and export costs, with heterogeneity in impacts reported across sectors. With regard to the degree to which SMEs foresee Brexit as affecting their prospective turnover in the next year, the results suggest that the majority of SMES do not associate Brexit with a prospective increase in turnover, albeit there are disparities across regions and sectors. These findings underscore the necessity for strategies to tackle the heterogeneous challenges Brexit imposes on the various sectors and regions of the UK. Considering SMEs that foresee Brexit affecting their prospective turnover decrease in the next year, our results indicate that 67% of these businesses do not attribute their projected turnover reduction to Brexit, while 33% do. Geographic and sectoral disparities are again evident.

With respect to plans over the next three years, we find that between 12.7% and 15.7% of SMEs with future capital investment plans acknowledge Brexit's influence from 2018 to 2021. The impact varies across sectors, with the production and construction sectors experiencing the most pronounced effect (15.6%). In terms of the development plans of new products or services, between 13.7% and 20.9% of SMEs with plans identify Brexit as a factor during the same timeframe, signalling a fluctuating, but escalating impact in the last year. The most significant impact was noted in the production and construction sector (17.3%), while other services (8.4%) were least impacted. For R&D investment plans, an oscillating trend is observed over the period 2018 to 2021, with a surge observed in 2021 (21.7%). The sector-specific impact is relatively uniform, with the most significant impact in the transport, retail, and food service/accommodation sector (18.4%) and the least in other services (13.2%). Regarding export/market expansion plans, 30.2% of SMEs with plans in place cite Brexit's influence in 2018, reducing to 25.7% by 2020, but notably increasing again to 34.7% in 2021. The sector-specific influence was most significant in the production and construction sector (35.3%), and least in other services (22.3%).

Sections 4.2-4.4 present the empirical results regarding the impacts of Brexit on SMEs. Section 4.1 investigates the influence of Brexit perceived as a major business obstacle on future plans of SMEs, particularly focusing on those that are innovative and export-oriented. Brexit's perception as a major obstacle negatively impacts on various aspects of SMEs' future operations. Notably, it is expected to lead to a 15% reduction in their aim to growth sales in

the next three years. While innovative and exporting SMEs are more likely to aim for sales growth, only exporters significantly perceive Brexit as an obstacle. Moreover, the perception of Brexit as a major business obstacle is associated with a 20% decrease in future capital investments. While innovative SMEs show a positive impact on capital investment, their view of Brexit as a significant barrier is not statistically significant. Exporters show a minor positive impact on capital investment and a substantial positive perception of Brexit as an obstacle. On product or service development plans, the perception of Brexit as a major business obstacle has no significant impact. Nevertheless, innovative and exporting SMEs exhibit a strong positive impact on future product or service development, while their perception of Brexit as an obstacle is not significant. In terms of R&D investment plans and future plans to increase export sales or begin selling to new overseas markets, the perception of Brexit as a major obstacle shows a negative impact. Innovative and exporting SMEs demonstrate a significant positive effect, with their perception of Brexit as an obstacle being only significant for exporting SMEs.

Section 4.2 identifies the primary challenges stemming from the UK's departure from the EU, with a focus on the impacts on investment and internationalization processes for SMEs that consider Brexit as a major obstacle for their businesses. A series of Heckman probit models are employed to assess the influence of Brexit as a major business obstacle, leading to changes in investment, and difficulties in raising capital, as well as shifts in costs of import and export to and from the EU. In the investment and capital raising sphere: innovative SMEs; those with a business plan; women-led; and MEG-led SMEs are more likely to perceive a decrease in investment or greater capital raising difficulties due to Brexit. In terms of import costs, innovative SMEs and exporter do not seem to perceive an increase in cost of imports from the EU as a significant obstacle due to Brexit. In terms of export costs, SME exporters are more likely to perceive an increase in export costs to the EU as a major obstacle due to Brexit. Interestingly, businesses aged 6 - 10 years and those with stable turnover are less likely to consider an increase in cost of exports to the EU as a major obstacle following to Brexit. Overall, there are differential impacts of Brexit on SMEs, with size, innovation capacity, leadership, and export orientation serving as significant drivers of the extent to which Brexit is perceived as a significant obstacle to business success.

Section 4.3 investigates the perceptions of UK SMEs, specifically those that are innovative or export-oriented, regarding the impact of Brexit on their anticipated turnover in the forthcoming 12 months. Results from a multinomial probit regression analysis show that SMEs that are

innovative or engaged in exporting activities in the previous year are less likely to disregard Brexit's influence, but more inclined to consider it as a major factor in their prediction of a decline in turnover. On the other hand, the average marginal effects from a multinomial probit regression analysis examining the perspective of SMEs anticipating a turnover increase revealed a nuanced outcome. The relationship between innovation and export-orientation in the previous year and the perception of Brexit's influence on expectations of increased turnover is statistically significant, albeit at a diminished impact relative to counterparts expecting a decrease in turnover. In general, both innovative and export-oriented SMEs typically associate expected changes in turnover with Brexit. However, the extent of this effect, varies, suggesting the intricate nature of Brexit's impact on SMEs' financial expectations.

Finally, Section 5 provides a descriptive analysis of the relationship between levelling-up metrics related to Gross Value Added (GVA) per hour worked and the Index of multiple deprivation (IMD) with the potential impacts of Brexit in terms of internationalization, turnover and innovations of SMEs. The results suggest that regions with the lowest Gross Value Added (GVA) per hour (£31.22-£32.47) include Northern Ireland, Wales, Yorkshire & the Humber, and North East. SMEs in these regions report concerns over Brexit as a significant business obstacle, ranging from 16.68% of SMEs in the North East to 32.26% of SMEs in Wales. In particular, the increase in the cost of imports from the EU due to Brexit is a shared concern for SMEs, with the highest proportion of those SMEs affected located in Wales (78.49% of SMEs that see Brexit as a major obstacle). Notably, the North East region indicates a significant impact on their plans to increase export sales or begin selling to new overseas markets over the next three years (89.78% of SMEs with plans to increase export sales or begin selling to new overseas markets over the next three years). Regions with a moderate GVA per hour worked (£32.58-£33.95) include East Midlands, West Midlands, South West, and North West. These regions exhibit a relatively consistent view of Brexit as a business obstacle, ranging from 18.06% of SMEs in the South West to 23.73% of SMEs in the North West. Noteworthy is the North West region, where 89.64% of SMEs that perceive Brexit as a major obstacle anticipate an increase in the cost of imports from the EU. Moreover, the impact of Brexit on SME capital investment plans is most prominent in the West Midlands, affecting 29.50% of SMEs with capital investment plans. The regions with the highest GVA per hour worked (£34+) are the East of England, Scotland, South East, and London. In these regions, Brexit as a major business obstacle varying between 22.53% of SMEs in South East to 35.17% of SMEs in London. SMEs located in London also exhibit the highest concern about the impact of Brexit on capital investment plans over the next three years (39.88% of SMEs with capital

investment plans). SMEs located in Scotland show a higher percentage of SMEs that view Brexit as a major factor in the expected decrease in turnover in the next 12 months (45.23% of SMEs that expect a decrease in turnover in the next 12 months).

In terms of the IMD (which ranges from 1, most deprived to 20, least deprived), regions with higher deprivation (IMD ranging from 1 - 11.1) include the North East, Yorkshire & Humber, Northern Ireland, and London. The data indicate large proportions of SMEs viewing Brexit as a major business obstacle, ranging from 16.7% in the North East to 35.2% in London. Notably, SMEs in the North East (74.3% of SMEs perceiving Brexit as a major obstacle) and Yorkshire & Humber (67.2% of SMEs perceiving Brexit as a major obstacle) report a significant increase in the cost of imports from the EU as a major obstacle derived from Brexit. Regarding Brexit's impact on business plans, the most significant effects are observed in the North East, with almost 90% of SMEs indicating that their plans to increase export sales or begin selling to new overseas markets have been affected by Brexit. Middle IMD regions (ranging from 11.1 - 11.8), include West Midlands, North West, East Midlands, and Scotland. In these regions, there is a lower variation SMEs viewing Brexit as a business obstacle, ranging from 22.8% in East Midlands to 32.7% in Scotland. The North West exhibits the highest percentage (89.64%) of SMEs reporting an increase in the cost of imports from following Brexit, while a large number of SMEs in the East Midlands consider the increase in export costs as a major obstacle induced by Brexit (44.85%). Data from regions with high IMD scores (11.85 - 20), include Wales, South West, East of England, and South East. The proportion of SMEs considering Brexit as a business obstacle is highest in Wales (32.26%) and lowest in the South West (18.06%). Both Wales (78.49% of SMEs that perceive Brexit as a major obstacle) and South West (65.3% of SMEs that perceive Brexit as a major obstacle) highlight significant increases in the cost of imports from the EU post-Brexit. Finally, Brexit is perceived to have substantial impact on SMEs' three-year plans, especially plans designed to increase export sales and invest in R&D. While the findings presented are primarily descriptive, they nonetheless highlight the complex and varied influence of Brexit on SMEs across various regions in the UK, each with differing levels of deprivation or productivity. Future research is required to explore these disparate effects. Such investigations can inform and facilitate the creation of bespoke regional policy initiatives, specifically designed to ameliorate the distinct challenges encountered by SMEs.

We make two key contributions. Firstly, we employ the Longitudinal Small Business Survey (LSBS) data to offer fresh empirical insights into the effects of Brexit on the internationalization,

innovation, and financial performance of UK Small and Medium-sized Enterprises (SMEs). By adopting this approach, we are able to conduct an extensive and longitudinal examination of Brexit's aftermath on SMEs across various industries and regions in the UK. Second, we contribute to the ongoing discussions on the 'levelling up' agenda and how best to address inequality across UK regions from a business perspective. The results of the research provide important insights into the heterogeneous impacts of Brexit on SMEs across the constituent industries and regions of the UK. This contribution also adds to the literature on the 'levelling up' agenda and provides policymakers with evidence to base recommendations on how best to support SMEs in a post-Brexit era.

The rest of this paper is structured as follows. Section 2 provides a background discussion and relevant literature. Section 3 describes the data set used and the research methodology. In sections 4 and 5, we present the results of our analysis. Section 6 presents the conclusions of the study.

2. BACKGROUND

Industry associations, think tanks and lobby group reports utilise anecdotal evidence and surveys to garner insights regarding the impacts of Brexit, while official governmental reports tend to use relatively aggregated data. Much of the results emanating from these studies suggest negative impacts of Brexit for the UK economy (Sampson, 2017; Alessandrini *et al.*, 2022; Dhingra *et al.*, 2022).

Brexit's potential impact has been analysed primarily through anticipated macroeconomic effects such as growth, trade, and inflation (Armstrong & Portes, 2016; Van Reenen, 2016; Dhingra *et al.*, 2017; Sampson, 2017). The business level effects have focused on large firms, especially those in sectors with complex cross-country supply chains (such as in the automotive sector), which has seen a significant decrease in capital investment due to Brexit-related uncertainty (Dhingra *et al.*, 2018). These uncertainties have raised more general questions regarding the attractiveness of the UK as a business location (Cumming & Zahra, 2016).

At the time of writing, the actual impact of Brexit on SME activities at a national, regional and industry level has not been assessed fully. Moreover, while providing important insights, the aforementioned evidence base is assembled from small samples of firms drawn from particular industries and geographic locations. To the best of our knowledge, there have been

no official UK government studies providing evidence of the impacts of Brexit on SMEs using the most recent waves of the LSBS - the UK Government's own flagship business survey. The current research fills this evidence gap using the LSBS to provide practitioners and policymakers with new insights regarding the impacts of Brexit on SME internationalisation, innovation and turnover at UK, regional and industry level.

Brexit introduced significant uncertainty and potential changes in regulation, immigration policy, and trading relationships. The implications of Brexit are complex and multifaceted, and the lack of governmental pre-planning for such a scenario has exacerbated these uncertainties. Several studies have been conducted to examine the impact of Brexit on SMEs. Brown *et al.* (2019) find that innovative and growth-oriented SMEs are the most concerned about the impact of Brexit. Brown *et al.* (2020) examine the impact of Brexit on Scottish SMEs and find that certain types of SMEs (i.e., innovators and exporters) are disproportionately fearful of the negative impacts of Brexit. Billing *et al.* (2019) discuss the potential impacts of Brexit on UK regions and related sub-national governance challenges. The findings imply that the sub-national institutional structure in the UK is predominantly ill-equipped to handle the realities that have ensued following Brexit. Calabrese *et al.* (2022) suggest that Brexit has added an additional layer of uncertainty for UK SMEs, particularly concerning future access to debt finance. However, relationship lending plays a crucial role in mitigating these concerns, albeit it may not be as effective for SMEs engaged in product innovation. Despite the mixed evidence, it is clear that the uncertainties surrounding Brexit significantly affected UK SMEs (Cumming & Zahra, 2016). More comprehensive empirical research is required to understand the specific and long-term impacts of Brexit on SMEs.

3. DATA AND METHODOLOGY

3.1 Data

For the empirical analysis conducted in the present study, we utilise the UK Longitudinal Small Business Survey (LSBS). Commissioned by the Department for Business, Innovation and Skills (BEIS), the Longitudinal Small Business Survey (LSBS) is a large-scale telephone survey of owner/proprietors, Managing Directors or other senior directors in UK-based of Small and Medium-sized Enterprises (SMEs).

To ensure consistency of the results, we utilize the four most recent waves of LSBS data from 2018 to 2021. This is necessary because the questions asked in previous years are not always consistent with those included in the 2018-2021 waves.

3.2 Descriptive statistics

The LSBS encompasses detailed information on the characteristics of SMEs, ranging from basic demographic data to various economic variables, including information regarding the business impacts of Brexit. The LSBS is a valuable resource for gaining insight into the characteristics and potential vulnerabilities of SMEs in the UK, particularly in relation to the impact of Brexit.

The comprehensive data provided, including demographic and economic variables are detailed in Table 1. The key dependent variables used in the analysis measure whether SMEs in the sample exhibit an impact in their internationalisation, investments, and innovative activities.

Table 1: Variable definitions

This Table shows names and definitions of explanatory variables. All variables are gathered from the Longitudinal Small Business Survey, 2018-2021.

Variable	Definition	LSBS code
<i>UK exit from the EU</i>		
Brexit as a major business obstacle	SME responds affirmatively to the following question: Would you say that UK exit from the EU is a major obstacle to the success of your business in general?	G2I (cohort B)
<i>Major obstacles relating to UK exit from EU</i>		
	Decrease in investment/greater difficulty in raising capital	G8C (cohort B)
	Increase in cost of imports from the EU	G8D (cohort B)
	Increase in cost of exports to the EU	G8E (cohort B)
Brexit as a driver of future turnover	Extent to which SME considers the UK's exit from the EU to be a factor in the increase/decrease in turnover that is expected in the next 12 months	P7/P11_1
<i>Plans over the next 3 years / Whether plans over the next three years have been affected by Brexit</i>		
	SME aims to grow sales in the next 3 years	R1
	Capital investment (in premises, machinery etc.) in the UK	R4C / R8A_C (cohort B)
	Develop and launch new products/services	R4D / R8A_D (cohort B)
	Invest in R&D	R4G / R8A_G (cohort B)

	Increase export sales or begin selling to new overseas markets	R4H / R8A_H (cohort B)
<i>SME innovation capacity and international trading activity</i>		
SME Innovator	SME has introduced new or significantly improved goods or services in the last 3 years	J1/J1SUM
SME exporter	SME exported goods or services in the past 12 months (outside UK)	C1/C2
<i>Size</i>		A2SPSS1
Zero employees (base category)	Zero employee business had no employees on their payroll (excluding owners and partners) at the time of the interview.	
Micro	1-9 employees.	
Small	10-49 employees.	
Medium	50-249 employees.	
<i>Business age</i>	Age of the firm.	A6SUM and A6, missing values for 2016 are completed with values from 2015
0 – 5 years (base category)		
6 – 10 years		
11 – 20 years		
20+ years		
<i>Turnover change</i>	Turnover in the past 12 months, compared with the previous 12 months.	P2
Decreased (base category)		
Stayed roughly the same		
Increased		
<i>Profit</i>	Firm generates a profit or surplus after considering all sources of income in the last fiscal year.	P12
<i>Business plan</i>	The business has a formal written business plan.	F5
<i>Women-led</i>	Women-led businesses are defined as those majority-led by women, which is controlled by a single woman or having a management team of which a majority are women. 'Majority' here means over 50%.	WLED
<i>Minority ethnic-led</i>	A business where at least half of the leadership team comes from minority ethnic groups (as this is a UK survey, minority ethnic groups are those that are not White British, where White British includes White English, White Scottish etc). The leadership team comprises the directors and working owners. We can include members of several ethnic groups and can include people who describe themselves as mixed ethnicity where White British is one of those ethnicities.	MLED
<i>Region</i>	Region where the firm has its headquarters.	NATION
England (base category)		
Scotland		
Wales		

Northern Ireland		
<i>Sector</i>	Industry Sector	SECTOR
Manufacturing sector (base category)	Production and construction (SIC 2007: ABCDEF).	
Transportation and retail services	Transport, retail, and food service / accommodation (SIC 2007: GHI).	
Business services	Business services (SIC 2007: JKLMN).	
Other services	Other services (SIC 2007: PQRS).	
<i>Legal status</i>		LEGAL
Other (e.g., base category -Limited Liability Partnership, Limited Liability Company, etc.)		
Sole Proprietorship Company Partnership		

Our estimable models, which are described in the next section, include a number of control variables that relate to the demographic and firm-level characteristics of the SMEs in our sample. Table 2 presents summary information. Figures suggest that Brexit is viewed as a major business obstacle by 22.1% of SMEs in the sample. Specific challenges related to Brexit include a decrease in investment or greater difficulty in raising capital (13.6%), increased costs of imports from (63.2%) and exports (33.4%) to the EU. Brexit is perceived as a driver of future turnover changes, with 22.4% of SMEs seeing a minor/major impact on turnover increases and 33% anticipating a minor/major impact on turnover decreases.

As for future intentions over the next three years, a majority of SMEs, or approximately 58.3%, aim to grow their business. 22.3% of SMEs plan to make capital investments in the UK, 29.5% plan to develop and launch new products/services, 16.2% aim to invest in R&D, and 12.6% aim to increase export sales or begin selling to new overseas markets. These intentions are influenced by Brexit, with 13.6%, 14.4%, 16.6%, and 29.3% of SMEs indicating so, respectively.

Among the control variables, 20.6% are SME innovators, and 14.3% are SME exporters. Most SMEs have zero employees (75.6%), are micro-sized (20.1%), and have been operating for over 20 years (37.4%). In terms of turnover changes over the last year, 31.3% report a decrease, 41.3% report no change, and 27.4% report an increase. Profitability is reported by 76.8% of businesses. As for business characteristics, 27.3% of the SMEs in our sample have a business plan. Women-led and minority ethnic-led businesses account for 20% and 4.8% of the sample, respectively. Regionally, most SMES are based in England (88.4%), and the

business services sector is the largest accounting for 33.5% of SMEs. Most SMEs are companies (48.7%) by legal status. In order to check for multicollinearity issues, Table 3 presents pairwise correlations between the explanatory variables. The highest correlation between profit and turnover change equals 0.23. Hence, multicollinearity does not appear to present a critical concern for our empirical analysis.

Table 2: Summary Statistics

This table reports the summary statistics using data from the Longitudinal Small Business Survey, 2018-2021. Cross-sectional survey weights applied to represent the population of SMEs in the UK. Respondents who answer “I do not know” or refused to answer are excluded from the sample. Variable definitions are reported in Table 1.

	Mean	Std.	N
<i>UK exit from the EU</i>			
Brexit as a major business obstacle	0.221	0.415	14,342
<i>Major obstacles relating to UK exit from EU</i>			
Decrease in investment/greater difficulty in raising capital	0.136	0.411	1,023
Increase in cost of imports from the EU	0.632	0.579	1,033
Increase in cost of exports to the EU	0.334	0.567	1,026
<i>Brexit as a driver of future turnover increase</i>			
Brexit has a minor/major impact	0.224	0.417	4,510
<i>Brexit as a driver of future turnover decrease</i>			
Brexit has a minor/major impact	0.330	0.471	801
<i>Future intentions over the next 3 years</i>			
Aims to grow	0.583	0.493	42,944
Capital investment (in premises, machinery etc.) in the UK	0.223	0.416	14,342
Develop and launch new products/services	0.295	0.456	14,342
Invest in R&D	0.162	0.369	14,342
Increase export sales or begin selling to new overseas markets	0.126	0.332	14,342
<i>Future intentions over the next 3 years affected by Brexit</i>			
Capital investment (in premises, machinery etc.) in the UK	0.136	0.423	4,870
Develop and launch new products/services	0.144	0.388	5,179
Invest in R&D	0.166	0.460	3,559
Increase export sales or begin selling to new overseas markets	0.293	0.529	2,441
CONTROL VARIABLES			
<i>Innovation and International trade</i>			
SME Innovator	0.206	0.404	42,478
SME exporter	0.143	0.350	42,733
<i>Size</i>			
Zero employees (base category)	0.756	0.430	42,944
Micro (1-9)	0.201	0.401	42,944
Small (10-49)	0.037	0.189	42,944
Medium (50-249)	0.006	0.078	42,944
<i>Business age</i>			
0 – 5 years (base category)	0.159	0.366	42,775

6 – 10 years	0.177	0.382	42,775
11 – 20 years	0.289	0.453	42,775
20+ years	0.374	0.484	42,775
Turnover change			
Decreased (base category)	0.313	0.464	40,965
Stayed the same	0.413	0.492	40,965
Increased	0.274	0.446	40,965
Profitability			
Profit	0.768	0.422	40,205
Business characteristics			
Business plan	0.273	0.445	41,353
Women-led	0.200	0.400	40,979
Minority ethnic-led	0.048	0.215	40,303
Region			
England (base category)	0.884	0.320	42,944
Scotland	0.059	0.235	42,944
Wales	0.035	0.184	42,944
Northern Ireland	0.022	0.148	42,944
Sector			
Manufacturing sector (base category)	0.251	0.433	42,944
Transportation and retail services	0.188	0.391	42,944
Business services	0.335	0.472	42,944
Other services	0.225	0.417	42,944
Legal status			
Other (base category, e.g., LLP, LLC, etc.)	0.040	0.197	42,944
Sole Proprietorship	0.405	0.491	42,944
Company	0.487	0.500	42,944
Partnership	0.068	0.252	42,944

Table 3: Correlation matrix

This table reports the correlation matrix between all variables used in this study. * shows significance at $p < .01$.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Innovator	1.000											
(2) Exporter	0.194*	1.000										
(3) Firm size	0.109*	0.118*	1.000									
(4) Firm Age	-0.017*	0.067*	0.181*	1.000								
(5) Turnover change	0.075*	0.065*	0.137*	-0.060*	1.000							
(6) Profit	-0.008	0.055*	0.059*	0.034*	0.228*	1.000						
(7) Business plan	0.141*	0.060*	0.328*	-0.015*	0.078*	-0.028*	1.000					
(8) Women-led	-0.019*	-0.078*	-0.028*	-0.052*	-0.028*	-0.047*	0.011	1.000				
(8) MEG-led	0.014*	-0.006	0.015*	-0.086*	-0.018*	-0.039*	0.031*	-0.002	1.000			
(10) Region	0.010	0.030*	0.011	-0.024*	0.003	0.006	-0.004	-0.005	-0.059*	1.000		
(11) Sector	0.010	-0.112*	-0.050*	-0.052*	-0.022*	-0.075*	0.100*	0.177*	0.051*	-0.061*	1.000	
(12) Legal Status	0.025*	0.078*	0.144*	-0.005	0.042*	0.090*	0.058*	-0.097*	0.012	-0.027*	-0.161*	1.000

3.3 Empirical methodology

3.3.1 Binary probit: Future plans of SMEs

We utilize information contained in the LSBS to identify which SMEs are most concerned by Brexit (i.e., Brexit is a major obstacle for their business), and execute a regression-based analysis to assess the impact of Brexit on the internationalisation, expected turnover and innovation activities of SMEs. We address potential sources of endogeneity by estimating (simultaneously via a recursive bivariate probit model) the impact of subjective views of SMEs regarding whether Brexit is a likely obstacle to internationalisation (proxied by future intentions to export), innovation (proxied by future intentions to invest in R&D) and turnover (proxied by aim to grow sales) of SMEs. our empirical approach use lagged independent variables to mitigate endogeneity concerns arising from reverse causality.

