

Job Creation and Job Destruction in Great Britain in the 1980s

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The data used in this paper are from the 1980, 1984 and 1990 British Workplace Industrial Relations Surveys. These data are publicly available. The data extraction and analysis were performed using SPSSX on an IBM mainframe. The SPSSX programs are available upon request from David G. Blanchflower, Department of Economics, Dartmouth College, Hanover, NH, 03755, USA.

ABSTRACT

This paper characterizes the processes of job creation and job destruction (JC&D) in Britain, and provides more 'stylized facts' to hold up against models of JC&D. The analysis is based on data from the Workplace Industrial Relations Survey (WIRS) surveys of 1980, 1984 and 1990 each of which are representative cross-sections of approximately 2000 continuing British establishments. They cover all sectors (excluding agriculture and mining), public and private, manufacturing and services. The issues examined include the diversity of employment growth rates and the correspondingly substantial JC&D rates. We show that both JC&D are extremely concentrated: about 50% of each of these is accounted for by just 4% of continuing establishments.

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Economists have long studied net changes in employment but only lately have they turned their attention to the gross flows. Typically, previous work in this area set out to characterize the empirical properties of gross job flows. Perhaps the most striking finding is the large amount of heterogeneity of employment growth experiences within very narrowly defined groups of firms or establishments. For example, even within 3 or 4-digit industries inside specific regions and age classes of firms, there will be simultaneous, and often substantial, job creation and job destruction. Empirical regularities relating job reallocation (the sum of job creation and destruction) to age and size classes and to the state of the business cycle have also been established. Much of this earlier work relates to manufacturing only, and most to the private sector. In this paper we compare job creation and destruction in Great Britain across all industries, in both the public and private sectors using data from the Workplace Industrial Relations Survey (WIRS) surveys of 1980, 1984 and 1990 each of which are representative cross-sections of approximately 2000 continuing British establishments. We also report separate results by the age of the establishment as well as by union status. This is new evidence. In addition, we look at the establishment-level analog of job reallocation and provide multivariate evidence on the important covariates of job reallocation. Previously, statements such as 'job reallocation decreases with age' were based on simple bivariate cross-tabulations over groups of establishments. We investigate the relationship in a multivariate context based on the establishment unit. The data available to us also allows us to attack another problem: the size of within-firm reallocations. The information available to us relates to establishments, but we know whether these are single-establishment enterprises, or part of a multi-establishment firm. We can therefore isolate the difference in the job reallocation rate between single- and multi-establishment organizations, conditional on a variety of other factors being held constant.

I. A Brief Survey

This section of the paper briefly reviews the evidence on job creation and destruction and employment growth at firm or establishment level.

One of the earliest analytical contributions has become known as Gibrat's Law (Gibrat, 1931). This derives a typical lognormal distribution for firm size from assumptions about the dynamic adjustment of employment and the distribution of the shock. While the evidence suggests that this does not provide the best fit to the data (see Chesher, 1979, for example), the idea of deriving the equilibrium size distribution from the micro adjustment behavior is continued in modern work (e.g., Caballero, 1992). This provides one of the motivations for gaining a better understanding of employment change at establishment level.

There are two main approaches to consider. One might be termed the empirical Industrial Organization approach, focusing on entry and exit data of firms/plants and the progress of entrants. Examples include Geroski (1991) providing an excellent summary of the UK and US evidence, Baldwin and Gorecki (1990) utilizing a very rich Canadian database, and Dunne, Roberts and Samuelson (1989b) and Pakes and Ericson (1990) for the US. One of the main messages of this work is that there is a lot of entry of new firms at the bottom end of the size distribution, but that many of these remain only a short time. A simple characterization of the process would be "up or out": entrants are either successful and grow (after about ten years they operate on the same scale as incumbents) or die off fairly quickly (in the UK, 5% of entrants disappear after their first year and 30% have left by five years). A similar picture is true for the US (see Dunne, Roberts and Samuelson (1989b)). There is thus a lot of turnover of firms and therefore jobs in most industries at most times, particularly concentrated among small firms. The marketplace acts as a filter, sorting out the viable projects.

The second main collection of papers to consider focuses more directly on labor market flows. Much of the recent revival of interest in gross employment flows is due to the work of Dunne, Roberts and Samuelson (1989a), and particularly Davis and Haltiwanger (1990, 1992) who exploit a large dataset on US manufacturing plants. Davis, Haltiwanger and Schuh (1994) present a comprehensive view of the results on US data;

Contini and Revelli (1993) present results for Italy, Boeri and Cramer (1991) for Germany, and Leonard and van Audenrode (1993) discuss the case of Belgium. OECD (1994) summarizes the international evidence.

The main results of this literature can be summarized as follows. First, the amount of job creation and destruction is very large: in the US, annual rates of job creation and destruction (these are defined below) in manufacturing are each of the order of 10%. Second, these are pervasive and occur simultaneously in even very narrowly defined industries. Third, there are a few empirical regularities (see Blanchflower (1994)): job reallocation rates (the sum of job creation and job destruction rates) tend to decline with the size and age of the firm. A number of issues have been under-played in this literature. First, the empirical results presented are typically bivariate correlations: job reallocation and age of plant for example; sometimes these are further split up by industry or size. However, there does not seem to be much true multivariate analysis of the determinants of job reallocation. A second question arises from the distinction between firms and establishments. Some surveys use data on firms (enterprises) and some use plants (establishments); neither of these can address the question of how much reallocation occurs between establishments within firms.

Finally, we turn to the papers that have looked at gross employment flows in the UK; these are usefully summarized in Baldwin and Gorecki (1990). There are a series of regional/local area studies (for example, Storey, 1985), and a series of papers by Gallagher and co-authors (Gallagher and Stewart, 1986; Gallagher, Daly and Thomason 1990, 1991, and Daly, Campbell, Robson and Gallagher, 1991) who use the Dun and Bradstreet credit rating database on UK private sector firms. They establish a number of facts about job creation and destruction and their relation to firm size. The central finding is the overwhelming importance of small firms to net job generation. However, the studies do not look at annual changes (they take longer periods of varying length), nor consider in any detail the nature of job creation and job destruction. Finally, their work is restricted to the

private sector. Konings (1992) replicates the Davis and Haltiwanger study for the UK on a database of quoted (and therefore larger than average) manufacturing companies. He finds the same pattern of the importance of idiosyncratic shocks and asymmetry of the gross flows.

II. Data

The data used in this paper are taken from the Workplace Industrial Relations Survey series conducted in the Great Britain in 1980, 1984 and 1990 and known as WIRS1, WIRS2 and WIRS3 respectively. The surveys were sponsored by the Department of Employment, the Policy Studies Institute, the Economic and Social Research Council and the Arbitration, Conciliation and Advisory service (ACAS). The level of observation is the establishment (defined as 'places of employment at a single address or site')¹. To be included in the survey an establishment had to have at least 25 employees (full or part-time) both at the time the sample was drawn and at the time of the interview. In each case the most recently available Census of Employment was used as the sampling frame; the 1977, 1981 and 1987 Censuses were used for WIRS1, WIRS2 and WIRS3 respectively². Both establishment births and deaths that occur over the period in question, as well as establishments that failed to meet the 25 employee threshold at two points in time are necessarily excluded from our analysis. So our sample generalizes to the population of surviving establishments with 25 employees at the beginning and end of the periods 1977-1980 (WIRS1), 1981-1983 (WIRS2) and 1987-1990 (WIRS3).

Establishments were selected differentially across establishment size bands, where size is measured by employment, large establishments being over-sampled. To compensate for these inequalities of selection the data are weighted. The survey incorporated personal interviews with the senior manager dealing with employee relations, industrial relations or personnel matters, plus interviews with other managers as well as worker representatives. This paper uses only data from the senior manager's interview and the Basic Workforce Data Sheet, a self-completion questionnaire sent to managers several days prior to the main

management interview. The samples are not panels³. To construct the gross flows at sector and aggregate levels, we use the net employment change at the establishment level. But in fact this considerably understates the amount of worker turnover that occurs because a given net change at the establishment level can be the result of simultaneous hiring and separations. Lane et al (1992) have shown this to be a significant phenomenon in the US.

