productivity insights network

PIN - Productivity Projects Fund

Small Project Report

Analysis of SME productivity performance and drivers during the first three quarters of the pandemic

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About PIN

The Productivity Insights Network was established in January 2018 and is funded by the Economic and Social Research Council. As a multi-disciplinary network of social science researchers engaged with public, private, and third sector partners, our aim is to change the tone of the productivity debate in theory and practice. It is led by the University of Sheffield, with co-investigators at Cambridge Econometrics, Cardiff University, Durham University, University of Sunderland, SQW, University of Cambridge, University of Essex, University of Glasgow, University of Leeds and University of Stirling. The support of the funder is acknowledged. The views expressed in this report are those of the authors and do not necessarily represent those of the funders.

Table of Contents

1. Introduction

The productivity performance of SMEs during the pandemic is a topic on which relatively little is known, although it has been possible to engage in informed speculation about likely impacts. Output per employee is likely to have been hit hard in sectors most affected by lockdown and social distancing requirements, particularly as the Coronavirus Job Retention Scheme ('furloughing') allowed firms to retain employee headcount. Output per hour worked in early ONS aggregate estimates appears to have been less badly affected. In addition to sectoral differences, it is reasonable to think that the performance of SMEs will have been highly heterogeneous for other reasons. Aside from access to emergency funding support (CRJS, CIBL and BBL) some firms may have been protected by overall higher levels of cash reserves, or access to 'family capital' or 'sweat equity'. At the small and micro scale, additional factors beyond financial structure and sector, may have played a part. These factors might include: the demographic characteristics and financial skills of the owner/managing partner/managing director; firm location, structure and age; and the extent of activity in innovation by firms. Some of these issues have been highlighted in the detailed summaries derived from ongoing ONS Business Impact of Coronavirus surveys, particularly around business closure/restart and ability to access the various support schemes, as well as (for sole-traders) in individual level surveys such as the ESRC Understanding Society household panel.

One reasonably timely source of information at individual firm level is contained within the quarterly cross-sectional SME Finance Monitor Surveys, which, at the time of this research study, had been released to quarter three of 2020. These surveys are intended to provide up-to-date monitoring on SME access to and experience of business financing, and the most recent surveys have been adapted to elicit information on emergency funding schemes. Surveys are far from ideal in terms of detailed information on labour productivity and firm performance, but do include banded information on the owner's or managing director's understanding of annual turnover, profits and employment headcount. This is sufficient to allow some multivariate modelling to inform how different factors and characteristics of firms have affected the productivity performance (using regression analysis to explain turnover after controlling for number of employees) of SMEs during the first three quarters of the crisis. This report provides early findings that could be built on further through additional research as more data becomes available.

The remainder of this paper is structured as follows: Section 2 presents key descriptive statistics using data from SME Finance Monitor Survey and set outs the overall analytical strategy for the multivariate analysis. Section 3 presents the key findings from the multivariate analysis and section 4 provides the main conclusions.

2. Data and Methodology

SME Finance Monitor Survey

The SME Finance Monitor Survey (herein referred to as 'the survey') was commissioned to provide a robust and respected independent source of information on the demand for, and availability of, finance for SMEs in the UK. Over 160,000 SME interviews have been conducted since the survey started in Q2 2011, across 38 waves of interviewing (approx. 4,500 in each quarter)[1]. The survey is currently monitoring SMEs through the immediate and longer-term implications of Covid-19, with regular updates on SME access to finance as well as their growth plans and prospects. There are certain limitations to the survey data which need to be highlighted. The key ones in relation to our analysis are as follows:

- This is a repeated cross-sectional survey in which the same (or similar) information is asked to a different sample of individual business representatives each time. It is not a longitudinal survey in which the same information is asked of the same group of business representatives over time, i.e. the subject firms change each quarter.

- The survey question asks annual turnover of the company for the last full financial year in each quarter – lag in turnover data means this may not be a true reflection of the current state.

- Some variables, including turnover and employment data, are banded, requiring the use of mid-point estimates, and so it may not always be clear how much these variables have actually changed over time. For example, an SME may have increased its turnover from £2m to £4m, but this increased will not be captured as the turnover figure remains within the given £2m - £5m band.

- Despite the scale of the survey, in which approximately 4,500 business are surveyed in each quarter, detailed analysis of particular sub-samples may be affected by small cell sizes and the potential influence of outlier observations.