The empirical approach comprises a two-equation binary outcome model with correlated error disturbances as follows:

$$I_i = \beta'X_i + \gamma BREXIT_i + v_{1i} \quad (1)$$

$$BREXIT_i = \beta'X_i + v_{2i} \quad (2)$$

I_i is a binary measure of future strategic intentions in terms of aim to grow sales, internationalisation and innovation for SME i . $BREXIT_i$ is the latent propensity that SME i reports that Brexit is a potential obstacle for its business. X_i is a vector of control variables such as Location (urban, rural), size (zero employees; micro, 1 – 9 employees; small, 10 – 49 employees; medium, 50 – 249 employees); Innovative (in terms of process and products); exporter; turnover from last year; female or minority ethnic-led; makes surplus (profit); Age (>5 years, 6 – 10 years, 11-20 years and 20+ years); has a business plan. The error terms, v_{1i} , v_{2i} are distributed identically as bivariate normal with zero mean, unit variance and correlation coefficient, ρ , independently across observations. This empirical exercise allows us to identify which SMEs are more likely to be affected by Brexit in terms of turnover growth, future innovation and internationalisation plans. All results associated with these models are presented in terms of average marginal effects (AME) and errors are clustered at regional level to allow for individual correlations within the same geographic area.

3.3.2 Heckman models: Major obstacles faced by UK SMEs related to Brexit

To investigate why SMEs consider some factors related to internationalization, innovation and turnover as a major obstacle arising from Brexit, we use a probit model with sample selection (Van de Ven & Van Praag, 1981). This model assumes that there is an underlying relationship (latent equation) $y_j^* = X_j\beta + \mu_{1j}$ such that we observe only the binary outcome (outcome equation: specific major obstacle related to internationalization, innovation and turnover derived from Brexit) $y_j^{\text{probit}} = (y_j^* > 0)$. The dependent variable, however, is not always observed. Rather, the dependent variable for SME j is observed if (selection equation: Brexit seen as a major obstacle for SME j) $y_j^{\text{select}} = (Z_j\gamma + \mu_{2j} > 0)$ where $\mu_1 \sim N(0,1)$; $\mu_2 \sim N(0,1)$; $\text{corr}(\mu_1, \mu_2) = \rho$ (rho).

When $\rho = 0$, there is no evidence of selection bias; and thus, the outcome and selection equations are independent, making estimation of the selection model unnecessary. However, since the model is estimated by maximum likelihood (ML), ρ is not directly estimated. Instead, the Heckprobit routine directly estimates a nonlinear transformation of ρ (athrho) defined as: $\text{athrho} = \frac{1}{2} \ln\left(\frac{1+\rho}{1-\rho}\right)$. A significant athrho indicates the presence of selection bias in the model.

All results associated with these models are presented in terms of average marginal effects (AME) and errors are clustered at regional level to allow for individual correlations within the same geographic area.

3.3.3 Multinomial models: The impact of Brexit on Turnover expectations

We use a multinomial probit (MNP) regression to investigate the effect of Brexit on the turnover expectations of SMEs. The model is also used to estimate whether Brexit has a major, minor or not impact on future turnover expectations of SMEs. The MNP model is used with discrete dependent variables that take on more than two outcomes that do not have a natural ordering (Cameron & Trivedi, 2005).

We assume SME i 's utility for choosing organizational form j , U_{ij} ($i = 1, \dots, n$; $j = 1, \dots, n$) is a function of firm-level characteristics and a stochastic error. The utility of choosing alternative j is therefore modelled as:

$$U_{ij} = x'_{ij}\beta + \varepsilon_{ij} \quad (3)$$

where x_{ij} is a vector of covariates and the errors are assumed to be normally distributed, with $\varepsilon \sim N(0, \Sigma)$ where $\varepsilon = (\varepsilon_{i1}, \varepsilon_{i2}, \varepsilon_{i3})$. The probability that option j (not a factor, minor factor or major factor) is chosen is

$$p_{ij} = \Pr(y_i = j) = \Pr\{\varepsilon_{ik} - \varepsilon_{ij} \leq (x_{ij} - x_{ik})' \beta\}, \quad \text{for all } k \quad (4)$$

where y_i is a random variable that indicates the choice made by SME i . The MNP model is an extension of the binary probit model that allows the coefficients of the explanatory variables to vary across the choices and allow us to assess whether specific characteristics are associated with higher probabilities of an organization being classified within alternative j .

Given that we are not interested in the coefficients of the multinomial model per se, but in the change in the probability associated to changes in business characteristics, all results associated with these models are presented in terms of average marginal effects (AMEs). Standard errors are clustered at regional level to allow for individual correlations within the same geographic area.

4. RESULTS AND DISCUSSION

In this Section, we outline the key findings from the LSBS analysis. We begin by exploring via a descriptive perspective how perceptions of Brexit by SMEs have evolved over time, and their influence on key outcomes related to internationalization, investments and turnover. The empirical findings related to the impacts of Brexit on these variables are then presented.

4.1 Brexit perceptions by SMEs: internationalization, investments and turnover

Figure 1 presents the percentage of small and medium-sized enterprises (SMEs) perceiving Brexit as a significant business obstacle across survey waves from 2018 to 2021. The data indicates that in 2018, 22.4% of SMEs identify Brexit as major obstacle, which slightly decreases to 20.7% in 2019 and remains stable at 20.3% in 2020. However, in 2021, the percentage notably increases to 24.5%. This fluctuating trend implies a persistent concern among SMEs regarding the impact of Brexit on their business. It suggests the importance of understanding the underlying factors and implications of Brexit in order to devise appropriate strategies to address resultant challenges faced by SMEs.

Figure 1: Brexit as a major business obstacle by survey wave

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

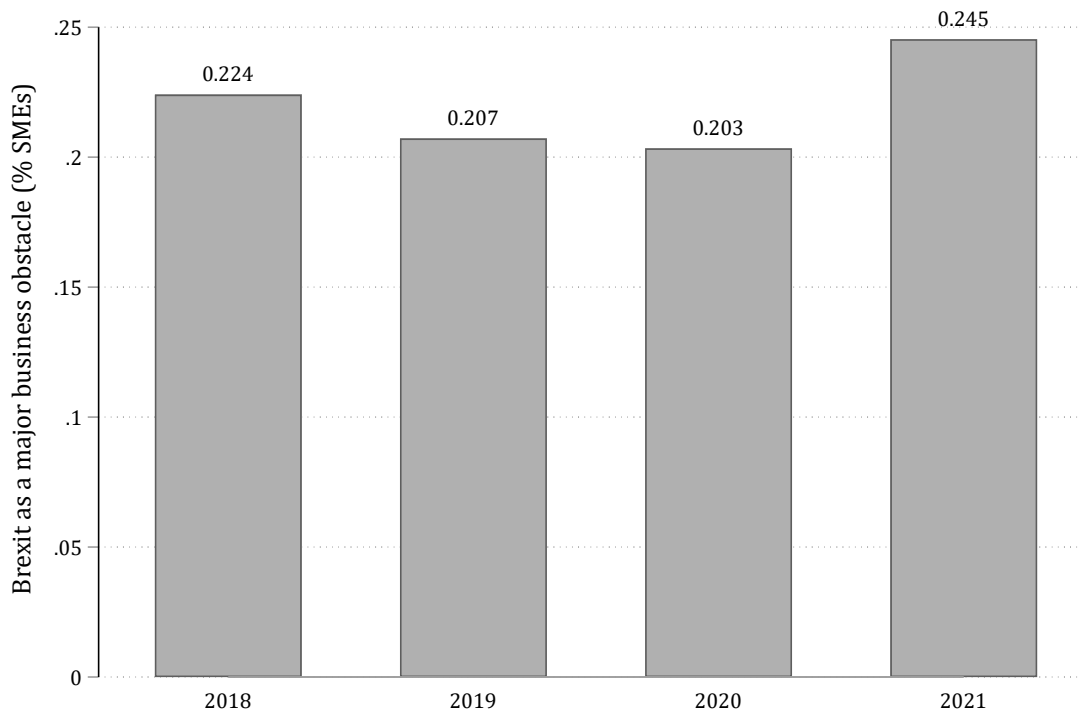


Figure 2 illustrates the perceived magnitude of Brexit as a business impediment across various sectors, represented in terms of percentage of Small and Medium Enterprises (SMEs) affected. Among the sectors based on the Standard Industrial Classification (SIC) 2007, Transport, Retail, and Food Service/Accommodation (SIC 2007: GHI) exhibit the highest percentage (26.6%) of SMEs considering Brexit as a significant barrier. This is closely followed by the Business Services sector (SIC 2007: JKLMN) with 25.2%. The Production and Construction sector (SIC 2007: ABCDEF) reports 20.7%, while the sector encompassing Other Services (SIC 2007: PQRS) registers the lowest percentage of SMEs affected at 15.0%. The data underscores the varying degree of Brexit's impact across different industry sectors.

Figure 2: Brexit as a major business obstacle by sector (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

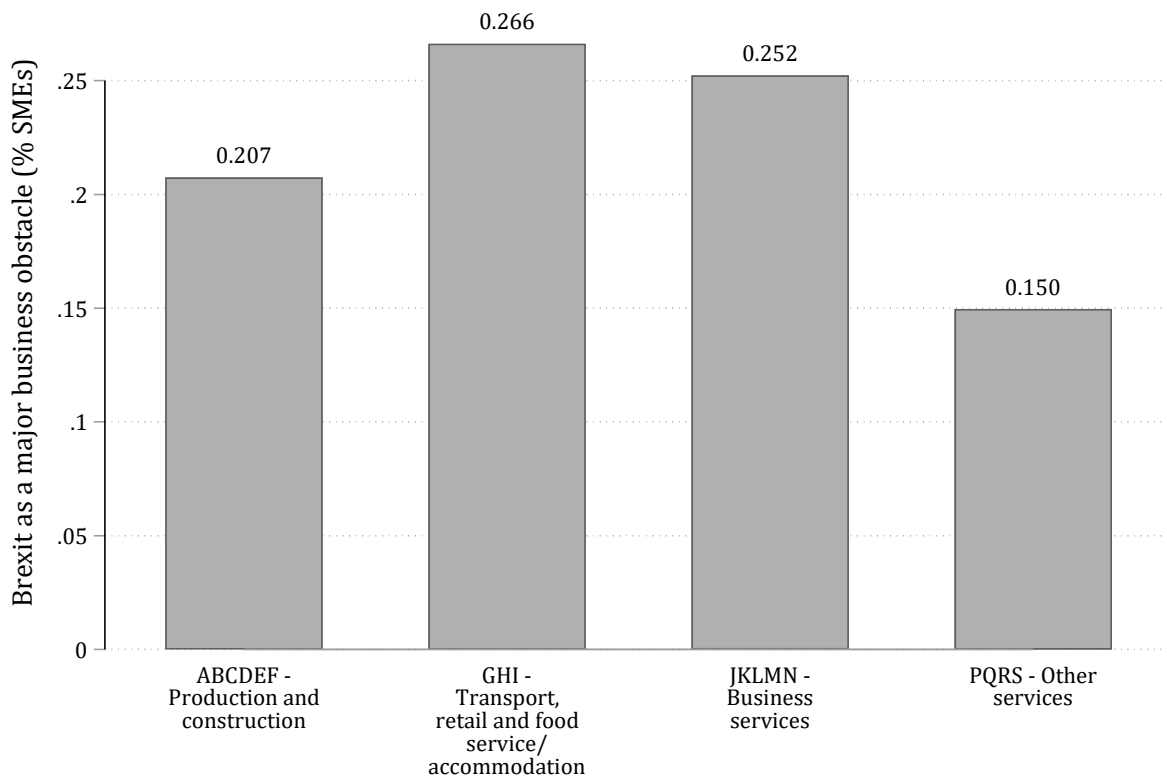


Figure 3 presents data from the 2021 survey wave, focusing solely on SMEs that perceive Brexit as a significant business obstacle. It delineates the sector-wise percentage of SMEs perceiving a decline in investment or facing increased difficulty in raising capital due to the UK's departure from the EU. Among the sectors, Business Services (SIC 2007: JKLMN) records the highest percentage at 17.6%, indicating that these SMEs are the most affected. Production and Construction sectors (SIC 2007: ABCDEF) follow closely, with 14.9% of SMEs encountering these challenges. Other Services (SIC 2007: PQRS) and the Transport, Retail, and Food Service/Accommodation sector (SIC 2007: GHI) register lower percentages, 10.0% and 9.6% respectively, suggesting they are comparatively less affected by these Brexit-related obstacles.

Figure 3: Major obstacles relating to UK exit from EU: Decrease in investment/greater difficulty in raising capital by sector (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle related to a decrease in investment/greater difficulty in raising capital by sector. To ensure consistency, the information presented in this figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

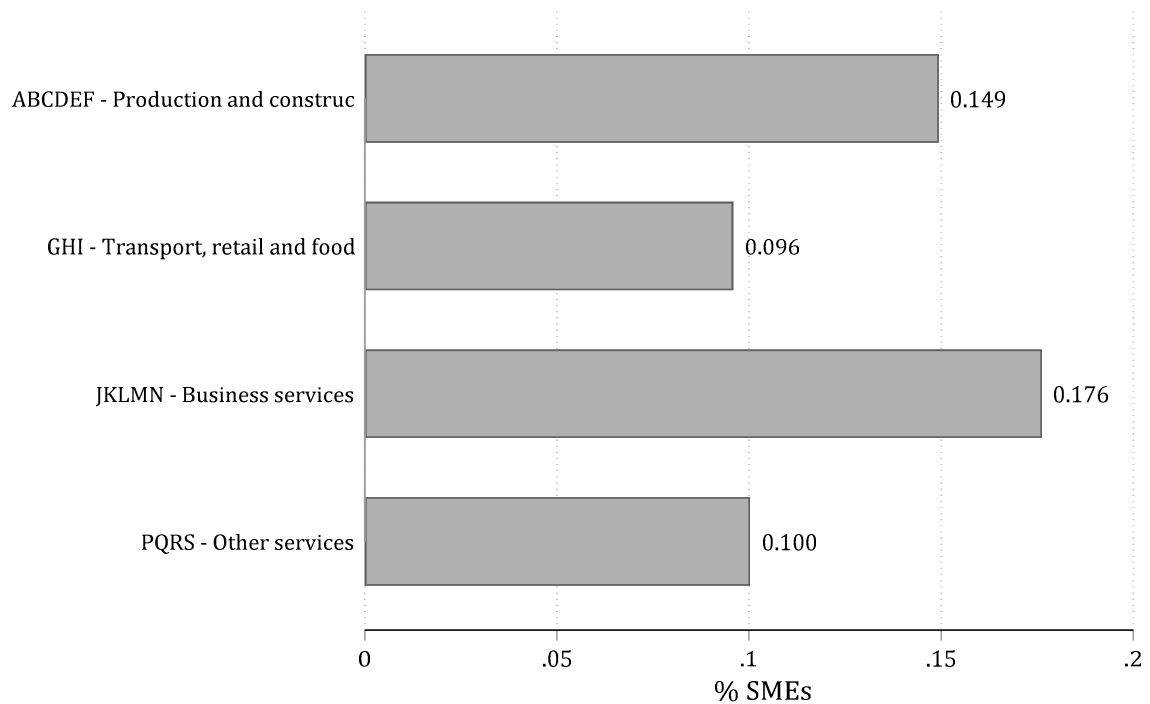
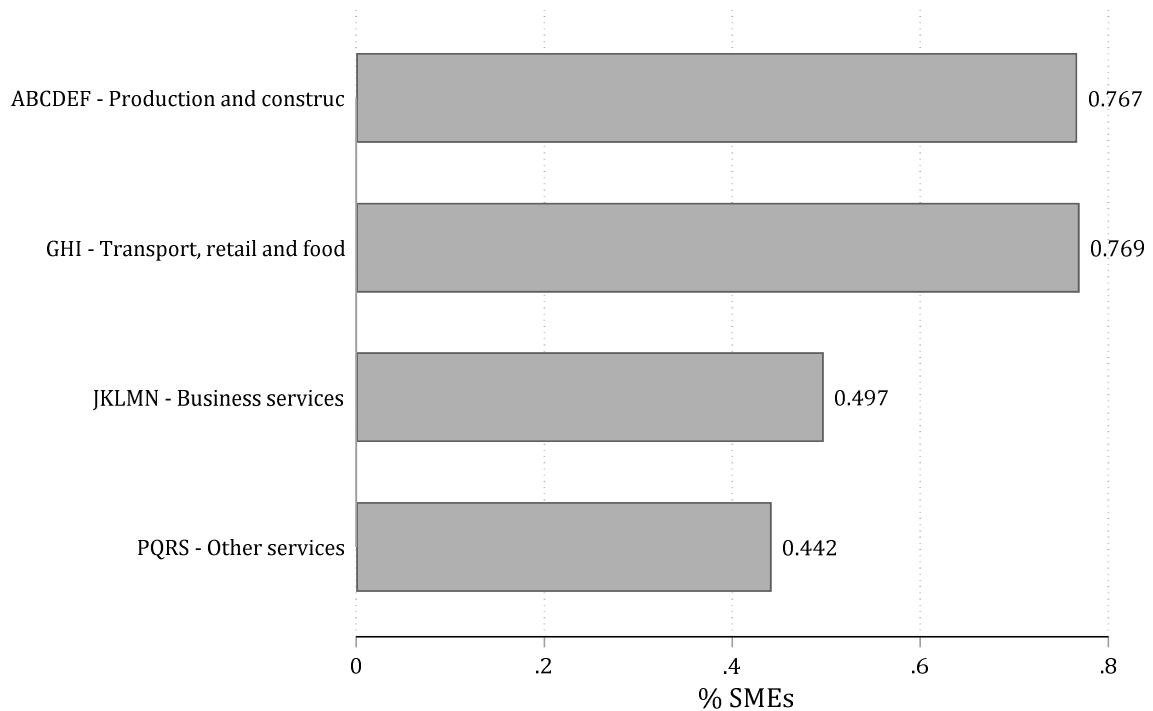


Figure 4, based on the 2021 survey wave, details the perceived impact of increased import costs for SMEs by sector. The data are limited to SMEs that regard Brexit as a significant business obstacle. The Transport, Retail, and Food Service/Accommodation (SIC 2007: GHI) and Production and Construction (SIC 2007: ABCDEF) sectors have the highest proportion of SMEs affected, with 76.9% and 76.7% respectively. On the other hand, Business Services (SIC 2007: JKLMN) and Other Services (SIC 2007: PQRS) sectors indicate a lower percentage of SMEs considering increased import costs as a major obstacle related to Brexit, with 49.7% and 44.2% respectively.

Figure 4: Major obstacles relating to UK exit from EU: Increase in cost of imports from the EU by sector (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle related to an increase in cost of imports from the EU by sector. To ensure consistency, the information presented in this figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



Based on data from the 2021 survey wave, Figure 5, depicts the sector-wise perception of increased export costs to the EU as a major business obstacle due to Brexit. The data encompasses only SMEs that perceive Brexit as a significant business obstacle. The sector of Transport, Retail, and Food Service/Accommodation (SIC 2007: GHI) emerges as the most affected, with 45.8% of SMEs reporting an increase in export costs. Business Services (SIC 2007: JKLMN) follows at 32.3%. The Production and Construction sector (SIC 2007: ABCDEF) and Other Services (SIC 2007: PQRS) exhibit lower percentages, with 26.6% and 25.9% of SMEs affected, respectively.

Figure 5: Major obstacles relating to UK exit from EU: Increase in cost of exports to the EU by sector (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle related to an increase in cost of exports to the EU by sector. To ensure consistency, the information presented in this figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

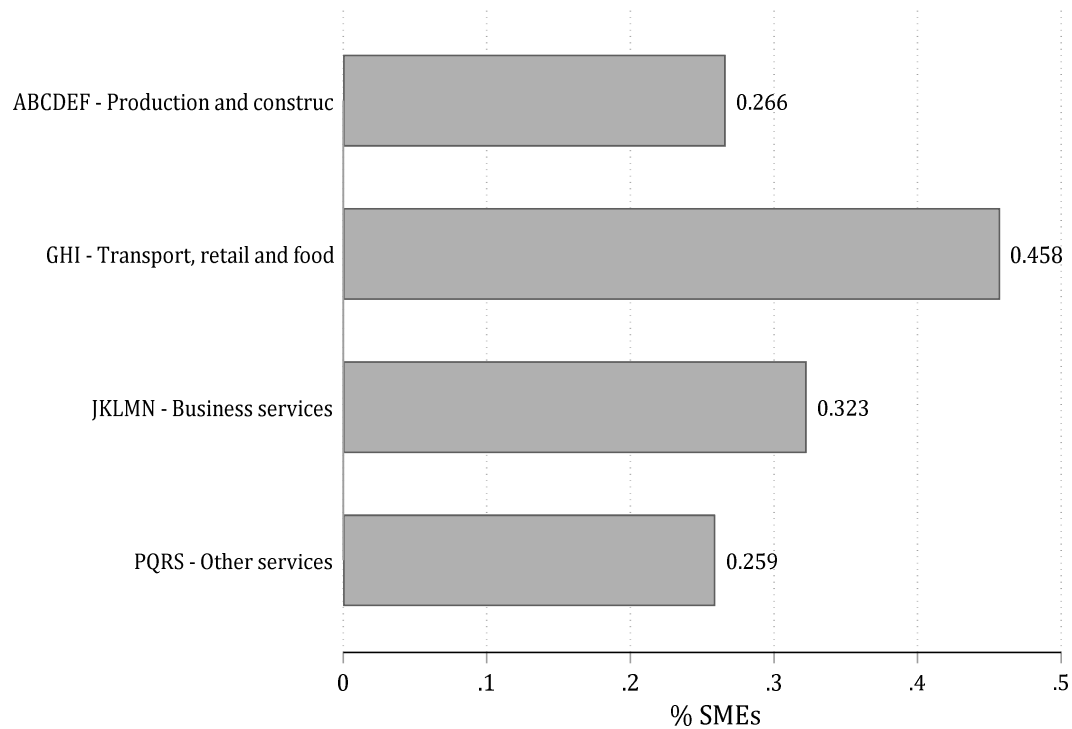


Figure 6 provides insights into SMEs' perceptions of the extent to which Brexit is projected to influence an increase in turnover in the next 12 months, as per the 2021 survey wave. The data is exclusive to SMEs that anticipate a turnover increase in the next year. A vast majority of these SMEs (77.6%) do not consider Brexit to be a contributing factor. Brexit is acknowledged as a minor factor by 15.8% of SMEs, while a relatively small proportion (6.6%) regard it as a major factor. In total, 22.4% of SMEs perceive Brexit as a minor or major factor affecting their expected turnover increase.

