

Employment Creation and Destruction: An Analytical Review

by Randall W. Eberts and Edward B. Montgomery

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Introduction

Most assessments of labor market performance over a business cycle or across regions focus on changes in net employment rates. Hidden behind the veil of these aggregate numbers are four components of employment change: jobs gained from business openings, jobs gained from business expansions, jobs lost from business contractions, and jobs lost from business closings. In the last several years, a number of studies have identified and examined these components over time and across regions to gain additional insights into the performance and dynamics of labor markets.

Labor market dynamics are characterized by two types of turnovers. One is the transition of workers into and out of positions; the second is the change in the number of jobs. While these decisions are interrelated, they are aligned with supply and demand responses. Workers move between jobs to better match their skills, wage expectations, and workplace preferences with the attributes of the position. Businesses change the number and type of employment positions in response to shifts in product demand and factor costs. Traditionally, research on labor market dynamics has concentrated on

the supply-side responses to labor market shocks by examining worker decisions to move into and out of the labor force or between employment and unemployment. This paper focuses on jobs by tracking employment changes resulting from the opening, expansion, contraction, and closing of individual establishments. Examining the components of job creation and destruction provides insight into the employment turnover process beyond what can be learned by looking only at the flow of workers.

Our objectives are twofold. First, we review previous studies of job creation and destruction to see what consensus has emerged about the demand-related side of labor market dynamics. Second, we present new evidence from several sources to augment existing evidence on differences in the causes of high- and low-frequency movements in employment. In particular, we look at whether the components of cyclical and secular (regional) variations in job growth follow similar patterns. Are fluctuations in employment over business cycles correlated more with variations in job creation (openings and expansions) than with variations in job destruction (contractions and closings)? Is employment growth in some regions characterized by greater job creation or fewer job losses?

While these two questions appear to be similar, none of the earlier studies has directly compared the behavior of cyclical and regional employment components. Our evidence suggests that these components behave quite differently over time and across regions. We find that employment fluctuations over business cycles are associated primarily with job destruction, whereas employment differences across regions are associated more with job creation.

These insights may have important policy implications at both the local and national levels. For instance, since regional employment differences are correlated more with job creation than with job destruction, state and local policies aimed at promoting new firm creation and expansion might be more fruitful in the long run than those directed toward aiding ailing firms. On the other hand, since cyclical employment is associated more with job destruction, it may be prudent to design policies to help firms through economic downturns so that fewer workers are laid off and less hardship is incurred. Clearly, definitive policy recommendations must await a more structural analysis of the determinants of job creation and destruction. Nonetheless, the results presented here may be of value in guiding this structural modeling and may serve as a cautionary note to policymakers that existing actions could be working against the economic forces that generate employment growth.

I. Definitions and Data

Studies of the demand-side components of employment change depend on longitudinal establishment-level data. By definition, an establishment is considered an opening if it did not exist at the beginning of the period but did exist at the end. A closing is defined conversely. Therefore, employment gains from openings are the sum of employment in establishments that were not present at the beginning of each period but that did exist at the end. Employment losses from closings refer to employment at those establishments that were in the data set at the beginning of the period but absent at the end. Employment shifts due to expanding or contracting firms are based on job changes at those entities that are present at both the beginning and the end of each period.

Two issues arise in constructing the data sets that could affect the relative contributions of the four components of net employment change. The first is the frequency of observations. The proportion of jobs created from openings or expansions (or lost as a result of closings or contractions) is sensitive to the length of time between the beginning and the end of the period used to construct each component. Given a time-invariant stochastic process of openings and closings, a greater proportion of employment gains would be attributed to openings than to expansions as the period between observations lengthens. To illustrate, consider the extreme case in which the time period chosen is from 1789 to the present. Here, virtually all U.S. employment would have been generated from openings. Obviously, job creation — openings and expansions combined — would not be affected by the frequency of observations. The same is true for job destruction.

The second issue is the construction of the opening and closing components. From an economic perspective, one would define a "new establishment" as a newly created institution, typically located in one place, that combines labor, capital, and purchased inputs to produce goods or services. All studies basically agree with this definition. However, because of variations across data sets in the ability to track and identify firms, studies differ in implementing this definition, which is sensitive to the treatment of mergers and acquisitions, changes in management or ownership, and the movement of establishments from one location to another.

Identifying the four employment components requires extensive data collection. At present, only three U.S. data sets are appropriate for such analyses: the Unemployment Insurance/ES202 data, the Longitudinal Research Datafile, and several extracts of Dun & Bradstreet credit records. Since all three are derived from information collected for purposes other than constructing a longitudinal file of employment, each has its strengths and weaknesses. In describing these data sets, we will concentrate on coverage, frequency of observations, firm-versus establishment-level data collection, and treatment of mergers and acquisitions.

Description of Data Sets

State-Specific Files

Unemployment Insurance (UI) tax records and ES202 reports provide state-specific data suitable for longitudinal analysis. Employers with more than a minimal number of employees (usually more than one) are required to pay taxes to finance the UI program. Because these are tax payments, states carefully monitor the filings to ensure compliance and accuracy of the returns. One drawback of the UI tax records is that they are collected at the firm level, which means that for multi-unit enterprises, data do not exist for individual plants or branches. To circumvent this problem, researchers have supplemented the UI data with ES202 records. States collect these records at the establishment level as part of the Bureau of Labor Statistics' program to enumerate employment and payroll.

By combining these two data sets, researchers have created longitudinal files of individual establishments that offer a broad coverage of industries and firms of various sizes. Data are typically collected on an annual basis so that the beginning and ending period for each interval of observations is one year. Establishments are identified by their tax identifier number, which is altered only when a significant change in corporate structure or ownership occurs. Most studies treat mergers and relocations of establishments across county boundaries as a legitimate change in an establishment's identity. Some researchers, such as Jacobson (1985), have used predecessor and successor files to track establishments more accurately and to provide a better accounting of openings and closings.