The population of workers covered by the WIRS series fell from 16.3 million in 1980 to 14.9 million in 1984 and increased to 15.6 million by 1990⁴. The fall between 1980 and 1984 is largely due to the decline in the proportion of employees working in larger establishments, but was also due to a move towards smaller workplaces within the WIRS population. The mean size of workplace in our datafile was 118 employees in 1980, 109 in 1984 and 102 in 1990. In each of the three surveys employment growth is well below the national level, with the difference especially pronounced in 1983/1984 when the economy was just emerging from a deep recession. For the period 1979/1980 the number of employees in employment in Great Britain fell by 0.8% compared with a fall of 1.6% for WIRS1. For the years 1983/1984 the figures were +0.9% overall compared with -1.5% in WIRS2 and +1.0% for 1989/1990 compared with +0.1% in WIRS3⁵. The interested reader can obtain further details on these surveys from the various source books -- Daniel and Millward (1984) on WIRS1; Millward and Stevens (1986) on WIRS2 and Millward, Stevens, Smart and Hawes (1992) on WIRS3.

At this point it is appropriate to describe briefly the macroeconomic circumstances behind the changes in employment we observe in our samples of workplaces. Unemployment was around 5% in both 1980 and 1990, with roughly the same number of employees in employment (22 million), but in 1980 unemployment was at the start of a steep rise while it was still falling in 1990. 1984 was at a trough of the cycle with high unemployment (10.7%) and low employment (20.7 million). Throughout the 1980s there was a rapid (and continuing) decline in employment in manufacturing, from 6.8 million in 1980 to 5 million in 1990 and just over 4 million at the time of writing. Manufacturing's

share of employment fell from 31% in 1980 to 26% in 1984 to 23% in 1990. The WIRS sample figures were 40%, 29% and 23% respectively. The mean size of manufacturing establishments in WIRS was 185 in 1980, 147 in 1984 and 128 in 1990. Private non-manufacturing employment grew by 12% between 1984 and 1990 after a small contraction between 1980 and 1984. Largely through privatization, and more recently by the contracting out of services by public sector bodies, employment in the parts of the public sector covered by the WIRS sample fell from 1.3 million in 1980 to 0.8 million in 1990, with most of the change occurring since 1984.

III. Results

This section simply states the results of our analysis; the following section provides some discussion and sets them in context. The rates of job creation and destruction (JC&D) are weighted summary statistics of the distribution of employment growth rates over firms or establishments. The employment growth rate for each workplace is simply the number of employees in period t , whether full or part-time, minus employment in period $t-1$ as a proportion of employment in $t-1$. The job creation rate (JC) is the average employment growth rate among establishments that are growing, while the job destruction rate is the absolute average employment growth rate among establishments where employment is falling (JD); usually in the literature these are weighted by employment size (Davis and Haltiwanger, 1990). Thus an understanding of JC&D requires an understanding of this distribution. This section therefore looks first at features of this distribution before moving on to consider the job creation and destruction rates.

a) Employment Growth

Let the growth rate of employment in establishment i at a particular date be g_i , with density function $f(\cdot)$. Much attention has been given to the mean of the distribution, that is if $f(\cdot)$ is written as $g_i \sim (X_i, \sigma)$, the focus is on X_i . This follows naturally from studies of aggregate employment, where the prime concern is to model the evolution of the stock of employment. A number of authors have estimated models of employment growth for

individual establishments (Blanchflower and Millward, 1988; Blanchflower, Millward and Oswald, 1991 for Great Britain; Long (1993) for Canada, Wagner (1992) for Germany and Leonard (1992) for the US) and a few on firms (Nickell and Wadhvani, 1991; Bronars and Deere, 1993 and Freeman and Kleiner, 1990). Many of these are based on the same labor demand approach used in the macroeconomics literature⁶, with the addition of the variety of controls available in a cross-section study. In this paper, we focus more on other aspects of the distribution, as this is an important element of an understanding of JC&D.

Since the job creation and job destruction rates are simply the weighted means of different truncations of the distribution $f(\cdot)$, clearly the variance and the degree of skewness are likely to be important. In fact a simple simulation suggests that they may be more important than the mean. If we initially start with a mean growth rate of 2% and an SD of 25, which, as we will show below is approximately what we observe empirically, and increase the mean growth rate to 4% the JC rate remains roughly constant at 22.4% and the JD rate declines slightly from 19% to 17.5%. In contrast, if we take the same starting values as before but simply increase the standard deviation from 25 to 35 the JC rate jumps to 27.3 and the JD rate to 26.4. This relative dependence is clearly sensitive to the type of distribution chosen, but the point is made that the higher moments of the employment growth distribution such as the standard deviation are important to understanding the evolution of employment flows⁷. Put another way, we are 1) investigating the diversity of experience in employment growth across establishments and 2) considering evidence on the factors that are associated with high variance among a particular sub-population. The remainder of this section of the paper reports on this.

The basic features of the data for the three cross-sections are given by sector in Table 1, where all data are weighted⁸. In all three years it is possible to calculate for each establishment a one year change: in addition a 5 year change is available in WIRS1 along with a 4 year change in WIRS2 and both a 6 year and a 3 year change from WIRS3. These are the only employment numbers available to us. The mean one year growth rate of

employment increased from 1.6% in 1979-1980 in this sample of surviving establishments, to 2.3% in 1983/4 to 3.8% in 1989/90. Growth rates in the private sector tended to be higher than in the public sector. Non-union workplaces grew considerably faster than union workplaces. One year growth rates in private non-manufacturing were a lot higher than in private manufacturing, however, the picture is reversed in the later two periods when longer time changes are examined. At first glance these are somewhat surprising results, but they presumably reflect the very low starting size in our surviving manufacturing establishments after the severe recession years of the early 1980s.

Table 2 reports not only mean employment growth rates by year but also indicators of the dispersion of employment growth between establishments. Once again all data are weighted, although we report both the unweighted and weighted bases. Behind the summary statistic of mean growth lies a diversity of experience, particularly as indicated by the 10-90 percentile range which increased from 29.4 to 35.8 between 1980 and 1990. The standard deviation also increased from 18.9 to 29.2, but the coefficient of variation actually falls (from 11.7 to 7.7) over the period because of the increase in the mean growth rate. Not only did the mean employment growth rate increase during the 1980s but so did the dispersion of these growth rates.

Table 3 provides a more detailed picture of the range and variability of the 1 year employment growth rates for 1979/1980, 1983/1984 and 1989/1990. (Blanchflower and Millward, 1988 and Blanchflower, Millward and Oswald, 1991 report employment growth rates using the WIRS1 and WIRS2 data for 5 year and 4 year changes respectively). The main points that emerge from Table 3 are as follows.

- 1) In each of the three parts of Table 3 just under a half of all establishments were relatively stable (changed by between +5% and -5%). Approximately one workplace in eight changed employment by at least 20% in a one year period. The proportion of establishments that changed employment by at least 20% was greater in 1990 than it was in 1980 (13.3% in 1980 against 16.6% in 1990).

2) Manufacturing shows the least stability of any sector: approximately 40% of establishments grew by less than 5% in absolute value, while around 17% experienced employment change in excess of 20%. Over a longer horizon, this is accentuated further. It is striking that even though the period 1980 - 1984 is generally acknowledged to have been an extremely difficult one for manufacturing in Great Britain (particularly as measured by employment), 25% of manufacturing plants grew by 20% or more over that period which is more than in private service establishments.

3) Establishments in the union sector were less likely to grow a lot ($\geq 20\%$) than those in the non-union sector. There is less evidence at the other end of the distribution that union workplaces were more likely to shrink a lot (i.e. declines of more than 20%). In all cases the variability of employment growth is greater in the non-union sector than in the union sector. As might be expected employment varies most in private sector non-union establishments.

