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SMALL BUSINESS AND JOB CREATION: DISSECTING THE MYTH AND REASSESSING THE FACTS

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ABSTRACT

This paper investigates how job creation and destruction behavior varies by employer size in the U.S. manufacturing sector during the period 1972 to 1988. The paper also evaluates the empirical basis for conventional claims about the job-creating prowess of small businesses. The chief findings and conclusions fall into five categories:

(1) Conventional wisdom about the job-creating prowess of small businesses rests on misleading interpretations of the data.

(2) Many previous studies of the job creation process rely upon data that are not suitable for drawing inferences about the relationship between employer size and job creation.

(3) Large plants and firms account for most newly-created and newly-destroyed manufacturing jobs.

(4) Survival rates for new and existing manufacturing jobs increase sharply with employer size.

(5) Smaller manufacturing firms and plants exhibit sharply higher *gross* rates of job creation but not higher *net* rates.

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1 Introduction

Few ideas about the U.S. economy reap greater homage in public discourse than the belief that small businesses are the fountainhead of job creation. Claims about the job-creating prowess of small business appear with remarkable regularity in a wide range of public pronouncements, including speeches by prominent politicians, newspaper columns by leading opinon makers, statements from the U.S. Small Business Administration, and assessments by well-known analysts like David Birch. Box 1 contains a sampling of these claims. [1] As the quotations in the box illustrate, claims about the role of small business in creating jobs are frequently presented as justification for tax incentives, regulatory policies and other government programs that favor the small business sector.

[Box 1: SMALL BUSINESS AND JOB CREATION: RECITING THE CONVENTIONAL WISDOM]

In addition to the public discourse, previous academic research motivates our interest in the relationship between employer size and job creation. This research convincingly establishes strong connections between employer size and important economic outcomes like the level and inequality of wages, the incidence of fringe benefits, workforce quality, the pace of

[1] See also the SBA's annual reports to the President, *The State of Small Business*, and Birch (1979, 1987). The chorus of praise for the job creation performance of small business has been challenged by only a handful of critics. See Armington and Odle (1982a) and chapter 3 in Brown, Hamilton and Medoff (1990). For journalistic pieces that question conventional wisdom about the small business role in creating jobs see Wessel and Brown (1988), Marshall (1993) and Kinsley (1993).

technological innovation, and the likelihood of unionization. [2] These findings prompt us to ask how job creation and destruction behavior varies by employer size, a question that we address for the U.S. manufacturing sector.

We also evaluate the empirical basis for conventional claims about the job-creating prowess of small businesses. In this regard, we develop two sets of conclusions:

(1) **The conventional wisdom about the job-creating prowess of small businesses rests on misleading interpretations of the data.** One common error entails the use of changes in the size distribution of employment to draw inferences about the relationship between job creation and employer size. A second problem – the regression fallacy – leads to overly favorable assessements of small business job creation whenever measurement error or transitory employment movements are present in the data. Finally, a common confusion between net and gross job creation distorts the overall job creation picture and hides the enormous number of new jobs created by large employers.

(2) **The most widely cited studies of job creation rely upon unsuitable data.** We review previous research that documents severe data problems in the data base that underlies the most prominent studies of small business job creation. Our review leads us to question whether any useful information can be gleaned from these studies about the relationship between employer size and job creation.

Our analysis of job creation and destruction behavior in the manufacturing sector relies upon the Longitudinal Research Database (LRD) housed at the Center for Economic Studies

[2] Recent studies include Acs and Audretsch (1988), Brown and Medoff (1989), Brown, Hamilton and Medoff (1990), Davis and Haltiwanger (1991,1992), and Hansen (1992).

in the U.S. Bureau of the Census. The LRD contains plant-level data at annual sampling intervals for the U.S. manufacturing sector from 1972 to 1988. Information in the LRD permits classification of employers by various characteristics, including plant and firm size. Among U.S. data sets that have been used to study job creation and destruction, the LRD contains the most detailed information on plant characteristics, the most careful treatment of the statistical sampling frame, and the best treatment of plant entry and exit. We exploit the LRD to deepen our understanding of job creation and destruction in the U.S. manufacturing sector and, by extension, the entire U.S. economy. [3]

The chief findings to emerge from our study of the U.S. manufacturing sector fall into three categories:

(1) **Large plants and firms account for most newly-created (and newly-destroyed) manufacturing jobs.** Plants that average at least 100 employees account for two-thirds of job creation over the 1972 to 1988 period. Firms with at least 500 employees account for more than one-half of job creation. These findings reflect the simple fact that large plants and firms account for the bulk of the manufacturing jobs base.

