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Private Sector Employment Growth, 1998-2004: A Panel Analysis of British Workplaces

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Abstract
Using nationally representative panel data for British private sector workplaces this paper points to the importance of distinguishing between workplace and firm size when analysing employment growth, and finds that the factors associated with growth differ markedly between single independent establishments and those belonging to multi-site firms. Results also differ according to whether one adjusts for sample selection arising from workplace survival, and according to whether one distinguishes between growth per se and internal, organic employment growth. We find evidence at the plant level that is consistent with creative job destruction.

Key Words: employment growth; workplace survival; workplace age; workplace size; human capital; sunk costs
JEL Classifications: J21; J23
Data: Workplace Employment Relations Survey 1998-2004; EUKLEMS 1970-2004

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1. Introduction

There is a growing literature in industrial organisation using micro-level firm and establishment data to test theory regarding the factors associated with employment growth. This literature modifies some of the central tenets stemming from early theory, and indicates substantial heterogeneity in firms' behaviour within industries and over the business cycle (Sutton, 1997). The literature has concentrated on testing Gibrat's (1931) Law of Proportionate Effect which states that the growth rate of a firm does not depend on its current size and past growth history. However, new theories of firm growth have emerged dealing with issues such as industry dynamics and the effects of learning over the life-cycle of firms (e.g. Jovanovic, 1982, and Pakes and Ericson, 1995).

In recent years the greater availability of good micro-level data and advanced econometric techniques have created new possibilities for the analysis of firm growth. For example, GMM methods (e.g. Oliveira and Fortunato, 2006) and simulation techniques (e.g. Cabral and Mata, 2003) have been used to capture different features of the size distribution. The empirical evidence is benefiting from larger samples of firms or establishments and the availability of a wider array of explanatory variables. However, the comparability of different studies remains a challenge due to the variety of the methods and definitions used.

Sample selection arising from increased exit probabilities amongst small establishments having slow or negative growth may overstate the growth rate of smaller units (Mansfield, 1962). Although studies tend to find sample selection adjustments make little difference (Evans, 1987a, 1987b; Hall, 1987) the absence of selection effects may be due, at least in part, to reliance on functional form or weak instruments to identify equations. These identification problems are not usually discussed, even though they may affect the reliability of results.

In Britain, there is a small empirical literature on employment growth but it is somewhat under-developed due to data inadequacies (e.g., Dunne and Hughes, 1994; Hart and Oulton, 1996; Geroski et al., 1997; Geroski et al., 2003; Bryson, 2004). This is unfortunate since analysis of establishment-level dynamics, including patterns of employment growth and exit, can contribute to a better understanding of how jobs are created and destroyed. This, in turn, can inform debate regarding appropriate public policy in areas such as labour market regulation and taxation. Furthermore, better knowledge of factors affecting growth at the micro-level is crucial in identifying the potential sources of growth in the whole economy.

In particular, the role of human capital in the growth process has not received much attention in the literature. High-skilled labour may be a necessary requirement for the creation and implementation of new technologies and innovations. Investing in the workforce, for example through training, may increase the firm's capability to expand its operations. New knowledge on these relationships helps in understanding the role of human capital structure and investments in the post-entry performance of establishments.

This study takes advantage of very rich micro-data from a nationally representative panel survey of British workplaces and their employees covering the period 1998-2004. We use it to explore the impact of workplace characteristics on establishment-level employment growth. The study tests insights from industrial economics relating to influences on employment growth. In particular, we examine the influences of establishment size, age, technology, and human capital investments. We test the sensitivity of our employment growth findings to selection effects arising from differential probabilities of workplace survival.

We conduct separate analyses for single establishment firms and those belonging to a larger organisation. We are also able to identify the impact of takeovers (agreed and opposed), workplace amalgamations and splits, and management buyouts. By controlling for such changes we are better able to estimate factors associated with internal growth, as opposed to changes in growth attributable to firm structural change.

Findings are broadly supportive of Gibrat's Law in that there is little correlation between initial size or lagged growth on subsequent growth, even when one has accounted for the effects of size on survival. Younger workplaces are less likely to survive than older workplaces and, once this is accounted for in the selection modelling, younger workplaces have higher growth rates. There is some evidence that sunk costs increase survival probabilities, but no evidence of effects on employment growth. Workforce composition has some influence over both workplace survival and growth, whereas direct measures of human capital investments are associated with workplace survival but not workplace growth. Findings differ for single independent establishments and those belonging to multi-site firms. Single-site firms have higher survival probabilities and lower internal employment growth than their multi-site firm counterparts. Furthermore, age is not associated with growth or survival in establishments belonging to multi-site firms.

The paper is structured as follows. The second section reviews the existing theory and empirical literature on growth. The third section introduces the data and econometric framework. The empirical analysis and the results are presented in the fourth section. Finally, the concluding section discusses the policy implications of the findings.

2. Theory and evidence on factors affecting employment growth

This section outlines the theoretical literature and empirical evidence on firm growth and the effects of size, age, sunk costs and human capital. There are excellent surveys on the recent literature (e.g. Santarelli and Vivarelli, 2007; Caves, 1998) covering a wider range of studies on firm formation, growth and survival.

2.1. Firm size and growth

According to Gibrat's (1931) Law of Proportionate Effect the growth rate of a firm is independent of its current size and its past growth history. Growth should be independent of initial size and there should be no serial correlation in growth rates. Empirical evidence has challenged these suppositions. First, it appears that growth rates of new and small firms are negatively related to their initial size, with smaller firms at the outset growing more rapidly than larger ones (for the UK see Dunne and Hughes, 1994). However, Gibrat's Law appears to hold for the UK in all but the smallest companies (Hart and Oulton, 1996). Second, there is serial correlation in patterns of growth. Geroski *et al.* (1997) for Britain find positive effects of lagged growth, but patterns differ across studies (Caves, 1998: 1949-1950). In the long run, firm size is found to follow a random walk (Geroski *et al.*, 2003).

Sample selection arising from increased exit probabilities amongst small establishments having slow or negative growth may overstate the growth rate of smaller units. Hart and Oulton (1996: 1250) readily admit that their results may be biased because they relate only to surviving companies. However, studies that seek to adjust for sample selection also seem to support Gibrat's Law. A study concentrating on trade union effects for Britain in the 1990s found a negative correlation between size and growth (Bryson, 2004). But, once account was taken of the large positive impact of size on survival, size had a positive but statistically non-significant impact on growth. This suggests that the primary impact of size is to enhance survival chances: accounting for the selection effect associated with lower survival rates among slower growing small establishments renders the size effect on growth statistically non-significant. Similarly, Lotti et al. (2007) found that after market selection, including a period of 'shakeout' in the Italian radio, TV and communication equipment industry, the resulting industrial "core" did not depart from a Gibrat-like pattern of growth. This leads them to conclude that Gibrat's law can be seen as a long-run regularity after market selection (and learning) have fully played their roles.

Changes in ownership structure or links to foreign firms may have a profound effect on the growth prospects of an individual establishment. In most of the literature, the assumption is that Gibrat's Law relates to internal growth but, as Kumar (1985: 329) notes, 'the overall growth of firms consists of internal growth (due to new investment) and acquisition growth'. Blonigen and Tomlin (2001) study the size-growth relationship for foreign-owned affiliate plants in the United States. Their results strongly reject Gibrat's Law for Japanese manufacturing affiliates.

2.2. Firm age effects

In Jovanovic's life-cycle model (1982) firms are uncertain about their own capabilities before starting a business, but they learn about their relative efficiency – which is treated as a fixed permanent characteristic - over time through natural selection. This 'passive learning' process implies a negative relationship between establishment age and growth, and a positive relationship between age and survival. The reason is that as the firm ages it becomes more confident about its costs, adjusting its growth accordingly, which results in a decline in the mean and variance of the firm's growth rate. Jovanovic's model implies Gibrat's law holds for mature firms. Pakes and Ericson (1995) posit an active learning model wherein firm performance is driven by firm-specific active learning and investments in R&D and innovation activities. The model predicts that, over time, any association between the firm's initial size and current size disappears.

There is empirical confirmation of Jovanovic's supposition that growth diminishes with size at a decreasing rate, and decreases with age holding firm size constant (Evans, 1997b), though not in the largest firms (Dunne et al., 1989). What little is known for Britain comes from a study that did not focus on this relationship: it suggests non-linear effects of age on growth (Bryson, 2004). Although it is often assumed that the negative correlation between ageing and growth is associated with 'geriatric effects' arising from firms' reduced propensity to invest in new technologies and new techniques, due to data constraints there is limited empirical research in this area. One exception is Salvanes and Tveteras (2004) who show that vintage capital effects increase plant closure probabilities in Norwegian manufacturing.

2.3. The role of sunk costs

Cabral (1995) argues that, because capacity and technology choices involve some 'sunkness', or non-recoverable component, small entrants – because they face higher exit probabilities than their larger counterparts – will invest more gradually initially, only raising investment subsequently. This, he argues, induces negative dependence between size and expected growth, even controlling for sample selection. Cabral's model has been extended to include investments in human capital that involve some degree of 'sunkness' (Nurmi, 2004a).

Doms, Dunne and Roberts (1995) find "increases in the capital intensity of the input mix and increases in the use of advanced manufacturing technologies are negatively correlated with plant exits and positively correlated with plant growth". During the 1980s, the adoption of new microelectronic technologies in British workplaces was negatively correlated with employment growth but the correlation was positive having controlled for workplace characteristics (Blanchflower et al., 1991; Machin and Wadhwani, 1991). Blanchflower and Burgess (1995) found similar results using the 1990 Workplace Industrial Relations Survey (WIRS) cross-section. Van Reenen (1997) using British firm-level panel data confirms these findings having accounted for fixed effects and the endogeneity of technology and employment choice. However, none of the British studies focus on the relationship between technological choices and size.

