

**What drives productivity growth
behind the frontier? A mixed-
methods investigation into UK
SMEs**

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ABSTRACT

International evidence suggests productivity growth is most rapid among ‘frontier’ firms, i.e. those in the top decile of the productivity distribution. Other studies have identified the marked difference in sectoral productivity growth in the UK over the last decade. Here, we consider the drivers of productivity growth in SMEs which are ‘behind the frontier’. Looking at quantitative data on value added and turnover per employee growth in twelve 4-digit sectors (six in manufacturing and six in services) we find no consistent relationship between firms’ position in deciles of the productivity distribution and subsequent productivity growth. We also find few significant differences between the observable characteristics of firms behind the frontier which experience rapid and slower productivity growth. Behind the frontier, firm age, size, number of subsidiaries and investment are only weakly related to productivity growth, at least in the short-term. The lack of influence of these observable influences on productivity growth suggests the potential importance of other externally unobservable factors in shaping productivity growth. We explore these unobservables in in-depth interviews, highlighting a number of factors which characterise high productivity growth SMEs. These include: inspirational leadership, people management practices, strategic investments, data oriented operational management and product, market and tactical innovation. Few of the factors are sector specific, and none operates in isolation.

Our study emphasises the role of transformational leadership in driving productivity growth in SMEs and has implications for the targeting of SME policy interventions after the Covid-19 crisis. Policy interventions should be based on the idea that SMEs, irrespective of previous productivity, can achieve high growth if they have focused and effective leadership, if they have appropriate human resource management practices, if they are innovative and if operational management is data driven. This has implications both for the targeting of policy support and the need to support SME owner-managers with the skills they need to be effective leaders of transformational change. Scope exists to extend business network and mentoring schemes with few respondents in our interviews were currently engaged in business networks aimed at creating better businesses. Government also has a continuing role to stress the importance of developing leadership and management capabilities alongside any direct public support. This may be particularly important in years to come as investment in training is likely to come under particular pressure due to cash-constraints in the post-Covid recovery. Finally, our study emphasises the positive role that government procurement practices

can have in stimulating innovation in SMEs. Post-Covid, the role of government as a lead customer may be particularly important in stimulating demand.

1. INTRODUCTION

Over the past decade, aggregate labour productivity growth has slowed in most OECD countries and particularly in the UK. Many studies on firm performance and growth have examined the role of observable firm characteristics such as firm size, sector and age (Lee et. al., 2016, Barret et. al., 2018, Riley et al. 2018). However, the determinants of firm growth have become increasingly complex, and there is a recognition that other unobservable firm characteristics are important. In SMEs, studies have found that the leadership style of the entrepreneur (Yong and Poutziouris, 2010, Koryak et. al. 2015), employees' commitment to the organisation (Patterson et. al., 1997), innovation (Roper et. al., 2008, Audretsch et. al. 2014) and Human Resource Management (HRM) practices (Patterson et. al., 1997, Peng at. al., 2019) are important determinants of firm growth. For example, Bloom and Van Reenen, (2010) link poor management practices to the long tail of low performing firms in the UK, while, Peng et. al. (2019) argue that the ability of business leaders to manage people is critical. Effective leadership may be particularly important in smaller firms where the business is often an extension of the ethos of its owner-manager (Yong and Poutziouris, 2010).

Another important literature links firms' productivity growth with their position in the productivity distribution. Using firm level data for twenty-four OECD countries, for example, Andrews et. al. (2015) showed that since 2001, the most productive firms in the economy - so called 'frontier firms' - grew their productivity around three times faster than other firms - the 'laggards' or non-frontier firms. Some more recent evidence suggests, however, that this pattern may have changed in the period since the Great Financial Crisis. Schneider (2018), for example, examined growth in centiles of the productivity distribution for UK firms and find that, since the Global Financial Crisis, firms at the top quartile of the distribution experienced declines in their growth rates while other firms experienced increases in growth rates.

In this paper, we investigate the drivers of productivity growth among UK SMEs operating in a group of tightly defined manufacturing and service sectors. Typically, these SMEs are operating 'behind the frontier'¹. We rely on a mixed methods approach to investigate the role of the firm's position along the productivity distribution, the firm's other

¹ In Andrews (2015, Table 1), for example, global frontier firms had average employment of 409, compared to 225 for non-frontier firms.

observable characteristics, as well as unobservable organisational characteristics. First, using data derived from company accounts, we consider whether productivity growth in SMEs is related to firms' initial productivity level. Here, we follow the methodological approach suggested by Schneider (2018) in looking at the full productivity distribution in terms of deciles of the distribution. Second, we examine the importance of other measurable drivers of productivity growth, such as firm size, age, subsidiaries and investments. Third, drawing on detailed interviews with 14 highly productive, high growth SMEs across five sectors, we investigate other drivers of productivity growth that are unobservable from quantitative data.

We find that among SMEs, there is no consistent relationship between the position of a firm in the productivity distribution and its subsequent productivity growth, suggesting that small firms with initially low levels of productivity are just as likely as highly productive firms to experience productivity growth. Moreover, we find no strong relationship between firm age, size, subsidiaries or investment and productivity growth. Thus, our results suggest that observable firm characteristics including initial productivity levels are weak drivers of growth. Instead, findings from the qualitative analysis revealed that inspirational leadership, people management practices, operational management practices and innovation are important drivers of growth across sectors.

The argument proceeds as follows. Section 2 provides a brief overview of previous literature. In section 3 we outline our data sources and methods. Section 4 focuses on the quantitative analysis and considers productivity growth across deciles of each sectors' productivity distribution, as well as other observable determinants of growth. We present the qualitative analysis in Section 5, and offer conclusions and policy recommendations in Section 6.

2. LITERATURE REVIEW

2.1 Observable determinants of productivity growth and firms' position along the productivity distribution

Many studies explore the relationship between firms' age, size and investments and growth. Younger and smaller firms are usually thought to grow faster than established large firms (Peng et. al. 2019, Lee et. al. 2016, Yong and Poutziouris, 2010), but empirical findings are mixed. Lee et. al. (2016) find that younger firms are more likely to grow rapidly but also more likely to exit the market afterwards, and that smaller firms are

less likely to shrink after experiencing high growth. Hall et. al. (2009) find that larger and older firms are less productive than smaller and younger firms. In contrast, Barret et. al., (2018) find that, among UK SMEs', larger and older firms tend to be more productive than smaller younger firms. Andrews et. al. (2015) also find a positive relationship between firm size and productivity growth. Overall, therefore, the findings on firm age, size and productivity growth are inconclusive. In terms of other firm characteristics, Andrews et. al. (2015) find that highly productive firms are more likely to be part of a group or conglomerate, suggesting that firms with subsidiaries may be more productive than others. Maksimovic and Phillips (2002) also find that, with the exception of the smallest firms, conglomerate firms are more productive than single segment firms of comparable sizes. Firms' level of fixed investments have also been linked to productivity growth (Chirinko, 1993).

Regarding the relationship between firms' position in the productivity distribution and productivity growth, Andrew et. al. (2015) provide the first large scale international evidence using data for twenty-four OECD countries. They show that since 2001, productivity in frontier firms grew around three times faster than that in non-frontier firms. This difference in productivity growth rates is more pronounced in services than in manufacturing. Andrews et. al. (2015) argue that the divergence in productivity growth between frontier and non-frontier firms is due to slow – and perhaps a slowing - rate of technological diffusion from frontier firms to other companies.

Using the same dataset, Andrews et. al. (2016) find evidence that some of the greatest productivity growth disparities are in sectors which are intensive users of Information and Communication Technologies (ICT). This suggests that some 'winner takes all' dynamics of digital technologies are at work reflecting first mover advantages (Ulhoi 2012). However, Andrews et. al. (2016) also find that average productivity is lower in these sectors, suggesting that non-frontier firms may have little access to the complementary capabilities needed to reap the benefits of new (digital) technologies or that they lack the tacit knowledge to do so (Pelletier and Cloutier 2019; D'Ippolito, Petruzzelli, and Panniello 2019). Both of these mechanisms, they argue, lead to lower technological diffusion and lower aggregate productivity (Roper and Bourke 2018).

Andrews et al. (2015, 2016) look at the productivity problem from a global perspective, while it is quite plausible that different factors may be shaping productivity gaps in different industries and national contexts. For instance, Roper, Driffield, and Hathaway (2019) highlight the different intra-firm and market factors which shape productivity in UK

sectors while Bartelsman et. al. (2008) examine the relative importance of global and national frontier firms in facilitating technology diffusion to laggard firms. For the UK, they find that national frontier firms are much more important for technology diffusion, and that diffusion from the global frontier reduces with technological distance whereas technological distance has no effect on diffusion from the national frontier. For the US, Autor et. al. (2017) find that the persistent fall in labour productivity is attributable to the increasing importance of a small number of superstar firms that benefit from globalisation and technological changes. These firms' success raises product market concentration and causes productivity to be concentrated in a small number of highly productive firms with a small labour share. The result is lower national labour productivity. Similarly, McGowan et. al. (2017) find that the increasing survival of incumbent firms which exhibit limited dynamism and financial strength has built inertia into OECD markets, reduced investment and employment in healthy firms, reduced the rate of market entry and lowered the growth of young firms. They argue that all these channels lead to lower aggregate productivity.

More recently, however, Schneider (2018) analysed the productivity puzzle using UK firm level data for all sectors and finds evidence which, at least for the period since the Global Financial Crisis (GFC), suggests a different set of productivity growth dynamics to that implicit in Andrews et. al. (2015, 2016). He investigates changes in UK productivity growth among *centiles* of the productivity distribution and compares productivity growth in the pre-crisis and post-crisis period. Consistent with Andrews et. al. (2015, 2016), he finds that firms in the top *quartile* of the labour productivity distribution (measured as value added per worker) grew faster than other non-frontier firms in both the pre- and post- crisis period. However, in the post-crisis period, growth among firms at the top end of the distribution, while still high, was considerably slower than their growth in the pre-crisis period. By contrast, growth among firms in the 50th to 75th percentile stayed about the same, while growth among firms in the bottom half of the distribution surpassed pre-crisis growth. Thus, he argues that lower aggregate productivity growth in the UK post-crisis period is attributable to firms at the top end of the distribution, i.e. the frontier firms. He shows that this is potentially the result of reallocation of unproductive labour into these firms, or that workers in these firms are not as productive as their pre-crisis predecessors were. Other recent studies focussed on the UK productivity puzzle have also demonstrated the very different sectoral experience of productivity change pre- and post-recession (Riley et al. 2018).