The relationship between the employment growth rate and the initial level of employment is important for the equilibrium size distribution of establishments. Traditionally of interest is the relationship between the mean growth rate and size. Also relevant here is a comparison of variability of employment growth across different size bands. The evidence is presented in Table 4. First, the mean growth rate, which is reported in column 6 is clearly declining in size. Small establishments tend to grow and large establishments tend to decline; this is necessary for a stable size distribution. In each of our three years, establishments with employment of 25-49 employees grew the fastest over the one year period (4.40% in 1980, 4.31% in 1984 and 6.95% in 1990). The largest workplaces of at least 1000 employees, on average declined by around 4% (3.88% in 1980, 3.97% in 1984 and 3.40% in 1990). Hence the difference in growth rates between the smallest and largest establishments widened over the period (8.3% in 1980 compared with 10.3% in 1990). Otherwise, the differences in the distribution are not very marked. There is certainly little difference in the proportion of establishments experiencing significant

change: for example, in 1984, for all but the biggest category of establishments, all size bands showed around 50% of establishments in the -5% to +5% range. Thus the relationship between size and the range of growth/decline rates is not as strong as might have been expected.

The 1990 survey reports employment in 1990, 1989, 1987 and 1984 so an interesting exercise is to compare the performance of establishments which are in existence at all these dates over the two three year spells 1984 - 1987 and 1987 - 1990. Table 5 reports the results. Before considering the data, recall that the bias introduced by the sample selection procedure will be particularly noticeable here. Of establishments in which employment fell by 20% or more over the first period, presumably many would have continued to decline over the second; however, many of those will not be in the sample. Thus, particularly in the first row, there is an artificial inflation of the data in the right hand cells. Once again the data are weighted using the 1990 weights, although we do report the unweighted bases. Approximately a quarter of establishments that declined by at least one fifth between 1984 and 1987 declined by a further 20% over the following three year period. However, a further quarter grew by at least 20% over the later period. Of the establishments that grew by at least 20% in the first period approximately one half had similar growth patterns in the second period. These data appear to be better characterized by persistence than mean reversion. That is, most of the weight is around the main (northwest to southeast) diagonal. Mean reversion would be characterized by weight on the opposite diagonal, and clearly this is not the case. Thus a broad generalization is that establishments will typically continue to grow or decline rather than fluctuate around a particular employment level. This is in line with the persistence results of Davis and Haltiwanger (1992).

b) Job Creation and Job Destruction

Although we only have three cross-sections, they are from interesting and quite different years: 1980 being the start of the first dramatic rise in unemployment, 1984 when

the rise in unemployment flattened out, and 1990 when unemployment fell quite substantially. As can be seen from columns 5 and 6 of Table 6 which reports one year changes, 9,300 jobs were created in the WIRS3 datafile for the period 1989/1990 and 9,000 jobs destroyed. The numbers in the previous years were 7,900 created and 11,400 destroyed in 1979/80 (WIRS1) and 7,500 created and 10,300 destroyed in 1983/84 (WIRS2). If we were to gross these up to the population, for example, the 1984 numbers need to be multiplied by 68.3 and the 1990 numbers by 75.5. In 1990 this suggests that 702,150 jobs were created and 679,500 were destroyed between 1989 and 1990 for surviving establishments with at least 25 employees. In 1984 fewer jobs were created (512,250) but roughly the same number were destroyed (703,490).

Table 6 also shows that manufacturing accounted for a reasonable share of job creation even in 1980 and 1984. This is due to higher employment growth variance and larger size implying greater JC for a lower mean growth rate. The table also shows how the job destruction of 1980 and 1984 was centered on manufacturing: 58% of jobs destroyed were in manufacturing in 1980 compared with 30% in 1990. In 1980 private manufacturing accounted for 41% of employment in the WIRS1 sample compared with 29% of total employment in 1990 (Panel 3 of Table 6). Private non-manufacturing was responsible for 35% of job creation in 1990 compared with 20% in 1980. The public sector accounts for a smaller proportion of job creation and a higher proportion of job destruction at the end of the period than was true at the beginning. The decline in the size of the union sector that occurred during the 1980s is reflected here in a decline in its contribution to both job creation and job destruction.

Another perspective on the nature of job creation and destruction is to look at the concentration of these activities across establishments. In our dataset these processes are extremely concentrated: Figures 1a and 1b plot the Lorenz curves. In each of the three years approximately 50% of all jobs created are accounted for by around 10% of growing establishments (Figure 1a), and 50% of all jobs destroyed are also accounted for by about

10% of declining establishments (Figure 1b). Therefore, since on average over the three years 43.6% of establishments were hiring, we can say that 50% of all jobs created were accounted for by about 4% of establishments. Similarly, 50% of all jobs destroyed in surviving establishments were accounted for by 4% of establishments.

Manufacturing plants are well represented among the big job creators (the top decile), 32% of plants in the top JC decile in 1990 were in manufacturing. They are also predominant among the top decile of job destroyers, outstandingly so in 1980 when 65% of such plants were in manufacturing; by 1990, however, this number was down to 40%. The average (absolute) growth rate increases by decile for both JC and JD. This is not tautological, and indeed the reverse could easily be true. Another way of looking at this is to compute shares of jobs created(destroyed) by growth rate. In fact, less than half of all jobs created (destroyed) came from fast growing (declining) plants (defined as having an absolute growth rate in excess of 20%), and about a third came from relatively slow growers (0 - 10%). This concentration is not necessarily due to differences in establishment size. Clearly JC and JD are related to the size of establishment: a 1% growth rate leads to more jobs being created in a establishment of 10000 employees than it does in one of a 100 person establishment. In fact average establishment size by JC or JD decile increases slowly up to the 9th decile, and the final decile contains significantly larger establishments⁹. However, this fact does not explain away the concentration: it would be perfectly possible for the existing size distribution to coexist with a much less concentrated distribution of JC&JD. Two further points emerge: (i) the degree of concentration is very similar across the three years, although JD is less concentrated in 1980 (ii) in each year JD is slightly more concentrated than JC.

In Table 7 rather than report *numbers* of jobs created or destroyed we now report job creation and job destruction *rates* by sector. Following Davis and Haltiwanger (1990)¹⁰, we define them as follows:

$$\text{JC rate} = \frac{+(N_t - N_{t-1})}{N_{t-1}}$$

$$\text{JD rate} = \frac{-|N_t - N_{t-1}|}{N_{t-1}}$$

where the sum over "+" indicates the sum over growing establishments, over "-" means over declining establishments, and the sum on the denominator is the sum over all establishments. As mentioned above, these are two statistics based on the employment growth distribution which give us more information than can be gained from simply looking at the mean or variance. Furthermore, they are economically meaningful concepts, and their study has engendered a lot of empirical and theoretical research (some of which was discussed in section II above).

The overall job creation rate rose from 3.58 in 1979/1980 to 5.45 in 1989/1990. Moreover the job creation rate in every sector was higher at the end of the 1980s than it was at the beginning. It was everywhere lower in private manufacturing than in private non-manufacturing as well as in the union sector compared with the non-union sector. The job destruction rate actually increased over the period. It declined in private manufacturing but increased strongly in both private services and the public sector. The union sector showed a small increase in the JD rate over the period while the non-union sector experienced a small decrease.

In Tables 8 to 10 we explore further the differences in job creation and destruction rates. Table 8 reports the distribution of JC&D by base year establishment size. There seems to be a natural watershed around a size of 200. Below that establishments create more than their "share" of jobs, and above it establishments destroy more than their share of jobs. We illustrate this in columns 5 and 6 of the table where we divide the share of JC and JD respectively by the share of employment reported in column 3. Within the context of

the selection of our sample of continuing establishments, medium to large establishments (100 or more employees) account for over 50% of jobs created. This runs counter to existing wisdom on the importance of small firms, but fits in with the most recent work of Davis, Haltiwanger and Schuh (1994).

Table 9 examines differences in one year job creation and destruction rates between union and non-union workplaces in the private sector. Because of the fact that union workplaces tend to be bigger than non-union we produce separate estimates for big and small workplaces - where 200 employees is taken as the cut-off. In the first two columns of the table we report actual numbers of jobs created (JC) and destroyed (JD) for the periods 1979/1980; 1983/1984 and 1989/1990. In columns 3 and 4 job creation and job destruction rates are reported. In columns 5 and 6 the proportion of establishments that expanded and declined respectively over the relevant period are reported. Columns 7 through 9 report total employment, the number of establishments (weighted) and their average size in the base year. First, at the beginning of the 1980s 72% of private sector workers in our sample were members of unions compared with 52.3% at the end. Second, the share of employment accounted for by workers in 'big' union workplaces fell from 47% to 30%. The share of small union workplaces fell only slightly from 25% to 23%. Third, the average size of big union workplaces also declined during the 1980s -- from 655 employees in 1979 to 488 employees in 1989 while the small number of big non-union establishments in the sample increased their average size from 373 to 397. Fourth, the average size of both small union and small non-union workplaces remained roughly constant. Fifth, job creation rates tended to be highest in all periods in small non-union establishments. Sixth, in 1979/1980 the union sector created more jobs than the non-union sector; by 1989/1990 the picture was reversed. Seventh, job destruction rates also tended to be highest in all periods in small non-union establishments, but by the end of the 1980s non-union establishments were responsible for a much higher share (24% and 47% respectively) than they were at the beginning of the decade.