According to Cabral (1995: 168), R&D intensity can also be seen as a proxy for the degree of 'sunkness' of investment costs. Walsh (2000) studies the role of sunk costs in explaining the growth and failure patterns in Irish manufacturing. Walsh finds that Gibrat's Law holds for small businesses that operate in endogenous sunk cost sectors (advertising and R&D) but fails in exogenous sunk cost sectors (homogeneous goods). Yasuda (2005) and Calvo (2006) also find positive effects of R&D and innovating activity on employment growth in Japan and Spain respectively.

2.4. Human capital effects

It is only recently that analysts have considered the impact of human capital on employment growth. *A priori*, it is not obvious what impact higher human capital will have on employment growth. It may be that employers simply hire labour that is 'fit for purpose', the 'fit' being dependent upon whether the employer seeks to compete at the price or quality margin for his or her chosen product or service. If this is so, one might expect no systematic relationship between the quality of human capital deployed and employment growth. Alternatively, Nurmi (2004a) conceives of two firm types, the first operating in new or innovative markets with less certain growth paths who tend to be reliant on high-skilled labour to learn about their growth potential, and firms operating in standard markets with more certain futures able to rely on less-skilled workers. The model predicts that firms with high-skilled workers grow faster than firms with low-skilled personnel. Romer (1986, 1990) suggests that, regardless of firm type, if investment in human capital improves labour productivity – for instance because tasks are performed more efficiently, or labour is more innovative, or management is of higher calibre – this may translate into a competitive advantage resulting in employment growth. Building on the technological change literature, Andersson et al. (2007) propose a "make versus buy" model of workforce skill adjustment, where choices between providing training to workers and buying required skills are closely related to technology investments and R&D. According to their results, human resource management practices have implications for firm performance, measured by labour productivity.

There is conflicting empirical evidence on the impact of human capital on employment growth but Nurmi (2004b) and Maliranta (2003) for Finland and Persson (2004) for Sweden find positive associations between relative education and growth in manufacturing. In considering the effects of training on growth, Bryan (2006) emphasises that sales would be a preferable measure for growth because training may be provoked by employment growth. Nevertheless, Bryan finds that the relationship between training and growth is weak for a relatively small sample of small firms in Wales.

2.5. Differences between single- and multi-site organisations

There are theoretical reasons to believe that the growth patterns of establishments belonging to single-establishment firms and those belonging to multi-site firms will differ systematically. Within a multi-plant firm, central management will wish to expand those parts of the firm that are profitable and close down unprofitable parts. Single-establishment firms, on the other hand, may put up with poor profitability for longer because, for them, plant closure is synonymous with firm closure (Williamson, 1970). Multi-plant firms have lower exit sunk costs due to their ability to dispose of physical assets and human resources, though this factor becomes less important as plant size increases. Plants belonging to a larger firm may also have easier access to external financing, which may have a positive effect on their growth. In fact, growth patterns appear to differ only in small ways between single-establishment firms and multi-establishment firms (Caves, 1998: 1957). However, there are empirical studies (e.g., Dunne et al. 1989 and Persson 2004) finding that firms belonging to a multi-site organisation have higher growth rates than single establishments.

3. Data and econometric framework

3.1. Data

Our data are the 1998-2004 Workplace Employment Relations Panel Survey. The level of observation is the workplace, namely a place of employment at a single address or site. The Panel follows up on the 1998 Workplace Employment Relations Survey which is a stratified random sample of workplaces in Britain with at least 10 employees. The 2004 Panel has two components. The first is a single interview conducted with the senior manager responsible for employment relations on a day-to-day basis. These interviews were conducted at a random sub-sample of the workplaces that had participated in the 1998 survey, had continued to be in operation throughout the intervening six-year period, and employed at least 10 employees at the time of the 2004 interview. In total 938 interviews were conducted, a response rate of 75 percent. In addition, the remaining establishments from the 1998 survey that were not selected for a Panel interview were screened by telephone to establish whether they were still in existence and to establish the current level of employment at their workplace. Of the 1,506 private sector workplaces in the 1998 survey, 1,262 were still in existence in 2004, 240 had closed down and 4 were unaccounted for.[1] Since we are interested in the effects of market conditions on employment growth our analyses are confined to those workplaces in the private trading sector. This leaves us with a sample of 1,060 surviving trading sector workplaces. However, 2004 employment data were only available for 813 of these workplaces. The remaining 247 are therefore missing from the employment growth equations. We tackle this missing data problem in the estimation as discussed below.

Our first dependent variable is workplace employment growth between 1998 and 2004. The data are derived from an identical question asked in both years: "Currently how many employees do you have on the payroll at this establishment?" Some analysts have followed Davis and Haltiwanger (1992) in using an employment growth measure based on the change in employment as a percentage of the average of employment in two periods – in our case, 1998 and 2004 thus:

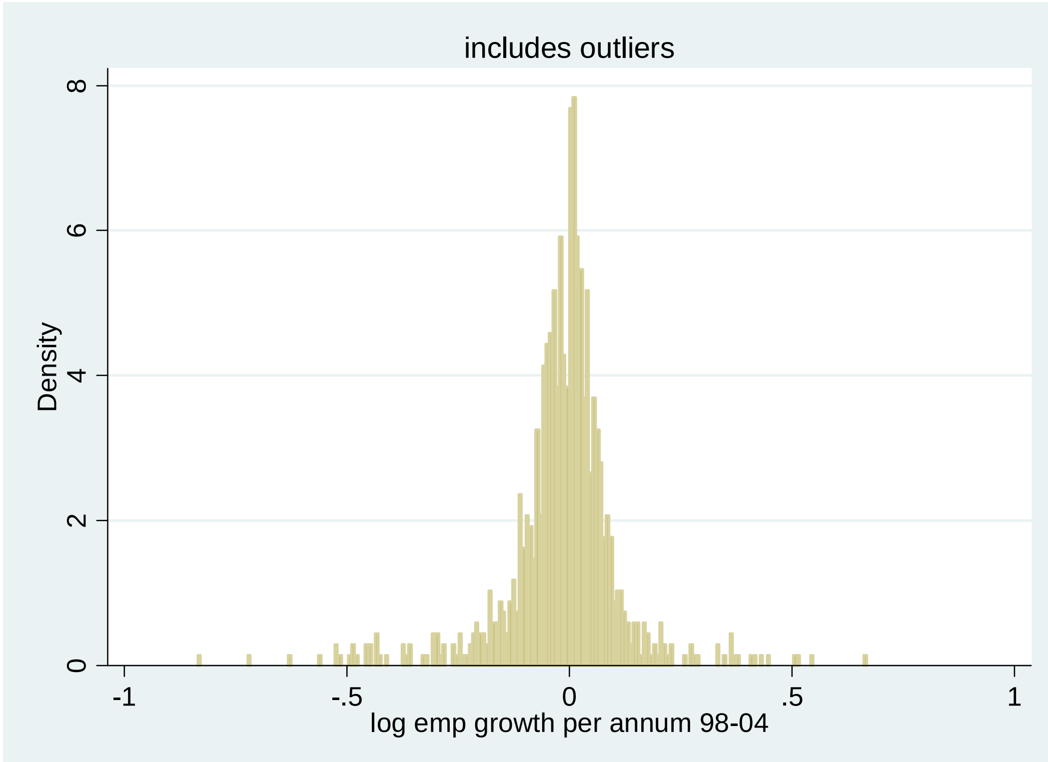
$$\frac{(E_{04} - E_{98})}{(E_{04} + E_{98})/2} \times 100$$

However, although this measure is superior to the conventional growth measure (change in employment as a percentage of employment in the first period) in that it is more normally distributed, it does not give an accurate per annum rate of growth. We therefore use an alternative measure:

$$\frac{(\log(E_{04} / E_{98}))}{6.3}$$

This gives the log employment growth rate per annum, where 6.3 is the median number of years between both interview points. The graph below shows the distribution of the variable. In analyses we exclude outliers in the top and bottom percentile of the distribution.

[1] Eight cases identified as private sector workplaces in WERS98 were dropped from the analyses because subsequent checks by the WERS research team revealed that they were not workplaces.



Our second dependent variable is a (0,1) dummy identifying whether the workplace survived over the period. Unlike many analyses, our data permit us to distinguish workplace closure from relocations, name changes, mergers, splits, takeovers and other forms of ownership change. Information on workplace outcomes in 2004 comes from survey interviewers' contacts with workplaces as part of the second wave of the panel. The outcome codes provide the information to identify workplace closure (Chaplin *et al*, 2005). Workplace closure is defined as the complete cessation of the activities of a workplace with the termination of all contracts of employment. The transfer of employment to a new site or to another workplace in the same organization is not included in this definition, nor is a simple change of ownership such as a take-over.

Descriptions of the co-variates used as independent variables in the analysis and their mean values are presented in Appendix Table A1. All variables used in estimation were measured at the time of the 1998 survey or earlier thus preserving a gap in time between independent covariate measurement and employment and survival outcomes. Our discussion is confined to those variables that are the focus of the paper.

Size: In addition to the continuous workplace size data obtained in 1998 and 2004, respondents provided retrospective data on employment levels in the year prior to the 1998 survey. We use these data to construct the log change in employment in the year prior to the 1998 survey, thus permitting us to test for serial correlation in patterns of growth. We incorporate a missing dummy where this retrospective information is absent and set these cases to zero on employment change in 1998-1997. A dummy variable identifies whether there had been "any reductions in the number of employees in any section or sections of the workforce" in the year prior to the 1998 survey. Another dummy variable identifies whether the workplace is a stand-alone independent establishment or part of a larger organization. Firm size, as opposed to workplace size, is captured four dummy variables plus a further dummy capturing those workplaces where these data are missing. Because larger firms are invariably multi-site firm size is entered as an alternative to workplace size and the stand-alone identifier.