Figure 6: Extent to which SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected increase in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

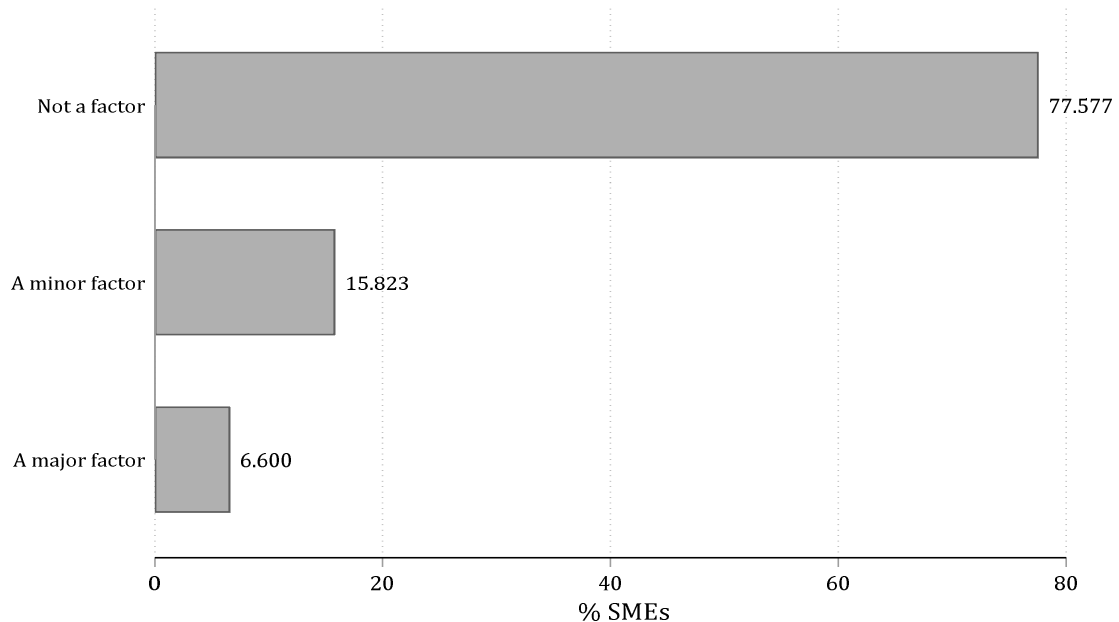


Figure 7, based on the 2021 survey data, provides a regional analysis of SMEs' perspectives on the influence of Brexit on the anticipated increase in turnover in the next 12 months. In England, 78% of SMEs do not consider Brexit as a major factor, while 22% regard it as a minor or major factor. In Scotland and Wales, 75% of SMEs do not see Brexit as a factor, but 25% perceive it as a minor or major factor. Northern Ireland exhibits the highest percentage of SMEs (36%) considering Brexit a minor or major factor, with only 64% considering it not to be a factor in driving anticipated increase in turnover. Both Scotland and Wales follow closely, each with 25% of SMEs acknowledging Brexit as a minor or major influencing factor on their expected turnover growth. The percentage is slightly lower in England, where 22% of SMEs perceive Brexit as having a minor or major impact on their projected turnover increase. The analysis is restricted to SMEs expecting a turnover increase in the forthcoming year.

Figure 7: Extent to which SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months by region (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected increase in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

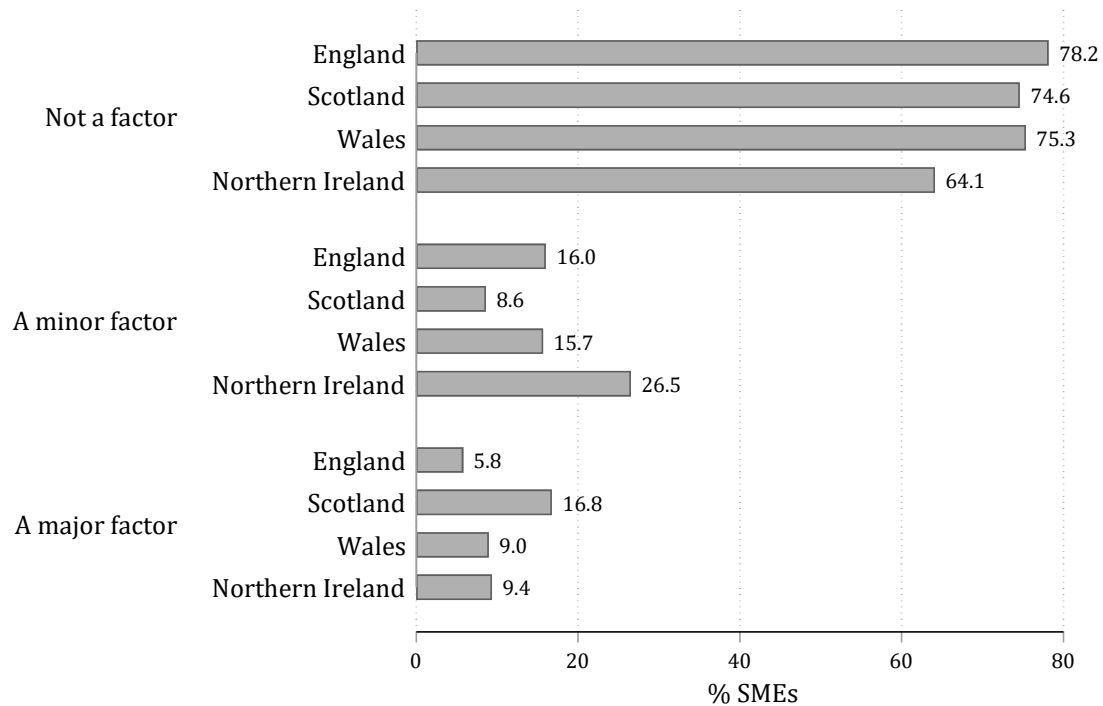


Figure 8, drawn from the 2021 survey data, provides a sectoral breakdown of SMEs' perceptions on the impact of the UK's exit from the EU on the expected turnover increase in the forthcoming 12 months. The Production and Construction sector (SIC 2007: ABCDEF) has the highest proportion of SMEs (29.9%) considering Brexit a minor or major factor, with 70.0% viewing it as not important. The Transport, Retail, and Food Service/Accommodation sector (SIC 2007: GHI) follows with 23.9% of SMEs considering Brexit a minor or major factor and 76.1% deeming it not a factor. For Business Services (SIC 2007: JKLMN), 20.7% regard Brexit as a minor or major factor, while 79.3% do not see it as a factor. Other Services (SIC 2007: PQRS) exhibit the lowest percentage, 16.7%, considering Brexit a minor or major factor, with 83.2% viewing it as not a factor. The data is restricted to SMEs anticipating a turnover increase in the next year.

Figure 8: Extent to which SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months by sector (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected increase in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

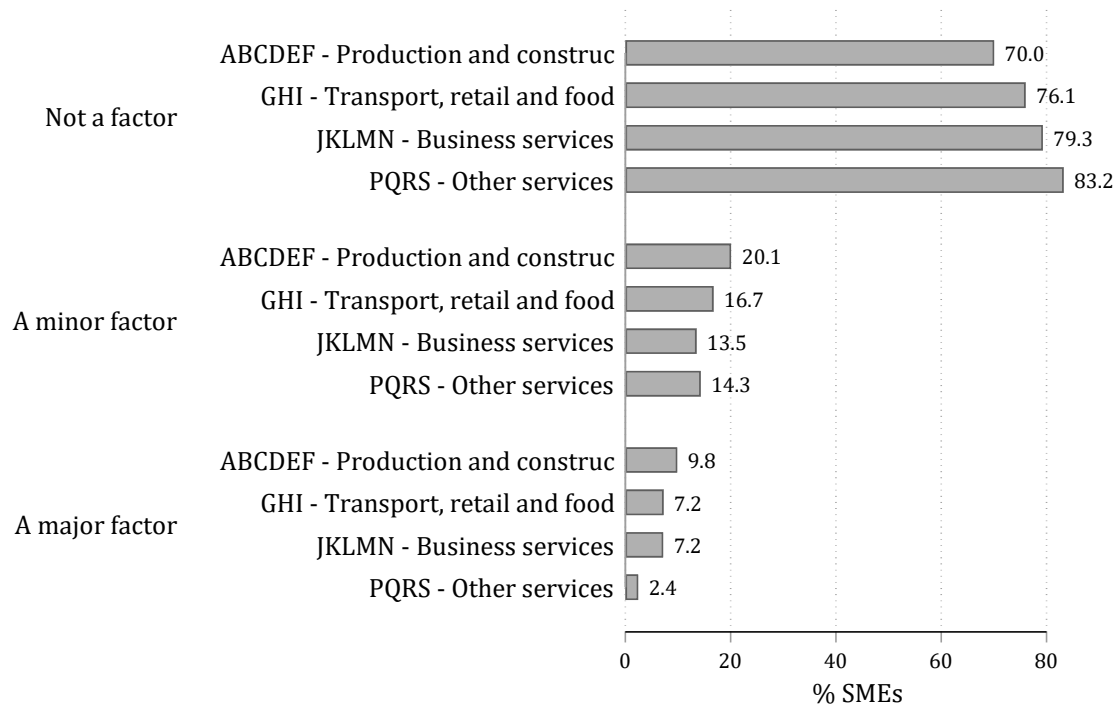


Figure 9 presents the perceptions of SMEs regarding the influence of Brexit on their expected decrease in turnover in the forthcoming year. The data, collected exclusively from the 2021 survey wave, only includes SMEs projecting a downturn in their turnover over the next 12 months. Approximately two-thirds (67.0%) of the respondents do not consider Brexit a contributing factor to their anticipated decrease in turnover. Conversely, a cumulative 33.0% regard it as either a minor or major factor, with 14.8% classifying it as a minor factor and 18.2% identifying it as a major factor. This data reveals the disparate views on Brexit's economic consequences among SMEs expecting a decrease in turnover.

Figure 9: Extent to which SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected decrease in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

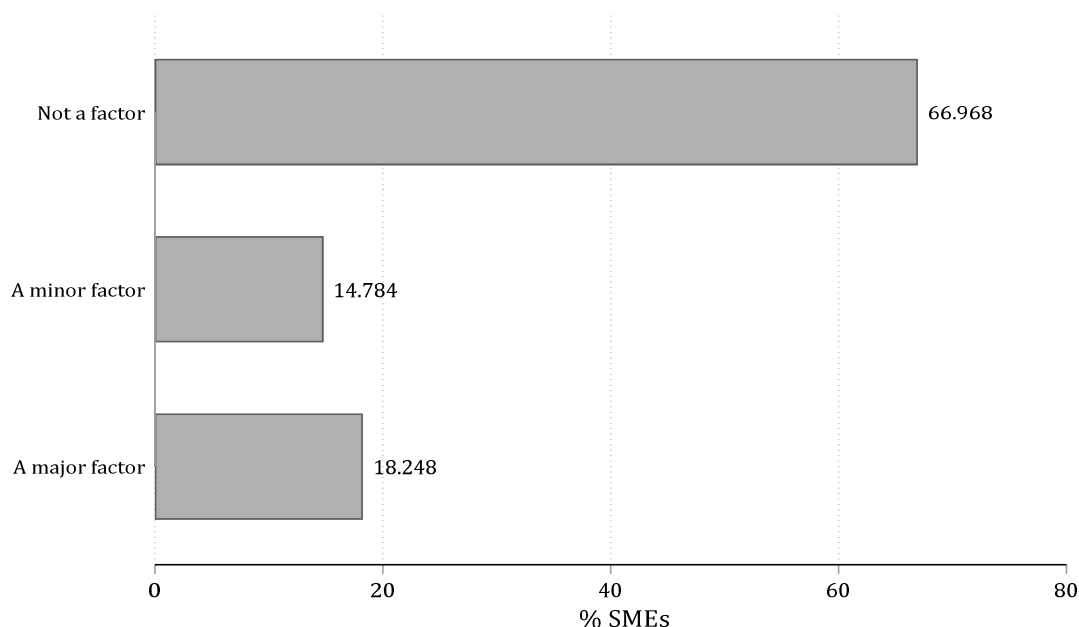


Figure 10 shows the influence of Brexit on the anticipated decrease in turnover over the next 12 months for SMEs, by region. The 2021 survey wave data reveals variations in perceptions across England, Scotland, Wales, and Northern Ireland, encompassing only SMEs that anticipate a downturn in turnover. In England, 67.6% of SMEs do not consider Brexit a factor in their expected turnover decrease, with 13.9% viewing it as a minor factor and 18.4% as a major factor. This results in a combined 32.3% of SMEs who see Brexit as a minor or major factor. Scotland reports a lower percentage (54.8%) of SMEs discounting Brexit as a factor, while a higher percentage of SMEs (32.1%) consider it a major factor relative to counterparts located in England. The minor factor stands at 13.2%, culminating in 45.3% viewing Brexit as either minor or major factor. Wales displays the highest percentage (72.7%) of SMEs considering Brexit not a factor. However, a substantial proportion (25.6%) view it as a minor factor, and only a negligible proportion (1.7%) see it as a major factor. This aggregates to 27.3% perceiving Brexit as a minor or major factor. In Northern Ireland, 56.5% of SMEs do not view Brexit as a factor, while a significant 31.3% see it as a minor factor, and 12.3% as a major factor. This results in a combined 43.6% who consider Brexit as either a minor or major factor in their expected turnover decrease.

Figure 10: Extent to which SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months by region (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected decrease in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

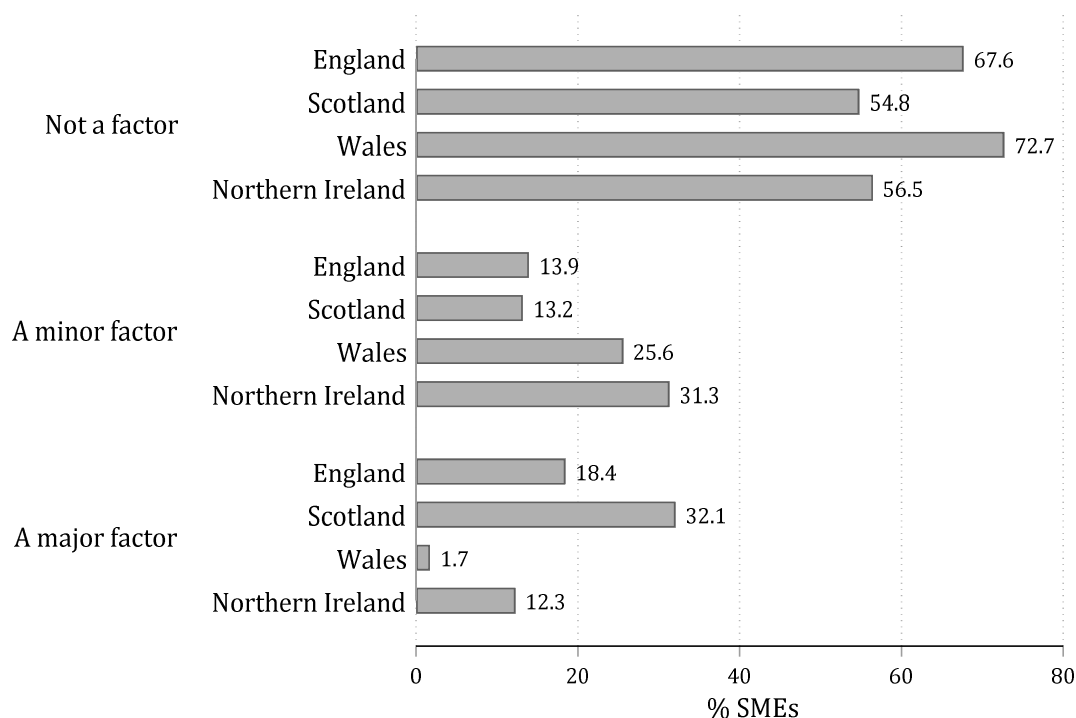


Figure 11 provides sector-specific data on the perceived impact of the UK's departure from the EU on the anticipated decrease in turnover over the next year among SMEs, as gathered from the 2021 survey wave. This analysis includes SMEs predicting a turnover decrease in the upcoming year. In the production and construction sector (SIC 2007: ABCDEF), 74.4% of SMEs do not view Brexit as a factor affecting their predicted turnover decrease, while 13.9% consider it a minor factor and 11.7% a major factor. Collectively, 25.6% see Brexit as either a minor or major factor. SMEs in the transport, retail, and food service/accommodation sector (SIC 2007: GHI) exhibit a different pattern, with 35.1% not considering Brexit as a factor. A significant 43.6% of SMEs view Brexit as a major factor and 21.3% as a minor factor, cumulating to 64.9% who perceive Brexit as either a minor or major factor. In business services (SIC 2007: JKLMN), a large proportion (77.1%) do not consider Brexit as a factor, with 9.0% and 13.9% viewing it as a minor and a major factor, respectively. The combined minor/major factor group represents 22.9%. In other services (SIC 2007: PQRS), 57.9% do

not see Brexit as a factor, while 26.8% regard it as a minor factor, and 15.3% as a major factor. This amounts to 42.1% considering Brexit as either a minor or major factor in their anticipated turnover decrease.

Figure 11: Extent to which SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months by sector (% of SMEs)

This Figure reports the % of SMEs that perceive Brexit SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected decrease in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

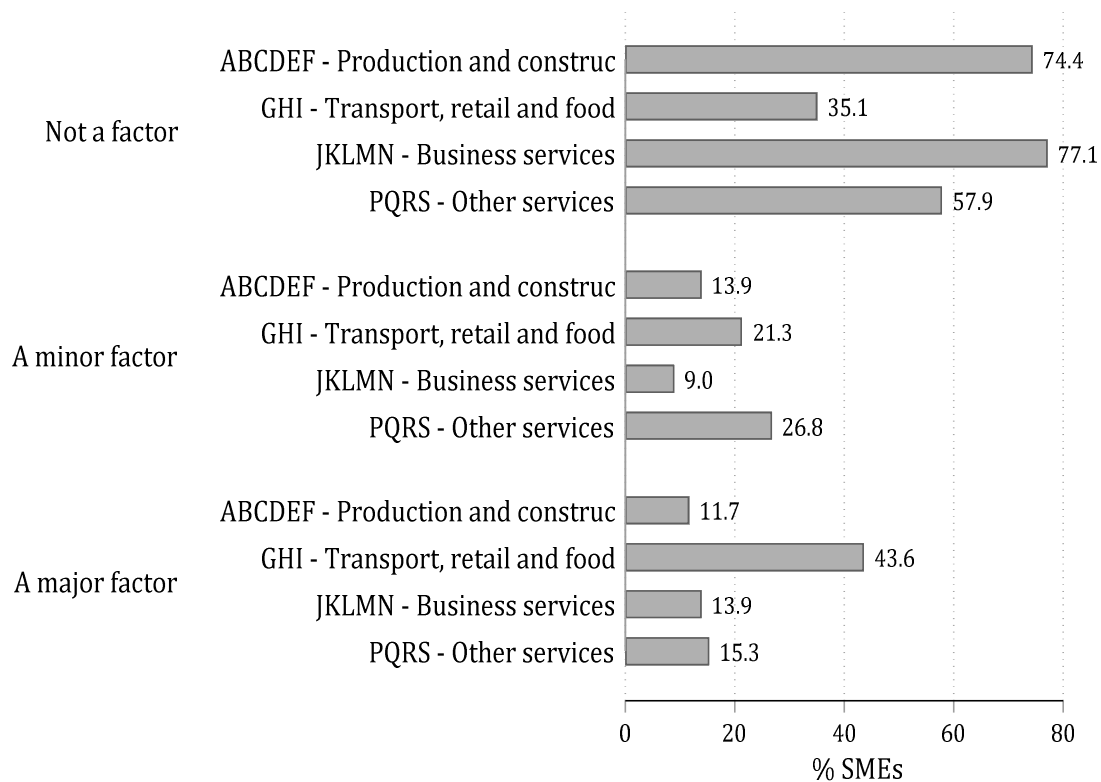


Figure 12 plots the proportion of small and medium enterprises (SMEs) that report a Brexit-induced influence on their capital investment plans (in premises, machinery, etc.) over a three-year forecast period. The sample only includes SMEs that have specific plans for the forthcoming three years. In 2018, 12.7% of SMEs indicated that Brexit affected their capital investment plans. This proportion increases slightly to 15.7% in 2019, before dropping to 9.8% in 2020. However, in 2021, the percentage rebounded to the 2019 level of 15.7%. This temporal analysis suggests fluctuating perceptions of Brexit's impact on capital investment planning among SMEs over the years under consideration.

Figure 12: Whether plans over the next three years have been affected by Brexit: Capital investment (in premises, machinery etc.) in the UK (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

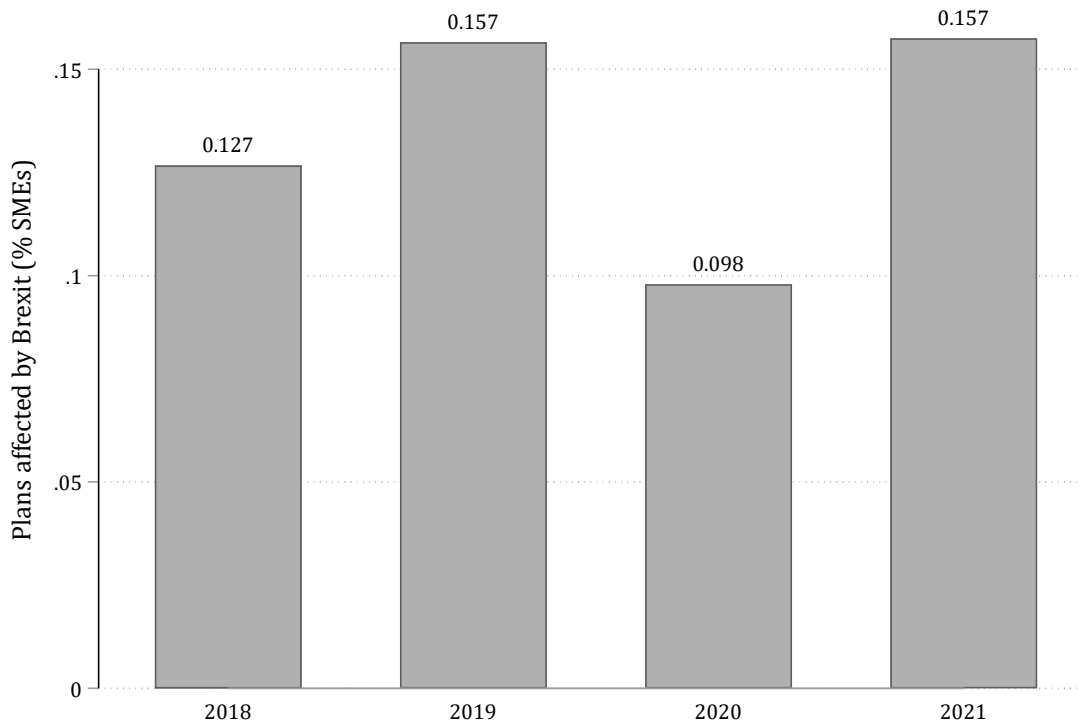


Figure 13 outlines the sector-specific impact of Brexit on the three-year capital investment plans (pertaining to premises, machinery, etc.) of small and medium enterprises (SMEs) in the United Kingdom. The sample only includes SMEs that have specified plans for the forthcoming three years. In the production and construction sector (SIC 2007: ABCDEF), 15.6% of SMEs report that Brexit has affected their capital investment plans. The corresponding percentages for the transport, retail, and food service/accommodation sector (SIC 2007: GHI), business services sector (SIC 2007: JKLMN), and other services sector (SIC 2007: PQRS) were 11.2%, 14.2%, and 11.7%, respectively. This figure illustrates the varying expected influence of Brexit on capital investment plans across different industry sectors, with the production and construction sector appearing to be the most affected.