One major drawback of the UI data is their limited geographical scope. So far, information from only three states — Wisconsin, Pennsylvania, and Tennessee — has been used to study employment dynamics, although other states, including Illinois, Maryland, Ohio, and Missouri, have made their data available to researchers.

Censuses and Surveys of Manufacturers

The Census Bureau collects detailed information about manufacturing establishments on a yearly basis through the Annual Surveys of Manufacturing and on a decennial basis through the Census of Manufactures. The latter includes a com-

plete accounting of all manufacturing firms in 1967, 1972, 1977, 1982, and 1987. The annual surveys provide a probability-based sample of roughly 25 percent of these establishments.

Two different longitudinal manufacturing data sets have been constructed from the Census of Manufactures files. The first, by Dunne, Roberts, and Samuelson (1989), links the censuses, forming a panel that observes manufacturing establishments every five years. The second, constructed by the Census Bureau and called the Longitudinal Research Datafile (LRD), links both the annual surveys and the decennial censuses to form a panel with annual and quarterly observations. These data have been used by researchers, most notably Davis and Haltiwanger (1990), to estimate high-frequency employment dynamics. The primary advantage of the LRD is that it combines high-frequency observations with a sufficiently long time series to look at cyclical changes. The five-year panel used by Dunne et al., on the other hand, takes advantage of a complete census of manufacturing establishments, but misses elements of transitory or short-run employment dynamics, since establishments are created and destroyed within these five-year intervals.

The longitudinal matching of manufacturing establishments is based on plant identification, which does not change if firm mergers and acquisitions simply reflect a transfer of ownership. Although matching problems still arise (see Dunne and Roberts [1986] for details), the data set measures actual firm exits and entries as accurately as does any other source. The major drawback of the census-based files is coverage. Because these data include only manufacturing industries, they are not suitable for studying employment dynamics in other sectors and may not represent the economy as a whole.

Dun & Bradstreet Data

The Dun & Bradstreet Company maintains information on nearly 5 million businesses in every major industry and region of the country in order to assess their creditworthiness. The advantage of these data is their broad coverage of industries and regions. Birch (1981) was the first to use Dun & Bradstreet numbers to construct longitudinal files of establishments. During the early 1980s, the Small Business Administration (SBA) contracted with Catherine Armington and Marjorie Odle of the Brookings Institution to construct a

longitudinal establishment database from the Dun & Bradstreet files. We use the SBA's extract of their work later in this paper.

Data sets derived from Dun & Bradstreet files have several problems that are not present in files derived from census data. One drawback stems from the fact that the Dun & Bradstreet data set is neither a census, as is the Census of Manufactures, nor a scientifically sampled survey, such as the Survey of Manufactures. Dun & Bradstreet collects information on individual firms and establishments simply to assess their credit ratings. Therefore, biases may exist in either the identification of establishments, the number and type of establishments sampled, the frequency of sampling, or the updating of records.

In particular, Dun & Bradstreet changes an establishment's identification if it is merged or acquired. This practice may lead to overestimating the number of openings and closings, since a change in ownership is counted in both categories. Howland (1988), in examining selected industries, finds that this feature of the Dun & Bradstreet data does not induce a serious bias.

On the other hand, Dun & Bradstreet is sometimes slow to include new firms and tends to miss some openings completely, since new branches of multi-establishment firms are not counted unless they file separate credit reports. Thus, the failure to update records on a timely basis may underestimate the jobs lost due to closings and gained due to openings.^{1,2}

Jacobson (1985) compares Dun & Bradstreet data with UI data for Texas. He finds two somewhat offsetting biases. Reporting lags and failure to characterize openings and continued operations properly led the Dun & Bradstreet data to

overestimate employment and employment change from openings relative to closings in small, independent firms. At the same time, employment in large, multi-unit firms was underestimated. With these offsetting biases, Jacobson concludes that measurements of overall employment growth with Dun & Bradstreet data are reasonably accurate, but that openings may be overestimated compared to closings.

In sum, each data set has advantages and disadvantages in constructing the four employment components and in analyzing the job turnover process over time and across regions. The general consensus is that manufacturing data sets derived from census figures are probably the least problematic. However, by including only manufacturing, they provide the narrowest coverage, with only 17 percent of the U.S. workforce represented — and this share continues to decline. Thus, to provide broader coverage and the ability to generalize beyond manufacturing, it is instructive to compare employment components derived from various data sets.

II. Summary of Previous Studies

Table 1 summarizes the employment components reported by various studies that use the three data sets previously described. Comparisons among these studies are somewhat difficult: Not only do the data sets differ in construction, but wherever possible, analysts have chosen to study different years and to use intervals of different lengths in constructing the components. Even so, several similarities stand out.

First, gross employment flows are generally larger than net employment changes. For instance, Leonard (1987) finds that although net employment increased on average only 2.8 percent per year between 1977 and 1982, enough new jobs were created to boost total employment by 13.8 percent, and enough jobs were lost to reduce employment by 11 percent. While the magnitudes of these gross flows vary, all of the studies listed exhibit the same relationship between gross and net flows. Thus, net employment changes substantially understate the amount of turnover, or job creation and destruction, taking place in the market.

Leonard offers further evidence of significant job turnover not shown in the table. His analysis shows that shrinking establishments reduce their employment by an average of 21 percent per year, while growing establishments increase their employment by an average of 30 percent

■ 1 Some researchers have adjusted for this undercounting by following a two-step imputation method. First, they estimate the rate at which Dun & Bradstreet recorded start-ups between 1969 and 1980 for each of several industries. They then multiply the actual openings contained in the files by the appropriate absorption rates to approximate the incidence at which start-ups actually occurred. However, Howland (1988) and Jacobson (1985) point out several problems with this method. First, it assumes a constant absorption rate, which does not take into account the improvement in Dun & Bradstreet's recording of openings during the 12-year period. Second, it makes the unrealistic assumption that employment creation at nonsampled firms is the same as at sampled firms. Because of the company's incentive to include all active and large firms, it is more likely that unrecorded openings have fewer employees than recorded ones.