As in the present paper, Lee et. al. (2016) examined the growth trajectories of UK SMEs using a mixed methods approach. They find no consistent relationship between prior and future productivity growth rates - almost half of the high growth firms in their sample were already growing in the periods before their high growth spell, a quarter of firms were stagnant before experiencing rapid growth, and a minority of firms were shrinking prior to experiencing rapid growth. Taken together with the results in Schneider (2018), these findings indicate that prior productivity levels or growth rates may not predict future growth among UK firms

The analysis in Schneider (2018) is also revealing as it shows the insights that can be gained from examining productivity growth for different quantiles of the productivity distribution, rather than focusing on the simpler frontier/non-frontier dichotomy. In this paper, we adopt this approach to investigate the generalisability of the idea implicit in Andrews et al. (2015, 2016) that firms' productivity growth is conditional on their position in the productivity distribution.

2.2 Organisational determinants of productivity growth

Here, we briefly review literature on organisational determinants of productivity growth, including firms' approach to innovation, leadership styles and organisations' approach to Human Resource Management (HRM).

There is a consensus in the literature that innovative firms tend to be more productive. Hall et. al. (2009) find that both product and process innovation have a positive impact on productivity. Baumann and Kritikos (2016) find that R&D intensity has a similar positive impact on Micro SMEs as it does on larger firms. Love and Roper (2015), in a review of the literature on innovation, exporting and growth, show that many studies find a strong positive association between these variables although the channels of effects are less well understood for SMEs. Barret et. al. (2018) find that among UK SMEs' innovation and strategic management practices exert a positive influence on productivity. Audretsch et. al. (2014) also report positive impacts for SMEs. Coad and Rao (2008) find that the effect of innovation on growth depends on the productivity distribution, with innovation being more important for high growth or superstar firms. Uhlaner et. al. (2013) find that external sourcing of ideas from market research, external networks and inter-firm cooperation, when combined with process innovations, improved sales among Dutch SMEs.

Given that many small businesses tend to operate as an extension of the ethos of their owner-managers, leadership styles will determine the extent to which small firms can achieve sustainable performance (Yong and Poutziouris, 2010). Based on the behavioural approach to organisational leadership, Burns (1978) and Bass (1985) classify leadership as either transactional or transformational. Transactional leadership styles focus on exchange relationships between leaders and followers, and exploit the extrinsic motives of followers by rewarding them for achievements or punishing them for poor performance. Transformational leadership, on the hand, focuses on motivating employees through exploiting their intrinsic motives, and directing their focus towards the achievement of organizational goals rather than the associated rewards. Oregon et. al. (2005) find that in manufacturing SMEs, organisations that balance transformational and transactional leadership styles are better performers, and organisations that emphasize any one of these leadership styles perform better than those with inconsistent or unclear leadership styles.

Findings from other studies suggest that leadership styles closer to transformational leadership are associated with higher performance growth. Yong and Poutziouris, (2010) posit that British culture, with its low power distance and high individualism, means that employees are generally more receptive to participative and supportive leadership styles where their voices are heard and their needs and welfare accommodated. Indeed, their analysis reveals that leadership styles that are participative and that incorporate delegation of authority achieve higher growth in sales. This is important because the close relationship between an SME and its owner means that SMEs may lend themselves to directive or authoritarian leadership styles (Yong and Poutziouris, 2010) which can be demoralising to staff and have negative implications for productivity growth.

A related leadership style, people-oriented leadership, has received considerable attention in the literature (House, 1996; Mullins, 2002). This leadership style is supportive, participative and focuses on the achievement of employees. Employees are consulted on important organizational decisions, and leaders seek their feedback and recommendations (Yong and Poutziouris, 2010). The related concepts of ethical leadership (Eisenbeiss et. al., 2015) and relationship-oriented leadership (Wang et. al., 2011) have also been found to promote productivity growth.

In addition to its direct impact on productivity, effective leadership can drive performance through its impact on innovation. Dunne et. al. (2016) find that small business leaders that are inspirational in their approach are able to foster innovation within their organizations. Leadership styles that are consultative and that allow group members to voice their opinions and feel involved in decision-making facilitate innovation success (Anderson and West, 1998). Inspirational leaders are also able to motivate staff through exhibiting positive emotions, thereby eliciting similar emotions from their employees which in turn can foster high performance (Dunne et. al., 2016). Communication is also key: the more clearly a leader is able to communicate ideas, goals responsibilities and cultural norms while being empathetic to subordinates' needs, the more they are able to foster creativity and innovation (Mayfield and Mayfield, 2004).

Apart from the role of the leader, Human Resource Management practices have been linked to growth². Aspects of these practices have been categorised as High Performance Work Systems (e.g. Appelbaum et al. 2000) or High Commitment Management (e.g. Wood and de Menezes 1998). Overall, most studies reveal positive associations between these practices and performance irrespective of the combinations of practices considered (Guest et al. 2003). The suggestion is that these practices work through motivating employees and enhancing their commitment (Jackson et. al. 2014, Peng et. al. 2019).

Patterson et. al., (1997) was the first large scale empirical study that quantitatively examined the effects of human management practices on firm performance in the UK. Their results clearly indicate that how companies manage their people is crucial for both productivity and profitability, and that the importance of other management practices such as quality control and investments in R&D are less important than the effect of people management practices. They find that employee attitudes, and in particular their job satisfaction, account for 16% of variations in productivity between firms, while their organisational commitment accounts for 7% of this variation. Organisational cultural factors account for 29% of between firm variation in productivity over 3 or 4-year periods. They show that people management practices taken together account for 18% of the variation between firms in terms of productivity. The strongest impact was for job flexibility and the acquisition and development of skills, i.e. recruitment, induction, training and appraisal. They find that other management practices unrelated to HRM had

² Paauwe and Boselie, (2005) provide a review of this literature

little impact. In particular, an emphasis on quality and on technology each explained less than 1% of between firm variations in productivity, and investments and strategy had no impact.

Guest et. al. (2003) also finds positive associations between a bundle of HRM practices and performance among 366 UK companies. Oakland and Oakland (2001) find that certain people management practices are common in world-class organisations. Among these are: effective communication, planned training and development, empowerment of employees and review and continuous improvements. They also argue that a well-organised performance measuring system that covers all aspects of performance is necessary for organisational success, and Yong and Poutziouris, (2010) argue that management systems that incorporate performance rewards can foster organisation performance. From interviews with high growth UK SMEs, Lee et. al. (2016) find that investment in human and managerial capital and business strategy are important drivers of growth, whereas product innovation, diversification and internationalization are important for a small minority of firms.

Overall, there is significant historical evidence in the literature suggesting that innovation, inspirational or transformational leadership and human resource management practices were instrumental to productivity growth among UK SMEs in the pre-GFC period. As Schneider (2018) suggests, however, productivity growth patterns have changed since that period so here we focus on the drivers of productivity growth in SMEs over the 2016-18 period.

3. DATA AND METHODS

Our data analysis has three objectives. First, we aim to examine the relationship between firms' position in the productivity distribution and productivity growth for SMEs in twelve (4-digit) sectors. Second, we explore the role of other observable firm characteristics- such as firm age and size- in determining firm growth. Third, we follow-up our quantitative analysis with more in-depth qualitative investigation of potential unobservable drivers of productivity with a group of high performing SMEs. Our aim of using mixed methods rules out the use of anonymised administrative data (such as the Business Structure Database) and instead we therefore use firm-level panel data derived from the Financial Analysis Made Easy (FAME) database which provides access to Companies House data.

3.1 Quantitative analysis

We focus our analysis on Small and Medium Enterprises (SME's) with 10-249 employees which remained in business for the period 2016 to 2018. We include firms which are independent companies and also those which fall in the 10-249 employee sizeband but are part of larger groups. We also focus on twelve 4-digit SIC sectors – six in manufacturing and six in services - chosen to provide a spread of industry types, and where the number of firms were large enough to enable robust distributional analysis. We focus on productivity comparisons within 4-digit sectors on the basis that firms within these narrowly defined sectors will face similar market conditions and technological opportunities.

Firms are included in our analysis only where they reported full accounts in 2016 and 2018 which enabled us to calculate productivity measures at the start and end of the period and growth between 2016 and 2018. Table 1 profiles our data and compares the number of firms for which we have full accounts and the total population of firms (with 10-249 employees) in each sector. For most sectors, our accounts data is most strongly representative for firms with between 100 and 250 employees, where we capture an average of 34 per cent of firms across all sectors. On average across sectors, we capture 14.2 per cent of firms with 50 to 99 employees, 4.4 per cent of firms with 20-49 employees, and only 1.5 per cent of firms with 10-19 employees. These proportions reflect the provisions of the Companies Acts which mean that smaller firms are not required to register full accounts with Companies House. Thus, our quantitative data reflects medium-sized firms more than it does small firms.

We focus on two alternative measures of labour productivity. First, turnover per employee which is often used as a simple proxy for productivity and is easily derived from accounts data. Secondly, value added per employee, where value added is calculated as the sum of operating profit and labour costs. In each case we focus on deciles of the productivity distribution and within each decile focus on median growth. This approach has the advantage of minimising the impact of extreme growth rates at either end of the productivity distribution.

3.2 Qualitative analysis

Our qualitative analysis aimed to explore potential drivers of labour productivity which are not observable from firms' accounting data. A purposive sampling approach was adopted, focusing on SMEs which were more than 5 years old, had above average labour productivity (value added per employee) for their sector, and had achieved high productivity growth (Gentles et al. 2016). Interviews were concentrated in four of the twelve sectors included in the quantitative analysis and which were selected based on: the homogeneity within the 4-digit SIC code (i.e. excluding sectors which encompass 'other' categories); having an adequate number of firms to enable an achieved sample of 4-6 interviews per sector and policy relevance. The selected sectors were: Manufacture of instruments and appliances for measuring, testing and navigation (SIC 2651); Manufacture of metal structures and parts of structures (SIC 2511); Manufacture of metal structures and parts of structures; Computer consultancy activities (SIC 6202); and Temporary employment agency activities (SIC 7820). However, due to a low response rate in the Temporary Employment Agencies sector, firms within the Legal Services sector were also contacted.

A total of 14 interviews were conducted between November 2019 and January 2020, all with the Managing Directors, or equivalents, within the firms. Four firms were interviewed in the Manufacture of metals and metal structures (Metals) and three in the Manufacture of instruments for measurement, testing and navigation (Instruments). Firms varied in size from 40 to 200 employees and in age from 11 to 100 years. Two of the manufacturing firms were family owned but neither of these were family managed. The others were privately owned by a small number of shareholders; by private equity firms or were parts of a larger multinational group. Seven firms were interviewed in the Services sectors, specifically within Computer Consultancy (4), legal (2) and temporary employment agency (1) sectors. Three had between 20 and 60 employees; two had 120-150 employees and two had over 250 employees, one having grown from 200 to 300 in the last two years and one has been steadily growing through acquisition of other companies for many years, to 500 in employment. They mainly vary in age from 15-45 years, with one exception being a legal firm which was 120 years old. Four were owned by a small number of shareholders and three were part of larger groups.

