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Longitudinal Exploration of the Role of External Finance in Helping SMEs Achieve Growth, Higher Productivity and Potential in Relation to their Transition to Net Zero

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Longitudinal Exploration of the Role of External Finance in Helping SMEs Achieve Growth, Higher Productivity and Potential in Relation to their Transition to Net Zero

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ABSTRACT

This report investigates the determinants of SME growth and productivity in the UK, drawing on data from the Longitudinal Small Business Survey (LSBS) from 2020 to 2023. The analysis identifies three interrelated domains that significantly influence SME performance: business capacity and strategic orientation, innovation access to external finance, and environmental engagement.

Firm size, age, sector, and planning practices are strongly associated with growth ambition and productivity. Firms with employees, formal business plans, and separate premises are more likely to pursue expansion and achieve higher output per employee. Sectoral differences are also evident, with production and construction firms outperforming service-oriented businesses.

Access to external finance plays a stabilising role in SME performance. Firms that secured finance were more resilient during economic downturns and more likely to maintain employment and turnover levels. However, finance was more often used to sustain operations than to drive growth, suggesting that financial support mechanisms must be better aligned with expansion objectives.

Environmental engagement is positively correlated with both growth ambition and productivity. Firms offering solutions to environmental challenges and prioritising sustainability goals tend to perform better. Nonetheless, the adoption of energy efficiency measures remains limited, and motivations are primarily economic rather than environmental. Awareness of energy-saving schemes is uneven, particularly among lower-productivity firms.

These findings underscore the need for integrated policy approaches that support SME growth, improve access to finance, and promote sustainability. Tailored interventions should address structural barriers, enhance strategic planning, and ensure that financial and environmental support mechanisms are accessible and impactful across the SME landscape.

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LIST OF ACRONYMS

EU	European Union
GFC	Global Financial Crisis, 2008
FSB	Federation of Small Business
HGF	High-growth firms
IMD	Index of Multiple Deprivation
LSBS	Longitudinal Small Business Survey
MEG	Minority Ethnic Groups
NZ	Net Zero
OECD	Organisation for Economic Co-operation and Development
ONS	Office for National Statistics
PHG	Potential High Growth (PHG)
RQ	Research Questions
SME	Small and Medium Sized Enterprises

ABSTRACT

This report investigates the determinants of SME growth and productivity in the UK, drawing on data from the Longitudinal Small Business Survey (LSBS) from 2020 to 2023. The analysis identifies three interrelated domains that significantly influence SME performance: business capacity and strategic orientation, innovation access to external finance, and environmental engagement.

Firm size, age, sector, and planning practices are strongly associated with growth ambition and productivity. Firms with employees, formal business plans, and separate premises are more likely to pursue expansion and achieve higher output per employee. Sectoral differences are also evident, with production and construction firms outperforming service-oriented businesses.

Access to external finance plays a stabilising role in SME performance. Firms that secured finance were more resilient during economic downturns and more likely to maintain employment and turnover levels. However, finance was more often used to sustain operations than to drive growth, suggesting that financial support mechanisms must be better aligned with expansion objectives.

Environmental engagement is positively correlated with both growth ambition and productivity. Firms offering solutions to environmental challenges and prioritising sustainability goals tend to perform better. Nonetheless, the adoption of energy efficiency measures remains limited, and motivations are primarily economic rather than environmental. Awareness of energy-saving schemes is uneven, particularly among lower-productivity firms.

These findings underscore the need for integrated policy approaches that support SME growth, improve access to finance, and promote sustainability. Tailored interventions should address structural barriers, enhance strategic planning, and ensure that financial and environmental support mechanisms are accessible and impactful across the SME landscape.

1. INTRODUCTION

This report investigates barriers to growth faced by SMEs, with a specific focus on distinguishing the key factors that separate low-growth from high-growth businesses. The analysis examines multiple determinants of business growth and performance, including organisational capabilities, growth ambitions, investment patterns, demand for external financing, productivity metrics and geographical location effects. Additionally, we will investigate SMEs' Net-Zero (NZ) investment levels and intentions, building on our ongoing research on the demand and supply factors affecting NZ transition (Owen 2021; Owen et al 2022,2020a-b,2019,2017; Gottschalk and Owen 2023, 2024). The findings in this report are based exclusively on the 1,350 businesses that continuously participated in the Longitudinal Small Business Survey (LSBS) from 2020 through 2023 and completed all survey rounds during this period. The use of longitudinal data across the four-year period captures the immediate effects of significant economic disruption and the subsequent recovery and organisational adaptation patterns demonstrated by UK SMEs.

1.1 Context

Since the Global Financial Crisis (GFC), UK business investment has been disrupted by multiple shocks: global disruptions including Covid-19, wars in Ukraine and the Middle East, global tariffs and domestic changes due to Brexit. SMEs are particularly vulnerable to shocks and business size is related to firm survival prospects during crises, as Miklian and Hoelscher (2022) show in an extensive literature survey. SMEs are generally less equipped to withstand and adapt to adverse conditions than larger firms, which typically have greater access to financial resources, operate across diverse sectors or markets, and benefit from economies of scale. In contrast, small businesses often lack the financial and managerial capacity to absorb shocks, have limited influence over their external environment, and face greater challenges in recovery. They are more vulnerable to closure during crises due to restricted access to credit, dependence on a narrow customer base, and insufficient preparedness for weathering disruptions.

Moreover, UK SME finance markets have evolved since the GFC. SMEs now have access to more diverse funding sources, as challenger and specialist banks exceed major UK banks in lending activity, and alternative finance forms such as asset finance, debt funds, equity, and non-bank lending have grown markedly (British Business Bank, 2024). Looking ahead, SMEs face a complex array of challenges including increasing costs, complex and changing trade barriers, an evolving digital technology landscape and mounting environment and sustainability related issues (ERC, 2024).

Although SMEs represent around 99.8% of all UK businesses, contributing approximately 60% of employment and just over half of private sector turnover, they exhibit lower investment rates and levels relative to larger firms (DBT, 2024). Enhancing SME investment is therefore critical for future productivity and living standards improvements (British Business Bank, 2025). The UK government has introduced a new pro-growth industrial strategy HMG (2024) aimed at reverting the country's historically low business investment, which has held back productivity growth, innovation and economic performance OECD (2024b). Although HMG (2024) outlined broad macroeconomic guidelines without explicitly highlighting SMEs contribution to this industrial strategy, the literature and economic policy analyses clearly indicate that SMEs are fundamental to boosting economic growth at the regional and national level (Gomes et al., 2023; Hart et al., 2021; Stoica et al., 2020; González-Loureiro and Pita-Castelo, 2012; Audretsch and Keilbach, 2004; Beck and Demircuc-Kunt, 2006).

More recently the UK government issued HMG (2025) "Backing Your Business, Our Plan for Small and Medium Sized Businesses," a strategy document setting out a long-term plan for government support for SMEs. The strategy, which places SME growth and productivity potential at its core, includes several initiatives to support business investment and long-term growth such as improved access to finance, improved business skills, reducing cost and administration burden.

1.2 Growth and Productivity

Private investment stimulates growth by expanding capabilities, enhancing efficiency, and enabling innovation while complementing public investments to improve wages and living standards (British Business Bank, 2025). Historically, the UK has recorded the lowest G7 investment levels for 24 of the past 30 years, consistently below 20% of GDP since the 1990s. Between 2010-2019, France and Germany invested 32% and 70% more than the UK, respectively, achieving superior productivity growth (OECD, 2024a). Investment barriers include prohibitive credit costs, although three quarters of UK SMEs consider their investment level to be appropriate (Bank of England, 2024), which may indicate a lack of awareness around optimal investment levels. Better-managed firms are more likely to invest and to have a higher level of investment (DBT, 2024).

1.3 External Finance and Business Support

The Covid-19 pandemic marked the start of a new macroeconomic landscape, marked by persistently higher inflation and elevated interest rates. In response to rising inflationary pressures, the Bank of England began increasing its base rate in December 2021. Since

then, SMEs have faced increasingly constrained financing conditions and heightened economic uncertainty. This has led to a notable decline in SME lending, with a shift towards smaller, short-term financing arrangements, often at the expense of longer-term investments, posing challenges for productivity and growth (OECD, 2025). In the UK lenders remain cautious about business repayment capabilities and continue to favour lending to larger, established enterprises. Consequently, smaller businesses report persistent difficulties in accessing finance (Bank of England, 2023).

1.4 Net Zero and Just Transition

Both the UK and EU are committed to becoming climate neutral by 2050. EU member states have committed to reducing emissions by a minimum of 55% below 1990 levels by 2030 (European Commission, 2024) requiring a substantial investment, estimated at an additional €477 billion annually through to 2030, (to meet the total required green investment c. €1.2 trillion p.a.) (Nerlich et al., 2025). Public and private sector finance will be required to achieve these targets. Access to finance is required for two important climate responses for firms: (1) to mitigate climate change, e.g. reducing carbon emissions and (2) to adapt to climate change so firms become resilient to the physical risks from climate change e.g. flooding, strong winds. Without timely investment in climate mitigation, climate events will intensify, increasing adaption costs (Disch and McElligott, 2025). The Climate Change Committee, in its advice to the UK government, recommended an average investment of £26 billion per year between 2025 and 2050 to achieve the Balanced Pathway, with a peak in the first half of the transition period (CCC 2025)¹.

In conclusion, since 2008 UK SMEs have faced persistent investment challenges, exacerbated by global disruptions, domestic policy shifts, and structural economic changes. Despite their significant contribution to employment and output, SMEs continue to invest at lower levels than larger firms, constrained by limited access to finance, rising costs, and macroeconomic uncertainty. While recent government strategies, such as HMG (2024) Invest 2035 and Backing Your Business, signal renewed support for SME growth, sustained improvements in productivity and resilience will depend on targeted investment, better financial access, and strategic alignment with climate and digital transitions. In particular, achieving net zero targets will require SMEs to invest in both mitigation and adaptation measures, yet many face barriers to accessing the necessary finance.

¹ Seventh Carbon Budget, 26 February 2025, page 85, <https://www.theccc.org.uk/wp-content/uploads/2025/02/The-Seventh-Carbon-Budget.pdf>

Supporting SME participation in the green transition is therefore essential to ensuring inclusive, sustainable, and long-term economic growth.

1.5 This study

This analysis presents a quantitative examination of the UK Longitudinal Small Business Survey (LSBS), covering four consecutive annual waves from 2020 to 2023. The study investigates a range of factors associated with business growth and productivity, including organisational capabilities, strategic growth intentions, investment behaviour, demand for external finance, productivity proxies, and geographical influences.

The LSBS dataset presents limitations for direct measurement of growth and productivity, as it lacks an explicit output variable necessary for calculating productivity (e.g., output per employee). As a result, proxy indicators are employed. Specifically, sales turnover over the previous 12 months and staff numbers at a given point in the year are used to construct a proxy for productivity, while firms' stated intentions to grow sales serve as a measure of growth ambition. Previous research has shown that growth intention is positively associated with subsequent increases in sales and employment, although it explains only a modest proportion of the observed variation (Levie et al., 2015; Røtnes & Madsen, 2019).

The emphasis on sales turnover is particularly relevant given that over 90% of firms in the LSBS sample employ fewer than ten people. For micro-enterprises, working capital is a critical determinant of operational sustainability and growth potential. Empirical evidence highlights that effective working capital management significantly enhances profitability and long-term performance (Taurigana & Afrifa, 2013; Afrifa & Padachi, 2016). In this context, turnover and employment-based proxies offer a valid and contextually appropriate approach to assessing growth and productivity.

Finally, the economic significance of environmental objectives is increasingly recognised. The UK Government's Invest 2035: The UK's Modern Industrial Strategy (HMG, 2024) identifies the Net Zero (NZ) transition and clean energy sectors as strategic priorities for future growth. In addition, the UK's low-carbon economy is projected to reach a market value of \$1.8 trillion² by 2050 and thus offer substantial opportunities for many of the UK's left-behind regions (HMG 2024), where SMEs are crucial to delivering NZ and a Just Transition (OECD 2023; Owen, 2021; Owen et al, 2020, 2020a, Cowling et al 2012;

² Endnote 22: "The Climate Change Committee (2017) UK business opportunities of moving to a low-carbon economy - Climate Change Committee (theccc.org.uk). This has been converted from GBP to USD following OBR assumptions on future exchange rates." HMG (2024) p. 18.

Audretsch & Dohse 2007). SMEs will play a pivotal role in delivering Net Zero outcomes and supporting a just transition across these areas. The UK's low carbon economy market size creates huge opportunities.

Building upon and extending existing research in this field, this report examines the following research questions (RQ):

RQ1: What determines differences in SME growth and productivity in terms of business characteristics, capabilities, export-orientation, future business intentions, and performance? (referencing LSBS sections A, B, C, G, J, N, P, and R)

RQ2: What are the impacts of different types of business support and of external finance on SME performance and ambition? (referencing also LSBS sections H, J, K, and P)

RQ3: Are SMEs' NZ transition objectives and future environmentally oriented business intentions related to SMEs growth and productivity? (referencing also sections D and E)

The rest of this report is structured as follows. Section 3 presents a review of the literature, Section 4 describes the methodology and Section 5 examines RQ1, RQ2 and RQ3 respectively. Section 6 presents the econometric analysis, while Section 7 discusses the findings, considering the implications for practice and government policy.

2. LITERATURE REVIEW

Business growth research, especially SME growth, has generated substantial academic interest spanning more than four decades (Wright et al., 2015). However the field remains characterised by ongoing debate and complexity and often contradictory evidence (Hart et al., 2021).

ERC research indicates that only a few UK small businesses achieve significant growth, and business growth is declining overall. This research is supported by the Office for National Statistics (ONS), whose 1998-2023 business structure database shows that while there are 400,000 more established SMEs in 2023 than in 2010, the proportion experiencing employment growth has dropped from 20% to just 13%. Factors driving business investment include: financial health, human capital levels, management practices, and growth-oriented attitudes all of which positively influence business investment decisions (ERC, 2024).

2.1 Growth and Productivity

There is considerable evidence that high-growth firms (HGFs), as defined by the OECD in 2007³, contribute significantly to employment and economic growth (Hart et al., 2021; Owen et al., 2019; Owen et al., 2022; OECD, 2021; Stel et al., 2005; Siegel et al., 1993). However, rapid growth is episodic in nature and high growth in one period does not protect against future failure in the next. Therefore, high growth cannot be considered as a firm characteristic, but rather a state that some firms undergo and temporarily experience (Brown et al., 2014). The volatile nature of growth has led to increased focus on “growth trajectories” rather than traditional static growth rate metrics (Coad et al., 2014). This approach better captures the interplay between growth and business survival and offers a more comprehensive method for evaluating how fast-growing firms contribute to employment creation and broader economic development (ERC, 2024). The new metrics outlined -below and in ERC (2024) , better reflect the episodic nature of businesses growth, and provide clear insights into associated policy issues:

- **Start-up Scalers:** New businesses reaching £1m+ turnover within three years.
- **Growth Sustainers:** Established firms (trading 3+ years) with £1-2m turnover in 2020 that scaled to £3m+ by 2023.
- **Productivity Heroes:** Established SMEs (3+ years) that simultaneously increase both revenue per employee and total headcount, with revenue growing faster than employment.

2.2 Firm Size and Age

High-growth firms (HGFs) represent a central focus of both academic research and policy development due to their critical role in driving job creation and economic growth. The relationship between firm size, age, and growth contributions became a key focus of the growth literature when David Birch’s (Birch, 1979; Birch, 1981; Birch, 1987) seminal work on job increase in the US observed that small firms operating for no more than 5 years were responsible for most of the net job creation. These findings have been subsequently validated in other contexts and across both periods of economic expansion and contraction (Mason et al., 2015; Birch, 1979; NESTA, 2009; Anyadike-Danes and Hart, 2018). This perspective contradicts Gibrat's Law (the Law of Proportionate Effect), which asserts that firm size does not influence growth rates, as companies of all sizes have equal potential for proportional growth. According to this principle, corporate growth is largely a random

³ 10+ employee enterprises with 3 consecutive years of sales growth above 20% per annum. (Eurostat-OECD Manual on Business Demography Statistics 2007)

process (Sutton, 1997). From a policy perspective, Gibrat's Law highlights the critical importance of creating an enabling business environment that provides equitable access to resources and growth opportunities across all firm sizes (Parker et al., 2024).

Haltiwanger et al. (2013) showed that once age is controlled for, the small firm advantage in job creation largely disappears. Young firms exhibit high rates of gross job creation and destruction. However Acs (2011) found that high impact firms in US, i.e., firms that experienced significant revenue growth and expanding employment growth, are on average 25 years old. The UK shows a similar pattern: although younger firms have a higher propensity for rapid growth, 70% of high-growth firms (HGFs) have been operating for five years or more (NESTA, 2009). Therefore Brown et al. (2017) contend the relevance of the assumption that HGF firms are young and small.

2.3 Sector

High-growth firms are not confined to high-technology industries, but are distributed across a wide range of sectors, (Brown et al., 2014; Bleda et al., 2013) While the concentration of attention on technology-intensive sectors reflects their visibility and symbolic importance for innovation-led growth, empirical evidence demonstrates that HGFs emerge in traditional sectors as well. Their distinguishing feature is not necessarily the sector in which they operate, but rather the degree to which they adopt innovative practices. The (NESTA, 2009) study of UK HGFs highlights that such firms are more likely to introduce new products, services, or processes, and that innovation frequently serves as a key driver of their growth. This suggests that sectoral context alone does not determine growth trajectories; rather, it is the interaction between sectoral characteristics and firm-level innovation that explains why some firms, regardless of industry, achieve rapid expansion.

2.4 Exports

Export activity demonstrates a strong association with firm growth, with extensive evidence showing that exporting firms tend to outperform their non-exporting counterparts in terms of growth rates, productivity, and resilience (Carpenter and Petersen, 2002; Rogers, 2004; Lawless and McCann, 2011). More productive firms self-select into export markets and experience further productivity gains (Ganotakis and Love, 2012). Studies on SMEs demonstrate a positive relationships between exporting and growth and innovation (Golovko and Valentini, 2011). SMEs with prior innovation experience demonstrate higher export propensity, greater export success, and enhanced growth from international activities compared to non-innovating firms, highlighting clear synergies between innovation and export activities (Love and Roper, 2015). Exposure to international markets

provides opportunities for firms to access larger customer bases, diversify revenue streams, and benefit from knowledge spillovers that can enhance competitiveness. Moreover, firms that successfully expand into export markets often develop dynamic capabilities that support sustained growth, including the ability to adapt to diverse customer demands, improve quality standards, and strengthen managerial expertise (see for instance Fernandes et al., 2025). However, while exports can provide a growth premium, entry into international markets is not without risk, as firms face challenges such as exchange rate volatility, regulatory barriers, and heightened competition. Nonetheless, the consistent association between exporting and higher growth performance underscores the importance of internationalisation in the growth trajectories of HGFs.

2.5 People, Management Quality and Practices

The role of people, management quality, and organisational practices is a critical determinant of firm growth. Human capital, in particular, constitutes a fundamental internal resource that can differentiate high-growth firms from their peers. Siegel et al. (1993) found that management's prior industry experience was a distinguishing feature of high-growth companies compared to those experiencing lower growth. More recent work also emphasises the importance of entrepreneurial motivation and leadership capabilities. Hamilton and Ng (2025) review of the literature on HGFs highlights that founder dynamics, including strategic decision-making and the ability to mobilise resources effectively, are central to capturing growth opportunities (Rees-Jones et al., 2024). Similarly, Moen et al. (2016) argue that high growth is closely linked to founder ambition and motivation, which shape firms' capacity to overcome constraints and pursue aggressive expansion strategies. Management practices, such as the adoption of performance monitoring systems, investment in workforce development, and openness to external advice, also play a pivotal role in sustaining growth (Forth & Bryson, 2019). Firms with higher management quality are more likely to build strong organisational cultures, align human resources with strategic objectives, and adapt effectively to changing market conditions. Taken together, these studies reinforce the view that while external factors such as sectoral opportunities and access to international markets influence growth, internal resources – particularly human capital and management capabilities – are equally decisive in shaping which firms are able to achieve and sustain high growth.

2.6 Access to Finance Business Support

SME growth can be constrained by limited access to financial resources arising from imperfections in capital market allocations (Cressy, 2002; Cowling et al., 2012).

Theoretically supply-side failures for business seeking external finance is largely due to information asymmetries between the providers of finance and the firm seeking finance, which makes effective due diligence prohibitively expensive for relatively smaller loans and contributes to the associated problems of adverse selection, moral hazard and agency failure (Carpenter and Petersen, 2002; Jensen and Meckling, 1976) and can lead to supply-side failure to fund viable SMEs (Owen et al., 2023; North et al., 2010). The pecking order theory (Myers and Majluf, 1984) suggests that firms prefer internal financing over external sources due to information asymmetries and associated costs. This preference is relevant to smaller firms that often lack access to public capital markets. Financial constraints are particularly binding for smaller firms, limiting their ability to pursue growth opportunities (Beck et al., 2005). Reliance on internal funding can constrain the SME growth (Carpenter and Petersen, 2002) and may result in firms delaying investment decisions (Brown and Lee, 2019).

Several studies suggest that potential high growth (PHG) SMEs suffer from access to finance barriers, due to a variety of demand and supply-side factors such as information asymmetries between innovative businesses and financiers, pecking order preferences, knowledge deficiencies of SME managers and advisors and the suitability and cost of available finance (Owen et al., 2020b; Owen et al., 2019; Owen et al., 2017; Baldock, 2016; Baldock and Mason, 2015; Lee et al., 2015; Cowling et al., 2012; Beck and Demirguc-Kunt, 2006; Mole et al., 2017; Gottschalk and Owen, 2023).

Recent work on the factors influencing both the supply and demand for external finance by SMEs has shown that non-bank debt and alternative providers are stepping in to reduce the funding gap for bank rejected borrowers, without fully replacing bank and government funding (McGeown et al., 2025; Owen et al., 2022; Owen et al., 2017; Owen et al., 2020b; Owen et al., 2020a; Cowling and Liu, 2021; Gottschalk and Owen, 2023; Gottschalk et al., 2024).

Cowling and Wilson (2025), researching UK firm investment decisions found that nearly 59% of companies achieved payback periods of three years or less. Smaller firms demonstrated the strongest preference for shorter payback periods, reflecting how financial constraints make cash flow preservation crucial and shorter paybacks reduce uncertainty. Reduction in uncertainty is important as post-GFC uncertainty contributed to investment collapse (Melolinnä et al., 2018).

Brown et al. (2024) examined how day-to-day and strategic advice affected innovation and productivity in UK SMEs. Findings show firms using external advice achieved on average 22.1% higher labour productivity compared to non-users, indicating that strategic advice

appears important for unlocking the innovative potential of firms which then ultimately leads to productivity enhancing behaviours. There is substantial evidence for SME support improving performance, as shown in Cravo and Piza (2019)' s meta-analysis. However, making the link between support and successful access to finance and growth performance is more complex. Our previous research suggested that timing and quality of advice is crucial, as advice to access finance often comes too late, or is required by poorer cases.

2.7 Net Zero and Just Transition

SMEs have a significant aggregate environmental footprint. Across OECD countries SMEs account for 40% of industrial pollution, commercial waste and greenhouse gas emissions (Wildnerova et al., 2024) and will play a key role in addressing the climate crisis and achieving net zero targets. While their smaller size and simpler organisational structures enable faster implementation of environmental initiatives compared to larger corporations (Wiesner et al., 2018) research on SME engagement in and funding of sustainability practices remains limited (Wildnerova et al., 2024).

The literature emphasises the public sector's critical role in encouraging environmental practices adoption (Cowling and Liu, 2021). The motivations for SMEs to engage in environmental actions are multifaceted. Key drivers include regulatory compliance, cost savings, competitive advantage, and corporate social responsibility (CSR) (Arend, 2014). Even in the UK, where SMEs are not subject to direct environmental reporting requirements, regulatory compliance often serves as a baseline motivation, ensuring that firms meet legal requirements, as shown in Williamson et al., (2006). SME environmental practices and environmental innovation markets are interrelated, with well-designed policies stimulating both environmental adoption (Mukherjee et al., 2024) and cleantech market development, therefore understanding SME motivations for environmental actions helps explore demand-pull versus regulatory push-pull dynamics (Cowling and Liu, 2021; Owen and Vedanthachari, 2022).

Recent geo-political uncertainty and related increase in energy costs have increased the urgency for the green transition of SME firms (Chen et al., 2024). However, the green transition needs a strong business case and access to finance. Economic uncertainty may make it increasingly difficult to access external funding (Freel et al., 2012; Mac an Bhaird et al., 2016; Harrison et al., 2022; Chen et al., 2024). Consequently, improving SME access to sustainable finance has become an important policy issue (e.g., EU 2021 Strategy for Financing the Transition to a Sustainable Economy).