(2) **Survival rates for manufacturing jobs increase sharply with employer size.** The one-year job survival rate at the biggest firms is 92 percent, as compared to only 81 percent for the smallest firms. The one-year survival rate for newly-created jobs at the biggest firms is 76 percent, as compared to only 65 percent at the smallest firms. Similar patterns hold for large plants as compared to small plants, and for multi-unit firms as compared to single-unit firms. Hence, in terms of both new jobs and the typical existing

[3] Our forthcoming book describes the LRD in much greater detail.

job, larger employers offer greater job durability.

(3) **Smaller manufacturing firms and plants exhibit sharply higher *gross* job creation rates but not higher *net* creation rates.** The gross job creation rate averages 12.2 percent per year for firms with fewer than 100 employees, nearly double the rate for firms with 25,000 or more employees. In this sense, small businesses create a disproportionately large share of new jobs. In the same sense, however, smaller plants and firms destroy a disproportionately large share of existing jobs. The *net* job creation rate in the U.S. manufacturing sector exhibits no strong or systematic relationship to employer size.

The sections that follow explain how and why we arrived at these conclusions. The next two sections describe our measurement procedures. Subsequent sections present our results and central line of argument.

2 Measuring job creation and destruction

Although the concept of a job is easy to understand, measuring and interpreting job creation and destruction requires careful definitions. In this study, a job means an employment position filled by a worker. Our data do not distinguish among part-time, full-time and overtime employment positions; all count equally as a single job. We do not measure the number of vacancies (i.e., unfilled positions) at a point in time or the change in vacancies over time. Rather, we measure plant-level changes in the number of filled employment positions.

The basic observational unit underlying our job creation and destruction measures is the plant – a physical location where production takes place. In contrast to a plant, a company

or firm is an economic and legal entity that encompasses one or more plants and, possibly, administrative offices specializing in nonproduction activities. While we provide tabulations broken down by plant and firm size, all job creation and destruction measures are cumulated from plant-level employment changes.

We calculate job creation and destruction from plant-level net employment changes over twelve-month intervals. If, for example, a plant expands by ten employees between March 1987 and March 1988, then according to our calculations the plant contributes ten jobs to the 1988 creation count. If another plant contracts by eight employees over the same time interval, it contributes eight jobs to the 1988 destruction count.

Since plants represent the observational units in the LRD, our calculations capture the effects of firms that shift employment between plants. By the same token, however, our calculations do not capture the effects of job shifts within plants. For example, if a plant replaces several secretaries with an equal number of computer programmers, no net change in plant-level employment occurs; hence, our calculations record no job creation or destruction associated with this event. Because of the point-in-time nature of LRD employment data, our calculations also do not record plant-level employment changes that are reversed within the sampling interval. For example, if a plant lays off some workers in July 1987 and recalls an equal number in September 1987, there is no net effect on the plant's employment change between March 1987 and March 1988; hence, no contribution to job creation and destruction would be recorded for this episode of layoff and recall. For both reasons – the failure to capture within-plant job shifts and the point-in-time nature of the employment data – our

job creation and destruction measures understate the true magnitudes.

With these remarks as background, we supply the following definitions:

Definition 1: Gross job creation at time t equals employment gains summed over all plants that expand or start up between $t-1$ and t.

Definition 2: Gross job destruction at time t equals employment losses summed over all plants that contract or shut down between $t-1$ and t.

In line with these definitions, plants with unchanged employment contribute to neither job creation nor job destruction. We shall typically express job creation and destruction figures as rates by dividing through by a measure of the employment level. [4]

Definition 3: The net employment change at time t is the difference between employment at time t and employment at time $t-1$.

A simple and important relationship links the concepts described by these three definitions: *The net employment growth rate equals the job creation rate minus the job destruction rate.* In other words, job creation and destruction figures decompose the net change in aggregate employment into a component associated with growing plants and a component associated with shrinking plants.