Trends emerging from the descriptive statistics[2]

As expected, the descriptive analysis of the survey data suggests that **average turnover per business[3] had decreased, with a fall of 10% during the first three quarters of the pandemic** (i.e. Q1-Q3 of 2020 compared to Q1-Q3 of 2019 - see **Figure 1**). As highlighted above though, these findings need to be interpreted with caution as the survey question asks for turnover for the last full financial year in each quarter. As such the fall in turnover is likely to under-report the true impact. Other survey questions on business sentiments during Covid found that three-quarters of SMEs reported having been negatively affected by Covid and that, overall, 30% expected turnover to be down by more than 50% or be non-existent. A further breakdown

[1] Major changes were made to the questionnaire for Q1 2018
[2] Businesses in the agriculture sector were removed from the analysis due to inconsistent data.
[3] Average turnover per business = (Midpoint of banded turnover * count of business) / total no. of businesses. Excludes don't knows / refused.

of the average turnover changes by employment size, sector, region and business age found the following:

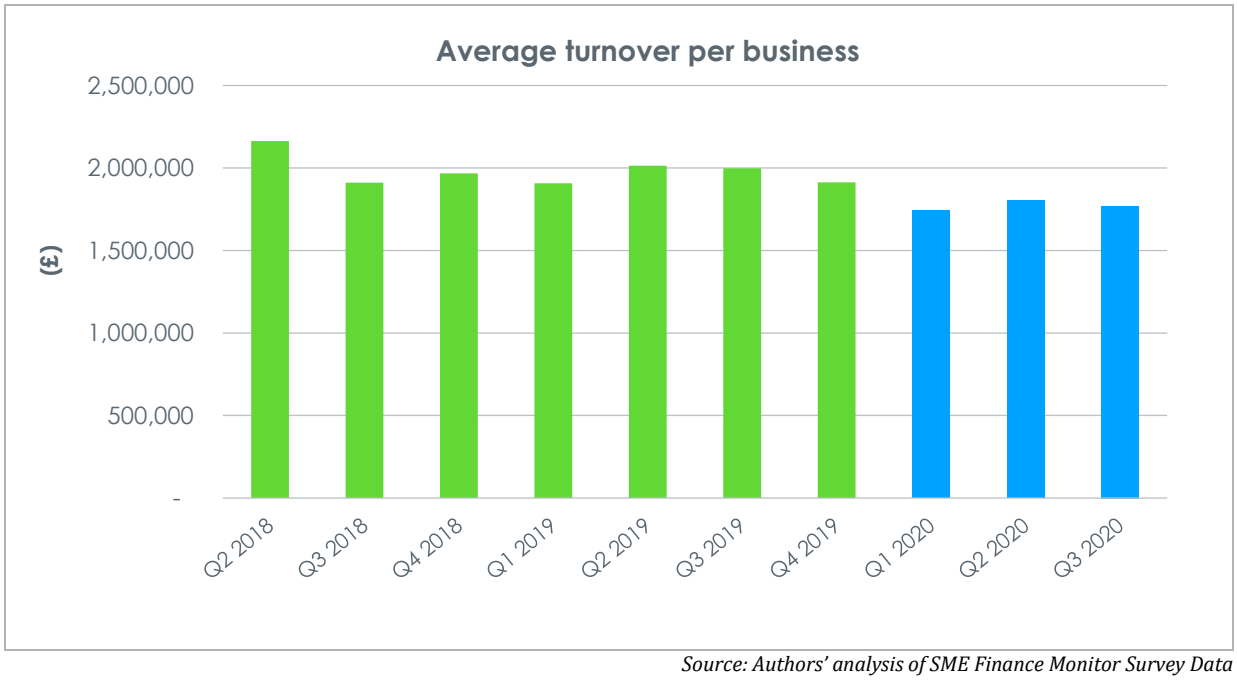
- **Employment size:** whilst firms with only one employee appear to have been most affected (fall of 19% in average turnover during the first three quarters of 2020), there is no clear trend in change in turnover by employment size (see **Figure 5** in annex).

- **Sector**: businesses in the construction and services sectors experienced a 10-13% fall in average turnover, whilst the manufacturing sector was largely unaffected in the early stages of the pandemic. Within the services sector, wholesale/retail businesses were most affected by the pandemic (see **Figure 6** in annex).

- **Region:** businesses in Wales appear to have been the most affected by the pandemic, whilst businesses in the North West, South East, London and the East of England appear to have been the least affected. However, it is important to note that these regional comparisons do not control for any other firm characteristics (see **Figure 7** in annex).