Chen et al. (2024) found that energy-efficient UK firms (2015-2021) experienced fewer credit constraints. Cowling and Liu (2021) found evidence that UK SMEs engaging with clean technologies have higher external capital demand, but traditional providers do not fully meet these needs, forcing firms toward alternative and non-traditional sources of finance, primarily direct government subsidies or guaranteed loans. Growing evidence suggests environmental practices benefit firm growth (Dechezleprêtre and Kruse, 2018), improving economic performance through increased revenue or reduced production costs. Green SMEs demonstrate higher productivity, wages, and sales growth than non-greening counterparts. However, establishing causality between growth and greening is complicated by unobserved factors like management practices that may drive both outcomes (Wildnerova et al., 2024). Our previous analysis of the LSBS 2021 survey highlighted a key causality question for SMEs: do they adopt green practices because they can afford to, suggesting that strong performance enables going green, or does going green itself lead to improved performance, and if so, with what time lag? Our findings indicate that it is primarily the larger, better-performing SMEs that are embracing green initiatives, while smaller, less well-resourced firms are less likely to do so (Gotschalk and Owen 2023, Gotschalk, Owen and Coban 2024). Ferrando et al. (2023) report half of the firms surveyed in the EU 2023 SAFE survey stated that they consider their environmental investments sufficient to mitigate their negative climate impact. High financing costs, insufficient public subsidies and environmental reporting cost were cited as deterrents to access to climate related finance and were greater for SME firms. The survey shows that public loan guarantees and private sector funds play a key role in financing and accelerating the transition to a green economy. In the UK matching grants and loans with loans operating through private sector to support the ETL also encouraged blended financing. Furthermore, green loans have become an essential part in governments' green policy mix, often alongside other green policy interventions (e.g., subsidy schemes for green technology adoption) (Mukherjee et al., 2024).

Wildnerova et al. (2024) found that one-third of SMEs are environmentally engaged, with considerable variations by size, age and country. Larger and older SMEs were more likely to be environmentally engaged (50% of medium-sized firms vs 10% micro firms), although some firms were "born green." The gap between small and larger firms likely reflects that environmental initiatives require long-term investment and strategies that are proportionately costlier for smaller firms with fewer resources, skills, and environmental awareness. Solar energy is the most cited action among greening SMEs, followed by recycling and energy efficiency.

The drivers for SME investment in sustainability driven by value chain participation, finance access, and competitiveness requirements. However, SMEs face significant barriers to sustainability investment: high upfront costs with uncertain long-term returns, regulatory and technology changes, and knowledge gaps around net zero pathways and financing options (OECD, 2022b). Access to finance is further hindered by SMEs' lack of ownership of premises and constraints that limit their ability to invest in property and other real estate assets (Wu et al, 2007, Camison et al 2022, Owen et al., 2019, 2022, Gottschalk and Owen 2023, Gottschalk, Owen and Coban 2024). Governments have an important role to play in crowding in private sector financing for the SME green transition through credit guarantees for sustainability linked lending to accelerate SME net zero transition.

In conclusion, the literature indicates that future debates on SME growth must increasingly situate productivity and sustainability as interlinked priorities. While high-growth firms make a disproportionate contribution to employment and economic performance, their episodic growth trajectories mean that long-term prosperity relies on embedding productivity-enhancing practices across a wider base of firms. Evidence shows that firms investing in innovation, management quality, and human capital tend to achieve stronger productivity outcomes, and these same factors underpin the capacity to adapt to the demands of the net zero transition. The shift towards a low-carbon economy requires SMEs not only to decarbonise their operations but also to develop new products, services, and processes that contribute to green growth. As research demonstrates, environmentally engaged SMEs often achieve higher productivity, wages, and sales growth than their non-greening counterparts, suggesting that the pursuit of net zero can align with and reinforce productivity gains. Yet, persistent barriers such as high financing costs, information asymmetries, and knowledge gaps risk excluding smaller firms from these opportunities. Addressing these challenges will require integrated policy approaches that combine productivity support measures with sustainable finance instruments, thereby enabling SMEs to become both engines of economic growth and key actors in the just transition to net zero. Moreover, as highlighted in the UK Transition Task Force and City of London, improving access to finance for Net Zero transition will require a suitable policy mix of initiatives aimed at financing the activities needed to make credible transition strategies viable and financing businesses with a credible transition strategy⁴.

⁴ <https://www.theglobalcity.uk/PositiveWebsite/media/Research-reports/Scaling-Transition-Finance-Report.pdf>

3. METHODOLOGY

The first stage of the research involves an analysis of data of the ninth wave of the UK Longitudinal Small Business Survey recently published by the Department for Business and Trade (DBT, 2025). This report will focus on the panel of 1,350 businesses from across the UK that have taken part in all 4 waves of the LSBS conducted during between 2020 and 2023. In order to address the research question on SMEs' NZ transition objectives and future environmentally oriented business intentions, the survey responses of Cohorts A and C will also be analysed. In order to minimise the length of the survey, the DBT created three cohorts (A, B and C), which were each exclusively asked a series of non-key questions. For example, only cohort A was asked questions on business energy usage. Cohorts were chosen for respondents at random during their interview. There were approximately 3,200 employers in each 2023 cohort: 3,230 in cohort A, 3,216 in cohort B and 3,214 in cohort C. Each respondent is part of one cohort only (DBT 2024c). The initial phase of the methodological approach consists of a preliminary descriptive analysis with a particular emphasis on productivity and growth ambitions. The objective is to identify and characterise business attributes of productive SMEs that aim to grow sales. These descriptive insights will serve as a foundation for addressing the research questions delineated in the Introduction. These descriptive insights will inform an econometric study of the determinants of productivity growth of SMEs in the UK.

4. ANALYSIS AND FINDINGS

This section presents the analysis for each research question, drawing on relevant indicators from the LSBS survey. As the dataset does not include direct measures of investment intentions or actual investment amounts, the analysis focuses on proxy variables that reflect growth ambition, such as businesses' stated aims to increase sales and efforts to increase productivity, e.g., the provision of staff training. Additionally, the analysis explores how environmentally oriented decisions, such as sustainability practices, interact with sales and productivity outcomes, offering insight into the relationship between green strategies and business performance. In all tables in this section the subscript letters indicate which groups within each characteristic category (e.g., firm size, sector, age, region) have column proportions that do not differ significantly from each other at the 0.05 significance level. This means that if two or more categories share the same subscript letter within a column, their proportions are statistically similar at the 5% confidence level.

4.1 RQ1: Determinants of SME growth and productivity

4.1.1 Sales growth

Tables 5.1 to 5.4 present a cross-tabulation of business characteristics against their stated aim to grow sales across four survey waves between 2020 and 2023. Regional, management and ownership characteristics present an overall picture of a gradual decline in SME sales growth ambitions during the sample period.

In 2020, 741 firms stated they aimed to grow sales compared with 450 who did not. By 2021, the number of affirmative responses rose to 798, but the count of firms not seeking to grow sales also increased sharply to 704. This expansion in both groups may reflect the mixed impact of government initiatives targeted to support business activity during the Covid-19 lockdown (March 2020–March 2021)⁵, e.g., “Eat out to help out”, VAT rate cut, business rates relief, which were limited to 2020-2021. In 2022 the number of firms aiming to grow sales declined to 723, while the number of those without growth ambitions also fell to 647. The following year this trend continued: only 650 firms stated they aimed to grow sales, while the number of firms reporting no growth ambitions rose further to 700. Overall, between 2020 and 2023, the LSBS surveys indicate a clear negative outlook with the count of businesses aiming to grow sales falling steadily, with the exception of the Covid-19 pandemic year.

Examining business characteristics reveals distinct behaviours. Among firms with no employees, the “yes” responses fell from 482 in 2020 to 403 in 2023, while “no” responses rose markedly from 376 to 585. A similar but less pronounced pattern is observed among micro-businesses (1–9 employees), where affirmative counts remained stable around 203–224, but negative responses rose from 67 in 2020 to 108 in 2023. These differences are significant at 5 percent confidence level. Among small employers (10-49) the number of firms aiming for growth in 2020 and 2021 is significantly higher than those not aiming for growth, both statistically (<0.05) and in magnitude. However, the number of firms in each category remained stable between 2020 and 2023, suggesting that the Covid-19 disruption and inflationary pressures in 2022 did not affect the growth ambitions of small employers. Larger firms (50–249 employees) displayed much smaller changes over the sample period. However, the counts were very low, and differences not statistically significant (Tables 5.3 and 5.4).

⁵ <https://www.instituteforgovernment.org.uk/sites/default/files/timeline-lockdown-web.pdf>

Sectoral patterns reinforce these findings. In business services, the number of firms with growth ambitions remained high, rising slightly from 296 in 2020 to 252 in 2023 (<0.05), but the number of firms without growth ambitions rose more substantially from 176 to 314, suggesting greater hesitation even within a relatively growth-oriented sector. In production and construction, the decline was sharper, with positive responses falling from 176 in 2020 to 158 in 2023 (<0.05). Government support for hospitality had a mixed impact (GHI sector). Although the number of firms aiming for sales in the growth increasing from 153 in 2020 to 175 in 2021, the counts of SMEs not aiming for sales growth also rose (<0.05).

Age also matters, as older businesses show a notable increase in “no” answers. Among firms over 20 years old, the count of those not seeking to grow rose from 233 in 2020 to 423 in 2023, while positive answers fell from 335 to 294 (<0.05). By contrast, younger firms (0-5 years) remained more likely to pursue growth in 2020-2021, although their absolute numbers are smaller (total around 60 in both years). By 2022-2023, the number of new firms had dropped markedly to a total of 23 in 2022 and 9 in 2023.

Altogether, the data show a gradual but consistent weakening of sales growth ambitions between 2020 and 2023. The decline is mostly among sole traders and longer-established businesses. While some sectors and firm sizes retained relatively stable growth aspirations, the overall trend is characterised by a fall in positive outlook and a steady rise in negative prospects. These findings indicate that SME growth ambitions had dampened down in the aftermath of the pandemic and into the more uncertain economic climate of 2022-2023, which was marked by inflationary pressures until October 2022⁶.

Looking at regional and ownership dimensions, the data indicate a clear downward trajectory in growth ambitions. The decline is evident not only in aggregate totals but also across geographic areas, family ownership structures, women-led and MEG-led enterprises, and deprived locations. The pattern is consistent: “yes” counts decrease while “no” counts increase, underscoring a broader retreat from sales growth ambitions that cuts across firm characteristics. This suggests that the dampening of SME growth appetite between 2020 and 2023 was widespread, not confined to any one type of business or region, though it appears particularly pronounced among older firms, sole traders, family-owned and women-led businesses, and those in disadvantaged areas.

Location and deprivation status also mattered. Urban firms were consistently more growth-oriented, with 515 “yes” responses in 2020 compared with 214 in rural areas. Yet both

⁶ <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/l55o/mm23>

declined by 2023, with urban “yes” answers at 451 and rural at 199, while “no” responses in both locations rose substantially. For firms located in the most deprived 15% of the country, the number seeking growth fell from 51 in 2020 to 40 in 2023, while “no” responses more than doubled from 16 to 38, suggesting a disproportionate weakening of ambition in disadvantaged areas.

Regionally, Southern England (London, South-East and East of England) consistently contributed the largest share of firms aiming to grow, with 306 positive responses in 2020 and 317 in 2021, although this fell to 250 by 2023. At the same time, negative responses in Southern England rose from 144 in 2020 to 286 in 2023, marking a reversal in the regional outlook. A similar trend can be seen in the Midlands+ (East and West Midlands and South-West England), where positive responses remained relatively stable at 223 in 2020 and 226 in 2023, but “no” responses climbed from 171 to 206. In Northern England (North and Yorkshire and the Humber), growth ambitions fell from 147 in 2021 to 101 in 2023, while negative responses rose from 92 in 2020 to 133 in 2023. The Devolved Nations (Northern Ireland, Scotland, and Wales), though smaller in numbers, also exhibited a contraction in growth ambition, with “yes” responses declining from 100 in 2020 to 73 in 2023, while “no” responses grew modestly from 43 to 74. In all regions, therefore, the count of firms aiming to grow declined while the number of those without growth ambitions increased, with the South experiencing the sharpest reversal.

Ownership patterns add further insight. Family-owned businesses were consistently more likely to aim for growth, yet the count of “yes” responses declined from 622 in 2020 to 512 in 2023, while “no” responses increased from 426 to 653. Non-family businesses were fewer in number but also shifted, with “yes” responses broadly stable (118 in 2020 versus 138 in 2021, though declining later) while “no” answers rose.

Similarly, gender leadership shows a modest difference between growth and non-growth firms (<0.05), but a contractionary trend: in 2020, 143 woman-led businesses aimed to grow, but by 2023 this number had fallen to 109, while negative responses increased from 68 to 153. In 2023, woman-led businesses comprised 17 percent (N=109) of those firms aiming to grow sales and 22 percent (N=153) of those not aiming to grow. This slight disparity may reflect broader structural or cultural barriers that influence growth ambitions among woman-led enterprises, although the overall representation remains relatively balanced across both category of firms.

Among MEG-led firms, the total numbers are small, and may not be representative, but the direction is clear. In 2020, 22 businesses aimed to grow compared with 7 that did not, whereas by 2023 only 9 aimed to grow while 27 reported no growth ambitions. Minority

ethnic group (MEG)-led businesses are notably underrepresented among those aiming to grow sales, accounting for only 1 percent (N=9) compared to 4 percent (N=27) among those not aiming to grow. Even though the difference is statistically significant, the counts are too low to be representative. This underrepresentation among growth-ambitious firms suggests potential systemic challenges or resource constraints that disproportionately affect MEG-led firms, limiting their capacity or inclination to pursue expansion strategies.

Having and maintaining a business plan plays a significant role in an SME's growth ambition. Among growth orientated firms, 27 percent (N=175) maintain an up-to-date business plan in 2023 compared to only 11 percent (N=80) of non-growth firms. In contrast, SMEs without any business plan constitute the majority (77 percent, N=535) of those not aiming to grow, compared to 65 percent (N=421) of growth orientated firms. All differences are significant at 5 percent. This pattern underscores the importance of strategic planning in fostering growth-oriented behaviour (Brown et al., 2024).

Operating from separate business premises shows strong association with growth ambitions. Among businesses expressing growth ambitions, 50 percent (N=327) operate from separate premises, compared to just 32 percent (N=224) of those firms not aiming to grow (<0.05). This finding aligns with existing empirical literature, which highlights that ownership of premises, while distinct from merely having separate premises (non-current tangible asset), is a significant factor in securing access to finance (Mac an Bhaird and Lucey, 2010; Heyman et al., 2008) and, by extension, facilitating business.

Profitability in the past 12 months shows a slight but statistically significant difference. While profitable businesses represented 78 percent (N=507) of growth-oriented firms, they comprised a higher 83 percent (N=582) non-growth firms. Interestingly, a higher proportion (21 percent, N=135) of businesses aiming to grow reported not making a profit compared to those not aiming to grow (16 percent, N=112). This suggests that firms experiencing financial pressure may be more inclined to pursue growth as a strategic response to improve performance. However, this growth-through-adversity approach may present challenges, as recent research indicates that initial profitability is more critical than initial growth for achieving sustained high performance (Mansikkamäki, 2023). This dynamic creates potential financing challenges, as traditional bank lending typically prioritises profitability (as a proxy for repayment capacity) in credit assessments. Consequently, approximately one-fifth of growth-oriented firms may face restricted access to conventional funding sources. These findings underscore the critical importance of SME-bank relationships and highlight the growing role of intermediaries and brokers as SME funding

markets continue to diversify and evolve beyond traditional lending model (Gottschalk et al., 2024).

Overall, the evidence in Tables 5.1 to 5.4 suggests a marked deterioration of SME sales growth ambitions between 2020 and 2023, with a steady decline in the number of firms expressing an intention to expand and a corresponding rise in those reporting no such ambition. This trend is observable across regions, ownership structures, and firm characteristics, indicating that it reflects a broad-based shift in sentiment rather than an isolated development. While micro-to medium-sized, and younger, firms retained relatively stronger growth aspirations, the contraction was particularly visible among sole traders, long-established businesses, family-owned and women-led enterprises, and firms located in disadvantaged areas. The regional pattern further underscores this weakening outlook, with Southern England and the Devolved Nations registering especially pronounced reversals. Taken together, these results point to a widespread retreat from growth ambitions among UK SMEs, shaped by a climate of heightened uncertainty and more cautious strategic orientations in the post-pandemic period.

Table 0-1 Firm characteristics and aim to grow sales – 2020-2021

R1. Aim to grow sales. (2020)				R1. Aim to grow sales. (2021)		
	Yes	No	Total	Yes	No	Total
A2. Number of employees (Grouped)(2020)				A2. Number of employees. (2021)		
No employees	Count 482 _a	376 _b	858	Count 533 _a	608 _b	1141
	% 65.0%	83.6%	72.0%	% 66.8%	86.4%	76.0%
Micro 1 - 9	Count 217 _a	67 _b	284	Count 224 _a	89 _b	313
	% 29.3%	14.9%	23.8%	% 28.1%	12.6%	20.8%
Small 10 - 49	Count 38 _a	6 _b	44	Count 36 _a	6 _b	42
	% 5.1%	1.3%	3.7%	% 4.5%	0.9%	2.8%
Medium 50 - 249	Count 4 _a	1 _a	5	Count 5 _a	1 _a	6
	% 0.5%	0.2%	0.4%	% 0.6%	0.1%	0.4%
Total	Count 741	450	1191	Count 798	704	1502
A3/A4. Broad sector (2020)				A3/A4. Broad sector (2021)		
ABCDEF - Production and construction	Count 176 _a	140 _b	316	Count 220 _a	217 _a	437
	% 23.7%	31.1%	26.5%	% 27.6%	30.9%	29.1%
GHI - Transport, retail and food service/ accommodation	Count 153 _a	47 _b	200	Count 175 _a	76 _b	251
	% 20.6%	10.4%	16.8%	% 21.9%	10.8%	16.7%
JKLMN - Business services	Count 296 _a	176 _a	472	Count 295 _a	284 _a	579
	% 39.8%	39.1%	39.6%	% 37.0%	40.4%	38.6%
PQRS - Other services	Count 118 _a	87 _a	205	Count 108 _a	126 _b	234
	% 15.9%	19.3%	17.2%	% 13.5%	17.9%	15.6%
Total	Count 743	450	1193	Count 798	703	1501
A6. Age of business - summary (2020)				A6. Age of business - summary (2021)		
0 - 5 years	Count 48 _a	8 _b	56	Count 51 _a	8 _b	59
	% 6.5%	1.8%	4.7%	% 6.4%	1.1%	3.9%
6 - 10 years	Count 101 _a	51 _a	152	Count 108 _a	63 _b	171
	% 13.6%	11.4%	12.8%	% 13.6%	9.0%	11.4%
11 - 20 years	Count 257 _a	157 _a	414	Count 288 _a	251 _a	539
	% 34.6%	35.0%	34.8%	% 36.1%	35.7%	35.9%
More than 20 years	Count 335 _a	233 _b	568	Count 348 _a	381 _b	729
	% 45.1%	51.9%	47.7%	% 43.7%	54.2%	48.6%
Total	Count 742	449	1191	Count 797	703	1500
Regions combined				Regions combined		
Southern England	Count 306 _a	144 _b	450	Count 317 _a	241 _b	558
	% 41.2%	32.0%	37.7%	% 39.7%	34.3%	37.2%
Midlands+	Count 223 _a	171 _b	394	Count 234 _a	263 _b	497
	% 30.0%	38.0%	33.0%	% 29.3%	37.4%	33.1%
Northern England	Count 114 _a	92 _b	206	Count 147 _a	130 _a	277
	% 15.3%	20.4%	17.3%	% 18.4%	18.5%	18.5%
Devolved Nations	Count 100 _a	43 _b	143	Count 100 _a	69 _a	169
	% 13.5%	9.6%	12.0%	% 12.5%	9.8%	11.3%
Total	Count 743	450	1193	Count 798	703	1501

Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-2 SME management characteristics and aim to grow sales – 2020-2021

R1. Aim to grow sales. (2020)					R1. Aim to grow sales. (2021)				
Urban/rural (2020)		Yes	No	Total	urban/rural (2021)		Yes	No	Total
Urban	Count	515a	287a	802	Count	552a	458a	1010	
	%	69%	64%	67%	%	69%	65%	67%	
Rural	Count	214a	158b	372	Count	229a	244b	473	
	%	29%	35%	31%	%	29%	35%	32%	
Total	Count	743	448	1191	Count	797	703	1500	
Businesses located in the most deprived 15% of the country (2020)					Businesses located in the most deprived 15% of the country (2021)				
Yes	Count	51a	16b	67	Count	65a	18b	83	
	%	7%	4%	6%	%	8%	3%	6%	
Total	Count	743	449	1192	Count	797	704	1501	
A10. Whether have separate business premises. (2020)					A10. Whether have separate business premises. (2021)				
Yes	Count	421a	213b	634	Count	375a	186b	561	
	%	57%	47%	53%	%	47%	26%	37%	
Total	Count	743	449	1192	Count	797	703	1500	
A12. Is your business a family owned (2020)					A12. Is your business a family-owned (2021)				
Yes	Count	622a	426b	1048	Count	669a	667b	1336	
	%	84%	95%	88%	%	84%	95%	89%	
Total	Count	743	449	1192	Count	797	704	1501	
A17/A2A. Total number of directors and partners. (2020)					A17/A11. Total number of directors and partners. (2021)				
0	Count	24a	8a	32	Count	35a	5b	40	
	%	3%	2%	3%	%	4%	1%	3%	
1	Count	375a	308b	683	Count	415a	505b	920	
	%	50%	69%	57%	%	52%	72%	61%	
2	Count	217a	112a	329	Count	217a	150b	367	
	%	29%	25%	28%	%	27%	21%	24%	
3-5	Count	101a	16b	117	Count	104a	32b	136	
	%	14%	4%	10%	%	13%	5%	9%	
6-10	Count	21a	5b	26	Count	21a	12a	33	
	%	3%	1%	2%	%	3%	2%	2%	
Total	Count	743	449	1192	Count	797	704	1501	
Whether business is women-led (2020)					Whether business is women-led (2021)				
Yes	Count	143a	68a	211	Count	142a	129a	271	
	%	19%	15%	18%	%	18%	18%	18%	
Total	Count	742	450	1192	Count	797	703	1500	
Whether business is MEG-led (2020)					Whether business is MEG-led (2021)				
Yes	Count	22a	7a	29	Count	18a	11a	29	
	%	3%	2%	2%	%	2%	2%	2%	
Total	Count	743	449	1192	Count	797	703	1500	
F5. Do you have a formal written business plan? (2020)					F5. Do you have a formal written business plan? (2021)				
Yes - kept up to date	Count	172a	54b	226	Count	172a	43b	215	
	%	23%	12%	19%	%	22%	6%	14%	
Yes - but not kept up to date	Count	48a	35a	83	Count	80a	53a	133	
	%	6%	8%	7%	%	10%	8%	9%	
No	Count	518a	361b	879	Count	542a	607b	1149	
	%	70%	80%	74%	%	68%	86%	77%	
Total	Count	742	450	1192	Count	796	703	1499	
P12. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2020)					D11. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2021)				
Yes	Count	485a	332b	817	Count	573a	578b	1151	
	%	65%	74%	69%	%	72%	82%	77%	
Total	Count	743	448	1191	Count	797	703	1500	

Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-3 Firm characteristics and aim to grow sales – 2022-2023

R1. Aim to grow sales. (2022)					R1. Aim to grow sales. (2023)			
A2. Number of employees. (2022)					A2. Number of employees. (2023)			
		Yes	No	Total		Yes	No	Total
No employees	Count	478 _a	529 _b	1007	Count	403 _a	585 _b	988
	%	66%	82%	74%	%	62%	84%	73%
Micro 1 - 9	Count	203 _a	113 _b	316	Count	204 _a	108 _b	312
	%	28%	17%	23%	%	31%	15%	23%
Small 10 - 49	Count	36 _a	4 _b	40	Count	36 _a	6 _b	42
	%	5%	1%	3%	%	6%	1%	3%
Medium 50 - 249	Count	6 _a	1 _a	7	Count	7 _a	1 _b	8
	%	1%	0%	1%	%	1%	0%	1%
Total	Count	723	647	1370	Count	650	700	1350
A3/A4. Broad sector. (2022)					A3/A4. Broad sector. (2023)			
ABCDEF - Production and construction	Count	189 _a	187 _a	376	Count	158 _a	162 _a	320
	%	26%	29%	27%	%	24	23	24
GHI - Transport, retail and food service/ accommodation	Count	137 _a	80 _b	217	Count	125 _a	68 _b	193
	%	19%	12%	16%	%	19	10	14
JKLMN - Business services	Count	251 _a	251 _a	502	Count	252 _a	314 _b	566
	%	35%	39%	37%	%	39	45	42
PQRS - Other services	Count	146 _a	128 _a	274	Count	115 _a	155 _b	270
	%	20%	20%	20%	%	18	22	20
Total	Count	723	646	1369	Count	650	699	1349
A6. Age of business - summary. (2022)					A6. Age of business - summary. (2023)			
0 - 5 years	Count	15 _a	8 _a	23	Count	7 _a	2 _a	9
	%	2%	1%	2%	%	1%	0%	1%
6 - 10 years	Count	86 _a	56 _b	142	Count	83 _a	56 _b	139
	%	12%	9%	10%	%	13%	8%	10%
11 - 20 years	Count	269 _a	219 _a	488	Count	266 _a	219 _b	485
	%	37%	34%	36%	%	41%	31%	36%
More than 20 years	Count	351 _a	363 _b	714	Count	294 _a	423 _b	717
	%	49%	56%	52%	%	45%	60%	53%
	Count	722	646	1368	Count	651	700	1351
regions combined					regions combined			
Southern England	Count	314 _a	226 _b	540	Count	250 _a	286 _a	536
	%	43%	35%	39%	%	38%	41%	40%
Midlands+	Count	203 _a	236 _b	439	Count	226 _a	206 _b	432
	%	28%	37%	32%	%	35%	29%	32%
Northern England	Count	119 _a	112 _a	231	Count	101 _a	133 _a	234
	%	16%	17%	17%	%	16%	19%	17%
Devolved Nations	Count	86 _a	72 _a	158	Count	73 _a	74 _a	147
	%	12%	11%	12%	%	11%	11%	11%
Total	Count	722	646	1368	Count	650	699	1349

Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-4 SME management characteristics and aim to grow sales – 2022-2023

R1. Aim to grow sales. (2022)					R1. Aim to grow sales. (2023)				
		Yes	No	Total			Yes	No	Total
urban/rural (2022)					urban/rural (2023)				
Urban	Count	514 _a	425 _b	939	Count	451 _a	485 _a		936
	%	71%	66%	69%	%	69%	69%		69%
Rural	Count	202 _a	216 _b	418	Count	199 _a	215 _a		414
	%	28%	33%	31%	%	31%	31%		31%
Total	Count	721	646	1367	Count	651	700		1351
Businesses located in the most deprived 15% of the country (2022)					Businesses located in the most deprived 15% of the country (2023)				
Yes	Count	58 _a	25 _b	83	Count	40 _a	38 _a		78
	%	8%	4%	6%	%	6%	5%		6%
Total	Count	721	646	1367	Count	651	700		1351
A10. Whether have separate business premises. (2022)					A10. Whether have separate business premises. (2023)				
Yes	Count	383 _a	164 _b	547	Count	327 _a	224 _b		551
	%	53%	25%	40%	%	50%	32%		41%
Total	Count	722	646	1368	Count	650	700		1350
A12. Is your establishment family-owned? (2022)					A12. Is your business a family-owned business (2023)				
Yes	Count	585 _a	617 _b	1202	Count	512 _a	653 _b		1165
	%	81%	96%	88%	%	79%	93%		86%
Total	Count	723	646	1369	Count	650	699		1349
A17/A11. Total number of directors and partners. (2022)					A17/A11. Total number of directors and partners. (2023)				
0	Count	38 _a	4 _b	42	Count	39 _a	16 _b		55
	%	5%	1%	3%	%	6%	2%		4%
1	Count	387 _a	457 _b	844	Count	342 _a	488 _b		830
	%	54%	71%	62%	%	52%	70%		61%
2	Count	199 _a	139 _b	338	Count	155 _a	156 _a		311
	%	28%	22%	25%	%	24%	22%		23%
3-5	Count	71 _a	40 _b	111	Count	86 _a	37 _b		123
	%	10%	6%	8%	%	13%	5%		9%
6-10	Count	21 _a	6 _b	27	Count	22 _a	3 _b		25
	%	3%	1%	2%	%	3%	0%		2%
Total	Count	722	646	1368	Count	652	700		1352
Whether business is women-led (2022)					Whether business is women-led (2023)				
Yes	Count	119 _a	124 _a	243	Count	109 _a	153 _b		262
	%	16%	19%	18%	%	17%	22%		19%
Total	Count	722	647	1369	Count	651	699		1350
Whether business is MEG-led (2022)					Whether business is MEG-led (2023)				
Yes	Count	17 _a	10 _a	27	Count	9 _a	27 _b		36
	%	2%	2%	2%	%	1%	4%		3%
Total	Count	721	646	1367	Count	650	700		1350
F5. Do you have a formal written business plan? (2022)					F5. Do you have a formal written business plan? (2023)				
Yes - kept up to date	Count	158 _a	77 _b	235	Count	175 _a	80 _b		255
	%	22%	12%	17%	%	27%	11%		19%
Yes - but not kept up to date	Count	67 _a	21 _b	88	Count	52 _a	84 _b		136
	%	9%	3%	6%	%	8%	12%		10%
No	Count	492 _a	548 _b	1040	Count	421 _a	535 _b		956
	%	68%	85%	76%	%	65%	77%		71%
Total	Count	722	646	1368	Count	651	699		1350
D11. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2022)					P12. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2023)				
Yes	Count	602 _a	562 _a	1164	Count	507 _a	582 _b		1089
	%	83%	87%	85%	%	78%	83%		81%
Total	Count	722	646	1368	Count	651	699		1350

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

4.1.2 Defining Labour Productivity in the LSBS dataset

Labour productivity is commonly defined as the ratio of output to the number of hours worked. Since there is no output variable in the LSBS dataset, for each SME, productivity was computed as the ratio of its annual sales turnover to the reported employment size in the current year. As a result, negative productivity values in the dataset can arise when SMEs report negative turnover. As shown in Table 5.3 the number of such firms is minimal and often zero. For instance, no SME employing between 10 and 249 staff reports negative turnover (Tables 5.4 and 5.6). The highest observed count of firms with negative turnover, and thus negative productivity, is 24, indicating that this phenomenon is rare and concentrated among the smallest businesses. To calculate cross-tabulations, the productivity variable was recoded into a categorical variable. For 2023, 2022, and 2021, the change in productivity is defined as: $\frac{Prod_t - Prod_{(t-1)}}{Prod_{(t-1)}}$.

4.1.3 Firm characteristics and productivity

Tables 5.6 to 5.13 present a distribution of firm productivity, measured in pounds sterling (£), across various firm characteristics including size, sector, age, region, and location over the sample period 2020-2023. The productivity bands range from negative or zero productivity (-£999 to £0) to high productivity (£50K+), with weighted column percentages indicating the proportion of firms within each category.

Overall, firm size, sectoral orientation (particularly business services and production), firm age, regional, urban location and profitability dominate higher performance categories. Smaller, younger firms tend to exhibit lower productivity, while larger, older firms and those in production-oriented sectors perform better. Additionally, firms in deprived areas, women-led or minority ethnic group-led, and those lacking formal business plans tend to cluster in lower productivity ranges. While the general distribution remains stable over the sample period, there were gradual improvements in productivity among micro and small enterprises, older firms, and urban-based businesses.

Table 0-5: Productivity 2023 (summary) in £

£	Frequency	Percent%
-999 to 0	24	1.8%
0 to 999	1	0.1%
1K to 9K	97	7.2%
10K to 49K	442	32.8%
50k+	650	48.2%
Total	1215	90.0%
Missing	135	10.0%
Total	1350	100.0%

Source: Authors own analysis using data from the LSBS 2020 to 2023.

The Covid-19 lockdown had a clear negative impact on productivity. Across the four-year period from 2020 to 2023, the number of businesses in the two lowest productivity brackets rose following the Covid-19 lockdown and increased from 15 in 2020 to 57 in 2021. However, this figure declined in subsequent years, to 31 in 2022 and 26 in 2023. Overall, the number of businesses with low productivity has remained marginal throughout the period. In the three highest productivity brackets (£1K to 50K+), the total number of businesses ranged from 986 in 2020 to 1189 in 2023, with a peak of 1293 in 2022.

Whilst the total number of SMEs in the lowest productivity brackets is extremely low, it is worth noting that businesses with no employees consistently predominate in these brackets. There is only one business in the lowest productivity range among employers in 2020, and none in 2021-2023. This suggests that low-productivity outcomes are much more likely to be found among sole proprietorships or non-employing SMEs. However, there is also a slight increase in the proportion of no-employee businesses in the highest productivity category (£50k+), from 58 percent (N=267) in 2020 to 66 percent (N=433) in 2023. The proportion of micro businesses (1–9 employees) in the mid-to-high productivity categories is relatively stable throughout the period, with their share in the £50k+ bracket increasing from 36 percent in 2020 to 30 percent in 2023. Although the percentage appears to decline slightly in 2023, the absolute count remains just below N=200, suggesting that micro enterprises continue to contribute meaningfully to productivity growth in the UK.

Smaller SMEs with 10 to 49 employees accounted for less than 5 percent of the whole sample in 2020-2023, but their numbers in higher productivity brackets remained stable over this period. For instance, the proportion of these firms in the £50k+ category was 5 percent in 2020 to 4 percent in 2021-2023. Medium-sized businesses (50–249 employees) are very few and consistently represented less than 1 percent of the total in all productivity levels.

The persistence of a high share of businesses without employees indicate that many SMEs absorbed the immediate Covid-19 related shocks by maintaining operations without expanding their workforce. Non-employers represented 72 percent of the total sample in 2020 (N=722 out of 1001), increased to 76 percent in 2021 (N=1027 out of 1358) and remained around 73 per cent through to 2023. Post-2021, there is evidence of modest incremental increases of employment in micro (1-9) and small (10-49) firms, suggesting that the economic recovery did not translate into a broad-based expansion of employment capacity.

The age of businesses also correlates with productivity. Firms older than 20 years consistently dominate the £50k+ productivity category, rising from 52 percent (N=) in 2020 to 61 percent (N=394) in 2023. Conversely, younger firms (0–5 years) are absent from the lower bands and only marginally present in the highest (1 percent, N=8, Table 5.11), suggesting that maturity and experience contribute to higher productivity. Mid-aged firms, aged 11-20 years, also show strong representation in the middle and higher productivity bands (43 percent, N=43; 46 percent, N=202 and 32 percent, N=206 respectively), reinforcing the link between age and performance. The ageing profile of firms is also clear during this period. The proportion of businesses over 20 years old rose from 47 per cent in 2020 to 52 per cent in 2023, while the share of new firms (0–5 years old) fell to just 1 per cent by 2023. This sharp decline in entrepreneurial entry is likely to be linked to the uncertain economic environment created by COVID-19 and inflationary pressures, both of which discouraged new business formation.

Findings on firm age and productivity contrast with findings on firm age and sales growth. While younger firms demonstrate stronger growth ambitions, the aspirational nature of the intentions means they are not yet converted into productivity improvements. This suggests that younger firms pursuing expansion strategies may require targeted support during the critical period between initiating growth activities and realising productivity growth. The findings highlight a potential policy consideration around supporting firms through the transition period where growth investments are made but productivity returns have yet to materialise.

Table 0-6 Firm characteristics and productivity 2020

Characteristics (Weighted column %)	Productivity 2020 (summary) in £						Total
	-999 to 0	0 to 999	1K to 9K	10K to 49K	50k+		
A2. Number of employees (2020)							
No employees	Count	9 _{a, b}	5 _{a, b, c}	95 _b	346 _a	267 _c	722
	%	90%	100%	91%	81%	58%	72%
Micro 1 - 9	Count	1 _{a, b, c}	0 _{a, b, c}	7 _c	65 _b	165 _a	238
	%	10%	0%	7%	15%	36%	24%
Small 10 - 49	Count	0 _a	0 _a	2 _a	12 _a	23 _a	37
	%	0%	0%	2%	3%	5%	4%
Medium 50 - 249	Count	0 _a	0 _a	0 _a	2 _a	2 _a	4
	%	0%	0%	0%	0%	0%	0%
Total	Count	10	5	104	425	457	1001
A3/A4. Broad sector (2020)							
ABCDEF - Production and construction	Count	5 _a	0 _{b, c, d}	33 _{a, d}	76 _c	137 _{a, b, d}	251
	%	56%	0%	31%	18%	30%	25%
GHI - Transport, retail and food service/ accommodation	Count	1 _{a, b}	0 _{a, b}	14 _{a, b}	47 _b	88 _a	150
	%	11%	0%	13%	11%	19%	15%
JKLMN - Business services	Count	3 _{a, b}	0 _b	25 _b	186 _a	210 _a	424
	%	33%	0%	24%	44%	46%	42%
PQRS - Other services	Count	0 _{a, b}	5 _c	33 _d	116 _{b, d}	23 _a	177
	%	0%	100%	31%	27%	5%	18%
Total	Count	9	5	105	425	458	1002
A6. Age of business (2020)							
0 - 5 years	Count	0 _a	0 _a	3 _a	23 _a	14 _a	40
	%	0%	0%	3%	5%	3%	4%
6 - 10 years	Count	3 _{a, b}	0 _{a, b}	21 _b	47 _a	61 _{a, b}	132
	%	30%	0%	20%	11%	13%	13%
11 - 20 years	Count	0 _a	0 _{a, b, c}	40 _{b, c}	179 _c	144 _b	363
	%	0%	0%	39%	42%	31%	36%
More than 20 years	Count	7 _{a, b, c}	5 _c	39 _d	176 _{b, d}	239 _a	466
	%	70%	100%	38%	41%	52%	47%
Total	Count	10	5	103	425	458	1001
Regions combined							
Southern England	Count	1 _a	0 _a	29 _a	153 _a	218 _b	401
	%	11%	0%	28%	36%	48%	40%
Midlands+	Count	7 _a	0 _b	31 _b	149 _b	137 _b	324
	%	78%	0%	30%	35%	30%	32%
Northern England	Count	0 _{a, b}	0 _{a, b}	23 _b	72 _{a, b}	65 _a	160
	%	0%	0%	22%	17%	14%	16%
Devolved Nations	Count	1 _{a, b}	5 _c	20 _b	52 _b	37 _a	115
	%	11%	100%	19%	12%	8%	12%
Total	Count	9	5	103	426	457	1000

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-7 Firm management characteristics and productivity 2020

Characteristics (Weighted column %)		Productivity 2020 (summary) in £					
Urban/rural (2020)		-999 to 0	0 to 999	1K to 9K	10K to 49K	50k+	Total
Urban	Count	4 _a	0 _a	78 _b	306 _b	320 _b	708
	%	40%	0%	76%	72%	70%	71%
Rural	Count	6 _a	5 _a	25 _b	117 _b	126 _b	279
	%	60%	100%	24%	28%	27%	28%
Total	Count	10	5	103	425	459	1002
Businesses located in the most deprived 15% of the country (2020)							
Yes	Count	0 _a	0 _a	10 _a	20 _a	25 _a	55
	%	0%	0%	10%	5%	5%	5%
	Count	10	5	104	425	458	1002
A10. Whether have separate business premises. (2020)							
Yes	Count	1 _a	0 _a	18 _a	218 _b	298 _c	535
	%	10%	0%	17%	51%	65%	53%
Total	Count	10	5	104	425	458	1002
A12. Is your business a family-owned business (2020)							
Yes	Count	10 _a	5 _a	96 _a	370 _a	400 _a	881
	%	100%	100%	93%	87%	87%	88%
Total	Count	10	5	103	425	458	1001
A17/A2A. Total number of directors and partners. (2020)							
0	Count	0 _{a, b, c}	0 _{a, b, c}	1 _c	24 _b	3 _{a, c}	28
	%	0%	0%	1%	6%	1%	3%
1	Count	8 _a	5 _a	75 _a	288 _a	209 _b	585
	%	80%	100%	72%	68%	46%	58%
2	Count	2 _{a, b, c}	0 _{a, b, c}	28 _c	67 _b	175 _a	272
	%	20%	0%	27%	16%	38%	27%
3-5	Count	0 _{a, b, c}	0 _{a, b, c}	0 _c	23 _b	66 _a	89
	%	0%	0%	0%	5%	14%	9%
6-10	Count	0 _{a, b, c}	0 _{a, b, c}	0 _c	20 _b	3 _{a, c}	23
	%	0%	0%	0%	5%	1%	2%
Total	Count	10	5	104	425	458	1002
Whether business is women-led (2020)							
Yes	Count	1 _{a, b, c}	5 _d	38 _c	73 _b	54 _a	171
	%	10%	100%	37%	17%	12%	17%
	Count	10	5	104	425	457	1001
Whether business is MEG-led (2020)							
Yes	Count	0 _{a, b}	0 _{a, b}	0 _b	16 _a	8 _{a, b}	24
	%	0%	0%	0%	4%	2%	2%
	Count	10	5	103	425	459	1002
F5. Do you have a formal written business plan? (2020)							
Yes - kept up to date	Count	0 _a	0 _a	16 _a	83 _a	102 _a	201
	%	0%	0%	15%	20%	22%	20%
Yes - but not kept up to date	Count	0 _a	0 _a	4 _a	28 _a	40 _a	72
	%	0%	0%	4%	7%	9%	7%
No	Count	10 _a	5 _{a, b}	84 _a	314 _{a, b}	314 _b	727
	%	100%	100%	81%	74%	69%	73%
Total	Count	10	5	104	425	458	1002
P12. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2020)							
Yes	Count	0 _a	0 _{a, b}	36 _b	305 _c	375 _d	716
	%	0%	0%	35%	72%	82%	71%
Total	Count	10	5	103	426	458	1002

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-8 Firm characteristics and productivity 2021

Characteristics (Weighted column %)		Productivity 2021 (summary) in £					
A2. Number of employees. (2021)		-999 to 0	0 to 999	1K to 9K	10K to 49K	50k+	Total
No employees	Count	20 _{a, b}	34 _b	73 _b	458 _a	442 _c	1027
	%	91%	97%	95%	84%	66%	76%
Micro 1 - 9	Count	2 _{a, b}	1 _{a, b}	4 _b	74 _a	200 _c	281
	%	9%	3%	5%	14%	30%	21%
Small 10 - 49	Count	0 _a	0 _a	0 _a	13 _a	26 _a	39
	%	0%	0%	0%	2%	4%	3%
Medium 50 - 249	Count	0 _a	0 _a	0 _a	2 _a	3 _a	5
	%	0%	0%	0%	0%	0%	0%
Total	Count	22	35	77	547	671	1352
A3/A4. Broad sector (2021)							
ABCDEF - Production and construction	Count	10 _{a, b}	22 _b	0 _c	150 _a	212 _a	394
	%	45%	63%	0%	27%	32%	29%
GHI - Transport, retail and food service/ accommodation	Count	0 _a	0 _a	27 _b	30 _a	141 _c	198
	%	0.0%	0.0%	35.1%	5.5%	21.0%	14.7%
JKLMN - Business services	Count	12 _a	6 _b	25 _{a, b}	240 _a	268 _a	551
	%	55%	17%	32%	44%	40%	41%
PQRS - Other services	Count	0 _a	7 _b	25 _b	127 _b	49 _a	208
	%	0%	20%	32%	23%	7%	15%
Total	Count	22	35	77	547	670	1351
A6. Age of business - summary (2021)							
0 - 5 years	Count	0 _{a, b}	0 _{a, b}	6 _b	22 _{a, b}	18 _a	46
	%	0%	0%	8%	4%	3%	3%
6 - 10 years	Count	6 _{a, b}	14 _b	10 _{a, c}	55 _c	76 _c	161
	%	27%	39%	13%	10%	11%	12%
11 - 20 years	Count	5 _{a, b}	15 _{a, b, c}	33 _{b, c}	259 _c	190 _a	502
	%	23%	42%	43%	47%	28%	37%
More than 20 years	Count	11 _{a, b}	7 _c	28 _{b, c}	210 _b	387 _a	643
	%	50%	19%	36%	38%	58%	48%
Total	Count	22	36	77	546	671	1352
Regions combined							
Southern England	Count	7 _{a, b, c}	16 _{a, b, c}	33 _c	165 _b	309 _{a, c}	530
	%	32%	44%	43%	30%	46%	39%
Midlands+	Count	11 _a	13 _{a, b}	27 _{a, b}	165 _b	204 _{a, b}	420
	%	50%	36%	35%	30%	30%	31%
Northern England	Count	1 _a	7 _{a, b}	6 _a	134 _b	100 _a	248
	%	5%	19%	8%	25%	15%	18%
Devolved Nations	Count	3 _{a, b}	0 _c	11 _{a, b}	82 _b	58 _{a, c}	154
	%	14%	0%	14%	15%	9%	11%
Total	Count	22	36	77	546	671	1352

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-9 Firm management characteristics and productivity 2021

Characteristics (Weighted column %)		Productivity 2021 (summary) in £					
Urban/rural (2021)		-999 to 0	0 to 999	1K to 9K	10K to 49K	50K+	Total
Urban	Count	11 _a	28 _b	54 _{a, b}	367 _{a, b}	447 _{a, b}	907
	%	50%	80%	70%	67%	67%	67%
Rural	Count	11 _a	7 _b	23 _{a, b}	176 _{a, b}	210 _{a, b}	427
	%	50%	20%	30%	32%	31%	32%
Total	Count	22	35	77	546	670	1350
Businesses located in the most deprived 15% of the country (2021)							
Yes	Count	1 _{a, b}	6 _b	8 _b	19 _a	31 _a	65
	%	5%	17%	10%	3%	5%	5%
Total	Count	21	35	77	546	671	1350
A10. Whether have separate business premises. (2021)							
Yes	Count	2 _{a, b}	1 _b	19 _{a, c}	176 _c	322 _d	520
	%	9%	3%	25%	32%	48%	38%
Total	Count	22	35	77	546	671	1351
A12. Is your business a family-owned business (2021)							
Yes	Count	16 _a	35 _b	69 _{a, c}	493 _{b, c}	590 _c	1203
	%	73%	100%	88%	90%	88%	89%
Total	Count	22	35	78	545	670	1350
A17/A11. Total number of directors and partners. (2021)							
0	Count	0 _{a, b, c}	0 _{a, b, c}	0 _c	26 _b	4 _{a, c}	30
	%	0%	0%	0%	5%	1%	2%
1	Count	11 _a	35 _b	60 _c	384 _c	357 _a	847
	%	50%	100%	77%	70%	53%	63%
2	Count	3 _{a, b}	0 _c	16 _{a, b}	96 _b	194 _a	309
	%	14%	0%	21%	18%	29%	23%
3-5	Count	8 _a	0 _b	0 _b	25 _b	96 _c	129
	%	36%	0%	0%	5%	14%	10%
6-10	Count	0 _a	0 _a	2 _a	13 _a	19 _a	34
	%	0%	0%	3%	2%	3%	3%
Total	Count	22	35	78	546	672	1353
Whether business is women-led (2021)							
Yes	Count	2 _{a, b}	13 _c	13 _{a, b}	119 _b	89 _a	236
	%	9%	37%	17%	22%	13%	17%
Total	Count	22	35	77	546	670	1350
Whether business is MEG-led (2021)							
Yes	Count	0 _{a, b}	0 _{a, b}	0 _{a, b}	19 _b	9 _a	28
	%	0%	0%	0%	3%	1%	2%
Total	Count	22	35	77	546	671	1351
F5. Do you have a formal written business plan? (2021)							
Yes - kept up to date	Count	0 _{a, b}	0 _b	9 _a	79 _a	99 _a	187
	%	0%	0%	12%	14%	15%	14%
Yes - but not kept up to date	Count	0 _{a, b}	21 _c	2 _b	52 _a	48 _{a, b}	123
	%	0%	60%	3%	10%	7%	9%
No	Count	22 _a	14 _b	66 _{a, c}	415 _c	523 _c	1040
	%	100%	40%	86%	76%	78%	77%
Total	Count	22	35	77	546	671	1351
D11. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2021)							
Yes	Count	0 _a	13 _b	37 _b	424 _c	576 _d	1050
	%	0%	37%	48%	78%	86%	78%
Total	Count	22	35	77	545	670	1349

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-10 Firm characteristics and productivity 2022

Characteristics (Weighted column %)		Productivity 2022 (summary) in £					
		-999 to 0	0 to 999	1K to 9K	10K to 49K	50k +	Total
A2. Number of employees. (2022)							
No employees	Count	21 _{a, b}	9 _{a, b}	76 _b	418 _a	401 _c	925
	%	95%	100%	95%	84%	62%	74%
Micro 1 - 9	Count	1 _{a, b}	0 _{a, b}	3 _b	67 _a	219 _c	290
	%	5%	0%	4%	13%	34%	23%
Small 10 - 49	Count	0 _a	0 _a	1 _a	11 _a	25 _a	37
	%	0%	0%	1%	2%	4%	3%
Medium 50 - 249	Count	0 _a	0 _a	0 _a	2 _a	4 _a	6
	%	0%	0%	0%	0%	1%	0%
Total	Count	22	9	80	498	649	1258
A3/A4. Broad sector. (2022)							
ABCDEF - Production and construction	Count	9 _{a, b}	7 _b	15 _c	97 _c	199 _a	327
	%	41%	78%	19%	19%	31%	26%
GHI - Transport, retail and food service/ accommodation	Count	1 _{a, b, c}	0 _{a, b, c}	17 _c	54 _b	119 _a	191
	%	5%	0%	22%	11%	18%	15%
JKLMN - Business services	Count	12 _a	2 _{a, b}	22 _b	196 _a	253 _a	485
	%	55%	22%	28%	39%	39%	39%
PQRS - Other services	Count	0 _a	0 _a	25 _b	151 _b	78 _a	254
	%	0%	0%	32%	30%	12%	20%
Total	Count	22	9	79	498	649	1257
A6. Age of business - summary. (2022)							
0 - 5 years	Count	0 _{a, b}	0 _{a, b}	0 _{a, b}	13 _b	6 _a	19
	%	0%	0%	0%	3%	1%	2%
6 - 10 years	Count	6 _a	0 _{a, b}	8 _b	56 _b	64 _b	134
	%	27%	0%	10%	11%	10%	11%
11 - 20 years	Count	3 _a	7 _b	43 _b	225 _b	181 _a	459
	%	14%	78%	54%	45%	28%	36%
More than 20 years	Count	13 _{a, b}	2 _b	29 _b	203 _b	399 _a	646
	%	59%	22%	36%	41%	61%	51%
Total	Count	22	9	80	497	650	1258
Regions combined							
Southern England	Count	8 _{a, b}	2 _{a, b}	27 _{a, b}	178 _b	291 _a	506
	%	35%	22%	34%	36%	45%	40%
Midlands+	Count	10 _{a, b}	7 _b	25 _a	144 _a	204 _a	390
	%	43%	78%	32%	29%	31%	31%
Northern England	Count	1 _{a, b}	0 _{a, b}	16 _{a, b}	97 _b	96 _a	210
	%	4%	0%	20%	19%	15%	17%
Devolved Nations	Count	4 _{a, b}	0 _{a, b}	11 _{a, b}	79 _b	59 _a	153
	%	17%	0%	14%	16%	9%	12%
Total	Count	23	9	79	498	650	1259

