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What Role Did Management Practices Play in SME Growth Post-recession?

Alex Bryson
John Forth

Department of Quantitative Social Science
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Department of Quantitative Social Science, UCL Institute of Education, University College London,
20 Bedford Way, London WC1H 0AL, UK

Explaining Cross-National Variation in Workplace Employee Representation

Alex Bryson[1] and John Forth[2]

Abstract

Small and medium-sized enterprises (SMEs) are known to contribute significantly to aggregate economic growth. However, little is known about the role played by management practices in SME growth since recession. We contribute to the literature on SME growth by analysing longitudinal administrative data on firms' employment and turnover, taken from the UK's Business Structure Database (BSD), with data on management practices collected in face-to-face interviews from the HR Managers and employees who were surveyed as part of the 2011 British Workplace Employment Relations Survey (WERS). We find off-the-job training is the only management practice that is robustly and significantly associated with higher employment growth, increased turnover, and a decline in closure probabilities, over the period 2011-2014. The findings suggest SME investment in off-the-job training is sub-optimal in Britain such that firms could benefit economically from increasing the amount of off-the-job training they offer to their non-managerial employees.

JEL codes: L25; M12; M50; M53

Keywords: SMEs; small and medium-sized enterprises; employment growth; sales; workplace closure; HRM; training; recession

Contact Details: Alex Bryson (a.bryson@ucl.ac.uk), UCL

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[1] University College London, National Institute of Social and Economic Research and Institute for the Study of Labor

[2] National Institute of Social and Economic Research

The report also presents research based on data from the Business Structure Database (BSD), produced by the Office for National Statistics (ONS). The data are Crown Copyright and reproduced with the permission of the controller of HMSO and Queen's Printer for Scotland.

The WERS and BSD were supplied by the Secure Data Service at the UK Data Archive.

The use of the WERS and BSD data does not imply the endorsement of the WERS sponsors, the ONS or the Secure Data Service in relation to the interpretation or analysis of the data. This work uses research datasets which may not exactly reproduce National Statistics aggregates.

The syntax used in our analyses are available on request from the authors.

1. INTRODUCTION

In recent years, researchers and policy makers have paid great attention to the contribution that small and medium-sized enterprises (SMEs) make to economic growth. One of the reasons for this is that numerous empirical studies have shown the importance of SMEs in job creation. Definitions vary as to what constitutes a SME: some definitions are based on employment size, others on turnover and still others on the value of assets.[3] However, it is most common to define a SME as any private sector firm with fewer than 250 employees. On this basis, in 2015, SMEs accounted for 60 per cent of all private sector employment in the UK (15.6 million jobs) and 47 per cent of all private sector turnover (£1.8 trillion) (Department for Business Innovation and Skills, 2015).

The role of SMEs in the creation of jobs and output has been highlighted in a variety of domestic and international studies over the past thirty years (e.g. Birch, 1981; OECD, 2002; Hijzen *et al*, 2010; Criscuolo *et al*, 2014). In recent firm-level evidence for the UK, Hijzen et al (*ibid*.) showed that SMEs accounted for between 64 per cent and 77 per cent of all private sector job creation in the UK over the period 1997-2005 – and between 48 per cent and 67 per cent of private sector job destruction – with the precise figures dependent on the methodology used to assign jobs to size classes. Research which has sought to identify 'high-growth firms' has shown that many of the firms which register high rates of growth in employment or turnover are relatively small. For instance, Anyadike-Danes et al (2009, 2014) have shown that, over the period 1998-2013, around six per cent of all UK private sector firms with 10 or more employees met the Eurostat-OECD's (2007) definition of 'high growth': that is, average employment growth of at least 20 per cent per annum over three years. Although this share of high-growth firms does not differ greatly by firm size, the numerical importance of SMEs in the business population means that they are significant contributors to overall job creation.

Whilst the recent empirical literature has focused on quantifying the contribution of different types of firm to job creation or output, there has been less of a focus on identifying the factors which may help a firm to grow, despite evidence that SMEs find it more difficult than larger firms to identify and adopt innovative technologies and working methods due to their weaker internal resources (Roper and Hart, 2013). In part, this focus is a natural consequence of the data available to researchers. Studies such as that by Anyadike-Danes et al (2009), Hijzen et al (2010) and Criscuolo et al (2014) have relied on the analysis of firm-level administrative data, such as that provided in the Office for National Statistics' Business Structure Database (BSD) (Welpton, 2009). As explained in Section Three, the BSD provides a comprehensive longitudinal database of all firms in the UK; it therefore forms a robust basis for quantifying growth at firm-level and for identifying some of the basic demographic features of high-growth firms. However, it lacks any

[3] The 2006 Companies Act uses all three, defining an SME as an enterprise that meets at least two of the following criteria: turnover of no more than £25.9m; a balance sheet total of no more than £12.9m; and no more than 250 employees.

detailed information about the internal organisation of the firm – its management practices, competitive strategy or use of technology. The broader management literature suggests these are potential determinants of growth (see Section 2), and so there remains a great deal to learn about which SME workplaces are high-growth, and why.

Our contribution to this literature is two-fold. First we use data from the ONS Business Structure Database (BSD) to provide an up-to-date picture of patterns of growth among SMEs over the ten years from 2004 to 2014. This decade includes the years of economic growth from 2004-8, the period of recession from 2008-9, and the period of slow recovery from 2009-14.[4] Our analysis thus complements that of Anyadike-Danes and Hart (2014) by updating some of the earlier evidence on firm growth (e.g. Anyadike-Danes et al, 2009; Hijzen et al, 2010) which focused on the relatively buoyant period of the late 1990s and early 2000s.

Second, we link information on the growth of individual firms, taken from the BSD, to data on management practices and other firm characteristics that were collected in the 2011 Workplace Employment Relations Survey (WERS) (Department for Business, Innovation and Skills et al, 2014). This linked dataset allows us to examine the determinants of firm growth – and survival – in a sample of around 500 SMEs over the period 2011-2014. This is the first time that the BSD and WERS have been linked for such an investigation.

We find off-the-job training is the only management practice that is robustly and significantly associated with higher employment growth, increased turnover, and a decline in closure probabilities, over the period 2011-2014. The findings suggest SME investment in off-the-job training is sub-optimal in Britain such that firms could benefit economically from increasing the amount of off-the-job training they offer to their non-managerial employees.

Section Two provides an overview of the existing literature on firm growth, ranging across economics, management sciences and HRM, and identifies the hypotheses we test in our empirical investigation. Section Three introduces the BSD and WERS data in more detail, and outlines the methods used in our quantitative analysis. Section Four presents our analysis of patterns of growth among SMEs based on the BSD, followed by the results of our analysis of the determinants of growth based on the BSD-WERS linked dataset. Section Five concludes and discusses some of the implications of the analysis.

2. EXISTING THEORY AND EMPIRICAL EVIDENCE ON FIRM GROWTH

Firm growth is defined in a number of ways in the literature, with some analysts focusing on employment, others on sales and still others on value-added. We take a similarly broad view, noting only where the evidence differs

[4] The output of the UK economy finally returned to its pre-recession level in 2014, whereas employment did so one year earlier.

strongly according to the measure used. We do focus, however, on measures of scale, rather than productivity, but it should be noted that there may even be a trade-off between the two in the short term, if actions to improve process efficiency (for example) lead to a reduced demand for labour. However, one would expect improvements in total factor productivity to drive growth in the long-run at the firm level, just as it does at the macro-economic level, and there is much in common between the two micro-economic literatures (Syverson, 2011). Whilst empirical studies have not tended to find a strong relationship between firm-level productivity and growth – beyond its role in reducing the probability of firm closure (see Coad, 2007: 22-3, 25-6) – recent evidence for the UK does point to a mutually-reinforcing relationship (Du and Temouri, 2015). In this section we focus on research that is of particular relevance to SMEs.[5]

The starting point for much of the economics literature on firm growth is Gibrat's 'Law' which proposes that the expected growth rate of a given firm is independent of its size at the beginning of the period being examined (Gibrat, 1931). Studies focusing on larger firms do indeed find no significant relationship between firm growth and size (see Caves, 1998). As newer data sources have become available which include smaller firms, the weight of evidence has tended to shift such that most studies now find a negative relationship between firm size and growth: that is, smaller firms tend to grow faster than larger ones. Variance in the growth rates decreases with size, consistent with the observation that small firms are much more likely to fail than larger firms. In short, the likelihood of survival for small firms tends to be low; however, those that do survive tend to experience higher growth rates than their larger counterparts.