The discussion guide for the interviews drew on that used in a previous ERC study focused on firms' understanding of productivity and its drivers (Roper et al. 2019). This highlighted the very different sectoral understandings of the term 'productivity' and the range of different performance measures used in different industries. Additional questions built on those in the World Management Survey³ and the Office of National Statistics Management Practices Survey⁴. Questions focused on seven key themes:

- observable performance measures as used in the quantitative analysis;
- business strategy;
- market position and location;
- approach to innovation;
- approach to people management;
- business management processes and practices; and
- government support and policy.

We recorded interviews with the permission of participants; these were transcribed before analysis.

4. QUANTITATIVE PERSPECTIVES ON PRODUCTIVITY CHANGE

4.1 Labour productivity distributions

We consider the distribution of labour productivity among SMEs within six 4-digit manufacturing sectors: machining, instruments and appliances, medical and dental instruments, metal structures, other plastic products and other printing. The distributions of value added per employee and turnover per employee for the combined population of firms from the six sectors in 2016 are illustrated in Figure 1. In each graph, columns represent median productivity or turnover per employee for SMEs within that decile of the distribution. By definition in the upper panels of Figure 1 we see increasing value added per employee and turnover per employee in higher deciles of the distribution. The lower panels of Figure 1 profile the median growth rates of value added per employee and turnover per employee from 2016-18. In each case the fastest growth rate in each

³ See <https://worldmanagementsurvey.org/>.

⁴ See

<https://www.ons.gov.uk/employmentandlabourmarket/peopleinwork/labourproductivity/articles/experimentaldataonthemanagementpracticesofmanufacturingbusinessesingreatbritain/2018-04-06/relateddata>

productivity indicator is in the third decile of the distribution with significantly lower growth among firms with higher initial value added or turnover per employee (Figure 1).

Conducting the same aggregate analysis for the six service sectors we cover (beverage serving, computer consultancy, hotels and similar, legal activities, restaurants and temporary employment agencies) suggests a broadly similar picture (Figure 2). By definition, median value added per employee and turnover per employee increases by decile. However, growth in value added and turnover per employee again have little systematic relationship to value added and turnover deciles (Figure 2). If anything, SMEs with higher levels of value added per employee or turnover per employee tend to have lower levels of growth in each measure.

This is suggestive of the results obtained by Schneider (2018) for all UK firms, suggesting little consistent relationship between firms' starting position in the productivity distribution and subsequent growth. It also resonates with the findings in Lee et al. (2016) who find no consistent relationship between prior and future subsequent growth in SMEs. Our results challenge the conclusions in Andrew et. al. (2015, 2016), Autor et. al. (2017) and McGowan et. al. (2017). We show that, behind the frontier, the premise that firm growth is tied to their initial productivity level relative to other firms does not hold. In the next section, we explore whether our findings mask sectoral heterogeneity in the pattern on this relationship.

4.2 Sectoral analysis

Schneider's (2018) aggregate analysis – for all UK firms – suggested considerable variability in the growth of productivity within the large group of non-frontier firms. The findings of Riley et al. (2018) reflect this heterogeneity in sectoral productivity growth. In this section we look at deciles of the productivity distribution among SMEs to explore the robustness of any relationship between productivity levels and growth. It is important to bear in mind, however, that in some of our study sectors the number of firms in each decile is relatively small and therefore some volatility between groups might be anticipated (Table 1).

Median growth in value added per employee by decile for manufacturing sectors again shows the standard definitional pattern (Figure 3). Comparing the scales of the vertical axis in the charts in Figure 3, however, suggests the very different levels of value added per employee between sectors, a result which is echoed in sectoral comparisons of

turnover per employee (Figure 4) and again for the service sectors (Figures 5 and 6). Comparing value added and turnover growth by decile within manufacturing sectors (Figures 7 and 8) suggests little consistent pattern, and particularly little consistent link between productivity deciles and either growth in value added per employee or turnover per employee. The same analysis for the six service sectors suggests a similar conclusion with little consistent relationship between productivity decile and growth in either value added or turnover per employee (Figures 8 and 9). Indeed, in five of the six service sectors firms in the top decile of the distribution actually suffered productivity losses from 2016-18 rather than gains.

As with the aggregate analysis, the absence of a consistent relationship between productivity levels and growth for these 'behind the frontier' firms suggests the difficulty of generalising from the international evidence on the frontier v non-frontier distinction suggested by Andrews (2015, 2016) to non-frontier firms. Can we identify any other observable indicators which are more strongly related to growth in value added per employee or turnover per employee? This is the focus of the next section.

4.3 What characterises high productivity growth firms?

The preceding analysis has suggested that SMEs with high productivity growth are not necessarily in the higher deciles of the productivity distribution but that higher productivity growth may instead occur in lower deciles. In this section, we explore other observable factors which previous studies have suggested may explain this pattern. We follow an approach adopted in studies of business growth (Gundry and Welsch, 2001) and compare the characteristics of firms in the top third of the distribution of value added growth with those in the bottom third of the distribution of value added growth. We consider four factors: the age of the firm (in years), the size of the firm (employment), firms' number of subsidiaries and firms' level of investment in fixed capital as a percentage of turnover⁵.

Table 2 reports mean values for these indicators for firms in the top and bottom third of the productivity growth distribution. We also report t-tests to identify significant differences. In terms of firm age there is a slight tendency for younger firms to have faster productivity growth but this difference is only weakly significant in one of the twelve

⁵ An alternative here would have been firms' investments in current assets. This was not possible due to limited data availability.

sectors considered. High productivity growth is more strongly correlated with firm size with high growth firms being significantly larger in three sectors, a finding in line with the results in Andrews et al. (2015) and Barret et. al. (2018). Consistent with the findings of Andrews (2015, 2016) and Maksimovic, and Phillips, (2002), firms with subsidiaries were also generally more likely to have faster productivity growth although again this difference was only statistically significant in two manufacturing sectors. We find no significant differences between high and lower growth firms in terms of investment in fixed assets (Table 1).

4.4 Multivariate analysis

We can examine the association between productivity growth, position in the productivity distribution and the other firm characteristics using a simple regression analysis. Here the dependent variable is productivity growth (value added or turnover) and the firm observables are treated as regressors (Table 3). Models all include fixed effects for sector. We omit the top and bottom deciles of the distributions to control for the impact of outliers. As suggested by the earlier descriptive analysis few of the decile variables or business characteristics are robustly linked to growth in either value added or turnover growth per employee. Thus, the regression analysis supports our general finding that observable firm characteristics, including firms' position along the productivity distribution, are poor predictors of growth.

The weak relationship between observable firm characteristics and SMEs' productivity growth suggests the potential value of otherwise unobservable productivity growth drivers. We explore this using qualitative analysis based on detailed interviews with high growth SMEs.

5. QUALITATIVE ANALYSIS

Here, we conducted targeted interviews with SMEs which, starting from a high productivity level, had achieved significant productivity growth over the 2016-18 period. The interviews suggest a number of factors which characterised this group of strongly performing SMEs:

- the role of the leader: their capabilities and values;
- valuing people and coherent people management practices;
- The use of data to drive improvement through routinised operational management and a focus on performance and customers

- their innovative product/service offer and the market they operate in, and
- strategic and tactical investments.

We consider each of these factors below.

5.1 The role of the leader

The role and influence of the leader was apparent in the success of each of the interviewed firms. There was no single shared characteristic but a combination of experience, knowledge and values all seemed important. These leadership values typically placed customer and staff satisfaction as core to the business and from which strong people and operational management processes were established.

It is noteworthy that the influence of the leader underpinned all other factors discussed below (such as investment and innovation), but came across particularly strongly with regard to people management and the value they place on people as illustrated through these quotes:

'They call me the people person. I suppose culturally it does start with me but I'm very luckymost departments have got people recruited that are of the same like-mind as myself we look after people and that's something that I have instilled'
(Manufacturer of metals and metal structures)

'I learnt what it was like to work for people I had little or no respect for and I learnt what it was like to work for yourself and how not to treat people in the way that you had yourself been treated'
(Manufacturer of metals and metal structures)

'When I think about the last 20 years of my career, and things that I've done in businesses, it's stand out in that it's the first time that I've brought that whole methodology into one place, (and) delivered it'
(Computer Consultancy)

'We want to build a business that other businesses look at and go 'bloody hell, they're good'.... And we think how you achieve that is you can employ people who are average or good, and the trick is you give them permission to be great. And being great is about bringing good energy and a good attitude to work.'
(Computer Consultancy)

'we believe that if you love your people, they will love your customers, and then you grow a successful business and make profits'.

(Computer Consultancy)

This illustrates the interplay between satisfied staff and satisfied customers which was a recurrent theme in the interviews.

Many of the firms had implemented a change in strategy or approach at the time a new leader was brought in which they said contributed to the success of the firm. For example, two manufacturing firms had moved from being family-owned and managed to being family owned, but professionally managed. This happened 8 years ago in one case, with the introduction of a professional MD and around 4 years ago at the other, as the MD who had worked with the family a long time, formally took the reins. In this case, the family recognised that they needed:

'other people to take the company forward because it's a bigger business, it's a bigger international, it's grown a lot in the last thirty years'.

(Manufacturer of metals and metal structures)

Both firms introduced changes to the way the company was run, particularly with regard to processes. While these factors are also vital, one leader stated *'culture eats strategy for breakfast'* - a sentiment echoed by many other respondents.

Changes in strategy were in many cases accompanied by changes to the leadership team itself, either in developing existing leaders or making personnel changes. For example, one respondent reported that leadership development and understanding diversity in the leadership team (through Myers-Briggs testing) was at the forefront of the change which he had brought in and was vital to success:

'I know how sitting in the board room some of this stuff (leadership development) feels soft and intangible, but I can't impress upon you hard enough how it laid a foundation for transformational change in the business'.

(Computer Consultancy)

Whilst leadership development was relatively common, so too was changing leadership teams for new CEOs to bring in like-minded people and people who wanted and could deliver change.

'I made a few structural changes to the Senior Leadership Team, brought a top grade in to the operations director position, made some changes to the sales organisation... and the leader of sales'.