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-11 Firms management characteristics and productivity 2022

Characteristics (Weighted column %)		Productivity 2022 (summary) in £					
		-999 to 0	0 to 999	1K to 9K	10K to 49K	50k+	Total
Urban/rural (2022)							
Urban	Count	11 _a	7 _{a, b, c}	75 _c	327 _{a, b}	456 _b	876
	%	50%	78%	95%	66%	70%	70%
Rural	Count	10 _a	2 _{a, b}	4 _b	168 _a	187 _a	371
	%	45%	22%	5%	34%	29%	30%
Total	Count	22	9	79	497	650	1257
Businesses located in the most deprived 15% of the country (2022)							
Yes	Count	0 _{a, b}	0 _{a, b}	10 _b	29 _a	37 _a	76
	%	0%	0%	13%	6%	6%	6%
Total	Count	22	9	80	498	650	1259
A10. Whether have separate business premises. (2022)							
Yes	Count	3 _a	0 _a	15 _a	137 _a	346 _b	501
	%	13.6%	0.0%	19.0%	27.6%	53.3%	39.9%
Total	Count	22	9	79	497	649	1256
A12 Is your business a family-owned business? (2022)							
Yes	Count	15 _a	9 _{a, b, c}	71 _{b, c}	455 _c	553 _b	1103
	%	68%	100%	90%	91%	85%	88%
Total	Count	22	9	79	498	649	1257
A17/A11. Total number of directors and partners. (2022)							
0	Count	0 _a	0 _a	0 _a	16 _a	23 _a	39
	%	0%	0%	0%	3%	4%	3%
1	Count	11 _{a, b}	9 _c	57 _{b, c}	353 _c	355 _a	785
	%	50%	100%	72%	71%	55%	62%
2	Count	3 _{a, b, c}	0 _{a, b, c}	22 _c	87 _b	186 _{a, c}	298
	%	14%	0%	28%	18%	29%	24%
3-5	Count	8 _a	0 _{b, c, d}	0 _d	26 _c	69 _b	103
	%	36%	0%	0%	5%	11%	8%
Total	Count	22	9	79	497	650	1257
Whether business is women-led (2022)							
Yes	Count	3 _{a, b}	7 _c	17 _b	109 _b	82 _a	218
	%	14%	78%	22%	22%	13%	17%
Total	Count	22	9	79	498	650	1258
Whether business is MEG-led (2022)							
Yes	Count	0 _a	0 _a	0 _a	16 _a	10 _a	26
	%	0%	0%	0%	3%	2%	2%
Total	Count	22	9	79	498	649	1257
F5. Do you have a formal written business plan? (2022)							
Yes - kept up to date	Count	7 _a	7 _b	3 _c	77 _d	116 _{a, d}	210
	%	32%	78%	4%	15%	18%	17%
Yes - but not kept up to date	Count	0 _{a, b}	0 _{a, b, c}	17 _c	40 _b	22 _a	79
	%	0%	0%	22%	8%	3%	6%
No	Count	15 _a	2 _b	59 _a	380 _a	510 _a	966
	%	68%	22%	75%	76%	78%	77%
Total	Count	22	9	79	497	650	1257
D11. Taking into account all sources of income in the last financial year, did you generate a profit or surplus? (2022)							
Yes	Count	7 _a	0 _a	47 _b	433 _c	578 _c	1065
	%	32%	0%	59%	87%	89%	85%
Total	Count	22	9	79	498	649	1257

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 0-12 SME Firm Characteristics and productivity 2023

Characteristics (Weighted column %)		Productivity 2023a (summary)					
A2. Number of employees (Grouped). (2023)		-999 to 0	0 to 999	1K to 9K	10K to 49K	50k +	Total
No employees	Count	24 _a	1 _{a, b, c}	90 _a	341 _c	433 _b	889
	%	96%	100%	95%	79%	66%	73%
Micro 1 - 9	Count	1 _{a, b}	0 _{a, b, c}	4 _b	78 _a	196 _c	279
	%	4%	0%	4%	18%	30%	23%
Small 10 - 49	Count	0 _a	0 _a	1 _a	13 _a	27 _a	41
	%	0%	0%	1%	3%	4%	3%
Medium 50 - 249	Count	0 _a	0 _a	0 _a	1 _a	5 _a	6
	%	0%	0%	0%	0%	1%	0%
Total	Count	25	1	95	433	661	1215
A3/A4. Broad sector (2023)							
ABCDEF - Production and construction	Count	10 _a	1 _a	10 _b	88 _c	168 _a	277
	%	42%	100%	11%	20%	25%	23%
GHI - Transport, retail and food service/ accommodation	Count	0 _a	0 _{a, b, c}	15 _{b, c}	41 _{a, c}	116 _b	172
	%	0%	0%	16%	9%	18%	14%
JKLMN - Business services	Count	14 _a	0 _a	37 _a	182 _a	278 _a	511
	%	58%	0%	39%	42%	42%	42%
PQRS - Other services	Count	0 _a	0 _{a, b, c}	33 _c	122 _c	98 _b	253
	%	0%	0%	35%	28%	15%	21%
Total	Count	24	1	95	433	660	1213
A6. Age of business - summary (2023)							
0 - 5 years	Count	0 _{a, b}	0 _{a, b}	0 _{a, b}	0 _b	8 _a	8
	%	0%	0%	0%	0%	1%	1%
6 - 10 years	Count	12 _a	0 _{a, b, c, d}	19 _d	50 _c	41 _b	122
	%	50%	0%	20%	12%	6%	10%
11 - 20 years	Count	2 _a	1 _{b, c}	40 _{b, c}	197 _c	212 _b	452
	%	8%	100%	42%	45%	32%	37%
More than 20 years	Count	10 _{a, b}	0 _{a, b}	36 _b	186 _b	400 _a	632
	%	42%	0%	38%	43%	61%	52%
Total	Count	24	1	95	433	661	1214
Regions combined							
Southern England	Count	10 _{a, b}	0 _{a, b}	37 _{a, b}	161 _b	295 _a	503
	%	40%	0%	39%	37%	45%	41%
Midlands+	Count	10 _a	1 _a	31 _a	137 _a	212 _a	391
	%	40%	100%	33%	32%	32%	32%
Northern England	Count	1 _{a, b}	0 _{a, b}	19 _{a, b}	82 _b	92 _a	194
	%	4%	0%	20%	19%	14%	16%
Devolved Nations	Count	4 _a	0 _a	7 _a	53 _a	62 _a	126
	%	16%	0%	7%	12%	9%	10%
Total	Count	25	1	94	433	661	1214

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level. Midlands+ includes East and West midlands and South-West England.

Table 0-13 SME Management Characteristics and Productivity

Characteristics (Weighted column %)		Productivity 2023 (summary)					
Urban/rural		-999 to 0	0 to 999	1K to 9K	10K to 49K	50k+	Total
Urban	Count	14 _a	0 _a	92 _b	293 _a	448 _a	847
	%	58%	0%	95%	66%	69%	70%
Rural	Count	10 _a	1 _a	4 _b	149 _a	202 _a	366
	%	42%	100%	4%	34%	31%	30%
	Count	24	1	97	442	650	1214
Businesses located in the most deprived 15% of the country (2023)							
Yes	Count	0 _a	0 _a	9 _a	21 _a	35 _a	65
	%	0%	0%	9%	5%	5%	5%
	Count	24	1	97	442	651	1215
A10. Whether have separate business premises. (2023)							
Yes	Count	4 _a	0 _{a, b}	24 _a	110 _a	353 _b	491
	%	16%	0%	25%	25%	54%	40%
	Count	25	1	97	442	650	1215
A12. Is your business a family-owned business (2023)							
Yes	Count	14 _a	1 _{a, b, c}	86 _{b, c}	407 _c	537 _b	1045
	%	58%	100%	89%	92%	83%	86%
	Count	24	1	97	442	650	1214
A17/A11. Total number of directors and partners. (2023)							
0	Count	0 _{a, b}	0 _{a, b}	0 _b	18 _a	34 _a	52
	%	0%	0%	0%	4%	5%	4%
1	Count	8 _a	0 _{a, b}	76 _b	328 _b	339 _a	751
	%	33%	0%	78%	74%	52%	62%
2	Count	2 _a	1 _b	21 _{a, b}	67 _a	186 _b	277
	%	8%	100%	22%	15%	29%	23%
3-5	Count	14 _a	0 _{a, b, c, d}	0 _d	25 _c	69 _b	108
	%	58%	0%	0%	6%	11%	9%
	Count	24	1	97	442	650	1214
Whether business is women-led (2023)							
Yes	Count	2 _a	0 _{a, b}	34 _b	92 _a	110 _a	238
	%	8%	0%	35%	21%	17%	20%
Total	Count	24	1	97	442	650	1214
Whether business is MEG-led (2023)							
Yes	Count	0 _{a, b, c}	0 _{a, b, c}	0 _c	18 _b	8 _{a, c}	26
	%	0%	0%	0%	4%	1%	2%
Total	Count	24	1	97	442	649	1213
F5. Do you have a formal written business plan?							
Yes - kept up to date	Count	18 _a	0 _{a, b}	17 _b	67 _b	128 _b	230
	%	75%	0%	18%	15%	20%	19%
Yes - but not kept up to date	Count	0 _a	0 _{a, b}	14 _b	31 _a	55 _{a, b}	100
	%	0%	0%	14%	7%	8%	8%
No	Count	6 _a	1 _{a, b, c, d}	66 _d	344 _c	465 _{b, d}	882
	%	25%	100%	68%	78%	72%	73%
Total	Count	24	1	97	442	649	1213
P12. Taking into account all sources of income in the last financial year, did you generate a profit or surplus?							
Yes	Count	0 _a	1 _{b, c}	37 _c	379 _b	576 _b	993
	%	0%	100%	38%	86%	88%	82%
No	Count	24 _a	0 _{b, c}	60 _c	60 _b	73 _b	217
	%	100%	0%	62%	14%	11%	18%
	Count	24	1	97	441	651	1214

Source: Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level. All questions bar F5 and A17/A11 are "Yes/No" questions. The difference between Total and Yes corresponds to No answers. For A17/A11, band 6-10: the counts are zero except for 10K to 49K (N=4) and 50K+ (N=20); band 11+: counts are zero for all productivity levels, except 50+ (N=2).

Sectoral differences are also pronounced across productivity bands. Business services (JKLMN) consistently account for the largest share of high-productivity firms, maintaining an average of 42 percent share in the 50k+ category across all years. This stability suggests that this sector has a central role in driving productivity. In contrast, production and construction (ABCDEF) and transport, retail, and food services (GHI) show more variability. The production sector's share in the highest productivity bracket increased from 30 percent in 2020 to 25 percent (N=167) in 2023, while the transport and retail sector remained relatively stable around 18 percent.

Regional variation is evident between 2020 and 2023. Southern consistently was the most productive region, maintaining a dominant share in the £50k+ productivity category, and only slightly declining from 48 percent in 2020 to 45 percent in 2023. Throughout the sample period, the number of firms in the lowest productivity bands remained relatively small. However, there was a notable spike in all regions in 2021, likely driven by the economic disruption caused by the Covid-19 lockdown. This increase proved temporary, and figures returned to trend levels in 2022. This indicates that the inflationary pressures that started in April 2021 and peaked in October 2022⁷ did not affect SMEs in the UK. In Northern England and the Devolved Nations, no firms were reported in the second lowest bands by the end of the period.

The share of SMEs located in Midlands+ in the lowest productivity bands declined steadily between 2020 (78 percent, N=7) to 40 percent (N=10) in 2023. These counts are extremely low and most businesses in this region can be found in the two highest productivity bands. Overall, the proportion of Midlands+ firms in the top three brackets remained stable at around 30 percent. Businesses in Northern have suffered most from the Covid-19 lockdown. Their share in the £1K-£9K bracket fell significantly in 2021 (8 percent N=6) compared to 2020 (22 percent N=23) but recovered in 2022 (32 percent N=25) and 2023 (33 percent, N=31). The drop in 2021 was due to a slight increase in the two lowest productivity bands (<£0 and £0-£999), which declined in subsequent years. The productivity pattern of SMEs in the Devolved Nations is similar to those in Northern England and show a slight decline, indicating regional disparities in productivity growth. At the end of the sample period, regional productivity patterns show a notable split: 57 percent and 55 percent of firms in Southern England and the Midlands+ respectively achieve the highest productivity bands, while only 44 percent and 48 percent of firms in Northern England and the Devolved Nations reach this level.

⁷ <https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/l55o/mm23>

Location appears to be a significant factor in productivity performance. Urban businesses dominate across all productivity bands, comprising 94 percent (N=92) of firms in the £0.1-£999 range and 69 percent (N=448) in the highest productivity band (£10k to £49k). Rural firms, while less represented overall (30 percent of the total), show a relatively stronger presence in the mid and high-range bands, representing 34 percent (N=149) of the £1K-£9K band and 31 percent (N=202) £10k to £49k band. This suggests that urban firms may benefit from greater access to infrastructure, markets, and resources that support higher productivity.

In summary Tables 5.6, 5.8, 5.10, and 5.12 demonstrate that firm size significantly influences productivity levels only among firms with no employees and micro firms (1-9 staff), with notable differences observed in the £1K-£9K and £10K-£49K productivity bands ($p < 0.05$). In the sector category, the presence of distinct subscripts (a, b, c) across all sectors within these productivity ranges indicates a statistically significant variation in their proportional distributions. Similarly, in the age category, firms aged 11-20 years and those over 20 years share the same subscript in the £0-£999 productivity column, suggesting comparable proportions, while younger firms differ significantly. These patterns highlight the differentiated impact of firm characteristics on productivity outcomes.

Tables 5.7, 5.9, 5.11, and 5.13 present a detailed breakdown of business productivity across location and management characteristics, e.g., deprivation status (IMD), business structure, leadership demographics, planning practices, and financial performance. Productivity is measured in pounds sterling (£), segmented into four bands ranging from negative or zero productivity to high productivity (£10,000-£49,000), with weighted column percentages indicating the distribution within each category.

Only 5 percent of firms identified as operating in the 15% most deprived areas, as measured by the Index of Multiple Deprivation (IMD). These firms are evenly distributed across the three highest productivity bands in throughout the sample period, except in 2021, with no business in the two lowest brackets. It is noteworthy that the number of firms operating in deprived locations and posting low productivity increased in 2021, suggesting a negative impact of the Covid-19 lockdown on these businesses. However, the overwhelming majority of SMEs in the sample operated in the highest productivity brackets and were not located in deprived areas. This indicates that deprivation status alone may not be a strong predictor of productivity, though the small sample size limits useful interpretation.

Urban businesses consistently outperform rural ones in productivity throughout the sample period, but both were negatively affected by the 2020-2021 Covid-19 lockdown. Less than five urban SMEs were reported in the two lowest productivity brackets in 2020, against eleven rural SMEs. The counts increased for both rural and urban businesses in 2021, although more urban than rural SMEs broke even that year (N=28 vs N=7 in £0-£999 bracket). The number of low-productivity urban businesses reverted to 2020 numbers in 2022. By 2023, urban firms accounted for 69 percent (N=453) of the 50k+ category, compared to 31 (N=208) percent for rural firms.

Having separate business premises is positively associated with higher productivity, and its impact on productivity was not affected by the 2020-2021 pandemic. During the sample period, less than five firms were in the two lowest productivity band and had separate premises. The vast majority operated in the three highest brackets throughout the period. Clearly, having dedicated facilities demonstrate commitment to growth, strategic planning, and can improve access to finance through property collateral, if those premises are owned rather than rented (Wu et al, 2007, Camison et al 2022, Owen et al., 2019, 2022). There is increasing evidence that UK SMEs purchasing the commercial properties they previously rented. This shift is driven by economic uncertainty, rising rents, and the financial advantages of ownership, such as lower fixed costs and access to finance, given that traditional funders often require property security⁸.

Family-owned businesses are prevalent across all productivity levels over the sample period, without being impacted by the Covid-19 lockdown. Their representation is particularly high in the mid-range bands (£1K-£9K and £10K-£49K), indicating that family ownership does not hinder productivity and may support sustained performance. The relationship between the number of business partners and productivity was nuanced over the sample period and played a role in shaping firms' performance during the Covid-19 disruption. Across all sample years, firms in the highest productivity brackets (£1K to £50K+) were predominantly those with a single partner. In addition, the number of firms in the two lowest productivity bands remained consistently below five, regardless of the number of directors or partners. However, there was a rise in the number of low-productivity firms with 3-5 partners in 2021, a trend that persisted beyond the immediate aftermath of the pandemic. Nonetheless, by 2023, firms with 2-5 partners had an increasing representation in higher productivity bands, particularly those with 3-5 partners 11 percent, (N=69 in the top band), suggesting that collaborative leadership structures may enhance

⁸ <https://bridgingandcommercial.co.uk/article/21562/why-more-smes-are-buying-the-premises-they-used-to-rent>

productivity. In 2023, firms with a single partner/director the mid-to higher productivity brackets, accounting for 77 percent (N=73) in the £1-£9K range and 74 percent (N=320) in the £10K-£49K range.

Woman-led businesses represented 17 percent of the total sample between 2020 and 2022, with an increase to 20 percent (N=238) of the sample in 2023. Most woman-led businesses are mid-to-higher productivity in 2020 and 2023, i.e., £1K-£50K+ (N>30 in both years). In 2021 and 2022, however, there was an increase in the lower productivity bands, -£999 to £999, from N= 6 in 2020 to N=15 in 2021 and N=10 in 2022. By 2023, there were none in the £0-£999 range and only one in the lowest band. This contrasts with MEG-led businesses which can only be found in the mid-to-highest productivity ranges (£1K to 50K and above) over the sample period, without any impact of the Covid-19 disruption. Arguably, the total counts for these businesses are extremely low and may not be representative. Nonetheless, the findings in Tables 5.5, 5.7, 5.9 and 5.11 may reflect structural barriers or resource constraints that limit productivity potential among woman-led firms. Research demonstrates that women-owned SMEs face significant barriers in securing formal financing (Cheng, 2015; Ughetto et al., 2020; Orser et al., 2020; Rao et al., 2021).

The vast majority of firms did not have a business plan over the sample period, despite strategic planning being strongly correlated with productivity. In both 2020 and 2021, no businesses with up-to-date plans were found in the two lowest productivity brackets. A similar pattern emerged in 2022 and 2023 for firms with outdated business plans. Interestingly, Tables 5.9 and 5.11 reveal that SMEs with updated business plans began to appear in the low productivity categories in 2022 and 2023, although the sample sizes were too small to draw definitive conclusions. The absence of a business plan was most common among firms in the lower productivity bands during 2020–2021. In subsequent years, however, the majority of firms without a business plan were concentrated in the mid-to-higher productivity brackets, e.g., 68 percent (N=65) in the £0–£999 band and 71 percent (N=471) in the £50K+ bracket in 2023.

Finally, profitability is a clear indicator of productivity during the sample period, including during the Covid-19 disruption. In 2021, 88 percent (N=576) of firms in the highest productivity band reported making a profit in the past 12 months, compared to only 39 percent (N=38) in the £0-£999 range. Notably, no firms in the lowest productivity band reported profitability in 2020-2021, underscoring the direct link between turnover per employee and financial performance. Overall, the total percentage of profitable firms increased steadily from 71 percent of the total number of SMEs in the sample of firms in

2020 to 85 percent in 2022. By 2023, profitability dipped slightly to 82 per cent, coinciding with inflationary pressures and rising borrowing costs.

4.1.4 Firm Export Orientation and Innovation of SMEs

This section investigates the influence of export orientation and innovation on firm performance. The discussion begins with an examination of export orientation's influence on sales growth and productivity, followed by an analysis of how innovation affects productivity.

4.1.4.1 Sales Growth and Export Orientation

Figure 5.1 presents a temporal comparison of the proportion of firms that engage in innovation and export activities among those with the strategic objective of increasing sales, spanning the years 2020 to 2023.

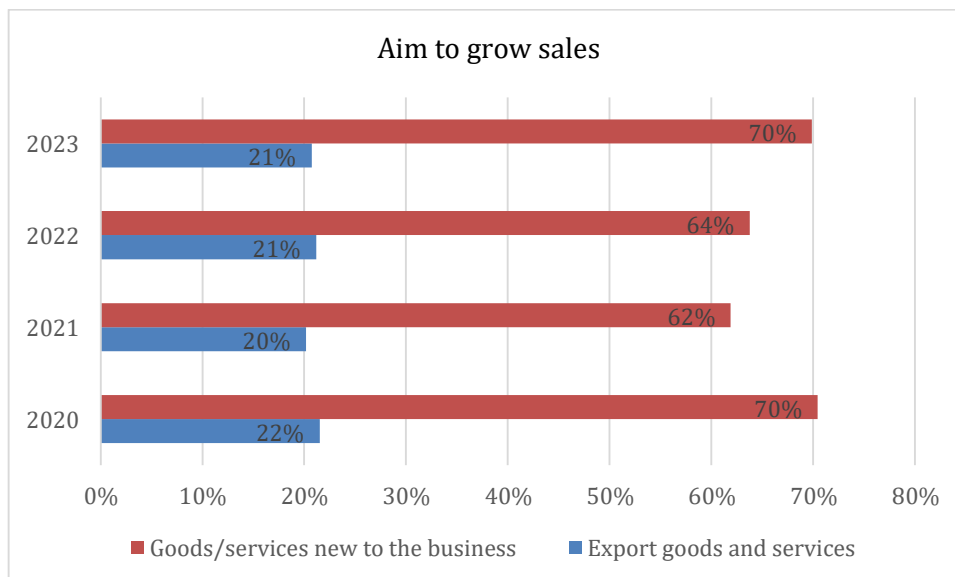
The data reveals a persistent and substantial emphasis on innovation, defined as the introduction of goods or services new to the business, relative to exporting goods and services. In 2020 and 2023, 70 percent of firms reported engaging in innovation, marking the highest levels across the observed period. Although there was a slight dip in 2021 (62 percent) and 2022 (64 percent), the overall trend underscores a strong and sustained commitment to innovation as a growth strategy. In contrast, the proportion of firms that export has remained relatively stable and markedly lower, fluctuating narrowly between 20 percent and 22 percent over the four-year period. This disparity suggests that while innovation is widely perceived as a critical driver of sales growth, exporting is either less accessible or less prioritised by most firms. The consistently low export figures may reflect structural barriers, such as limited international market access, regulatory constraints, or a strategic focus on domestic markets. Overall, the figure illustrates a clear divergence in strategic orientation among growth-seeking firms, with innovation being a dominant and enduring focus, whereas exporting remains a secondary or less feasible avenue for expansion. This pattern may have important implications for policy interventions aimed at enhancing firms' international competitiveness and supporting broader economic diversification. Furthermore, it suggests significant untapped potential as demonstrated by a recent FSB report which highlighted the substantial growth benefits of SME exports for the UK economy. The report found that export-active SMEs demonstrate higher growth rates, greater resilience, and stronger performance than domestic-only firms (FSB, 2024).

4.1.4.2 Productivity and Export Orientation

Figure 5.2 illustrates the distribution of firms that export goods and services across five productivity bands, measured in pounds sterling (£), from 2020 to 2023.

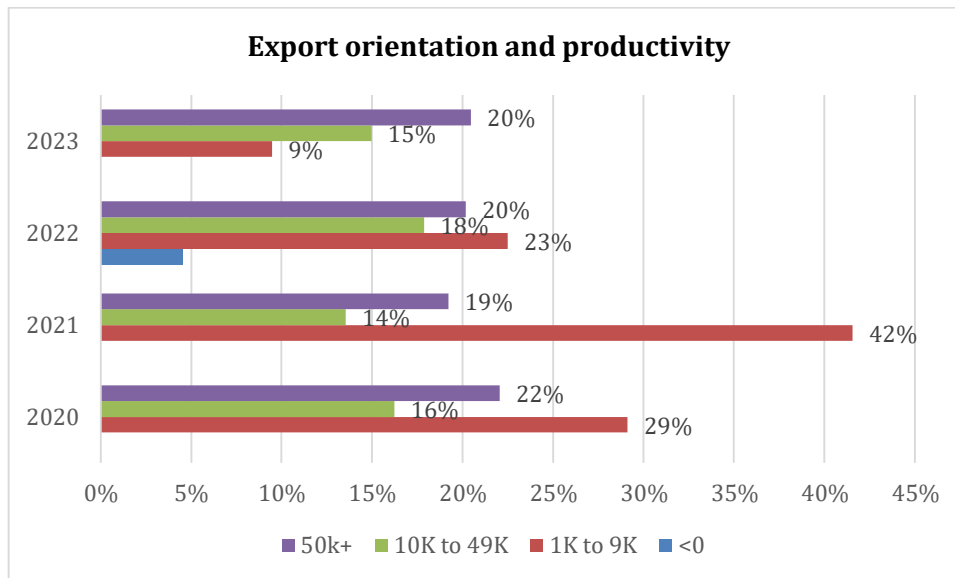
The productivity bands range from negative productivity (–£999 to £0) through to high productivity (£50K and above), allowing for a nuanced examination of performance heterogeneity among exporting firms. The figure provides further empirical support for the existence of a positive association between firms' productivity profiles and their export orientation. However, it is important to note that the cross-tabulation analysis employed does not allow for the determination of causality. Specifically, it remains unclear whether higher productivity leads firms to engage in export activities, or whether participation in export markets contributes to enhanced productivity.