Age: The age of the workplace is the number of years it has been operating at its current and any previous address. Dummy variables identify workplaces aged under 5 years, 5-9 years and 10 or more years, with a further dummy capturing those workplaces where the data are missing.[2]

Sunk costs: In addition to the training measures discussed below which might themselves be viewed as proxies for sunk costs, we use four measures. The first is the use of email by management to communicate with staff which we consider to be a rather imperfect measure of sunk investments in technology. The second is achieving the Investors in People Award which is awarded in recognition of an employer's achievement of training and development good practice. The third is the attainment of the quality standards BS5750 or ISO9000. Finally, to help capture investments in technological and organizational change we use information on the changes managers said had been introduced at the workplace in the previous five years.[3] They were shown a card where the following changes were listed:

1. Changes in payment systems
2. Introduction of new technology
3. Changes in working time arrangements
4. Changes in the organisation of work

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[2] Some of these missing cases arise due to a routing error in the questionnaire.
[3] This question was only asked of workplaces aged 5 or more years.

5. Changes in work techniques or procedures
6. Introduction of initiatives to involve employees
7. Introduction of new product or service.

Human capital: We use a variety of information to proxy workplace human capital. The first is the occupational and gender shares in workplace employment collected on a workforce data sheet. The data identify the largest non-managerial occupational group at the workplace, the percentage of employees who are managers and professionals, the percentage of employees who are female, and the age composition of the workforce. Another aspect of human capital is captured in mangers' responses to the question: "About how long does it normally take before new [employee in the largest occupational group] are able to do their job as well as more experienced employees already working here?" A third aspect of human capital is the proportion of experienced employees in the largest occupation undertaking off-the-job training in the last 12 months and the duration of that training. Our measures simply identify whether the workplace is above or below the median on these two training dimensions for workplaces with the same largest occupation.

Structural change: We can identify the impact of takeovers (agreed and opposed), workplace amalgamations and splits, and management buyouts. By controlling for such changes we are also better able to estimate factors associated with internal growth. Managers were asked whether there had been any change in the controlling ownership of the workplace in the previous five years and, if so whether this had entailed

1. An agreed takeover / merger
2. A takeover / merger formally opposed
3. Sold by parent organisation
4. Ex-public sector, now privatised / denationalised
5. Management buyout
6. Buy-out by employees generally.

We use this information to establish the degree to which growth is associated with ownership change rather than internal growth.

In addition to standard controls for region and industry, our baseline models include a range of data items capturing the nature of the product market or service that the workplace provides, and the state of market competition for their goods and services. We also control for the financial performance of the workplace in 1998 relative to the industry average as perceived by the workplace manager, thus helping to account for workplaces that might have already been in trouble at the beginning of the panel. We include the type of measure the workplace uses to assess its performance (profit, value added, sales etc.), thus soaking up some workplace heterogeneity that might otherwise be unaccounted for.

Workplace employment growth and survival probabilities are partly determined by the industry in which they are located. We are interested in industry dynamics in its own right and because they account for some of the variance in workplace fortunes which might not otherwise be accounted for. We match in time-varying industry-level data at 2-digit SIC level from two sources. The first is the EUKLEMS database (version March 2007) which is part of a research project, financed by the European Commission, to analyse productivity in the European Union at the industry level. The data are available for 71 2-digit industries for each year over the period 1970-2004 (Timmer et al., 2007). We matched these data to the WERS workplace data using industry codes for the 53 industries common to the two datasets.[4] The data item that appears in this paper is changes in capital compensation, defined as the difference between gross value added and labour costs. We derive five variables measuring changes in capital compensation for the periods 1996-1990, 1989-1984, 1983-1977 and 1976-1970. The variables are constructed as differences in the log levels. So, for example, change in capital compensation for the period 1996-1990 is computed as: log(cap95+cap96)-log(cap90+cap91) to smooth short run changes. The second industry-level data set we use is OECD's STructual ANalaysis (STAN) Database which includes industry-level information that allows us to calculate labour productivity (value added/employment), export and import ratios to gross output, and capital intensity for the period since 1992 for 58 2-digit industries. OECD's ANalytical Business Enterprise Research and Development Database (ANBERD) also allows us to calculate R&D intensity, defined as R&D expenditures on industrial R&D activities carried out in the business enterprise sector.

3.2. Econometric framework

Correlates of the employment growth measure described above are estimated using regression models that account for the complex survey design allowing results to be generalised to the workplace population from which the sample was drawn. Models are run on data weighted by the inverse of the workplace's sampling probability. As well as allowing the results to be generalised to the population from which the sample is drawn, the use of probability weights also guards against estimation bias which can arise through differential sample selection probabilities.[5] We employ the Huber-White robust variance estimator that produces consistent standard errors in the presence of heteroscedasticity.

All control variables relate to 1998, with the exception of employment change and some performance measures which cover 1997-98 and the lagged industry-level variables derived from EUKLEMS and STAN. The equation can be written as follows:

$$G_{i9804} = X'_{i98}\beta + G_{i9798} + \varepsilon_i$$

where G_{i9804} denotes employment growth per annum at workplace i in the period 1998-2004. X'_{i98} is a vector of observable attributes affecting employment adjustment at the workplace, measured in 1998 (including some performance measures covering the period 1997-98) with β a vector of coefficients to be estimated. G_{i9798} is a lagged dependent variable for employment growth over the period 1997-98. Finally, ε is the error term. The rationale for the variables chosen has been outlined above.

Any negative relationship between firm size and growth may simply be a function of sample selection bias arising because small establishments with lower employment growth rates are more likely to disappear from the sample than larger establishments with similar growth rates. Similarly, young workplaces with lower growth rates may have a higher probability of closure than larger workplaces with similar growth rates. To overcome any downward bias in the estimated relationship between size (age) and growth this may induce we adopt the approach undertaken in recent research whereby results from the employment

[4] WERS does not cover industries like Forestries, Fishing, Mining and Minerals Extraction.

[5] Differential sampling fractions can result in standard estimator biases (Skinner, 1997). The weights account for all variation in sampling probabilities, thus eliminating differential sampling probability as a possible source of estimation bias.

equation are adjusted by selection equation estimating probability of survival using a probit model. We estimate the survival equation and growth equation jointly by maximum likelihood weighted by the sampling probability. This estimation can be understood as if the survival equation generates a selection term based on the likelihood of each 1998 workplace surviving through to 2004. This selection term is then carried forward into the employment change equation over the period 1998-2004. These final results relating to employment change are 'selection adjusted' since the procedure eliminates any bias in the estimates caused by tendencies for unmeasured characteristics which influence workplace survival to be correlated with unmeasured characteristics which influence employment growth (Heckman, 1979).

We run models which rely on functional form to identify the equations, and we have estimated as robustness checks variants that use lagged change in industry-level capital compensation as instruments. We argue that these capital compensation variables capture dynamic change in industry-level capital formation which implies shifts in the barriers to firm entry into the industry. In turn, this affects the propensity of employers to keep workplaces open since firms take account of the opportunity costs of keeping old plants open relative to opening new plants: periods of growth (reduction) in capital compensation imply higher (lower) entry barriers and thus an increased (reduced) likelihood that firms will prolong the life of existing plants rather than set up new plants. There is no logical reason for the inclusion of industry-level lagged changes in capital formation when seeking to explain employment growth *conditional* on survival. The four variables capturing lagged industry-level capital compensation are jointly statistically significant for survival if entered alone or alongside other controls. It is not possible to test the validity of these exclusion restrictions. However, two points are worth noting. First, the measures of lagged capital compensation were jointly non-significant in the employment equations. Second, the selection models identified on functional form performed in a similar way to the models with the instruments included, suggesting that their inclusion made little difference to the selection modelling. We therefore present the models identified on functional form.

There is statistical support for the selection adjustment in the models identified on functional form. The RHO indicating the correlation in the error terms in the two equations is highly significant (and the Wald test of independence in the two equations is also highly significant), as is the LAMBDA summarising the estimated magnitude of the unmeasured influences on growth.[6] There is also an economic interpretation to the selection model. The rho capturing correlations between unobservables in the survival and growth equations is negative and highly statistically significant. Thus, for example, if older workplaces are more likely to survive but are less inclined to grow (RHO < 0) than younger workplaces then estimating the impact of workplace age on the selected ('low-growth') sample leads to a downward (upward) bias in the growth rates of younger (older) workplaces. This point also applies to larger versus smaller workplaces.

Our models are predictive in the sense that they use information collected in 1998 or earlier to predict workplace employment growth subsequently. It is therefore reasonable to make causal inferences about the variance in growth rates using these 1998 predictors. Of course, those 1998 measures may themselves be a function of the trajectory in workplace performance at the time of the initial survey. If so these baseline characteristics are not independent of growth trajectories. We cannot wholly account for this potential endogeneity. However, we maintain that our efforts to control for unobserved heterogeneity, coupled with our use of performance indicators in 1998, help tackle this issue.

There is a further problem that arises with our data which we mentioned earlier, namely the absence of employment data in 2004 for 248 of our surviving workplaces. There are a number of ways one might tackle this potentially non-random missing data problem. We have chosen to fit tobit models, treating these cases as left-censored observations, to see how their inclusion in our estimation affects results. The assumption is that, in the absence of these cases, we only observe a portion of the underlying distribution in employment growth. The tobit model fits the remainder of this distribution, thus accounting for the missing employment data. We also seek to account for these missing observations in the Heckman selection model by treating these cases as non-survivors.