- **Business age:** in general, older businesses tend to have performed better during the pandemic than younger businesses. Businesses established for less than one year experienced the greatest fall in average turnover, at 61%. Note, this is unsurprising as this compares new businesses at the time of the pandemic with a different group of new businesses one year prior – so facing very different trading conditions as new enterprises (see **Figure 7Figure 7** in annex).

Figure 1: Average turnover per business

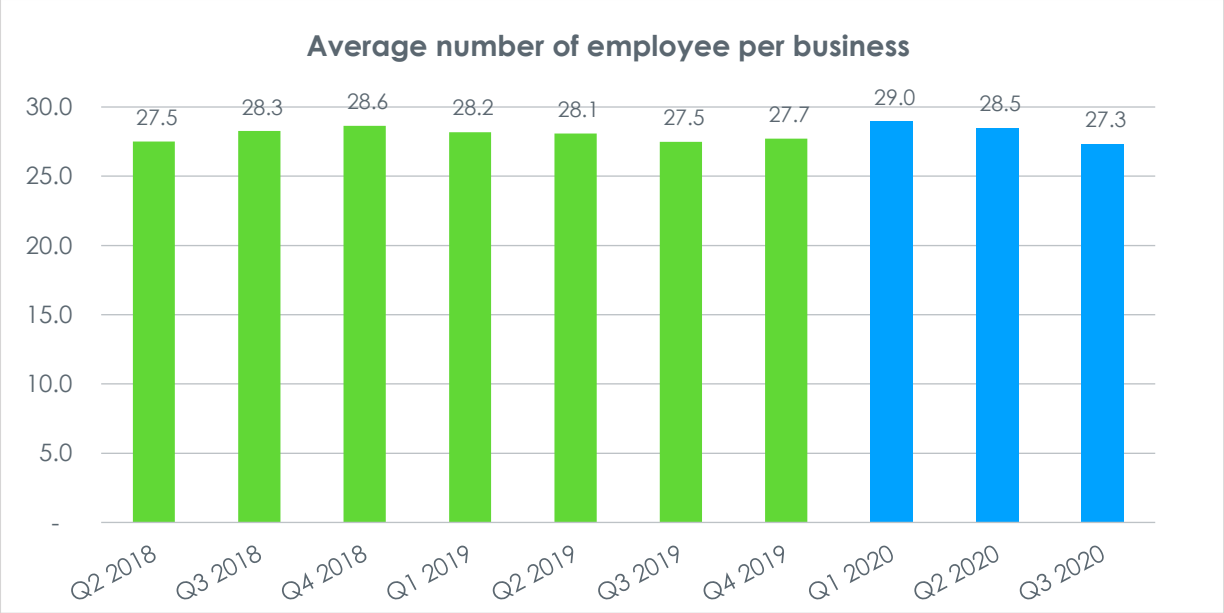


Source: Authors' analysis of SME Finance Monitor Survey Data

Whilst the data indicates a fall in average turnover in the first three quarters of the pandemic, the data on employment suggests limited impact. Average employment per business remained at similar levels to those seen before the pandemic - average employment increased by 1.2%

during the pandemic (i.e. first three quarters of 2020) compared to the first three quarters of 2019 (see **Figure 2**). However, there were some important changes within the first three quarters of 2020. Employment numbers for Q1 2020 were at their highest since Q2 2018, but there was then a noticeable decline in Q3 2020 employment numbers, albeit that some of this may have been due to seasonality (there was a similar downward trend in Q3 in the previous year). The limited impact on employment is unsurprising when considering actions taken by the businesses during the pandemic. In the Q3 2020 survey, 59% of businesses reported to have 'furloughed' staff, only 11% had made staff redundant, whilst 21% of business said they may have to make staff redundant. The government's furlough scheme is likely to have somewhat limited or delayed the impact of the pandemic on employment.