The job creation and destruction components of the net employment change provide insights into employment dynamics that are unavailable from traditional sources of information on employment trends. For example, suppose that aggregate employment grew 2 percent

[4] To convert time-t job creation and destruction measures to rates, we divide by the average of employment at t and $t-1$. The resulting growth rate measure has several technical advantages over more conventional growth rate measures. See Davis, Haltiwanger and Schuh (1993) for further discussion of this point.

during the past year. That figure could be produced by a 4 percent rate of job creation and 2 percent rate of job destruction, or by a 22 percent rate of creation and a 20 percent rate of destruction. Important aspects of economic behavior and performance are likely to vary with rates of job creation and destruction. Higher rates of job creation and destruction mean larger numbers of workers compelled to shuffle between jobs and, most likely, a greater incidence of unemployment. For a given net growth rate, higher rates of job creation make it easier for displaced workers and labor market entrants to find employment, and higher rates of job destruction imply less job security for employed persons. Higher rates of job creation and destruction also imply greater heterogeneity in the behavior of employment growth across plants. Thus, job creation and destruction figures offer a window into the diversity of plant-level outcomes masked by aggregate employment statistics.

3 Measuring employer size

There are many related but distinct concepts of employer size. Our analysis considers four concepts: current plant size, average plant size, firm size, and ownership type. Current size equals the simple average of the plant's current employment and its employment twelve months earlier. In contrast, average plant size equals the weighted mean number of employees, computed over all annual observations on the plant during the 1972 to 1988 period. Firm size equals the number of manufacturing workers employed by the plant's parent firm in the preceding Census of Manufactures. [5] Finally, ownership type indicates whether the

[5] Only in Cenus years can we measure total employment for every manufacturing firm. The Census of Manufactures was carried out in 1972, 1977, 1982 and 1987.

plant's parent firm operates one or multiple plants.

A few remarks help to clarify the usefulness, strengths and weaknesses of these alternative measures of employer size. Plant size is a natural metric for the scale of operations at a geographically distinct production unit. Since employment often fluctuates from year to year, because of demand variation and other factors, average plant size provides a better indication of the production unit's intended scale of operations. Hence, for most purposes, we prefer average size to current size. [6]

Firm size is superior to plant size as an indicator of the overall scale of operations carried out by the plant's parent firm. Firm size corresponds closely to the notion of business size that underlies most public discourse on job creation behavior. In addition, patterns of government regulation and business access to financial markets are tied more closely to firm size than to plant size. Smaller firms enjoy exemption from or weaker enforcement of many government regulations related to the environment, affirmative action, financial reporting, and occupational health and safety. [7] Larger firms enjoy greater access to certain forms of financial credit like equity and debt issues. [8]

Ownership type is a crude indicator of firm size. Its chief virtue lies in its widespread availability and easy use in government data on individual business establishments. Consequently, many other studies and government statistical publications report breakdowns of economic activity by ownership type.

[6] Most other studies focus on yet a different measure of employer size that we describe in our analysis of the regression fallacy.

[7] See chapter 5 in Brock and Evans (1986) and pages 82-88 in Brown, Hamilton and Medoff (1990).

[8] On the relationship between firm size and financing patterns, see Walker (1989), Gaston (1989), Gertler and Gilchrist (1992), and Kashyap and Stein (1992).

4 Job creation and destruction rates by employer size

With these remarks as background, we now turn to the empirical evidence. Table 1 displays average net and gross job flow rates by employer size. The table reveals strong regularities in the relationship between employer size and gross job flow rates. Consider, first, the average rate of gross job creation. By all four measures, gross job creation rates decline monotonically with employer size. The job creation rate averages 16.5 percent of employment per year for firms with fewer than 20 employees, 9.3 percent for firms with 500-999 employees, and 6.3 percent for firms with 50,000 or more employees. Similar patterns prevail for the ownership-type indicator and both measures of plant size. Thus, small employers create new jobs at a much higher gross rate than large employers.

[TABLE 1 HERE]

But gross job creation measures clearly reveal only part of the story. Table 1 also shows that the gross job destruction rate declines sharply with firm and plant size. It averages 18.8 percent of employment per year for firms with fewer than 20 employees, 9.8 percent for firms with 500-999 employees, and 8.0 percent for firms with 50,000 or more employees. Again, similar patterns prevail for the ownership-type indicator and plant size measures. Thus, small employers also destroy jobs at a much higher rate than large employers.

How does net job creation vary by employer size? On this score, the empirical evidence produces no strong pattern. Net job creation rates by firm size exhibit a $\cap$ shape: manufacturing firms with 100-499 employees show mild net contraction rates between 1972 and

1988, whereas smaller and larger firms show sharper contraction rates. Neither plant size measure evinces any strong relationship to net job creation rates, although the net contraction rate is substantially smaller for single-unit than multi-unit firms. In a nutshell, net job creation behavior in the U.S. manufacturing sector exhibits no strong or simple relationship to employer size.