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[6] See footnotes 3 and 4 to Appendix Table A2
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Analysis of growth

4.1: Size of workplace

Neither the size of the workplace in 1998 (number of employees and its squared term), nor the firm structure (captured with the single-establishment dummy) are correlated with workplace employment growth over the period 1998-2004 (Table 1). Nor are lagged employment growth and reductions in sections of the workforce in the period 1997/98. The addition of controls makes little difference. The picture is a little different when one accounts for missing employment data among surviving workplaces using tobit estimation. In these models employment growth in the period 1998/97 is positively correlated with subsequent employment growth indicating serial correlation which runs counter to Gibrat's Law. The Heckman selection models point to the importance of accounting for size effects on survival. Although establishment size *per se* has little direct impact on survival, single-establishment firms have higher survival probabilities than establishments belonging to multi-site firms. Nevertheless, having adjusted for observable and unobservable factors associated with workplace survival, workplace size remains statistically non-significant. Lagged growth is also statistically non-significant. Reductions in workforce size in the period 1998/97 emerge as significantly positively correlated with subsequent employment growth suggesting that, once one accounts for the correlation between such reductions and the potential for workplace closure, workforce reorganizations often precede periods of growth.[7]

We investigated the size effects further by replacing the continuous linear and squared terms for number of employees in 1998 with dummy variables in the Heckman selection models. This revealed a clear non-linearity in survival probabilities: relative to workplaces with 10-24 employees, those with 25-49 employees had significantly lower survival probabilities (-.51, t=2.44) whereas those with 50-99 employees had significantly higher survival probabilities (.75, t=2.48). However, having corrected for survival

[7] Including lagged capital compensation as exclusion restrictions to the survival equations strengthens this result relating to reductions in sections of the workforce: with these exclusion restrictions this variable is significantly negatively correlated with survival but significantly positively correlated with growth. Other results relating to size are unaffected.

probabilities these employment size dummies remained statistically non-significant in the growth equation.[8]

Table 1: Size of Workplace and Employment Growth

	OLS	*tobit*	*OLS*	*tobit*	*Heckman (1)*		*Heckman (2)*	
Controls?	*No*	*No*	*Yes*	*Yes*	*Yes, Emp growth*	*Yes, survival*	*Yes, Emp growth*	*Yes, survival*
Single-establishment firm	-0.003	0.122	-0.009	0.072	-0.020	0.419	-0.024	0.400
	(0.18)	(1.86)	(0.68)	(1.21)	(1.40)	(2.16)*	(1.59)	(2.41)*
Log N employees in 1998	0.004	0.184	-0.005	0.176	0.011	-0.288	0.007	-0.020
	(0.10)	(1.09)	(0.19)	(1.40)	(0.38)	(0.51)	(0.24)	(0.05)
Log N employees in 1998 squared	-0.002	-0.021	-0.000	-0.023	-0.002	0.056	-0.001	0.010
	(0.37)	(1.10)	(0.08)	(1.60)	(0.67)	(0.90)	(0.42)	(0.24)
log difference in employment between 1998 and 1997	-0.020	0.160	0.000	0.224	0.006	-0.384	-0.009	0.119
	(1.40)	(1.97)*	(0.01)	(2.97)**	(0.41)	(1.63)	(0.62)	(0.56)
Log difference in employment missing	-0.020	0.052	0.016	0.126	0.040	-0.630	0.030	-0.001
	(0.68)	(0.32)	(0.48)	(0.96)	(1.11)	(1.42)	(0.86)	(0.00)
Reductions in workforce in section(s) of workforce in 1997	-0.007	-0.044	0.018	-0.033	0.025	-0.273	0.024	-0.221
	(0.40)	(0.59)	(1.51)	(0.61)	(2.01)*	(1.45)	(1.89)	(1.53)
R-squared /pseudo R-squared	0.01		0.35			0.32		0.21
Prob>F		0.03		0.0000	0.0000		0.0000	

Notes:
(1) Full models are appended in Appendix Table A2.
(2) T-statistics are in parentheses. * denotes statistical significance at a 95% confidence level. ** denotes significance at a 99% confidence level.
(3) With and without controls OLS N=797, tobit N=1061 (248 censored).
(4) Heckman (1) N=989, 193 censored, 796 uncensored. Rho -.75 se=.16; sigma=.09 se=.01 lambda=-.069 se=.02. Wald test of indep. eqns. (rho = 0): chi2(1) = 7.15 Prob > chi2 = 0.0075
(5) Heckman (2) N=1237, 441 censored, 796 uncensored. Rho -.83 se=.08; sigma .10 se=.01 lambda -.083 se=.014. Wald test of indep. eqns. (rho = 0): chi2(1) = 19.92 Prob > chi2 = 0.0000. Note that Heckman (2) differs from Heckman (1) in that it treats surviving workplaces with missing employment data as non-survivors (ie. SURVIVE=0) whereas, in Heckman (1) these cases are absent from the analysis.

These results are broadly supportive of Gibrat's Law in that there is little correlation between initial workplace size or lagged growth on subsequent growth, even when one has accounted for the effects of size on survival. In checking the robustness of these results we considered three further issues: first, whether any link between size and growth was obscured by changes in ownership structure, secondly whether the relationship differed systematically across single-establishment and multiple-establishment firms, and thirdly

[8] These analyses are not presented but they are available on request.

whether size effects differed if one replaces workplace size and the single-establishment dummy variable with dummy variables for firm size.

Our baseline models contain a single ownership change variable, namely whether the workplace had been sold by its parent company in the five years prior to 1998. Being sold was strongly negatively correlated with employment growth, an effect which grew in magnitude a little having accounted for its positive correlation with workplace survival (see Appendix Table A2). In an alternative model specification we introduced five other dummy variables capturing ownership change relating to privatisation, a takeover or merger/acquisition, management buyout, a change in shareholders or partners, and a catch-all 'other' ownership change. Only the 'other' ownership change category was significant: it was correlated with higher growth. Their inclusion did not affect the impact of being sold. Nor did their inclusion affect the results relating to size. Next we decided to remove all workplaces that had been subject to one of these ownership changes to get a 'clean' estimate of workplaces' internal growth. This sample selection resulted in the removal of one-fifth of the sample (256 workplaces). With this exclusion single establishment firms had significantly lower employment growth than those belonging to multiple establishment firms (-0.024, t=1.85). This effect strengthened having accounted for survival probabilities (-.035, t=2.52). Thus it appears that being a single establishment firm was associated with lower *internal* employment growth.[9]

Separate regressions were run for the 228 single independent establishments and the 569 establishments belonging to a multi-site firm. The smaller samples meant that we had to reduce the number of covariates we controlled for in the models. The shape of size effects differed for single independent establishments and those belonging to larger organizations: among single- establishment firms size in 1998 had an inverted-u relationship with growth whereas, among those belonging to larger organizations the relationship was u-shaped. However, in both cases the relationships were not statistically significant. The other difference to emerge related to the effects of reductions in sections of the workforce in 1998/97: their positive effect on subsequent growth noted above was confined to singles and was only apparent having accounted for the fact that it was also correlated with lower survival probabilities.

[9] This growth could have been affected by ownership change subsequent to 1998, something we do not consider here.

Finally, we reran the models presented in Table 1 but replaced the log of workplace size, its squared term, and the single-establishment dummy with dummy variables for firm size. Workplaces located in large firms were less likely to survive than those in small firms but, conditional on survival, they had faster growth rates.[10]

4.2: Age of workplace

The age of establishment in 1998 was not correlated with employment growth over the period 1998-2004, either in isolation or once controls are added, and whether one accounts for the missing employment data among surviving workplaces or not (Table 2). However, younger workplaces were less likely to survive than older workplaces and, once this is accounted for in the selection modelling, workplaces aged under 5 years had higher growth rates than workplaces aged 10 or more years. This is consistent with Jovanovich's life-cycle model of passive learning.

Table 2: Age of Workplace and Employment Growth

	OLS	*tobit*	*OLS*	*tobit*	*Heckman (1)*		*Heckman (2)*	
Controls?	*No*	*No*	*Yes*	*Yes*	*Yes, Emp growth*	*Yes, survival*	*Yes, Emp growth*	*Yes, survival*
Age of establishment (ref: 10+ years)								
< 5 years	0.032	-0.165	0.034	-0.039	0.044	-0.440	0.050	-0.342
	(1.28)	(1.18)	(1.80)	(0.37)	(2.25)*	(1.70)	(2.41)*	(1.48)
5-9 years	0.022	-0.062	-0.010	-0.046	0.001	-0.386	0.004	-0.317
	(1.18)	(0.68)	(0.64)	(0.67)	(0.05)	(1.86)	(0.23)	(1.89)
Don't' know age	0.003	0.107	0.003	0.185	0.001	0.013	-0.009	0.209
	(0.12)	(1.42)	(0.14)	(1.82)	(0.06)	(0.04)	(0.41)	(0.69)
R-squared /pseudo R-squared	0.01		0.35			0.32		0.21
Prob>F		0.2159		0.0000	0.0000		0.0000	

Notes:
(1) See notes (1)-(5) in Table 1.

The inclusion of a broader array of ownership change measures does not alter the results presented in Table 2 very much, although it does strengthen the negative relationship between being a young workplace and surviving. However, the exclusion of workplaces that had experienced some type of ownership change in the 5 years prior to 1998 results in a much stronger association between very young workplaces and faster employment growth.

[10] Relative to the reference category of under 100 employees, workplaces in firms with between 1,000 and 10,000 employees grew by 4.3 percent per annum more quickly (t=2.20) and those with 10,000 or mor3e

If workplace age is entered alone those workplaces aged under 5 years had an 'internal' growth rate of 6 percent per annum more than those workplaces aged 10 years or more (0.062, t=2.35). This effect is robust to the inclusion of controls and to adjustment for sample selection (0.055, t=2.43 and 0.059, t=2.59 respectively).

The relationship between workplace age and employment growth differed across single-site firms and those belonging to larger organizations. Among single-site firms younger workplaces grew faster than older ones: workplaces aged under 5 years grew 7 percent per annum more quickly than workplaces aged 10 years or more while those aged 5-9 years grew 5 percent per annum more quickly. The effect was more pronounced having accounted for selection due to workplace survival because the youngest workplaces had lower survival probabilities.[11] Age was not associated with either growth or survival in establishments belonging to larger firms. These results make sense because, in the case of single-site firms, the age of the workplace is synonymous with the age of the firm so this is where one might expect theories regarding firm age and growth to be most apparent. This is not the case, of course, among workplaces belonging to larger firms.