(Manufacturer of instruments for measurement, testing and navigation)

The background of the leaders varied with some having formal management training; some were experienced leaders, either within the firm/sector or outside; some explicitly cited the value of earlier experience in bigger firms which they could bring into the smaller firm; some had grown through their existing firm. Legal firms tend to be owned by equity partners, senior lawyers within the firm. Interestingly, one of the legal firms interviewed had a dedicated CEO from outside the legal sector, who had an entrepreneurial approach to growing the business through establishment of new, related businesses. He noted that in this sector good lawyers become partners and responsible for management of the firm, which takes them away from fee-earning and into roles they do not necessarily have the skills for – a *'double whammy'*.

Overall, the emphasis of these business leaders on people was a recognition of the importance of people to the success of their business. One firm stated that continuity of people was vital in a business where 94 per cent of the customers were the same year-to-year. For another firm good people management and looking after people helped with retention and business success. The strong consistent emphasis on people-oriented leadership where staff are valued resonates with the concept of transformational and inspirational leadership, found in many studies to be strong drivers of growth (Mullins, 2002; Yong and Poutziouris, 2010; Wang et. al., 2011). The premise that people who feel valued add value to the organisation is reflected in Patterson et. al. (1997), who find large growth effects of employee attitudes and commitment. Firms' perceptions of the impact of strategy helps to explain mixed findings from other studies. For example, Lee et. al. (2016) and Barret et. al. (2018) find positive impacts of strategic business strategies while Patterson et. al. (1997) find no impact. Our results suggest that, when a people oriented leadership style is adopted, firms can achieve high productivity growth. The findings also underline the importance making employees feel part of the organisational culture (Mayfield and Mayfield, 2004)

5.2 People management practices

The majority of respondents were passionate about the importance of people to the success of the business and all adopted a range of HR practices. For example, all of the firms interviewed had regular, consistent means of communicating with staff which was two-way and with processes to ensure feedback was acted upon. All firms had all-staff meetings to discuss the business, which varied in frequency from monthly to quarterly. Surveys assessed satisfaction and mood. Crucially, feedback from staff meetings or surveys fed into management discussions and/or were discussed across the business to identify improvements. Listening to staff was seen as vital to quality engagement and improvement. As one CEO stated, his staff are:

'going to have the best ideas, way better than mine, so let's listen to them..... it's about engaging with your people, listening to your people so that they feel they're an active participant in growing your business. It's not a top down management, it's more consultative'

(Computer Consultancy)

'we've got a 'see it-fix it' campaign where people can put forward comments about the way we do business across any part of the organisation if they think it's an efficient tool or it's incorrect and it could be improved. So, the staff are heavily involved in how we improve the organisation's performance'

(Computer Consultancy)

One firm had introduced a weekly 'pulse' survey of staff, feeding into an employee promoter score, exploring factors such as their relationship with managers. This was part of a detailed approach to changing people management within the firm including:

'...impressing upon people the point of one to ones and a good rhythm of business around the team and the team management'.

(Computer Consultancy)

This 'rhythm' and regularity was commonly referred to in communications.

'Every Saturday morning, I receive an email from each of our main directors giving me an update on ...things that are going well, and things that are a challenge, and anything we need to really address come Monday morning We're very regimented, and we're very structured. I think our people would freak out if we

didn't do a stand up on the first Monday of the month. They'd say, 'oh my god, what's gone wrong?' So, they're so used to our routine'.

(Computer Consultancy)

Another firm emphasised the importance of being always available, outside regular meetings:

'our business is pretty agile, I mean our organisational structure is fairly flat although I'm the MD.... my door's always open and I'm very close to the staff'.

(Computer Consultancy)

Firms' communications activities usually supported an approach to performance management whereby people wrote their own objectives and were clear on how their objectives aligned to the goals of the organisation, over a short and longer term. One firm had a monthly self-assessment of energy, attitude, knowledge and performance, discussed at a one to one meeting. This firm, which is renowned as being an excellent place to work, is clear that:

'we're constantly monitoring our people for better key performance... We're a performance culture, we're here to perform, we're here to drive the business forward, and we need everybody to play their part.....if you worked in an environment where somebody's not playing their part, it's very de-motivational for everybody in the team'

(Computer Consultancy)

Developing staff was also frequently mentioned, but usually qualified by stressing that any training needed to be of value to the business. For example, one firm had developed staff so that could operate across multiple machines and so make best use of the resources of people and machinery. Retaining and attracting skilled staff was sometimes cited as a motivation to train and develop staff and to recruit staff to develop within the firm, as shown by this example:

'if you can get people maybe that in their early twenties, or mid-twenties that just want to learn, they become more involved in our company'.

(Computer Consultancy)

Alongside workforce development most firms interviewed also supported the development of managers although this was less strategic than many other business practices. One computer consultancy firm had a twelve-stage development programme for leaders and in another they provided training in the fundamentals of management:

'how to do staff appraisals, how to manage teams, how to manage absence, basic things that you don't necessarily know, if you've never been a Manager before'.

(Computer Consultancy)

Another firm trained managers to be coaches to change the nature of the conversations in the business, something which impacted on the bottom line:

'That managers coach course I've implemented three times, and every business that it's happened in has seen a significant change. In my old business, they reckoned that just that one shift in the way that we manage people led to a 23% increase in new business acquisition....and now they pay forward two years at a time for that course'

(Computer Consultancy)

The range of rewards to retain and motivate staff were diverse, from leaving early if individual targets were met to a '13th pay cheque' if the company meets targets. These were usually packages of reward as part of the broader approach to People Management.

'my bonus plan is all about profit across the group so my real driver in the business is to absolutely maximise profit and it's the same focus for all of the directors and also for everybody in this business whether they're in sales, whether they're on the production floor, or whether they are Admin staff, everybody is on a bonus of some description and it's driven around the profit base'.

(Manufacturer of metals and metal structures)

There was a tendency for bonuses to be shared across the firm in the manufacturing sector but being more individualised in the services sector.

The interviews revealed a considerable emphasis on looking after staff within SMEs with a range of routinised activities to motivate and engage staff. Retention, meeting customer expectations and targets and improving products and services are key

business drivers, but there is also a personal commitment from the leaders interviewed to want to lead a good place to work. There was less emphasis on staff training and management development than on good communication and creating a good place to work where staff could achieve job satisfaction and deliver excellent results. It would appear that the right environment and processes is of greater importance to the respondents than on-going, formal training.

These findings, consistent across firms and sectors, underscore the importance of effective HRM for firm growth. Themes around effective communication (Mayfield and Mayfield, 2004), job flexibility, recruitment and training (Patterson et. al. 1997, Oakland and Oakland (2001), and performance measuring and reward systems (Peng et. al. 2019, Yong and Poutziouris, 2010, Guest et. al. 2003) are in line with established findings in the literature. The impact of job flexibility, such as allowing employees to leave early if they met their target, is reflected in the findings of Patterson et. al. (1997).

5.3 Operational management

Most of the firms interviewed emphasised the importance of good information in managing their business. By introducing or maintaining the discipline of regular meetings at which ‘the numbers’ were discussed, owners and managers were able to keep on top of the business, understand the issues and staff also expected this routine. Getting business processes right was seen as a critical basis for further developments:

‘You need to get the engine sorted before you can race the car’.

(Manufacturer of metals and metal structures)

Operational management processes tended to evolve over time with experience, with improvements sought in the data collected, and in how the data was used. Management processes were often brought in by professional leaders or when a larger group took ownership of the firm. One family owned firm brought in a professional manager with experience in FTSE 100 firms. He introduced processes to ensure the company had the data which would have been expected at larger firms. However, he also identified the advantages of smaller firms to act on the data with greater agility:

‘You’ve got that FTSE 100 control data ... but then we have the best of both worlds because we have the flexibility and decision-making process of a small-medium enterprise’.

(Manufacturer of metals and metal structures)

For another manufacturing firm, there was also a lot of freedom to operate within a larger multinational and decentralisation, but the larger organisation brought 'focus' on management and data:

'It brings.. a very, very rigid financial structure. You know we have to report monthly, quarterly, on your usual very rigid financial model. We are required as a business unit to go and present a three to five year strategic plan every year. We have a budget meeting.... we have a Regional Operation Review and we know what's expected of us. However (providing you're meeting growth expectations), there is a level of autonomy to run your business how you want to run it and I like that.'

(Manufacturer of instruments)

5.4 Innovation, activities and markets

Reflecting the positioning of Mittelstand firms (De Massis et al. 2018; Pahnke and Welter 2019), the majority of interviewees emphasised the importance of innovative products or services and/or operating in a niche market. For Manufacturing and Legal Services firms, offering specialist products and expert knowledge in a niche market was seen as important while maintaining a responsive approach to meeting customer demands. By contrast, Computer Consultancy firms operated in a broader market, with lower costs of entry, but most offered some form of unique and innovative service to stand out. In this section, we will consider the Manufacturing, Legal Services and Computer Consultancy firms separately due to differences in their approaches to innovation, their activities and the types of market they serve.

5.4.1 Manufacturing

Due to the degree of specialisation, the activities of the manufacturing firms interviewed are diverse, even within the same 4-digit SIC sectors. One firm in the Manufacture of Metal Structures ('Metals') sector is an offsite construction manufacturer - designing and manufacturing steel structures for specific building types (3-15 storeys) and transporting to site. This firm operates in a growth market and this has been a focus of the firm's growth and investment strategy. Future demand in this market niche seemed assured as only a small proportion of suitable buildings are manufactured offsite and government

has mandated that all new primary schools to be built using this approach. Another firm in the Metals sector provides an illustration of the specialisation of products:

'We've got thousands of ... competitors but not on every single product we do and not on every single size we do. So, we're very, very specialist in terms of precision products. If you look at, typically, our other competitors we might do stainless and aluminium and titanium but they only do aluminium, or they only do stainless, or they only do thicker stainless, and things like that. It's very difficult to get an exact direct comparison because I don't think there is one'. (Manufacturer of metals and metal structures).

The level of specialisation of products in the Metals firms requires high levels of innovation in production, with many reporting that this was simply necessary to meet customer demand. For example, one firm reported the need to adapt their metal to allow the customer to increase the lifecycle of their machines:

'One of our customers was using our material... through a stamping machine, a hundred thousand stampings, and they had to refurbish the tooling. They were quite concerned about that and so, we went to one of our suppliers, signed an agreement to work with them to develop a slightly different mix of the material grade... The net result of that is they get over a million parts now, per refurbishment of the stamping tool. So, a massive, massive difference'. (Manufacturer of metals and metal structures)

Similarly, innovation was important for the firms in the Manufacture of Instruments. One firm was developing new products targeted at growth markets of glass and aluminium given increased use for environmental purposes; another privately owned firm invested all profits into innovation in the first years of their business, taking no or minimal salaries; another invested 20% back into R&D each year. However, all were tactical in their innovation, positioning their products relative to competitors and recognising that as small firms, they couldn't lead innovation in all areas but needed to 'cherry pick' the areas in which they could best meet market needs. This reactive innovation was an intrinsic part of the activities and maintaining market position.