These observations are consistent with models which emphasise the learning process in start-up firms. Jovanovic (1982) proposes a model in which firms have limited information on their productivity at birth, but discover their ability over time, which naturally implies that some will expand and others fail. Ericson and Pakes (1995) propose an 'active' learning model in which small firms grow by learning and innovating, implying that the defining feature that is associated with firm growth may, in fact, be age rather than size. Whilst it is often difficult to precisely disentangle the two, since size and age are typically highly correlated, a number of empirical studies provide evidence that it is, in fact, young start-ups (rather than small firms *per se*) which tend to have the highest growth rates on average (Dunne and Hughes, 1994; Haltiwanger et al, 2013). This has led to a great deal of attention among policy makers on 'gazelles': high-growth firms that are less than five years old (OECD, 2015).

There are a variety of reasons to expect that the rate of firm growth will vary across industry sectors. First, one can expect firms in relatively young industries to have higher growth rates than those in more mature sectors, because of the higher level of new opportunities that are available in the

[5] Those interested to read further are encouraged to consult the more detailed overviews provided by Coad (2007) and Audretsch (2012).

former. This is particularly evident in high-tech industries, where rapid technological progress can provide growth opportunities to innovators and early adopters. The empirical evidence does indicate, however, that high-growth firms are found to some extent in all industries and sectors (Anyadike-Danes et al, 2009) and so sector of activity is not, by itself, a strong predictor of growth.

The co-location of firms from related sectors can be important for their growth, however. One reason is that local competition encourages them to innovate; another is that smaller firms can use 'regional clusters' to increase their visibility and for reputational advantage which they could not easily secure by their own means (Gilbert et al, 2008). Operating on international markets is also found to be positively associated with growth in empirical studies. For example, Greenaway and Kneller (2008) find that entry into export markets is associated with an increase in firm size, wages and productivity. One reason is that the firm accesses a larger market, but another is that, by exposing itself to international competition, the firm learns about new technologies and work processes ('learning by exporting').

Competition does not have universally positive implications for firm growth, however, especially for small firms. Whilst higher levels of competition typically encourage improvement and innovation, and stimulate higher levels of productivity, it is also the case that highly competitive markets tend to be characterised by high levels of exit – a process of 'creative destruction' in which the least productive firms are likely to be forced out by the more productive (Bravo-Biosca, 2011). As noted above, small firms can be particularly vulnerable early in their life whilst they are learning how to operate efficiently.

Access to finance is important for growing firms because it provides the resource base from which investments can be made to facilitate future growth, and research finds that financial constraints can prevent firms with growth potential from exploiting new opportunities (Bottazzi et al, 2011). A prime cause of such constraints is that potential lenders tend to have less information on the capabilities of smaller or younger firms, which makes it more difficult to judge credit risks (Audretsch, 2012). Credit is therefore typically rationed, in a way that tends to constrain many small and young firms from accessing the finance that they would like in order to grow. In this environment, the social capital and experience of the business owners can be crucial. Indeed, there is evidence that new firms benefit from being founded by teams rather than individuals because of the wider set of networks and relationships that the team brings to the business, as well as the greater diversity of skills and experience (Department for Business Enterprise and Regulatory Reform, 2008). However, the type of ownership can also affect growth in other ways. For instance, 'managerial' theories of the firm (e.g. Marris, 1963) propose that firm size is a more important component of the managerial utility function than profit, and so managers will have greater incentives than owners to maximise growth. This argues in favour of the separation of ownership and control. Indeed, there is some evidence that

management-controlled SMEs have stronger preferences for growth than owner-controlled firms (Hay and Kamshad, 1994).

External conditions also affect firms' growth rates. One important set of factors relates to the regulatory and institutional environment. In their 10-country study, Bravo-Biosca et al (2014) find that a more developed financial sector, greater banking competition and better contract enforcement are all associated with a more dynamic firm-growth distribution, which includes a higher share of growing firms. Stringent employment protection legislation, on the other hand, is associated with a lower share of growing firms. But greater stability (less dynamism) does have the benefit of reducing the number of shrinking firms. The state of the economy is, of course, also influential. One effect of economic downturns is to shift the average growth rate downwards (shifting the central mass in the firm growth distribution to the left). Another effect is to reduce the spread or variation between firms, consistent with a hypothesis that firms have more discretion over their growth rates when the economy is in good health, but face stricter discipline in recessions (Coad, 2007). Nonetheless, the recent evidence for the UK suggests that, even in the recent economic crisis, many firms were still able to register 'high growth' (Anyadike-Danes and Hart, 2014), indicating that some firms are able to prosper even in the most difficult of aggregate conditions.

It is implicit in some of the preceding discussion that knowledge, skills and innovation are important determinants of firm growth. These are the issues we focus on in our empirical investigation having controlled for many of the other factors identified as important above.

In Penrose's (1959) theory of firm growth, knowledge and skills are 'resources' which allow firms to create a competitive advantage. This can occur through the development of new products and processes, and also by increasing the firm's ability to absorb knowledge generated elsewhere. In addition, knowledge and skills create 'dynamic capabilities' which allow firms to reconfigure their operations in fast-changing markets and grow at above-average rates (Teece et al, 1997). Indeed, young start-ups are argued to be particularly dependent on skilled labour because of the particular challenges of establishing a new business under conditions of uncertainty (Cardon, 2003). Cardon (2003) emphasises the role that contingent labour can play in allowing firms to acquire appropriate skills and capabilities during periods of expansion. But training and reward practices are also likely to be important in SME growth.

The literature on how the effectiveness of different HR practices might vary across a firm's life-cycle is rather under-developed, and has tended to focus on models in which firms develop through a very-stylised set of stages (birth, rapid growth, maturity and decline), whereas the reality is much more varied (Phelps et al, 2007). There is nonetheless a recognition that the range of HR practices that are most effective for a firm will need to alter depending on the organisation's stage of development. Baird and Meshoulam (1988), for example, argue that employee training and developing appropriate pay systems are of particular importance in the high-growth stage, whereas issues

to do with communication, co-ordination and employment relations become more important in later stages, when the firm is larger and its activities and workforce are more diverse. Certainly, there is plentiful evidence that the HR practices of small, medium and large firms differ in some notable respects (Forth et al, 2006). A small empirical literature supports the contention that training and employee development are important for SME growth. Barringer's (2005) study of 50 high-growth and 50 slow-growth firms showed that high-growth firms were more likely to engage in training and employee development, and were also more likely to use financial incentives to motivate and reward employees. Barratt and Mayson's (2007) study of 600 small firms came to similar conclusions as to the relevance of training and incentives for growth. The empirical literature on employee involvement indicates that small firm financial performance is positively associated with the least bureaucratic, more informal methods of direct communication between employees and management (Bryson, 1999). Given the theoretical and emergent empirical evidence to date we test three hypotheses:

Hypothesis One: Off-the-job training will be positively associated with SME growth.

Hypothesis Two: the provision of financial incentives to employees through performance pay (PP) will be positively associated with SME growth.

Hypothesis Three: more formal mechanisms for employee engagement will not be associated with SME growth.

Firm growth is linked in the theoretical literature to innovation (Geroski, 2000; Aghion and Howitt, 1992). One important way in which innovation can contribute to growth is by expanding the firm's market through the development of new products. Another is innovation in processes that result in improved productivity. However it is not obvious how much time is required for innovative activities (such as R&D) to be converted into economic output. Some studies find a positive association between innovation and sales growth (e.g. Geroski and Toker, 1996; Roper, 1997). Others have found that it can be negatively associated with growth among poorly-performing firms (Coad and Rao, 2008). Process innovation can also result in reductions in employment. For instance, the introduction of new technology may reduce the demand for unskilled labour within the host firm (although it may increase the demand for skilled labour in the host firm and in supplying firms). Innovative forms of work organisation can also bring about efficiencies which reduce the firm's demand for labour. The impact of process innovation on employment growth is thus ambiguous *a priori*. Nevertheless, much of the firm-level evidence does tend to find a positive relationship (e.g. Doms et al, 1995; Mason et al, 2009). We test two related hypotheses:

Hypothesis Four: product innovation will be positively associated with SME growth.

Hypothesis Five: process innovation will be positively associated with SME sales growth but negatively or non-significantly associated with SME employment growth.

Managerial capabilities are developed through knowledge acquisition and experience, such that educational background, prior experience in the industry and prior experience in a high-growth firm are all consistently found to have a positive impact on firm growth (Agarwal et al, 2004). One strand of this literature argues that family-owned firms may particularly lack managerial expertise because the practice of handing over control to the next generation limits the talent pool (Bloom and Van Reenen, 2010). This may explain the negative relationship between family ownership and growth that is evident in the literature on firm growth (Hart, 2011). Irrespective of managerial experience and capability, however, it is also important to acknowledge that some firms do not wish to pursue growth, even if the opportunity presents itself; in other words, the attitudes of the owner or senior manager are also important. One reason that owners or managers may not seek to grow is that it typically entails less control of the firm as the number of activities grows and the hierarchy increases (Williamson, 1967). Evidence of a lack of desire for growth has been put forward by Tether (1997) among others. The desire to retain control may be particularly strong among family owners. We therefore test the following hypothesis:

Hypothesis Six: family ownership is negatively associated with SME growth.