■ 2 The closing bias has been addressed in two ways. One is to assume that the establishments purged by Dun & Bradstreet are still operating and to include them in the data set. The other is to follow Dun & Bradstreet's procedure and treat the purged establishments as actual closings.

TABLE 1

Summary of Employment Components (percent)

| Study | Time Period | Interval | Region | Industry | Annual Employment Change | | | | | Openings/ Creation | Closings/ Destruction | |
|--------------------------------------|-------------|----------|--------|----------|--------------------------|-----------|-------------|----------|------|-----------------------|--------------------------|--|
| | | | | | Openings | Expansion | Contraction | Closings | Net | | | |
| Unemployment Insurance Data | | | | | | | | | | | | |
| Leonard (1987) | 1977-82 | 1 yr. | WI | All | 2.5 | 11.3 | -8.8 | -2.2 | 2.8 | 18.12 | 12.00 | |
| Jacobson (1986) | 1979-85 | 6 yr. | PA | All | 5.3 | 2.2 | -2.3 | -5.0 | 0.1 | 70.67 | 68.49 | |
| Dun & Bradstreet Data | | | | | | | | | | | | |
| Armington and Odle (1982) | 1976-82 | 6 yr. | U.S. | All | 4.8 | 3.7 | -2.2 | -3.7 | 2.6 | 56.47 | 62.71 | |
| Armington and Odle (1982) | 1976-82 | 6 yr. | U.S. | Mfg. | 3.9 | 3.1 | -2.1 | -4.0 | 0.9 | 55.71 | 65.57 | |
| Eberts and Montgomery (current) | 1976-78 | 2 yr. | U.S. | All | 6.5 | 7.1 | -4.6 | -5.0 | 4.0 | 47.79 | 52.08 | |
| Eberts and Montgomery (current) | 1980-82 | 2 yr. | U.S. | All | 4.3 | 5.6 | -4.0 | -5.3 | 0.6 | 43.43 | 56.99 | |
| Census Bureau Data | | | | | | | | | | | | |
| Dunne, Roberts, and Samuelson (1989) | 1977-82 | 5 yr. | U.S. | Mfg. | 3.5 | 2.3 | -3.1 | -3.5 | -0.8 | 60.34 | 53.03 | |
| Davis and Haltiwanger (1990) | 1979-83 | 1 yr. | U.S. | Mfg. | 1.6 | 6.4 | -9.7 | -3.0 | -5.0 | 20.00 | 23.62 | |

NOTE: Changes are calculated as a percentage of beginning-period employment.

SOURCE: See references.

per year.³ Smaller firms tend to grow faster than larger firms, but each year a new set of small firms accounts for much of the growth. The correlation in growth rates one year apart is -0.24 , suggesting that above-average growth in one year is followed by below-average growth the next. This feature suggests that long-run growth rates may be lower than short-run changes as some firms experience frequent reversals in employment trends.

Leonard also finds substantial heterogeneity in conditions at establishments even within an industry or region (as defined by counties). In fact, there is more variation in employment growth rates *within* counties or industries than across them. The extent of this heterogeneity is reflected in the fact that the standard deviation in growth rates across establishments often exceeds the mean growth rate, especially in

manufacturing. Dunne et al. (1989) likewise find considerable heterogeneity within regions and industries. For instance, between 1977 and 1982, for every position gained in an expanding industry, 0.604 jobs were lost; for every position lost in a contracting industry, 0.644 jobs were added. Similar patterns were also found across growing and declining regions. For every position lost in a contracting region, 0.724 jobs were added, and for every position gained in an expanding region, 0.728 jobs were lost.

Second, as shown in the last two columns of table 1, there appears to be considerable variation across studies in the contribution of openings to job creation and closings to job destruction. Employment gains from openings as a share of total job creation ranges from slightly more than 18 percent to nearly 71 percent. Employment loss from firm closings as a fraction of total job destruction exhibits a similarly wide range of values. As previously discussed, the largest variations arise when intervals of different lengths are used to construct the employment components. For instance, Dunne et al.

■ 3 Weighting establishments by size and then taking the average growth rate for shrinking, growing, and stable firms yields the 2.8 percent net employment growth rate.

(1989) and Davis and Haltiwanger (1990) use virtually the same data, yet find significant differences in the contribution of openings to job creation and closings to job destruction. Dunne et al. report that 60 percent of job creation is attributable to openings, while Davis and Haltiwanger find that only 20 percent can be explained this way. The primary reason for the disparity is that Dunne et al. attribute all employment growth during the five-year interval to new firms, while Davis and Haltiwanger attribute only the first year's growth to openings, with the rest attributed to expansions. The converse applies to closings relative to contractions. Consequently, Dunne et al. find a much greater proportion of jobs created from openings or lost due to closings than do Davis and Haltiwanger.

The same large variation in employment components resulting from different observation frequencies is evident when comparing the studies of Leonard (1987) and Jacobson (1985). Both analyses use UI/ES202 data, but from different states. Therefore, the data sets are similar in construction as well as in the collection and maintenance of information (although the latter does vary across states). Yet, Leonard finds that only 18 percent of new jobs can be traced to openings when looking at observations of establishments one year apart, while Jacobson attributes 71 percent of new jobs to openings when observing establishments six years apart.