In Table 10, we look at the age of operation of establishments. At the outset we should note that in 1990 the question asked was: "For how long has this establishment been operating here at this address?" whereas in the previous two years it was: "How long ago did the establishment first engage in its main activity?" From the distribution of employment in column 3, it seems that the difference matters, so 1990 is not strictly comparable. There is evidence in column 4 of a strong negative relationship between employment growth and the age of an establishment across all years. We also find a strong negative relationship in 1980 and 1984 between age of the establishment and the job creation rate, falling from 19.2% among establishments less than three years old in 1980 (15.7% in 1984) to 2.6% (5.4% in 1984) for establishments 25 years or older. By 1990 the relationship was a good deal weaker. There is much less evidence of a high degree of correlation between age and the job destruction rate. It is worth emphasizing though, that even among long-lived establishments, there is a considerable amount of job creation and destruction. Clearly, there is a strong correlation between age and size, and as might be expected older (hence bigger) continuing workplaces account for a large proportion of jobs created and destroyed.

c) Job Reallocation

We now examine differences in the job reallocation rate (JR) by sector and over time. This is defined as the sum of the job creation and job destruction rates defined above and is a measure of the total amount of job mobility in a sector. The magnitude of job reallocation we demonstrate below is an indicator of the high degree of heterogeneity in employment growth. Differences in the job reallocation rate between sectors have been studied for the US by Davis and Haltiwanger (1992), Davis, Haltiwanger and Schuh (1994) and OECD (1994).

As can be seen from Table 11 the job reallocation rate increased over the three years (averages are 8.76 in 1980, 8.86 in 1984 and 10.76 in 1990). Moreover, the increase in the JR rate occurred principally outside private manufacturing: the JR rate increased in private

services and the public sector by over a third between the beginning and the end of the decade. There were also increases through time in the JR rate in both the union and non-union sectors: with the amount of job reallocation always higher in the non-union sector. Both small union and non-union establishments in the private sector experienced increases in the JR rate. Big union establishments experienced increases, while big non-union establishments experienced a decrease. The Table shows clearly that the private sector generates more job reallocation than does the public sector and that the non-union sector generates more than the union sector.

In line with the rest of this literature, all of the above analysis is made up of unconditional, bivariate tabulations. That is, in examining the effect of unionization for example on the JR rate, size, industry and other factors are not held constant. This is because it is not straightforward to imagine what sort of multivariate regression might be appropriate. The JC and JD rates are properties of aggregates, not individual establishments, as of course are measures of dispersion. However, the approach we adopt is to use the absolute value of the growth rate as a dependent variable. This is the establishment level analog of the aggregate job reallocation rate. High values of the dependent variable will be associated with features that produce both high positive and high negative growth rates. Features that affect the first moment of the employment growth distribution should generally not have a significant affect on the absolute growth rate.

In Table 12 we report the results of running a series of regressions with the absolute value of the one year growth rate as the dependent variable. We pool the data from all three of our surveys for private sector establishments only (yielding in total 3615 observations). We include as explanatory variables year dummies, industry dummies, the lagged employment level (measuring base year size), age of operation, whether the establishment was a single independent organization or not, union status, and a set of variables reflecting the demand conditions experienced by the establishment over the year preceding the interview date. As a guide to reading the Table, in column 1 only year dummies are

included; as we move to the right across from column 2-5 lagged employment, industry dummies, age of operation dummies and demand dummies are added in turn. In columns 6-8 separate results are presented from each of the three WIRS surveys. Job reallocation in 1984 is indistinguishable from 1980, but 1990 yields a significantly higher number confirming the results in the final row of Table 11 above. The negative coefficient on the lagged employment level supports the general idea that job turnover is lower among bigger establishments, but again, this is now confirmed in a multivariate context. In column four the age variables are strongly significant and suggest that the job reallocation rate declines with workplace age, holding constant size in the base year. Establishments older than 25 years have a particularly low JR rate: this is true in all years (see columns 6-8), despite some differences in the precise wording of the questions on age in 1990 compared with the earlier two years as discussed above. Union recognition does not appear to significantly affect job turnover. This is in conflict with the established evidence that unions affect the mean employment growth rate¹¹. In columns 5 through 8 of Table 12 three dummy variables are included to control for the state of demand in the establishment's main product market over the preceding year¹². As expected, most of these are insignificant; the exception is in 1980, when the demand down variable does significantly raise the JR rate (presumably, reduces the negative growth rates). This carries over to the pooled regression.

The single establishment dummy is also significant, indicating less job turnover among single establishments. Note that in this regression context, these figures are now controlling for size of establishment, industry, and union status. Assuming that the other right hand side variables control for most of the salient differences between establishments, this provides the first evidence of how much of the measured JRR is due to a firm simply reallocating a given set of jobs between its various establishments. It seems that given an average absolute growth rate of 11.6%, and a rate of (11.6-2.2)% from column 5 of Table 12 for single independent establishments, $((11.6-2.2)/11.6)*100=81\%$ of the measured JR rate is 'real'.

IV. Discussion

In this section we provide some commentary on the results, and in particular discuss implications for microeconomic modeling of employment growth. Looking first at the employment growth results, we emphasize two points: the range and the diversity of establishment employment growth. First, the range. Quite a large fraction of establishments experience substantial employment change over a year: in 1990, 35% of surviving plants grew or declined by 10% a year or more, in 1984, 28% did and in 1980, 31% did. It seems unlikely that idiosyncratic plant-level wage changes can account for much of these large changes. Given estimated wage elasticities of below unity, the required dispersion in real wage growth rates is not credible (see also Hamermesh (1993) p. 155). More likely candidates for the driving force behind changes of this magnitude are two elements included in standard labor demand models but typically de-emphasized by them: idiosyncratic demand shocks and technological change. These employment growth rates can be viewed as the labor market consequences of various facets of product market competition: product and process innovation, new product diffusion processes, entry and exit, product life cycles etc.. These will influence the evolution of the firm's demand and output and hence employment; firms at different points in the life-cycle of a product will face different employment growth distributions.

The second feature we emphasize is the differences in variability in employment growth between different sectors of the economy. For example, the higher degree of variability among manufacturing establishments (plants) is surprising because these plants are typically bigger than service establishments, and big establishments usually have lower growth/decline rates. Furthermore, manufacturers can manage inventories to smooth production and employment whereas service industries cannot. There may be a number of reasons for this result. One argument is that manufacturing markets are typically national or international in nature and more competitive. Small disturbances to demand or costs can therefore become magnified into large output and employment changes. Second, in

manufacturing industry there is potentially more scope for introducing innovations in products and processes. These, too, will act to increase the variance of employment growth rates.

We also showed that half of all jobs created come from about 10% of growing establishments (4% of all establishments); these are made up of large establishments growing moderately and medium-sized establishments growing rapidly; almost a third of them are in manufacturing. The same is true for job destruction, with a higher preponderance in manufacturing. It seems hard to offer a plausible explanation of this degree of concentration in terms of conventional labor demand models¹³. Rather it seems to fit more comfortably with a more dynamic view of JC&D: for example, the ideas of firm (establishment) entry and exit, of the growth and decline through the life cycle of a product, technology or firm. Thus the major job creators are those hitting a 'take-off' phase of their life-cycle. Other job creators are progressing through 'normal growth'. A similar story could be told about job destruction.