3. DATA and METHODS

Our analyses are based on data from two sources: the ONS Business Structure Database (BSD) and the 2011 Workplace Employment Relations Survey (WERS). The BSD is an administrative database compiled by the Office for National Statistics from the UK's official business register. The strength of the database lies in its comprehensive coverage of all but the smallest firms in the UK economy. Firms may be traced over time, and so the database is able to provide a dynamic view of firm entry, exit and growth. The database comprises annual 'snapshots' taken from the Inter-Departmental Business Register – the UK's official register of businesses and the sampling frame for surveys of business activity conducted by the Office for National Statistics. The IDBR contains records on all firms with turnover above the VAT threshold and all firms with PAYE schemes (a total of over 2 million firms). Firm-level records in the BSD may be linked over time via a unique 'enterprise reference number' (the 'Entref'). The number of variables found in the BSD is small relative to other data sources. However, the BSD has the virtue of providing extensive coverage of the population of firms in the UK. It therefore forms a robust basis for quantifying levels of growth at firm-level and for identifying some of the basic demographic features of high-growth firms. The BSD has provided the basis for much of the recent evidence on firm growth in the UK (e.g. Anyadike-Danes et al, 2009; Hijzen et al, 2010; Criscuolo et al, 2014).[6]

[6]Welpton (2009) provides further details.

WERS is a linked employer-employee survey which provides nationally representative data on workplaces in Britain with five or more employees. The strength of the survey lies in the richness of data collected on workplace policies and practices.

The WERS survey was undertaken between February 2011 and June 2012 via face-to-face interviews with managers responsible for employment relations at the workplace. The 2011 WERS carried forward some workplaces from the preceding WERS (carried out in 2004) to construct a panel sample of around 1,000 workplaces. These were supplemented by a "refreshment sample" of around 1,700 workplaces sampled from the 2010 Inter-Departmental Business Register (IDBR). Once sampling weights have been applied, WERS is representative of all workplaces in Britain with five or more employees, with the exception of those in agriculture and mining which are excluded from the survey. The full 2011 WERS sample contains data on 1,691 private sector workplaces (1,193 in the refreshment sample and 498 in the panel).

WERS does not itself provide data on the recent growth trajectory of the workplace or firm. However, we are able to analyse growth in the years following the 2011 WERS by matching the refreshment sample workplaces to their appropriate firm-level records in the BSD via the IDBR Entref. This is possible for 92 per cent of the refreshment sample workplaces – those where the HR manager who responded to the WERS survey has given permission for data matching to take place.[7] It is then possible to use the longitudinal administrative data contained within the BSD to measure the growth trajectory of the firm over the period 2011-2014, whilst also controlling for its rate of growth prior to 2011.

The linked BSD-WERS sample allows us to measure firm growth using the same metrics that are well established in the existing literature (e.g. Anyadike-Danes et al, 2009), and then to go on to explore the characteristics associated with that growth in a way that has not previously been possible in Britain. We are thus able to generate unique and valuable insights into the factors associated with growth among SMEs.[8]

We arrive at a linked WERS-BSD sample of 1,060 private sector workplaces, of which 515 belong to SMEs (private sector firms with fewer than 250 employees in the 2011 BSD). Of the 513 firms with non-zero employment in the 2011 BSD, some 335 have 5-49 employees and 178 have 50-249

[7] It is not possible to link WERS panel workplaces to the BSD in large numbers, as the panel workplaces possess Entrefs from 2003 (the point at which they were first sampled from the IDBR). Consequently, we focus solely on the refreshment sample.

[8] The WERS data have been used previously to study workplace employment growth (e.g. Bryson and Nurmi 2011; Bryson, 2004) and SME employment practices (e.g. Forth et al., 2006; Hoque and Bacon, 2006; Bryson, 1999). However, it has not previously been used to study employment growth in SMEs.

employees. The remaining 545 private sector workplaces in WERS belong to large firms with at least 250 employees in the 2011 BSD.

Each of the 513 SME firms in the WERS-BSD matched dataset has only one workplace observation in WERS. In trying to explain the role of workplace practices on SME growth, we use this single workplace to characterise the whole of the firm, even though the firm may have other workplaces which we do not observe and which might differ from the workplace observed in WERS. In practice, the degree of such measurement error is likely to be small. If we compare the employment numbers recorded for the workplace in WERS with those recorded for the whole firm in the BSD, we find that the WERS workplace accounts for 95% of the firm's total employment on average within our SME sample. For workplaces belonging to firms with 5-49 employees, the average is 100% and for those with 50-249 employees it is 84%. By comparison, the average for workplaces belonging to firms with at least 250 employees is just 38%.

Five percent of the SME firms that we observe in 2011 (28 out of 513) exit over the period 2011-2014. Among the remaining 485, we can regress growth in employment between 2011 and 2014 on a variety of firm characteristics, controlling for growth over the period 2008-11. The main demographic characteristics of the firm are taken from the BSD, whilst all other firm characteristics are taken from WERS. Although WERS includes indicators of many potential drivers of firm growth, it does not include some drivers that are argued to be important in the literature discussed in Section Two, notably measures of access to finance. Nor does it contain measures of growth intentions. Nevertheless, our range of firm characteristics is wider than is typically available.

We experiment with a variety of model specifications to arrive at a parsimonious specification which is necessary given our modest sample size. The variables we concentrate on are apposite for the SME population. So, for example, there is less focus on unions than in the prior literature on workplace employment growth (Bryson, 2004). These variables, which are discussed when presenting the results, are listed below:

- Size, age, industry, single/multi (measured in the BSD)
- Product market characteristics
- Innovation and technology
- Incentives
- 'High-performance' work practices
- Training / skills
- Voice
- Strategy
- Target setting
- Recruitment practices
- HR innovation
- The largest non-managerial occupational group.

In reporting results we focus on variables relevant to the hypotheses set out in Section Two. Descriptive statistics for those variables which do feature in our final models are presented in Appendix A, which includes statistics for the full sample (Table A.1) as well as statistics for workplaces belonging to small and medium-sized firms presented separately (Tables A.2 and A.3).

Different approaches have been taken to the measurement of firm growth within the research literature. The two most commonly-used approaches are:

- The base-year method, in which firm size at the end of the period of observation is divided by firm size at the start of the period

- The average-period method, in which the increase in size over the period of observation is divided by the average of firm size at the start and end of the period.

A formal exposition of the two methods is provided in Appendix B. The base-year method is intuitive, as it provides a fairly straightforward 'compound' measure of growth per annum (*G*). However, the average-year method provides a more equitable treatment of small and large firms and is conventional in the more academic literature (e.g. Hijzen et al, 2010; Haltiwanger et al, 2013). We thus follow the established academic literature in using the 'average-period' method.

As noted above, we measure the growth of the firm in the three years following the WERS survey (2011-2014). We also measure growth in the three years prior to the WERS survey (2008-2011) and use this 'prior trajectory' as a control variable in our regression analyses.

The BSD allows us to measure firm growth in terms of both employment and total sales. Whilst much of the recent literature for the UK tends to focus on employment growth (e.g. Anyadike-Danes et al, 2009; Hijzen et al, 2010), we follow Bishop et al (2009) in looking at growth in employment and total sales. This recognises that, whilst job creation is an important social and economic outcome, firms are likely to have growth objectives focused around revenue, since sales ultimately indicate market success.[9]

For the most part, we analyse growth in employment and growth in turnover separately. However, we also analyse a binary variable which identifies those firms that are in the top quartile of the employment growth distribution *and* the top quartile of the turnover growth distribution (equating roughly to growth of at least ten per cent per annum on both measures).

Finally, in recognition that our measures of firm growth are computed only among those firms that survive to 2014, we also examine the probability of firm closure (exit). This is measured as the disappearance of the firm's unique

[9] We acknowledge that gross value-added would be preferable to total sales. However the former is not recorded in the BSD, except for the subset of firms that are surveyed as part of the ONS' Annual Business Survey.

Entref from the IDBR between 2011 and 2014. In most cases, this will arise through the closure of the firm and its subsequent removal from the register. However, a firm's Entref may also disappear if the firm merges with, or is taken over by, another firm. Exit is thus potentially measured with some degree of error.