Figure 13: Whether plans over the next three years have been affected by Brexit: Capital investment (in premises, machinery etc.) in the UK by sector (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

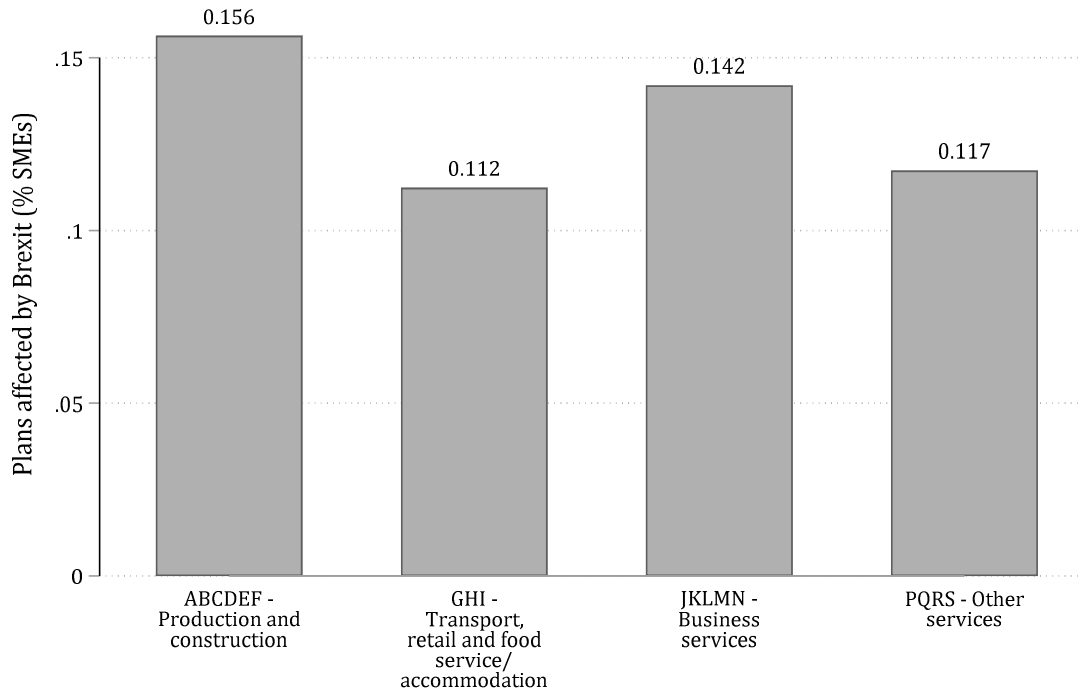


Figure 14 shows the impact of Brexit on the three-year plans of small and medium enterprises (SMEs) in the UK to develop and launch new products or services. The sample only includes SMEs that have specific plans for the upcoming three years.

In 2018, 13.7% of SMEs indicate that Brexit affected their plans to develop and launch new products or services. The proportion marginally decreases to 13.3% in 2019, then declined further to 9.8% in 2020. However, in 2021, there was a notable increase with 20.9% of SMEs reporting that Brexit impacted their product or service development plans. This data suggests a fluctuating yet overall growing influence of Brexit on SMEs' product or service innovation strategies over the examined period.

**Figure 14: Whether plans over the next three years have been affected by Brexit:
Develop and launch new products/services (% of SMEs)**

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

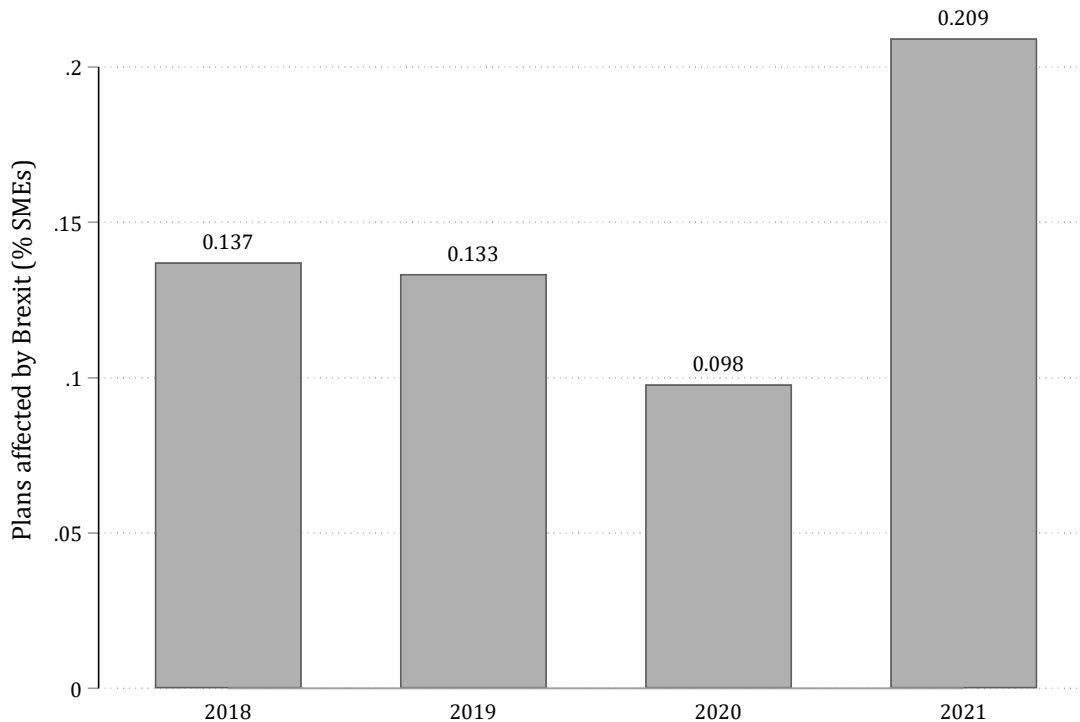


Figure 15 shows the sector-specific influence of Brexit on the three-year plans of small and medium enterprises (SMEs) in the UK to develop and launch of new products or services. The sample only includes SMEs that have explicit plans for the forthcoming three years. In the production and construction sector (SIC 2007: ABCDEF), 17.3% of SMEs report that Brexit has impacted their plans to develop and launch new products or services. The corresponding percentages for the transport, retail, and food service/accommodation sector (SIC 2007: GHI) and the business services sector (SIC 2007: JKLMN) were 15.2% and 16.3% respectively. The lowest impact is reported in the other services sector (SIC 2007: PQRS) with 8.4% of SMEs indicating Brexit has influenced their innovation plans. These data illustrate the varying degrees of Brexit's impact on sector-specific product or service development strategies, with the most substantial effect observed in the production and construction sector.

Figure 15: Whether plans over the next three years have been affected by Brexit: Develop and launch new products/services by sector (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

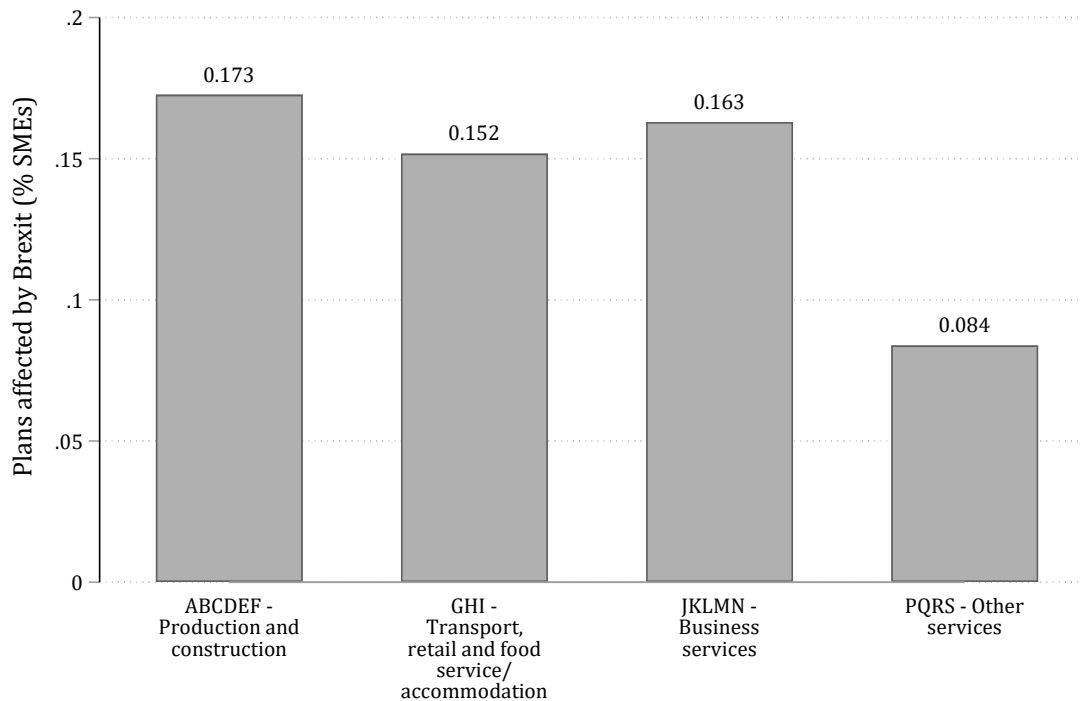


Figure 16 illustrates the potential influence of Brexit on R&D investment planning among Small and Medium Enterprises (SMEs) over a four-year period (2018-2021). The data, which exclusively involves SMEs intending specific plans for the next three years, reveals a fluctuating trend. In 2018, 15.6% of SMEs indicated Brexit-induced changes to their R&D investment plans. This proportion marginally increased to 17.2% in 2019, before declining to 10.7% in 2020. A significant surge to 21.7% was observed in 2021. The observed fluctuations highlight the potentially dynamic and complex impact of Brexit on SMEs' R&D investment strategies over time.

Figure 16: Whether plans over the next three years have been affected by Brexit: Invest in R&D (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

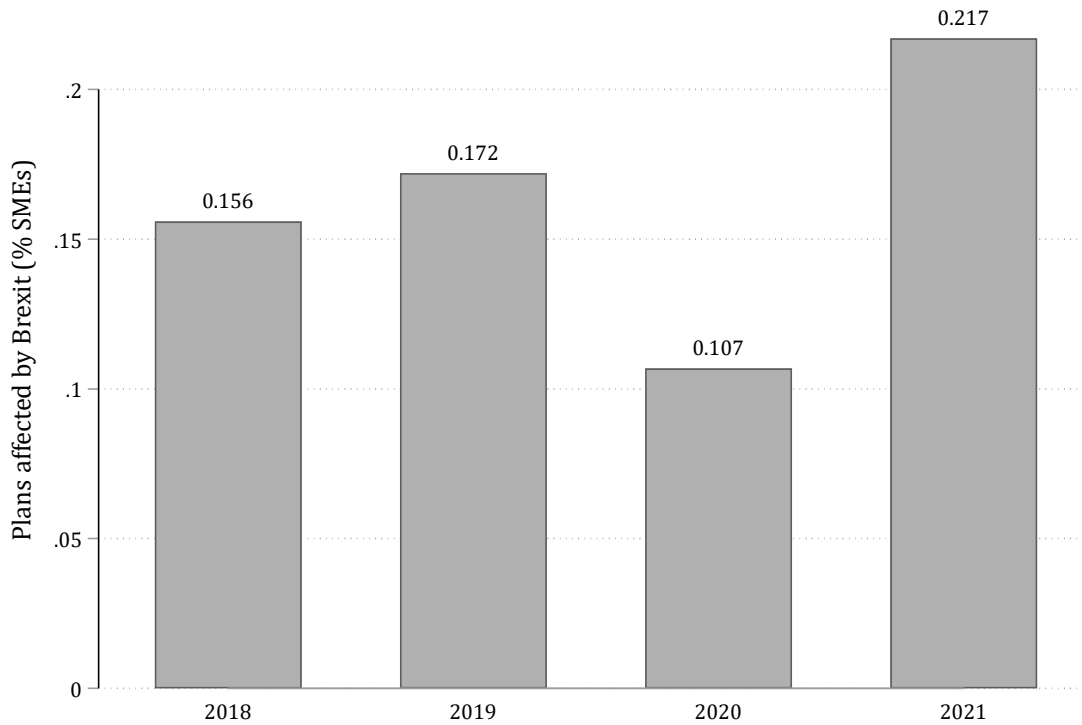


Figure 17 provides a sectoral perspective on how Brexit influences the three-year R&D investment planning of Small and Medium Enterprises (SMEs). The data, restricted to SMEs with specific plans for the next three years, elucidates divergent sectoral impacts of Brexit. Production and construction sectors (SIC 2007: ABCDEF) report a 17.9% impact, closely followed by transport, retail, and food service/accommodation sectors (SIC 2007: GHI) at 18.4%. Business services (SIC 2007: JKLMN) report a slightly lower impact at 17.1%, and other services (SIC 2007: PQRS) exhibit the least Brexit-induced changes at 13.2%. The data highlights the varied sector-specific implications of Brexit on SMEs' R&D investment strategies.

Figure 17: Whether plans over the next three years have been affected by Brexit: Invest in R&D by sector (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

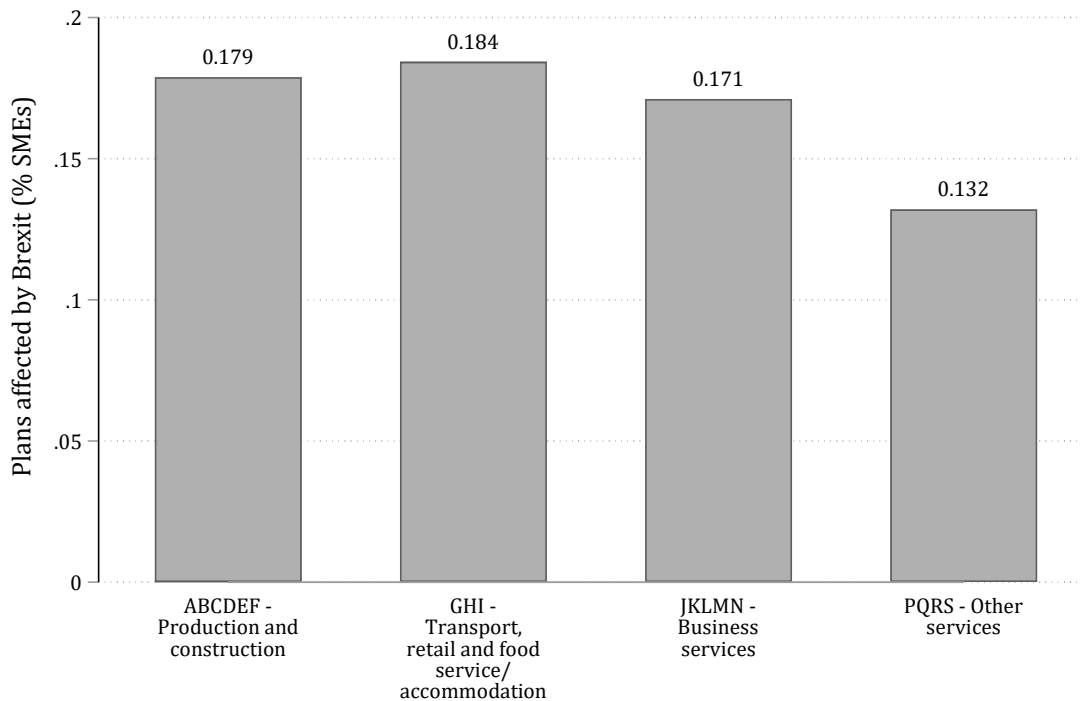


Figure 18 illustrates the influence of Brexit on SMEs' plans for export growth and market expansion over the next three years. This four-year longitudinal data (2018-2021), including only SMEs with explicit three-year plans, demonstrates a fluctuating pattern. In 2018, 30.2% of SMEs report Brexit-related changes in their export or market expansion strategies. This proportion dropped to 26.1% in 2019 and slightly decreased to 25.7% in 2020. However, a significant rise to 34.7% was recorded in 2021. These variations underscore the evolving nature of Brexit's influence on SMEs' export and market expansion strategies over time.

Figure 18: Whether plans over the next three years have been affected by Brexit: Increase export sales or begin selling to new overseas markets (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

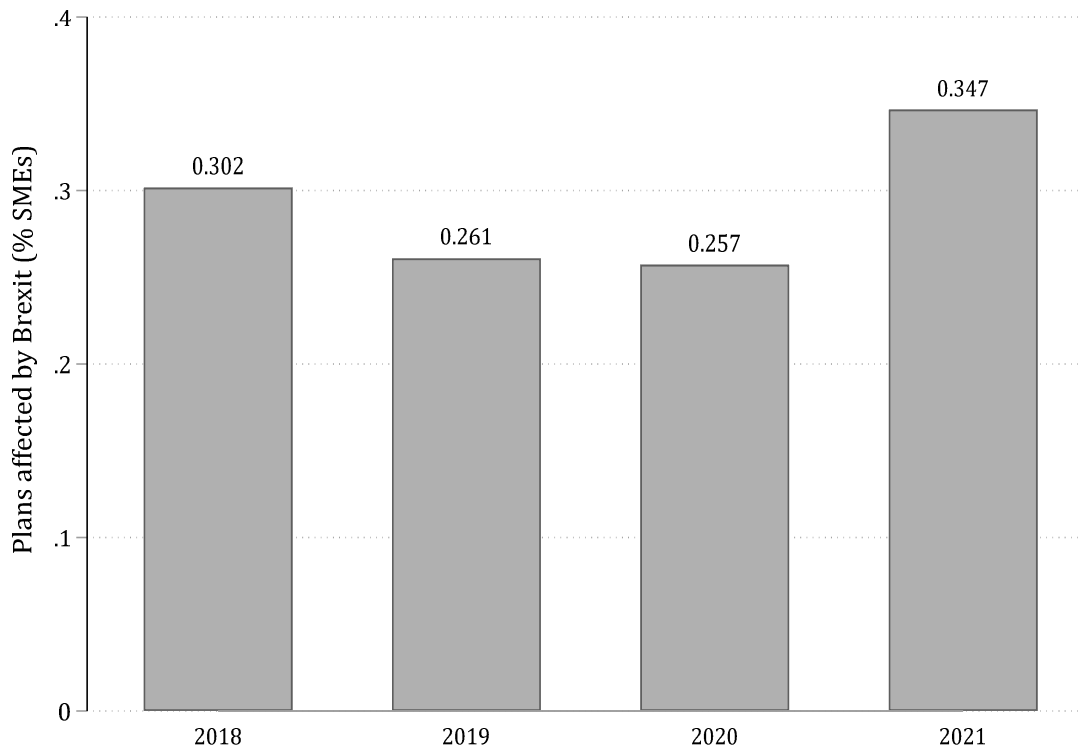
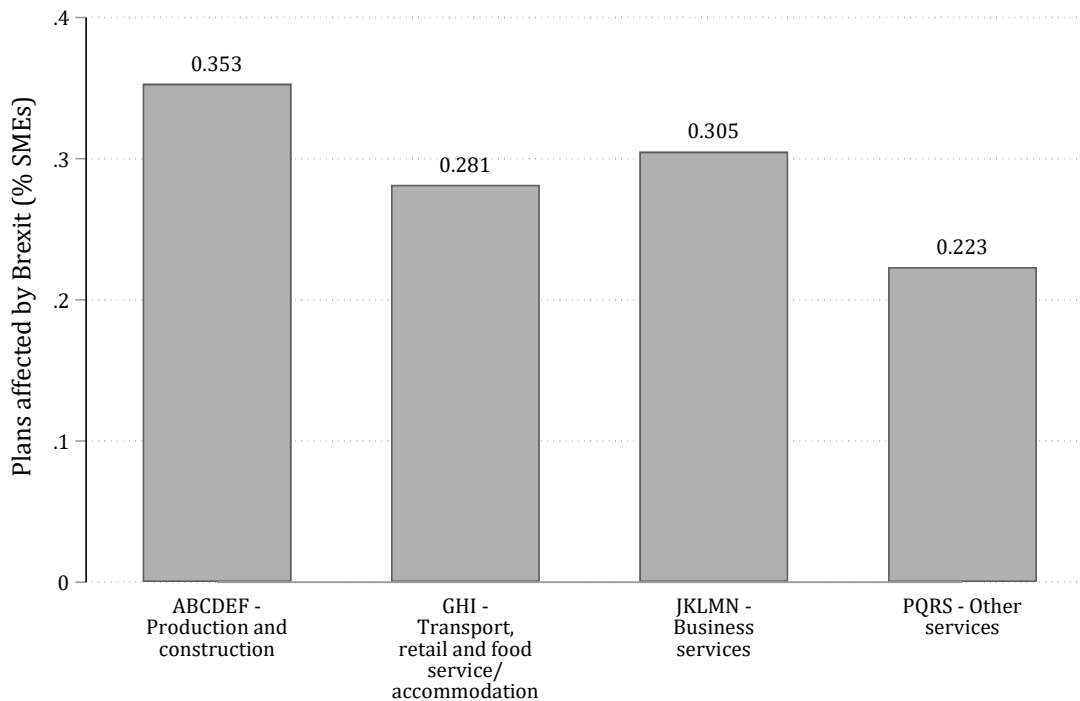


Figure 19 provides a sectoral analysis of Brexit's influence on Small and Medium Enterprises' (SMEs) three-year plans to augment export sales or initiate sales in new overseas markets. The data, restricted to SMEs with definitive plans for the next three years, highlights considerable sectoral variation. The production and construction sectors (SIC 2007: ABCDEF) report the highest impact at 35.3%. Transport, retail, and food service/accommodation sectors (SIC 2007: GHI) followed at 28.1%, and business services (SIC 2007: JKLMN) report a 30.5% impact. Other services (SIC 2007: PQRS) experienced the least influence at 22.3%. These findings emphasize the differential sector-specific effects of Brexit on SMEs' strategies for export sales and overseas market expansion.

Figure 19: Whether plans over the next three years have been affected by Brexit: Increase export sales or begin selling to new overseas markets by sector (% of SMEs)

This Figure reports the % of SMEs with future plans affected by Brexit. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



4.2 The impact of Brexit perceived as a major business obstacle on future plans for SMEs

Brexit prompted a multitude of responses from different sectors of the economy. For SMEs, it presents a unique set of challenges and opportunities. In light of this, understanding the perceptions of SMEs towards Brexit is key, particularly as they represent an important part of the economy. In this context, Section 4.2 explores the impact of Brexit perceived as a major business obstacle and its implications on the future plans of SMEs. By examining this issue, we aim to provide insights into how SMEs are navigating the post-Brexit business landscape, thus offering valuable guidance for policy-making and strategic planning.

Table 4 presents evidence regarding the impact of Brexit on SME future grow sales in the next three years. The analysis employs a recursive bivariate probit model estimated through maximum likelihood estimation and control for factors such as business size, age, turnover

changes, and whether the business is innovative, exports, makes a surplus, or has a business plan.

The analysis also accounts for whether the business is led by a woman or a member of a minority ethnic group (MEG). The results suggest that if Brexit is perceived as a major obstacle, it can reduce SMEs' aim to grow sales over the next 3 years by 15% (-0.150**). SMEs that are innovative or exporters are more likely to aim for sales growth (0.063*** and 0.057***, respectively), but the perception of Brexit as a major obstacle is only positively significant for exporters (0.244***). Larger SMEs are more likely to aim for sales growth. However, Brexit being perceived as a major obstacle is only significant for SMEs with 10 - 49 employees (0.033***). Older SMEs (those that have been in business longer) are less likely to aim for sales growth and more likely to perceive Brexit as a major obstacle, though the latter is only significant for businesses aged 6 - 10 years (-0.036*). Businesses that experienced increased turnover in the previous year are more likely to aim for sales growth (0.092***), but are also more likely to perceive Brexit as a major obstacle (-0.082***).

Our results also suggest that SMEs making a surplus are less likely to aim for sales growth (-0.028***), but are more likely to perceive Brexit as a major obstacle (0.031**). SMEs with a plan are more likely to aim for sales growth (0.154***) and to perceive Brexit as a major obstacle (0.068***). Women-led businesses are less likely to aim for sales growth (-0.049***) and are not significantly more likely to perceive Brexit as a major obstacle. Businesses led by a minority ethnic group (MEG) are more likely to aim for sales growth (0.025***) and to perceive Brexit as a major obstacle (0.032***).

Table 4: Impact of Brexit on future grow sales of SMEs

This table marginal effects of the impact of Brexit on grow sales in the next 3 years from a recursive bivariate probit estimated via Maximum likelihood. Sectoral and regional dummies are included in all specifications. Z-scores are reported in parenthesis. Omitted Categories: Size (Micro 1 - 9), Age (0 - 5), Turnover change (Decreased). All models include regional (England, Scotland, Wales, Northern Ireland), SIC 2007 sectors (ABCDEF, GHI, JKLMN, PQRS), wave dummies and a constant term. ***, ** and * refer to the significant level of 1%, 5% and 10%, respectively. Standard errors clustered at regional level.