How can all the facts established here and elsewhere in the job creation and destruction literature best be explained? It seems that an approach based on conventional labor demand would make little impact on the diversity and concentration of growth rates. A similar conclusion is probably true of a simple sectoral flows model. The selection and passive learning model of Jovanovic (1982) seems more hopeful, but Davis and Haltiwanger (1992) provide some estimates to suggest that it can only account for a small part of job reallocation. Perhaps a model based on competition and innovation such as the one developed by Ericson and Pakes (1990) would fare better. Dropping the perfect competition assumption used by all the models set out in section I would allow firms to actively compete amongst themselves. There would be winners and losers; depending on the structure of the model, success would be more or less persistent. Again, it seems likely that some models of the introduction and diffusion of innovations would lead to the sort of concentration of employment gains and losses emphasized in section IV.

At the same time, macroeconomic events do impinge on this process. There has to be a role for aggregate shocks to affect some moments of the employment growth distribution. The precise channel through which this works is clearly of interest for the modeling of aggregate labor market phenomena such as unemployment.

V. Conclusions

It may be helpful to collect together some of the more important facts described above:

- * Employment growth rates, job creation, job destruction and job reallocation rates were higher at the end of the 1980s than they were at the beginning.
- * There was a considerable degree of diversity of experience. Even within narrow industry groups, there is a wide range of employment growth rates.
- * Correspondingly, the job creation and job destruction rates are substantial.
- * Employment growth distributions exhibit excess kurtosis: that is, there is a lot of weight both at the mean and in the tails.
- * Both job creation and job destruction are extremely concentrated: about 50% of each of these is accounted for by just 4% of continuing establishments.
- * There is evidence that employment growth in manufacturing plants is more variable than it is in private service sector workplaces. Given (an albeit weak) negative relationship between size and variability and that manufacturing establishments are bigger than service sector ones, this is very surprising.
- * The fortunes of a particular establishment are better characterized by persistence rather than mean reversion: growing establishments tend to continue growing and declining establishments tend to continue declining.
- * Non-union workplaces grow faster than union workplaces.
- * Small workplaces grow faster than big workplaces.
- * Young workplaces grow faster than older workplaces.

* Private service sector workplaces grow faster than workplaces in private manufacturing.

* Small workplaces with less than 100 employees account for a disproportionately large share of job creation and a disproportionately small share of job destruction. However, workplaces with at least 100 employees account for around one half of all jobs created and three-quarters of all jobs destroyed in a one year period.

We confirm the main findings of the gross job flows literature for the case of manufacturing in Britain¹⁴. As we set out earlier, these include the diversity of employment growth experience and the consequent large gross flows despite modest net employment changes. We also find similar patterns by size and age of establishment. However, using our data, we are able to go much further than this and examine data on establishments in both private services and the public sector. We show (Tables 7 and 11) that, contrary to what might have been imagined, the job reallocation rate is about the same in manufacturing as in private services (higher in the former in 1980 and 1984, higher in the latter in 1990). The job reallocation rate in the public sector is lower than in the private, but still substantial at 7%¹⁵. We also have data on unionization, so a second new contribution is to compare gross job flows between the union and non-union sectors. In fact, job reallocation is somewhat higher in the non-union sector, though the difference is more marked in larger workplaces. A final innovation is our presentation of multivariate evidence on job reallocation, using all the data in our sample. This enables us to disentangle the age and size effects, and to examine the extent of mobility between establishments within firms.

The results we have established above suggest to us that the driving forces behind the remarkable amount of job creation and destruction we have observed are likely to be found in product markets as well as in labor markets. The role of product market competition in generating a diversity of employment outcomes seems a fruitful avenue for further work; linking this with the features of labor markets and the use of new technology,

for example, may provide a model rich enough to explain the patterns we observe in the data.

Endnotes

Table 1. Mean Employment Growth Rates by Sector (%)

	1980		1984		1990		
	<i>1 year</i>	<i>5 year</i>	<i>1 year</i>	<i>4 year</i>	<i>1 year</i>	<i>3 year</i>	<i>6 year</i>
All Establishments	1.6	14.0	2.3	4.7	3.8	14.1	36.4
Private Sector	1.4	18.1	3.5	6.9	3.9	15.5	47.6
Public Sector	2.1	5.7	0.1	0.7	3.6	10.5	8.1
Private Manufacturing	-1.9	14.7	1.4	7.2	1.9	13.6	53.8
Private Non-Manufacturing	3.4	20.3	4.5	6.7	4.8	16.4	44.2
Union	1.1	5.9	1.1	-2.4	3.7	13.6	35.4
Non-Union	2.5	29.1	4.6	18.1	4.8	17.2	42.8

Notes: employment growth calculated as follows: $\frac{N_t - N_{t-1}}{N_{t-1}} * 100$ with the weights applied.

These are unweighted means of the weighted data.

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 2. Employment Growth Rates by Year (%)

	<i>weighted %</i>						<i>unweighted base</i>	<i>weighted base</i>
	<i>mean</i>	<i>annual-ized</i>	<i>sd</i>	<i>max</i>	<i>min</i>	<i>10-90</i>		
1980								
1 year	1.6	-	18.9	379.3	-93.9	29.4	1886	1862
5 year	14.0	2.7	68.6	3280.0	-95.1	81.7	1577	1521
1984								
1 year	2.3	-	21.4	314.3	-94.3	27.9	1813	1862
4 year	4.7	1.2	77.6	3450.0	-96.1	68.4	1624	1620
1990								
1 year	3.8	-	29.2	1003.2	-97.1	35.8	1705	1766
3 year	14.1	4.5	58.9	1241.2	-97.2	65.5	1441	1507
6 year	36.4	5.3	131.8	3928.8	-97.0	114.6	1191	1237

Notes: employment growth calculated as follows: $\frac{N_t - N_{t-1}}{N_{t-1}} * 100$ with the weights applied.

These are unweighted means of the weighted data.

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 3. Employment Growth (%) 1 Year Change in:

a) 1980

	Proportion of Establishments with Employment Growth Rate (%):					N
	-20	> -20 & -5	> -5 & < 5	5 & < 20	20	
All Establishments	5.3	21.3	46.9	18.5	8.0	1862
Private Sector	6.5	20.7	44.5	19.4	8.9	1270
Public Sector	2.9	22.6	52.1	16.5	6.0	592
Manufacturing	10.1	22.8	42.0	18.7	6.3	482
Private Services	3.0	20.3	48.3	18.5	9.9	702
Public Services	2.2	22.6	52.7	16.5	5.9	530
Union	5.1	22.4	48.6	16.9	6.8	1193
Non-union	5.7	19.3	43.7	21.3	10.0	669
Private -- Union	6.9	22.4	45.8	17.4	7.5	637
Private -- Non-union	6.1	19.0	43.1	21.5	10.3	633

Source: Workplace Industrial Relations Survey, 1980

Base: all establishments reporting employment at the time of the survey and one year earlier.

b) 1984

	Proportion of Establishments with Employment Growth Rate (%):					N
	-20	> -20 & -5	> -5 & < 5	5 & < 20	20	
All Establishments	4.7	19.2	48.9	19.0	8.3	1862
Private Sector	5.7	18.5	42.9	21.5	11.3	1199
Public Sector	2.8	20.4	59.6	14.4	2.8	663
Manufacturing	7.5	20.2	38.5	23.8	10.0	410
Private Services	4.1	19.0	45.7	20.9	10.2	716
Public Services	2.7	19.9	60.8	13.6	3.0	613
Union	5.4	20.9	51.6	16.6	5.6	1240
Non-union	3.2	15.7	43.4	23.8	13.7	622
Private -- Union	8.2	21.1	42.7	18.8	9.1	588
Private -- Non-union	3.3	16.0	43.1	24.1	13.4	611

Source: Workplace Industrial Relations Survey, 1984

Base: all establishments reporting employment at the time of the survey and one year earlier.

c) 1990

	Proportion of Establishments with Employment Growth Rate (%):					N
	-20	> -20 & -5	> -5 & < 5	5 & < 20	20	
All Establishments	5.3	16.4	44.9	22.1	11.3	1766
Private Sector	6.1	17.7	38.3	24.0	13.9	1255
Public Sector	3.2	13.2	61.1	17.5	5.0	511
Manufacturing	7.4	23.0	38.7	19.7	11.2	403
Private Services	5.2	15.2	36.4	27.5	15.7	771
Public Services	3.1	12.1	61.9	17.8	5.1	499
Union	4.3	16.5	52.3	18.9	7.9	898
Non-union	6.3	16.3	37.2	25.4	14.8	868
Private -- Union	5.6	19.4	45.3	19.5	10.3	458
Private -- Non-union	6.4	16.7	34.2	26.6	16.0	797