4. RESULTS

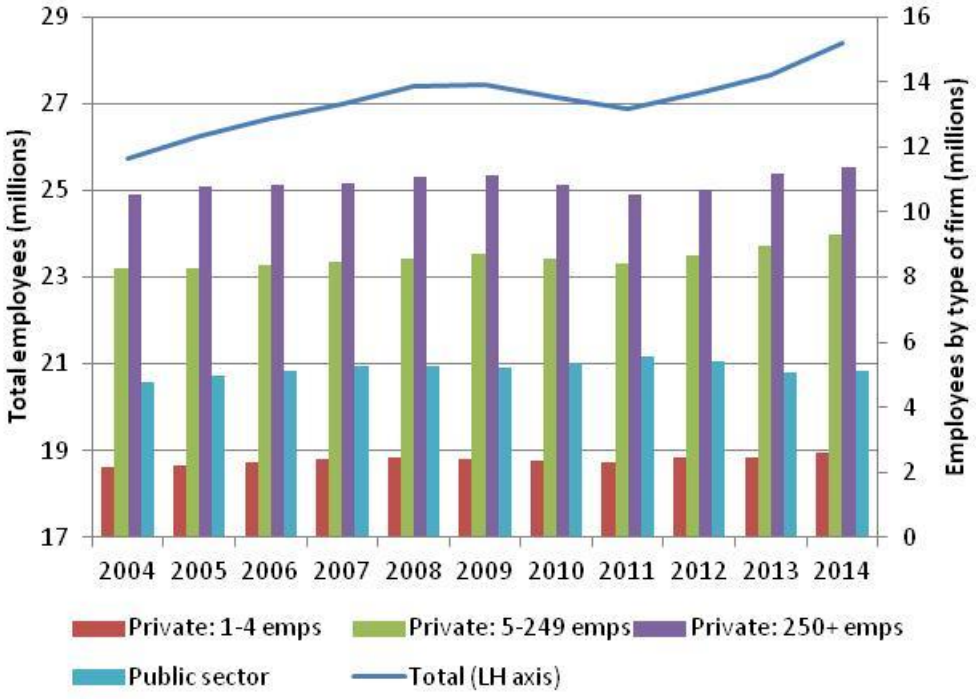
4.1 ENTRY, EXIT AND GROWTH AMONG SMEs: ANALYSIS OF THE BSD

In this section we present descriptive analyses regarding employment growth in the economy between 2004 and 2014, and the role played by firm entry and exit. We do this through analyses of the Business Structure Database (BSD).

The total number of employees (as measured by the BSD) rose from 25.7m in 2004 to 27.4m in 2009 (Figure 1, left-hand axis). It then fell back to 26.9m in 2011 following the onset of recession before recovering to reach 28.4m in 2014. Thus 2011 - the year the WERS went into the field - was the lowest point since the onset of the crisis.

The total number of employees in private sector SMEs with 5-249 employees followed a similar pattern over most of this period, growing from 8.3m in 2004 to 8.7m in 2009, then falling to 8.4m in 2011 before rising to 9.3m in 2013.

Figure 1: Employees by Firm Size, Business Structure Database

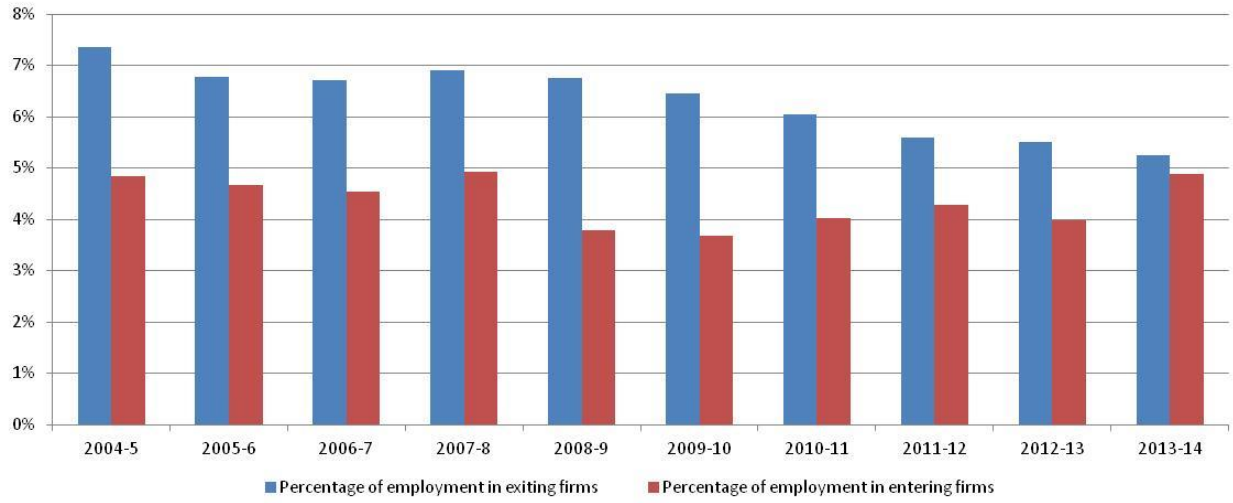


Source: BSD

The share of employees in SMEs was stable at around 31.5% from 2004-2011 but it has since grown to around 33%, primarily because of the fall in public sector employment since 2011, but also due to a small increase in the share of *private sector* employment in firms with 5-249 employees (rising from 38.8% in 2008 to 40.0% in 2014).[10]

Figure 2 shows the contribution of firm birth and firm death to employment among SMEs pre- and post-recession. All public sector organisations are excluded from this and subsequent analyses. Prior to recession around 7% of employees were in firms that had exited by the following year, but this fell steadily after the crisis. The contribution of new firms entering the population was a little below 5% prior to recession and fell further to under 4% with the crisis. However, it had recovered to almost 5% by 2014. The remaining 90% or so of SME employment in each year was in firms appearing in consecutive years, that is, firms that had neither exited nor entered.

Figure 2: Percentage of Employment in SMEs Accounted for by Firm Entry and Exit, BSD



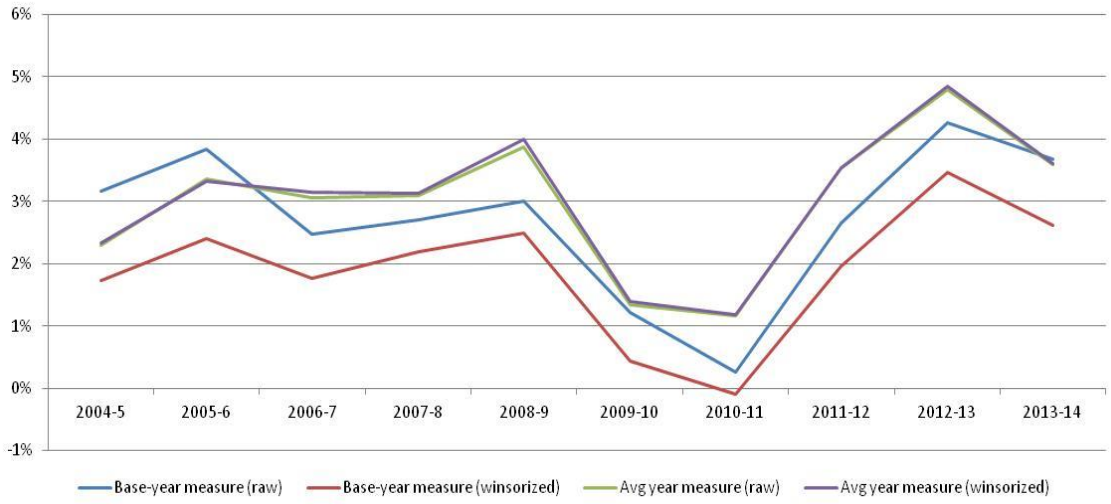
Source: BSD

For those firms that are observed in two consecutive years we are able to estimate their rate of employment growth. As noted above, there are two ways that growth measures are typically constructed in the literature. The first method divides employment change between t and t+1 by the employment

[10] The literature is not consistent on how employment in small and large firms responds to the business cycle. On the one hand, Moscarini and Postel-Vinay (2012) show that employment in large firms is more closely linked to changes in the unemployment rate than those of small ones. On the other hand, Hardwick and Adams (2002) find countercyclical variation in the relationship between firm size and growth, suggesting that larger firms grow faster during recessions and recoveries.

level in time t. This is what we term the base-year measure. The second measure is similar but this time the denominator is the average employment in years t and t+1. Growth trends for SMEs using both measures are presented in Figure 3. We also present their winsorized equivalents whereby outlier values beyond the 1st and 99th percentile values are recoded to these limits. Trends in growth are similar whichever measure is used: growth rates are fairly stable at 2-4% per annum prior to recession, dip in 2008/9 with the onset of recession, only to recover quickly in 2010/11, peaking at rates of 3-5% per annum in 2012/13. In the rest of the report we focus on the second measure because it is the measure most commonly used in the literature (eg. Hijzen et al. 2010).[11]

Figure 3: Employment Growth among SMEs, BSD



Source: BSD

[11] Using this measure tends to result in lower levels of employment growth due to the fact that the measure typically has a larger denominator than the base-measure indicator and has an upper bound of <1.9999. We use the winsorized version to avoid results being skewed by outlying cases experiencing exceptional growth or contraction.