5.4.2 Services

Computer Consultancy firms were involved in similar activities - the sale or reselling of computer hardware and software – and have seen market growth driven by the adoption

of cloud computing. Despite the similarity in their activities, most of the firms interviewed had some form of unique offer. Two firms were offering a service to ensure effective deployment of cloud services and retain customer loyalty:

'We compete with dozens if not ...hundreds of other companies who do a similar sort of role so ...it's quite a competitive marketplace and we're all out there selling software to customers and servicing that software or providing ancillary services in order to keep the customers happy with us and to keep them satisfied with our service. So, you've got to provide ancillary services to provide that value add'.

(Computer Consultancy)

Firms in the Computer Consultancy sector tended to report that they 'kept up' with innovation in products and were not especially innovative *except in the provision of these additional services*. Generally, their preference was not to take the risk of leading innovation. One firm commented: *'we don't want to be a leader; we want to be a fast follower'*.

The Legal Services firms interviewed operated in fairly niche sectors: intellectual property (IP) and media law. The media law firm largely had international clients and the intellectual property firm needed to maintain European operations and needed to establish European bases in order to continue to operate post-Brexit. Both firms compete on the basis of their expertise, while the IP firm also competed on price, a factor which impacts on its approach to people management, which we will explore later.

Overall, the highly productive manufacturing firms interviewed tended to be in a niche market, where innovation was essential. In the legal sector, the firms interviewed were similarly specialist and reliant on expertise for their market position, whereas in the computer consultancy sector firms' USP was in the offer of ancillary services. In each case, innovation had both strategic and tactical aspects: innovation strategy was linked to the growth aspirations of the firm; innovation tactics depended on market opportunities, expertise within the firm and the products/services of competitors. The growth effect of innovation that is informed by external sources of information including market research is reflected in the findings of Uhlander et. al. (2013). The general importance of innovation for growth is well documented in the literature. The firms we interview reveal that both product and process innovations were instrumental for growth, in line with Hall et. al. (2009) and Uhlener et. al. (2013). These findings are in contrast to Coad and Rao (2008) who find that innovation tends to be more important for superstar

firms. Here we find that, behind the frontier, innovation continues to be a strong driver of productivity growth.

5.5 Strategic and tactical investments

Investment proved to be weakly related to productivity in our analysis of Companies House data. The qualitative research sought to understand this more fully and businesses were asked about whether they had made any specific investments in capital, digital or intangible assets in recent years and whether they thought this was an explanation for their growth and success.

All of the manufacturing businesses had made investments in recent years in new machinery to streamline production processes, buildings (warehouses or additional factory space) or digital investments, from investing in CRM systems to investing in R&D to develop robots to aid production. For these firms, investments are usually formal and routinised (e.g. a certain amount of turnover or profit each year is allocated to R&D or investment activities) and/or well-planned and strategic with significant lead-in times to investments. For example, one firm, which had been sold by the owner-managers 10 years previously, took 5 years to plan before investing in plant and machinery. Digital investments were also seen as vital in managing the business – managing stock, production and the communication between departments and accounts – and the relationship with customers. One other firm, which was adopting a steady approach to investment over a long timeframe, reported the importance of digital investments to running an efficient business, but also the benefits to employees if future digital investments are correctly implemented:

'you have to go about it the right way but the return on this, the alleviation of stress and process on the human factor will be immense'.

(Manufacturer of metals and metal structures)

Digital investment was also seen as important to product development by some firms. For example, for one long-established manufacturer, the investment (and the innovation) was entirely digital, reporting:

'We are a digital company...we do marine automation, so that's our business effectively' (Manufacturer of instruments for measurement, testing and navigation).

Digital investment was changing the nature of some businesses. A Temporary Employment Agency commented:

'this was never a technology business; it was a recruitment business..... But increasingly, in all areas, that's a little bit more blurred now'.

(Temporary Employment Agency)

Digital investment was no guarantee of success, however. One computer consultancy business had invested in an automated invoicing system but had faced challenges in implementation due to a lack of support from the licence seller, being an early adopter of the technology, and a need to change internal processes.

Both manufacturing and services firms were also investing in marketing. One manufacturing business reported changing the way they marketed their product – starting with how the customer would use the product within their sector rather than starting with the functionality of the product. This was a significant change, requiring investment in the team and the marketing processes and had led to increased sales. Other firms (manufacturing and services) were expanding or restructuring their sales operations in preparation for Brexit. One of the firms in the legal sector had invested in European bases to operate in Europe, another had created four new subsidiary and complementary businesses. This entrepreneurial approach was reported to be different to most law firms, and this was led by a CEO without a legal background. A Computer Consultancy business was growing through acquisition, buying business where firms' existing owners are seeking retirement. Thus, 'investments' have been made in a broad range of activities across the firms behind the frontier, from marketing to new buildings and, to varying degrees, new technologies. As with innovation, investment decisions are strategic, with implementation shaped strongly by market needs and conditions.

5.6 Overview

Overall, our qualitative analysis suggests a number of factors which characterise these high performing SMEs. They all have inspirational leaders who focus on creating a good place to work. These firms are innovative in their products, processes and markets. They are also data driven, and undertake strategic investments. These results suggest that these good practices are not the preserve of larger firms with greater capacity but can also be delivered by capable and passionate leaders in SMEs.

6. CONCLUSIONS

We examine the drivers of productivity growth among UK SMEs over the 2016-18 period using a combination of quantitative and qualitative methods. Drawing on insights from recent literature that uses firms' position along the productivity distribution to explain falling aggregate productivity (Andrews et. al. 2015, 2016, Schneider, 2018), we investigate whether the most productive SMEs experience the fastest growth. We then consider the influence of other observable indicators derived from accounting data on firm growth, including the age and size of the firm. Finally, we conduct in-depth interviews with high growth SMEs to identify those unobservable attributes which most strongly characterise high performing companies.

Contrary to previous findings which show that the most productive firms in the economy-frontier firms - grow faster than other firms, we find no consistent relationship between firms' initial productivity level and subsequent productivity growth for SMEs who typically operate 'behind the frontier'. Thus, while previous evidence suggests that large productive firms are also the fastest growing firms, our analysis reveals that for SMEs, growth is unrelated to previous productivity levels, and this finding is robust across twelve manufacturing and service sectors. Moreover, we find no strong relationship between growth and the size of the firm, its age, its number of subsidiaries or its fixed investments. Together, our results suggest that observable firm characteristics are poor determinants of firms' productivity growth. This focuses attention on unobservable organisational factors which we explore through interviews with a sample of high performing SMEs.

Our qualitative analysis suggests a number of factors which characterise high performing SMEs: inspirational leadership, people management, data-driven operational management processes, strategic investments, and product, market and tactical innovation. Few of these factors are sector specific, although there are variations in how they are implemented. None operates in isolation.

Our findings have implications for the targeting of SME policy interventions which may be particularly important as we seek to rebuild strength after the Covid-19 crisis. Our analysis suggests that observable firm characteristics are only weakly linked to subsequent productivity growth, so targeted policy interventions based on firm size, age, subsidiaries or investments are likely to be inefficient. Moreover, as SMEs' productivity growth is also unrelated to their position in the productivity distribution, policy initiatives based on the premise that more productive firms will grow their productivity faster are

also likely to be ineffective for SMEs. Rather, policy interventions should be based on the idea that SMEs, irrespective of previous productivity, can achieve high growth if they have focused and effective leadership, if they have appropriate human resource management practices, if they are innovative and if operational management is data driven. This has implications both for the targeting of policy support and the need to support SME owner-managers with the skills they need to be effective leaders of transformational change. This, in turn, should lead SMEs to adopt positive practices to manage their people, and introduce practices that are conducive to innovation.

In the current phase of the Covid-19 crisis firms' short-term decisions about cash flow, operations and marketing will be critical to survival. To support the medium-term recovery, adopting measures to support business networks and mentoring is one route through which government can empower transformational leadership. Few respondents in our interviews were currently engaged in business networks aimed at creating better businesses. Therefore, there is potentially a wide pool of successful small business leaders that could be drawn upon as exemplars and who are willing to share their experience, expertise and passion.

Encouraging firms to engage in leadership and management development going forwards will also be critical - the Employers Skills Survey repeatedly shows that Managers are the occupational group least likely to receive training and that small firms experience greater resource barriers to training. Investment in training is likely to come under particular pressure if firms are cash-constrained in the post-Covid recovery. Training managers to have coaching conversations was reported to be very successful in this research in yielding positive short-term benefits, and there were other examples of formal management development for those new to management. However, even in these successful firms, there were examples where management development was an aspiration rather than a reality. Government has a continuing role to stress the importance of developing leadership and management capabilities alongside any direct public support. A related area is that of the recruitment of good leaders into firms. Firms in the study had often introduced new leaders, with a variety of backgrounds, but who brought in some form of change. Our results suggest that the decision making of boards regarding new leaders is critical, and attention must be paid to the new leader's skill set, knowledge, and values.

Finally, our study emphasises the positive role that government procurement practices can have in stimulating innovation in SMEs. This would appear to drive and reward

quality as firms seek to reach the quality criteria set to succeed. Post-Covid, the role of government as a lead customer may be particularly important in stimulating demand and signalling the potential of innovation to the wider market, e.g. in the adoption of new methods and techniques, such as offsite construction.