Source: Workplace Industrial Relations Survey 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 4: Employment Growth by Base Year Plant Size

BaseYear Plant Size	growth rate (%)					Mean Growth Rate %	weighted base	unweighted base
	- 20	-20 < -5	-5 < < 5	5 < 20	20			
1980: 1 yr							1862	1886
49	5	20	46	19	11	4.41	937	345
>49 & 99	5	21	48	21	5	0.04	464	341
>99 & 199	7	26	44	18	5	-1.88	258	372
>199 & 499	7	24	56	11	2	-3.20	139	337
>499 & 999	8	19	52	18	3	-2.94	39	241
> 999	7	30	50	13	1	-3.88	25	250
1984: 1 yr							1862	1813
49	3	20	47	20	10	4.31	972	328
>49 & 99	4	18	51	18	8	1.58	469	336
>99 & 199	8	17	50	18	8	-0.14	242	338
>199 & 499	8	22	51	18	1	-3.03	121	301
>499 & 999	10	18	52	18	2	-5.23	37	251
> 999	5	26	58	10	1	-3.97	21	259
1990: 1 yr							1766	1705
49	2	14	46	26	13	6.95	943	312
>49 & 99	9	19	44	17	10	0.59	466	318
>99 & 199	8	21	44	17	10	0.13	210	294
>199 & 499	7	18	46	23	6	-0.39	108	287
>499 & 999	4	22	57	14	2	-1.72	26	195
> 999	8	19	53	14	6	-3.40	14	299

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey **and** one year earlier.

Table 5. Persistence of Plant Level Employment Growth

	<i>growth rate 1987 - 1990 (%)</i>						<i>unweighted base</i>
		- 20	-20 & < -5	-5 < & < +5	+5 & < 20	+20	
<i>growth rate 1984-1987 (%)</i>	- 20	27	22	14	13	25	93
	-20 & < -5	20	39	21	14	6	221
	-5 < & < +5	11	23	35	21	10	352
	+5 & < +20	6	13	23	33	24	278
	+20	8	13	9	21	49	246
	These are row percentages						1190

Notes: weighted by 1990 weights

Source: Workplace Industrial Relations Survey, 1990

Base: all establishments reporting employment at the time of the survey and three years earlier.

Table 6: Job Creation and Destruction by Sector: Totals.

	Private Manufacturing	Private Non-Manufacturing	Public Sector	Union Sector	Number of Jobs	Weighted number of establishments
a) % of JC						
1980	28	39	32	70	7922	755
1984	33	43	24	65	7387	789
1990	27	48	25	54	9262	845
b) % of JD						
1980	58	20	22	80	11449	760
1984	45	27	28	89	10351	745
1990	30	35	35	68	9034	604
c) % Employment						
1980	41	25	34	80	221002	1862
1984	30	29	41	80	200053	1862
1990	29	37	34	66	170067	1766

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier. Weighted data.

Table 7: Job Creation and Destruction Rates by Sector

	Private Manufacturing	Private Services	Private Sector	Public Sector	Union Sector	Non-union Sector	Overall	Weighted number of establishments
a) JC rate								
1980	2.48	5.18	3.71	3.56	3.12	5.48	3.58	755
1984	3.92	4.82	4.73	2.35	3.00	6.46	3.69	789
1990	5.02	7.43	6.21	3.97	4.44	7.41	5.45	845
b) JD rate								
1980	7.25	3.79	6.20	2.50	5.19	5.15	5.18	760
1984	7.94	4.26	6.33	3.16	5.74	2.91	5.17	745
1990	5.40	4.94	5.24	5.45	5.48	4.99	5.31	604

Notes: these are weighted (Davis-Haltiwanger) rates.

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 8: Job Creation and Destruction by Establishment Size

	Share of JC (1)	Share of JD (2)	Share of Employment (3)	Share of Establishments (4)	(1)/(3)	(2)/(3)
1980						
49	27	10	15	50	1.9	0.7
49 < 99	17	11	14	25	1.2	0.8
99 < 199	19	19	16	14	1.2	1.4
199 < 499	11	21	19	7	0.6	1.1
499 < 999	11	15	13	2	0.9	1.1
999	14	23	23	1	0.6	1.0
1984						
49	28	12	17	52	1.6	0.7
49 < 99	20	10	16	25	1.3	0.6
99 < 199	21	16	17	13	1.3	0.9
199 < 499	14	21	18	6	0.8	1.1
499 < 999	8	20	12	2	0.6	1.6
999	8	22	20	1	0.4	1.1
1990						
49	27	9	19	53	1.4	0.5
49 < 99	21	19	18	26	1.1	1.0
99 < 199	18	18	17	12	1.1	1.1
199 < 499	18	22	19	6	0.9	1.1
499 < 999	6	9	10	1	0.6	0.9
999	10	21	15	1	0.7	1.4

Note: Plant size is reported as the base year, so for 1980 it is 1979 employment and so on.

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990.

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 9: Job Creation and Job Destruction: Private Sector Union and Non-Union Establishments

	Total JC	Total JD	JC Rate	JD Rate	% growing	% declining	Total Empt.	No. of Estabs.	Avge. Size
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1980									
BIG: Union	1468	4458	2.2	6.6	33.9	64.2	67458	103	655
BIG: Non-Union	325	807	3.6	9.0	43.4	44.7	8943	24	373
SMALL: Union	1634	2321	4.5	6.4	39.2	43.0	36422	535	68
SMALL: Non-Union	1944	1394	6.1	4.3	44.1	33.8	32015	609	52
1984									
BIG: Union	1010	4535	2.2	10.1	32.5	64.1	44956	75	599
BIG: Non-Union	362	197	4.3	2.4	55.7	39.5	8344	21	397
SMALL: Union	2021	1779	6.0	5.3	42.5	42.2	33560	512	65
SMALL: Non-Union	2199	971	7.0	3.1	52.4	30.1	31284	591	53
1990									
BIG: Union	1254	1861	3.8	5.6	42.8	52.2	33163	68	488
BIG: Non-Union	843	479	7.6	4.3	54.9	39.4	11106	28	397
SMALL: Union	1570	1277	6.1	5.0	45.5	40.5	25522	390	65
SMALL: Non-Union	3303	2263	7.8	5.3	53.0	32.6	42404	769	55

Note: All private sector establishments. Big (small) means more than 200 (200 or less). This refers to initial year (ie. 1979 for 1980).

JC&JD Rates are calculated as the size-weighted means of the growth rates (Davis-Haltiwanger) in the relevant category.

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 10: Job Creation and Destruction by Age of Establishment

Age (years)	JC	JD	Employment	Employment Growth Rate	JC Rate	JD Rate	Weighted # of Estabs.
Share of Total (%)				%	%	%	
1980							
< 3	5	0	1	23.5	19.2	2.9	27
3 & < 5	4	4	3	0.26	5.3	8.7	50
5 & < 10	15	8	10	4.88	5.5	4.8	158
11 & < 25	32	25	25	2.24	4.9	6.4	333
25	43	63	62	-1.07	2.6	6.4	656
TOTAL	5248	8856	141422	1.40	3.7	6.3	1270
1984							
< 3	3	2	1	45.32	15.7	12.8	27
3 & < 5	5	1	4	4.92	8.0	3.1	59
5 & < 10	12	11	10	4.30	7.6	9.8	151
11 & < 25	31	20	28	2.65	7.0	6.3	342
25	48	65	56	1.51	5.4	10.1	591
TOTAL	7306	10141	115581	3.48	6.3	8.8	1199
1990*							
< 3	8	7	6	7.09	8.6	6.3	90
3 & < 5	11	13	8	4.11	8.5	9.2	120
5 & < 10	21	13	13	9.19	10.5	5.4	206
11 & < 25	23	24	21	2.73	6.7	5.8	287
25	37	43	53	1.84	4.3	4.4	535
TOTAL	6816	5846	110716	3.86	6.2	5.3	1255

Notes: Note in 1990 the question asked was slightly different: "For how long has this establishment been operating here at this address?" whereas in the previous two years it was: "How long ago did the establishment first engage in its main activity?" From the distribution of employment, it seems that the difference matters, so 1990 is not strictly comparable.