Table 1 Employment Levels and Growth Within the SME Population, BSD
Panel A: Firm-weighted

Employment in 2011:	Employment in 2014 (row %)					Employment growth rate pa, 2011-14
	Exit	1-4	5-49	50-249	250+	
All	17.1	11.8	63.8	7.0	0.3	-1.19%
5-49 emps	17.5	12.6	68.0	1.9	0.0	-1.17%
50-249 emps	12.0	2.2	11.4	70.6	3.8	-1.41%

Panel B: Employment-weighted

Employment in 2011:	Employment in 2014 (row %)					Employment growth rate pa, 2011-14
	Exit	1-4	5-49	50-249	250+	
All	14.2	5.6	46.7	30.8	2.7	3.26%
5-49 emps	16.0	7.9	71.1	5.0	0.1	3.69%
50-249 emps	11.4	2.0	8.1	71.6	6.9	2.59%

Source: BSD

Panels A and B of Table 1 identify what happened to SME firms between 2011 and 2014, the period of employment growth we focus on in the remainder of this study. The tables are based on 452,595 firm-level observations. The left-hand column in the tables identifies the status of the firm in 2011 while subsequent rows show what had happened to them by 2014.

We can see from the firm-weighted data in Panel A that 17% of SMEs in 2011 had exited by 2014: some of these will have died, either due to bankruptcy or liquidation, while others may have exited for other reasons (as noted in Section Three, we are unable to distinguish between the reasons for exit).

Exit was more common among the smallest SMEs: 17.5% of SMEs with 5-49 employees had exited by 2014, compared with 12% of those with 50-249

employees in 2011. A little over two-thirds of those in the 5-49 employee category in 2011 remained in the same size band in 2014, as was the case for those in the 50-249 size band. Very few of the SME sample had grown beyond the employment threshold of 250 employees used to designate firms as SMEs (0.3%). The average growth rate of firms was -1.19% between 2011 and 2014, and was particularly low (-1.41% per annum) in the larger SMEs. The growth rate is negative in part because the figures exclude new firm entrants, most of whom would have grown.

By employment weighting the same data in Table 1 Panel B we can see what percentage of employees were in SMEs that exited or grew. Fourteen per cent of employees were employed by a SME that exited between 2011 and 2014: this figure is lower than the firm-weighted 17.1% indicating that it was the smaller SMEs employing fewer employees that were more likely to exit. When employee-weighted, the average growth rate of SMEs was positive at around 3.3% per annum, rising to 3.7% for employees in SMEs with 5-49 employees. The fact that growth rates are positive in Panel B but negative in Panel A indicates that employment growth was more positive among larger workplaces since it is these workplaces that account for a greater proportion of employees.

4.2 EXIT AND GROWTH AMONG SMES: ANALYSIS OF BSD-WERS LINKED DATA

Having presented exit and employment growth rates for SMEs in the BSD population we turn to analyses of the subset of private sector firms which appear in both WERS and the BSD. Analyses are weighted by the WERS workplace sampling weights so that they reflect figures for the population from which they were sampled, rather than merely within-sample estimates. The WERS sample is atypical of all firms since they were sampled in 2010 and had to survive until 2011/12 in order to be interviewed in the survey. They are therefore a little more stable than SMEs as a whole, as indicated by the lower exit rate of around 5% (Table 2, column 4) when compared to the much higher exit rates in Table 1 Panel A.

Table 2: Employment Growth and Exit Rates 2011-2014 for the Matched WERS-BSD Sample

2011 employment:	Employment growth rate pa, 2011-14		Exit rate (%)
	Mean	SD	
5-249 emps	0.80%	15.7	5.3%
5-49 emps	1.05%	16.0	5.4%
50-249 emps	-0.56%	13.6	5.2%

Source: WERS-BSD

The employment growth rates presented in Table 2 for the WERS-BSD sample are defined in the same way as those presented in the final column of Table 1 Panel A. The growth rates are more positive in the WERS-BSD sample than they are for all firms in the BSD. Mean growth is 0.80% per annum over the three years 2011-2014, which is modest, but it is notable that growth is stronger among small firms than it is among medium-sized firms. It is also notable that there is substantial variance in growth rates, as indicated by the large standard deviations. Growth rates are normally distributed overall, however.

A fuller understanding of growth patterns among SMEs relies on multivariate analyses as discussed earlier. In the literature on SME growth, employment growth is one important metric, but another is growth in sales turnover. We therefore estimate multivariate models as described earlier for employment growth, on the one hand, and sales growth on the other. The mean and distribution of turnover growth is very similar to those for employment growth. Descriptive information on all the control variables used in the models is provided in Appendix A.

Table 3 presents very simple models which use covariates found in the BSD to identify some basic characteristics that are correlated with employment growth and turnover in the period 2011-2014. The models are run on firms that did not exit the BSD over the period. The models contain identical covariates, namely the year in which the firm was born according to the BSD, a dummy variable identifying whether the firm was in the Manufacturing sector, employment (or turnover) levels in 2011 (expressed in logs) and growth in the period immediately following the financial crisis (2008-2011).

Table 3: Growth in employment or turnover - BSD specification

	[1] Employment growth 2011-14	[2] Turnover growth 2011-14
Employment growth 2008-11	0.096*	
	[1.94]	
Ln(employment in 2011)	-0.019***	
	[-3.02]	
Turnover growth 2008-11		-0.034
		[-0.77]
Ln(turnover in 2011)		-0.010**
		[-1.99]
Manufacturing	0.049*	0.052
	[1.94]	[1.57]
Year of birth:		
2006-10	0.006	0.008
	[0.20]	[0.23]
2001-05	0.003	0.051*
	[0.13]	[1.96]
1996-2000	0.002	-0.007
	[0.10]	[-0.34]
Ref. Pre 1996	0	0
	[.]	[.]
Number of observations	485	485
Adjusted R-squared	0.046	0.034

Source: WERS-BSD

Notes:

1. T-statistics in parentheses
2. Key to significance: * p<0.10, ** p<0.05, *** p<0.001
3. Constant not shown to prevent disclosure

Column 1 presents the employment growth equation. Coefficients can be interpreted as independent correlations between the variable and employment growth measured in terms of percentage changes. Employment growth in the period immediately following the recession in 2008-11 is positively correlated with employment growth in 2011-14. However, bigger SMEs in 2011 grew at a slower rate in 2011-14. Manufacturers grew 5% more quickly than firms in the Service sector. Firm age was not significant having conditioned on firm size.

A comparison of columns 1 and 2 reveals that larger firms grew less than smaller ones, irrespective of whether scale is measured via employment or turnover. Otherwise, the correlates of the two measures of growth were somewhat different. Whilst employment growth in 2008-11 was positively associated with growth from 2011-14, turnover growth in 2008-11 was actually

negatively, albeit not significantly, correlated with turnover growth in 2011-14. Firm age also mattered somewhat in the turnover regression (but not the employment regression), with firms set up in the early 2000s increasing turnover at a faster rate than older firms set up prior to 1996. Finally, the Manufacturing coefficient was statistically significant only in the employment regression; however it was positive and of a similar size in the turnover regression.

Table 4 presents similar employment and turnover growth models to those presented in Table 3 but this time we introduce additional control variables taken from the WERS HR Manager.[12] We experimented with a number of variables that do not appear in the table which proved statistically non-significant. These included target setting, strategic planning, representative forms of worker voice (such as trade unions) and a plethora of "high performance" work practices such as quality circles, just-in-time production and job rotation.

Table 4: Growth in employment or turnover - WERS specification

	[1]	[2]
	Employment growth 2011-14	Turnover growth 2011-14
Employment growth 2008-11	0.077*	
	[1.65]	
Ln(employment in 2011)	-0.027***	
	[-3.83]	
Turnover growth 2008-11		-0.049
		[-1.14]
Ln(turnover in 2011)		-0.024***
		[-4.38]
Manufacturing	0.028	0.03
	[0.99]	[0.92]
Year of birth:		
2006-10	0.013	0.001
	[0.44]	[0.04]
2001-05	0.005	0.036
	[0.23]	[1.63]
1996-2000	0.000	-0.003
	[-0.02]	[-0.13]
Ref. Pre 1996	0	0
	[.]	[.]
Family owned	-0.022	-0.053**
	[-1.17]	[-2.47]
Growing market	0.026	0.029
	[1.30]	[1.33]

[12] 7 observations are lost due to missing data.