Figure 2: Average number of employees per business



Source: Authors' analysis of SME Finance Monitor Survey Data

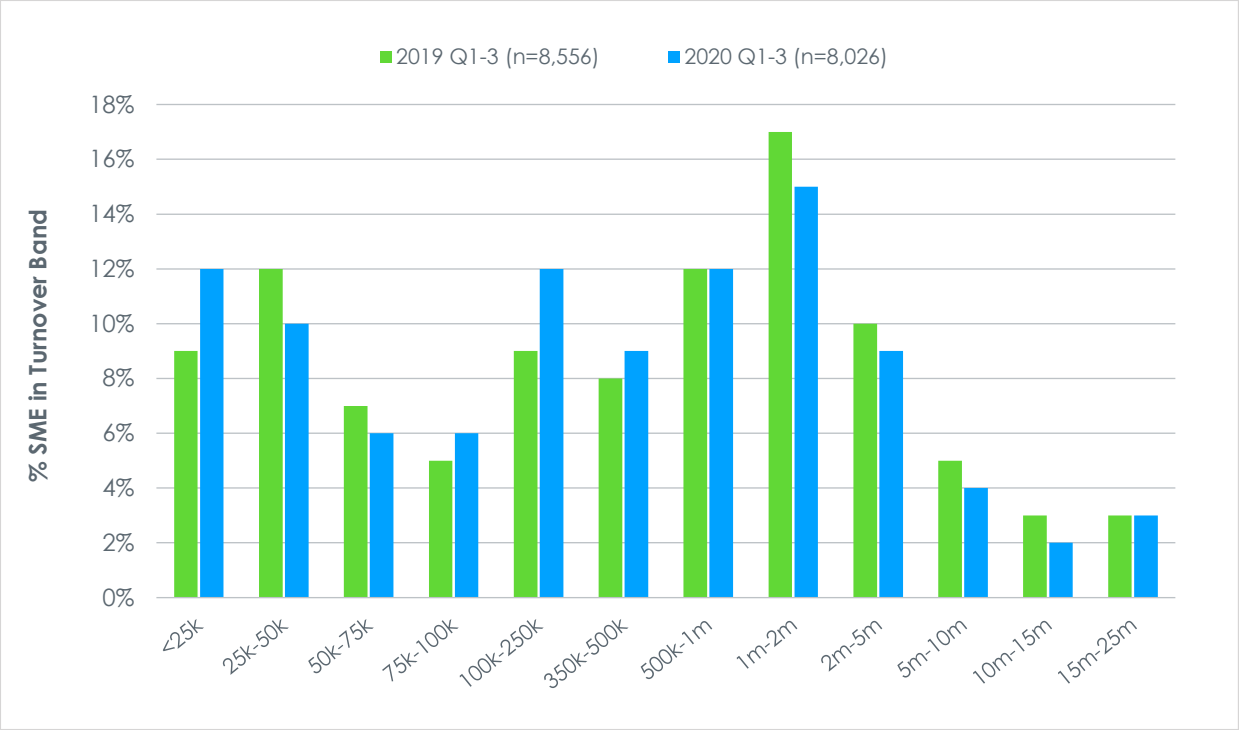
Analytical strategy for multivariate analysis

The descriptive analysis above suggests that there has been a negative impact on turnover, whilst the impact on employment was somewhat limited during the first three quarters of the pandemic. Since the survey captures repeated cross-sectional data, and is not a longitudinal survey, it limits our ability to do any difference-in-difference modelling. Instead, to inform how different factors and characteristics of SMEs have affected productivity performance as a result of the crisis, we have applied a pooled approach. That is, we pooled the data and tested for post-Covid interaction effects by using a dummy variable for pre and during Covid. The dummy variable takes the value 0 for Q1-3 2019 (pre-Covid) and 1 for Q1-3 2020 (during Covid). By interacting each explanatory variable with the Covid dummy variable, we have tested the extent to which there has been a change in the coefficient as a result of Covid.

Model Specification

The outcome variable for our model is banded turnover. As illustrated in **Figure 3**, the turnover data captured in the survey is in 12 bands. Appropriate for an outcome in this form, we estimated an Ordered Probit Model.

Figure 3: Distribution of Turnover (banded) for pre and during Covid.



Source: Authors' analysis of SME Finance Monitor Survey Data

To proxy for productivity, we included a control variable for employment. In addition to employment size, sector, region and business age we sought to incorporate different types of explanatory variable in the model to cover: owner/manager characteristics, firm characteristics, and attitudes/behaviors of firms (e.g. innovation activity). A description of each variable included in the model is presented in **Table 1** below.