How can we reconcile this empirical result with the widely held belief that small businesses account for a disproportionate fraction of new jobs? One might think that the answer lies in our focus on the manufacturing sector. Perhaps in the nonmanufacturing sectors of the economy, smaller firms exhibit higher net job creation rates than larger firms. But even if this were true, it is not the basis for the widespread belief about the job creation role of small business. Rather, that belief rests on fallacious and misleading interpretations of the data, as we explain in the next three sections.

5 The size distribution fallacy

Many claims about the job-creating prowess of small business appear to be based upon changes over time in the size distribution of employment. We review the calculation typically performed on the size distribution data and explain why the usual interpretation of this calculation leads to fallacious inferences about job creation.

The SBA typically defines small businesses as firms with fewer than 500 employees, although the precise cutoff is not important to the point at hand. Given a particular cutoff, let $TOTAL_t$ and $SMALL_t$ stand for total employment and small business employment,

respectively, in year t. In terms of these symbols, one can calculate the small business "contribution" to 1990 job creation as the ratio,

$$\frac{SMALL_{1990} - SMALL_{1989}}{TOTAL_{1990} - TOTAL_{1989}}.$$

In words, the small business contribution to 1990 job creation is equated to the ratio of net employment change among small firms to total net employment change. [9]

The fallacy arises because firms can migrate between size categories from one year to the next. An example illustrates this point.

[Box 2: ILLUSTRATION OF THE SIZE DISTRIBUTION FALLACY]

The example considers three firms, one of which (firm 1) satisfies the SBA definition of a small business in year 1. The largest firm (firm 3) grows dramatically in year 2, while the two smaller ones shrink. As it shrinks, firm 2 migrates from the large to the small business category. On net, total employment increases by 100.

If one executes the typical calculation on data in the example, small business appears to contributes 90 percent of net job growth. But, as the construction of the example makes clear, this interpretation is fallacious. In the example, firm-level net job growth actually increases with firm size, an observation that can be made only by following individual employers over time, as in the calculations that underlie the net and gross job flow figures in table 1.

How important is such migration across firm size categories in reality? The large magnitude of gross job flows – and the concentration of job flows in plants that undergo big em-

[9] Zayas (1978) use data on changes in the size distribution of employment to calculate growth rates by size of business. This calculation is also subject to the size distribution fallacy identified below.

ployment changes – indicates that migration across categories is frequent and important.[10] Especially during periods of slow employment growth, firm migration from large to small is likely to occur quite often. This pattern creates the appearance of a booming small firm sector.

In summary, many claims about the job-creating prowess of small businesses derive from a fallacious interpretation of data on the size distribution of employment. Size distribution data cannot tell us whether small businesses systematically grew faster than large businesses.

6 Netting out reality

Sophisticated proponents of the view that small businesses create a disproportionate fraction of new jobs recognize the fallacy described above. [11] Circumventing the fallacy requires longitudinal data on individual establshments or firms – i.e., data that track individual employers over time. The most widely cited studies of job creation behavior rely upon such data, but they often present results in a way that can mislead the statistically naive.[12]

To understand the potential for confusion, consider the example in Box 3. The example depicts a situation with moderate net job growth in the midst of much larger gross job flows. We know from table 1 that this situation typifies the experience of the U.S. manufacturing sector. It also typifies the experience in other sectors of the U.S. economy and in other

[10]Table 1 shows that gross job creation and destruction flows are large relative to net employment changes. Chapter 2 of Davis, Haltiwanger and Schuh (1993) contains additional evidence on this point and on the concentration of gross job flows at plants that undergo big employment changes.

[11]The SBA's 1983 report, *State of Small Business*, clearly explains the fallacy on page 62. See also Birch and MacCracken (1983).

[12]The most widely cited studies of the small business role in creating jobs are the SBA's annual *State of Small Business Report* and Birch (1979, 1987).

industrialized nations. [13]

[Box 3: ILLUSTRATION OF A CONFUSION BETWEEN NET AND GROSS JOB CREATION]

In the example, 100 percent of the net job increase between years 1 and 2 is accounted for by firm 1, which is classified as small based on its employment in year 1. Thus, one might conclude that "small firms created virtually all new jobs" between years 1 and 2. Closer analysis reveals, however, that such a conclusion grossly mischaracterizes the distribution of newly-created jobs by size of firm. In fact, in this example large firms create 80 percent of the new jobs in year 2.