	=1 Aim to grow sales	=1 if Brexit is a major obstacle
Brexit is a major obstacle_{t-1}	-0.150** (-2.35)	
SME innovator_{t-1}	0.063*** (5.65)	-0.003 (-0.15)
SME exporter_{t-1}	0.057*** (3.19)	0.244*** (76.44)
Size: Micro 1 - 9	0.140*** (13.13)	0.013* (1.91)
Size: Small 10 - 49	0.263*** (67.20)	0.033*** (3.32)
Size: Medium 50 - 249	0.303*** (36.51)	0.029 (1.25)
Business age: 6 - 10	-0.150*** (-4.30)	-0.036* (-1.79)
Business age:11 - 20	-0.133*** (-4.62)	-0.016 (-0.73)
Business age: 20+	-0.244*** (-8.55)	-0.011 (-0.41)
Turnover: Stayed the same_{t-1}	0.001 (0.16)	-0.064*** (-8.45)
Turnover: Increased_{t-1}	0.092*** (4.47)	-0.082*** (-9.86)
Makes surplus_{t-1}	-0.028*** (-2.76)	0.031** (2.27)
Has business plan_{t-1}	0.154*** (7.12)	0.068*** (4.82)
Women-lead	-0.049*** (-4.56)	-0.013 (-0.47)
MEG-led	0.025*** (3.05)	0.032*** (8.96)
N	4459.000	
ρ	0.526*** (5.83)	
Wald test of $\rho=0$	34.034	
Log pseudo likelihood	-5439.250	

Table 5 examines the impact of Brexit on future capital investment (premises, machinery, etc.) SMEs in the UK. Results are derived from a recursive bivariate probit model estimated via Maximum Likelihood, incorporating sectoral and regional dummies into all specifications. Results suggest that Brexit being perceived as a major obstacle is associated with a 20% reduction in future capital investments (-0.200***). Additionally, innovation in SMEs positively affects capital investment (0.105***), but its relation to Brexit being perceived as a significant barrier is insignificant. SMEs that export show a minor positive effect on capital investment (0.024*) and a substantial positive effect on the perception of Brexit as an obstacle (0.243***). The size of the SMEs also significantly influences capital investment, with medium-sized enterprises (50 - 249 employees) having the highest impact (0.302***). In terms of business age, only firms aged 6 - 10 years showed a minor positive impact on capital investment (0.038**), while its effect on the perception of Brexit as a barrier was negative. Turnover that stayed the same in the previous period negatively affected both capital investment (-0.041***) and the perception of Brexit as an obstacle (-0.072***). The presence of a business plan also positively influenced both variables (0.072*** and 0.064***, respectively). Lastly, women-led SMEs exhibit a minor negative impact on capital investment (-0.061**), while minority ethnic group (MEG)-led enterprises demonstrated a significant positive effect on capital investment future plans and the perception of Brexit as an obstacle (0.155*** and 0.018***, respectively). This analysis collectively underscores that Brexit, perceived as a significant obstacle, along with other factors like size, age, and turnover of SMEs, plays a substantial role in influencing future capital investments in the UK SME sector.

Table 5: Impact of Brexit on future capital investment (in premises, machinery etc.) of SMEs in the UK

This table marginal effects of the impact of Brexit on capital investment in the next 3 years from a recursive bivariate probit estimated via Maximum likelihood. Sectoral and regional dummies are included in all specifications. Z-scores are reported in parenthesis. Omitted Categories: Size (Micro 1 - 9), Age (0 - 5), Turnover change (Decreased). All models include regional (England, Scotland, Wales, Northern Ireland), SIC 2007 sectors (ABCDEF, GHI, JKLMN, PQRS), wave dummies and a constant term. ***, ** and * refer to the significant level of 1%, 5% and 10%, respectively. Standard errors clustered at regional level.

	=1 Capital investment (in premises, machinery etc.) in the UK	=1 if Brexit is a major obstacle
Brexit is a major obstacle_{t-1}	-0.200*** (-7.17)	
SME innovator_{t-1}	0.105*** (12.10)	-0.005 (-0.27)
SME exporter_{t-1}	0.024* (1.78)	0.243*** (60.10)
Size: Micro 1 - 9	0.050*** (2.63)	0.013** (1.99)
Size: Small 10 - 49	0.157*** (13.18)	0.035*** (3.24)
Size: Medium 50 - 249	0.302*** (19.44)	0.032 (1.55)
Business age: 6 - 10	0.038** (2.31)	-0.031* (-1.74)
Business age: 11 - 20	0.002 (0.09)	-0.010 (-0.50)
Business age: 20+	0.009 (0.65)	-0.007 (-0.28)
Turnover: Stayed the same_{t-1}	-0.041*** (-2.96)	-0.072*** (-8.61)
Turnover: Increased_{t-1}	0.011 (0.57)	-0.085*** (-10.48)
Makes surplus_{t-1}	0.007 (0.55)	0.032** (2.37)
Has business plan_{t-1}	0.072*** (9.78)	0.064*** (4.83)
Women-lead	-0.061** (-2.38)	-0.013 (-0.48)
MEG-led	0.155*** (22.40)	0.018*** (9.23)
N	4459.000	
ρ	0.653*** (9.50)	
Wald test of $\rho=0$	90.186	
Log pseudo likelihood	-4738.293	

Table 6 presents the results of a recursive bivariate probit model estimated via Maximum Likelihood, which examines the impact of Brexit on the propensity of UK SMEs to develop and launch new products or services in the next three years. The perception of Brexit as a major business obstacle does not seem to impact the propensity to develop and launch new products or services. However, SMEs that innovate show a strong positive impact on future product or service development (0.204***), while their perception of Brexit as a major obstacle is not statistically significant. Exporting SMEs have a significant positive effect on future product or service development (0.157***) and on viewing Brexit as an obstacle (0.246***). SME size contributes positively to new product or service development, with medium-sized enterprises (50 - 249 employees) having the highest impact (0.104***). In terms of business age, only enterprises aged 20+ years showed a significant negative impact on new product or service development (-0.065***) compared to recently created SMEs. Turnover that remained the same in the previous period has an insignificant effect on new product or service development but negatively impacts the perception of Brexit as a major obstacle (-0.068***). SMEs with a business plan positively impact both variables (0.103*** and 0.063***, respectively). Finally, women-led SMEs demonstrate a minor positive effect on new product or service development (0.038**), whereas minority ethnic group (MEG)-led enterprises show a substantial positive impact on new product or service development (0.106***).

Table 6: Impact of Brexit on future develop and launch new products and/or services of SMEs in the UK

This table marginal effects of the impact of Brexit on develop and launch new products and/or services in the next 3 years from a recursive bivariate probit estimated via Maximum likelihood. Sectoral and regional dummies are included in all specifications. Z-scores are reported in parenthesis. Omitted Categories: Size (Micro 1 - 9), Age (0 - 5), Turnover change (Decreased). All models include regional (England, Scotland, Wales, Northern Ireland), SIC 2007 sectors (ABCDEF, GHI, JKLMN, PQRS), wave dummies and a constant term. ***, ** and * refer to the significant level of 1%, 5% and 10%, respectively. Standard errors clustered at regional level.

	=1 Develop and launch new products/services	=1 if Brexit is a major obstacle
Brexit is a major obstacle _{t-1}	-0.089 (-0.35)	
SME innovator _{t-1}	0.204*** (11.62)	-0.007 (-0.37)
SME exporter _{t-1}	0.157*** (2.59)	0.246*** (133.91)
Size: Micro 1 - 9	0.038*** (3.72)	0.012* (1.89)
Size: Small 10 - 49	0.074*** (4.39)	0.034*** (3.11)
Size: Medium 50 - 249	0.104*** (4.76)	0.030 (1.34)
Business age: 6 - 10	-0.010 (-0.66)	-0.039** (-2.54)
Business age:11 - 20	-0.012 (-1.08)	-0.017 (-0.85)
Business age: 20+	-0.065*** (-5.09)	-0.011 (-0.49)
Turnover: Stayed the same _{t-1}	-0.006 (-0.20)	-0.068*** (-10.54)
Turnover: Increased _{t-1}	0.041 (1.41)	-0.083*** (-7.80)
Makes surplus _{t-1}	-0.018** (-2.01)	0.031** (2.14)
Has business plan _{t-1}	0.103*** (16.17)	0.063*** (4.14)
Women-lead	0.038** (2.19)	-0.014 (-0.52)
MEG-led	0.106*** (12.61)	0.030*** (4.75)
N	4459.000	
ρ	0.409 (0.77)	
Wald test of $\rho=0$	0.600	
Log pseudo likelihood	-5040.131	

Table 7 provides the results from a recursive bivariate probit model, estimated via Maximum Likelihood, investigating the impact of Brexit on future investment in research and development (R&D) by SMEs in the UK over the next three years. The results suggest that the perception of Brexit as a major obstacle has a significant negative impact on future R&D investment (-0.078***). SMEs that are innovators show a significant positive effect on R&D investment (0.156***), while their perception of Brexit as a major obstacle is not significant. SMEs that export show a significant positive effect on R&D investment plans (0.165***) and on the perception of Brexit as a major obstacle (0.244***). SME size is found to have a positive impact on R&D investment, with medium-sized enterprises (50 - 249 employees) having the highest impact (0.214***). In terms of business age, only firms aged 6 - 10 years showed a minor positive impact on R&D investment (0.025***), while its effect on the perception of Brexit as a barrier was negative. Turnover that stayed the same in the previous period negatively affected both R&D investment (-0.039**) and the perception of Brexit as a major obstacle (-0.071***). The presence of a business plan positively influenced both variables (0.074*** and 0.065***, respectively). Finally, women-led SMEs exhibit a minor negative impact on R&D investment (-0.029***), while minority ethnic group (MEG)-led enterprises showed a minor positive effect on R&D investment (0.041***).

Table 7: Impact of Brexit on future investment in R&D of SMEs in the UK

This table marginal effects of the impact of Brexit on grow sales in the next 3 years from a recursive bivariate probit estimated via Maximum likelihood. Sectoral and regional dummies are included in all specifications. Z-scores are reported in parenthesis. Omitted Categories: Size (Micro 1 - 9), Age (0 - 5), Turnover change (Decreased). All models include regional (England, Scotland, Wales, Northern Ireland), SIC 2007 sectors (ABCDEF, GHI, JKLMN, PQRS), wave dummies and a constant term. ***, ** and * refer to the significant level of 1%, 5% and 10%, respectively. Standard errors clustered at regional level.

	=1 Invest in R&D	=1 if Brexit is a major obstacle
Brexit is a major obstacle_{t-1}	-0.078*** (-3.11)	
SME innovator_{t-1}	0.156*** (9.83)	-0.005 (-0.26)
SME exporter_{t-1}	0.165*** (8.64)	0.244*** (85.28)
Size: Micro 1 - 9	0.074*** (29.78)	0.014** (2.01)
Size: Small 10 - 49	0.137*** (20.53)	0.036*** (3.33)
Size: Medium 50 - 249	0.214*** (20.60)	0.030 (1.33)
Business age: 6 - 10	0.025*** (3.92)	-0.038** (-2.42)
Business age:11 - 20	0.008* (1.94)	-0.017 (-0.87)
Business age: 20+	-0.003 (-0.53)	-0.009 (-0.38)
Turnover: Stayed the same_{t-1}	-0.039** (-2.46)	-0.071*** (-8.15)
Turnover: Increased_{t-1}	0.000 (0.04)	-0.088*** (-9.73)
Makes surplus_{t-1}	-0.056*** (-8.92)	0.032** (2.34)
Has business plan_{t-1}	0.074*** (9.57)	0.065*** (5.07)
Women-lead	-0.029*** (-2.72)	-0.012 (-0.48)
MEG-led	0.041*** (11.65)	0.022*** (7.60)
N	4459.000	
ρ	0.548*** (8.13)	
Wald test of $\rho=0$	66.057	
Log pseudo likelihood	-4211.666	

Table 8 presents the results from a recursive bivariate probit model estimated via Maximum Likelihood, examining the impact of Brexit on the propensity of UK SMEs to increase export sales or start selling to new overseas markets in the next three years. The findings suggest that the perception of Brexit as a major obstacle negatively impacts the propensity to increase export sales or begin selling to new overseas markets (-0.048***). SMEs that innovate demonstrate a significant positive effect on this propensity (0.094***), while their perception of Brexit as a major obstacle is not significant. Exporting SMEs exhibit a significant positive effect on the propensity to expand export sales or enter new markets (0.304***) and on the perception of Brexit as a major obstacle (0.245***). The size of micro-sized SMEs (1 - 9 employees) negatively affects the propensity to increase export sales or start selling to new markets (-0.009***). Medium-sized enterprises (50 - 249 employees) show a minor positive effect (0.030**). In terms of business age, firms aged 6 - 10 years, 11 - 20 years, and 20+ years all showed significant negative impacts on the propensity to increase export sales or enter new markets. Turnover that stayed the same in the previous period has an insignificant effect on the propensity to increase export sales or start selling to new markets but negatively impacts the perception of Brexit as a major obstacle (-0.069***). SMEs with a business plan positively affect both variables (0.055*** and 0.063***, respectively). Finally, women-led SMEs and minority ethnic group (MEG)-led enterprises show insignificant effects on the propensity to increase export sales or start selling to new markets, while MEG-led enterprises show a minor positive effect on the perception of Brexit as a major obstacle (0.024***).

Table 8: Impact of Brexit on future increase export sales or begin selling to new overseas markets of SMEs in the UK

This table marginal effects of the impact of Brexit on grow sales in the next 3 years from a recursive bivariate probit estimated via Maximum likelihood. Sectoral and regional dummies are included in all specifications. Z-scores are reported in parenthesis. Omitted Categories: Size (Micro 1 - 9), Age (0 - 5), Turnover change (Decreased). All models include regional (England, Scotland, Wales, Northern Ireland), SIC 2007 sectors (ABCDEF, GHI, JKLMN, PQRS), wave dummies and a constant term. ***, ** and * refer to the significant level of 1%, 5% and 10%, respectively. Standard errors clustered at regional level.

	=1 increase export sales or begin selling to new overseas markets	=1 if Brexit is a major obstacle
Brexit is a major obstacle_{t-1}	-0.048*** (-5.96)	
SME innovator_{t-1}	0.094*** (16.94)	-0.007 (-0.37)
SME exporter_{t-1}	0.304*** (24.06)	0.245*** (83.48)
Size: Micro 1 - 9	-0.009*** (-4.76)	0.013* (1.83)
Size: Small 10 - 49	0.030*** (4.51)	0.034*** (3.14)
Size: Medium 50 - 249	0.030** (2.56)	0.029 (1.27)
Business age: 6 - 10	-0.086*** (-6.19)	-0.038** (-2.56)
Business age:11 - 20	-0.095*** (-5.37)	-0.015 (-0.79)
Business age: 20+	-0.082*** (-4.60)	-0.008 (-0.37)
Turnover: Stayed the same_{t-1}	-0.010 (-1.23)	-0.069*** (-8.08)
Turnover: Increased_{t-1}	0.005 (0.66)	-0.087*** (-9.36)
Makes surplus_{t-1}	-0.054*** (-15.29)	0.030** (2.33)
Has business plan_{t-1}	0.055*** (12.84)	0.063*** (4.64)
Women-lead	-0.007 (-0.57)	-0.011 (-0.46)
MEG-led	-0.003 (-0.41)	0.024*** (11.80)
N	4459.000	
ρ	0.437*** (7.51)	
Wald test of $\rho=0$	56.446	
Log pseudo likelihood	-3826.267	

4.3 Determinants of the major obstacles relating to UK exit from EU: investments and internationalization

In section 4.3, we delve into the key determinants of the major challenges emerging in relation Brexit, with a focus on investments and internationalization. This section aims to illustrate the complexities faced by SMEs in the post-Brexit landscape and provide a clearer understanding of the principal obstacles SMEs face due to Brexit and how these perceived obstacles might be linked to specific types of SMEs.

Table 9 presents the average marginal effects from a Heckman probit model with sample selection, assessing the probability of UK small and medium-sized enterprises (SMEs) viewing Brexit as a major business obstacle (selection equation) and considering a decrease in investment or greater difficulty in raising capital as a major obstacle due to Brexit (outcome equation). For the selection equation, SME innovators (0.036***), SME exporters (0.112***), and family-owned SMEs (0.014***) show a significant positive effect on the likelihood of seeing Brexit as a major business obstacle. Micro-sized SMEs (1 - 9 employees) show a smaller positive effect (0.016**), while small SMEs (10 - 49 employees) show a minor positive effect (0.030*). Meanwhile, SMEs with turnover that remained the same (-0.127***) or increased (-0.137***) in the previous period, and those making a surplus (-0.019**), have significant negative effects on the likelihood of seeing Brexit as a major business obstacle. SMEs with a business plan and women-led SMEs show minor positive (0.011*) and negative (-0.007*) effects, respectively. In the outcome equation, SME innovators (0.050***), SMEs with a business plan (0.054***), women-led SMEs (0.050***), and minority ethnic group (MEG)-led SMEs (0.060***) show significant positive effects on the likelihood of considering a decrease in investment or greater difficulty in raising capital as a major obstacle due to Brexit. SMEs with turnover that increased in the previous period (-0.060**) and those making a surplus (-0.062***) have significant negative effects. Micro-sized SMEs show a minor positive effect (0.016*), while small and medium-sized SMEs show minor negative effects (-0.016* and -0.013*, respectively).

Table 9: Major obstacles relating to UK exit from EU: Decrease in investment/greater difficulty in raising capital for SMEs in the UK

This table presents the average marginal effects from a Heckman probit model with sample selection (Van de Ven and Van Pragg 1981) which is estimated using the Stata "Heckprobit" routine (StataCorp, 2019). The selection equation relates to the probability of seeing Brexit as a major business obstacle. The outcome equation relates to the probability of considering a decrease in investment/greater difficulty in raising capital a major obstacle due to Brexit. Average marginal effects for the outcome are calculated on the probability of success conditional on selection. All regressions include a constant term. The exclusion restrictions used in the selection equation are whether the SME is family owned (i.e., one which is majority-owned by members of the same family) and its legal form (Other (base category, e.g., LLP, LLC, etc.), Sole Proprietorship, Company, Partnership). The base categories for categorical variables are: zero employees (size), 0-5 years (business age), decreased (turnover change). Z-statistics adjusted for clustering at regional level are reported in parentheses. ***, ** and * indicates statistical significance at the 1%, 5% and 10% levels, respectively.

	Average marginal effects	
	Selection	Outcome
SME innovator t_{-1}	0.036*** (4.12)	0.050*** (3.02)
SME exporter t_{-1}	0.112*** (19.10)	0.012 (0.79)
Size: Micro 1 - 9	0.016** (2.33)	0.016 (0.92)
Size: Small 10 - 49	0.030* (1.86)	-0.016 (-0.44)
Size: Medium 50 - 249	0.027 (1.43)	-0.013 (-0.37)
Business age: 6 - 10	0.019 (1.53)	-0.008 (-0.14)
Business age: 11 - 20	0.002 (0.17)	0.080 (1.18)
Business age: 20+	0.021** (1.96)	0.018 (0.36)
Turnover: Stayed the same t_{-1}	-0.127*** (-23.88)	-0.020 (-0.47)
Turnover: Increased t_{-1}	-0.137*** (-35.57)	-0.060** (-1.97)
Makes surplus t_{-1}	-0.019** (-2.50)	-0.062*** (-3.82)
Has business plan t_{-1}	0.011* (1.81)	0.054*** (3.01)
Women-lead	-0.007* (-1.69)	0.050*** (3.07)
MEG-led	0.006 (0.53)	0.060*** (4.26)
Family owned	0.014*** (3.14)	
<i>Fixed effects</i>		
Regional FEs	YES	YES
Industry FEs	YES	YES
Legal form FEs	YES	NO
Athrho	0.916*** (3.24)	
N	3560.000	
Selected	390.000	
Non-selected	3170.000	
Log pseudo-likelihood	-1192.140	
Wald test of indep. Eqns ($\rho = 0$)	10.483	
Prob > chi2	0.001	

Table 10 presents the average marginal effects from a Heckman probit model with sample selection, assessing the probability of UK small and medium-sized enterprises (SMEs) viewing Brexit as a major business obstacle (selection equation) and considering an increase in cost of imports from the EU as a major obstacle due to Brexit (outcome equation). The model incorporates a constant term, and uses SME family ownership and legal form as exclusion restrictions in the selection equation. In the selection equation, SME innovators (0.036***), SME exporters (0.111***), and family-owned SMEs (0.013**) show significant positive effects on the likelihood of seeing Brexit as a major business obstacle. Micro-sized SMEs (1 - 9 employees) show a smaller positive effect (0.014**). On the other hand, SMEs with turnover that remained the same (-0.127***) or increased (-0.137***) in the previous period, and those making a surplus (-0.019**), have significant negative effects on the likelihood of seeing Brexit as a major business obstacle.

For the outcome equation, micro-sized SMEs (0.112***), medium-sized SMEs (50 - 249 employees, 0.149***), and small SMEs (10 - 49 employees, 0.060**) show a significant positive effect on the likelihood of considering an increase in cost of imports from the EU as a major obstacle due to Brexit. SME innovators (0.052**) and SME exporters (0.034**) also show minor positive effects. Meanwhile, SMEs with turnover that remained the same (-0.073***), those with a business plan (-0.094***), women-led SMEs (-0.074**), and minority ethnic group (MEG)-led SMEs (-0.088 at 10% significance level) show significant negative effects on the likelihood of considering an increase in cost of imports from the EU as a major obstacle due to Brexit.

Table 10: Major obstacles relating to UK exit from EU: Increase in cost of imports from the EU for SMEs in the UK

This table presents the average marginal effects from a Heckman probit model with sample selection (Van de Ven and Van Pragg 1981) which is estimated using the Stata "Heckprobit" routine (StataCorp, 2019). The selection equation relates to the probability of seeing Brexit as a major business obstacle. The outcome equation relates to the probability of observing an increase in cost of imports from the EU due to Brexit. Average marginal effects for the outcome are calculated on the probability of success conditional on selection. All regressions include a constant term. The exclusion restrictions used in the selection equation are whether the SME is family owned (i.e., one which is majority-owned by members of the same family) and its legal form (Other (base category, e.g., LLP, LLC, etc.), Sole Proprietorship, Company, Partnership). The base categories for categorical variables are: zero employees (size), 0-5 years (business age), decreased (turnover change). Z-statistics adjusted for clustering at regional level are reported in parentheses. ***, **, * - statistical significance at the 1%, 5% and 10% levels.

	Average marginal effects	
	Selection	Outcome
SME innovator $t-1$	0.036*** (4.02)	0.052 (1.33)
SME exporter $t-1$	0.111*** (18.71)	0.034 (0.63)
Size: Micro 1 - 9	0.014** (2.26)	0.112*** (4.35)
Size: Small 10 - 49	0.028 (1.43)	0.060** (2.08)
Size: Medium 50 - 249	0.023 (1.37)	0.149*** (7.86)
Business age: 6 - 10	0.016 (1.12)	-0.096 (-0.69)
Business age: 11 - 20	-0.001 (-0.08)	0.014 (0.09)
Business age: 20+	0.020 (1.50)	0.046 (0.29)
Turnover: Stayed the same $t-1$	-0.127*** (-20.79)	-0.073*** (-2.70)
Turnover: Increased $t-1$	-0.137*** (-34.29)	-0.048 (-0.64)
Makes surplus $t-1$	-0.019** (-2.20)	-0.044 (-0.96)
Has business plan $t-1$	0.010 (1.62)	-0.094*** (-3.04)
Women-lead	-0.006 (-1.37)	-0.074 (-1.40)
MEG-led	0.003 (0.26)	-0.088* (-1.66)
Family owned	0.013** (2.14)	
<i>Fixed effects</i>		
Regional FEs	YES	YES
Industry FEs	YES	YES
Legal form FEs	YES	NO
Athrho	-1.123** (-2.39)	
N	3561.000	
Selected	391.000	
Non-selected	3170.000	
Log pseudo-likelihood	-1274.766	
Wald test of indep. Eqns ($\rho = 0$)	5.728	
Prob > chi2	0.017	

Table 11 presents the average marginal effects from a Heckman probit model with sample selection, estimating the probability of UK small and medium-sized enterprises (SMEs) perceiving Brexit as a major business obstacle (selection equation) and the probability of observing an increase in the cost of exports to the EU due to perceiving Brexit as a major business obstacle (outcome equation). The model includes a constant term and uses family ownership and legal form of SMEs as exclusion restrictions in the selection equation. In the selection equation, SME innovators (0.037***), SME exporters (0.111***), and micro-sized SMEs (1 - 9 employees, 0.014**) show significant positive effects on the likelihood of seeing Brexit as a major business obstacle. Conversely, SMEs with turnover that remained the same (-0.127***) or increased (-0.138***) in the previous period, and those making a surplus (-0.019**) have significant negative effects on the likelihood of seeing Brexit as a major business obstacle.