Table 1: Description of explanatory variables

Explanatory variable	Description
Sole Trader	The variable takes the value 1 if the business legal status is 'sole proprietorship' AND the business has only one employee, or otherwise 0.
Family Business	The variable takes the value one if the business is a family-owned business, that is one which is majority owned by members of the same family, or otherwise 0
Legal Status	This variable takes the value1 if the legal status is 'Sole Proprietorship', 2 if it is a "Partnership" and 3 if "Limited Liability Partnership or Ltd Company"
Female Ownership	If the owner of the business is female then 1, or otherwise 0.
BAME ownership	If the owner/partner/majority shareholders ethnic background is from black, Asian, or minority ethnic background then takes the value 1, or otherwise 0.
Business owners age	This variable takes the value 1 if the owners age is under 30, 2 if its between 31-50, 3 if its between 51-65, and 4 if it is over 65.
Owner has financial qualification	This variable takes the value 1 if person in charge of the financial management within the business has a finance qualification or have they undertaken any financial training, or otherwise 0.
Innovation activity	Takes the value 1 if the business has developed a new product or service in the past 3 years, or otherwise 0.

3. Key findings

The results from the multivariate analysis are presented in **Table 2**. In summary, the key findings are as follows:

- There has been a strong sectoral dimension to SME performance during the pandemic amongst those surveyed. Service and construction sectors have been most adversely affected, whilst manufacturing firms have been relatively unaffected. These findings are likely to reflect the impact of the various lockdowns and social distancing restrictions, affecting service sectors in particular, and the lost time for the construction sector in the first lockdown, whilst construction sites were made Covid-secure.
- There is limited evidence of regional differences as a result of the pandemic. Wales-based SMEs appear to have been negatively affected relative to SMEs in other regions, though this is only marginally significant at 6.5%.
- Long-established businesses have been less affected than more recently formed SMEs. The relative adverse effect on more recently formed firms impacted those from 2 to 5 years old in particular.
- Innovative SMEs, i.e. those that had developed a new product or service in the last 3 years, were found to have been less adversely affected than non-innovative SMEs. This may reflect a broader innovative mindset that has meant that these SMEs were more likely to pivot or adapt to the circumstances.
- Family-owned SMEs were found to have been more adversely affected by the pandemic than non-family-owned SMEs.

- Medium sized businesses (50 to 100 employees) were found to have been the most affected during the pandemic.

Table 2: Results from the Ordered Probit Model with Interaction effects.

Dependent variable: Turnover	Coef. (with no interaction)	Coeff. (interaction with Q1-3 2020 dummy variable)
Employment (base = 1 employee)		
2-10	1.001***	0.042
11-50	2.238***	-0.037
51-100	3.234***	**-0.228****
101-200	3.980***	-0.215
201-250	4.032***	-0.078
Assets (base = less than 25k)[4]		
25k-50k	0.243***	0.052
50k-75k	0.386***	0.105
75k-100k	0.703***	-0.116
100k-250k	0.682***	-0.018
250k-500k	0.782***	-0.035
500k-1m	0.723***	**0.213****
1m-2m	1.087***	0.072
5m-10m	1.496***	0.136
10-15m	1.831***	-0.066
15m-25m	2.151***	0.163
>25m	1.337**	0.812
Don't know	0.612***	0.050
Refused	0.625***	-0.045
Sector (base = Manufacturing)		
Construction	0.142**	**-0.213****
Services	-0.05	**-0.176****
Region (base case = West Midlands)		
North East	-0.01	-0.051
North West	0.011	0.072
Yorkshire & Humber	0.064	-0.034
East Midlands	0.034	-0.062
East	0.038	-0.031
London	0.114**	0.070
South East	0.128**	-0.037
South West	-0.04	0.033
Scotland	-0.04	-0.058
Wales	0.015	**-0.174***
Northern Ireland	0.038	0.126
Sole Trader	0.097	-0.006

[4] There was missing data for the £2-5m category in all quarters.

Family Business	-0.06**	**-0.084***
Legal Status (base = Sole proprietorship)		
Partnership	0.169**	0.150
LLP & Ltd Company	0.668***	**0.220****
Business Age (base = less than one year)		
Over 1 but under 2 years ago	0.449***	-0.217
2 - 5 years ago	0.508***	**-0.271****
6 - 9 years ago	0.644***	-0.127
10 - 15 years ago	0.617***	-0.054
More than 15 years ago	0.716***	-0.048
Female Ownership	-0.32***	0.013
BAME ownership	-0.25***	0.046
Business owners age		
31 to 50	0.248**	-0.084
51-65	0.211**	-0.093
over 65	0.092	-0.140
Owner has financial qualification	0.165***	0.005
Innovation activity	0.003	**0.110****
Covid Q1-Q3 2020	0.180	-
Number of observations	**13,449**	
Pseudo R2	**0.2639**	