Figure 0.1 Export orientation and innovation of SMEs that aim to grow sales.



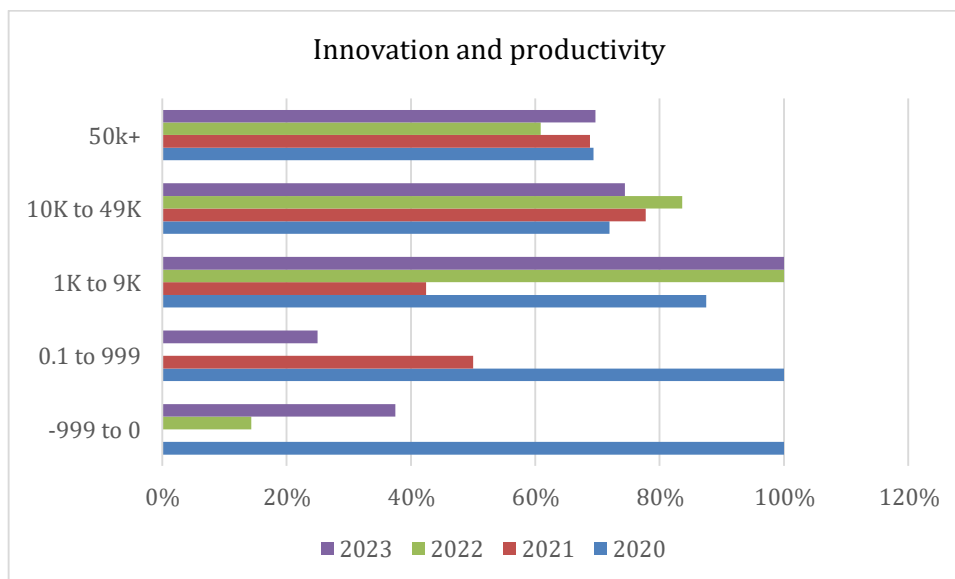
Source: Authors own analysis using data from the LSBS 2020 to 2023. Note: Only positive responses to question “Aim to grow sales” shown, positive responses to “whether export goods and services”, and response “All just new to business”.

Figure 0.2 Export orientation and productivity.



Source: Authors own analysis using data from the LSBS 2020 to 2023. Note: Only positive responses to question “C1/C2. Whether export goods or services” are reported. The remaining percentage up to 100% corresponds to the negative answers. See Table A1 in Annex for detailed counts.

Figure 0.3 Innovation and Productivity



Source: Authors own analysis using data from the LSBS 2020 to 2023

Overall, the data reveals a marked decline in low-productivity participants and a concurrent rise in high-productivity exporters. This trend may signal increasing efficiency and competitiveness among businesses that export goods and services. The most striking feature of the figure is the progressive shift in the distribution of firms toward higher productivity brackets over time. In 2021, a substantial proportion of exporting firms, approximately 41 percent, fell within the £1K-£9K productivity range, indicating a concentration of relatively low-performing exporters. However, this proportion declined

steadily in subsequent years, reaching just 9percent in 2023. This downward trend suggests a contraction in the share of low-productivity exporters, potentially reflecting either market exit or productivity improvements among surviving firms. In contrast, the share of firms in the highest productivity band (£50K+) remained stable around 20% over the sample period, with a slight decrease to 19% in 2021, and a peak to 22% in 2020. The middle productivity band (£10K to £49K) remained relatively stable across the four years, fluctuating modestly between 14 percent and 18 percent. This stability suggests a persistent core of moderately productive exporters, potentially representing firms in transition or those operating in sectors with limited scalability. Finally, the presence of firms with negative productivity appears only in 2023, albeit at a small proportion (5 percent). This anomaly may reflect data volatility, reporting inconsistencies, or the inclusion of firms experiencing temporary losses despite maintaining export activity.

4.1.4.3 Innovation and Productivity

Figure 5.3 shows the productivity distribution among firms that have introduced new goods and services, an operational definition of innovation, across the years 2020 to 2023.

As with Figure 5.2, the data are stratified into five productivity bands, ranging from negative productivity (-£999-£0) to high productivity (£50K and above), enabling a detailed examination of how innovation correlates with firm-level economic performance. Overall, Figure 5.3 provides evidence of a positive relationship between productivity and innovation firms and shows by a decline in negative productivity and a broadening of moderate productivity gains.

A noteworthy feature of Figure 5.3 is the marked decline in the proportion of firms with negative productivity over time. In 2020, a substantial share of innovative firms fell within the lowest productivity bracket, suggesting that initial innovation efforts may have been associated with high costs or transitional inefficiencies. However, this proportion diminished steadily through 2023, indicating a possible maturation of innovation strategies or improved alignment between innovation and market demand. Simultaneously, the proportion of firms in the second lowest positive productivity band (£0-£999) decreased, which may reflect a growing number of firms achieving marginal gains from innovation. This shift could be interpreted as a transitional phase, where firms begin to realize returns on their innovative activities, albeit modestly. More notably, the middle productivity bands (£1K-£9K and £10K-£49K) show a consistent upward trend across the four years. This suggests that innovation is increasingly associated with moderate productivity gains, potentially due to cumulative learning effects, process improvements, or enhanced product-market fit. The expansion of these bands implies that innovation is becoming a

more reliable driver of performance for a broader base of firms. In contrast, the proportion of firms in the highest productivity category (£50K and above) remains relatively stable across the observed period. This stability may indicate that while innovation contributes to high productivity, the leap to this level requires additional factors such as scale, capital intensity, or internationalization, which are not uniformly accessible to all innovators.

Overall, these results suggest that productivity gains from innovation may not materialise immediately or uniformly across all firms. Therefore, ongoing monitoring of firms that have adopted innovations and are in the transition stage would be important for understanding and supporting the innovation-productivity relationship.

4.2 RQ2 – Impact of Business Support and External Finance on SME Performance

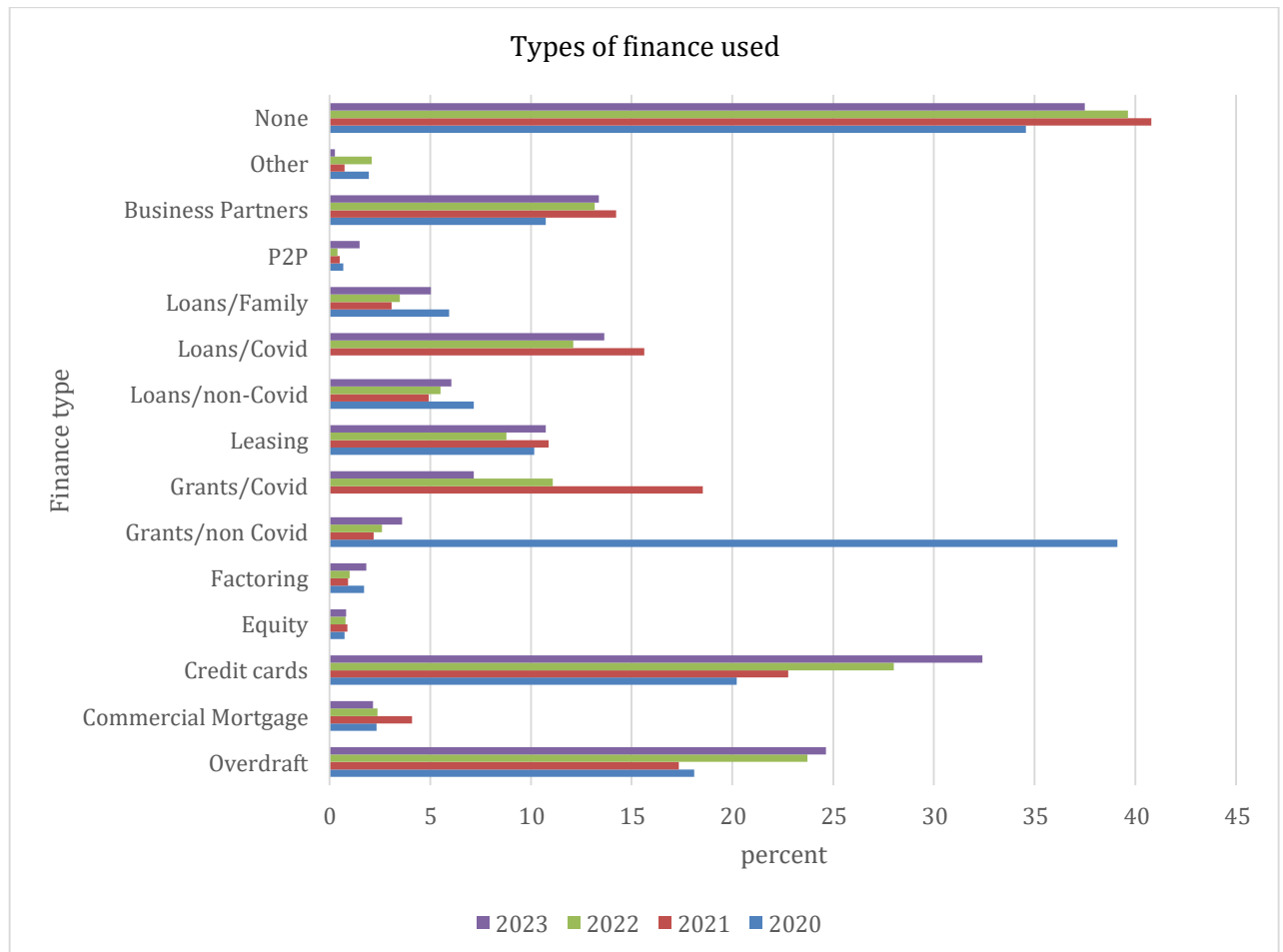
Access to finance is often cited as an important factor in the survival and growth of small businesses, (Bakhtiari et al., 2020; Ardic et al., 2012). This section examines the impact of external financing sources on SME performance. Understanding how different sources of external financing influence SME outcomes has become increasingly important for policymakers and practitioners as access to finance is cited as one of the most significant constraints facing SME firms (Rao et al., 2021) and it will be essential to fund the SME investment required to transition to net zero (OECD, 2022a).

4.2.1 Sources of Finance

Figure 5.4 presents the percentages of various finance sources used by SMEs over a four-year period (2020 to 2023). Figure 5.4 reveals three main trends. Firstly, there is a predominance of respondents who reported using no form of external finance. This category has the highest percentage across all four years, with a marked increase in 2021 from 34 percent to above 40 percent (N=612). This finding is consistent with the British Business Bank finding that SME finance usage fell from 50 percent in Q3 2023 to 43 percent by Q2 2024, remaining stable through Q3 2024, (British Business Bank, 2025). This pattern suggests either a strong preference towards self-financing, potentially reflecting improved cash flow conditions, or reduced availability of external finance instruments due to uncertainties stemming from the pandemic and post-pandemic economic landscape. Policy analyses support the latter explanation, as UK SME finance success rates reduced from 71 percent in Q4 2019 to 53 percent in Q4 2023, with larger, more experienced maintaining better access to funding (SME Finance Monitor, Q2 2024).

A second notable feature of the data is the exceptionally high proportion of businesses that reported receiving government grants in 2020, reaching 39 percent (N=466). The LSBS Wave 9 (2023) dataset does not clarify whether this figure includes Covid-related grants, and unlike the years 2021 through 2023, there is no separate variable identifying Covid-specific grants for 2020. Considering this absence, it is reasonable to assume that the 2020 data reflect general government grant usage, excluding Covid-related support. The dataset provides distinct figures for Covid-related grants in subsequent years. These grants peaked in 2021 at 19 percent (N=278), followed by a steady decline to 7 percent (N=97) in 2023. Conversely, the category of government grants unrelated to Covid (*Grants/non-Covid*) exhibits a pronounced decline over the observed period to 7 percent (N=97) in 2023. This reduction is due to the phasing out of pandemic-era support schemes or a shift in policy focus away from general grant funding.

Figure 0.4 Finance Sources used by SMEs 2020 to 2023



Source: Authors own analysis using data from the LSBS 2020 to 2023. Note: Each finance type shown is a separate “yes/no” question. Only the positive answers are charted. The remaining percentage up to 100% corresponds to the negative answers.

A final observation concerns the predominance of short-term and relatively expensive forms of financing, particularly credit cards and bank overdrafts. These instruments are consistently used throughout the sample period, suggesting their entrenched role in SME financial strategies. Specifically, the proportion of businesses using bank overdrafts ranges from 17 percent (N=260) in 2020 to 25 percent (N=333) in 2023, indicating a small upward trend. The use of credit cards has increased annually from 20 percent in 2020 to 32 percent in 2023, representing a 60 percent increase. While both credit cards and overdrafts offer flexibility and immediate access to liquidity, features that are especially valuable in managing short-term cash flow, they are typically associated with higher interest rates compared to traditional loans or specialised financing products.

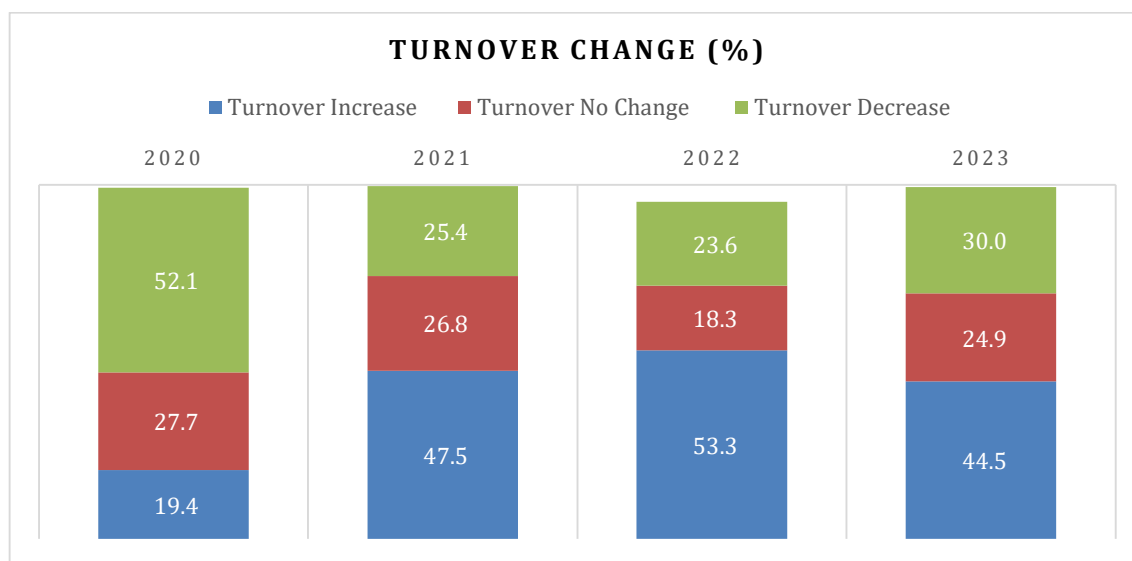
This reliance on costlier forms of credit may reflect constraints in accessing more affordable finance or a preference for convenience over long-term financial efficiency. The persistence of these funding choices raises important questions about the financial resilience and strategic planning of SMEs in the face of evolving economic conditions.

Other financing types such as Loans/Covid, Equity, Overdraft, and Commercial Mortgage display more moderate and fluctuating patterns, suggesting that their adoption may be more sensitive to specific economic conditions or sectoral dynamics. The presence of niche categories like P2P (peer-to-peer lending), Factoring, and Business Partners indicates a diversification in financing strategies, albeit with relatively lower uptake.

4.2.2 Changes in Turnover

Figure 5.5 presents the proportions of SMEs reporting turnover changes across consecutive years from 2020 and 2023, disaggregated into three categories: turnover increase, no change, and turnover decrease. A clear shift in the distribution of outcomes is observable across the four years, reflecting wider economic fluctuations and business performance trends during this period. In 2020, the majority of firms reported a decline in turnover, with 52.1 percent experiencing reductions, while only 19.4 percent reported increases. This finding is consistent with the economic disruption caused by the COVID-19 pandemic, which imposed significant constraints on business activity. By 2021, the trend had reversed, with 47.5 percent of firms experiencing increases in turnover compared to just 25.4 percent reporting decreases. This improvement suggests a period of recovery, as restrictions eased and economic activity resumed.

Figure 0.5 Changes in Turnover 2020 to 2023



Source: Authors own analysis using data from the LSBS 2020 to 2023

The positive trajectory continued into 2022, when 53.3 percent of firms experienced growth in turnover, the highest proportion across the four years, while the share of firms facing declines fell to 23.6 percent. This pattern indicates that 2022 represented a high point in the post-pandemic recovery, reflecting renewed demand and the re-establishment of market stability. However, 2023 saw a modest reversal, with the proportion of firms reporting turnover increases falling to 44.5 percent and those experiencing decreases rising again to 30 percent. The increase in stagnation, with 24.9 percent of firms reporting no change, points to a more uncertain or constrained business environment, possibly influenced by inflationary pressures, supply chain disruptions, or tightening credit conditions.

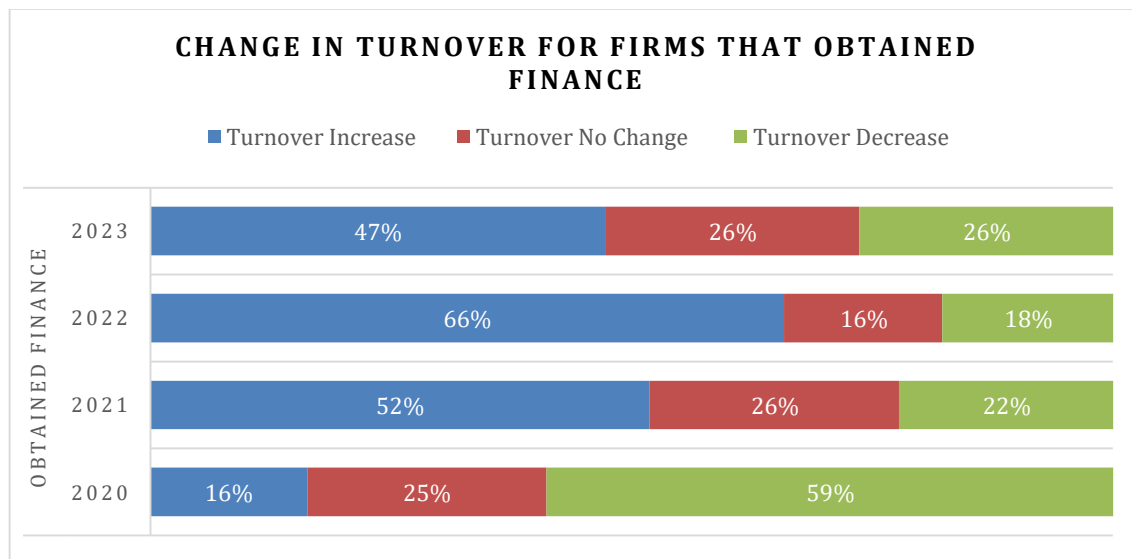
4.2.3 Firms that Obtained Finance – Employment and Turnover

Figure 5.6 tracks turnover outcomes for firms that obtained external finance between 2020 and 2023. In 2020, the predominance of SMEs that report a turnover decrease (59 percent) suggests that, despite access to finance, many firms were unable to counteract the adverse macroeconomic conditions of that year. In 2021, there was a discernible shift, with firms that obtained external finance more likely to report turnover increases than the overall population (52 percent against 48 percent see Figure 5.5). Comparable proportions of firms maintained stable turnover levels regardless of external finance access (26 percent vs 27 percent see Figure 5.5), while fewer externally financed firms reported a decline in turnover (22 percent vs 26 percent see Figure 5.5).

In 2022 and 2023, the positive trend continues. In 2022 66 percent of externally financed firms reported an increase in turnover, up from 52 percent in 2021, and exceeded the 54

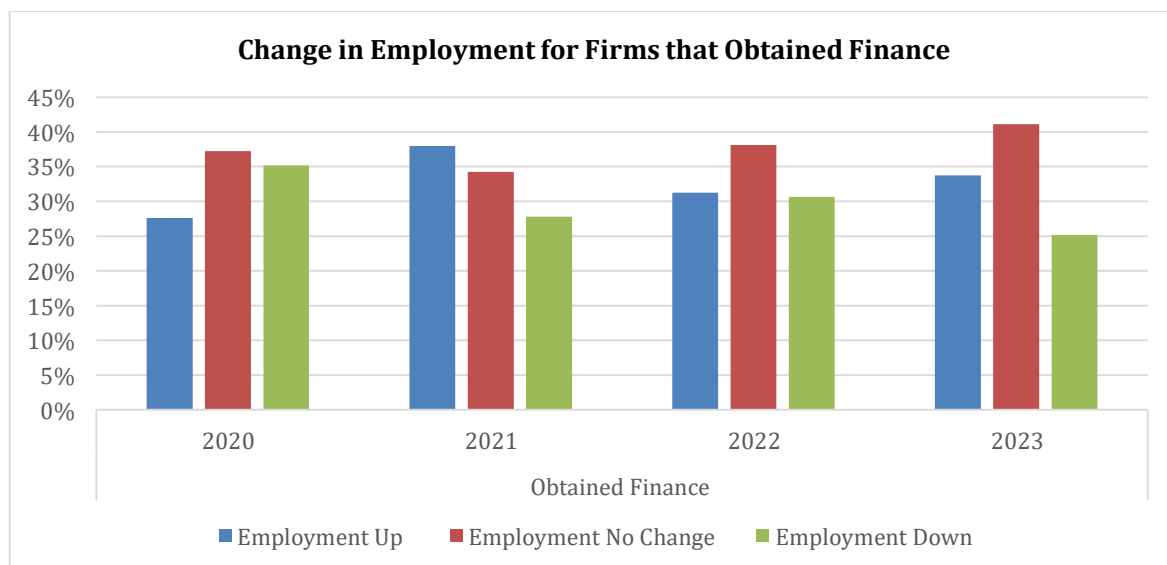
percent recorded by the overall population (see Figure 5.5). This indicates that financial support mechanisms may have become more effective over time, whether through improved design, more efficient implementation, or better alignment with the specific needs of firms. Additionally, externally finance firms were less likely to experience stagnant turnover than the overall population (16 percent vs. 18 percent), further supporting the view that external financing contributed to more favourable turnover outcomes. Overall, Figure 5.6 illustrates a progressive enhancement in the turnover performance of firms that obtained finance, with more recent years reflecting better outcomes.

Figure 0.6 Turnover of SMEs that obtained finance 2020 to 2023.



Source: Authors own analysis using data from the LSBS 2020 to 2023

Figure 0.7 Change in employment 2020 to 2023.



Source: Authors own analysis using data from the LSBS 2020 to 2023

Comparing externally financed firms to the overall sample shown in Figure 5.5 shows that in the crisis year, financed firms were less likely to see turnover fall than firms overall (about 35 percent vs 52 percent in 2020), implying a buffering effect of finance. In the recovery years, however, financed firms were less likely to post turnover growth and more likely to report no change (e.g., 31 percent growth vs 53 percent overall in 2022; 33–34 percent vs 45 percent in 2023, with “no change” 38–41 percent vs 18–25 percent). This divergence suggests that external finance may serve to stabilise revenues, including working capital, input costs, or balance-sheet repair, rather than to drive business expansion. Selection effects may also matter. Firms seeking finance may have faced tighter constraints or higher exposure to cost shocks. Overall, Figure 5.6 suggests a countercyclical role for finance, namely, mitigating losses in downturns and sustaining steady turnover in more uncertain and challenging macroeconomic conditions.

Figure 5.7 builds on the previous two figures by presenting changes in employment among firms that obtained finance between 2020 and 2023, disaggregated into three categories: employment increase, no change, and employment decrease. The data reveal important year-on-year fluctuations that reflect the evolving relationship between access to finance and firms’ capacity to sustain or expand their workforce in differing economic conditions. In 2020, employment outcomes were broadly divided, with 27 percent of firms reporting growth, 37 percent stability, and 35 percent decline. The relatively high share of firms experiencing reductions in employment suggests that finance provision was insufficient to offset the widespread disruption associated with the pandemic, which constrained firms’ ability to maintain staff levels despite access to external funding.

The situation improved in 2021, with 38 percent of firms increasing employment, the highest level across the observed period. At the same time, the share of firms experiencing declines in employment fell to 28 percent. This shift indicates that finance was more strongly associated with workforce expansion during the early stages of recovery, as businesses sought to rebuild capacity and respond to renewed demand.