It is also worth noting that the Dun & Bradstreet and Census Bureau data yield similar results with respect to the ratio of openings to job creation. Using the Dun & Bradstreet numbers and looking only at manufacturing, Armington and Odle (1982) report that openings account for 56 percent of job creation, compared to the 60 percent found by Dunne et al. using census data. This slightly smaller fraction of jobs from openings using the Dun & Bradstreet data, even though the period was one year longer than the census-based analysis, suggests that this data set's tendency to overestimate births may not be serious. The two studies show a wider variation in the fraction of jobs lost from closings, but are still closer than studies using the same data sets but different observation frequencies.

Finally, based on the work of Armington and Odle, employment components for manufacturing closely follow employment components for all industries. The ratios of openings to job creation and closings to job destruction are quite similar, and all of the four components are reasonably close, particularly after considering manufacturing's relatively slower net employment change and, at times, employment loss.

Therefore, after accounting for differences in the intervals used to construct the employment components, it appears that the findings from various studies yield comparable qualitative results.

III. Accounting for Employment Change over Time and across Regions

To account for employment change over time and across regions, we first examine the variation of each of the four components over time in order to determine which contributes most to job fluctuations during business cycles. Similarly, we examine the variation across regions of each of the four components to identify which one is most associated with regional employment change. Some studies and data sets are more suitable for looking at one perspective than the other, but by considering evidence from the breadth of studies, a composite picture of these two processes emerges.

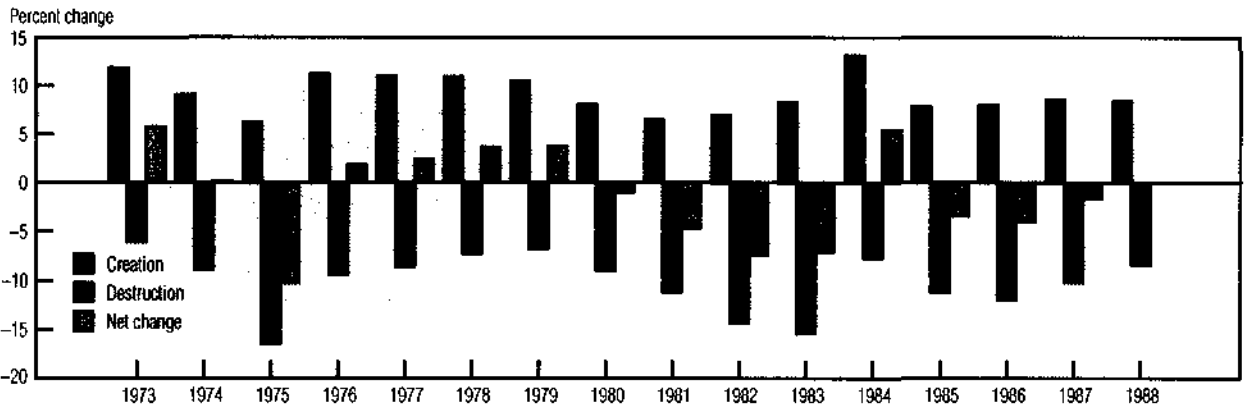
Variations over Time

Since Davis and Haltiwanger's study has the most frequent observations of the analyses discussed here, and since it spans at least two business cycles (1973–88), it is best suited for looking at the cyclical job turnover process. The results show that job destruction accounts for most of the net employment change over business cycles. As depicted in figure 1, recessions are marked by a mild decrease in creations but a large increase in destructions. Recoveries have lower-than-average destructions but slightly higher-than-average creations. The correlation between job destruction and net employment change over the period is twice as high as the correlation between job creation and net employment change (0.97 versus 0.48).

The results of Dunne et al. are consistent with those of Davis and Haltiwanger. However, because Dunne et al.'s data are not at business cycle frequencies, only tentative inferences about adjustments over these cycles can be drawn. Comparing periods of employment expansion and contraction, it appears that job destruction explains more of the variation in net employment change than does job creation. For example, the share of jobs lost from destruction rose from 19 percent in 1963–67 to 33 percent in 1967–72, as net employment fell from a 15 percent increase

FIGURE 1

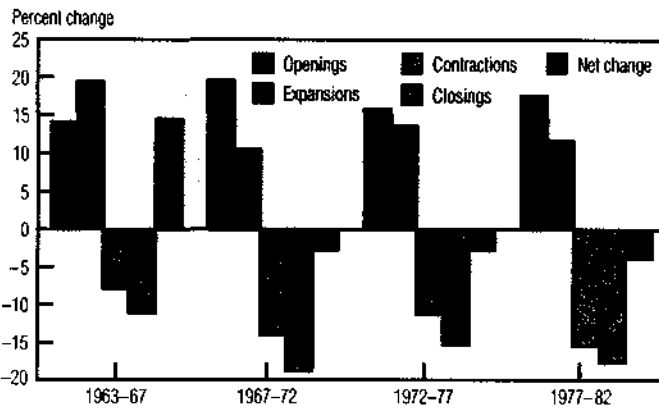
Manufacturing Job Creation and Destruction over Time



SOURCE: Census of Manufactures and Survey of Manufactures data, compiled by Davis and Haltiwanger (1990).

FIGURE 2

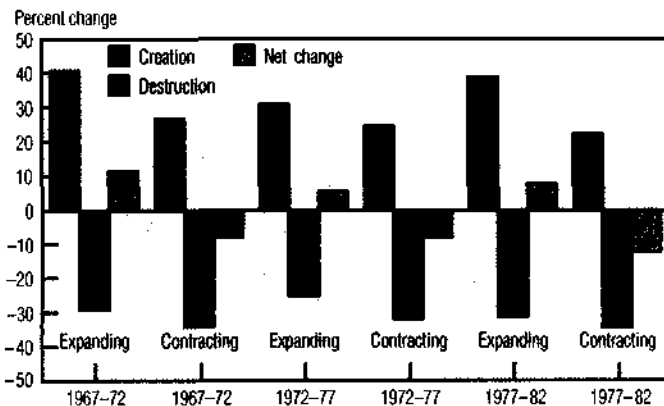
Components of Manufacturing Job Creation and Destruction



SOURCE: Dunne et al. (1989).