Employment growth calculated as follows: $\frac{N_t - N_{t-1}}{N_{t-1}} * 100$ with the weights applied. Private Sector only

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 11. Job Reallocation Rate by Sector

<i>Sector</i>	<i>1979/1980</i>	<i>1983/1984</i>	<i>1989/1990</i>
Private Manufacturing	9.7	11.9	10.4
Private Services	9.0	9.1	12.4
Private sector	9.9	11.1	11.5
Public sector	6.1	5.5	9.4
Union sector	8.3	8.7	9.9
Non-union sector	10.6	9.4	12.4
Big* union - private sector	8.8	12.3	9.4
Small* union - private sector	10.9	11.3	11.1
Big* non-union - private sector	12.6	6.7	11.9
Small* non-union - private sector	10.4	10.1	13.1
< 200 employees - private sector	9.3	10.8	12.3
200 employees - private sector	10.7	10.7	10.2
Overall	8.8	8.9	10.8

Notes: * 'Big' defined as having at least 200 employees in the base year. 'Small' defined as having less than 200 employees in the base year.

Source: Workplace Industrial Relations Surveys, 1980, 1984 and 1990

Base: all establishments reporting employment at the time of the survey and one year earlier.

Table 12. OLS Absolute Growth Rate Regressions.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
						1980	1984	1990
1984 dummy	0.547 (0.76)	0.489 (0.69)	0.593 (0.84)	0.454 (0.64)	0.762 (1.03)	n/a	n/a	n/a
1990 dummy	1.728* (2.47)	1.746* (2.51)	1.953** (2.81)	1.517* (2.18)	2.313** (3.01)	n/a	n/a	n/a
E_{t-1}		-1.168** (5.41)	-1.184** (5.06)	-1.103** (4.36)	-1.087** (4.29)	-.956* (2.20)	-1.430** (3.22)	-0.925* (2.09)
Industry dummies	No	No	8	8	8	8	8	8
Single independent				-2.415** (3.05)	-2.176** (2.72)	-1.647 (1.27)	-3.422* (2.35)	-2.343 (1.58)
Age 3-5 years				-5.456** (2.96)	-5.446** (2.95)	-7.877* (2.08)	-8.958* (2.47)	-2.584 (0.98)
Age 5-10 years				-5.937** (3.88)	-5.900** (3.84)	-9.207** (3.20)	-7.280* (2.49)	-1.909 (0.80)
Age 11-25 years				-7.739** (5.55)	-7.771** (5.57)	-9.319** (3.53)	-8.939** (3.37)	-5.144* (2.38)
Age 25 years +				-9.268** (6.93)	-9.287** (6.94)	- (4.23)	-8.117** (3.14)	-9.181** (4.56)
Union recognition				-0.029 (0.04)	-0.026 (0.04)	0.247 (0.21)	0.918 (0.78)	-0.620 (0.52)
Demand up					1.152 (1.66)	1.920 (1.48)	.417 (0.37)	1.499 (1.19)

Demand down					2.321**	2.794*	2.390	0.350
					(2.65)	(2.26)	(1.39)	(0.16)
Demand DK					.0274	.745	-2.548	2.680
					(0.02)	(0.32)	(0.65)	(0.43)
Constant	10.090	16.227	15.081	23.865	22.802	22.478	23.682	25.908
F	3.1796	11.884	9.877	10.618	9.426	3.675	4.894	5.010
\bar{R}^2	.001	.009	.026	.044	.045	.037	.059	.055
DF	3612	3611	3603	3597	3594	1258	1121	1236

a. Dependent variable is the absolute 1 year growth rate (weighted mean=11.59: in 1980=10.65; 1984=11.62; 1990=12.51). T-statistics in parentheses.

* Statistically significant at the .05 level; ** at the .01 level of significance (two-tailed tests).

Source: WIRS1, WIRS2 and WIRS3. Base: all private sector establishments

References

Anderson, Patricia M., and Bruce D. Meyer. 1994. "The extent and consequences of job turnover". Brookings Papers on Economic Activity - Microeconomics, pp. 177-248.

Baldwin, John R. and Paul K. Gorecki. 1990. Structural Change and the Adjustment Process: Perspectives on Firm Growth and Worker Turnover Canadian Government Publishing Centre, Ottawa.

Blanchflower, David G.. 1994. "Job creation and job loss: research questions arising from the use of establishment based data." Paper presented to the OECD Conference on 'Job creation and job loss: analytical and policy issues and data development', Paris, France, November.

Blanchflower, David G., and Neil Millward. 1988. "Trade unions and employment change: an analysis of British establishment data." European Economic Review, Vol. 32, pp.717-726.

Blanchflower, David G., Neil Millward and Andrew J. Oswald. 1991. "Unionization and employment behaviour." Economic Journal, Vol. 101, No. 407, pp. 815-834.

Boeri, Tito and Ulrich Cramer. 1992. "Employment growth, incumbents and entrants; evidence from Germany", International Journal of Industrial Organization, 10 (December) pp. 545-565.

Bronars, Stephen G. and Donald R. Deere. 1993. "Union organizing, firm growth and the business cycle." American Economic Review, Vol. 83(1), pp. 203-220.

Caballero, Ricardo J. 1992. "A Fallacy of Composition." American Economic Review, Vol. 82(5), pp. 1279-1292.

Chesher, Andrew D. 1979. "Testing the Law of Proportionate Effect." Journal of Industrial Economics, Vol. 27, pp. 403 - 411.

Contini, Bruno and Riccardo Revelli. 1993. "Gross Flows vs Net Flows: What is there to be Learned?." Unpublished paper.

Daly, Michael, Martin Campbell, Geoffrey Robson and Colin Gallagher . 1991. "Job Creation 1987-89: The contributions of small and large firms." Employment Gazette, Vol. 99, No. 11, November, pp. 589 - 596.

Daniel, William W. and Neil Millward. 1984. Workplace Industrial Relations in Britain, Heinemann, London.

Davis, Steven J. and John Haltiwanger. 1990. "Gross Job Creation and Destruction: Microeconomic Evidence and Macroeconomic Implications." NBER Macroeconomics Annual V, pp. 123 - 168

Davis, Steven J. and John Haltiwanger. 1992. "Gross Job Creation, Gross Job Destruction and Employment Reallocation." Quarterly Journal of Economics, Vol. 107, pp. 819 - 864.

Davis, Steven J, John Haltiwanger and Scott Schuh. 1994. "Job Creation and Destruction in US Manufacturing: 1972 - 1988." Monograph, University of Chicago.

Dunne, Timothy, Mark J. Roberts and Larry Samuelson. 1989a. "Plant Turnover and Gross Employment Flows in the US Manufacturing Sector." Journal of Labor Economics, Vol. 7, pp. 48 - 71.

Dunne, Timothy, Mark J. Roberts and Larry Samuelson. 1989b. "The growth and failure of U.S. manufacturing plants." Quarterly Journal of Economics, Vol. CIV, No. 4, pp. 671-698.

Freeman, Richard B, and Morris M. Kleiner. 1990. "Employer behavior in the face of union organizing drives." Industrial and Labor Relations Review, Vol. 43, No. 4, pp. 351-363.

Gallagher, Colin C. and H. Stewart. 1986. "Jobs and the business life cycle in the UK." Applied Economics, Vol. 18, pp. 875 - 900.

Gallagher, Colin C., Michael J. Daly and Jeremy Thomason . 1990. "The growth of UK companies 1985-87 and their contribution to job generation." Employment Gazette February, pp. 92 - 98.

Gallagher, Colin C., Michael J. Daly and Jeremy Thomason. 1991. "The growth of UK companies and their contribution to job generation, 1985-87." Small Business Economics Vol. 3, No. 4, pp. 269 - 286.

Geroski, Paul A. 1991. Market Dynamics and Entry. Blackwell, Oxford

Gibrat R. 1931. Les inegalites economiques. Paris.

Hamermesh, Daniel S. 1993. Labor Demand. Princeton University Press, Princeton, N.J..