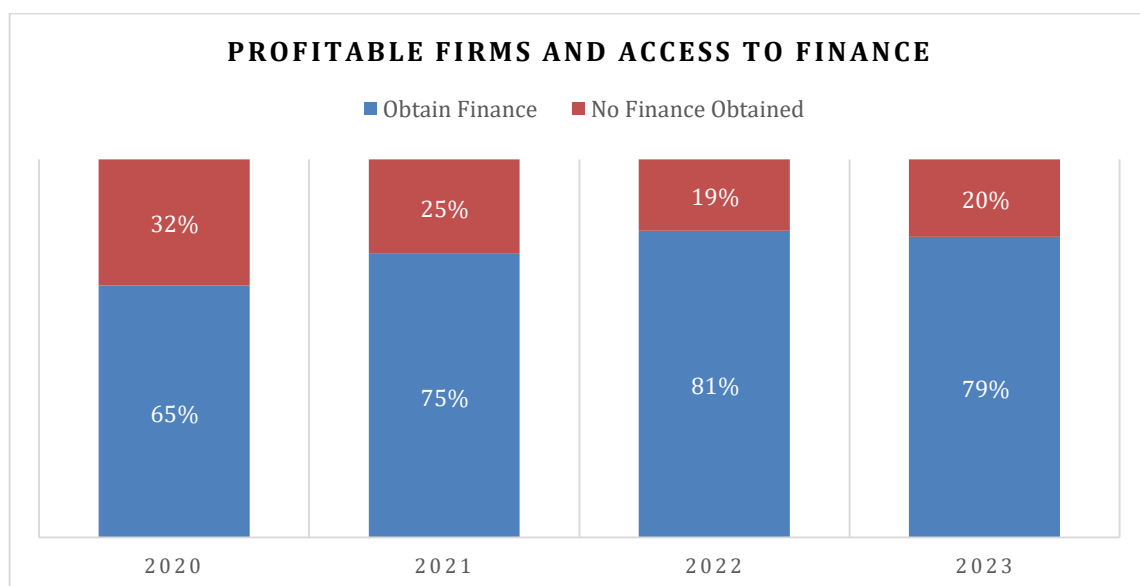
In 2022, the balance became less favourable. Although 31 percent of firms reported rising employment, a nearly equal proportion (30 percent) reported decreases, and the share with no change rose to 38 percent. This pattern suggests that while finance continued to support some firms in expanding their workforce, broader economic uncertainties, such as inflationary pressures, supply chain difficulties, and a tightening cost environment, constrained employment growth and led to greater heterogeneity in outcomes.

By 2023, the data reveal a modest improvement in employment growth, with 34 percent of firms reporting increases, yet this was still below the 2021 peak. The proportion of firms experiencing declines in employment fell to 25 percent, while stability rose to 41 percent, the highest across the period. This shift suggests that finance was increasingly used to sustain existing employment rather than drive expansion, reflecting a more cautious business environment characterised by cost containment and limited risk-taking.

Overall, Figure 5.7 indicates that while access to finance does play a role in supporting employment growth, its impact is contingent on the wider economic context. Finance was most strongly associated with workforce expansion during the immediate post-pandemic recovery in 2021, whereas in subsequent years it was more closely linked to employment stabilisation rather than growth. This underscores the importance of external conditions in shaping the employment effects of finance and suggests that policy interventions may be required to amplify the growth-enhancing impact of finance during periods of economic uncertainty.

We conducted Chi-squared tests to determine whether employment and turnover changes (2020 to 2023) differed significantly between firms that received external finance and those that did not. Results reveal a consistent and statistically significant association between access to finance and changes in employment, with all years showing significance at either the 95% or 99% confidence level. The strength of this relationship, while modest (ϕ ranging from 0.063 to 0.098), suggests that firms receiving finance are more likely to experience employment changes.

Figure 0.8 Profitability and Access finance 2020 to 2023.



Source: Authors own analysis using data from the LSBS 2020 to 2023

Figure 5.8 shows a clear upward trend in the percentage of profitable firms accessing finance over the first three years, rising from 65 percent in 2020 to a peak of 81 percent in 2022. This suggests a progressively improving financial environment or increased creditworthiness among profitable firms during this period. In 2023, however, there is a slight reversal, with the proportion of firms obtaining finance declining marginally to 79 percent, and those not obtaining finance increasing to 20 percent. Despite this minor dip, the overall trend indicates that a growing majority of profitable firms were able to secure financing, which may reflect enhanced financial inclusion, policy support, or improved firm-level financial performance. The consistency and magnitude of this trend underscore the importance of profitability as a determinant of access to finance. This may reflect rational bank screening, where lenders prioritise repayment capacity, favouring profitable firms. However, this approach may exclude viable firms which lack current profitability but possess growth-potential, highlighting the importance of policy interventions to ensure finance supports firms in the initial growth stages.

4.3 RQ3 - SME Net Zero

The net-zero transition presents both opportunities and challenges for SMEs. This section examines whether SMEs' net-zero transition objectives and future environmental business intentions are associated with differences in growth and productivity outcomes, providing insights for both policy and practice.

Table 5.14 presents a cross-tabulation of firms' attitudes toward environmental and social goals in 2023, segmented by their aim to grow sales. The analysis focuses on two dimensions: (1) whether firms offer solutions to environmental problems such as climate change or food waste, and (2) the degree to which social and environmental goals are a primary concern.

The evidence from the data indicates that businesses' environmental goals shifted between 2021 and 2023, with these changes mediated by whether firms aimed to grow sales or improve productivity levels. In 2021, firms reporting sales growth ambitions were more likely to view offering solutions to environmental problems as important.

Table 0-14 Environmental objectives by growth aims 2021-2023 (column %)

R1. Aim to grow sales. (2021)					R1. Aim to grow sales. (2023)			
		Yes	No	Total		Yes	No	Total
D1. Important to the business - offering solutions to environmental problems, such as climate change or food waste (2021)					D1. Important to the business - offering solutions to environmental problems, such as climate change or food waste (2023)			
Yes	Count	279 _a	213 _a	492	Count	226 _a	90 _b	316
	%	35%	30%	33%	%	35%	13%	23%
Total	Count	797	704	1501	Count	651	699	1350
D3. Whether social and environmental goals are main concern (2021)					D3. Whether social and environmental goals are main concern (2023)			
Your business' only concern	Count	4 _a	8 _a	12	Count	2 _a	0 _a	2
	%	1%	2%	1%	%	0%	0%	0%
Your business' primary concern	Count	49 _a	28 _a	77	Count	76 _a	65 _a	141
	%	10%	8%	9%	%	18%	23%	20%
Equal to financial or other goals	Count	168 _a	88 _b	256	Count	93 _a	69 _a	162
	%	33%	24%	29%	%	23%	25%	24%
Secondary to financial or other goals	Count	262 _a	176 _a	438	Count	203 _a	102 _b	305
	%	51%	48%	50%	%	49%	37%	44%
Non-existent	Count	30 _a	61 _b	91	Count	36 _a	34 _a	70
	%	6%	17%	10%	%	9%	12%	10%
Total	Count	513	363	876	Count	411	277	688

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

In the first dimension (D1), firms that do offer environmental solutions are more likely to report aiming to grow sales (35 percent in 2021 and 2023), compared to those that do not (30 percent in 2021, and 13 percent in 2023). The difference in 2023 is statistically significant at 5 percent, as indicated by the differing column proportions. This suggests that although interest in environmental goals contracted across the board, the retreat was particularly strong among businesses that had no growth ambitions, indicating that growth orientation sustains a greater commitment to environmental concerns over time.

The second dimension (D3) explores the prioritisation of social and environmental goals. Table 5.14 shows a similar pattern regarding the status of environmental and social goals relative to financial aims. Less than five firms reported these goals as their sole concern in both years, indicating that such a stance is extremely rare. A more common position is treating these goals as either a primary concern or equal to financial goals (162 firms). Notably, there is an increase in the numbers of such businesses from N=77 (9 percent) in 2021 to N=141 firms in 2023 (20 percent). In addition, firms aiming to grow sales are more likely to treat social and environmental goals as primary (N=76, 18 percent in 2023, N=49, 10 percent in 2021) or equal (N=93 or 23 percent in 2023, 168, N=33 percent in 2021) compared to those not aiming to grow sales. However, businesses identifying environmental aims as secondary remain predominant in both years. Although there was

a decline between 2021 and 2023, businesses that treat environmental objectives as secondary continued to dominate SMEs focused on growth as well as those that are not.

Finally, although a small share of firms reports these goals as non-existent (10 percent in both years), the proportion of businesses not aiming for growth and reporting no environmental goal declined from 17 percent (N=61) in 2021 to 12 percent (N=34). Overall, Table 5.14 indicates a growing awareness of environmental issues among UK SMEs, particularly those with growth ambitions. Nevertheless, environmental objectives continue to be subordinate to financial priorities. As shown in Table 5.16, most businesses pursue environmental goals primarily through strategies aimed at improving energy efficiency and reducing energy costs, a trend that intensified following the 2022 invasion of Ukraine, which triggered a sharp rise in UK energy prices.

When productivity is considered, differences emerge across output cohorts as shown in Table 5.15. In 2021, firms in the highest productivity brackets (above £50k) showed strong engagement with environmental concerns (D1), with 34 percent (N=227) of businesses acknowledging environmental importance. Yet by 2023 this figure had markedly contracted to 25 percent (N=164). At the same time, the lowest productivity groups displayed minimal engagement in both years, with only marginal counts reporting environmental solutions as important (D1). A parallel trend can be observed in the weighting of environmental goals relative to financial ones (D3). In 2021, 76 firms across productivity categories identified them as their primary concern, a number that rose to 128 in 2023. The increase was concentrated in middle-to-higher productivity cohorts, which suggests that greater efficiency and output levels are associated with a stronger elevation of environmental priorities.

It is clear in Table 5.15 that businesses not offering solutions to environmental issues dominate in both years, although, the proportion of firms offering solutions increases with productivity, peaking at 34% in the highest productivity bracket in 2021. This finding suggests a potential positive correlation between productivity and environmental engagement. Nevertheless, the overall decline in absolute numbers of firms recognising environmental importance implies that productivity alone does not guarantee sustained commitment; rather, the combination of growth orientation and higher productivity appears most conducive to embedding environmental goals.

Table 0-15 Environmental objectives by productivity levels - 2021-2023 (column %)

productivity 2021 (summary) -Cohort A								productivity 2023 (summary) – Cohort C						
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k +	Total		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k +	Total
D1. Important to the business - offering solutions to environmental problems, such as climate change or food waste (2021)								D1. Important to the business - offering solutions to environmental problems, such as climate change or food waste (2023)						
Yes	Count	6 _a	15 _a	27 _a	184 _a	227 _a	459	Count	20 _a	0 _{b, c}	13 _c	79 _c	164 _b	276
	%	27%	43%	35%	34%	34%	34%	%	83%	0%	14%	18%	25%	23%
Total	Count	22	35	78	546	670	1351	Count	24	1	95	434	661	1215
D3. Whether social and environmental goals are main concern (2021)								D3. Whether social and environmental goals are main concern (2023)						
Your business's only concern	Count	0 _a	0 _a	0 _a	3 _a	8 _a	11	Count	0 _a	0 _a	0 _a	1 _a	1 _a	2
	%	0%	0%	0%	1%	2%	1%	%	0%	0%	0%	0%	0%	0%
Your business's primary concern	Count	6 _a	13 _a	4 _{b, c}	35 _c	18 _b	76	Count	10 _a	0 _b	36 _a	43 _b	39 _c	128
	%	40%	46%	9%	11%	5%	10%	%	50%	46%	60%	19%	12%	21%
Equal to financial or other goals	Count	0 _a	15 _b	14 _{b, c}	93 _c	108 _c	230	Count	0 _a	0 _a	15 _b	51 _b	82 _b	148
	%	0%	54%	33%	29%	29%	29%	%	0%	54%	25%	23%	26%	24%
Secondary to financial or other goals	Count	9 _a	0 _b	21 _a	158 _a	210 _a	398	Count	10 _a	0 _b	9 _b	104 _a	151 _a	274
	%	60%	0%	49%	49%	56%	50%	%	50%	0%	15%	46%	48%	44%
Non-existent	Count	0 _a	0 _a	4 _a	34 _a	33 _a	71	Count	0 _{a, b}	0 _a	0 _b	21 _a	41 _a	62
	%	0%	0%	9%	10%	9%	9%	%	0%	0%	0%	9%	13%	10%
Total	Count	15	28	43	325	378	789	Count	20	0	60	226	315	621

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Taken together, the evidence points to a mixed relationship between business characteristics and environmental goals. While there was a general contraction in the overall counts of firms emphasising environmental solutions between 2021 and 2023, those aiming for sales growth or operating at higher productivity levels were more resilient in sustaining or even increasing the importance of environmental concerns. This suggests that ambition -whether expressed as growth orientation or higher productivity- plays a significant role in reinforcing commitment to environmental goals, even during periods of wider economic disruptions and business retrenchment.

Table 0-16 Energy efficiency measures by growth aims – 2020-2023 (column %)

R1. Aim to grow sales. (2023)					R1. Aim to grow sales. (2022)			
E6a. Has your business installed any energy efficiency measures in the last 12 months? Cohort A only. (2023)					E6a. Has your business installed any energy efficiency measures in the last 12 months? Cohort A (2022)			
		Yes	No	Total		Yes	No	Total
Yes	Count	20 _a	9 _a	29	Count	11 _a	4 _a	15
	%	21%	12%	17%	%	16%	13%	15%
No	Count	74 _a	64 _a	138	Count	52 _a	25 _a	77
	%	79%	88%	83%	%	75%	78%	76%
Total	Count	94	73	167	Count	69	32	101
R1. Aim to grow sales. (2021)					R1. Aim to grow sales. (2020)			
E6a. Has your business installed any energy efficiency measures in the last 12 months? Cohort A only. (2021)					E6A. Has your business installed any energy efficiency measures in the last 12 months? Cohort A only. (2020)			
Yes	Count	12 _a	11 _b	23	Count	14 _a	2 _b	16
	%	9%	24%	13%	%	10%	2%	7%
No	Count	120 _a	32 _b	152	Count	128 _a	82 _b	210
	%	90%	71%	85%	%	88%	96%	91%
Total	Count	133	45	178	Count	145	85	230

Source: Authors own analysis using data from the LSBS 2020 to 2023. Each subscript letter denotes a subset of categories whose column proportions do not differ significantly from each other at the .05 level.

Table 5.16 reports the adoption of energy efficiency measures by businesses between 2020 and 2023. It shows a gradual but uneven evolution, with sales growth ambitions playing a significant role in shaping these decisions. In 2020, 10 percent (N=14) firms aiming to grow sales adopted energy efficiency measures, compared to only 2 percent (N=2) among firms without growth ambitions (<0.05). This pattern highlights an early and marked divide, suggesting that businesses prioritising expansion were more inclined to integrate efficiency improvements into their operations. The gap is further reinforced by the higher share of businesses not adopting any energy efficiency measures among non-growth firms, N=82 against N=128 in the growth-oriented group.

In 2021, this divergence persisted, though the relative balance shifted slightly. Among firms aiming to grow sales, 12 adopted efficiency measures, whereas 120 did not. In contrast, among non-growth firms, 11 took measures while 32 did not. Although the absolute numbers remained modest, the data indicates that growth ambition was still associated with greater overall engagement in energy efficiency, even if the majority of businesses in both categories had yet to act. This is especially noteworthy during the Covid-19 disruption, when most businesses were in lockdown between March 2021 and March 2022.

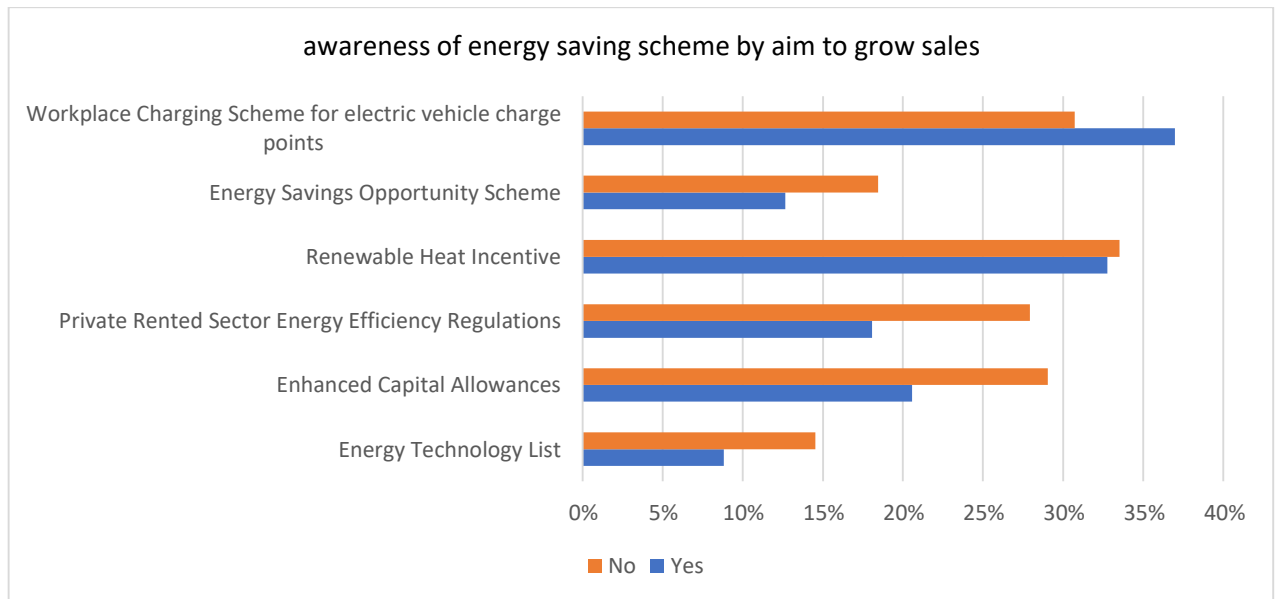
By 2022, the incidence of efficiency measures increased, particularly among sales growth firms. Here, 16 percent (N=11) businesses with growth ambitions had taken such steps, compared with 12 percent (N=4) among those without. Although the difference remains consistent with earlier years, demonstrating that sales growth orientation continues to provide a positive stimulus to efficiency adoption, it is not statistically significant. In addition, the absolute figures remain extremely low compared with the total counts of businesses surveyed, underlining that energy efficiency was still not a dominant strategy at this stage.

The most notable shift occurred in 2023, when the number of sales growth firms adopting efficiency measures rose to 21 percent (N=20), while 12 percent (N=9) non-growth firms reported similar action. Although both groups showed an increase, the proportion of growth-oriented firms taking action was higher, and the overall scale of adoption was more substantial than in earlier years. Importantly, this suggests not only persistence but also an intensification of the link between sales growth ambition and environmental investment, with growth-driven firms consistently more active in installing measures than their counterparts. This finding may also reflect the impact of the increase in energy costs in the aftermath of the invasion of Ukraine (February 2022).

Taken together, the evidence from 2020 to 2023 reveals a steady progression in the uptake of energy efficiency measures across all firms, yet with a consistent and positive influence of sales growth ambitions on these decisions. Growth-oriented businesses demonstrate a stronger and more reliable propensity to implement efficiency improvements, suggesting that the pursuit of expansion may create both the motivation and the resources necessary to engage with environmental and cost-saving strategies. In contrast, firms without sales growth ambitions remain less active in this area, with their engagement rising at a slower pace and to a lesser extent. This persistent divide underscores the importance of business strategy in shaping environmental practices, with sales growth orientation emerging as a decisive factor in the adoption of energy efficiency measures.

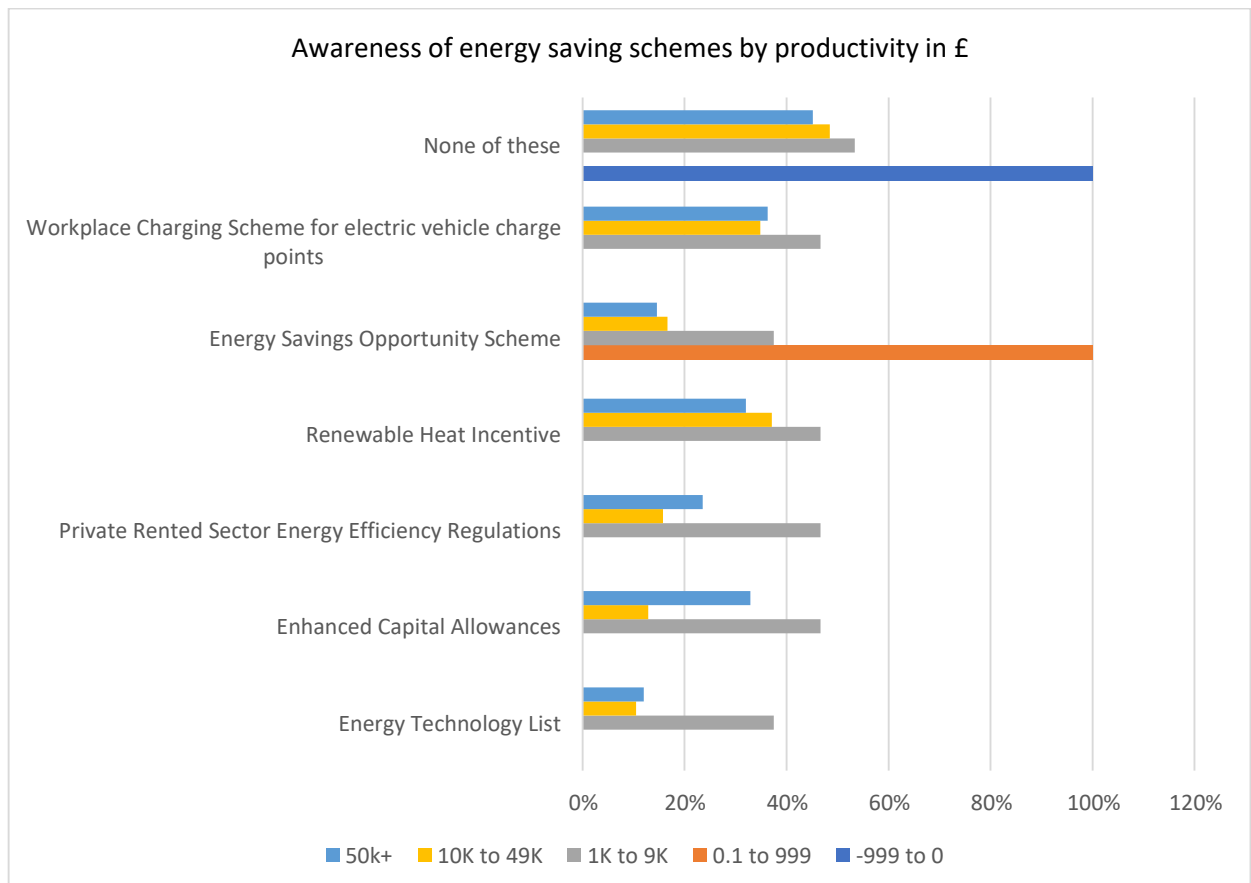
Figure 5.9 presents a comparative analysis of respondents' awareness of six distinct energy-saving schemes, segmented by their business orientation, specifically, whether they aim to grow sales. The data reveal varying levels of awareness across the schemes. The *Workplace Charging Scheme for electric vehicle charge points* emerges as the most recognised, with approximately 35 percent of respondents indicating awareness.

Figure 0-9 Awareness of energy saving scheme by aim to grow sales -2023 (Cohort C)



Source: Authors own analysis using data from the LSBS 2020 to 2023. Note: Each energy saving scheme shown is a separate “yes/no” question. Only the positive answers are charted. The remaining percentage up to 100% corresponds to the negative answers. See Annex (Table A2b-A2c) for detailed counts.

Figure 0-10 Awareness of energy saving schemes by productivity in £ - 2023 (Cohort C)



Source: Authors own analysis using data from the LSBS 2020 to 2023. Note: Each energy saving scheme shown is a separate “yes/no” question. Only the positive answers are charted. The remaining percentage up to 100% corresponds to the negative answers. See Annex (Table A3a-A3c) for detailed counts.

This is followed closely by the *Renewable Heat Incentive* and the *Enhanced Capital Allowances*, each with awareness levels around 30 percent. These figures suggest that schemes with direct implications for infrastructure or regulatory compliance may be more salient to businesses focused on growth.

In contrast, awareness of the *Energy Technology List* is notably lower, with only about 10 percent of respondents familiar with it. This may reflect either limited outreach or perceived relevance among the target audience. The *Private Rented Sector Energy Efficiency Regulations* and *Energy Savings Opportunity Scheme* occupy a middle ground, with awareness levels around 10–20 percent, indicating moderate penetration.

The similar magnitude of the “Yes” and “No” bars for several schemes, particularly the *Renewable Heat Incentive*, suggests a near-equal split in awareness, pointing to potential gaps in communication or accessibility. The consistent presence of a substantial proportion of respondents who are unaware of these schemes underscores a broader issue: despite the availability of energy-saving initiatives, knowledge dissemination remains uneven.

Overall, the figure illustrates that while some energy-saving schemes have achieved moderate visibility among growth-oriented businesses, others remain under-recognized. This disparity highlights the need for targeted awareness campaigns, especially for schemes with lower recognition but potentially high impact on energy efficiency and cost savings.