FIGURE 3

Manufacturing Job Creation and Destruction across Regions



SOURCE: Dunne et al. (1989).

to a 3 percent decline. For the same two periods, job gains from creations fell only moderately, from 34 to 30 percent. The same pattern emerges in comparing 1972-77 to 1977-82, as the rate of job destruction rose 6 percentage points over this interval, while the rate of job creation remained virtually unchanged.

This lack of variation in job creation reflects two offsetting trends. As seen in figure 2, job growth from expanding firms varies with net employment changes; job growth from openings runs countercyclically. Both components of job loss are procyclical and appear to be more variable than job creation components.

Leonard also offers annual time-series data, although they are much shorter than the Davis/Haltiwanger series. However, his evidence using state UI data is different from that based on census figures. Job creation is shown to be more highly correlated with net employment change than is job destruction. In addition, the variation over time of job creation is of the same magnitude as the variation of job destruction.

Variations across Regions

Dunne et al. also examine the pattern of gross flows across expanding and contracting census regions. As shown in figure 3, in two out of three cases it appears that differences in net employment change result more from variations in job creation rates than from variations in job destruction rates. During the 1967-72 period, employment gains from openings differed between the two types of regions by about 10 percentage points, while the rate of employment loss due to closings varied by less than 2 percentage points.

FIGURE 4

Manufacturing Employment Components: Expanding Regions

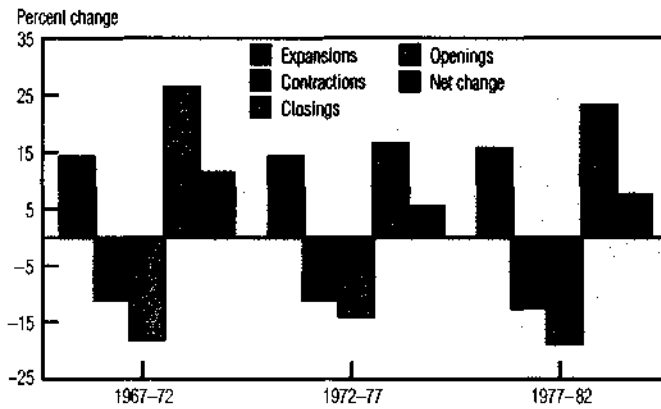
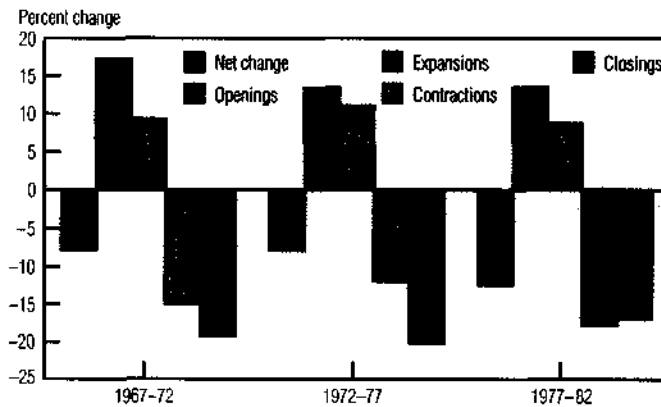


FIGURE 5

Manufacturing Employment Components: Contracting Regions



SOURCE: Dunne et al. (1989).

The same relative differences are found for the 1977-82 period.⁴

In expanding regions (figure 4), variations in the rate of openings or expansions appear to account for a larger fraction of the overall rate of net employment growth than do variations in the rate of employment loss from closings or contractions. However, for contracting regions (figure 5), changes in the rate at which employment is lost seem to be driven by variations in the rate of employment decline due to closings and contractions. This seems to suggest two different sources of manufacturing employment change. As found in the other studies, the primary source of employment variation

over time appears to be job destruction components. On the other hand, job creation, particularly from openings, appears to be the primary source of secular rates of employment change across regions. Defining regions as counties, metropolitan areas, states, or census regions does not alter the basic regional patterns of the four components of net employment change.

IV. Additional Regional Evidence

Evidence from these prior studies suggests a different pattern of gross employment flows across regions than over time. Over the business cycle (short run), job destruction behavior seems to dominate, while across regions (long run), job creation may be relatively more important. These differences need not be inconsistent any more than finding that, in the short run, aggregate demand disturbances generate most of the variations in output and yet play a minor role in explaining long-run growth differences.

The burgeoning endogenous-growth literature has focused on the factors that explain long-run growth-rate differences across countries or regions.⁵ These factors identify human capital externalities and technological spillovers (among other factors) as possible channels for the persistent differences in regional (country) growth rates. Clearly, these factors are unlikely to account for much of the short-run or cyclical variation in growth. Thus, to the extent that they are more highly correlated with job creation than with job destruction, there will be differences in the short- and long-run variability of job creation and destruction rates. In any case, a further examination of the dynamics of employment growth across regions might be useful in casting light on whether models of regional or long-run growth should focus on factors that differentially affect the job creation process.

Davis and Haltiwanger provided us with their data aggregated by census regions. We performed an analysis of variance (ANOVA) on this information to estimate the relative importance of temporal and regional variations in

⁴ The exception is the 1972-77 interval, in which employment losses resulting from closings vary more than employment gains resulting from openings. However, this period may not be representative of the nature of expanding and declining regions, as only one of the nine census regions experienced net employment losses during this time. The other two intervals offer a more balanced sample, with declining and expanding regions split evenly.

⁵ See Romer (1986), Lucas (1988), Krugman (1991), and Glaeser et al. (1992).