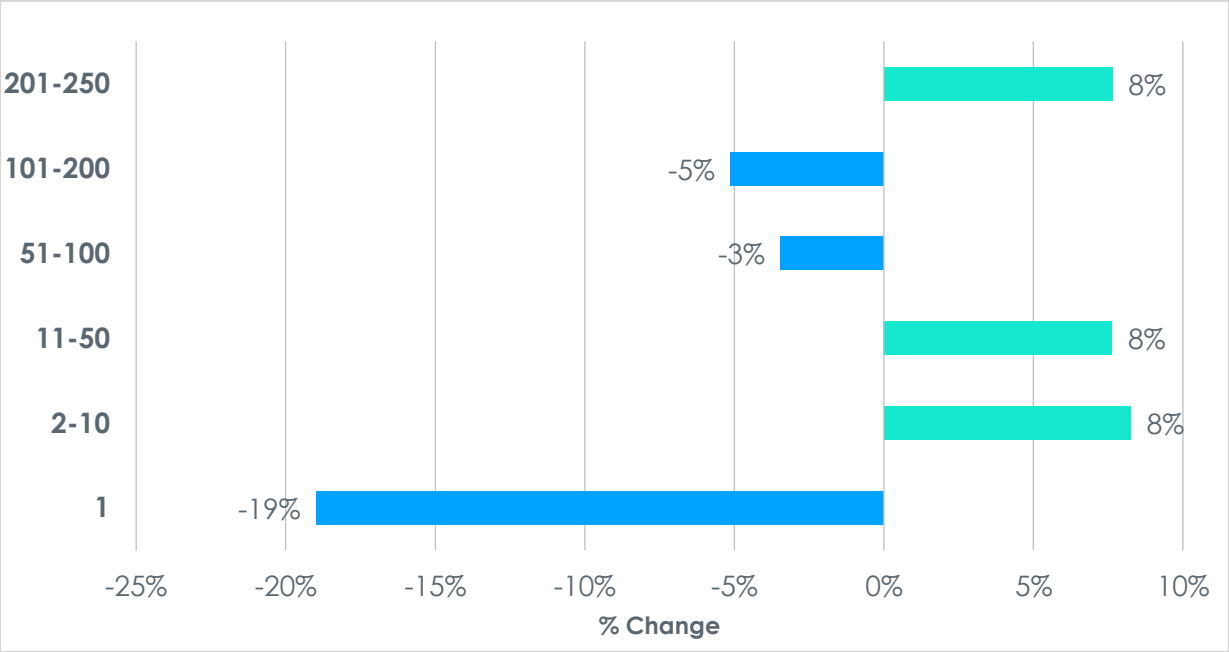
Source: Authors' analysis of SME Finance Monitor Survey Data

4. Conclusion

The key findings presented in this paper are based on some early exploratory analysis but show some of the potential effects of the pandemic on SME productivity. The sectoral difference in SME productivity outcomes is clear from the results and reflect the experience of various lockdowns and restrictions, affecting service sectors in particular, and the lost time for the construction sector in the first lockdown. There is limited evidence of regional differences in SME productivity because of the pandemic, though this may be worth exploring further as more data comes available. Wales-based SMEs appear to have been most affected, albeit this was only marginally significant relative to the West Midlands base. This finding is not reflected elsewhere in other recent studies, and so it may just be 'noise' in the data. Innovative SMEs, i.e. those that had developed a new product or service in the last 3 years, were found to have been less adversely affected than non-innovative SMEs. This may reflect a broader innovative mindset that has meant that these SMEs were more likely to pivot or adapt to the circumstances and is an area for further investigation. Other firm characteristics such as family ownership, size and age all appear to have an impact too, though the reasons for this may require further examination.