Degree of product innovation:		
Rarely innovating	0.027	0.024
	[1.21]	[1.09]
Middle of the road	0	0
	[.]	[.]
Often innovating	0.039*	0.021
	[1.78]	[0.92]
Merit pay scheme	0.036*	0.029
	[1.66]	[1.28]
Payment-by-results scheme	-0.001	0.043**
	[-0.03]	[2.02]
Arrangements for team working:		
No team working	0	0
	[.]	[.]
Non-autonomous teams	-0.015	-0.021
	[-0.73]	[-0.93]
Autonomous teams	-0.047**	-0.059**
	[-2.24]	[-2.54]
Percentage of largest occupation receiving training in past year:		
80%+ trained	0.060***	0.050*
	[2.59]	[1.90]
40-79% trained	0.081***	0.058**
	[2.79]	[2.05]
1-39% trained	0.034	0.058**
	[1.36]	[2.25]
None trained	0	0
	[.]	[.]
Attitude survey in last two years	0.037**	0.015
	[2.05]	[0.70]
New technology introduced in past two years	0.041**	0.033*
	[2.53]	[1.74]
Number of observations	478	478
Adjusted R-squared	0.139	0.128

Source: WERS-BSD

Notes:

1. T-statistics in parentheses
2. Key to significance: * p<0.10, ** p<0.05, *** p<0.001
3. Constant not shown to prevent disclosure
4. Identity of largest occupational group included among regressors but not shown for brevity

Beginning with the employment growth analysis in column 1, it is apparent that the introduction of the additional controls substantially increases the model's ability to capture variance in employment growth across firms relative to the BSD model in Table 3. This shows the value of the matched WERS-BSD dataset when compared with administrative datasets which merely contain information on a small range of demographic characteristics.[13] Furthermore, the additional WERS covariates do little to change the signs of the BSD variables: employment growth in 2008-11 remains positively correlated with growth in 2011-14, size in 2011 is negatively correlated with growth, and firm age is not significant. However, Manufacturing firms no longer have significantly faster growth than their Service sector counterparts.

Firms who introduced new technology in the two years prior to the WERS survey experienced 4% higher growth per annum than observationally-equivalent firms who had not introduced new technology. Similarly, those firms who said they "often led the way" in response to the question "to what extent would you say this workplace leads the way in terms of developing new products, services or techniques" grew 4% per annum faster than those who scored 3 on the 5-point scale (identified in the table as 'middle of the road'). There is therefore some support for Hypothesis Four which linked product innovation to higher employment growth, but the link between process innovation and higher employment growth runs counter to Hypothesis Five.

As predicted in Hypothesis One, investment in human capital brings rewards in terms of employment growth: firms where at least 40% of core non-managerial employees had undertaken off-the-job training in the year prior to the WERS survey interview grew at a significantly faster rate than those that were less training intensive.

In keeping with Hypothesis Two there is a positive association between performance pay for employees and higher employment growth: those firms paying at least some of their employees according to subjectively assessed merit in 2011 grew 3.5% per annum faster than observationally equivalent firms without such a scheme.

The concept of autonomous team-working is perhaps at the very heart of what many term "High Involvement Management", and is usually deemed the key instrument by which employees are able to maximise their contributions to output with minimal oversight by supervisors. In much of the literature it is identified as contributing positively to labour productivity and firm performance (e.g. Baron and Kreps, 1999). Yet, according to the results in column 1, firms using autonomous team-working grew at a rate of nearly 5% less per annum than 'like' firms that did not use teams, while there was no association with non-autonomous teams. These findings are consistent with Hypothesis Three that suggested more formal mechanisms for employee involvement may not deliver growth for SMEs. But it is also possible that, as other studies have shown (Cordery et al., 2010; Langfred, 2004) too much worker autonomy can

[13] Coad et al (2014: 99) are among those who bemoan the limited explanatory power of models based on such sources.

have negative consequences for a firm. For instance, managers sometimes devolve too much responsibility down to teams of workers with insufficient support, training and incentives to carry out their more onerous tasks. The result can be a decline in labour productivity which, ultimately, will affect the rate of growth in the firm. Another possibility is that that firms with well-functioning autonomous team-working are more productive than firms without, such that teams produce additional output without firms having to employ additional workers to generate that output. In other words, the firm may be more efficient and, as a consequent, less reliant on employment growth. This is one reason why some firms are able to engage in what economists sometimes refer to as "jobless growth".

Less formal, costly methods of engaging employees do appear to foster growth, however. Firms that had conducted employee attitudes surveys in the two years prior to the WERS survey interview experienced growth rates of almost 4% more per annum than 'like' firms who had not surveyed their employees. If, as is often argued in the HRM literature, employee attitude surveys are an indicator for employer interest in engaging and motivating staff, then this finding supports the proposition that firms can benefit from an engaged and satisfied workforce, a contention supported by other empirical research (Bryson et al, 2014).

Column 2 of Table 4 presents a very similar model for sales turnover growth in the period 2011-14. As with the employment growth analysis, the addition of the WERS covariates increases the explanatory power of the model quite markedly but has little direct impact on the sign nor the significance of the BSD variables. Size, as indicated by log turnover in 2011, remains negatively associated with sales growth whereas firm age, broad sector and lagged sales growth play little role. In a number of ways the sales growth model is strikingly similar to that for employment growth. Process innovation (the introduction of new technology) is associated with higher sales growth, as predicted in Hypothesis Five, as is investing in human capital via training, confirming Hypothesis One. The sales growth returns to training are for undertaking any training, with little evidence of additional returns for training a higher percentage of core employees.

Incentives are positively linked to sales growth, supporting Hypothesis Two, though on this occasion it is the use of payments-by-results, rather than merit pay, that proves statistically significant. Once again, autonomous team-working has adverse consequences for the firm: the fact that they adversely affect sales growth as well as employment growth suggests the mechanism could be reduced productivity in the presence of autonomous team working. The finding is not consistent with autonomous teams lowering employment through improved productivity.

There are two results that differ across our two measures of growth. The first relates to the use of attitude surveys: whereas these are linked to higher employment growth they are positive but not statistically significantly related to sales growth. The second is the role of family-ownership: family-owned firms experience significantly lower sales growth than 'like' firms that are not family-

owned, whereas family ownership is negative but not significant for employment growth. This negative effect of family ownership, predicted in Hypothesis Six, may be related to the poorer management which characterises many family-owned and family-run firms, an issue emphasised by Bloom and Van Reenen (2010).

In some parts of the literature, analysts have followed the OECD in adopting a simple (0,1) measure of firm growth whereby firms score '1' if they achieve growth of at least 20% per annum in either employment or turnover (e.g. Anyadike-Danes et al, 2009). The problem with such a measure is that firms identified as 'high growth' may expand along one dimension at the expense of the other resulting, for example, in jobless growth. We think there is value in using both employment and turnover to identify high performing firms but we depart from the OECD definition by identifying high performers as those firms that are in the top quartile of employment growth *and* turnover growth rates (roughly 10 percent growth per annum in either case). Thirteen per cent of our 485 surviving workplaces (49 out of 485, unweighted) have employment growth rates in the top quartile *and* turnover growth rates in the top quartile, whereas around 16% of firms in our sample meet the OECD criteria.

We estimate the influences on this 'high growth' measure in Table 5. Column 1 presents linear estimates of the (0,1) outcome whereas column 2 presents results from the equivalent probit estimator. The signs and significance of coefficients are very similar regardless of the estimation technique used so we comment below on column 1 since the coefficients are easier to interpret as they capture percentage changes in the probability of being high growth.

Table 5: High growth in employment and turnover

	[1]	[2]
	OLS	Probit
Employment growth 2008-11	0.288**	1.320**
	[2.51]	[2.46]
Ln(employment in 2011)	-0.034***	-0.208**
	[-2.59]	[-2.21]
Manufacturing	0.06	0.115
	[0.93]	[0.31]
Year of birth:		
2006-10	0.133**	0.796**
	[2.12]	[2.08]
2001-05	0.096*	0.675**
	[1.80]	[2.24]
1996-2000	-0.011	0.083
	[-0.28]	[0.25]
Ref. Pre 1996	0	0
	[.]	[.]
Family owned	-0.080*	-0.427**
	[-1.90]	[-2.12]

Growing market	0.129***	0.640***
	[2.70]	[2.77]
Degree of product innovation:		
Rarely innovating	0.005	-0.233
	[0.10]	[-0.71]
Middle of the road	0	0
	[.]	[.]
Often innovating	0.013	0.026
	[0.29]	[0.10]
Merit pay scheme	0.073	0.339
	[1.31]	[1.32]
Payment-by-results scheme	0.02	0.112
	[0.44]	[0.44]
Arrangements for team working:		
No team working	0	0
	[.]	[.]
Non-autonomous teams	0.053	0.296
	[0.94]	[1.01]
Autonomous teams	-0.012	-0.024
	[-0.27]	[-0.09]
Percentage of largest occupation receiving training in past year:		
80%+ trained	0.121**	0.859**
	[2.06]	[2.28]
40-79% trained	0.160**	1.016**
	[2.47]	[2.37]
1-39% trained	0.085	0.692*
	[1.62]	[1.85]
None trained	0	0
	[.]	[.]
Attitude survey in last 2 years	-0.052	-0.338
	[-1.30]	[-1.32]
New tech introduced	-0.026	-0.164
	[-0.67]	[-0.70]
Number of observations	478	478
Adjusted R-squared	0.198	
Pseudo R-squared		0.321

Source: WERS-BSD

Notes:

1. T-statistics in parentheses
2. Key to significance: * p<0.10, ** p<0.05, *** p<0.001
3. Constant not shown to prevent disclosure
4. Identity of largest occupational group included among regressors but not shown for brevity

Firms that grew strongly in the immediate aftermath of the crisis were "high growth" firms in 2011-14. However, growth was slower among those larger SMEs, as indicated by their log employment in 2011. In keeping with the literature (Caves, 1998), and in a departure from the findings presented above, younger firms were more likely to be high growth than those born some time ago. The model also confirms the adverse impact of family ownership on growth as predicted in Hypothesis Six. It also points to the importance of market conditions facing firms: those operating in growing markets experience significantly higher growth rates than those firms whose HR Manager characterised the market for their main product or service as "declining", "mature" or "turbulent". (Although there was a positive coefficient on growing markets in the models reported above it was not statistically significant).