Public discourse about job creation rarely distinguishes between the small business share of gross job creation (20 percent in the example) and its "share" of net job creation. Consequently, claims about the job creation role of small business often conjure up the image of an economy in which large firms inexorably shrink and small firms struggle valiantly to replenish the stock of jobs. This image deviates sharply from the facts set out in table 1 and in table 3 below, which show that both large and small employers create large numbers of new jobs.

To appreciate fully the misleading character of statements about the small business "share" of net job creation, consider a particular historical episode. Between March 1973 and March 1974, manufacturing employment as reported in the LRD increased on net by about 16,000 jobs. Over this same period, manufacturing plants with fewer than 100 employees

[13]See Davis, Haltiwanger and Schuh (1993) for a review of the evidence.

as of March 1973 experienced a net increase of about 160,000 jobs. Thus the net increase for small plants was ten times as large as the overall net increase. If we summarized these data in the usual phaseology of public discourse, we would say that "small employers created 1,000 percent of the new manufacturing jobs in 1974." Proponents of the small business job creation view would likely eschew the usual phraseology in this case, because it highlights the absurdity of the underlying calculation.

Continuing with the historical episode, manufacturing plants of more than 500 employees created about 1.3 million gross new jobs between 1973 and 1974. Since net job growth was only 16,000 during this period, we could easily identify a set of large manufacturing plants that accounted for 50 percent, 100 percent, 200 percent, or 1000 percent of net job growth. We could do so by choosing a set of large plants situated in states with robust employment growth or rapidly expanding industries. We could even identify several distinct sets of large plants, each of which accounted for, say, 100 percent of net job growth. Would useful economic policy prescriptions then follow from these characterizations of the data? Certainly not! Yet it is precisely this type of data characterization and argument that underlies claims that small businesses create most jobs and – therefore – ought to receive favorable tax and regulatory treatment.

In summary, longitudinal studies that focus on the "share" of net job growth accounted for by small businesses grossly misrepresent the actual distribution of newly-created jobs by size of employer. A more meaningful way to represent this distribution is to focus on the small employer share of gross job creation.[14]

[14]For the record, we should note that not every statistical tabulation performed on longitudinal data by

7 The regression fallacy

Most longitudinal studies of the relationship between employer size and job creation suffer from another statistical pitfall known as the regression fallacy or regression-to-the-mean bias. [15] The potential for bias arises whenever employers experience transitory fluctuations in size, or whenever measurement error introduces transitory fluctuations in observed size. Both phenomena are important features of longitudinal data on employers.

The simple example in Box 4 illustrates the regression fallacy. The example calculates growth rates for individual firms and by size of firm for years 2 and 3. Following widespread practice, firms are assigned to size classes using base-year employment.[16] The base year means the initial year of the time interval over which a particular growth rate is calculated.

[Box 4: ILLUSTRATION OF THE REGRESSION FALLACY]

Bold face entries in the illustration represent average employment growth rates by size class in years 2 and 3. These entries convey the impression that small firms outperform large ones in both years. Yet, closer inspection reveals that each firm is the same size in year 3 as in year 1. Evidently, the seemingly appropriate calculations underlying the bold face entries provide a misleading characterization of the size-growth rate relationship. This misleading

the SBA examines the small employer share of net job creation. For example, Table 13 in SBA (1988) reports gross job creation by firm size. Nonethelss, the surrounding text reverts to the misleading "net" calculation when characterizing the small business role in job creation.

[15] Friedman (1992) suggests that the regression fallacy "is the most common fallacy in the statistical analysis of economic data." Leonard (1986) explains how regression-to-the-mean bias can distort the estimated relationship between employer size and growth rates. Friedman (1992) and Quah (1993) focus on the regression fallacy in the recent literature that investigates whether per capita income levels are converging across countries.

[16] This classification practice is used, for instance, in the annual SBA reports to the president and in Birch (1979, 1987).

characterization is an example of the regression fallacy.