4.3: Sunk Costs

The literature discussed in Section 2.3 suggests that sunk costs should be positively associated with workplace survival because they raise the costs of new firm entry and, in the case of existing firms, raise the costs of creating new plants relative to maintaining existing ones. The predictions regarding employment growth are more ambiguous, and may imply lower growth initially but potentially faster growth in the longer run.

The three dummy variables proxying sunk costs – Investors in People, attaining quality standards and the use of email – are not significantly associated with employment growth (although Investors in People is negatively associated with growth in the tobit model which seeks to account for surviving workplaces with missing employment data). However, contrary to expectations, Investors in People status is negatively correlated with workplace survival (see Appendix Table A2).

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employees grew 4.8 percent per annum more quickly (t=2.33).

[11] Among single independent workplaces, compared to workplaces aged 10 or more years, those aged under 5 years had a significantly lower probability of survival (-1.44, t=3.33). Having accounted for selection on survival these younger workplaces grew at a rate of 13 percent per annum faster than those aged 10 or more years (0.128, t=2.26). Full results are available on request.

Changes to technology and work organization might also be viewed as sunk investments employers make in capital and labour. The seven dummy variables capturing these changes in the five years prior to 1998 were added to the baseline model.[12] With the exception of changes in payment systems which were weakly associated with higher growth none of these changes were associated with employment growth.[13] Changes in working time arrangements and changes in work techniques/procedures were associated with lower survival probabilities. The number of changes made was not associated with growth, although there was some evidence that making any changes as opposed to none was associated with lower survival probabilities.

Together these findings offer little support for the proposition that sunk costs increase survival probabilities or affect employment growth. However, this is not quite the end of the story. First, changes in technology and work organization are associated with survival in single-establishment firms. The introduction of new technology is positively associated with survival, as predicted under Cabral's model, as are changes in work techniques/procedures. Changes in pay systems and working time, on the other hand, were associated with lower survival probabilities. Changes were not significant for the survival of workplaces belonging to larger organizations. Second, in the absence of workplace-level information on R&D investments, we use industry-level STAN data for the period 1992-1996.[14] We introduced the log of growth in industry-level R&D expenditure over the period 1995/6-1992/3 and levels of industry R&D in 1992. R&D growth was positively associated with workplace survival but neither R&D growth nor R&D levels were associated with workplace employment growth. There is therefore some limited evidence to suggest that sunk costs increase survival probabilities, but no evidence of effects on employment growth.

4.4: Human Capital

The relationship between human capital and employment growth is presented in Table 3. Employment growth rose and then fell in an inverted-U shape with the percentage of

[12] Because the question was only asked of workplaces aged 5 or more years younger workplaces drop out of the analysis.

[13] 0.019 (t=1.79) in the OLS, and 0.019 (t=1.73) in the Heckman selection model.

[14] Our measure of R&D intensity is (r&d/industry employment) where r&d is expenditures on industrial R&D activities carried out in the business enterprise sector, regardless of the origin of funding, in GBP millions. Unfortunately these data are not available for a number of industries so our analyses with these data are run on

Managers/Professionals at the workplace, a finding which became stronger having accounted for sample selection.[15] Having accounted for the percentage of workers in the top two occupations, the nature of the largest occupational group at the workplace was not strongly correlated with growth. When entered alongside other human capital proxies, but without other controls, these dummies were only jointly statistically significant in the tobit model which sought to account for missing employment data. Having accounted for sample selection in the Heckman models growth was strongest where the largest non-managerial occupational group was Professionals.

Previous research using the same data set found a positive relationship between training and workplace survival (Collier, Green and Kim, 2007), confirming earlier research for Britain (Collier, Green and Peirson, 2005). In our estimates survival probabilities rose with the incidence of training for the workplace's largest occupational group[16], but the duration of that training was not significant. Furthermore, training had no effect on employment growth.

Having a small percentage of employees who were women was strongly and significantly correlated with lower workplace survival rates but higher employment growth rates. These effects are robust to sample selection.

The time that a worker takes to become competent in her job, which we treat as a measure of human capital investment, was not significant for employment growth. However, lower investments of this sort were negatively associated with workplace survival.

These findings were confirmed in analyses of 'internal growth' which removed workplaces subject to ownership change in the five years prior to 1998. Taken together, these findings suggest that workforce composition had some influence over both workplace survival and growth, whereas direct measures of human capital investments were associated with workplace survival but not workplace growth.

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smaller samples. N=552 for the survival models and N=359 for the growth models. Collinearity problems meant dropping single digit industry and the measures of financial performance used in 1998.

[15] Separate analyses for single independent establishments and those belonging to multiple-establishment organizations indicated that this inverted-U shape was confined to multis.

[16] Further analyses suggested that this association was confined to workplaces belonging to multiple-establishment organizations.

Table 3: Human Capital and Employment Growth

	OLS	Tobit	Heckman (1)		Heckman (2)	
Controls?	Yes	Yes	Yes, emp growth	Yes, survival	Yes, emp growth	Yes, survival
Largest occupational group (ref.: operative and assembly workers)						
Professionals	0.057	0.117	0.056	0.143	0.063	-0.233
	(1.60)	(0.70)	(1.51)	(0.24)	(1.60)	(0.50)
Technical/scientific	-0.000	-0.055	0.012	-0.398	0.026	-0.513
	(0.00)	(0.53)	(0.37)	(1.14)	(0.82)	(1.77)
Clerical/secetarial	-0.015	0.201	-0.005	-0.220	-0.013	0.070
	(0.64)	(2.36)*	(0.21)	(0.68)	(0.54)	(0.26)
Craft/skilled manual	-0.023	0.026	-0.015	-0.269	-0.011	-0.249
	(1.41)	(0.34)	(0.82)	(1.11)	(0.55)	(1.12)
Personal service	0.011	0.394	0.001	0.323	-0.030	0.774
	(0.44)	(3.31)**	(0.02)	(0.69)	(0.99)	(2.17)*
Sales	-0.011	0.020	0.002	-0.614	0.004	-0.371
	(0.55)	(0.21)	(0.09)	(1.83)	(0.16)	(1.50)
Routine unskilled manual	-0.005	-0.041	0.006	-0.355	0.009	-0.288
	(0.24)	(0.42)	(0.28)	(1.18)	(0.43)	(1.16)
Don't know LOG	-0.057	0.035	-0.077	0.850	-0.073	0.473
	(1.17)	(0.19)	(1.53)	(1.30)	(1.43)	(0.91)
% managers and professionals	0.002	0.001	0.002	-0.011	0.002	-0.009
	(1.69)	(0.33)	(1.83)	(0.85)	(2.18)*	(0.82)
% managers and professionals squared	-0.000	-0.000	-0.000	0.000	-0.000	0.000
	(1.91)	(0.38)	(1.77)	(0.63)	(1.98)*	(0.74)
<=10% of employees are women	0.040	0.022	0.064	-0.813	0.070	-0.630
	(3.04)**	(0.26)	(4.10)**	(3.25)**	(4.10)**	(2.75)**
Time taken for LOG to do job as well as experienced employees (ref: > month)						
1 week or less	-0.005	0.000	-0.001	-0.019	-0.005	0.282
	(0.20)	(0.00)	(0.05)	(0.07)	(0.19)	(1.18)
> 1 week <= month	-0.002	-0.009	0.006	-0.409	0.009	-0.234
	(0.14)	(0.15)	(0.45)	(2.36)*	(0.61)	(1.49)
Don't know	-0.013	-0.292	-0.007	-0.544	0.018	-0.723
	(0.40)	(1.43)	(0.21)	(1.01)	(0.45)	(1.48)
whether % LOG receiving off job training in last 12 months is below, at or above median for workplaces with same LOG (1=below 2=median 3=above)	0.003	-0.060	-0.002	0.234	0.003	0.055
	(0.62)	(1.77)	(0.27)	(2.25)*	(0.50)	(0.67)
whether duration of training for LOG off job training in last 12 months is below, at or above median for workplaces with same LOG (1=below 2=median 3=above)	-0.006	0.034	-0.006	0.037	-0.007	0.106
	(1.01)	(1.13)	(0.86)	(0.37)	(0.93)	(1.31)
Constant	-0.108	-0.586	-0.118	1.491	-0.108	0.820
	(1.47)	(2.12)*	(1.55)	(1.08)	(1.36)	(0.84)
Observations	813	1061	989	989	1237	1237
R-squared	0.35					

Notes:
(1) See notes (1)-(5) in Table 1.

4. Conclusions

This paper examines factors associated with employment growth in the British private traded sector using workplace panel data for the period 1998-2004. It focuses on the effects of workplace size, age, workplace size, age, technology, R&D and human capital investment and explores the sensitivity of results to survival probabilities. We point to important differences in factors associated with growth in single-site and multi-site firms. We also show that factors associated with employment growth *per se* differ from those that influence internal growth, that is, organic growth from within the workplace as opposed to growth associated with ownership change.

The findings are broadly supportive of Gibrat's Law in that there is little correlation between growth and initial workplace size or lagged growth, even when one has accounted for the effects of size on survival. However, single independent establishments had lower internal employment growth than establishments belonging to multi-site firms, a finding which runs counter to Gibrat's Law. Also, single-establishment firms had higher survival probabilities than establishments belonging to multi-site firms, something we might expect since the former marks the end of the firm whereas the latter does not.

Previous research has not considered the role played by reductions in sections of the workforce which can occur among growing and shrinking workplaces. Reductions in sections of the workforce in the period 1998/97 were positively correlated with subsequent employment growth suggesting that, having accounted for the correlation between workforce reductions and the potential for workplace closure, workforce reorganizations often precede periods of growth. This is consistent with creative job destruction on the part of single-establishment firms.