In the outcome equation, SME exporters have a significant positive effect (0.592***) on the likelihood of considering an increase in cost of exports to the EU as a major obstacle due to Brexit. Conversely, businesses aged 6 - 10 years (-0.171***) and those with turnover that remained the same (-0.085***) have significant negative effects on the likelihood of considering an increase in cost of exports to the EU as a major obstacle due to Brexit. Micro-sized, small-sized (10 - 49 employees), and medium-sized (50 - 249 employees) SMEs, along with businesses aged 11 - 20 years and 20+ years, and women-led SMEs, also show negative effects on this likelihood, but these effects are not statistically significant at the 10% level or better.

Table 11: Major obstacles relating to UK exit from EU: Increase in cost of exports to the EU for SMEs in the UK

This table presents the average marginal effects from a Heckman probit model with sample selection (Van de Ven and Van Praag 1981) which is estimated using the Stata "Heckprobit" routine (StataCorp, 2019). The selection equation relates to the probability of seeing Brexit as a major business obstacle. The outcome equation relates to the probability of observing an increase in cost of exports to the EU due to Brexit. Average marginal effects for the outcome are calculated on the probability of success conditional on selection. All regressions include a constant term. The exclusion restrictions used in the selection equation are whether the SME is family owned (i.e., one which is majority-owned by members of the same family) and its legal form (Other (base category, e.g., LLP, LLC, etc.), Sole Proprietorship, Company, Partnership). The base categories for categorical variables are: zero employees (size), 0-5 years (business age), decreased (turnover change). Z-statistics adjusted for clustering at regional level are reported in parentheses. ***, ** and * indicates statistical significance at the 1%, 5% and 10% levels, respectively.

	Average marginal effects	
	Selection	Outcome
SME innovator $t-1$	0.037*** (3.78)	-0.004 (-0.26)
SME exporter $t-1$	0.111*** (18.73)	0.592*** (44.65)
Size: Micro 1 - 9	0.014* (1.66)	-0.033 (-1.34)
Size: Small 10 - 49	0.027 (1.32)	-0.047 (-1.62)
Size: Medium 50 - 249	0.019 (1.03)	-0.047 (-1.23)
Business age: 6 - 10	0.021 (1.24)	-0.171*** (-4.11)
Business age:11 - 20	0.004 (0.29)	-0.046 (-0.73)
Business age: 20+	0.022 (1.56)	-0.082 (-1.44)
Turnover: Stayed the same $t-1$	-0.127*** (-23.16)	-0.085*** (-2.60)
Turnover: Increased $t-1$	-0.138*** (-33.68)	-0.006 (-0.14)
Makes surplus $t-1$	-0.019** (-2.57)	0.015 (0.77)
Has business plan $t-1$	0.010* (1.66)	0.013 (1.09)
Women-lead	-0.006 (-1.08)	-0.023 (-1.36)
MEG-led	0.011 (1.05)	-0.008 (-0.23)
Family owned	0.002 (0.23)	
<i>Fixed effects</i>		
Regional FEs	YES	YES
Industry FEs	YES	YES
Legal form FEs	YES	NO
Athrho	15.367*** (154.36)	
N	3559.000	
Selected	389.000	
Non-selected	3170.000	
Log pseudo-likelihood	-1238.712	
Wald test of indep. Eqns ($\rho = 0$)	23827.874	
Prob > chi2	0.000	

4.4 Extent to which SME considers the UK's exit from the EU to be factor in the decrease in turnover that is expected in the next 12 months for SMEs in the UK

In section 4.4, we explore the extent to which Small and Medium-sized Enterprises (SMEs) in the UK attribute the expected increase or decrease in their turnover over the next 12 months to Brexit. This section aims to quantify the perceived impact of Brexit on future financial performance and provides a nuanced understanding of how Brexit is influencing SMEs' revenue expectations. We will delve into the myriad factors that might be influencing these expectations, including but not limited to changes in trade agreements, regulatory hurdles, and market uncertainties. By dissecting these elements, we seek to shed light on the direct and indirect ways in which Brexit is shaping the financial future of SMEs in the UK.

Table 12 presents the results of a multinomial probit regression analysis examining the perceived impact of the UK's Brexit on the expected decrease in turnover for Small and Medium-sized Enterprises (SMEs) in the UK. The sample comprises SMEs anticipating a drop in turnover in the coming 12 months. The findings suggest that SMEs that were innovative or exporters in the previous year are less likely to consider Brexit as a non-factor, but more likely to view it as a major factor, in their expected turnover decrease. When it comes to firm size, micro, small, and medium firms are less likely to view Brexit as a non-factor. However, they are more likely to consider it either a minor or a major factor depending on the firm size category. Business age also plays a role. Firms aged 6-10 and over 20 years are more likely to perceive Brexit as a minor factor, albeit with varying degrees of statistical significance. However, they are less likely to view it as a non-factor or a major factor. Interestingly, firms that experienced stable turnover or an increase in the previous year, or those with a business plan, are more likely to consider Brexit a non-factor but less likely to view it as a major factor in their expected turnover decrease. Finally, the leadership characteristics, whether women-led or minority ethnic group (MEG)-led, indicate that these firms are less likely to see Brexit as a non-factor and more likely to consider it a major factor, albeit with varying degrees of statistical significance. In summary, the results suggest that the firm's characteristics such as innovation and export orientation significantly influence its perception of Brexit's impact on its anticipated turnover decrease.

Table 12: Extent to which SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months for SMEs in the UK

This table shows average marginal effects from multinomial probit regressions predicting whether Brexit has been a factor explaining expected future decrease in turnover. Sample is restricted to SMEs expecting a decrease in turnover that is expected in the next 12 months. Z-statistics adjusted for clustering at regional level are reported in parentheses. The base categories for categorical variables are: zero employees (size), 0-5 years (business age), decreased (turnover change). Z-statistics adjusted for clustering at regional level are reported in parentheses. ***, ** and * indicates statistical significance at the 1%, 5% and 10% levels, respectively.

	Not a factor	Minor factor	Major factor
SME innovator $t-1$	-0.086*** (-4.53)	-0.003 (-0.11)	0.089*** (10.15)
SME exporter $t-1$	-0.208*** (-13.07)	0.052** (2.04)	0.156*** (6.33)
Size: Micro 1 - 9	-0.093*** (-4.44)	0.106*** (4.32)	-0.013 (-0.40)
Size: Small 10 - 49	-0.148*** (-2.82)	0.093** (2.41)	0.055** (2.51)
Size: Medium 50 - 249	-0.300*** (-3.92)	0.252*** (3.60)	0.048*** (4.99)
Business age: 6 - 10	-0.158 (-1.14)	0.217* (1.69)	-0.060** (-2.43)
Business age:11 - 20	-0.044 (-0.64)	0.079 (1.32)	-0.035*** (-3.08)
Business age: 20+	-0.069 (-0.87)	0.098 (1.35)	-0.029** (-2.00)
Turnover: Stayed the same $t-1$	0.099*** (2.61)	-0.063 (-1.42)	-0.036** (-2.51)
Turnover: Increased $t-1$	0.061 (1.11)	0.011 (0.31)	-0.073*** (-3.42)
Makes surplus $t-1$	-0.024 (-0.51)	0.039 (1.00)	-0.015 (-1.14)
Has business plan $t-1$	0.076*** (9.12)	-0.069*** (-6.10)	-0.007 (-0.59)
Women-lead	0.081*** (5.42)	-0.051 (-1.53)	-0.030 (-0.71)
MEG-led	-0.260*** (-12.44)	0.171*** (5.40)	0.089*** (7.60)
Regional FEs		YES	
Industry FEs		YES	
Observations		355	
Log likelihood		-283.145	

Table 13 presents the average marginal effects from a multinomial probit regression analysis, investigating whether UK's Brexit is perceived as a factor contributing to an expected increase in turnover among UK's Small and Medium-sized Enterprises (SMEs) over the next 12 months. According to the findings, SMEs that were innovative in the previous year show a statistically insignificant relationship with Brexit's influence on positive turnover expectations. However, SMEs that were exporters in the previous year are less likely to view Brexit as a non-factor, but more likely to view it as a major factor, in their expected turnover increase. Although this effect is lower compared to results reported in Table 12 for the expected decrease in turnover. When considering firm size, micro, small, and medium-sized firms are more likely to consider Brexit as a non-factor, though their consideration of Brexit as a minor or major factor varies. The age of the firm also plays a role in these perceptions. Firms aged 6-10, 11-20, and over 20 years are more likely to view Brexit as a non-factor but less likely to see it as a minor factor. For major factor perceptions, only firms aged 6-10 years show a statistically significant relationship. Interestingly, firms that made a surplus or had a business plan in the previous year are less likely to view Brexit as a non-factor, but their perception of it as a minor or major factor shows varying degrees of statistical significance. Finally, the leadership characteristics of the firm indicate that women-led firms are more likely to consider Brexit as a non-factor or a major factor, but less likely to see it as a minor factor. In contrast, Minority Ethnic Group (MEG)-led firms are less likely to consider Brexit a non-factor, but more likely to see it as a minor or major factor. In summary, when examining the data shown in Tables 12 and 13, the characteristics of a Small and Medium-sized Enterprise (SME) that affect the perception of Brexit's impact on its expected turnover are not uniform. This suggests a complex interaction between various factors and characteristics that could potentially influence SMEs' expectation of turnover and their eventual impact of Brexit. Therefore, it is important for policymakers to consider the diversity and complexity of SMEs when developing post-Brexit strategies and policies. These findings also highlight the need for further research to better understand the subtle ways in which SME characteristics interact with perceptions and impacts of Brexit.

Table 13: Extent to which SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months for SMEs in the UK

This table shows average marginal effects from multinomial probit regressions predicting whether Brexit has been a factor explaining expected future decrease in turnover. Sample is restricted to SMEs expecting a decrease in turnover that is expected in the next 12 months. Z-statistics adjusted for clustering at regional level are reported in parentheses. The base categories for categorical variables are: zero employees (size), 0-5 years (business age), decreased (turnover change). Z-statistics adjusted for clustering at regional level are reported in parentheses. ***, ** and * indicates statistical significance at the 1%, 5% and 10% levels, respectively.

	Not a factor	Minor factor	Major factor
SME innovator t_{-1}	-0.001 (-0.16)	-0.007 (-0.73)	0.008* (1.91)
SME exporter t_{-1}	-0.042*** (-3.51)	0.016 (1.59)	0.026** (2.24)
Size: Micro 1 - 9	0.055*** (4.68)	-0.050*** (-3.02)	-0.006 (-0.54)
Size: Small 10 - 49	0.050* (1.86)	-0.027 (-1.27)	-0.024 (-0.98)
Size: Medium 50 - 249	0.038** (2.27)	-0.005 (-0.22)	-0.033 (-1.34)
Business age: 6 - 10	0.025 (1.34)	-0.028** (-2.50)	0.003 (0.14)
Business age: 11 - 20	0.024 (1.37)	-0.016*** (-4.35)	-0.008 (-0.42)
Business age: 20+	0.041*** (2.99)	-0.042** (-2.09)	0.001 (0.09)
Turnover: Stayed the same t_{-1}	0.004 (0.20)	0.004 (0.23)	-0.009 (-0.69)
Turnover: Increased t_{-1}	0.007 (0.17)	-0.007 (-0.17)	-0.000 (-0.04)
Makes surplus t_{-1}	-0.008 (-0.35)	0.023 (0.90)	-0.015*** (-5.90)
Has business plan t_{-1}	-0.026 (-1.47)	0.019 (1.31)	0.007 (0.71)
Women-lead	0.016 (1.37)	-0.027* (-1.76)	0.011*** (3.02)
MEG-led	-0.089*** (-4.36)	0.053*** (3.97)	0.036** (2.50)
Regional FEs		YES	
Industry FEs		YES	
Observations		1574	
Log likelihood		-1008.70	

5. IMPLICATIONS FOR THE UK'S INDUSTRIAL STRATEGY AND THE 'LEVELLING UP' AGENDA'

In this section, we explore some potential relationships between internationalization, investments and turnover with respect to the recent levelling up agenda. In this Section we use two measures which can provide some insights of inequalities at regional level in the UK: Gross Value Added (GVA) per hour worked (£) as a measure for differences in productivity between regions, and the index of multiple deprivation (IMD) based on measures involving productivity, employment, vacancy rates, lack of skills and transport links. IMD ranges from 1 (most deprived) to 20 (least deprived). We utilize survey weights in all our statistical computations. Our analyses are based on the most recent survey wave from the LSBS, specifically the 2021 wave. Additionally, GVA figures are sourced from the ONS and pertain to 2020, which is the most recent available year. IMD indicator values were also extracted from the LSBS database, and drawn from the 2021 survey wave.

Figure 20 plots the percentage of SMEs that perceive Brexit as a major business obstacle across different UK regions, in conjunction with the Gross Value Added (GVA) per hour worked. It showcases that SMEs in London experienced the highest perception of Brexit as a major obstacle (35.17%), coupled with the highest GVA per hour worked (£50.7). Conversely, the North East reports the lowest percentage of SMEs (16.69%), although its GVA per hour worked (£32.47) remained on par with other regions. Regional variations suggest an uneven impact on how SMEs perceive Brexit, along with diverse economic productivity as measured by GVA per hour worked, underscoring the complexity of the post-Brexit business landscape in the UK.

Figure 20: Brexit as a major business obstacle and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle compared to the GVA in the regions where they are located. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

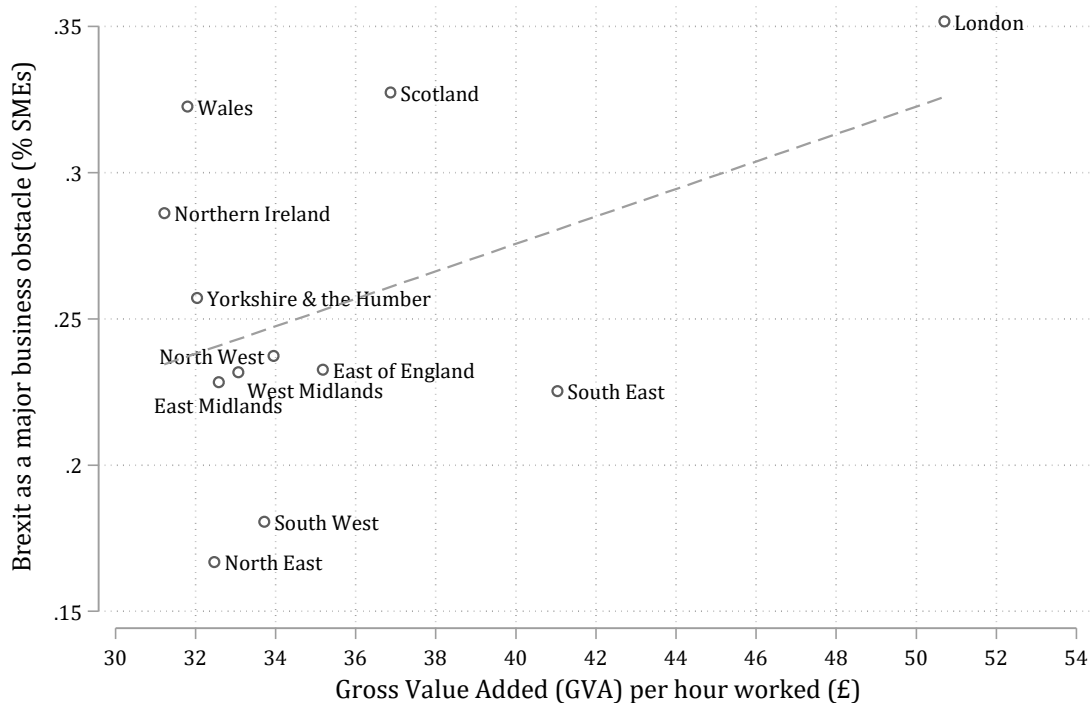


Figure 21 illustrates the interplay between the perception of Brexit as a substantial business obstacle among SMEs in various UK regions and their respective Index of Multiple Deprivation (IMD) scores. London stands out as the region where Brexit is perceived as the greatest obstacle (35.17% of SMEs), despite its moderate deprivation score (11.10215). On the contrary, the South East, with a lower perceived Brexit impact (22.53%), exhibits the highest IMD score (13.64864), indicating less deprivation. The North East, where Brexit is seen as major obstacle for 16.69% of SMEs, shows the highest level of deprivation with the lowest IMD score (8.794727). These results illustrate the nuanced interplay between regional Brexit-related business challenges and socio-economic deprivation across the UK.

Figure 21 Brexit as a major business obstacle and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle compared to the IMD in the regions where they are located. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



Figure 22 presents regional statistics in the United Kingdom post-Brexit, emphasizing the major obstacles relating to the UK's departure from the EU, associated with a decrease in investment or increased difficulty in raising capital amongst SMEs that seen Brexit as a major obstacle. Additionally, the Gross Value Added (GVA) per hour worked, measured in pounds, is presented for each region. The South East and Yorkshire & the Humber faced the greatest difficulties, with 23.36% and 23.63% of SMEs respectively reporting issues. London, despite encountering difficulties amongst 12.41% of SMEs, exhibits the highest GVA per hour worked at £50.7. In contrast, the East Midlands and the West Midlands demonstrated the lowest levels of obstacles, with only 7.63% and 4.01% of SMEs reporting problems respectively, albeit with relatively lower GVA per hour worked at £32.58 and £33.07 respectively. This table underscores regional variations in the economic impact of the UK's exit from the EU.

Figure 22: Major obstacles relating to UK exit from EU: Decrease in investment/greater difficulty in raising capital and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle in terms of decrease in investment/greater difficulty in raising capital compared to the GVA in the regions where they are located. Figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

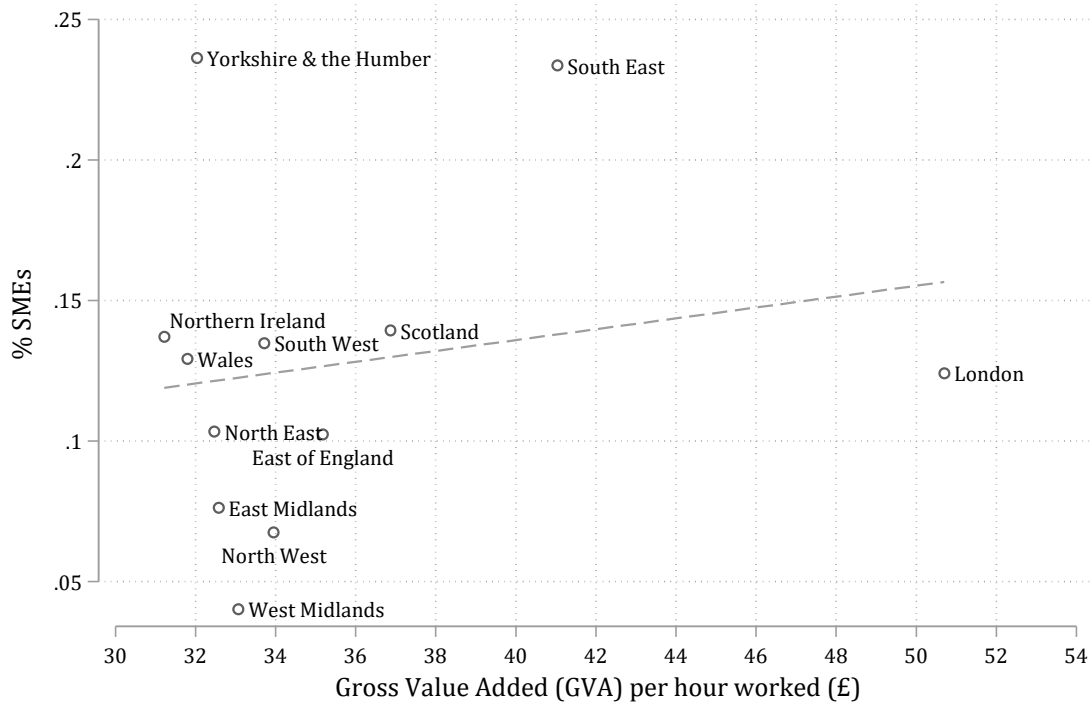


Figure 23 presents regional impacts of the UK's exit from the EU and corresponding levels of multiple deprivation within the UK. It measures obstacles relating to Brexit in terms of a decrease in investment or greater difficulty in raising capital SMEs that seen Brexit as a major obstacle, and the Index of Multiple Deprivation (IMD), with IMD scores ranging from 1 (most deprived) to 20 (least deprived). Regions such as the South East and Yorkshire & the Humber report the highest levels of Brexit-related obstacles at 23.36% and 23.63% of SMEs, respectively. Simultaneously, the South East demonstrates the least deprivation with the highest IMD score of 13.65. Conversely, the North East faces Brexit-related difficulties at a rate of 10.34% of SMEs, while also being the most deprived region with an IMD score of 8.79. The remaining regions depict varying levels of Brexit-induced complications and deprivation, suggesting the diverse regional implications of the UK's EU exit.

Figure 23: Major obstacles relating to UK exit from EU: Decrease in investment/greater difficulty in raising capital and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle in terms of decrease in investment/greater difficulty in raising capital compared to the IMD in the regions where they are located. Figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

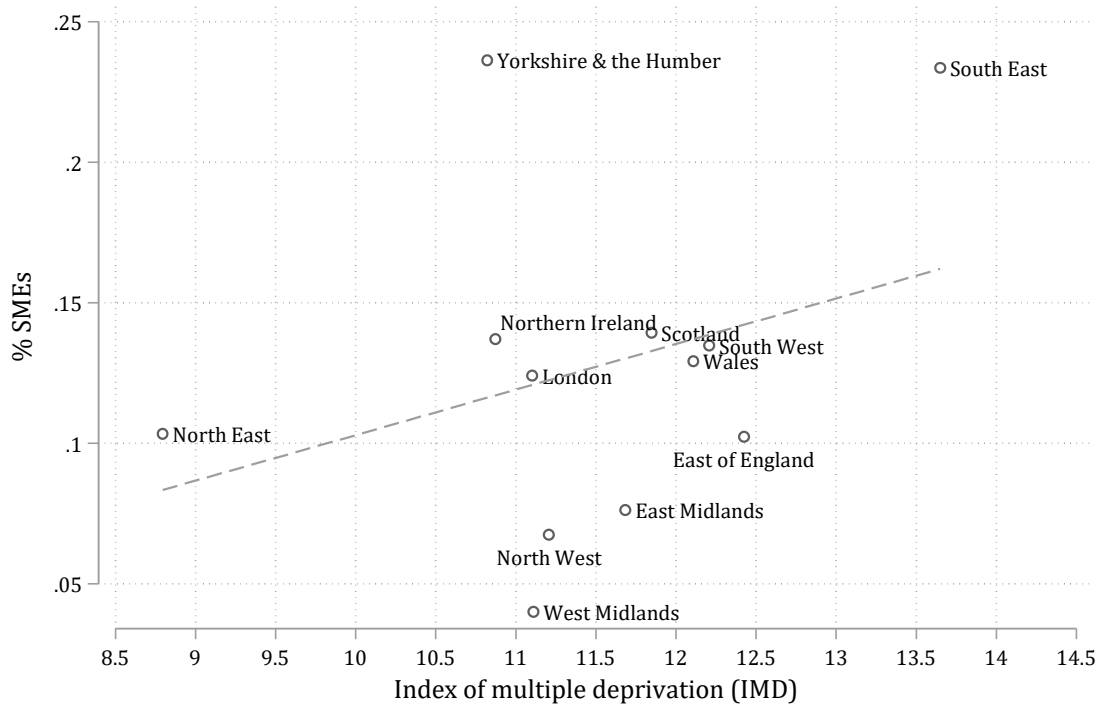


Figure 24 provides regional insights on the specific challenges faced by UK SMEs that perceive Brexit as a major business obstacle, specifically concerning an increase in the cost of imports from the EU. The table also illustrates the Gross Value Added (GVA) per hour worked in each region. The North West exhibits the most significant perceived obstacles related to import costs, with 89.64% of SMEs reporting this issue, despite having a relatively average GVA per hour worked (£33.95). The East Midlands and the East of England experience lesser difficulties, with 45.64% and 43.66% of SMEs respectively mentioning increased import costs. London, facing perceived increased import cost due to Brexit by 61.43% of SMEs, has the highest GVA per hour worked (£50.7). Conversely, Wales, despite a high percentage of SMEs (78.49%) encountering elevated import costs, has one of the lowest GVA per hour worked (£31.8). The figure underscores how regional economic productivity may not directly correlate with the extent of Brexit-induced import cost increases.