The fallacy arises because, each year, we reclassify firms into size classes using base-year employment. The interaction between this reclassification and transitory firm-level employment movements lies at the heart of the regression fallacy. On average, firms classified as large in the base year are more likely to have experienced a recent transitory increase in employment. Since transitory movements reverse themselves, firms that are large in the base year are relatively likely to contract. Likewise, firms classified as small in the base year are more likely to have experienced a recent transitory decrease in employment. Hence, firms that are small in the base year are relatively likely to expand. As in our illustration, this regression phenomenon (i.e., regression to the firm's own long run size) creates the illusion that small firms systematically outperform large firms.

The magnitude of the bias associated with the regression fallacy depends on several factors: the extent of measurement error in the data, the importance of transitory employment movements for individual employers, the size distribution of employment, and the precise size-class boundaries chosen by the analyst. As a consequence, we cannot precisely quantify the extent of regression-to-the-mean bias in previous studies without direct access to their longitudinal data. We can, however, replicate their procedure for measuring employer size in the LRD and determine the resulting relationship between size and net job growth. We can then compare this size-growth relationship to the ones that emerge under alternative size measures.

Table 2 carries out this comparison using LRD data for the period 1973 to 1988. Following

the standard practice described above, the first panel classifies continuing plants and plant deaths by base-year size. New plants are classified according to size in the entry year. As we have explained, the entries in this panel are subject to the regression fallacy. To avoid the regression fallacy, we measure employer size using average plant size or current plant size. Recall that current size equals the simple average of the plant's employment in the current and previous years, and average size equals a mean computed over all sample obervations on the plant.[17] Repeating portions of table 1, the bottom two panels of Table 2 display the figures for average and current plant size measures.

[TABLE 2 HERE]

The results of the comparison are striking. In Panel A, the net job creation rate declines steeply over the first five size class intervals and then flattens out over the remaining intervals. Panel B presents a sharp contrast. It indicates that the net job creation rate shows no systematic relationship to average plant size. Panel C actually shows a positive relationship between net job creation and current plant size. The gross job creation and destruction patterns also look much more favorable for small plants under the base-year size measure (Panel A) than under either alternative measure. Evidently, the regression fallacy illustrated in Box 4 operates with powerful effect in the LRD data for the U.S. manufacturing sector.

18

[17]To the extent that transitory employment fluctuations require more than one year to reverse themselves, our current size measure is subject to a milder and more subtle version of the regression fallacy. However, random errors in measuring employment levels do not produce a regression fallacy under any of our plant or firm size measures.

[18]Brown *et al* (1990) stress a different potential problem with the standard size measure. They argue that classifying new firms according to size in the entry year creates a bias, because new firms often start small even when their intended scale of operations is large. This point clearly applies to new plants as well. However, a symmetric point is that dying plants often contract and become small on their way towards exit.

There is good reason to suspect that the regression fallacy operates with even greater effect in the longitudinal data sets used in the widely cited studies by Birch (1979, 1987) and the annual SBA reports. In particular, measurement error is almost certainly more serious in their data sets than in the LRD, a point we develop in the next section. Given their procedures for measuring firm size, the more serious measurement problems in their data suggest greater susceptibility to the regression fallacy.

In summary, the standard practice of measuring firm or establishment size according to base-year employment leads to a regression fallacy, which in turn paints an overly favorable picture of the relative job growth performance of small employers. Our replication analysis with LRD data finds a substantial bias in favor of small businesses under the standard practice for measuring business size using base-year employment.

8 An unsuitable data base

Still another weakness of many leading studies of the job creation process is their reliance on an unsuitable data base: the Dun and Bradstreet Market Identifier (DMI) files. David Birch and associates use these data for their studies, and until recently, so did the SBA.[19] While the Dun and Bradstreet data base has many impressive attributes and represents

A careful reading of table 2 suggests that this latter effect dominates for manufacturing plants. Observe that, among the smallest plants, the difference between the gross destruction rate based on current size and the gross destruction rate based on average size exceeds the corresponding difference for the gross creation rate. Observe, also, that the creation and destruction rates align more closely when comparing the current and averge size measures than when comparing either of these measures to the Birch/SBA measure. This last observation indicates that the regression fallacy – not the birth problem stressed by Brown *et al* – accounts for the striking contrast between Panel A and the other panels.