Perhaps what is most striking about the "high growth" model is that most of the choices management makes regarding HR practices, investment and the organization of production, prove statistically non-significant in this model, even though many had a statistically significant effect on incremental growth as indicated in Table 4. In some instances, the reason for this is the larger standard errors in the "high growth" model such that, even if point estimates on particular coefficients are large, as in the case of merit pay, the estimates are insufficiently precise to produce a statistically significant result. In other instances, such as the introduction of new technology, the sign on the coefficient has switched to negative, although again the effect is not statistically significant. The clear exception to the non-significance of HR practices is the prevalence of training for core non-managerial employees: this is strongly positively associated with being a 'high growth' firm, with the returns being strongest where at least 40% of core employees have received off-the-job training in the 12 months prior to the WERS survey. The association between training and growth is thus a particularly robust one supporting Hypothesis One.

Each of the models described above run on a selective sample in the sense that they do not take account of the 28 firms that exited the sample after 2011. It is conceivable that the results presented for surviving firms might have looked different on the whole population if one took account of which firms exited and whether HR practices also influenced the probability of exit. We therefore finally estimated OLS and probit models to establish which firm traits predicted subsequent exit.

It is apparent that, conditional on size in 2011, younger firms are more likely to exit (Table 6), a finding that is typical in the literature. Family-ownership is also positively correlated with exit, as is the HR Manager's perception that organizational performance is below the average for the industry. However, very few HR and organizational choice variables are correlated with the probability of exit. There are two exceptions. First, undertaking employee attitude surveys are *positively* correlated with exit (although this result is only statistically significant in the probit regression, which may suffer from over-fitting given the small number of exits and large number of discrete covariates). Second, off-the-job training is linked to a lower likelihood of firm

exit. This latter point is consistent with earlier research by Collier et al (2005, 2011) using the WERS panel and suggests the training effects on growth noted earlier are an underestimate of the overall benefits of training to SMEs.

Table 6: Firm exit	[1] OLS	[2] Probit
Ln(employment in 2011)	0.01	0.205**
	[1.02]	[2.12]
Manufacturing	-0.084**	-1.259**
	[-2.02]	[-2.37]
Year of birth:		
2006-10	0.128**	1.540***
	[2.43]	[3.64]
2001-05	0.036	0.398
	[1.57]	[1.15]
1996-2000	0.023	0.166
	[0.87]	[0.44]
Ref. Pre 1996	0	0
	[.]	[.]
Family owned	0.033	0.490**
	[1.46]	[2.01]
Growing market	-0.018	-0.059
	[-0.77]	[-0.25]
Degree of product innovation:		
Rarely innovating	-0.011	0.077
	[-0.27]	[0.26]
Middle of the road	0	0
	[.]	[.]
Often innovating	-0.047	-0.375
	[-1.42]	[-1.29]
Merit pay scheme	-0.005	-0.074
	[-0.27]	[-0.23]
Payment-by-results scheme	-0.019	-0.176
	[-0.75]	[-0.63]
Arrangements for team working:		
No team working	0	0
	[.]	[.]
Non-autonomous teams	0.002	-0.204
	[0.07]	[-0.55]
Autonomous teams	0.057	0.336
	[1.44]	[1.08]
Percentage of largest occupation receiving training in past year:		
80%+ trained	-0.026	-0.228
	[-0.71]	[-0.71]
40-79% trained	-0.083*	-0.941*
	[-1.90]	[-1.66]
1-39% trained	-0.080*	-1.025**
	[-1.93]	[-2.44]
None trained	0	0

	[.]	[.]
Attitude survey in last 2 years	0.038	0.908***
	[0.87]	[2.73]
New tech introduced	-0.024	-0.372
	[-1.10]	[-1.47]
Perceived financial performance relative to industry average:		
A lot above average	0.05	0.188
	[0.85]	[0.36]
Above average	0.018	0.058
	[0.67]	[0.18]
About average	0	0
	[.]	[.]
Below average	0.083	0.937**
	[1.01]	[2.06]
Not known/no comparison possible	0.141*	1.444***
	[1.66]	[3.60]
Number of observations	506	506
Adjusted R-squared	0.115	
Pseudo R-squared		0.385

Source: WERS-BSD

Notes:

1. T-statistics in parentheses
2. Key to significance: * p<0.10, ** p<0.05, *** p<0.001
3. Constant not shown to prevent disclosure
4. Identity of largest occupational group included among regressors but not shown for brevity

5. CONCLUSIONS

This paper examines SME growth in the aftermath of perhaps the most severe recession Britain has experienced in over a century. Much of the literature on SME growth is based on evidence collected in more benign times, so it is particularly instructive to revisit this literature and reappraise what factors appear to be associated with growth. In doing so we combine administrative data taken from the Business Structure Database and evidence from HR Managers and employees surveyed as part of the 2011 Workplace Employment Relations Survey. The richness of these data mean we can go beyond a focus on 'structural' features of firms such as industrial sector, age, and initial size, by examining the role of choices made by firms in terms of their HR management practices, investment decisions, and the organization of production.

We find that 2011 – the year that WERS went into the field – saw the lowest aggregate level of employment since the onset of the crisis in 2008. In that sense the period 2011-2014, which is the basis for our later WERS-BSD

analysis, was a time of recovery. However, it was also a time in which the share of employees in private sector SMEs was growing (from 38.8% in 2008 to 40.0% in 2014), primarily because of the decline in public sector employment that took place between 2011 and 2014.

Focusing only on private sector SMEs, we find that the extent of churning in the population did not change a great deal through recession. In each pair of years from 2004-5 to 2013-14, the percentage of employment in private sector SMEs that continued in existence from year-to-year was always around 90%. Rates of employment growth among these firms did dip in recession, however, only to recover quickly in 2010/11. Again, this reinforces the view that our WERS-BSD analysis covers a period in which the economy – and its constituent firms – were returning to a more normal trajectory after the depths of the crisis

We then presented multivariate analyses of our sample of 513 SME firms from the WERS-BSD matched dataset. The analyses covered four outcomes: employment growth; turnover growth; being a 'high-growth' firm; and the probability of firm exit. The reference period for all analyses was 2011-2014. We found that the additional variables provided in the WERS data significantly extended the explanatory power of our models when compared with specifications relying upon the limited number of characteristics provided in the BSD – thereby showing the value of the matched WERS-BSD dataset when compared with purely administrative data sources. However, the set of additional workplace characteristics and HR practices that were found to be statistically significant was relatively small.

Looking across the wide range of workplace characteristics and HR practices that were examined in our analyses, we found that investments in new technology and the use of performance-related pay were positively and significantly correlated with growth in employment *and* growth in turnover. Nonetheless, the single most striking result was that the proportion of core non-managerial employees engaged in off-the-job training was robustly associated with higher growth and lower exit probabilities. Firms which engaged larger proportions of their core employees in off-the-job training had higher levels of employment growth and higher levels of turnover growth than other, similar firms. More extensive off-the-job training was also positively associated with 'high-growth', using the OECD definition which is a common reference point in the broader literature (that is, the attainment of at least 20% growth in either employment or turnover per annum). In addition, firms that engaged their core employees in off-the-job training were also less likely to exit the population over the three-year period covered by our analyses. The implication is that the amount of off-the-job training undertaken in Britain's private sector SMEs is sub-optimal and that an increase in training is likely to benefit firms and workers alike.

Other HR practices, such as communication and team-working, were not correlated with growth rates or were, in some cases, linked to poorer growth performance. We speculate that these practices may be more important once the firm matures into a larger entity and, indeed, some supporting arguments

have been made in this regard in the broader literature. However, there is a need for further research to investigate the extent to which certain HR practices impact *differentially* on the firm's ability to grow at different stages.