Figure 24: Major obstacles relating to UK exit from EU: Increase in cost of imports from the EU and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle in terms of increase in cost of imports from the EU compared to the GVA in the regions where they are located. Figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



Figure 25 outlines the concerns of UK SMEs that perceive Brexit as a significant obstacle, particularly in relation to the increase in import costs from the EU, and their association with the Index of Multiple Deprivation (IMD). The IMD ranges from 1 (most deprived) to 20 (least deprived). The North West shows the highest concern of an increase in import costs due to Brexit with 89.64% of SMEs affected, but exhibits a moderately deprived IMD score of 11.21. In contrast, the East Midlands and the East of England report the lowest increase in import costs at 45.64% and 43.66% respectively, with IMD scores of 11.68 and 12.42, indicating moderate deprivation. Meanwhile, the South East region shows a lower import cost increase at 63.36% of SMEs, but shows the least deprivation with the highest IMD score of 13.65. The North East, despite experiencing high import costs due to Brexit (74.26%), shows the most deprivation with the lowest IMD score of 8.79. This figure highlights a complex relationship between Brexit-induced import cost increases and regional deprivation in the UK.

Figure 25: Major obstacles relating to UK exit from EU: Increase in cost of imports from the EU and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle in terms of increase in cost of imports from the EU compared to the IMD in the regions where they are located. Figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

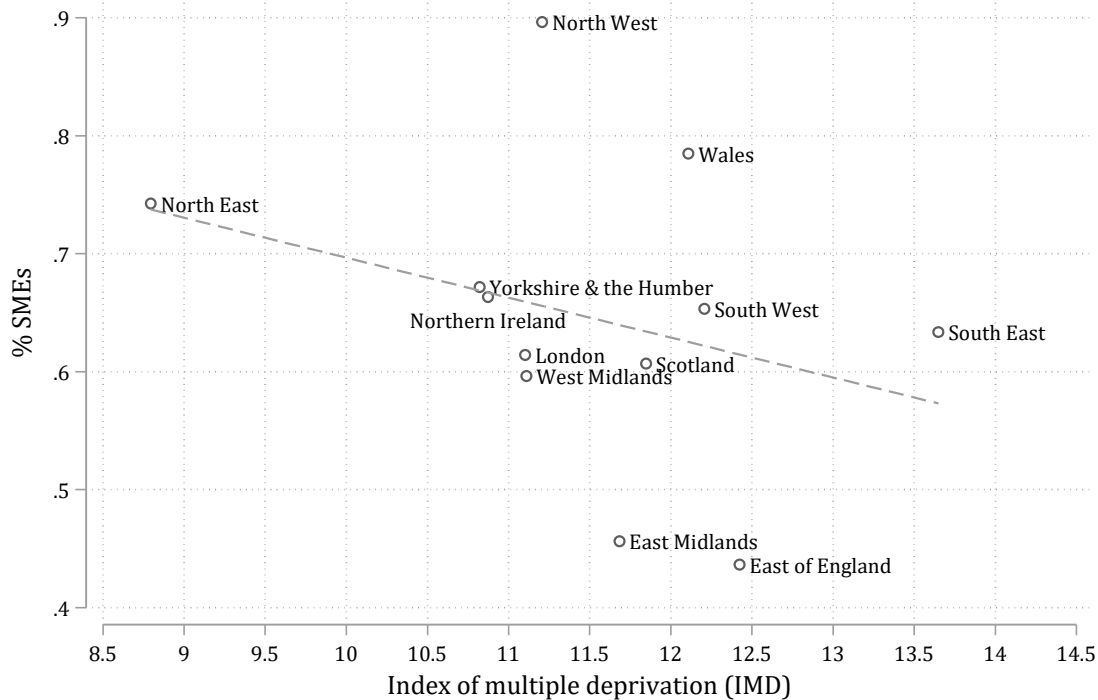


Figure 26 portrays the implications of Brexit, specifically the increased cost of exports to the EU, for UK SMEs that perceive Brexit as a major obstacle. It also provides the Gross Value Added (GVA) per hour worked for each region. The South West reports the highest increase in export costs with 55.19% of SMEs affected, even though it maintains a relatively average GVA per hour worked (£33.72). The East of England follows closely with 52.08% of SMEs affected. In contrast, London and the West Midlands report the lowest increases in export costs, with 22.69% and 9.17% of SMEs respectively impacted, despite London having the highest GVA per hour worked (£50.7). Yorkshire & the Humber, despite a lower percentage of SMEs (18.06%) encountering increased export costs, has one of the lowest GVA per hour worked (£32.04). This data underscores the varying regional impacts of Brexit-induced export cost increases, irrespective of economic productivity as reflected by GVA per hour worked.

Figure 26: Major obstacles relating to UK exit from EU: Increase in cost of exports to the EU and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle in terms of increase in cost of exports to the EU compared to the GVA in the regions where they are located. Figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

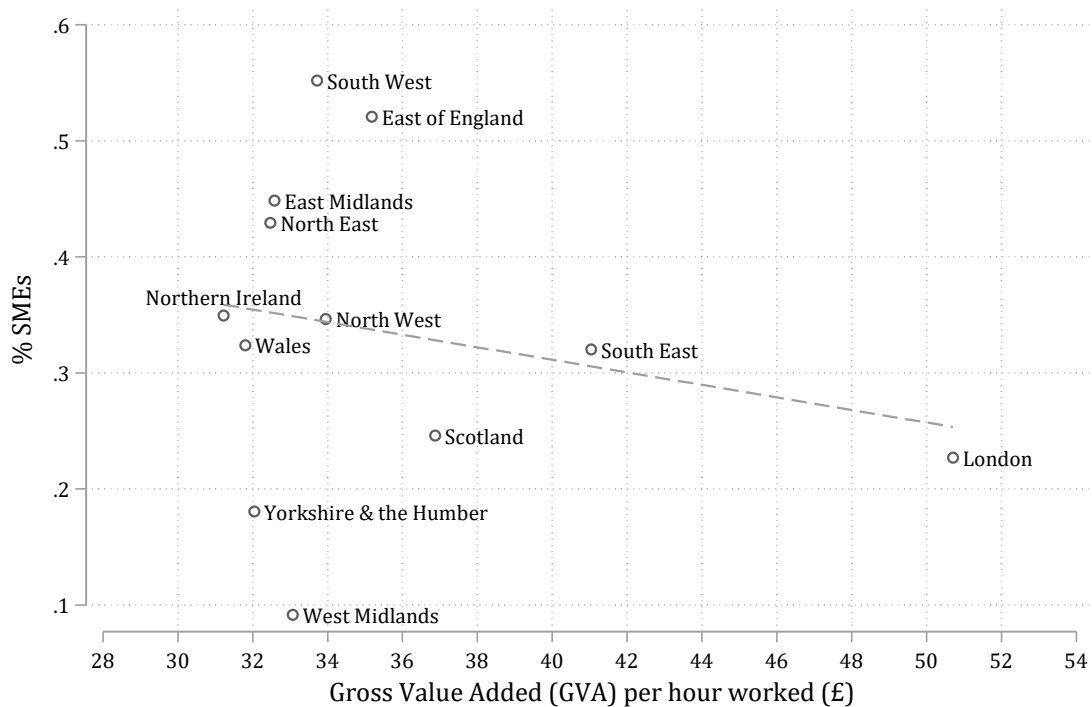


Figure 27 shows the impact of Brexit, specifically in relation to the perceived increase in cost of exports to the EU, among SMEs in the UK that consider Brexit as a significant business obstacle. This impact is presented alongside the Index of Multiple Deprivation (IMD), with IMD scores ranging from 1 (most deprived) to 20 (least deprived). The South West and the East of England report the highest increase in export costs, with 55.19% and 52.08% of SMEs respectively affected, and exhibit moderate levels of deprivation (IMD scores of 12.21 and 12.42). Conversely, the West Midlands and London face the least increase in export costs, at 9.17% and 22.69% respectively, while maintaining similar levels of deprivation (IMD scores of 11.11 and 11.10). The North East, despite relatively high export cost increases (42.93%), exhibits the most deprivation with an IMD score of 8.79. The figure highlights the heterogeneity in regional experiences of Brexit-related export cost increases and levels of deprivation.

Figure 27: Major obstacles relating to UK exit from EU: Increase in cost of exports to the EU and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs that perceive Brexit as a major business obstacle in terms of increase in cost of exports to the EU compared to the IMD in the regions where they are located. Figure is based solely on data collected during the 2021 survey wave. The sample only includes SMEs that consider Brexit as a major business obstacle. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

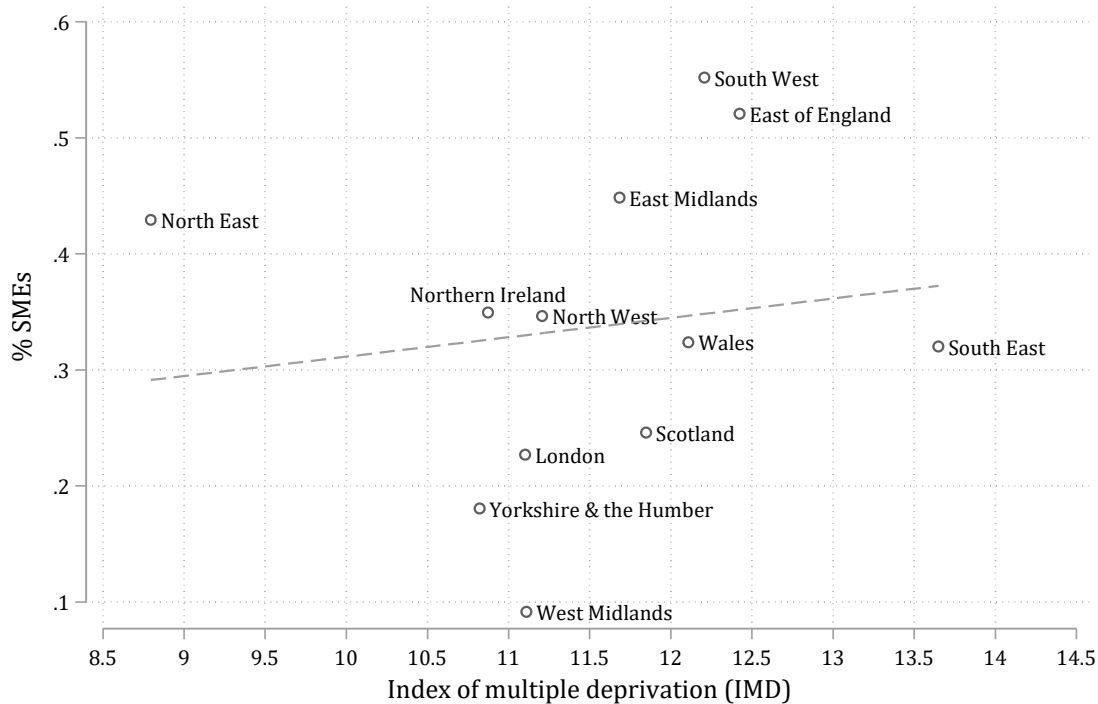


Figure 28 presents the impact of Brexit on the capital investment plans (in premises, machinery, etc.) of SMEs across various UK regions, who have such plans over the next three years. It also includes the Gross Value Added (GVA) per hour worked in each region. The data shows that London-based SMEs exhibit the most significant impact of Brexit on investment plans, with 39.88% affected, coupled with the highest GVA per hour worked (£50.7). Yorkshire & the Humber and the West Midlands also reveal significant effects on investment plans (31.04% and 29.50%, respectively), despite lower GVA rates (£32.04 and £33.07). Conversely, the East Midlands and the North West experience the least impact on investment plans (3.63% and 8.21% respectively), while maintaining moderate GVA values (£32.58 and £33.95). The findings underscore the varied influence of Brexit on the capital investment strategies of SMEs with such plans across different UK regions, irrespective of regional economic productivity.

Figure 28: Whether plans over the next three years have been affected by Brexit: Capital investment (in premises, machinery etc.) in the UK and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs with plans affected by Brexit compared to the GVA in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

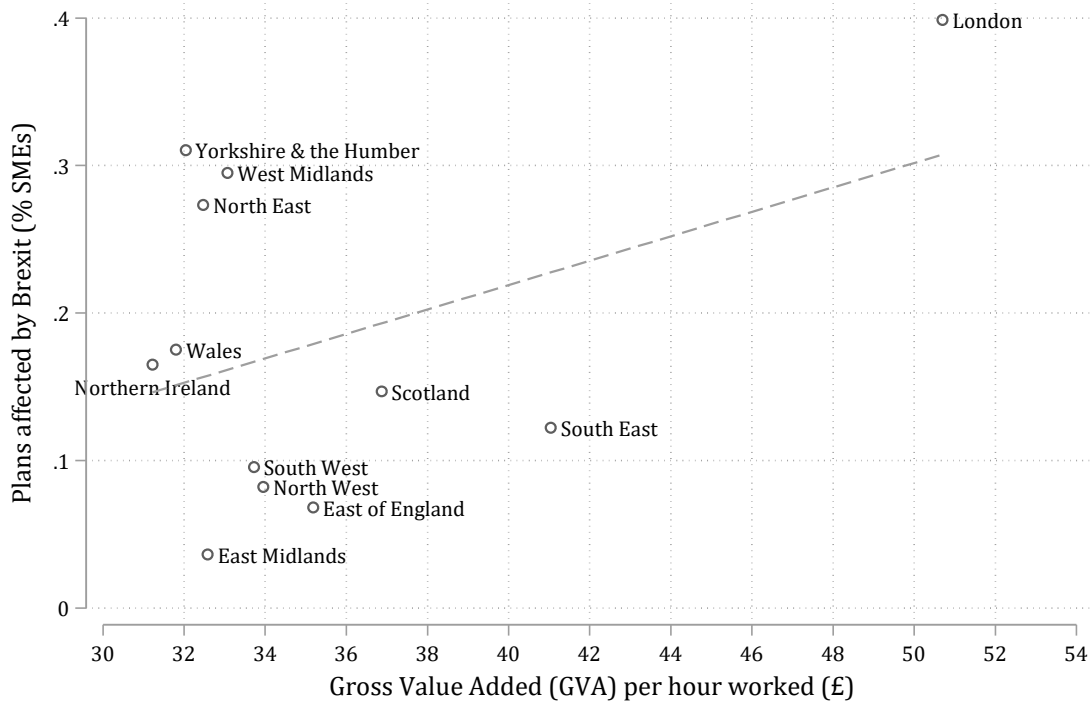


Figure 29 delineates the impact of Brexit on the future capital investment plans of SMEs across different regions of the UK, with an Index of Multiple Deprivation (IMD) score for each region. Notably, London SMEs are most impacted, with 39.88% reporting that Brexit has affected their investment plans, despite a moderate IMD score of 11.1. Yorkshire & the Humber and West Midlands also report a significant impact on their investment plans (31.04% and 29.5% respectively), with comparable IMD scores (10.82 and 11.11). On the other end of the spectrum, East Midlands and North West report the least impact (3.63% and 8.21%), although the North East, which has the lowest IMD score of 8.79, reports a substantial 27.32% of SMEs affected by Brexit. South East, despite having the highest IMD score of 13.65, only reports a moderate impact on SME investment plans (12.22%). The data hence indicates a complex relationship between Brexit's impact on capital investment plans of SMEs and regional deprivation levels.

Figure 29: Whether plans over the next three years have been affected by Brexit: Capital investment (in premises, machinery etc.) in the UK and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs with plans affected by Brexit compared to the IMD in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

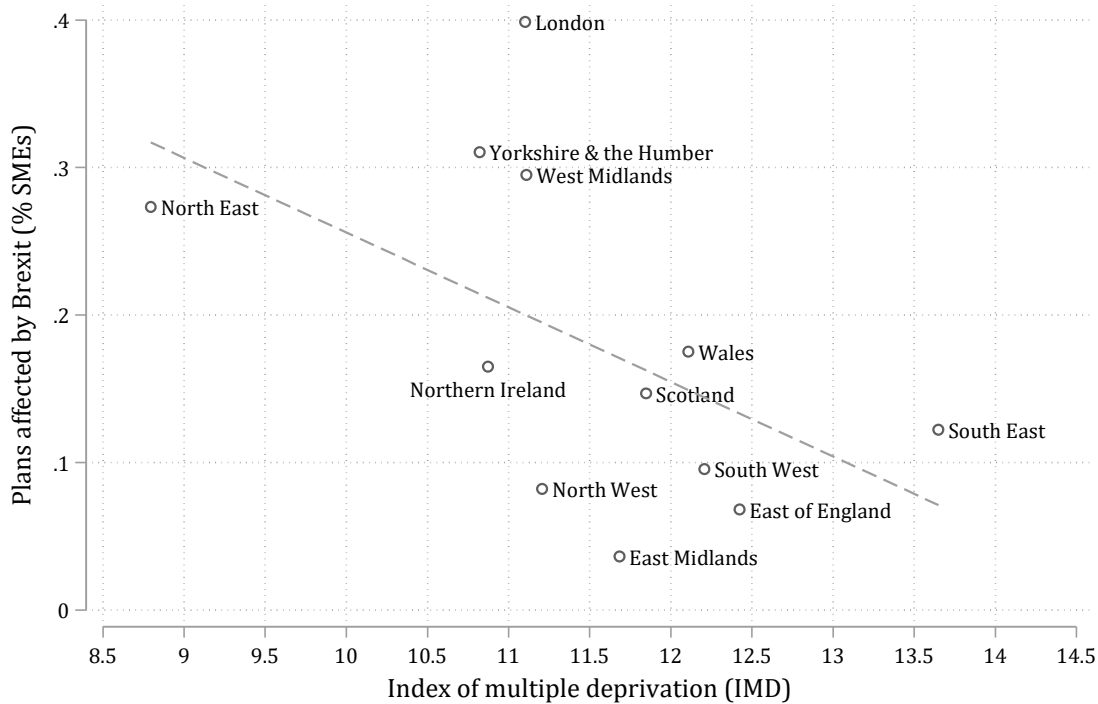


Figure 30 provides a regional breakdown of UK SMEs that have plans to develop and launch new products or services over the next three years, and whether these plans have been affected by Brexit. The data also includes Gross Value Added (GVA) per hour worked in each region. London shows the highest percentage of SMEs whose plans have been affected by Brexit (33.1%) as well as the highest GVA per hour worked (£50.7), while the North East reports the lowest percentage of affected plans (11.2%) and the second lowest GVA per hour (£32.47). Interestingly, the region with the lowest GVA per hour, Northern Ireland (£31.22), exhibits a similar Brexit impact level to the North East (11.9%). On average, regions with higher GVA per hour seem to have a larger proportion of their SMEs' plans affected by Brexit, with some exceptions such as East Midlands, which despite having a relatively low GVA per hour (£32.58), shows a high level of Brexit impact (26.6%).

Figure 30: Whether plans over the next three years have been affected by Brexit: Develop and launch new products/services and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs with plans affected by Brexit compared to the GVA in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

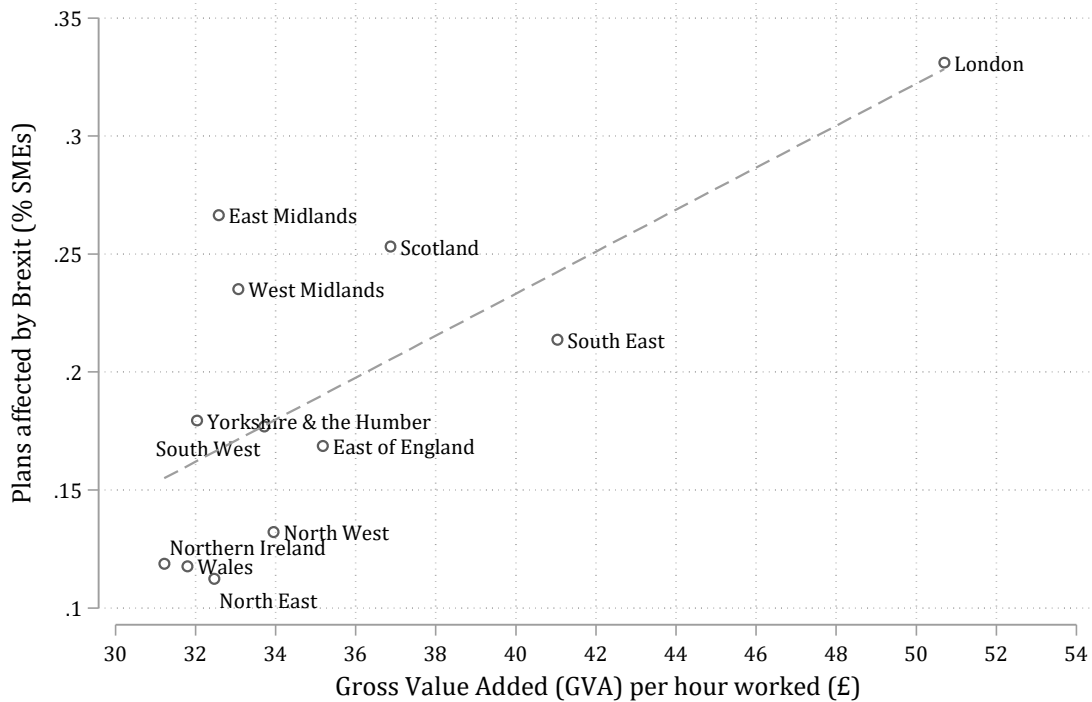


Figure 31 outlines a region-specific analysis of UK SMEs, their plans to develop and launch new products/services over the next three years, and how Brexit impacts these plans. The Figure also includes an Index of Multiple Deprivation (IMD) for each region, ranging from 1 (most deprived) to 20 (least deprived). London features the highest percentage of SMEs with Brexit-affected plans (33.1%) and ranks towards the higher end of deprivation (IMD score of 11.1). Conversely, the North East region reports the lowest percentage of Brexit-impacted plans (11.2% of SMEs) and has the lowest IMD score (8.79), indicating a higher level of deprivation. The South East, with an IMD score of 13.65—the highest in the Figure—has a Brexit impact of 21.4%, situating it in the middle of the range. The data suggest complex relationships between the level of deprivation in a region and the proportion of SMEs whose plans to develop and launch new products/services are affected by Brexit.