Jovanovic, Boyan. 1982. "Selection and the Evolution of Industry." Econometrica, Vol. 50, pp. 649 - 670.

Konings, Jozef. 1992. "Job Creation and Destruction in the UK Manufacturing Sector 1972 - 1986: Microeconomic Evidence." Centre for Economic Performance Working Paper no. 200, London School of Economics.

Lane, Julia I., David Stevens and Alan G. Isaac. 1992. "Workers and Jobs: Firm-Specific Contributions to Worker Turnover." Unpublished paper, The American University, Washington

Leonard, Jonathan S. 1992. "Unions and employment growth." Industrial Relations, Vol. 31, No. 1, pp. 80-94.

Leonard, Jonathan S. and Marc A. van Audenrode. 1993. "Corporatism Run Amok: Job Stability and Industrial Policy in Belgium and the United States." Economic Policy, 17, pp. 355-400.

Lilien, David M. 1982. "Sectoral Shifts and Cyclical Unemployment." Journal of Political Economy, Vol.90, pp. 777 - 793.

Long, Richard J. 1993. "The effect of unionization on employment growth of Canadian companies." Industrial and Labor Relations Review, Vol. 46, No. 4, pp. 81-93.

Millward, Neil and Stevens, Mark. 1986. British Workplace Industrial Relations, 1980-1984, Aldershot: Gower Press.

Millward, Neil, Mark Stevens, David Smart. and William R. Hawes. 1992. Workplace Industrial Relations in Transition, Dartmouth Publishing Co., Aldershot.

Nickell, Stephen. J. and Sushil Wadhvani. 1991. "Employment Determination in British Industry: Investigations using Micro data." Review of Economic Studies Vol. 55 pp. 955 - 970

Organization of Economic Cooperation and Development. 1994. "Job gains and job losses in firms" in Employment Outlook, 1994, Paris, France, pp. 103-135.

Pakes Ariel and Richard Ericson. 1990 "Empirical Implications of alternative models of firm dynamics" working paper, Yale University.

Storey, David, J. 1985. "Manufacturing employment change in Northern England, 1965-78: the role of small businesses". In David J. Storey (Ed.) Small Firms in Regional Economic Development: Britain, Ireland and the United States. Cambridge University Press, Cambridge, UK.

Wagner, Joachim. 1992. "Firm size, firm growth and persistence of change: testing Gibrat's Law with establishment data from Lower Saxony." Small Business Economics, Vol. 4, No. 2, pp. 125-132.

¹ We use the terms 'establishment' and 'workplace' synonymously. The term 'plant' is only used for manufacturing establishments.

² Sample sizes (unweighted) were: in 1980, n=2040, in 1984, n=2019 and in 1990, n=2061. For convenience, the results have been weighted to a base of 2000 in each year.

³ A small panel of some 210 establishments (public and private sector) is also available for the years 1980-1984. This proved too small for meaningful analysis. A larger trading sector panel is also available with 537 cases for the years 1984-1990. Our analysis of this proved to be unfruitful primarily because of discrepancies between data from the different surveys. In some cases it was apparent that the establishment had been defined more or less widely at different points in time. This may be due to the long time between the two interview dates or the probable use of different respondents, but whatever the reason, we do not feel able to present results here using this data.

⁴ There were 22,458,000 employees in employment in June 1980, 20,741,000 in June 1984 and 22,325,000 in June 1994. Consequently WIRS1 was representative of 72.6% of employees compared with 71.8% for WIRS2 in 1984 and 69.9% for WIRS3 in 1990. (Source: Employment Gazette, January, 1992)

⁵ Employees in employment in Great Britain were obtained from Employment Gazette, May 1992, Table 1.2.

⁶ Typically, employment is related to the real wage, the capital stock and some demand shock variables with some more or less complex dynamic structure.

⁷ An interest in the variance of employment growth rates in a cross-section sense is not new in this area. Lilien (1982) looks at this and examines its correlation with the aggregate unemployment rate. Davis and Haltiwanger (1990) consider explanations of the temporal pattern of job creation and destruction in terms of what they call "reallocation intensity". This is clearly related to the variance of employment growth shocks across firms, though they do not express it in those terms.

⁸ In the sense described in the previous section; they are not further weighted by their size. This means that it is possible (as happens in 1980 and 1984) for the average growth rate to be positive, but total employment to fall.

⁹ For example, the average size of plants in 1990 in the top decile of JC (JD) is 306 (405), while average size in the decile below is 132 (137).

¹⁰ In fact Davis and Haltiwanger divide by the average of current and lagged employment to cope with new plants for whom N_{t-1} is zero. As we do not have that problem, we simply divide by lagged employment. This means that the job creation and destruction rates reported here will be slightly larger than would be the case if we followed the Davis-Haltiwanger convention. On the other hand, of course, since our data exclude births and deaths of firms, our measures of job flows will be lower than studies which can include these. The two measures are monotonically related.

¹¹ See, for example, Blanchflower, Millward and Oswald (1991), Leonard (1992) and Long (1993)

¹² The main management respondent at each workplace was asked "Over the past twelve months would you say that demand for the main products or services of this establishment has been rising, falling, neither or don't know". The weighted proportions of responses in each category by year were as follows

	1980	1984	1990
Demand rising	36.0	57.8	28.5
Demand falling	29.0	10.0	5.6
Demand constant	26.7	30.6	39.1
Demand - don't know	8.3	1.6	5.0

¹³ Of course, if we write $N^d = - .w +$, we can always trivially assign desired properties to . This does not really count as explanation, though.

¹⁴ We cannot address time series issues because we have cross-sections at three dates only (1980, 1984 and 1990).

¹⁵ Again, recall that as we have no births or deaths, this is a lower bound.

Figure 1a. Concentration of Job Creation, 1980, 1984, and 1990.

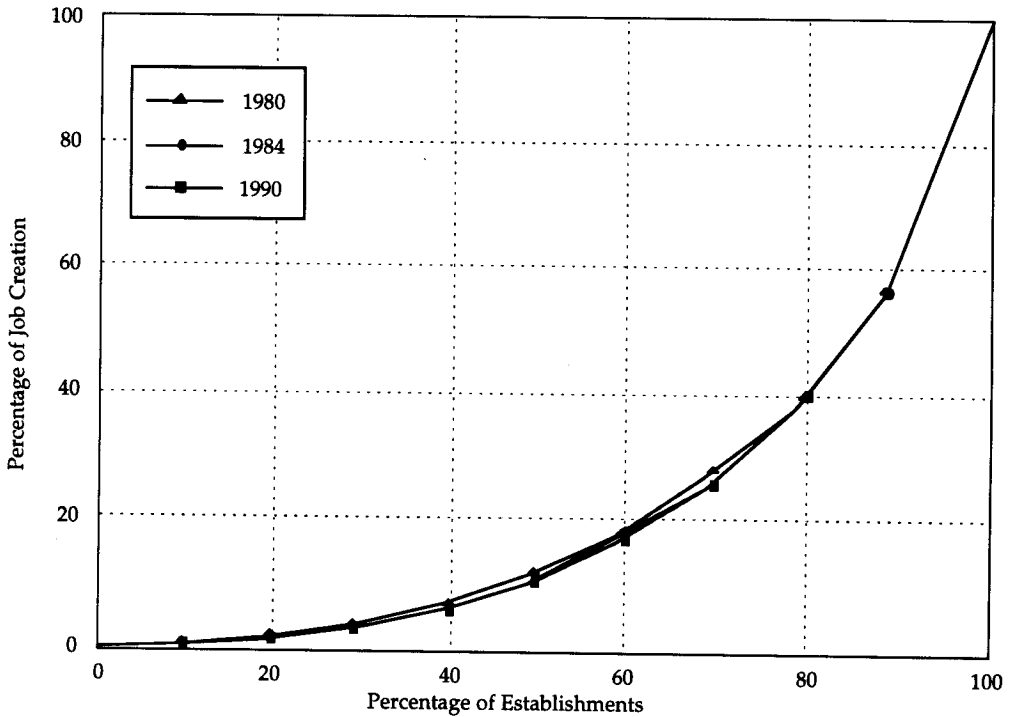


Figure 1b. Concentration of Job Destruction, 1980, 1984, and 1990.