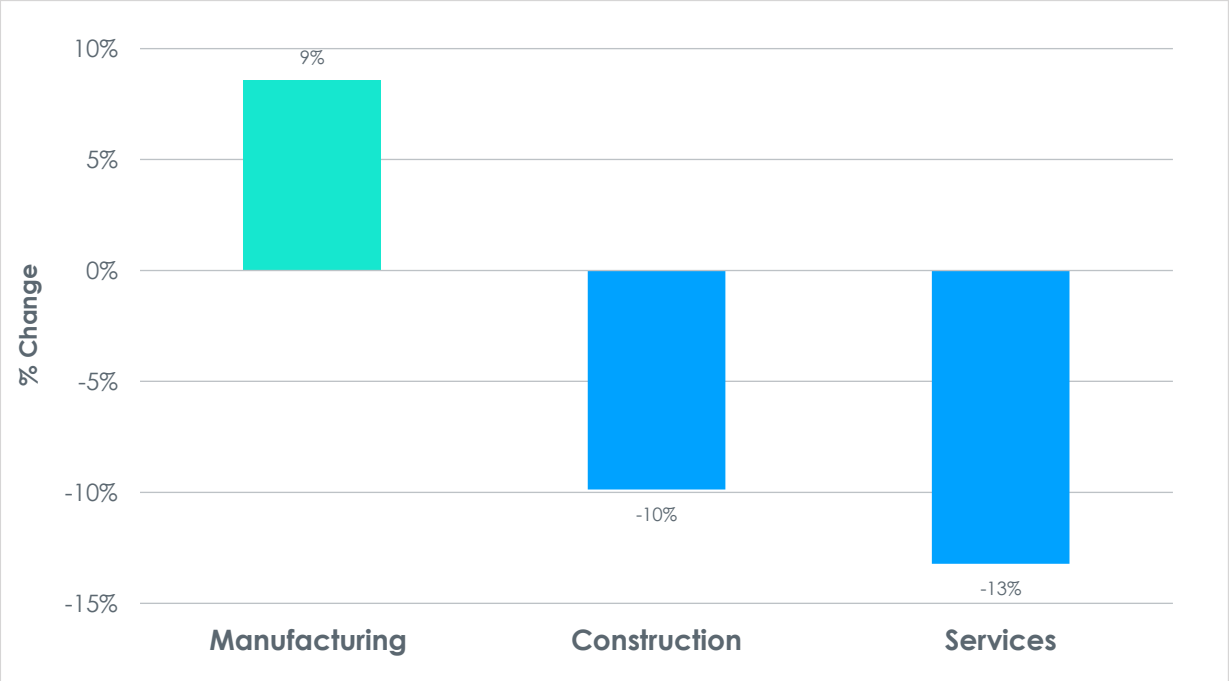
Annex

Figure 4: percentage change in average turnover (Q1-3 2020 vs Q1-3 2019), by employment size



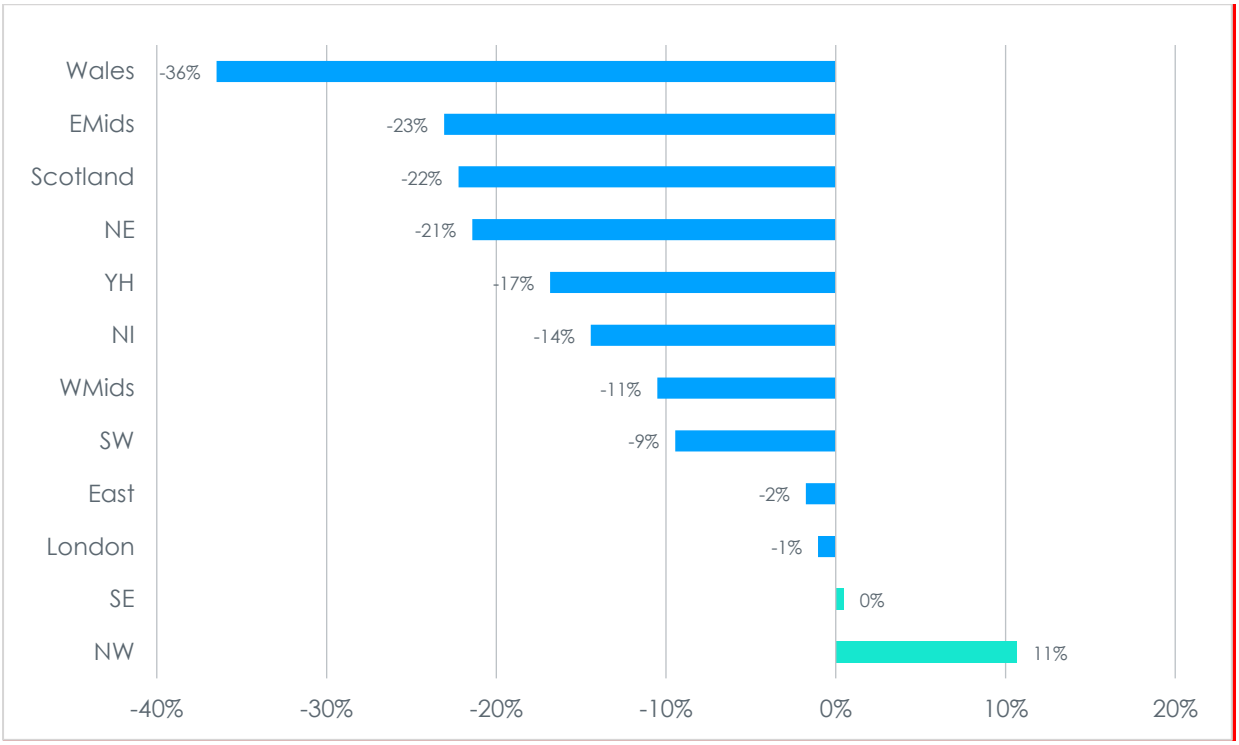
Source: Authors' analysis of SME Finance Monitor Survey Data