We also considered the effects of *firm* size, as opposed to establishment size. Workplaces located in large firms were less likely to survive than those in small firms but, conditional on survival, they had faster growth rates. This suggests large firms reallocate labour within and across their establishments, perhaps closing poorer performing workplaces and increasing employment in their surviving workplaces. This is consistent with Disney et al.'s (2003) work which found that UK multi-establishment manufacturers closed down their poorly-performing plants.

Younger workplaces were less likely to survive than older workplaces and, once this was accounted for in the selection modelling, younger workplaces had higher growth rates than older workplaces, *ceteris paribus*. However, the relationship between workplace age and employment growth differed across single-site firms and those belonging to larger organizations. Age was not associated with either growth or survival in establishments belonging to larger firms. These results make sense because, in the case of single-site firms, the age of the workplace is synonymous with the age of the firm so this is where one might expect theories regarding firm age and growth to be most apparent. This is not the case, of course, among workplaces belonging to larger firms.

In addition to the traditional focus on the age and size of employers we considered the role of sunk costs and human capital on employment growth. There is some evidence that sunk costs increase survival probabilities, but no evidence of effects on employment growth. Workforce composition had some influence over both workplace survival and growth, whereas direct measures of human capital investments are associated with workplace survival but not workplace growth. Thus, even if investment in direct investments in human capital can enhance competitiveness as Romer (1986, 1990) suggests it may lead to jobless growth rather than increased employment.

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Appendix Table A1: Unweighted Means, SDs, Min and Max for variables used in the analysis.

Panel A: All trading sector

Variable	Obs	Mean	Std. Dev.	Min	Max
dage1	1257	.0843278	.2779893	0	1
dage2	1257	.1376293	.3446476	0	1
dage3	1257	.7494033	.4335291	0	1
dagedk	1257	.0286396	.1668578	0	1
dsingle	1257	.2505967	.4335291	0	1
lemp98	1257	4.674659	1.243782	2.302585	10.27405
lemp98sq	1257	23.3982	12.17957	5.301898	105.5561
ldif9897	1257	.0330513	.2249189	-1.390595	2.397895
ldifdk	1257	.0453461	.2081448	0	1
dreduct	1257	.389817	.4879027	0	1
dorgsiz1	1257	.2020684	.4017028	0	1
dorgsiz2	1257	.2283214	.4199179	0	1
dorgsiz3	1257	.2545744	.4357951	0	1
dorgsiz4	1257	.2720764	.4452061	0	1
dorgsims	1257	.0429594	.2028464	0	1
dlog1	1257	.0684169	.2525604	0	1
dlog2	1257	.0652347	.2470378	0	1
dlog3	1257	.1272872	.3334271	0	1
dlog4	1257	.1495625	.356784	0	1
dlog5	1257	.0652347	.2470378	0	1
dlog6	1257	.1758154	.3808146	0	1
dlog7	1257	.2084328	.4063495	0	1
dlog8	1257	.1272872	.3334271	0	1
dlogdk	1257	.0127287	.1121459	0	1
pcmanpro	1257	15.87246	17.75861	0	100
pcmanpsq	1257	567.0523	1315.147	0	10000
dwpfem1	1257	.1400159	.3471416	0	1
dstuck1	1257	.0620525	.2413469	0	1
dstuck2	1257	.2315036	.4219613	0	1
dstuckdk	1257	.0151154	.1220604	0	1
trnrank	1257	2.122514	.8847311	1	3
trtimrank	1257	1.920446	.8380124	1	3
demail	1257	.0318218	.1755953	0	1
daward	1257	.300716	.4587519	0	1
dwrkplac	1257	.3818616	.4860363	0	1
drecog	1257	.3866348	.4871726	0	1
dfinp1	1257	.1614956	.3681339	0	1
dfinp2	1257	.3786794	.4852511	0	1
dfinp3	1257	.2959427	.456647	0	1
dfinp4	1257	.0668258	.2498194	0	1
dfinp5	1257	.0970565	.2961525	0	1
dmeas1	1257	.5727924	.4948698	0	1
dmeas2	1257	.1797932	.3841679	0	1
dmeas3	1257	.0875099	.2826934	0	1
dmeas4	1257	.035004	.183863	0	1
dmeas5	1257	.1249006	.3307377	0	1
dsold	1257	.0421639	.2010429	0	1
dsic1	1257	.2163882	.4119458	0	1
dsic2	1257	.0381862	.1917217	0	1
dsic3	1257	.0469372	.2115884	0	1
dsic4	1257	.2211615	.4151942	0	1
dsic5	1257	.0883055	.2838516	0	1
dsic6	1257	.0652347	.2470378	0	1
dsic7	1257	.0723946	.2592433	0	1
dsic8	1257	.1320605	.3386912	0	1

dsic9	1257	0	0	0	0
dsic10	1257	.026253	.1599504	0	1
dsic11	1257	.0548926	.2278612	0	1
dsic12	1257	.0381862	.1917217	0	1
dreg1	1257	.0453461	.2081448	0	1
dreg2	1257	.0787589	.2694694	0	1
dreg3	1257	.1376293	.3446476	0	1
dreg4	1257	.0564837	.2309453	0	1
dreg5	1257	.1081941	.310749	0	1
dreg6	1257	.0883055	.2838516	0	1
dreg7	1257	.2036595	.4028789	0	1
dreg8	1257	.0859189	.2803557	0	1
dreg9	1257	.0429594	.2028464	0	1
dreg10	1257	.0851233	.2791762	0	1
dreg11	1257	.0668258	.2498194	0	1
dsingprod	1257	.3953858	.489128	0	1
dmarket1	1257	.3524264	.477916	0	1
dmshar1	1257	.2983294	.4577069	0	1
dmshar5	1257	.1352426	.3421187	0	1
dmshardk	1257	.1233095	.328923	0	1
dstamar1	1257	.4797136	.4997871	0	1
dcompet1	1257	.0493238	.2166294	0	1
dcompet2	1257	.318218	.46597	0	1
dcompetdk	1257	.0095465	.0972776	0	1
ddegvhi	1257	.5425617	.4983835	0	1
ddeghi	1257	.3237868	.468106	0	1
dovrsea1	1257	.2243437	.4173154	0	1
lempgpa	813	-.0239669	.1384562	-.8354627	.6694293
survive	1253	.8459697	.361122	0	1
empmiss	1257	.1972951	.3981154	0	1

Panel B: Trading Sector with Valid LEMPGPA (excluding outliers)

Variable	Obs	Mean	Std. Dev.	Min	Max
dage1	797	.0664994	.2493094	0	1
dage2	797	.1417817	.3490451	0	1
dage3	797	.761606	.4263688	0	1
dagedk	797	.0301129	.1710053	0	1
dsingle	797	.2860728	.4522076	0	1
lemp98	797	4.683347	1.218735	2.302585	9.556692
lemp98sq	797	23.41719	11.90269	5.301898	91.33037
ldif9897	797	.0401804	.2126652	-.8161366	2.397895
ldifdk	797	.0464241	.2105339	0	1
dreduct	797	.3688833	.4828052	0	1
dorgsiz1	797	.2245922	.4175755	0	1
dorgsiz2	797	.281054	.449796	0	1
dorgsiz3	797	.2371393	.4255955	0	1
dorgsiz4	797	.2183187	.4133643	0	1
dorgsims	797	.0388959	.1934682	0	1
dlog1	797	.0790464	.2699806	0	1
dlog2	797	.0589711	.2357186	0	1
dlog3	797	.1292346	.3356701	0	1
dlog4	797	.1493099	.3566175	0	1
dlog5	797	.076537	.2660224	0	1
dlog6	797	.1417817	.3490451	0	1
dlog7	797	.2271016	.4192219	0	1
dlog8	797	.1242158	.3300347	0	1
dlogdk	797	.0138018	.1167406	0	1
pcmanpro	797	16.5705	18.01038	0	91.45299
pcmanpsq	797	598.5481	1324.11	0	8363.649
dwpfem1	797	.1518193	.359071	0	1
dstuck1	797	.0589711	.2357186	0	1

dstuck2	797	.238394	.4263688	0	1
dstuckdk	797	.0125471	.1113786	0	1
trnrank	797	2.145546	.8833444	1	3
trtimrank	797	1.93601	.8295247	1	3
demail	797	.0238394	.1526444	0	1
daward	797	.2797992	.4491824	0	1
dwrkplac	797	.3989962	.4899995	0	1
drecog	797	.378921	.485423	0	1
dfinp1	797	.1631117	.3696995	0	1
dfinp2	797	.3977415	.4897388	0	1
dfinp3	797	.2885822	.4533877	0	1
dfinp4	797	.0627353	.2426384	0	1
dfinp5	797	.0878294	.2832243	0	1
dmeas1	797	.5972396	.4907613	0	1
dmeas2	797	.174404	.3796948	0	1
dmeas3	797	.0803011	.2719295	0	1
dmeas4	797	.0313676	.1744187	0	1
dmeas5	797	.1166876	.3212492	0	1
dsold	797	.0401506	.1964355	0	1
dsic1	797	.2346299	.4240334	0	1
dsic2	797	.0200753	.1403459	0	1
dsic3	797	.0501882	.2184702	0	1
dsic4	797	.1894605	.39212	0	1
dsic5	797	.0928482	.2904018	0	1
dsic6	797	.0690088	.2536282	0	1
dsic7	797	.0690088	.2536282	0	1
dsic8	797	.1380176	.345135	0	1
dsic9	797	0	0	0	0
dsic10	797	.0326223	.1777576	0	1
dsic11	797	.0564617	.2309561	0	1
dsic12	797	.0476788	.2132195	0	1
dreg1	797	.0476788	.2132195	0	1
dreg2	797	.0815558	.2738587	0	1
dreg3	797	.1355082	.3424805	0	1
dreg4	797	.0589711	.2357186	0	1
dreg5	797	.1179423	.3227423	0	1
dreg6	797	.0865747	.2813873	0	1
dreg7	797	.1856964	.3891056	0	1
dreg8	797	.0853199	.2795326	0	1
dreg9	797	.04266	.2022162	0	1
dreg10	797	.0890841	.2850439	0	1
dreg11	797	.0677541	.2514812	0	1
dsingprod	797	.3889586	.48782	0	1
dmarket1	797	.3249686	.4686572	0	1
dmshar1	797	.3036386	.4601172	0	1
dmshar5	797	.1430364	.3503298	0	1
dmshardk	797	.1304893	.3370525	0	1
dstamar1	797	.5018821	.5003104	0	1
dcompet1	797	.0451694	.2078059	0	1
dcompet2	797	.3375157	.4731593	0	1
dcompetdk	797	.0125471	.1113786	0	1
ddegvhi	797	.5219573	.4998313	0	1
ddeghi	797	.3387704	.4735889	0	1
dovrsea1	797	.2321205	.4224506	0	1
lempgpa	797	-.0226411	.1148578	-.5289214	.353809
survive	797	.9987453	.0354218	0	1
empmiss	797	0	0	0	0

Notes: See notes in Table A2.