Table 1: Data coverage by sector and sizeband

	No of firms with full accounts					Number of firms in population					Coverage of sample				
	10 to 19	20 to 49	50 to 99	100 to 250	Total	10 to 19	20 to 49	50 to 99	100 to 250	Total	10 to 19	20 to 49	50 to 99	100 to 250	Total
(a) Manufacturing sectors															
2562: Machining	4	17	30	29	80	1,180	730	200	60	2,170	0.3	2.3	15.0	48.3	3.7
2651: Manufacture of instruments and appliances for measuring, testing and navigation	1	11	27	20	59	245	220	100	55	620	0.4	5.0	27.0	36.4	9.5
3250: Manufacture of medical and dental instruments and supplies	5	15	14	29	63	240	140	65	50	495	2.1	10.7	21.5	58.0	12.7
2511: Manufacture of metal structures and parts of structures	3	12	43	42	100	545	395	140	55	1,135	0.6	3.0	30.7	76.4	8.8
2229: Manufacture of other plastic products	7	14	49	62	132	340	265	115	80	800	2.1	5.3	42.6	77.5	16.5
1812: Other printing	4	15	46	44	109	920	515	160	85	1,680	0.4	2.9	28.8	51.8	6.5
(b) Service sectors															
5630: Beverage serving activities	6	21	26	27	80	7,815	3,320	355	100	11,590	0.1	0.6	7.3	27.0	0.7
6202: Computer consultancy activities	34	55	63	55	207	1,730	965	310	160	3,165	2.0	5.7	20.3	34.4	6.5
5510: Hotels and similar accommodation	16	59	122	177	374	1,770	1,945	745	360	4,820	0.9	3.0	16.4	49.2	7.8
6910: Legal activities	24	34	51	99	208	2,245	1,370	500	270	4,385	1.1	2.5	10.2	36.7	4.7
5610: Restaurants and mobile food service activities	19	33	50	64	166	10,255	4,260	780	340	15,635	0.2	0.8	6.4	18.8	1.1
7820: Temporary employment agency activities	20	43	50	47	160	1,060	980	630	480	3,150	1.9	4.4	7.9	9.8	5.1

Sources: FAME and ONS UK Business Count Data

Table 2: Firm characteristics for high and low productivity growth firms

	Firm age (years)		No. of employees		No. of subsidiaries		Investment in fixed assets (% turnover)			
	Low	High	Low	High	Low	High	Low	High		
Manufacturing										
2562: Machining	34.48	40.27	92.13	99.50	1.17	1.32	6.41	5.43		
2651: Manufacture of instruments and appliances for measuring, testing and navigation	35.26	32.61	93.58	74.39	2.53	1.28	16.84	5.25		
3250: Manufacture of medical and dental instruments and supplies	22.75	32.74	75.05	121.32	**	0.90	2.21	*	3.98	2.75
2511: Manufacture of metal structures and parts of structures	25.90	25.83	112.77	104.52	0.67	1.21	6.12	8.90		
2229: Manufacture of other plastic products	35.39	27.90	* 109.24	107.10	0.88	0.85	7.55	5.82		
1812: Other printing	37.45	34.45	95.15	124.52	**	0.70	1.55	*	9.87	2.46
Services										
5630: Beverage serving activities	22.86	20.19	89.14	104.62	0.77	1.48	40.38	15.18		
6202: Computer consultancy activities	22.00	19.75	72.33	71.32	2.02	1.31	53.89	11.38		
5510: Hotels and similar accommodation	25.61	22.42	96.01	110.90	**	0.48	1.18	43.73	96.86	
6910: Legal activities	14.15	13.42	96.44	104.69	1.34	1.39	0.40	2.00		
5610: Restaurants and mobile food service activities	19.59	17.03	93.49	102.53	0.61	0.60	32.92	51.96		
7820: Temporary employment agency activities	17.79	18.57	76.40	74.68	0.88	0.91	2.12	1.64		

Table 3: Position along the productivity distribution, other observable factors and productivity growth. Results from OLS regression models.

Variables	Value added per employ growth	Value added per employ growth	Turnover per employee growth	Turnover per employee growth
3 rd decile	-6.632 (7.775)	-6.608 (7.796)	-3.224 (5.201)	-3.242 (5.204)
4 th decile	0.335 (7.736)	0.324 (7.754)	-3.046 (5.179)	-3.044 (5.185)
5 th decile	2.255 (7.810)	2.232 (7.826)	-7.545 (5.192)	-7.552 (5.194)
6 th decile	-15.055** (7.660)	-15.070** (7.673)	-6.043 (5.162)	-6.296 (5.168)
7 th decile	-6.955 (7.632)	-6.929 (7.644)	-2.173 (5.178)	-2.022 (5.188)
8 th decile	-16.128** (7.652)	-16.149** (7.662)	-8.488 (5.170)	-8.234 (5.181)
9 th decile	-7.843 (7.663)	-7.914 (7.681)	-1.384 (5.140)	-1.638 (5.150)
Business age (years)		-0.027 (0.110)		-0.11 (0.075)
Employment		-0.003 (0.035)		0.026 (0.024)
No. of subsidiaries		-0.008 (0.887)		-0.502 (0.636)
Constant term	1.908 (10.804)	2.829 (11.729)	8.098 (6.974)	8.322 (7.537)
N	1195	1195	1337	1337
p	0.324	0.508	0.715	0.675
bic	13486.278	13507.464	14215.968	14234.15