[19]The SBA has recently contracted with the Bureau of the Census to longitudinally link the federal government's Standard Statistical Establishment List for the purpose of studying job creation and destruction behavior. See Census contract number 61-93-41, "The Longitudinal Data Study".

an unparalleled source of information for many commercial purposes, it is not designed or maintained to maximize its usefulness as a tool for statistical analysis. Numerous studies have highlighted severe problems with the DMI files as a tool for measuring job creation and destruction or business births and deaths. [20]

For the purpose of investigating the job creation process, the DMI files suffer from two key problems. First, there is an enormous discrepancy between U.S. total employment as tabulated from the DMI files and the corresponding employment figures produced by the Bureau of Labor Statistics (BLS) or the Bureau of the Census. In 1986, for example, total employment tabulated from the DMI files exceeds the corresponding BLS and Census figures by nine million persons. [21] In an economy with roughly 110 million employees, a discrepancy of this magnitude raises serious doubts about the accuracy of any statistical portrait generated from the DMI files. Furthermore, previous research finds that the most serious data problems in the DMI files involve younger and smaller businesses. This finding suggests that DMI-based claims about small business job creation should be interpreted with special caution.

Second, the DMI files do not accurately track business births and deaths or other important employment events. The U.S. Government Accounting Office (GAO) has analyzed the accuracy of the DMI files in accounting for mass layoffs, with particular emphasis on layoffs due to plant closures. SBA provided GAO with a sample of mass layoffs and plant closures from the DMI files for the 1982-84 period.[22] The GAO study found that 81 percent of the

[20]See Armington and Odle (1982b), Birch and MacCracken (1983), Birley (1984), Howland (1988, chapter 2), Evans (1987), Aldrich et al (1988), and the SBA (1983, 1987).

[21]See page 514 in the 1989 *U.S. Statistical Abstract.*

[22]The GAO defined a mass layoff as the dismissal of at least 20 percent of a plant's permanent work force.

mass layoff events in the DMI files were mistakenly identified. In reality, these 81 percent represented some other event, such as a change in ownership structure, not a mass layoff or plant closure.

The DMI files also inaccurately identify plant births. A study by Birley (1984) compares three alternative sources of data for identifying new firms: the DMI file, the ES-202 data generated from administrative records maintained by state unemployment insurance agencies, and the telephone directory. She finds that the DMI files failed to identify 96 percent of the new firms found in the ES-202 data. Using a similar methodology, Aldrich *et al.* (1988) find that the DMI files missed 95 percent of apparently new businesses in the ES-202 data and 97 percent of those in the telephone directory.

In short, previous research indicates that the DMI files are unsuitable for generating job creation and destruction figures. Identifying plant births and deaths and tracking businesses over time is most difficult for small employers. Thus the DMI files are especially ill-suited for investigating the role of small business job creation.

The LRD, in contrast, is explicitly designed and maintained to avoid the type of problems that plague the DMI files. It is based on business surveys specifically designed to provide a statistical portrait of U.S. manufacturing activity. In addition, the Census Bureau draws on payroll tax records and other government data sources to verify and enhance the quality of LRD employment data. [23] Drawing on the longitudinal data in the LRD, the next two

[23]Given the need of policy makers to understand the job creation process, government statistical agencies should set a high priority on developing longitudinal establishment-level data bases for other sectors of the U.S. economy. The Center for Economic Studies at the Bureau of the Census is currently conducting a pilot study to determine whether the federal government's Standard Statistical Establishment List can be effectively used to construct longitudinal data on firms and establishments for the entire U.S. economy.

sections report additional findings about the job creation process in the U.S. manufacturing sector.

9 What fraction of new manufacturing jobs did small employers create?

Table 3 reports the percentage of manufacturing employment and job creation and destruction by employer size for the period 1973 to 1988. As the table reveals, large employers created most new manufacturing jobs over the period. They also destroyed most of the lost manufacturing jobs. Panel I of the table reveals that plants averaging at least 100 employees accounted for roughly seven of every ten newly created and newly destroyed manufacturing jobs. Panel III shows that firms with at least 500 employees accounted for 53 percent of job creation and 56 percent of job destruction. Panel IV shows that multi-unit firms accounted for roughly seven of every ten newly created and newly destroyed manufacturing jobs.

[TABLE 3 HERE]

The table also reveals why large employers play the dominant role in job creation and destruction, despite the higher creation and destruction rates among smaller employers. The reason is that large employers account for the bulk of the manufacturing jobs base. Over the 1972-88 period as a whole, firms with at least 500 employees accounted for 65 percent of manufacturing employment.