FIGURE 6

Variation of Manufacturing Job Creation and Destruction over Time: 1973-88

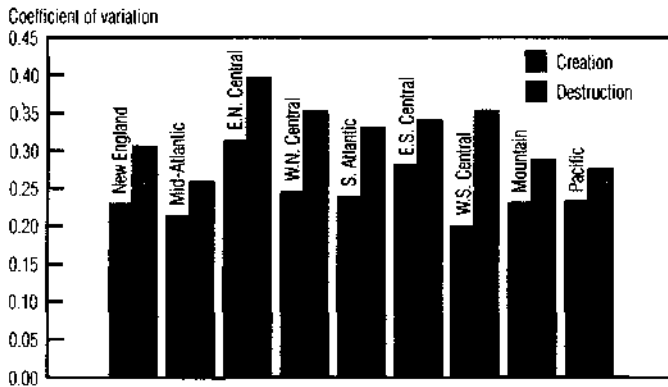


FIGURE 7

Variation of Manufacturing Job Creation and Destruction across Regions: 1973-88

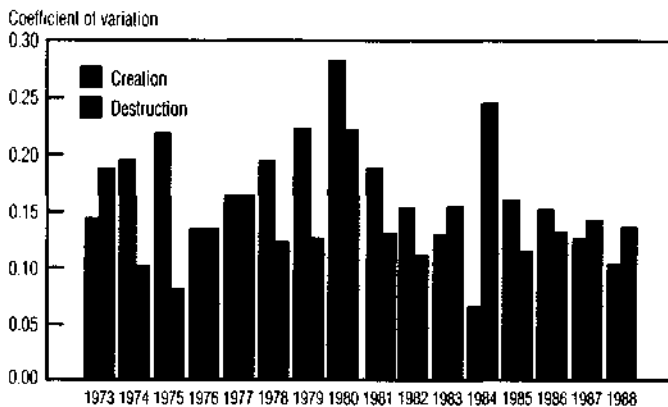
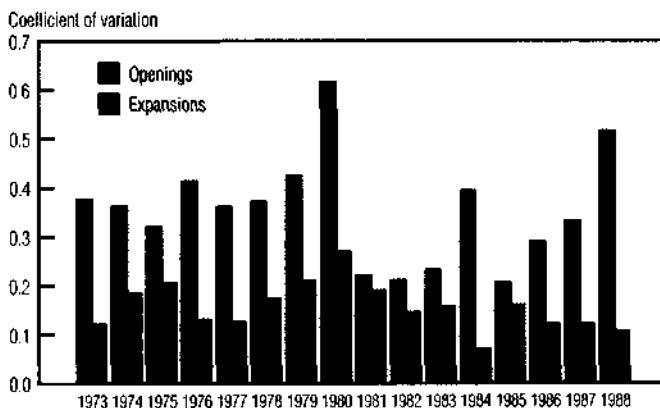


FIGURE 8

Variation of Openings and Expansions across Regions: 1973-88



SOURCE: Census of Manufactures and Survey of Manufactures data, compiled by Davis and Haltiwanger (1990).

explaining net employment change. As in most situations, the time-series variation explains a larger portion of the model variation than does regional variation. However, what is relevant for our purposes is the relative contribution of time and regional variation for job creation versus job destruction components. We found that regional variation explains a larger portion of the model variance for openings than for closings (33 percent versus 25 percent). Regional variation was also more important in explaining the model variance of expansions than of contractions (18 percent versus 3 percent).

Figure 6 presents the coefficients of variation for job creation and job destruction over time for each of the nine census regions and for all regions combined. For each region over time, job destruction varies more than job creation, which is consistent with the results for the entire sample and with the studies mentioned earlier. On the other hand, variation *across* regions is dominated by job creation (figure 7). For 11 of the 16 years covered in the sample, the variation in net employment change is explained more by fluctuations in job creation than by fluctuations in job destruction. Even during the recession years of 1981 and 1982, differences across regions in net employment change were driven principally by differences in job creation rates. The correlation across regions between net employment change and job creation is 0.69, while between net employment change and job destruction, it is 0.31.

Moreover, as illustrated in figure 8, openings vary more across regions than do expansions. However, births are not as highly correlated with net employment change as are expansions. In fact, during the 1980s, openings were primarily negatively related to regional employment conditions, with opening rates higher in the slow-growth regions. Expansions, on the other hand, are always positively related to net employment change. Therefore, Davis and Haltiwanger's manufacturing data yield the same results as do other studies: Job destruction is associated with employment change over time, while job creation is associated with employment change across regions.

To examine regional variations in job creation and destruction in more detail, we use the SBA's version of the Dun & Bradstreet data — a custom version prepared for us by SBA staff — that yields estimates of employment change due to openings, expansions, contractions, and closings for 76 industries in 263 Standard Metropolitan Statistical Areas (SMSAs).⁶ The primary

■ 6 Based on the 1977 boundary definition.

TABLE 2

**Employment Change by SMSA
(percent)**

| | Overall | | | Expanding SMSAs | | | Contracting SMSAs | | |
|-----------------|---------|---------|---------|-----------------|---------|---------|-------------------|---------|---------|
| | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 |
| Net change | 8.0 | 1.6 | 5.9 | 9.6 | 4.6 | 7.4 | -3.5 | -3.3 | -6.4 |
| Openings | 13.0 | 8.7 | 17.2 | 13.5 | 9.8 | 17.7 | 9.2 | 6.9 | 13.0 |
| Closings | -9.9 | -10.5 | -14.6 | -9.7 | -10.6 | -14.2 | -11.8 | -10.5 | -17.4 |
| Expansions | 14.2 | 11.3 | 9.3 | 14.8 | 12.7 | 9.6 | 10.3 | 9.0 | 6.5 |
| Contractions | -9.3 | -7.9 | -6.0 | -9.0 | -7.4 | -5.7 | -11.2 | -8.8 | -8.6 |
| Creation | 27.2 | 20.1 | 26.5 | 28.3 | 22.6 | 27.3 | 19.5 | 16.0 | 19.5 |
| Destruction | -19.3 | -18.4 | -20.6 | -18.7 | -17.9 | -19.9 | -25.0 | -19.3 | -26.0 |
| Gross change | 46.5 | 38.5 | 47.0 | 47.0 | 40.5 | 47.2 | 42.6 | 35.2 | 45.5 |
| Number of SMSAs | 263 | 263 | 263 | 239 | 141 | 209 | 24 | 122 | 54 |

NOTE: Changes are calculated as a percentage of beginning-period employment. Creation is defined as openings plus expansions. Destruction is defined as closings plus contractions.