Figure 31: Whether plans over the next three years have been affected by Brexit: Develop and launch new products/services and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs with plans affected by Brexit compared to the IMD in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

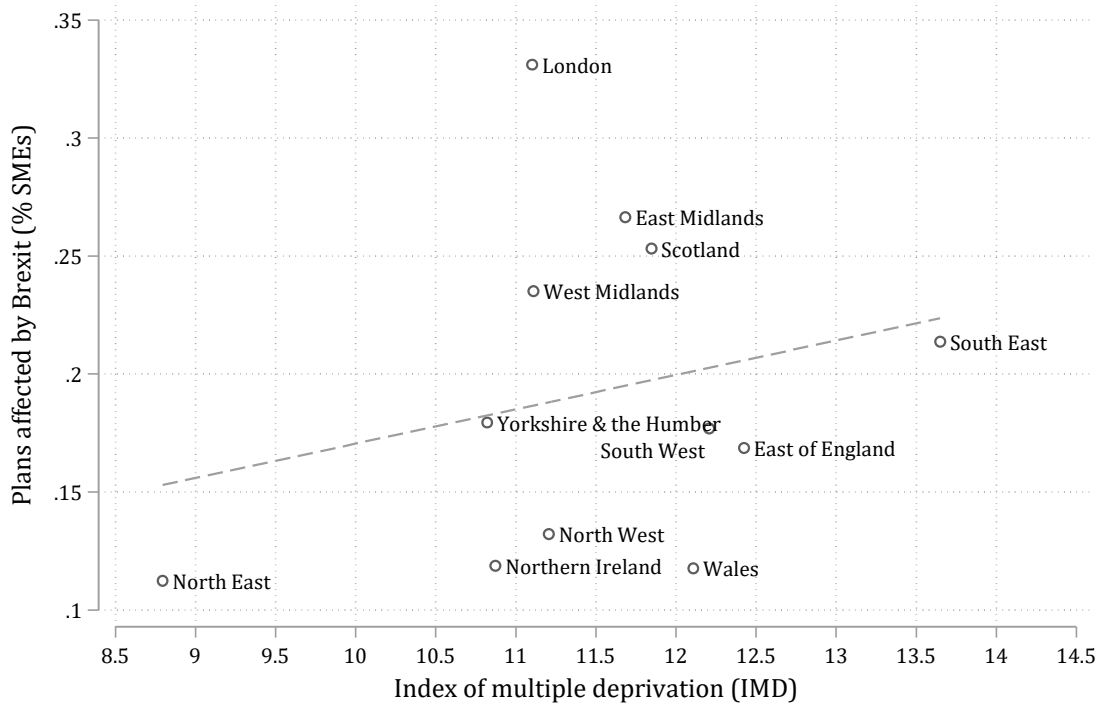


Figure 32 provides a regional summary of UK SMEs with plans to invest in R&D over the next three years, detailing the extent to which Brexit has impacted these plans. Additionally, it presents the Gross Value Added (GVA) per hour worked for each region. In particular, the North East demonstrates the highest proportion of SMEs with Brexit-affected plans (32.6%), despite its relatively low GVA per hour (£32.47). London, with the highest GVA per hour (£50.7), shows a lower percentage of affected plans (21.5%). Wales and Northern Ireland both present the lowest Brexit impact on R&D investment plans (8.8%) and hold the lowest GVA per hour worked (£31.8 and £31.22 respectively). This data suggest no clear correlation between the regions' economic productivity (GVA per hour worked) and the proportion of SMEs whose R&D investment plans affected by Brexit.

Figure 32: Whether plans over the next three years have been affected by Brexit: Invest in R&D and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs with plans affected by Brexit compared to the GVA in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



Figure 33 displays data on UK SMEs planning to invest in R&D over the next three years, indicating the percentage of those whose plans are affected by Brexit and providing the Index of Multiple Deprivation (IMD) for each region. London, despite having a relatively high IMD score of 11.10, indicating less deprivation, shows a lower-than-average proportion of SMEs with Brexit-affected plans (21.5%). On the other hand, the North East, with the lowest IMD score (8.79) indicative of more deprivation, reports the highest proportion of SMEs with Brexit-affected plans (32.6%). Wales and Northern Ireland exhibit the lowest Brexit impact (8.8%), with their IMD scores being moderately high (12.11) and relatively low (10.87), respectively. These results suggest the complex relationships between a region's level of deprivation and the percentage of SMEs whose R&D investment plans are affected by Brexit.

Figure 33: Whether plans over the next three years have been affected by Brexit: Invest in R&D and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs with plans affected by Brexit compared to the IMD in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

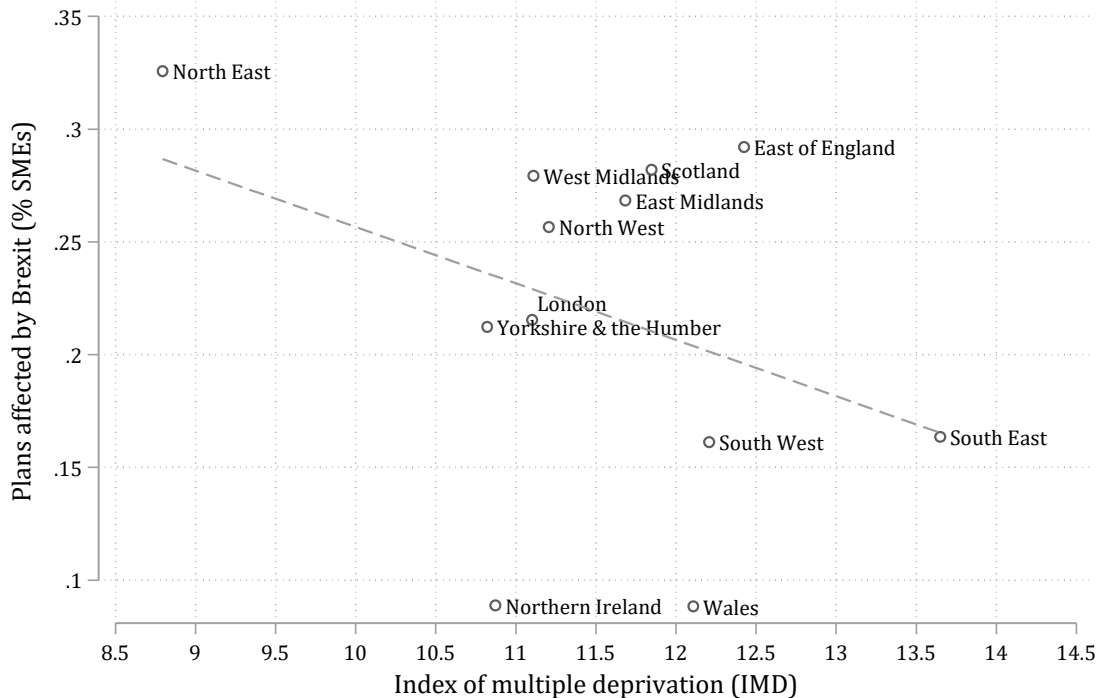


Figure 34 provides a regional comparison of UK SMEs intending to increase export sales or begin selling to new overseas markets in the next three years, and how Brexit affects these plans. Alongside, it includes the Gross Value Added (GVA) per hour worked in each region. Notably, the North East region displays the highest proportion of SMEs with Brexit-affected plans (89.8%), in spite of having a comparatively low GVA per hour (£32.47). Conversely, the East of England, with a moderately high GVA per hour (£35.18), reports the lowest percentage of Brexit-impacted plans (10.3%). Regions like London and Yorkshire & the Humber, with varying GVA per hour worked (£50.7 and £32.04 respectively), exhibit high Brexit impact on their SMEs' plans (49.7% and 64.9% respectively). The data suggest a lack of clear correlation between the regions' GVA per hour and the impact of Brexit on SMEs' plans to increase export sales or venture into new overseas markets.

Figure 34: Whether plans over the next three years have been affected by Brexit: Increase export sales or begin selling to new overseas markets and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs with plans affected by Brexit compared to the GVA in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

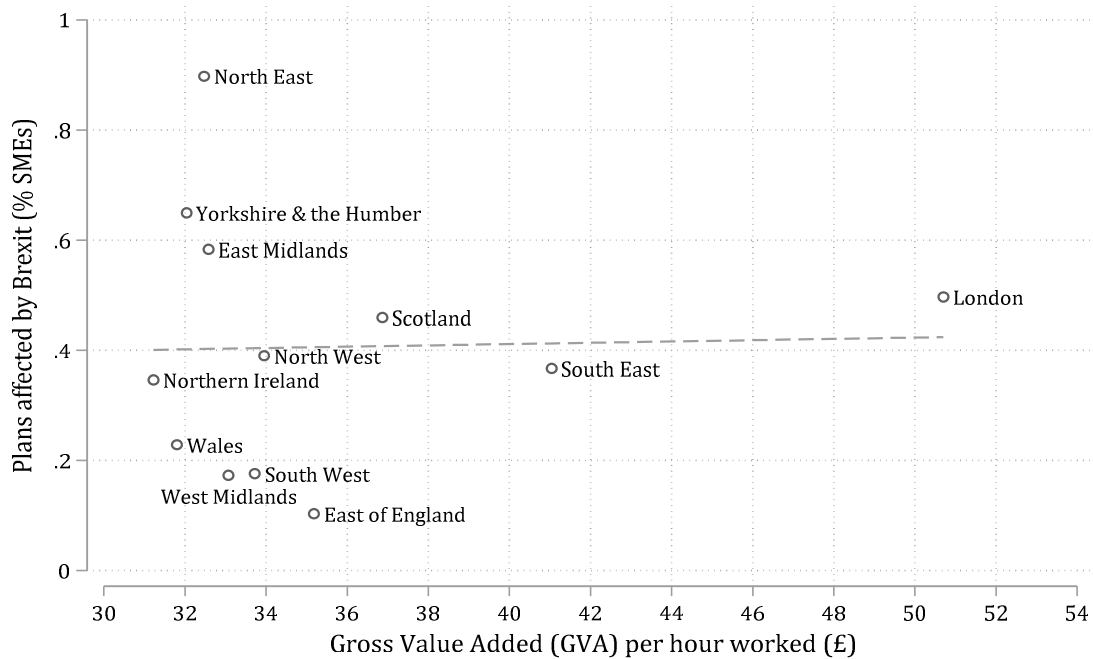


Figure 35 presents a region-specific breakdown of UK SMEs planning to increase export sales or enter new overseas markets in the next three years, revealing the extent to which Brexit affects these plans, and illustrating each region's Index of Multiple Deprivation (IMD). The North East region, despite being the most deprived (IMD score of 8.79), shows the highest percentage of SMEs with Brexit-affected plans (89.8%). In contrast, the East of England, which exhibits relatively less deprivation (IMD score of 12.42), shows the least Brexit impact on plans (10.3%). Yorkshire & the Humber, with a moderate IMD score of 10.82, records a high proportion of Brexit-impacted SMEs' plans (64.9%), while the South East, the least deprived region (IMD score of 13.65), shows a lower percentage of affected plans (36.7%). This data suggests a complex relationship between a region's deprivation level and the extent to which Brexit influences SMEs' plans to increase export sales or begin selling to new overseas markets.

Figure 35: Whether plans over the next three years have been affected by Brexit: Increase export sales or begin selling to new overseas markets and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs with plans affected by Brexit compared to the IMD in the regions where they are located. Sample only includes SMEs with specific plans over the next three years. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



Figure 36 presents a regional analysis of UK SMEs anticipating an increase in turnover in the next 12 months, demonstrating the degree to which these expectations are influenced by the UK's exit from the EU. Alongside, it offers the Gross Value Added (GVA) per hour worked for each region. Northern Ireland, despite having the lowest GVA per hour worked (£31.22), reports the highest percentage of SMEs considering Brexit as a factor in their expected turnover increase (35.9%). Conversely, the East Midlands, with a similar GVA per hour worked (£32.58), registers the lowest percentage of such SMEs (14.1%). Meanwhile, London, with the highest GVA per hour worked (£50.7), shows a moderate level of Brexit influence on expected turnover increase (22.98%). The data suggest a lack of straightforward correlation between a region's GVA per hour worked and the extent to which SMEs consider Brexit as a factor in their projected turnover increase.

Figure 36: Extent to which SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs that consider the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months compared to the GVA in the regions where they are located. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected increase in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

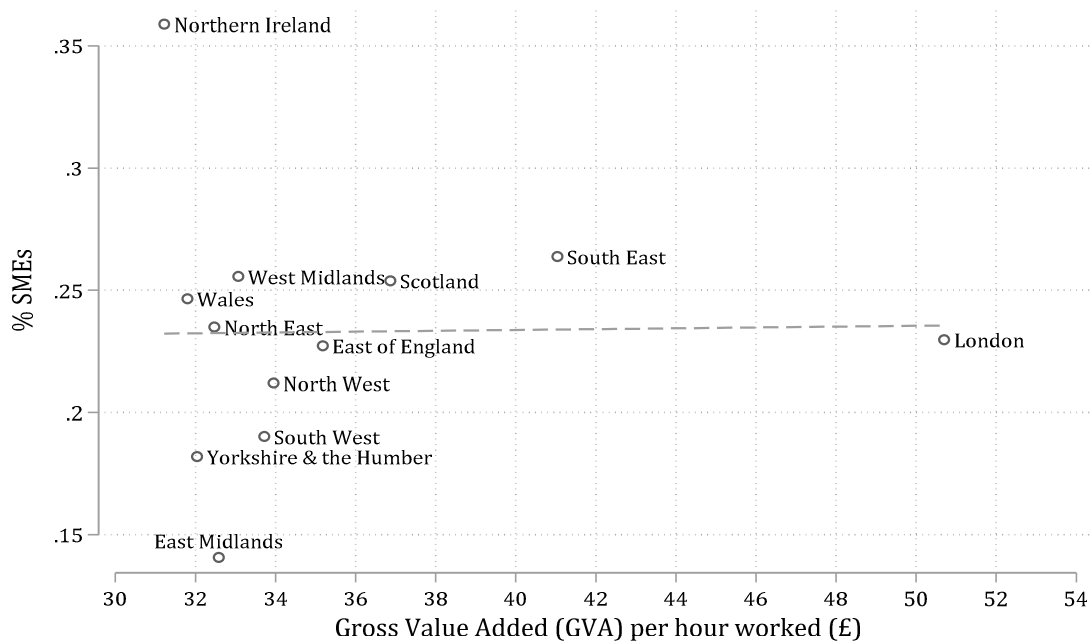


Figure 37 provides regional insights on UK SMEs projecting an increase in turnover in the next 12 months, and the extent to which these SMEs perceive Brexit as a contributing factor, paired with each region's Index of Multiple Deprivation (IMD). Northern Ireland, despite a moderate IMD score of 10.87, exhibits the highest percentage of SMEs considering Brexit as a key factor in their anticipated turnover increase (35.9%). On the contrary, East Midlands, with a similar IMD score of 11.68, reports the lowest percentage of such SMEs (14.1%). Meanwhile, regions such as the North East, with the lowest IMD score (8.79), and the South East, with the highest IMD score (13.65), show a moderate level of Brexit influence on their expected turnover increase (23.49% and 26.38%, respectively). This data suggests a lack of clear correlation between a region's level of deprivation and the extent to which SMEs perceive Brexit as a factor in their projected turnover increase.

Figure 37: Extent to which SME considers the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs that consider the UK's exit from the EU to be a factor in the increase in turnover that is expected in the next 12 months compared to the IMD in the regions where they are located. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected increase in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



Figure 38 provides a regional distribution of UK SMEs forecasting a decrease in turnover in the forthcoming 12 months, outlining the perceived influence of the UK's exit from the EU on this expectation, while presenting the Gross Value Added (GVA) per hour worked in each region. Despite having the lowest GVA per hour worked (£31.22), Northern Ireland exhibits the highest percentage of SMEs considering Brexit as a factor in the expected turnover decrease (43.5%). Conversely, the North East, with a comparable GVA per hour worked (£32.47), reports the lowest percentage of such SMEs (21.3%). London, which has the highest GVA per hour worked (£50.7), reveals a substantial level of Brexit influence on the expected turnover decrease (35.2%). The data suggests an absence of clear correlation between the GVA per hour worked in a region and the degree to which SMEs consider Brexit as a factor in their projected turnover decrease.

Figure 38: Extent to which SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months and Gross Value Added (GVA) per hour worked (£)

This Figure reports the % of SMEs that consider the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months compared to the GVA in the regions where they are located. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected decrease in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.

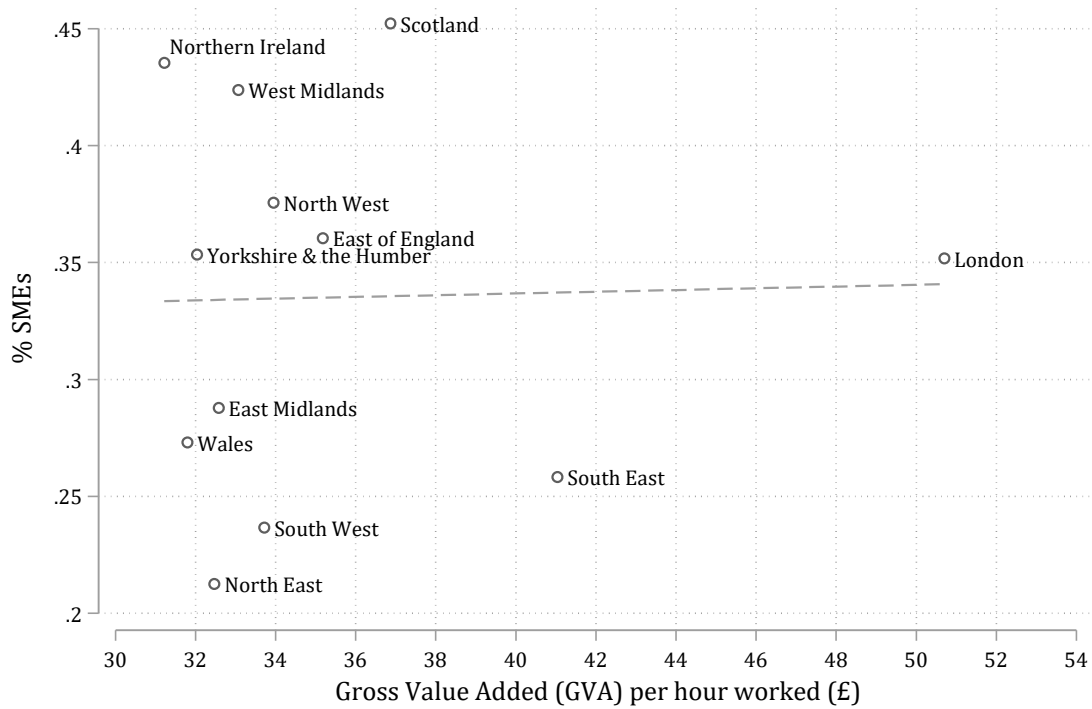
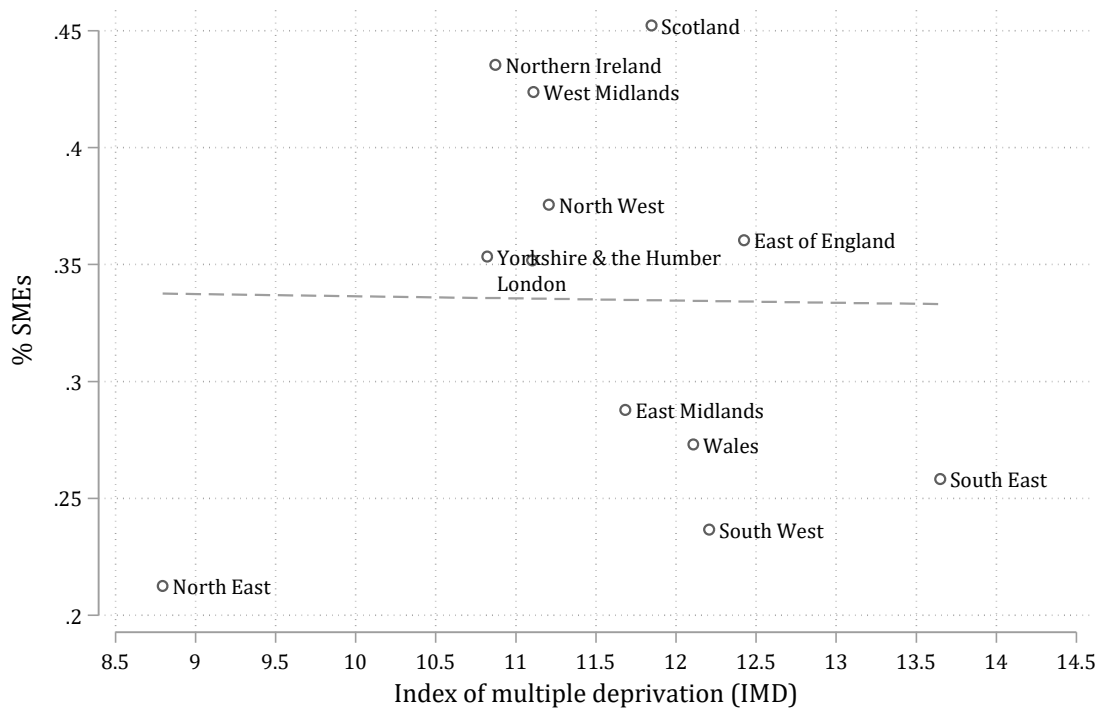


Figure 39 shows the geographical distribution of UK SMEs anticipating a turnover decrease in the next 12 months, and their perceptions of Brexit's influence on this expectation, side by side with the Index of Multiple Deprivation (IMD) for each region. Scotland, with an IMD score of 11.85, shows the highest proportion of SMEs attributing their expected turnover decrease to Brexit (45.2%). Conversely, the North East, despite having the lowest IMD score (8.79), reports the lowest proportion of such SMEs (21.3%). Furthermore, regions like Northern Ireland and West Midlands, with IMD scores of 10.87 and 11.11, respectively, also indicate a high level of Brexit's perceived impact (43.5% and 42.4%, respectively) on the expected turnover decrease. The findings suggest no direct correlation between the level of deprivation in a region and the extent to which SMEs consider Brexit as a factor in their projected turnover decrease.

Figure 39: Extent to which SME considers the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months and Index of multiple deprivation (IMD)

This Figure reports the % of SMEs that consider the UK's exit from the EU to be a factor in the decrease in turnover that is expected in the next 12 months compared to the IMD in the regions where they are located. Data is only available in the 2021 survey wave. Sample only includes SMEs with an expected decrease in turnover in the next 12 months. Cross-sectional survey weights applied to represent the population of SMEs in the UK.



6. CONCLUSIONS

Three years after the formal departure of the UK from the EU, the impacts of Brexit on SMEs in the UK are varied. SMEs, which form the backbone of the UK economy have experienced the complexities introduced by Brexit on different aspects of their business, including internationalization, innovation, and financial performance. The Brexit-induced challenges and uncertainties are intertwined with pre-existing issues and new global disruptions, creating a multifaceted business environment for the SMEs.

This paper reveals a rich, detailed, and complex picture of the impact of Brexit on SMEs, suggesting the need for further research to fully understand the ongoing effects of this landmark political event. The results, however, offer valuable insights for policymakers in the UK in their endeavour to support SMEs in a post-Brexit era. The heterogeneity of the Brexit impacts identified in this study calls for a nuanced, region-specific, and sector-specific policy approach. By addressing these varied impacts, it is possible to target the support that SMEs need to adapt, innovate, and grow in a changed trading environment.

In summary, the UK's departure from the EU has had a substantial influence on the SME sector, but the nature of this influence is multifaceted and varies across different regions and sectors. While Brexit has presented numerous challenges to SMEs, it also opens up the possibility of crafting more targeted, growth-oriented regulations. This offers a unique opportunity for the UK government to focus on delivering a 'levelling up' agenda that can help to address regional disparities and ensure a thriving SME sector in the post-Brexit era.

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