Figure 5.10 presents a comparative analysis of awareness levels across seven energy-saving schemes, segmented by business productivity categories. These categories range from negative productivity (–£999-£0) to high productivity (£50K+).

The data show a complex relationship between productivity and energy-saving scheme awareness. Notably, the category labelled “None of these” reaches 100 percent within the group of businesses with negative productivity. This outcome is unsurprising, as negative productivity is associated by definition with negative sales turnover (see section 5.1.2.1.). Moreover, limited awareness of available schemes aimed at reducing energy costs may further exacerbate operational inefficiencies, contributing to such underperformance. In contrast, awareness of specific schemes tends to increase with productivity, indicating that more productive businesses are generally more informed about available energy-saving initiatives.

Among the schemes, the *Energy Savings Opportunity Scheme* is the most familiar to SMEs within the 10K to 49K productivity group, suggesting that mid-range productive firms may be more engaged with incentive-based energy-efficiency programs. Similarly, the *Renewable Heat Incentive* and *Private Rented Sector Energy Efficiency Regulations* show moderate to high awareness among businesses in the £50K+ and £10K-£49K categories, reinforcing the notion that higher productivity correlates with greater scheme visibility.

Lower productivity groups, particularly those in the £0- £999 and £1K-£9K ranges, exhibit consistently lower awareness across most schemes. This pattern may reflect limited access to information, fewer resources for implementation, or reduced strategic emphasis on energy efficiency within smaller or less productive enterprises.

Overall, Figure 5.10 underlines a positive association between business productivity and awareness of energy-saving schemes. It also highlights disparities in informational reach and engagement, suggesting that targeted outreach efforts may be necessary to improve scheme visibility among lower productivity firms.

5. ECONOMETRIC ANALYSIS

Tables 6.1 to 6.4 present the multivariate analysis of the determinants of the rate of change of labour productivity between 2021 and 2023, with particular focus on the role of growth ambitions, access to finance, and environmental objectives. The regressions build on the descriptive analysis in sections 5.1 to 5.3. The dependent variable is the percent change in productivity, as defined in Section 5.1.2. Following previous research (Jabril et al 2020 and Owen et al 2019), the percent change in productivity is ranked into quartiles. The regression results for 2021, 2022, and 2023 are shown in Tables 6.1-6.3. They reveal consistent patterns in the effects of external finance and growth orientation on productivity, but the direction and significance of these effects vary across quartiles and over time.

The impact of growth ambitions (*R1 Aim to grow sales*) on the productivity rate is relatively mixed. In 2021 coefficients are negative and significant in Quartiles 1 and 3, positive and significant in Quartiles 2 and 4, indicating that growth orientation benefits lower-performing firms but may be misaligned with productivity in mid-range firms. In 2022, the variable is significant in the three highest quartiles of the productivity distribution. The impact of growth ambitions in quartiles 2 and 3 is positive: coefficient = 0.13, $p = 0.1$ (Quartile 2) and coefficient = 0.13, $p = 0.01$ (Quartile 3). However, the impact is negative and significant in the highest productivity band. Finally, in 2023, growth ambition is significant only in the lower quartile (0.11, $p = 0.01$), suggesting that aiming to grow sales is most beneficial for

firms at the bottom of the productivity distribution. Overall, growth ambitions consistently support productivity in the mid-quartiles across all years, while its impact in higher quartiles is either neutral or negative.

These findings contrast to those reported by Jibril, Stanfield, and Roper (2020), who examined the determinants of productivity growth among UK SMEs operating below the productivity frontier during the period 2016–2018. Their econometric analysis found no consistent relationship between a firm's initial position in the productivity distribution and its subsequent growth in turnover per employee. Indeed, firms in the lower deciles of the productivity distribution frequently exhibited higher growth rates than those in the upper deciles. Complementing this quantitative evidence, qualitative interviews with high-growth SMEs underscored the significance of unobservable organisational factors. The authors argue that these factors, rather than initial productivity levels, firm size, or prior turnover performance, play a more decisive role in driving productivity improvements. The divergence between their results and those of the present analysis can be attributed to two key differences. First, their sample predates major macroeconomic shocks, including the Covid-19 pandemic (2020) and the invasion of Ukraine (2022). Second, their study draws on a substantially larger firm-level panel dataset from the Financial Analysis Made Easy (FAME) database ($N = 1,395$), whereas the regressions reported here are based on fewer than 500 observations.

Access to external finance is captured through two measures: finance applied for, and finance used. In 2021, the use of external finance was statistically significant but negative in Quartile 2 (coefficient = -0.10 , $p < 0.05$), while applying for external finance had a negative effect in Quartile 3 (coefficient = -0.28 , $p < 0.01$), indicating an adverse association with productivity in these segments. However, applying for finance was positively associated with productivity in the lower quartile (coefficient = 0.32 , $p < 0.01$), suggesting that less productive firms may benefit from seeking external funding. In 2022, a significant positive association emerged in the upper quartile (coefficient = 0.24 , $p < 0.01$), implying that more productive firms may strategically apply for finance to sustain performance, while no other quartile showed significance. In 2023, the effect of applying for finance was heterogeneous across quartiles: the upper quartile displayed a positive coefficient (0.14) that was marginally significant at the 10% level, suggesting that firms seeking finance were more likely to be in the top tier of labour productivity, whereas the lower quartile exhibited a negative and highly significant coefficient (-0.18 , $p < 0.01$). This pattern indicates that applying for finance may signal strategic investment among high performers but financial distress among weaker firms, potentially reinforcing their lower productivity position. Overall, the impact of applying for finance varies by year and quartile: in 2021 and 2023,

lower-performing firms experienced opposing effects, while upper-performing firms consistently showed positive associations in 2022 and 2023.

The effects of using external finance are more complex and exhibit lagged impacts. In 2023, the use of external finance in 2022 shows sharp contrasts across the productivity distribution. In the upper quartile, the coefficient is strongly negative (-0.21 , $p < 0.01$), indicating that firms that used external finance in the previous year were less likely to remain in the highest productivity group. Conversely, Quartile 3 shows a positive and significant effect (0.18 , $p < 0.01$), suggesting that finance users were more likely to cluster in the middle rather than at the top. For the lower quartile, the effect was small and statistically insignificant.

These findings imply that while external finance may help firms maintain mid-level productivity, it does not appear to propel them to the frontier and may even exclude them from the upper quartile. In 2021, the use of external finance was significant only in Quartile 2, where the coefficient was negative (0.10 , $p = 0.03$), indicating that actual deployment of finance did not enhance productivity for mid-performing firms. In 2022, the pattern shifted: the upper quartile exhibited a significant negative association (-0.09 , $p = 0.04$), while the lower quartile showed a positive and significant effect (0.10 , $p = 0.02$), suggesting that finance use supported productivity among the least productive firms but was detrimental for those at the top. By 2023, the negative effect in the upper quartile intensified (-0.21 , $p < 0.01$), while Quartile 3 displayed a strong positive association (0.18 , $p < 0.01$) and Quartile 2 showed a marginally significant positive effect (0.07 , $p = 0.10$). Taken together, these results indicate that across all three years, the use of external finance tends to be negatively associated with productivity in the upper quartile, whereas mid- and lower-performing firms exhibit more mixed or positive effects.

Having an updated formal business plan shows a generally positive effect on productivity across quartiles in all years 2023. For quartile 2, the coefficient is positive (0.07 , significant at the 5% level), suggesting that firms with business plans are more likely to avoid being stuck at the lower end. For the lower quartile, the coefficient is negative (-0.07 , significant at the 1% level), confirming that planning reduces the likelihood of being in the least productive group. However, for quartile 3, the effect is slightly negative (-0.05 , significant at the 10% level), while for the upper quartile it is positive but insignificant. This indicates that business planning mainly serves to prevent firms from falling into the lowest productivity group rather than propelling them to the top.

Table 0-1 Determinants of productivity changes in 2021

Parameter	Upper Quartile 2021		Quartile 3 2021		Quartile 2 2021		Lower Quartile 2021	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
(Constant)	1.48	0.00	-0.25	0.55	0.18	0.67	-0.40	0.33
Micro 2021	0.15	0.60	-0.14	0.60	-0.18	0.51	0.17	0.52
Small 2021	-0.03	0.91	-0.11	0.71	0.05	0.85	0.09	0.75
Age 0 to 5 2021	0.38	0.06	-0.61	0.00	-0.17	0.38	0.40	0.04
Age 6 to 10 2021	-0.10	0.15	-0.16	0.02	0.20	0.00	0.06	0.36
Age >20 2021	0.11	0.02	-0.16	0.00	0.01	0.90	0.05	0.32
Transport Retail and Food Services 2021	0.07	0.31	0.06	0.42	-0.09	0.21	-0.04	0.54
Business Services 2021	-0.18	0.00	0.11	0.05	-0.03	0.63	0.10	0.07
Other Services 2021	-0.04	0.54	-0.06	0.37	0.10	0.13	0.00	0.97
Northern England	-0.05	0.44	-0.12	0.07	-0.12	0.08	0.29	0.00
Southern England	-0.08	0.12	0.08	0.13	-0.01	0.81	0.01	0.79
Devolved Nations	-0.16	0.05	0.35	0.00	-0.07	0.36	-0.12	0.11
Whether business is women-led (2021)	0.11	0.07	0.06	0.36	0.01	0.90	-0.17	0.00
Whether business is MEG-led (2021)	-0.81	0.00	0.28	0.06	0.18	0.20	0.35	0.01
F5. Do you have a formal written business plan? (2021)	-0.06	0.05	0.14	0.00	-0.05	0.07	-0.03	0.36
J1. New or significantly improved goods in the last 3 years. (2021)	0.16	0.01	-0.18	0.00	0.10	0.11	-0.07	0.23
R1. Aim to grow sales. (2020)	-0.09	0.06	-0.13	0.01	0.11	0.02	0.11	0.02
C1/C2. Whether export goods or services (2021)	-0.11	0.05	0.25	0.00	-0.17	0.00	0.03	0.65
A10. Whether have separate business premises. (2021)	0.21	0.00	-0.12	0.01	-0.12	0.01	0.03	0.54
Applied Ext Fin 2021	-0.01	0.95	-0.28	0.00	-0.03	0.72	0.32	0.00
K2. Whether used information or advice in the last 12 months - UK. (2021)	-0.03	0.65	-0.04	0.55	0.11	0.05	-0.05	0.37
Used External Finance (Debt, Equity and Grant 2021)	0.06	0.22	0.01	0.91	-0.10	0.03	0.04	0.38

All independent variables are binary, e.g, the value of R1. Aim to grow sales= 1 if the survey response is yes, 0 if the response is No. All regressions are weighted with Cross-sectional weight – 2021. **Upper quartile estimation:** R-square: 0.182; Adj. R-square: 0.140; N=430; **Q3 estimation:** R Square: 0.228; Adjusted R Square: 0.188; N=430. **Q2 estimation:** R Square: 0.162; Adjusted R Square: 0.119; N=430. **Lower quartile estimation:** R Square: 0.173; Adjusted R Square: 0.130; N=430

Table 0-2 Determinants of productivity changes in 2022

Parameters	Upper Quartile 2022		Quartile 3 2022		Quartile 2 2022		Lower Quartile 2022	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
(Constant)	0.43	0.38	0.44	0.35	-0.54	0.28	0.80	0.05
Micro 2022	0.31	0.30	-0.15	0.61	-0.15	0.62	0.17	0.57
Small 2022	0.09	0.78	0.01	0.97	-0.05	0.87	0.10	0.74
Age 0 to 5 2022	-0.14	0.54	0.05	0.80	0.11	0.63	-0.26	0.32
Age 6 to 10 2022	0.06	0.42	-0.01	0.88	0.06	0.42	-0.12	0.11
Age >20 2022	-0.07	0.12	0.11	0.02	0.06	0.25	-0.06	0.19
Transport Retail and Food Services 2022	0.22	0.00	-0.25	0.00	0.09	0.25	-0.02	0.74
Business Services 2022	0.07	0.20	-0.03	0.60	0.06	0.33	-0.06	0.23
Other Services 2022	0.25	0.00	-0.05	0.45	-0.02	0.78	-0.15	0.01
Northern England	0.20	0.00	-0.36	0.00	0.00	0.96	0.09	0.14
Southern England	0.02	0.73	-0.30	0.00	0.26	0.00	-0.07	0.19
Devolved	-0.13	0.07	-0.08	0.24	0.11	0.16	0.01	0.85
Whether business is women-led (2022)	-0.24	0.00	0.16	0.01	0.00	0.97	-0.16	0.00
Whether business is MEG-led (2022)	0.32	0.04	-0.04	0.80	0.13	0.42	-0.28	0.00
F5. Do you have a formal written business plan? (2022)	-0.08	0.01	0.00	0.95	0.03	0.37	0.00	0.86
J1. New or significantly improved goods in the last 3 years. (2022)	-0.04	0.61	-0.14	0.06	0.02	0.80	0.10	0.14
R1. Aim to grow sales. (2021)	-0.10	0.05	0.08	0.10	0.13	0.01	-0.07	0.11
C1/C2. Whether export goods or services. (2022)	-0.14	0.01	-0.03	0.61	0.07	0.23	0.05	0.42
A10. Whether have separate business premises. (2022)	0.05	0.24	-0.03	0.50	-0.02	0.67	-0.04	0.37
Applied Ext Fin 2022	0.24	0.00	0.06	0.44	-0.05	0.52	0.06	0.35
K2. Whether used information or advice in the last 12 months - UK. (2022)	-0.07	0.24	0.10	0.05	0.08	0.15	0.01	0.83
Used External Finance (Debt, Equity and Grant 2022)	-0.09	0.04	0.02	0.66	-0.06	0.20	0.10	0.02

All independent variables are binary, e.g, the value of R1. Aim to grow sales= 1 if the survey response is yes, 0 if the response is No. All regressions are weighted with Cross-sectional weight – 2022. **Upper quartile estimation:** R-square: 0.217; Adj. R-square: 0.178. N=442; **Q3 estimation:** R Square: 0.201; Adjusted R Square: 0.161; N=442. **Q2 estimation:** R Square: 0.161; Adjusted R Square: 0.119; N=442. **Lower quartile estimation:** R Square: 0.129; Adjusted R Square: 0.086; N=442

Table 0-3 determinants of productivity changes in 2023

Parameters	Upper Quartile 2023		Quartile 3 2023		Quartile 2 2023		Lower Quartile 2023	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
(Constant)	0.07	0.88	0.53	0.21	-1.18	0.01	1.48	0.00
Micro23	0.06	0.84	-0.22	0.44	0.01	0.98	0.15	0.57
Small23	0.01	0.99	-0.12	0.69	-0.10	0.74	0.21	0.45
Age 0 to 5 2023	-0.01	0.97	-0.11	0.70	-0.12	0.69	0.43	0.12
Age 6 to 10 2023	0.20	0.03	-0.24	0.01	0.07	0.43	-0.11	0.20
Age >20 2023	0.11	0.03	-0.08	0.11	0.13	0.01	-0.15	0.00
Transport Retail and Food Services 2023	0.09	0.23	-0.12	0.09	0.04	0.62	0.00	1.00
Business Services 2023	-0.08	0.20	-0.13	0.04	0.19	0.00	0.02	0.72
Other Services 2023	-0.14	0.07	-0.02	0.82	0.17	0.02	-0.02	0.74
Northern England	-0.03	0.74	-0.25	0.00	0.30	0.00	-0.13	0.08
Southern England	-0.04	0.50	-0.02	0.66	0.05	0.36	0.00	0.93
Devolved	-0.21	0.01	-0.12	0.12	0.10	0.19	0.16	0.03
Whether business is women-led (2023)	0.11	0.06	0.03	0.59	-0.04	0.50	-0.14	0.01
Whether business is MEG-led (2023)	0.11	0.30	-0.25	0.01	0.37	0.00	-0.16	0.10
F5. Do you have a formal written business plan? (2023)	0.04	0.17	-0.05	0.08	0.07	0.02	-0.07	0.01
J1. New or significantly improved goods in the last 3 years. (2023)	0.01	0.93	0.18	0.02	0.04	0.61	-0.24	0.00
R1. Aim to grow sales. (2022)	-0.06	0.20	-0.05	0.25	0.01	0.77	0.11	0.01
C1/C2. Whether export goods or services (2023)	-0.11	0.14	0.06	0.42	0.08	0.25	0.00	0.97
A10. Whether have separate business premises. (2023)	0.25	0.00	0.07	0.13	-0.17	0.00	-0.16	0.00
Applied Ext Fin 2023	0.14	0.09	0.04	0.58	0.07	0.32	-0.18	0.01
K2. Whether used information or advice in the last 12 months - UK. (2023)	-0.19	0.00	0.05	0.31	0.16	0.00	0.00	0.94
Used External Finance (Debt, Equity and Grant 2022)	-0.21	0.00	0.18	0.00	0.07	0.10	-0.03	0.52

All independent variables are binary, e.g, the value of R1. Aim to grow sales= 1 if the survey response is yes, 0 if the response is No. All regressions are weighted with Cross-sectional weight – 2023 **Upper quartile estimation**: R-square: 0.205; Adj. R-square: 0.161. N=405; **Q3 estimation**: R Square: 0.149; Adjusted R Square: 0.103; N=405. **Q2 estimation**: R Square: 0.226; Adjusted R Square: 0.184; N=405. **Lower quartile estimation**: R Square: 0.183; Adjusted R Square: 0.138; N=405

Over the three-year period, the impact of finance and growth orientation on productivity reveals a consistent pattern: **growth aims, and external finance tend to support productivity among lower-performing firms, while their effects are more ambiguous or even detrimental among top performers.** This suggests that policy interventions should be tailored to firm productivity levels, with targeted support for growth and financial access among firms seeking to improve performance, and more strategic guidance for high-performing firms to avoid overextension or inefficient capital use.

5.1 Environmental objectives

Tables 6.4 and 6.5 report the results of regression models for changes in labour productivity in 2021 and 2023, with a particular interest here in the explanatory variable **D3**, which captures whether the business has environmental aims either as a **main aim** or **secondary to financial objectives**. In 2021, the results indicate that prioritising environmental objectives over financial aims (*D3 main aim 2021*) is associated with a positive impact on productivity in the lowest productivity quartile, while exerting a negative influence on firms in the middle of the distribution. Specifically, the coefficient for D3 main aim is positive and highly significant for the lower quartile (0.37, $p < 0.01$), negative and statistically significant for Quartile 3 (-0.19, $p = 0.03$), and marginally negative for Quartile 2 (-0.16, $p = 0.07$), with no significant association observed for the upper quartile (-0.03, $p = 0.74$).

These patterns suggest that, in 2021, firms declaring environmental goals as a primary corporate aim were over-represented among the least productive firms and under-represented in the mid-performing quartiles.

By contrast, treating environmental aims as **secondary** has mixed impacts on the productivity of SMEs. They are positive for those in Q3 (0.15, $p < 0.01$), and negative in the Upper quartile, (coefficient= -0.15, $p < 0.01$). It has no discernible effects in Quartiles 2 and 1, implying that in 2021 secondary environmental commitments were linked to a shift from the top toward the upper-middle of the distribution.

The 2023 estimates presented in Table 6.5 show a significant reconfiguration of the impact of environmental objectives on productivity. Declaring environmental objectives as a **main aim** becomes positively and significantly related to the upper productivity quartile (0.34, $p < 0.01$) and negatively related to both the second (-0.19, $p = 0.01$) and lower quartiles (-0.19, $p < 0.01$), with no effect in Quartile 3. This represents a marked reversal relative to 2021 and indicates that, by 2023, businesses centring on environmental aims are located at the higher levels of the productivity distribution and are less likely to be found in its lower half. For **secondary environmental aims**, the 2023 pattern remains consistent with a tilt toward the upper-middle of the distribution, as evidenced by a positive association with Quartile 3 (0.11, $p = 0.03$). However, the impact of secondary environmental objective differs from 2021, by showing no impact at the top (insignificant in the upper quartile) and an emergent negative association in Quartile 2 (-0.23, $p < 0.01$), with no effect in the lower quartile.

Table 0-4 Environmental objectives and changes in productivity 2021

A	Upper Quartile 2021		Quartile 3 2021		Quartile 2 2021		Lower Quartile 2021	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
(Constant)	1.78	0.00	-0.51	0.23	0.23	0.58	-0.50	0.22
Micro 2021	0.16	0.55	-0.14	0.60	-0.16	0.55	0.14	0.59
Small 2021	-0.03	0.93	-0.12	0.67	0.05	0.86	0.10	0.72
Age 0 to 5 2021	0.30	0.13	-0.54	0.01	-0.18	0.37	0.41	0.03
Age 6 to 10 2021	-0.12	0.08	-0.13	0.05	0.20	0.00	0.05	0.43
Age >20 2021	0.09	0.05	-0.15	0.00	0.00	0.98	0.06	0.17
Transport Retail and Food Services 2021	0.07	0.30	0.07	0.31	-0.07	0.27	-0.07	0.32
Business Services 2021	-0.21	0.00	0.16	0.00	-0.01	0.88	0.05	0.32
Other Services 2021	-0.07	0.34	0.03	0.63	0.14	0.04	-0.11	0.10
Northern England	-0.02	0.77	-0.18	0.01	-0.13	0.05	0.33	0.00
Southern England	-0.07	0.19	0.04	0.49	-0.03	0.51	0.07	0.19
Devolved	-0.14	0.07	0.31	0.00	-0.08	0.29	-0.09	0.22
Whether business is women-led (2021)	0.13	0.03	0.03	0.67	0.00	0.98	-0.16	0.01
Whether business is MEG-led (2021)	-0.87	0.00	0.36	0.01	0.20	0.16	0.30	0.03
F5. Do you have a formal written business plan? (2021)	-0.06	0.04	0.13	0.00	-0.06	0.03	-0.01	0.84
J1. New or significantly improved goods in the last 3 years. (2021)	0.15	0.02	-0.18	0.00	0.09	0.13	-0.06	0.29
R1. Aim to grow sales. (2020)	-0.13	0.01	-0.07	0.16	0.13	0.01	0.07	0.14
C1/C2. Whether export goods or services (2021)	-0.12	0.04	0.28	0.00	-0.15	0.01	0.00	0.95
A10. Whether have separate business premises. (2021)	0.20	0.00	-0.13	0.01	-0.13	0.01	0.06	0.21
Applied Ext Fin 2021	0.00	0.97	-0.28	0.00	-0.02	0.82	0.30	0.00
K2. Whether used information or advice in the last 12 months - UK. (2021)	-0.05	0.41	-0.05	0.37	0.08	0.18	0.02	0.69
Used External Finance (Debt, Equity and Grant 2021)	0.04	0.42	0.02	0.74	-0.11	0.02	0.06	0.20
D3 Main aim 2021	-0.03	0.74	-0.19	0.03	-0.16	0.07	0.37	0.00
D3 Secondary aim 2021	-0.15	0.00	0.15	0.00	-0.01	0.74	0.02	0.66

All independent variables are binary, e.g, the value of R1. Aim to grow sales= 1 if the survey response is yes, 0 if the response is No. All regressions are weighted with Cross-sectional weight – 2021. **Upper quartile estimation:** R-square: 0.205; Adj. R-square: 0.160. N=430; **Q3 estimation:** R Square: 0.268; Adjusted R Square: 0.226; N=430. **Q2 estimation:** R Square: 0.170; Adjusted R Square: 0.123; N=430. **Lower quartile estimation:** R Square: 0.124; Adjusted R Square: 0.170; N=430

Table 0-5 Environmental objectives and changes in productivity 2023

	Upper Quartile 2023		Quartile 3 2023		Quartile 2 2023		Lower Quartile 2023	
	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.	Coeff.	Sig.
(Constant)	0.10	0.82	0.35	0.42	-0.83	0.05	1.34	0.00
Micro23	0.04	0.90	-0.22	0.44	0.02	0.95	0.17	0.53
Small23	0.01	0.98	-0.13	0.67	-0.09	0.75	0.21	0.46
Age 0 to 5 2023	0.03	0.92	-0.12	0.69	-0.13	0.65	0.40	0.15
Age 6 to 10 2023	0.13	0.15	-0.22	0.01	0.06	0.48	-0.05	0.54
Age >20 2023	0.13	0.01	-0.07	0.16	0.11	0.02	-0.16	0.00
Transport Retail and Food Services 2023	0.10	0.18	-0.11	0.13	0.01	0.94	0.00	0.94
Business Services 2023	-0.08	0.23	-0.13	0.04	0.19	0.00	0.02	0.79
Other Services 2023	-0.20	0.01	-0.01	0.91	0.18	0.01	0.02	0.74
Northern England	-0.01	0.86	-0.23	0.00	0.25	0.00	-0.11	0.11
Southern England	-0.02	0.75	0.00	0.97	0.00	0.99	0.01	0.91
Devolved	-0.19	0.02	-0.13	0.12	0.10	0.21	0.15	0.04
Whether business is women-led (2023)	0.10	0.07	0.04	0.46	-0.06	0.30	-0.13	0.01
Whether business is MEG-led (2023)	0.01	0.89	-0.24	0.02	0.39	0.00	-0.10	0.32
F5. Do you have a formal written business plan? (2023)	0.06	0.04	-0.05	0.09	0.06	0.03	-0.08	0.00
J1. New or significantly improved goods in the last 3 years. (2023)	0.00	0.97	0.20	0.01	-0.01	0.88	-0.22	0.00
R1. Aim to grow sales. (2022)	-0.07	0.18	-0.02	0.64	-0.05	0.34	0.13	0.00
C1/C2. Whether export goods or services (2023)	-0.13	0.09	0.04	0.54	0.12	0.10	0.00	0.96
A10. Whether have separate business premises. (2023)	0.25	0.00	0.07	0.17	-0.16	0.00	-0.16	0.00
Applied Ext Fin 2023	0.16	0.04	0.05	0.47	0.04	0.61	-0.19	0.01
K2. Whether used information or advice in the last 12 months - UK. (2023)	-0.14	0.01	0.07	0.20	0.11	0.04	-0.03	0.58
Used External Finance (Debt, Equity and Grant 2022)	-0.20	0.00	0.18	0.00	0.09	0.04	-0.03	0.39
D3 Main aim 2023	0.34	0.00	0.03	0.69	-0.19	0.01	-0.19	0.00
D3 Secondary aim 2023	0.06	0.27	0.11	0.03	-0.23	0.00	0.04	0.45

All independent variables are binary, e.g, the value of R1. Aim to grow sales= 1 if the survey response is yes, 0 if the response is No. All regressions are weighted with Cross-sectional weight – 2023. **Upper quartile estimation:** R-square: 0.246; Adj. R-square: 0.200. N=405; **Q3 estimation:** R Square: 0.160; Adjusted R Square: 0.109; N=405. **Q2 estimation:** R Square: 0.271; Adjusted R Square: 0.227; N=405. **Lower quartile estimation:** R Square: 0.207; Adjusted R Square: 0.159; N=405

Taken together, the cross-year comparison suggests that the productivity consequences of environmental orientation are time- and intensity-dependent. In 2021, making environmental aims the principal objective is associated with a lower-productivity profile, whereas treating them as secondary displaces firms from the top into the upper-middle, consistent with the view that environmental commitments were, at that point, more often a constraint than a complement to frontier productivity practices. By 2023, however, a main environmental orientation is positively associated with top-quartile membership and negatively with lower-quartile membership, implying that leading firms have learned to integrate environmental aims in ways that correlate with higher productivity, while secondary environmental aims continue to be linked to upper-middle performance but no

longer entail a statistically significant penalty for SMEs in the upper quartile of the productivity distribution. The findings also underscore the importance of distinguishing between **main** and **secondary** environmental aims: the former characterises lower-quartile SME productivity in 2021 but upper-quartile in 2023, whereas the latter remains associated with Quartile-3 positioning in both years but exhibits changing relationships at the extremes.