Figure 5: percentage change in average turnover (Q1-3 2020 vs Q1-3 2019), by sector



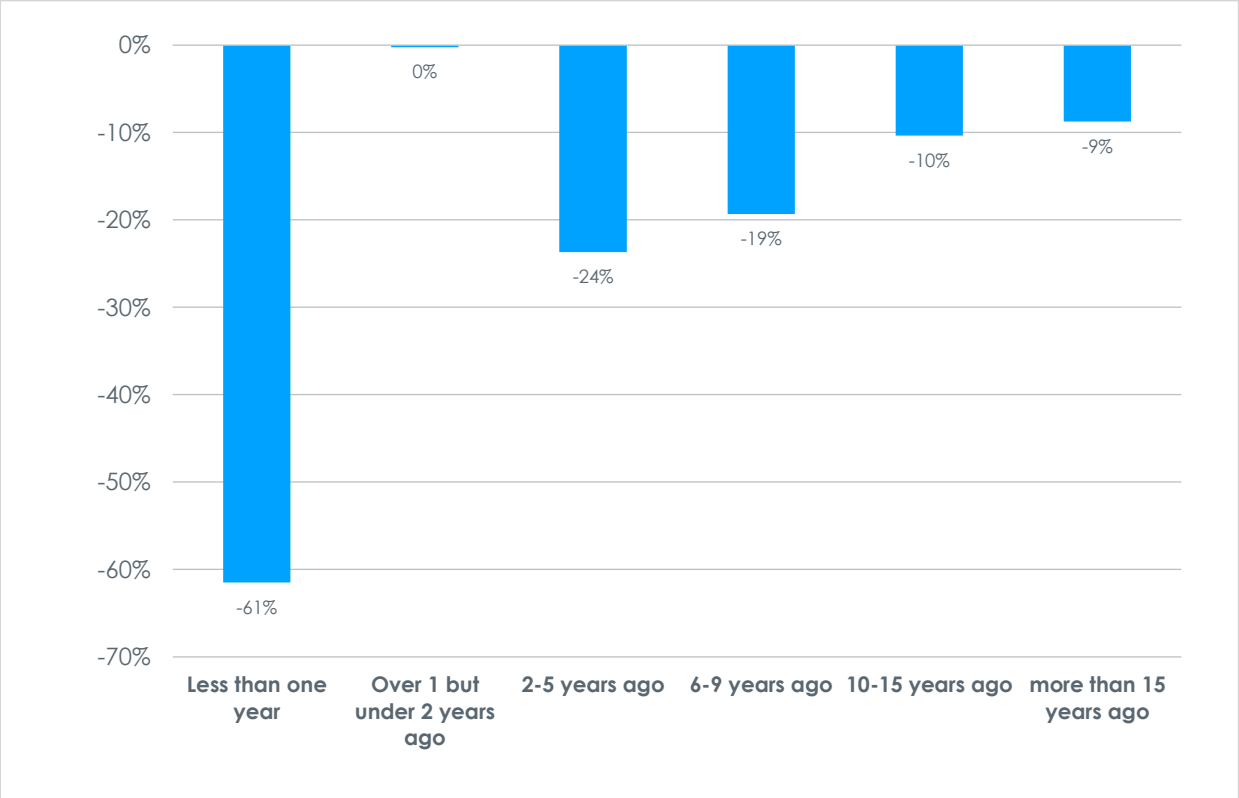
Source: Authors' analysis of SME Finance Monitor Survey Data

Figure 6: percentage change in average turnover (Q1-3 2020 vs Q1-3 2019), by region



Source: Authors' analysis of SME Finance Monitor Survey Data

Figure 7: percentage change in average turnover (Q1-3 2020 vs Q1-3 2019), by business age



Source: Authors' analysis of SME Finance Monitor Survey Data