Appendix Table A2: Employment growth in the Private Trading Sector

	(1) reg	(2) tobit	(3) reg	(4) tobit	(5) reg	(6) tobit	(7) reg	(8) tobit	Heckman (1)		Heckman (2)	
	lempgpa	lempgpa2	lempgpa	lempgpa2	lempgpa	lempgpa2	lempgpa	lempgpa2	lempgpa	survive	lempgpa	survive2
dage1	0.032	-0.165			0.033	-0.129	0.034	-0.039	0.044	-0.440	0.050	-0.342
	(1.28)	(1.18)			(1.33)	(0.94)	(1.80)	(0.37)	(2.25)*	(1.70)	(2.41)*	(1.48)
dage2	0.022	-0.062			0.020	-0.047	-0.010	-0.046	0.001	-0.386	0.004	-0.317
	(1.18)	(0.68)			(1.08)	(0.54)	(0.64)	(0.67)	(0.05)	(1.86)	(0.23)	(1.89)
dagedk	0.003	0.107			-0.001	0.170	0.003	0.185	0.001	0.013	-0.009	0.209
	(0.12)	(1.42)			(0.05)	(1.85)	(0.14)	(1.82)	(0.06)	(0.04)	(0.41)	(0.69)
dsingle			-0.003	0.122	0.001	0.117	-0.009	0.072	-0.020	0.419	-0.024	0.400
			(0.18)	(1.86)	(0.05)	(1.74)	(0.68)	(1.21)	(1.40)	(2.16)*	(1.59)	(2.41)*
lemp98			0.004	0.184	-0.002	0.202	-0.005	0.176	0.011	-0.288	0.007	-0.020
			(0.10)	(1.09)	(0.04)	(1.18)	(0.19)	(1.40)	(0.38)	(0.51)	(0.24)	(0.05)
lemp98sq			-0.002	-0.021	-0.001	-0.023	-0.000	-0.023	-0.002	0.056	-0.001	0.010
			(0.37)	(1.10)	(0.20)	(1.21)	(0.08)	(1.60)	(0.67)	(0.90)	(0.42)	(0.24)
ldif9897			-0.020	0.160	-0.022	0.165	0.000	0.224	0.006	-0.384	-0.009	0.119
			(1.40)	(1.97)*	(1.64)	(1.93)	(0.01)	(2.97)**	(0.41)	(1.63)	(0.62)	(0.56)
ldifdk			-0.020	0.052	-0.017	0.063	0.016	0.126	0.040	-0.630	0.030	-0.001
			(0.68)	(0.32)	(0.57)	(0.43)	(0.48)	(0.96)	(1.11)	(1.42)	(0.86)	(0.00)
dreduct			-0.007	-0.044	-0.006	-0.038	0.018	-0.033	0.025	-0.273	0.024	-0.221
			(0.40)	(0.59)	(0.33)	(0.53)	(1.51)	(0.61)	(2.01)*	(1.45)	(1.89)	(1.53)
dlog1							0.057	0.117	0.056	0.143	0.063	-0.233
							(1.60)	(0.70)	(1.51)	(0.24)	(1.60)	(0.50)
dlog2							-0.000	-0.055	0.012	-0.398	0.026	-0.513
							(0.00)	(0.53)	(0.37)	(1.14)	(0.82)	(1.77)
dlog3							-0.015	0.201	-0.005	-0.220	-0.013	0.070
							(0.64)	(2.36)*	(0.21)	(0.68)	(0.54)	(0.26)
dlog4							-0.023	0.026	-0.015	-0.269	-0.011	-0.249
							(1.41)	(0.34)	(0.82)	(1.11)	(0.55)	(1.12)
dlog5							0.011	0.394	0.001	0.323	-0.030	0.774
							(0.44)	(3.31)**	(0.02)	(0.69)	(0.99)	(2.17)*
dlog6							-0.011	0.020	0.002	-0.614	0.004	-0.371
							(0.55)	(0.21)	(0.09)	(1.83)	(0.16)	(1.50)
dlog8							-0.005	-0.041	0.006	-0.355	0.009	-0.288
							(0.24)	(0.42)	(0.28)	(1.18)	(0.43)	(1.16)
dlogdk							-0.057	0.035	-0.077	0.850	-0.073	0.473
							(1.17)	(0.19)	(1.53)	(1.30)	(1.43)	(0.91)
pcmanpro							0.002	0.001	0.002	-0.011	0.002	-0.009
							(1.69)	(0.33)	(1.83)	(0.85)	(2.18)*	(0.82)
pcmanpsq							-0.000	-0.000	-0.000	0.000	-0.000	0.000
							(1.91)	(0.38)	(1.77)	(0.63)	(1.98)*	(0.74)
dwpfem1							0.040	0.022	0.064	-0.813	0.070	-0.630
							(3.04)**	(0.26)	(4.10)**	(3.25)**	(4.10)**	(2.75)**
dstuck1							-0.005	0.000	-0.001	-0.019	-0.005	0.282
							(0.20)	(0.00)	(0.05)	(0.07)	(0.19)	(1.18)
dstuck2							-0.002	-0.009	0.006	-0.409	0.009	-0.234
							(0.14)	(0.15)	(0.45)	(2.36)*	(0.61)	(1.49)
dstuckdk							-0.013	-0.292	-0.007	-0.544	0.018	-0.723
							(0.40)	(1.43)	(0.21)	(1.01)	(0.45)	(1.48)
trnrank							0.003	-0.060	-0.002	0.234	0.003	0.055
							(0.62)	(1.77)	(0.27)	(2.25)*	(0.50)	(0.67)
trtimrank							-0.006	0.034	-0.006	0.037	-0.007	0.106
							(1.01)	(1.13)	(0.86)	(0.37)	(0.93)	(1.31)
demail							-0.067	-0.159	-0.050	-0.195	-0.036	-0.024
							(1.24)	(1.26)	(0.91)	(0.33)	(0.64)	(0.05)
daward							-0.016	-0.193	-0.011	-0.381	0.005	-0.493
							(1.50)	(2.83)**	(0.88)	(2.03)*	(0.33)	(3.03)**
dwrkplac							0.018	0.097	0.017	0.036	0.012	0.169
							(1.41)	(1.65)	(1.29)	(0.18)	(0.85)	(1.02)
drecog							0.005	0.096	0.009	-0.157	0.003	-0.011
							(0.42)	(1.61)	(0.73)	(0.80)	(0.19)	(0.07)
dfinp2							0.023	0.053	0.015	0.154	0.013	0.048
							(1.37)	(0.92)	(0.84)	(0.60)	(0.75)	(0.25)
dfinp3							-0.021	-0.057	-0.019	-0.288	-0.016	-0.226
							(1.14)	(0.80)	(1.00)	(1.18)	(0.83)	(1.13)
dfinp4							0.004	0.053	-0.009	0.547	-0.017	0.586
							(0.11)	(0.53)	(0.27)	(1.56)	(0.53)	(2.11)*
dfinp5							-0.042	0.046	-0.031	-0.610	-0.024	-0.306
							(1.19)	(0.31)	(0.86)	(1.40)	(0.65)	(0.81)