SOURCE: Authors' calculations based on the SBA's U.S. Establishment Microdata Files.

TABLE 3

**Employment Change by Expanding
and Contracting Industries (percent)**

| | Overall | | | Expanding Industries | | | Contracting Industries | | |
|----------------------|---------|---------|---------|----------------------|---------|---------|------------------------|---------|---------|
| | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 |
| Net change | 8.0 | 1.6 | 5.9 | 9.6 | 6.9 | 7.9 | -4.7 | -4.6 | -4.2 |
| Openings | 13.0 | 8.7 | 17.2 | 13.4 | 10.8 | 18.0 | 9.8 | 6.4 | 13.0 |
| Closings | -9.9 | -10.5 | -14.6 | -9.4 | -9.8 | -14.1 | -13.9 | -11.4 | -17.1 |
| Expansions | 14.2 | 11.3 | 9.3 | 14.8 | 13.2 | 9.4 | 9.8 | 9.1 | 8.5 |
| Contractions | -9.3 | -7.9 | -6.0 | -9.2 | -7.2 | -5.5 | -10.4 | -8.7 | -8.5 |
| Creation | 27.2 | 20.1 | 26.5 | 28.2 | 24.0 | 27.5 | 19.7 | 15.5 | 21.4 |
| Destruction | -19.2 | -18.4 | -20.6 | -18.6 | -17.0 | -19.6 | -24.3 | -20.1 | -25.6 |
| Gross change | 46.4 | 38.5 | 47.0 | 46.8 | 41.0 | 47.0 | 44.0 | 35.6 | 47.0 |
| Number of industries | 75 | 75 | 75 | 61 | 38 | 55 | 14 | 37 | 20 |

NOTE: Changes are calculated as a percentage of beginning-period employment. Creation is defined as openings plus expansions. Destruction is defined as closings plus contractions.

SOURCE: Authors' calculations based on the SBA's U.S. Establishment Microdata Files.

advantages of this data set are a detailed regional breakdown and the fact that it is not limited to a single industry. Although the SBA data set is based on individual establishments, our extract of the file does not allow us access to the underlying individual firm and establishment records that stand behind our area and industry summary statistics. Thus, we cannot examine questions about within-area heterogeneity by industry.

Table 2 presents summary statistics of employment changes by source for three periods in the 1970s and 1980s. Consistent with previous studies,

we find that net employment changes substantially understate the amount of turnover in the labor market. In 1976-78 and 1984-86, gross job flows were five to eight times larger than net turnover, while in the recessionary period of 1980-82, they were more than 20 times bigger. Even if we sort SMSAs into those with declining employment and those with rising (or constant) employment, this pattern of substantially greater gross job changes than net job changes remains. Within both growing and declining regions, significant amounts of creation and destruction are

TABLE 4

Employment Change in Selected Industries (percent)

| | Durable Mfg. | | | Nondurable Mfg. | | | Services | | | FIRE ^a | | |
|--------------|--------------|---------|---------|-----------------|---------|---------|----------|---------|---------|-------------------|---------|---------|
| | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 |
| Net change | 8.2 | -5.0 | -0.3 | 1.0 | -4.8 | -0.1 | 11.9 | 7.1 | 8.9 | 6.1 | 7.5 | 8.7 |
| Openings | 13.1 | 8.0 | 14.5 | 9.2 | 6.4 | 12.1 | -12.6 | 8.5 | 17.5 | 12.9 | 6.9 | 16.9 |
| Closings | -10.9 | -13.1 | -15.2 | -10.8 | -12.3 | -13.7 | -8.8 | -8.2 | -13.3 | -8.1 | -7.2 | -12.5 |
| Expansions | 14.0 | 9.2 | 8.6 | 10.6 | 8.3 | 7.3 | 15.7 | 13.0 | 9.7 | 16.1 | 16.4 | 11.2 |
| Contractions | -8.0 | -9.1 | -8.2 | -8.0 | -7.2 | -5.8 | -7.7 | -6.3 | -4.9 | -14.8 | -8.7 | -7.0 |
| Creation | 27.1 | 17.1 | 23.1 | 19.8 | 14.8 | 19.4 | 28.3 | 21.5 | 27.2 | 29.0 | 23.3 | 28.1 |
| Destruction | -18.9 | -22.2 | -23.4 | -18.8 | -19.6 | -19.5 | -16.5 | -14.5 | -18.3 | -22.9 | -15.9 | -19.4 |
| Gross change | 46.0 | 39.3 | 46.5 | 38.5 | 34.3 | 38.9 | 44.8 | 36.0 | 45.4 | 51.9 | 39.1 | 47.6 |

a. Finance, insurance, and real estate.

NOTE: Changes are calculated as a percentage of beginning-period employment. Creation is defined as openings plus expansions. Destruction is defined as closings plus contractions.

SOURCE: Authors' calculations based on the SBA's U.S. Establishment Microdata Files.