Figure 1: Productivity levels and growth: Manufacturing sectors

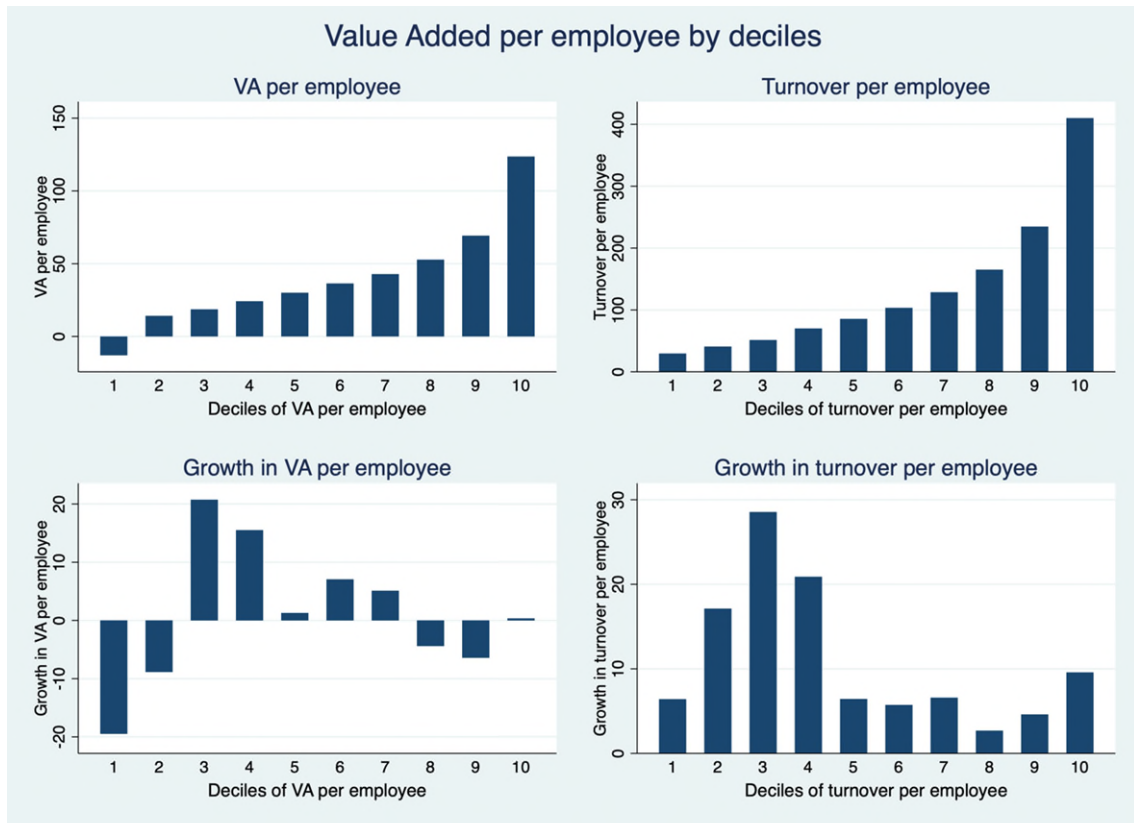


Figure 2: Productivity levels and growth: Service sectors

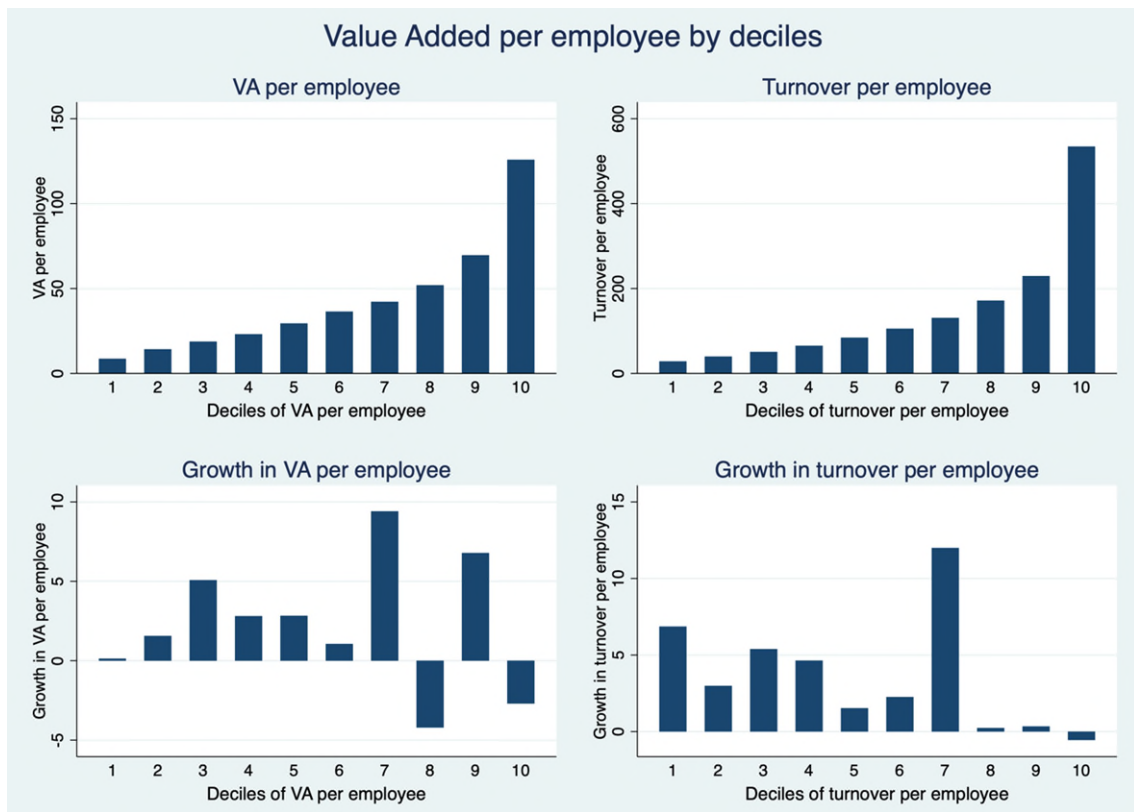


Figure 3: Median value added per employee by deciles: Manufacturing sub-sectors



Figure 4: Median turnover per employee by deciles: Manufacturing sub-sectors

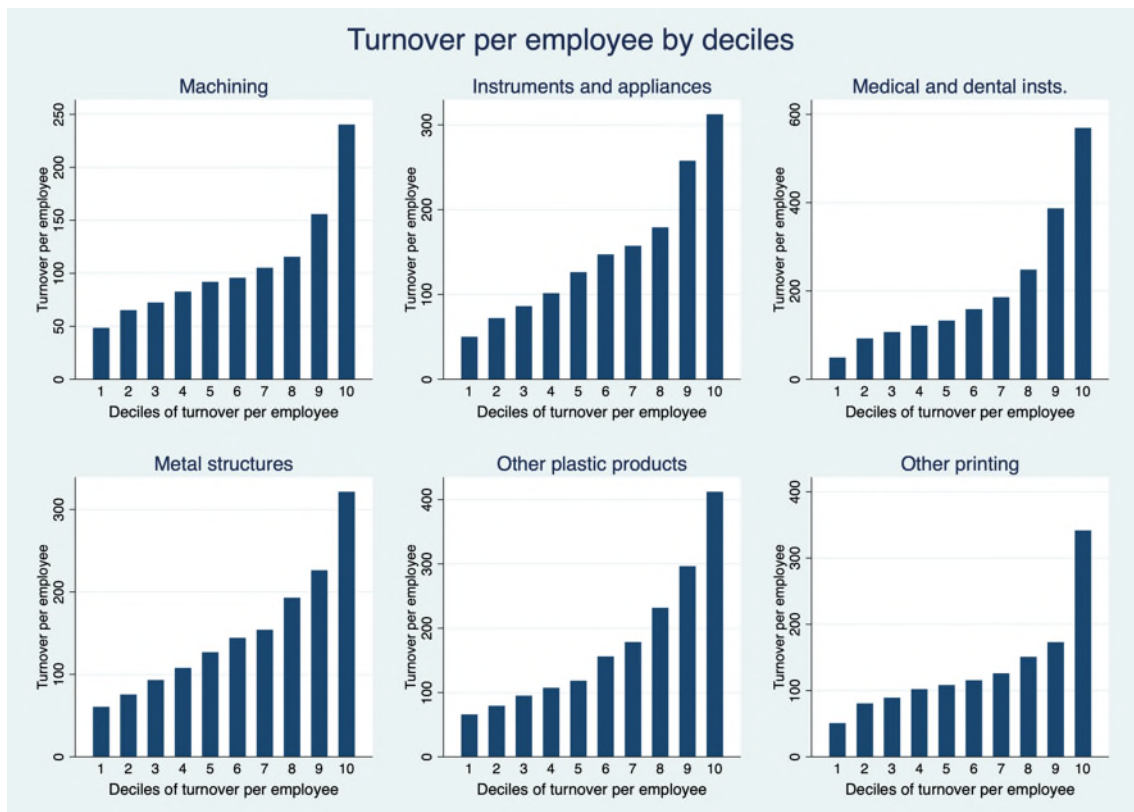


Figure 5: Median value added per employee by deciles: Services sub-sectors

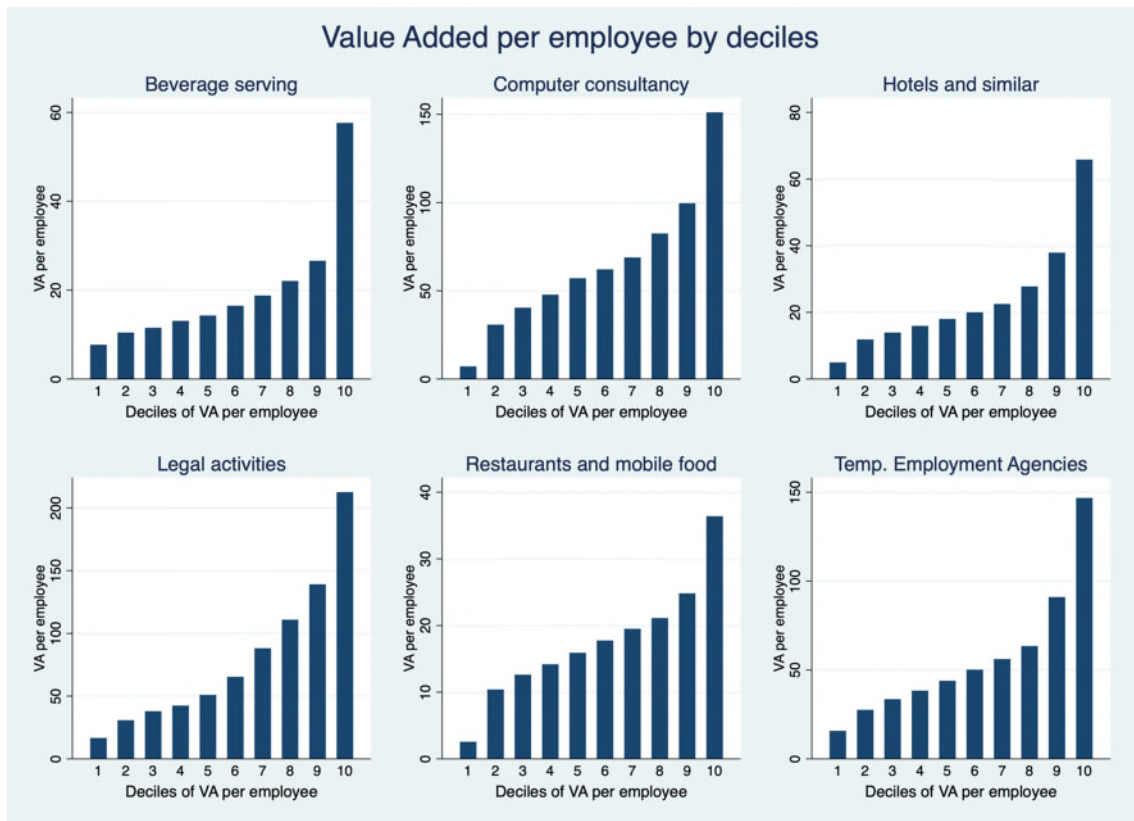


Figure 6: Median turnover per employee by deciles: Services sub-sectors

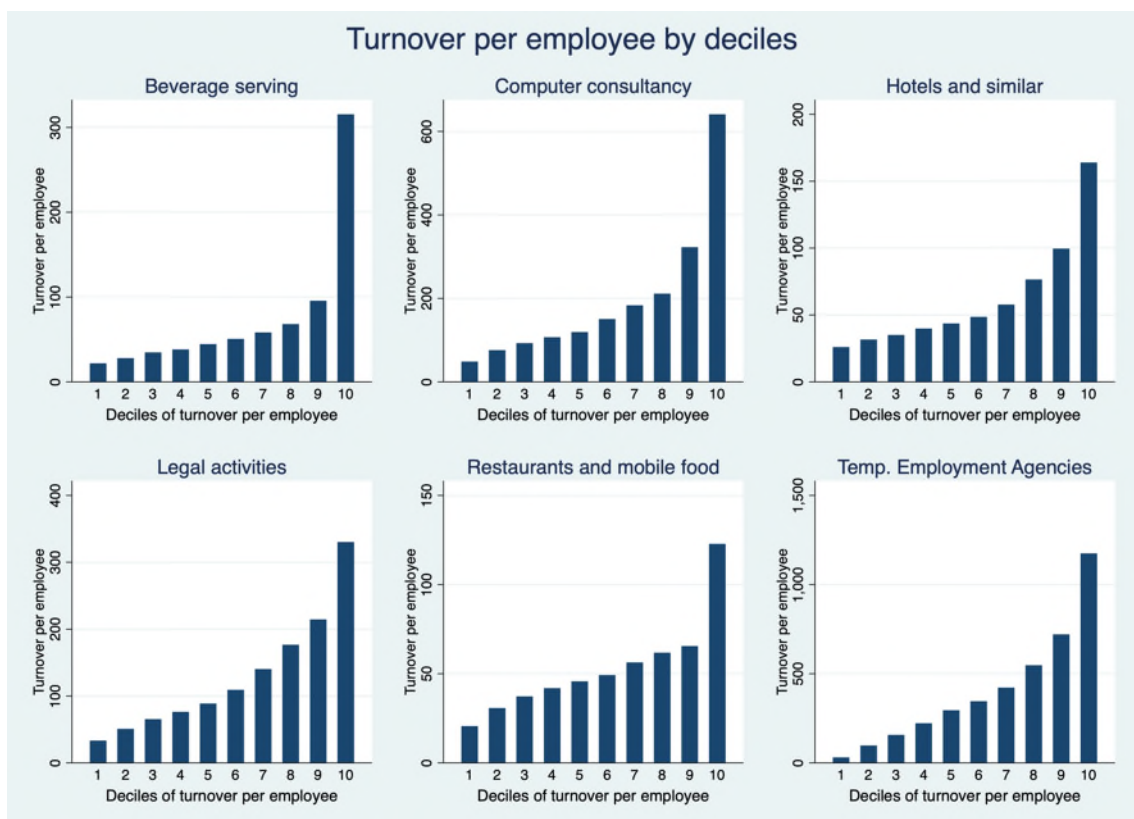


Table 7: Median growth in value added per employee by deciles: Manufacturing sub-sectors