Among the SMEs that were our focus, however, it is apparent that what firms chose to do in terms of investing in human capital, reorganising production and incentivising workers made a difference to how these SMEs emerged from recession. Ultimately, of course, firms are interested in profit maximisation as opposed to employment growth. Yet the fact that firms' choices also influenced sales growth is a reminder that these practices may also be beneficial for profit-maximising firms and that more might be done to encourage firms to invest where there appears to be sub-optimal investment.

Perhaps the chief limitation to our study is that we are unable to make causal inferences about the link between HR practices and growth. We are able to account for the growth trajectories of firms prior to 2011, so that the comparisons we make partial out the potentially confounding effect of dynamic growth effects that might otherwise bias our estimates of the links between practices and growth. But we are unable to account for the fact that firms are making choices that are partly based on their performance trajectory and what they think will work for them, such that the practices we observe are endogenous. Future research may be able to deploy methods which go beyond simple partial correlations to establish the causal effects of management practices on SME growth.

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APPENDIX A: ADDITIONAL TABLES

Table A.1 Descriptive Statistics for Control Variables, WERS-BSD, full sample

	Unweighted		Weighted		
	Mean	Std. dev.	Mean	Std. dev.	N
Employment growth 2008-11	0.064	0.194	0.091	0.201	485
Turnover growth 2008-11	0.021	0.253	0.038	0.256	485
Ln(employment in 2011)	3.485	1.513	2.748	1.285	485
Ln(turnover in 2011)	7.527	1.766	6.972	1.605	485
Manufacturing	0.122	0.327	0.147	0.355	485
2006-10	0.120	0.325	0.145	0.352	485
2001-05	0.249	0.433	0.348	0.477	485
1996-2000	0.196	0.397	0.174	0.379	485
Ref. Pre 1996	0.435	0.496	0.334	0.472	485
Family owned	0.513	0.500	0.571	0.496	485
Growing market	0.307	0.462	0.293	0.455	485
Rarely innovating	0.237	0.426	0.276	0.447	485
Middle of the road	0.280	0.450	0.284	0.452	485
Often innovating	0.482	0.500	0.440	0.497	485
Merit pay scheme	0.221	0.415	0.214	0.411	485
Payment-by-results scheme	0.303	0.460	0.293	0.456	485
No team working	0.262	0.440	0.363	0.481	485
Non-autonomous teams	0.340	0.474	0.265	0.442	485
Autonomous teams	0.398	0.490	0.372	0.484	485
80%+ trained	0.409	0.492	0.387	0.488	484
40-79% trained	0.128	0.335	0.099	0.299	484
1-39% trained	0.281	0.450	0.264	0.441	484
None trained	0.182	0.386	0.250	0.433	484
Attitude survey in last 2 years	0.304	0.461	0.205	0.404	483
New tech introduced	0.570	0.496	0.534	0.499	481
Professional	0.120	0.325	0.115	0.319	485
Assoc. Professional & Technical	0.122	0.327	0.129	0.336	485
Admin and Secretarial	0.118	0.322	0.117	0.321	485
Skilled Trades	0.151	0.358	0.188	0.391	485
Caring, Leisure and Service	0.118	0.322	0.093	0.291	485
Sales and Customer Service	0.153	0.360	0.169	0.375	485
Process and Plant Operatives	0.074	0.262	0.076	0.266	485
Elementary Occupations	0.146	0.354	0.113	0.317	485

Table A.2 Descriptive Statistics for Control Variables, WERS-BSD, sample with 5-49 employees

	Unweighted		Weighted		
	Mean	Std. dev.	Mean	Std. dev.	N
Employment growth 2008-11	0.078	0.193	0.095	0.200	315
Turnover growth 2008-11	0.024	0.245	0.038	0.252	315
Ln(employment in 2011)	2.790	1.097	2.403	0.881	315
Ln(turnover in 2011)	6.890	1.429	6.659	1.350	315
Manufacturing	0.121	0.326	0.157	0.364	315
2006-10	0.121	0.326	0.148	0.356	315
2001-05	0.324	0.469	0.378	0.486	315
1996-2000	0.197	0.398	0.165	0.372	315
Ref. Pre 1996	0.359	0.480	0.309	0.463	315
Family owned	0.549	0.498	0.588	0.493	315
Growing market	0.295	0.457	0.296	0.457	315
Rarely innovating	0.260	0.440	0.284	0.452	315
Middle of the road	0.276	0.448	0.282	0.451	315
Often innovating	0.463	0.499	0.434	0.496	315
Merit pay scheme	0.222	0.416	0.216	0.412	315
Payment-by-results scheme	0.248	0.432	0.250	0.434	315
No team working	0.330	0.471	0.385	0.487	315
Non-autonomous teams	0.276	0.448	0.241	0.428	315
Autonomous teams	0.394	0.489	0.375	0.485	315
80%+ trained	0.369	0.483	0.378	0.486	314
40-79% trained	0.102	0.303	0.099	0.299	314
1-39% trained	0.287	0.453	0.251	0.434	314
None trained	0.242	0.429	0.273	0.446	314
Attitude survey in last 2 years	0.204	0.403	0.156	0.363	314
New tech introduced	0.497	0.501	0.510	0.501	312
Professional	0.092	0.290	0.102	0.304	315
Assoc. Professional & Technical	0.133	0.340	0.137	0.345	315
Admin and Secretarial	0.133	0.340	0.121	0.326	315
Skilled Trades	0.168	0.375	0.206	0.405	315
Caring, Leisure and Service	0.124	0.330	0.098	0.298	315
Sales and Customer Service	0.130	0.337	0.140	0.348	315
Process and Plant Operatives	0.063	0.244	0.074	0.263	315
Elementary Occupations	0.156	0.363	0.121	0.326	315

Table A.3 Descriptive Statistics for Control Variables, WERS-BSD, sample with 50-249 employees

	Unweighted		Weighted		
	Mean	Std. dev.	Mean	Std. dev.	N
Employment growth 2008-11	0.038	0.195	0.071	0.205	170
Turnover growth 2008-11	0.016	0.269	0.040	0.275	170
Ln(employment in 2011)	4.773	1.324	4.637	1.490	170
Ln(turnover in 2011)	8.707	1.727	8.685	1.799	170
Manufacturing	0.124	0.330	0.093	0.291	170
2006-10	0.118	0.323	0.127	0.334	170
2001-05	0.112	0.316	0.180	0.385	170
1996-2000	0.194	0.397	0.222	0.417	170
Ref. Pre 1996	0.576	0.496	0.471	0.501	170
Family owned	0.447	0.499	0.478	0.501	170
Growing market	0.329	0.471	0.272	0.446	170
Rarely innovating	0.194	0.397	0.231	0.423	170
Middle of the road	0.288	0.454	0.297	0.458	170
Often innovating	0.518	0.501	0.472	0.501	170
Merit pay scheme	0.218	0.414	0.205	0.405	170
Payment-by-results scheme	0.406	0.493	0.528	0.501	170
No team working	0.135	0.343	0.247	0.433	170
Non-autonomous teams	0.459	0.500	0.398	0.491	170
Autonomous teams	0.406	0.493	0.355	0.480	170
80%+ trained	0.482	0.501	0.439	0.498	170
40-79% trained	0.176	0.382	0.098	0.299	170
1-39% trained	0.271	0.446	0.338	0.474	170
None trained	0.071	0.257	0.125	0.332	170
Attitude survey in last 2 years	0.491	0.501	0.475	0.501	169
New tech introduced	0.704	0.458	0.667	0.473	169
Professional	0.171	0.377	0.184	0.389	170
Assoc. Professional & Technical	0.100	0.301	0.083	0.277	170
Admin and Secretarial	0.088	0.284	0.096	0.296	170
Skilled Trades	0.118	0.323	0.085	0.279	170
Caring, Leisure and Service	0.106	0.309	0.068	0.253	170
Sales and Customer Service	0.194	0.397	0.325	0.470	170
Process and Plant Operatives	0.094	0.293	0.086	0.281	170
Elementary Occupations	0.129	0.337	0.072	0.259	170

APPENDIX B: MEASURES OF FIRM GROWTH

The two most commonly-used approaches to the measurement of firm growth (*G*) are:

- The base-year method, in which firm size (*N*) at the end of the period of observation (time t_i) is divided by firm size at the start of the period (time t_1)

$$G = \sqrt[i]{\frac{N_{t_i}}{N_{t_1}}}$$

- The average-period method, in which the increase in size over the period of observation is divided by the average of firm size at the start and end of the period

$$G = \frac{N_{t_i} - N_{t_1}}{(N_{t_i} + N_{t_1})/2} / i$$

The advantages of each method are outlined in the text.