TABLE 5

Variation in Total Employment Change

| | Overall | | | Expanding SMSAs | | | Contracting SMSAs | | |
|--------------|---------|---------|---------|-----------------|---------|---------|-------------------|---------|---------|
| | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 | 1976-78 | 1980-82 | 1984-86 |
| Net change | 0.005 | 0.002 | 0.005 | 0.007 | 0.002 | 0.004 | 0.001 | 0.005 | 0.004 |
| Openings | 0.014 | 0.008 | 0.026 | 0.017 | 0.009 | 0.026 | 0.008 | 0.001 | 0.026 |
| Closings | 0.014 | 0.011 | 0.024 | 0.013 | 0.012 | 0.023 | 0.016 | 0.010 | 0.041 |
| Expansions | 0.016 | 0.014 | 0.009 | 0.019 | 0.016 | 0.009 | 0.010 | 0.009 | 0.005 |
| Contractions | 0.009 | 0.006 | 0.004 | 0.008 | 0.005 | 0.003 | 0.010 | 0.007 | 0.009 |
| Creation | 0.060 | 0.042 | 0.065 | 0.073 | 0.047 | 0.066 | 0.037 | 0.028 | 0.054 |
| Destruction | 0.045 | 0.033 | 0.046 | 0.041 | 0.033 | 0.044 | 0.051 | 0.032 | 0.086 |
| Gross change | 0.205 | 0.148 | 0.218 | 0.222 | 0.159 | 0.214 | 0.174 | 0.120 | 0.276 |

NOTE: Changes are calculated as a percentage of beginning-period employment. Variance is estimated across SMSAs. Creation is defined as openings plus expansions. Destruction is defined as closings plus contractions.

SOURCE: Authors' calculations based on the SBA's U.S. Establishment Microdata Files.

going on simultaneously. In expanding SMSAs, almost 20 percent of jobs were lost in each of our data periods, while in contracting regions, enough new jobs were created in each period to increase employment by at least 15 percent.

The same heterogeneity is displayed within industries. As shown in table 3, even contracting industries exhibit sizable employment gains from openings and expansions. For instance, while net employment in declining industries fell by 4.2 percent between 1984 and 1986, new jobs spawned from openings and expansions increased the employment base by 21.5 percent. Conversely, expanding industries are subject to significant employment losses from closings and

contractions — between 17 and 19 percent for the three periods studied. The employment change calculations for various one-digit industries, shown in table 4, reinforce the point of substantial heterogeneity within and across industries. Both the declining manufacturing industry (durables and nondurables) and the growing service and finance, insurance, and real estate industries show substantial amounts of job creation and destruction. Even in the recessionary period of 1980-82, enough manufacturing jobs were created to boost employment by 15 percent, while in the expansionary period of 1984-86, enough service-sector jobs were lost to reduce employment by 18 percent. In each sector and time

TABLE 6

Correlations of Total Employment Changes

| | 1976-78 | 1980-82 | 1984-86 |
|------------------------|---------|---------|---------|
| P (Gross, Net) | 0.570 | 0.340 | 0.665 |
| P (Net, Creation) | 0.875 | 0.799 | 0.899 |
| P (Net, Destruction) | 0.388 | 0.516 | 0.268 |
| P (Gross, Creation) | 0.896 | 0.838 | 0.924 |
| P (Gross, Destruction) | -0.537 | -0.630 | -0.541 |

NOTE: Pearson correlation coefficients estimated across SMSAs.

SOURCE: Authors' calculations based on the SBA's U.S. Establishment Microdata Files.

period, gross flows were at least five times the level of net employment changes.

In table 5, we report the variance in rates of employment change between expanding and contracting SMSAs. These calculations show only a moderate amount of variation across SMSAs in rates of net employment growth — between 6 and 12 percent of the mean rate in each of our sample periods. On the other hand, the variation in gross employment changes is typically around 45 percent of the mean rate, suggesting again that there is both more turnover and more variation in turnover than would be suggested from net flow data.

These results imply that the variance across areas in openings and closings is similar to that of expansions and contractions. This finding holds in each period and in both growing and declining areas. Even if we disaggregate the data to look at employment changes by industry and SMSA, we find that openings account for more than 40 percent of creations and closings account for more than 50 percent of destructions in each period. Although similar to the results of Dunne et al., these findings differ from those of Davis and Haltiwanger, who show that openings or closings account for no more than 24 percent of job creation or destruction (see table 1). As noted above, variation in the length of the sampling intervals may explain some of this disparity. However, as others have found, change in the amount of *job creation* is the largest component of net job change across SMSAs.

In table 6, we calculate the correlation between gross and net employment flows and creation and destruction rates. In each period, job creation is more highly correlated with net job flows than is job destruction. This result is consistent with Dunne et al.'s and Davis and

Haltiwanger's finding that job creation explains a larger percentage of variations in net employment change across regions than does job destruction.

V. Conclusion

This paper offers a review and analysis of previous studies on job turnover using establishment-level data. Despite differences in the various data sets, the studies agree on several salient points. First, gross turnover is substantially greater than net growth. Second, many transitory or short-lived establishments do not show up in samples taken five years or even one year apart. Consequently, the relative contributions of openings to job creation and closings to job destruction depend on the length of the period chosen, which explains some of the differences observed across data sets. Third, substantial within-region and detailed-industry heterogeneity exists in employment growth rates.

The primary contribution of this paper is to show that the job turnover process is markedly different over time and across regions. Over time, we find that employment fluctuations are associated primarily with job destruction. Across regions, employment differences are associated more with job creation. These findings do not appear to be the result of differences in data sets, since the same data sets yield the two disparate patterns of job turnover. The results are consistent with the endogenous growth literature, which focuses on long-run factors such as human capital externalities and technological spillovers to explain long-run differences in regional or national growth rates. Since this pattern differs from the cyclical pattern of net employment dynamics, caution should be used in extrapolating models of cyclical labor market dynamics to explain long-run or regional dynamics. It will be the challenge of future research to uncover the specific factors that contribute to these differences.

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