6. DISCUSSION & CONCLUSIONS

6.1 Summary of Findings

This report has examined the multifaceted determinants of SME growth and productivity, drawing on data from the LSBS survey between 2020 and 2023. The findings highlight the critical role of firm-level characteristics, particularly size, age, sector, and strategic orientation, in shaping both growth ambitions and productivity outcomes. Firms with employees, formal business plans, and separate premises consistently demonstrate stronger growth orientation and higher productivity, suggesting that organisational capacity and strategic planning are foundational to performance enhancement.

The analysis also reveals that access to external finance is positively associated with improved turnover and employment outcomes, particularly during periods of economic recovery. However, the impact of finance appears to be more stabilising than expansionary, with financed firms more likely to maintain operations than to grow rapidly. This pattern highlights the importance of tailoring financial support mechanisms to the specific needs and constraints of SMEs, especially during macroeconomic uncertainty.

Given that finance is essential for firm survival and growth, the predominance of firms using no external financing (34% to 40% between 2020-23) is concerning, but is consistent with the SME Finance monitor which asserts that 35% of SMEs met the definition of a Permanent non-borrower (BVA-BDRC, 2024). It may be that on the demand side permanent non-borrowers would appear to reflect a more cautious section of the SME population focusing on stability rather than growth. This may be related to the uncertain operating environment, post Brexit, Pandemic and the current geopolitical uncertainties and unrest. However there is evidence that the credit rationed SME are more likely to self-exclude from future finance applications and this effect is more concentrated amongst smaller firms (Brown and Cowling, 2022).

Firms seeking finance predominantly rely on short-term, expensive options like credit cards and bank overdrafts, which remain consistently popular throughout the sample period,

indicating their entrenched role in SME financing strategies, as evidenced in our previous research (Owen et al 2023). However, short-term financing mechanisms are poorly suited to funding long-term investments, and their persistence raises important questions about SMEs' financial resilience and strategic planning capabilities in evolving economic conditions. Access to finance for growth makes an important contribution on the wider economy and whilst SMEs are happy to borrow to grow, one in five think it could be difficult for them to get finance, suggesting constraint and discouragement (BVA-BDRC, 2024, Fraser, 2014 and Kon and Story, 2003).

The presence of niche categories like P2P (peer-to-peer lending), Factoring, and Business Partners indicates a diversification in financing strategies, albeit with relatively lower uptake. This may reflect sample limitations or may indicate a need to continue to increase SME awareness of alternative finance options.

Environmental engagement emerges as another factor linked to growth and productivity. Firms that integrate environmental solutions and prioritise sustainability goals are more likely to report higher productivity and express growth ambitions. Nonetheless, the adoption of energy efficiency measures remains modest, and motivations are predominantly economic rather than environmental. Awareness of energy-saving schemes is uneven, with more productive firms demonstrating greater familiarity, indicating informational and resource disparities across the SME landscape that require more policy attention.

Overall, the evidence suggests that SME performance is shaped by a complex interplay of structural, strategic, and contextual factors. Policy interventions aimed at enhancing SME growth and productivity should therefore adopt a multidimensional approach, viz., supporting employment and planning capacity, improving access to finance, and fostering environmental engagement, while recognising the heterogeneity of SME experiences and capacities.

6.2 Implications for Policy & Practice

To enhance SME growth and productivity, strengthening strategic business planning should be a major focus of policy. This includes providing grants and advisory services to support the development and maintenance of formal business plans, as well as improving access to affordable business premises through local development initiatives. Sector-specific strategies are also essential, particularly for industries such as transport, retail, hospitality, and services, where tailored support can boost diversification and innovation. Furthermore, inclusive growth must be prioritised through targeted programmes for

underrepresented groups, such as woman-led and minority ethnic group-led businesses, alongside efforts to monitor and improve outcomes in deprived areas.

Improving access to finance is critical for enabling SMEs to grow and innovate. This can be achieved by developing affordable financing options, such as low-interest loans and alternative models like peer-to-peer lending and asset-based finance. Financial support mechanisms should be redesigned to better meet SME needs, especially during periods of economic disruption. Inclusive lending practices are also necessary to ensure that viable but currently unprofitable firms can access funding, potentially through guarantee schemes and more flexible credit screening. Additionally, reintroducing and tailoring grant programmes for innovation, digitalisation, and green transition will help align financial support with strategic growth objectives.

Policy should focus on reducing SME dependence on short-term funding through grants and credit guarantees to develop long-term, flexible financing options to encourage long-term investment. Flexibility would be important, as a fifth of growth-oriented firms have no profitability. This is particularly relevant for net zero investments where the motivations include both financial and non-financial returns.

Policy should also prioritise encouraging AI adoption among SMEs to accelerate productivity improvements, particularly given the positive but gradual relationship between innovation and productivity observed in the findings. This could include AI voucher schemes, digital skills training programs, and subsidized access to AI tools specifically designed for smaller businesses.

Targeted financial education programs should be introduced to help SMEs understand funding options and improve strategic decision-making, especially for underrepresented groups and early-stage firms. Strengthening the role of brokers and intermediaries can help SMEs navigate complex finance landscapes. Their role should be formalized and expanded through their integration into public support schemes.

Environmental engagement should be promoted as a driver of business performance. SMEs should be encouraged to integrate environmental solutions into their operations, particularly those with growth potential. Expanding subsidies and cost-saving schemes for energy-efficient upgrades will encourage adoption, especially among smaller firms. To address disparities in awareness, targeted outreach campaigns should be launched to improve visibility and uptake of energy-saving initiatives. Finally, promoting the reputational and strategic benefits of sustainability through case studies and sector-specific guidance can help embed environmental considerations into long-term business planning.

6.3 Future Research and Limitations of the Study

The Longitudinal Small Business Survey (LSBS) constitutes the largest and longest-running panel dataset on UK SMEs, offering valuable medium-term insights into the factors influencing growth ambitions and productivity. The panel structure of the data introduces survivor bias, as the analysis includes only firms that remained operational throughout the sample period, potentially overlooking the challenges faced by growth-oriented businesses that subsequently failed. Although the magnitude of this bias is likely to be small, given the minimal incidence of closures in the dataset, other sources of bias remain. In particular, the sample may be skewed toward SMEs that are more willing to continue responding to surveys, a group that may disproportionately comprise growth-oriented firms. Furthermore, the dataset is subject to longitudinal attrition and is constrained by relatively small cohort sizes for variables relating to environmental objectives.

The LSBS data set's utility is also constrained by the absence of data on investment intentions and actual investment amounts. This limitation restricts the ability to assess the practical underpinnings of growth strategies, particularly given that business expansion is frequently driven by capital investment and workforce development. A further drawback of the LSBS is the biennial frequency of questions related to socio-environmental intentions (missions) and the small annual cohorts of data relating to the net-zero transition, energy efficiency, and environmental investment objectives. The data limitation of environmental finance research cannot be overstated enough since there are no other large data sets with this data in UK. This intermittent and small data collection prevents the construction of a continuous robust panel capable of tracking SMEs' environmental engagement over time, thereby limiting the scope for longitudinal analysis of sustainability-related business behaviour.

Given the heterogeneous nature of SMEs and the complexity of their growth processes, this means that the quantitative approach employed may not fully capture the factors that influence firm development. Future research should adopt a mixed-methods approach combining quantitative panel data with qualitative case studies to provide insights to inform more targeted policy interventions, as in Jabril et al (2020). Given the episodic nature of growth there is a need to document the firms as they move through the high growth lifecycle phases. Furthermore, future research should investigate the experiences of failed firms to overcome survivor bias and provide a more complete picture of growth dynamics. This could include studying firms that exited the market despite pursuing growth strategies, offering valuable lessons for policy design.

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Annex

Table A1 presents a more detailed analysis of productivity, export orientation and innovation. This table complements the Figures 4.2a and 4.2b. The analysis of productivity data from 2020 to 2023 reveals distinct patterns in relation to export activity and the introduction of new goods. The data is segmented by productivity bands (in £) and categorized by whether firms exported and whether they introduced new goods. Across the four years, firms that did not export consistently outnumbered those that did, with total counts for non-exporters ranging from 799 in 2020 to 1115 in 2021, while exporters ranged from 200 to 239. Exporting firms tended to cluster more in higher productivity bands, particularly in the £50k+ category, where their mean count was 120.5, compared to 473.75 for non-exporters. However, the standard deviation for non-exporters in this band (86.1) was significantly higher, indicating greater variability in productivity among non-exporting firms.

The productivity band of £10k to £49k also showed a strong presence of non-exporters, with a mean of 409.75 and relatively low variability (std = 54.87). Exporters in this band had a mean of 77.75, suggesting that while exporting firms were present in this productivity range, they were less dominant. The lowest productivity bands (-999 to 0 and 0.1 to 999) were almost exclusively populated by non-exporters, reinforcing the association between exporting and higher productivity.

The introduction of new goods was categorized into "Some new" and "All new." Firms introducing all new goods consistently had higher counts in the upper productivity bands. For instance, in the £50k+ category, the mean count for "All new" firms was 112, compared to 54 for "Some new" firms. This suggests a positive correlation between the extent of innovation and productivity.

In the £10k to £49k band, "All new" firms had a mean of 100, while "Some new" firms averaged 28.75, further supporting the notion that comprehensive innovation is associated with higher productivity. The total counts also reflect this trend: firms introducing all new goods had a mean total of 225.25, compared to 97.75 for those introducing only some new goods. Interestingly, the lowest productivity bands showed minimal activity in terms of new goods introduction. The "-999 to 0" category had a mean of 5.5 for "Some new" and only 2 for "All new," indicating that innovation is rare among the least productive firms.

Overall, the data from 2020 to 2023 suggests a robust relationship between export activity, innovation, and productivity. Exporting firms and those introducing all new goods are more likely to be found in higher productivity bands. Non-exporting firms dominate the lower productivity ranges and exhibit greater variability. These findings underscore the importance of international engagement and innovation in driving firm-level productivity.

Table A1: Productivity of businesses that export goods and services (2020-20230) - Column %

C1/C2. Whether export goods or services (2020)							
Exports (2020 weight)		Productivity 2020 (summary)					
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
Yes	Count	0 _{a, b}	0 _{a, b, c}	30 _c	69 _b	101 _{a, c}	200
	%	0.0%	0.0%	29.1%	16.2%	22.1%	20.0%
No	Count	10 _{a, b}	5 _{a, b, c}	73 _c	354 _b	357 _{a, c}	799
	%	100.0%	100.0%	70.9%	83.3%	77.9%	79.8%
Don't know	Count	0 _a	0 _a	0 _a	2 _a	0 _a	2
	%	0.0%	0.0%	0.0%	0.5%	0.0%	0.2%
Total	Count	10	5	103	425	458	1001
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C1/C2. Whether export goods or services (2021)							
Exports (2021 weight)		Productivity 2021 (summary)					
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
Yes	Count	0 _{a, b}	0 _b	32 _c	74 _a	129 _d	235
	%	0.0%	0.0%	41.6%	13.6%	19.2%	17.4%
No	Count	22 _{a, b}	35 _b	45 _c	472 _a	542 _d	1116
	%	100.0%	100.0%	58.4%	86.4%	80.8%	82.6%
Total	Count	22	35	77	546	671	1351
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C1/C2. Whether export goods or services. (2022)							
Exports (2022 weight)		Productivity 2022 (summary)					
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
Yes	Count	1 _a	0 _a	18 _a	89 _a	131 _a	239
	%	4.5%	0.0%	22.5%	17.9%	20.2%	19.0%
No	Count	21 _a	9 _a	62 _a	409 _a	518 _a	1019
	%	95.5%	100.0%	77.5%	82.1%	79.8%	81.0%
Total	Count	22	9	80	498	649	1258
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

C1/C2. Whether export goods or services (2023)							
Exports (2023 weight)		Productivity 2023 (summary)					
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
Yes	Count	0 _a	0 _{a, b, c}	9 _{a, c}	65 _c	135 _b	209
	%	0.0%	0.0%	9.5%	15.0%	20.5%	17.2%
No	Count	24 _a	1 _{a, b, c}	86 _{a, c}	369 _c	525 _b	1005
	%	100.0%	100.0%	90.5%	85.0%	79.5%	82.8%
Don't know	Count	0 _a	0 _a	0 _a	0 _a	0 _a	0
	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	24	1	95	434	660	1214
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Table A2. Productivity of businesses that innovate (2020-20230) - Column %

		productivity 2020a (sum)					
J2. Whether goods/services new to the business. (2020)		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
At least some new to the market	Count	0 _a	0 _a	3 _a	36 _a	42 _a	81
	%	0.0%	0.0%	13.0%	27.9%	30.4%	27.8%
All just new to the business	Count	1 _a	1 _a	20 _a	93 _a	96 _a	210
	%	100.0%	100.0%	87.0%	72.1%	69.6%	72.2%
Total	Count	1	1	23	129	138	291
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
J2. Whether goods/services new to the business. (2021)							
At least some new to the market	Count	6 _a	6 _{b, c}	19 _c	28 _d	61 _b	120
	%	100.0%	50.0%	57.6%	20.7%	31.3%	31.5%
All just new to the business	Count	0 _a	6 _{b, c}	14 _c	107 _d	133 _b	260
	%	0.0%	50.0%	42.4%	79.3%	68.2%	68.2%
Don't know	Count	0 _a	0 _a	0 _a	0 _a	1 _a	1
	%	0.0%	0.0%	0.0%	0.0%	0.5%	0.3%
Total	Count	6	12	33	135	195	381
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
J2. Whether goods/services new to the business. (2022)							
At least some new to the market	Count	6 _a	0 _a	1 _{a, b, c}	17 _c	67 _b	91
	%	85.7%	0.0%	50.0%	12.3%	39.4%	28.7%
All just new to the business	Count	1 _a	1 _a	1 _{a, b, c}	119 _c	103 _b	224
	%	14.3%	100.0%	50.0%	86.2%	60.6%	70.7%
Don't know	Count	0 _a	1	0 _a	1 _a	0 _a	1
	%	0.0%	100.0%	0.0%	0.7%	0.0%	0.3%
Refused	Count	0 _a	0 _a	0 _a	1 _a	0 _a	1
	%	0.0%	0.0%	0.0%	0.7%	0.0%	0.3%
Total	Count	7	0 _a	2	138	170	317
	%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%
J2. Whether goods/services new to the business. (2023)							
At least some new to the market	Count	10 _a	0 _a	9 _a	20 _b	59 _b	98
	%	62.5%	0.0%	81.8%	21.7%	31.2%	31.8%
All just new to the business	Count	6 _a	0 _a	2 _a	71 _b	129 _b	208
	%	37.5%	0.0%	18.2%	77.2%	68.3%	67.5%
Don't know	Count	0 _a	0 _a	0 _a	1 _a	1 _a	2
	%	0.0%	0.0%	0.0%	1.1%	0.5%	0.6%
Refused	Count	0 _a	0 _a	0 _a	0 _a	0 _a	0
	%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Total	Count	16	0 _a	11	92	189	308
	%	100.0%	0.0%	100.0%	100.0%	100.0%	100.0%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Table A3a: Awareness of energy schemes and productivity – 2023 (Cohort C)

E10. Which of the following energy schemes are you aware of? The Energy Technology List

productivity 2023 (sum) (column % -weighted)

		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _{a, b}	1 _{a, b}	10 _b	119 _a	198 _a	331
	%	100.0%	100.0%	62.5%	89.5%	88.0%	87.6%
Yes	Count	0 _{a, b}	0 _{a, b}	6 _b	14 _a	27 _a	47
	%	0.0%	0.0%	37.5%	10.5%	12.0%	12.4%
	Count	3	1	16	133	225	378
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

E10. Which of the following energy schemes are you aware of? Enhanced Capital Allowance?

productivity 2023 (sum) (column % -weighted)

		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _{a, b, c}	1 _{a, b, c}	8 _c	115 _b	151 _{a, c}	278
	%	100.0%	100.0%	53.3%	87.1%	67.1%	73.9%
Yes	Count	0 _{a, b, c}	0 _{a, b, c}	7 _c	17 _b	74 _{a, c}	98
	%	0.0%	0.0%	46.7%	12.9%	32.9%	26.1%
	Count	3	1	15	132	225	376
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

E10. Which of the following energy schemes are you aware of? The Private Rented Sector Energy Efficiency Regulations?

productivity 2023 (sum) (column % -weighted)

		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _{a, b}	1 _{a, b}	8 _b	112 _a	172 _a	296
	%	100.0%	100.0%	53.3%	84.2%	76.4%	78.5%
Yes	Count	0 _{a, b}	0 _{a, b}	7 _b	21 _a	53 _a	81
	%	0.0%	0.0%	46.7%	15.8%	23.6%	21.5%
	Count	3	1	15	133	225	377
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Tables A3a-A3c support Figure 5-10 in the main report.

Table A4a investigates the relationship between growth ambitions and the adoption of energy efficiency measures, as well as the motivations behind such actions. Table A4b shows analogous data for business productivity levels. The analysis is structured around two key dimensions: whether cost reduction was a motivating factor, and whether environmental or reputational concerns played a role.

Table A3b: Awareness of energy schemes and productivity – 2023 (Cohort C) cont.

E10. Which of the following energy schemes are you aware of? The Renewable Heat Incentive?							
productivity 2023 (sum) (column % -weighted)							
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _a	1 _a	8 _a	83 _a	153 _a	248
	%	100.0%	100.0%	53.3%	62.9%	68.0%	66.0%
Yes	Count	0 _a	0 _a	7 _a	49 _a	72 _a	128
	%	0.0%	0.0%	46.7%	37.1%	32.0%	34.0%
	Count	3	1	15	132	225	376
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
E10. Which of the following energy schemes are you aware of? Energy Savings Opportunity Scheme?							
productivity 2023 (sum) (column % -weighted)							
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _{a, b}	0 _c	10 _{b, c}	110 _a	193 _a	316
	%	100.0%	0.0%	62.5%	83.3%	85.4%	83.6%
Yes	Count	0 _{a, b}	1 _c	6 _{b, c}	22 _a	33 _a	62
	%	0.0%	100.0%	37.5%	16.7%	14.6%	16.4%
	Count	3	1	16	132	226	378
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
E10. Which of the following energy schemes are you aware of? Workplace Charging Scheme for electric vehicle charge points?							
productivity 2023 (sum) (column % -weighted)							
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _a	1 _a	8 _a	86 _a	144 _a	242
	%	100.0%	100.0%	53.3%	65.2%	63.7%	64.2%
Yes	Count	0 _a	0 _a	7 _a	46 _a	82 _a	135
	%	0.0%	0.0%	46.7%	34.8%	36.3%	35.8%
Total	Count	3	1	15	132	226	377
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Table A3c: Awareness of energy schemes and productivity – 2023 (Cohort C) end

E10. Which of the following energy schemes are you aware of? Other.							
productivity 2023 (sum) (column % -weighted)							
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	3 _{a, b}	1 _{a, b}	15 _{a, b}	126 _b	223 _a	368
	%	100.0%	100.0%	100.0%	94.7%	98.7%	97.4%
Yes	Count	0 _{a, b}	0 _{a, b}	0 _{a, b}	7 _b	3 _a	10
	%	0.0%	0.0%	0.0%	5.3%	1.3%	2.6%
Total	Count	3	1	15	133	226	378
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

E10. Which of the following energy schemes are you aware of? None of these.							
productivity 2023 (sum) (column % -weighted)							
		-999 to 0	0.1 to 999	1K to 9K	10K to 49K	50k+	Total
No	Count	0 _a	1 _b	7 _{a, b}	68 _{a, b}	124 _{a, b}	200
	%	0.0%	100.0%	46.7%	51.5%	54.9%	53.1%
Yes	Count	3 _a	0 _b	8 _{a, b}	64 _{a, b}	102 _{a, b}	177
	%	100.0%	0.0%	53.3%	48.5%	45.1%	46.9%
Total	Count	3	1	15	132	226	377
	%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Table A4a Energy efficiency measures and growth ambitions– 2023 (Cohort C)

E6b. What prompted you to take action? To reduce my energy costs				
R1. Aim to grow sales. (2023) (column % -weighted)	Yes	No	Total	
Not	Count	5 _a	5 _a	10
	%	25%	55.6%	34.5%
Yes	Count	15 _a	4 _a	19
	%	75%	44.4%	65.5%
Total	Count	20	9	29
	%	100%	100%	100%

E6b. What prompted you to take action? Climate change/environmental/reputational concerns				
R1. Aim to grow sales. (2023) (column % -weighted)	Yes	No	Total	
Not	Count	16 _a	9 _a	25
	%	80%	100%	86.2%
Yes	Count	4 _a	0 _a	4
	%	20%	0%	13.8%
Total	Count	20	9	29
	%	100%	100%	100%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Table A4b Energy efficiency measures and productivity– 2023 (Cohort C)

E6b. What prompted you to take action? To reduce my energy costs						
productivity 2023 (sum) (column % -weighted)						
		-999 to 0	1K to 9K	10K to 49K	50k+	Total
No	Count	0 _a	0 _a	1 _b	4 _b	5
	%	0%	0%	25%	21%	22%
Yes	Count	0 _a	1 _a	3 _b	15 _b	18
	%	0%	0%	75%	79%	78%
Total	Count	0	1	4	19	23
	%	0%	0%	100%	100%	100%

E6b. What prompted you to take action? Climate change/environmental/reputational concerns						
productivity 2023 (sum) (column % -weighted)						
		-999 to 0	1K to 9K	10K to 49K	50k+	Total
No	Count	0 _a	0 _a	3 _b	16 _b	19
	%	0%	0%	60%	89%	83%
Yes	Count	0 _a	1 _a	2 _b	2 _b	4
	%	0%	0%	40%	11%	17%
Total	Count	0	1	5	18	23
	%	0%	0%	100%	100%	100%

Each subscript letter denotes a subset of productivity (summary) categories whose column proportions do not differ significantly from each other at the .05 level.

Among businesses that installed measures, cost reduction was the most frequently cited reason. Of those aiming to increase sales, 75 percent indicated that reducing energy costs prompted their actions, compared to 44.4 percent of those not aiming to grow sales. This disparity suggests that growth-oriented firms may be more financially driven by their sustainability efforts. Conversely, 25 percent of growth-oriented firms and 55.6 percent of non-growth-oriented firms did not cite cost reduction as a motivating factor, implying that other considerations may play a more prominent role for the latter group.

The bottom section of the table examines whether climate change, environmental concerns, or reputational factors influenced the decision to implement energy efficiency measures. Here, only 20 percent of growth-oriented businesses acknowledged these concerns, while none of the non-growth-oriented businesses did so. This indicates that environmental or reputational motivations are secondary to cost considerations, particularly among firms not focused on growth. The overwhelming majority, 80 percent of growth-oriented and 100 percent of non-growth-oriented businesses, did not cite these factors, reinforcing the notion that economic incentives remain the dominant driver of energy efficiency actions.



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