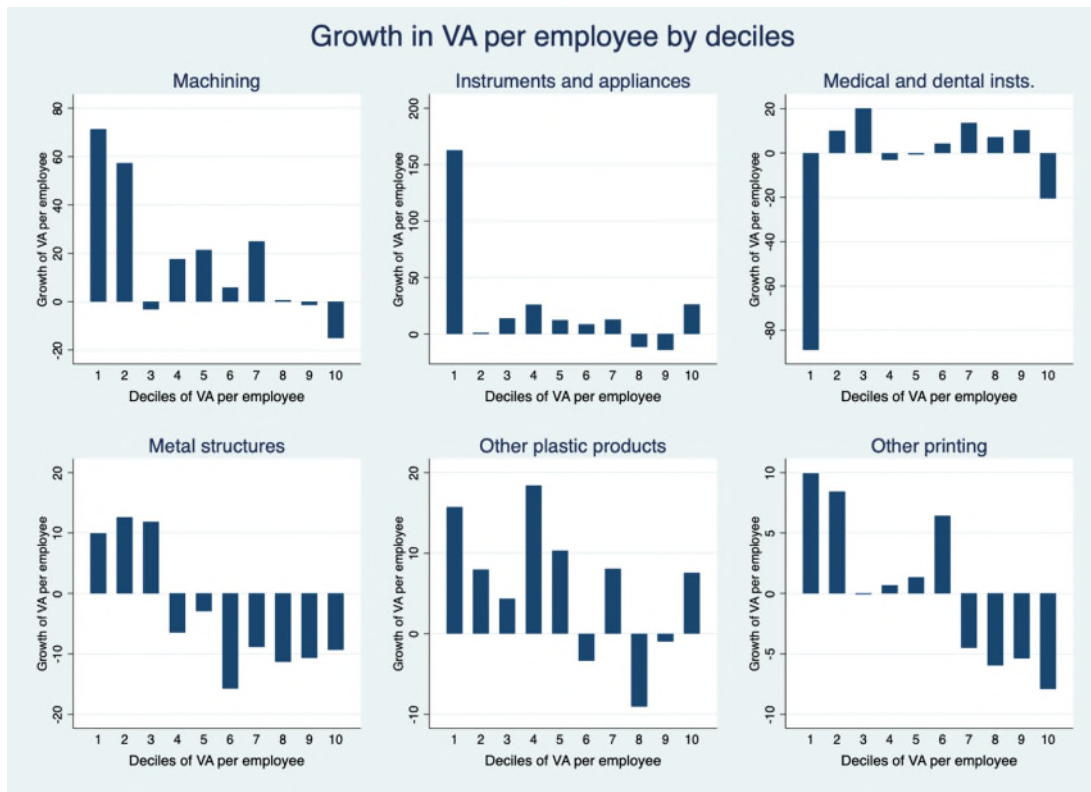


Table 8: Median growth in turnover per employee by deciles: Manufacturing sub-sectors

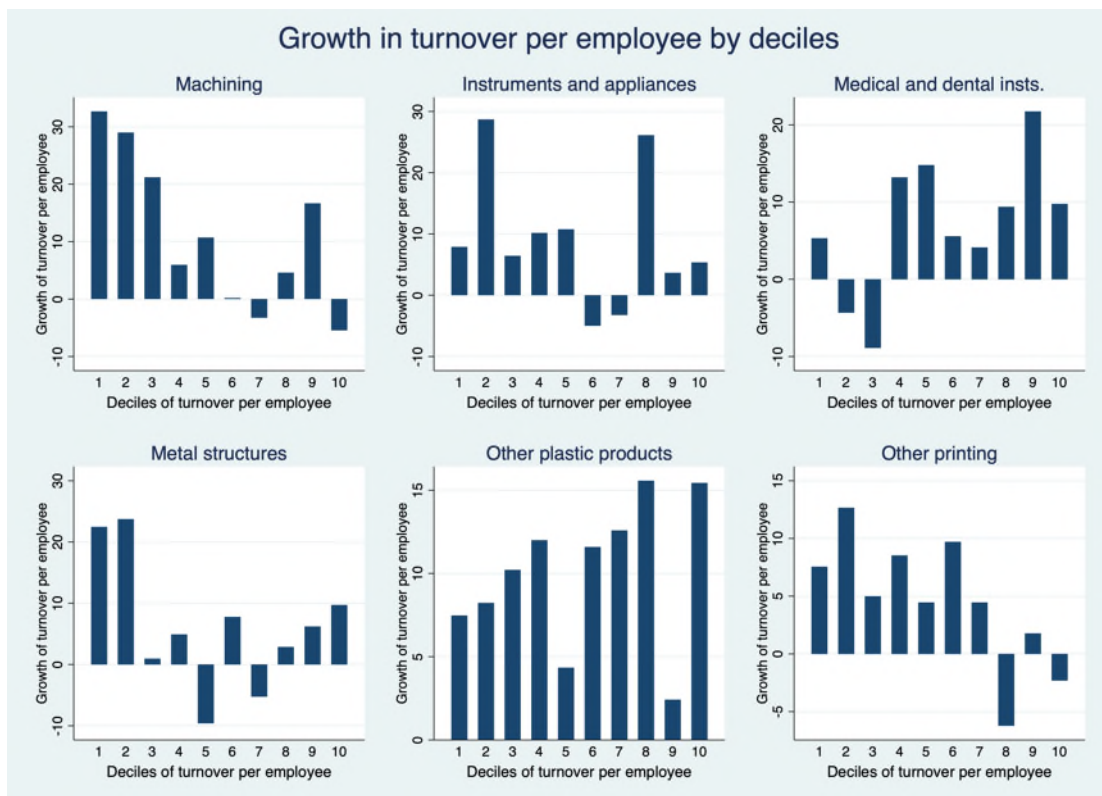


Table 9: Median growth in value added per employee by deciles: Services sub-sectors

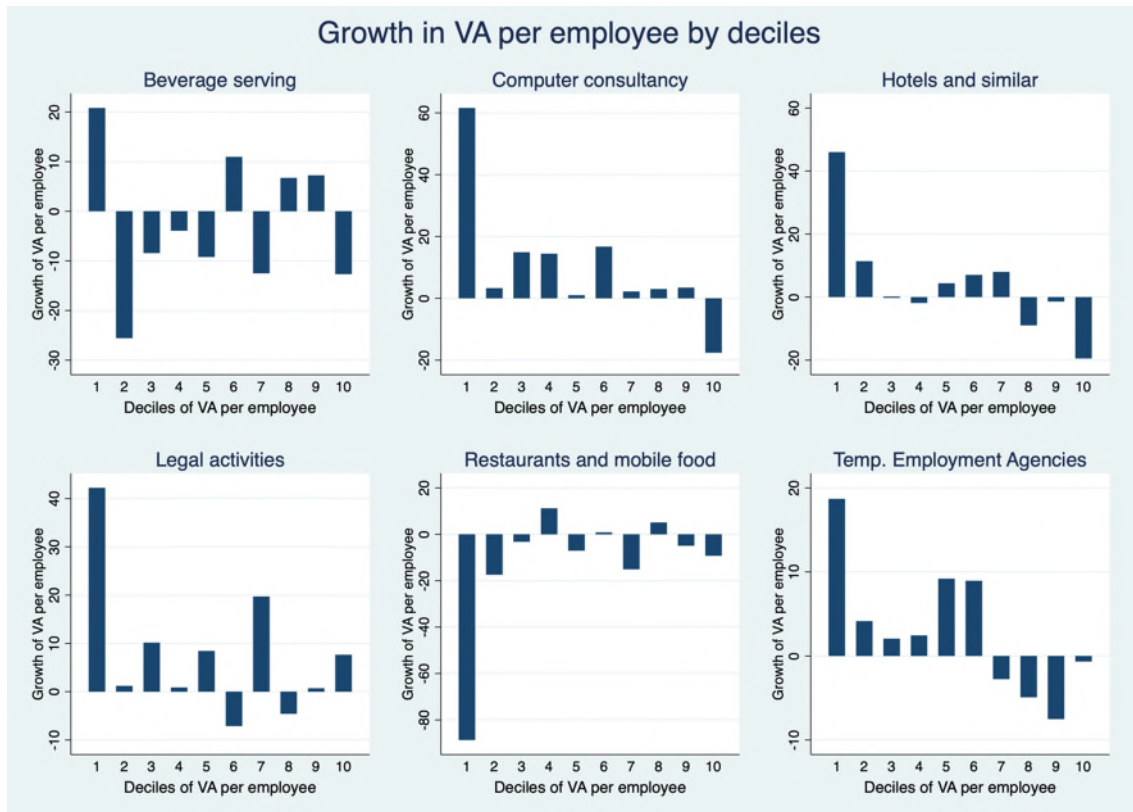
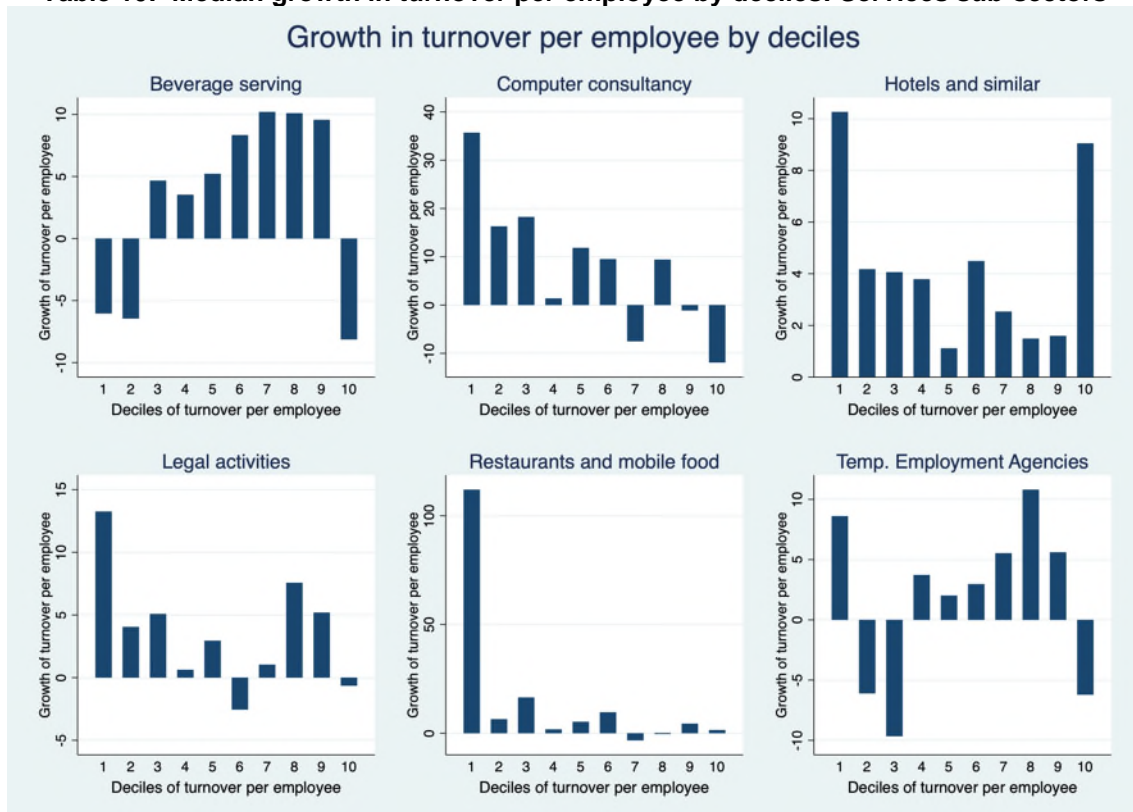


Table 10: Median growth in turnover per employee by deciles: Services sub-sectors



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