dmeas2							-0.007	-0.053	-0.012	0.303	-0.008	0.019
							(0.51)	(0.77)	(0.84)	(1.39)	(0.55)	(0.11)
dmeas3							-0.023	0.125	-0.023	0.086	-0.029	0.246
							(1.17)	(1.72)	(1.12)	(0.28)	(1.28)	(0.96)
dmeas4							-0.039	0.059	-0.049	0.697	-0.051	0.468
							(0.99)	(0.52)	(1.27)	(1.06)	(1.28)	(1.16)
dmeas5							0.047	0.000	0.033	0.398	0.031	0.203
							(1.55)	(0.00)	(1.05)	(1.11)	(0.96)	(0.69)
dsold							-0.099	0.120	-0.104	0.445	-0.123	0.878
							(3.03)**	(1.47)	(3.12)**	(1.06)	(3.68)**	(2.58)*
dsic2							0.051	-0.040	0.057	-0.042	0.070	-0.144
							(1.00)	(0.19)	(1.03)	(0.07)	(1.19)	(0.29)
dsic3							0.031	-0.148	0.025	-0.030	0.032	-0.211
							(1.36)	(1.15)	(0.99)	(0.08)	(1.17)	(0.64)
dsic4							0.076	0.050	0.059	0.649	0.060	0.366
							(3.47)**	(0.55)	(2.62)**	(2.02)*	(2.61)**	(1.47)
dsic5							0.029	-0.265	0.021	0.795	0.051	-0.288
							(1.32)	(2.31)*	(0.86)	(1.69)	(1.93)	(0.92)
dsic6							0.037	0.117	0.031	0.378	0.031	0.431
							(1.63)	(1.45)	(1.28)	(1.14)	(1.15)	(1.29)
dsic7							0.046	0.071	0.038	0.585	0.030	0.553
							(1.49)	(0.66)	(1.25)	(1.42)	(0.97)	(1.75)
dsic8							0.009	-0.011	-0.003	0.641	-0.009	0.523
							(0.43)	(0.13)	(0.13)	(1.97)*	(0.37)	(1.93)
dsic10							0.040	0.102	0.045	-0.299	0.026	0.199
							(1.15)	(0.67)	(1.22)	(0.51)	(0.69)	(0.42)
dsic11							0.074	-0.252	0.087	-0.527	0.108	-0.737
							(2.73)**	(1.91)	(2.97)**	(1.23)	(3.36)**	(2.07)*
dsic12							0.115	0.159	0.096	1.045	0.090	0.755
							(4.34)**	(1.57)	(3.47)**	(1.84)	(3.20)**	(2.01)*
dreg1							-0.026	-0.061	-0.054	1.224	-0.046	0.362
							(1.33)	(0.52)	(2.40)*	(2.95)**	(2.02)*	(1.08)
dreg2							-0.001	-0.238	-0.014	0.338	0.003	-0.179
							(0.03)	(2.04)*	(0.62)	(1.15)	(0.16)	(0.71)
dreg3							0.013	-0.075	0.011	-0.220	0.022	-0.415
							(0.73)	(0.77)	(0.60)	(0.84)	(1.13)	(1.71)
dreg4							-0.007	-0.109	-0.024	0.241	-0.015	-0.234
							(0.37)	(0.74)	(1.25)	(0.66)	(0.72)	(0.77)
dreg5							-0.031	-0.077	-0.039	0.280	-0.037	0.073
							(1.61)	(0.94)	(1.88)	(1.00)	(1.73)	(0.29)
dreg6							0.029	-0.040	0.023	-0.054	0.020	-0.060
							(1.53)	(0.40)	(1.12)	(0.19)	(0.98)	(0.26)
dreg8							0.036	-0.001	0.031	0.183	0.029	0.023
							(1.42)	(0.01)	(1.25)	(0.62)	(1.16)	(0.09)
dreg9							0.032	0.051	0.008	1.226	0.009	0.356
							(1.74)	(0.29)	(0.38)	(2.92)**	(0.37)	(0.85)
dreg10							0.025	0.080	0.014	0.242	0.011	0.037
							(1.29)	(0.89)	(0.76)	(0.91)	(0.53)	(0.14)
dreg11							0.045	0.116	0.027	0.548	0.020	0.392
							(1.82)	(1.26)	(1.00)	(1.56)	(0.73)	(1.29)
dsingprod							0.005	-0.069	0.015	-0.268	0.021	-0.270
							(0.44)	(1.17)	(1.14)	(1.39)	(1.54)	(1.69)
dmarket1							-0.024	-0.079	-0.026	0.226	-0.018	-0.072
							(1.81)	(1.48)	(1.86)	(1.10)	(1.22)	(0.44)
dmshar1							0.047	0.047	0.058	-0.716	0.055	-0.464
							(3.21)**	(0.76)	(3.69)**	(3.51)**	(3.48)**	(2.73)**
dmshar5							-0.030	0.101	-0.023	-0.311	-0.037	0.178
							(1.67)	(1.40)	(1.20)	(1.09)	(1.86)	(0.71)
dmshardk							0.038	0.044	0.041	-0.484	0.033	-0.263
							(2.58)*	(0.43)	(2.73)**	(1.91)	(2.07)*	(1.20)
dstamar1							0.019	0.137	0.014	0.186	0.008	0.254
							(1.91)	(2.67)**	(1.30)	(1.14)	(0.66)	(1.86)
dcompet1							0.052	-0.106	0.056	-0.416	0.050	-0.136
							(1.85)	(0.66)	(2.02)*	(1.13)	(1.81)	(0.37)
dcompet2							0.004	0.049	0.007	-0.214	0.002	-0.046
							(0.36)	(0.84)	(0.55)	(1.07)	(0.13)	(0.28)
dcompetdk							-0.013	-0.040	-0.002	0.537	-0.008	0.280
							(0.26)	(0.14)	(0.03)	(0.68)	(0.12)	(0.41)
ddegvhi							0.044	-0.038	0.050	-0.194	0.053	-0.241
							(2.40)*	(0.44)	(2.49)*	(0.70)	(2.40)*	(0.96)

ddeghi							0.028	-0.040	0.030	-0.048	0.035	-0.216
							(1.62)	(0.47)	(1.62)	(0.19)	(1.76)	(0.91)
dovrsea1							-0.005	-0.026	0.003	-0.553	0.008	-0.469
							(0.36)	(0.50)	(0.18)	(2.75)**	(0.50)	(2.63)**
Constant	-0.022	-0.226	-0.004	-0.663	-0.003	-0.679	-0.108	-0.586	-0.118	1.491	-0.108	0.820
	(2.31)*	(5.88)**	(0.05)	(1.81)	(0.04)	(1.83)	(1.47)	(2.12)*	(1.55)	(1.08)	(1.36)	(0.84)
Observations	797	1061	797	1061	797	1061	797	1061	989	989	1237	1237
R-squared	0.01		0.01		0.02		0.35					

Notes:
(1) Dependent variables are: LEMPGPA: log employment growth per annum. LEMPGPA2: log employment growth per annum treating survivors with missing employment data as left-censored. SURVIVE: (0,1) whether survived until 2004. SURVIVE2: (0,1) whether survived until 2004 treating survivors without employment data as zeros.
(2) The top and bottom percentiles of the employment growth distribution are treated as outliers and removed from estimation.
(3) For Tobits N=1061 includes 248 censored.
(3) Heckman (1) N=989, 193 censored, 796 uncensored. Wald chi2(70)=224.45. Log pseudolikelihood=24.8103. Prob > chi2=0.0000. Rho -.75 se=.16; sigma=.09 se=.01 lambda=-.069 se=.02. Wald test of indep. eqns. (rho = 0): chi2(1) = 7.15 Prob > chi2 = 0.0075
(4) Heckman (2) N=1237, 193 censored, 441 uncensored. Wald chi2(70)=188.17. Log pseudolikelihood= 10.91737. Prob > chi2= 0.0000. Rho -.83 se=.08; sigma .10 se=.01 lambda -.083 se=.014. Wald test of indep. eqns. (rho = 0): chi2(1) = 19.92 Prob > chi2 = 0.0000
(5) Controls are as follows:
DAGE: age of establishment including time at previous addresses (DAGE1=<5 yrs; DAGE2=5-9 yrs; reference is DAGE3=10+ yrs; AGEDK=dk age). Note that by collapsing ages of 10+ years I overcome routing problem associated with this variable in original data.
DSINGLE: single independent establishment
LEMP98 is log employment size at 1998.
LEMP98SQ: square of LEMP98
LDIF9897: log difference in employment between 1998 and 1997 calculated as: ldif9897=log(emp1998)-log(emp1997).
LDIFDK: LDIF9897 missing
DREDUCT: there have been reductions in one or more sections of the workforce in the 12 months prior to the 1998 survey interview
DSIZ*: 1998 employment size dummies as an alternative to LEMP98. (DSIZ2=25-49; DSIZ3=50-99; DSIZ4=100-199; DSIZ5=200-499; DSIZ6=500+; reference is DSIZ1=10-24)
DLOG1-DLOG8: largest non-managerial occupational group (ref=DLOG7 ie. operative and assembly workers). DLOGDK=don't know largest occupational group
PCMANPRO: % employees who are managers or professionals; PCMANPROSQ: square of % who are managers/profs. DPCDK: don't know % employees who are managers/professionals.
DWPFEM1: <=10% of employees are women.
DSTUCK1: takes 1 week or less for new core employee to do job as well as experienced core employee DSTUCK2: >1 to 1 month. Ref: > 1 month. DSTUCKDK: data missing
TRNRANK: whether proportion of core experienced employees receiving off-the-job training in the last 12 months is below, at or above the median for workplaces with the same core occupation. Where 1=below median 2=median 3=above median. Treated as continuous variable here.
TRTIMRANK: whether time core experienced employees spend on off-the-job training in the last 12 months is below, at or above the median for workplaces with the same core occupation. Where 1=below median 2=median 3=above median. Treated as continuous variable here.
DEMAIL: email used by management to communicate with employees (proxy for IT investment).
DAWARD: workplace is accredited as an investor in people (proxy for sunk costs in quality assurance).
DWRKPLAC: whether workplace has attained either of the quality standards BS5750 or ISO9000? (Treated as sunk investment)
DRECOG: if recognised union.
DFINP*: Dummies for financial performance of workplace relative to industry average in 1998. Subjective measure. DFINP2=better than average; DFINP3=average; DFINP4=below/a lot below average; DFINP5=data missing or comparison not possible. Reference is DFINP1=a lot better than average.
DMEAS*: Measure of financial performance used by workplace (ref: DMEAS1 profits or value added). DMEAS2: sales/fees/budgets. DMEAS3: costs or expenditure. DMEAS4: stock market indicators (eg. share price). DMEAS5: other/don't know.
DSOLD: sold by parent company in last 5 years.
DSIC*: single digit industry dummies. Ref: DSIC1=Manufacturing.
DREG*: region dummies. Ref: DREG7=rest of the South East
DSINGPROD: output is concentrated on one product/service
DMARKET1: market for product/service is local
DMSHAR*: company's UK market share for main product/service. DMSHAR1=<5%; DMSHAR5: >50%. DMSHARDK: data missing. Ref.: market share between 5-50%
DSTAMAR1: the market is growing. Reference is all other categories, namely mature, declining, turbulent
DCOMPET*: number of competitors. DCOMPET1: none. DCOMPET2: few (ie. 5 or less). DCOMPETDK: data missing. Reference: many competitors (6+)
DDEG* subjective perception of degree of market competition. DDEGVHI: very high. DDEGHI: high. Reference: very low, low, neither high nor low.
DOVRSEA*: perception of competition from overseas suppliers. DOVRSEA1: a lot. Ref: little or none.

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