The SBA defines small businesses to include any firm with fewer than 500 employees. According to this definition, Panel III of Table 3 reveals that small manufacturing firms

account for 46% of job creation. This figure reflects an expansive and generous definition of the small business sector. Political orations about the virtues of small business often bring to mind family-run businesses and struggling entrepreneurs with shoe-string operations, not firms with up to 500 employees. In addition, a host of government regulations that entail exemptions for small businesses specify a cutoff level far below 500 employees. For example, Brock and Evans (1986, p. 74) note that the "Office of Federal Contract Enforcement exempts businesses with fewer than fifty employees from filing affirmative action plans." As another example, the Worker Adjustment and Retraining Notification Act of 1988 requires employers to give workers and government officials sixty days advance notice before a plant closure or large layoff, but the Act exempts establishments with fewer than fifty employees. The Family and Medical Leave Act of 1993 exempts employers with fewer than 50 workers. Returning to Table 3, firms with fewer than fifty employees account for only 19 percent of gross job creation in the manufacturing sector; plants with fewer than fifty employees account for only 23 percent. Thus, according to these definitions, only about one-fifth of all new manufacturing jobs are created by small employers.

Would this characterization of the small business role in job creation differ if we looked outside the manufacturing sector? Although we are currently unable to calculate gross job creation and destruction rates for nonmanufacturing industries, we know that small businesses account for a considerably larger fraction of the jobs base in most nonmanufacturing industries. This point stands out clearly in table 4. Drawing on several data sources, the table reports employment shares for various concepts of large and small businesses. Ac-

cording to SBA figures, firms with fewer than 500 workers acount for 50 percent of private sector employment but only 36 percent of manufacturing employment. According to County Business Patterns data, establishments with fewer than 100 workers account for 64 percent of nonmanufacturing employment but only 28 percent of manufacturing employment. Thus, small businesses provide a much larger share of the jobs base outside the manufacturing sector. In addition, the available evidence indicates that the gross job creation rate declines with employer size in the nonmanufacturing sector, just as it does in the manufacturing sector. [24] These facts make us confident that small business accounts for a larger share of job creation and destruction in most nonmanufacturing industries than in the manufacturing sector. A more precise characterization awaits the development and analysis of high quality longitudinal data for nonmanufacturing businesses. Since the manufacturing sector accounts for a small and declining share of U.S. employment – only 19% in 1988 – we think the development of such data merits a high priority by government statistical agencies.

[TABLE 4 HERE]

10 The durability of jobs by employer size

Laudatory claims about the job creation role of small businesses often fail to consider how the permanence of jobs varies with employer size. This failure is serious, because job durability differs systematically by employer size. Table 5 documents this pattern for the manufacturing

[24] Unpublished tabulations prepared by Ken Troske for the finance, insurance and real estate sector in Wisconsin, and by Al Nucci for the U.S. nonmanucturing sector during the 1982-87 period, indicate that gross job creation rates decline sharply with employer size.

sector.

[TABLE 5 HERE]

The table shows one-year survival rates for all jobs and newly-created jobs by size of employer. The one-year survival rates for all jobs rise systematically with all four measures of employer size. The one-year survival rate for the biggest firms is 92 percent, as compared to only 81 percent for the smallest firms. Furthermore, the one-year survival rates for new jobs rise systematically with average plant size, firm size and ownership type. [25] The one-year survival rate for new jobs at the biggest firms is 76 percent, as compared to only 65 percent at the smallest firms. Simply put, bigger employers offer greater job durability. Regardless of employer size, however, new jobs are much less durable than the typical existing job.

Although the relationship is weaker, table 5 also reveals that the persistence of newly-destroyed jobs is greater for smaller employers. In a nutshell, both existing and newly-created jobs are less secure at small busineses than at large businesses, and once lost, small business jobs are less likely to reappear. Thus, in terms of job durability, larger employers outperform smaller ones.

11 Conclusions

Drawing on U.S. Census Bureau data for manufacturing plants from 1972 to 1988, we report new evidence on the relationship between employer size and job growth. We find that large

[25] The appendix explains why current plant size and average plant size exhibit different relationships to the one-year survival rate for new jobs. The explanation relates closely to our earlier discussion of the regression fallacy.

firms and plants dominate the creation and destruction of jobs in the U.S. manufacturing sector. This finding has a simple two-part explanation. First, for employers large and small, gross job creation and destruction rates are quite high – on the order of 10 percent of employment per year. Second, large firms and plants account for the bulk of the manufacturing jobs base.

While gross job creation rates are substantially higher for smaller plants and firms, so are gross destruction rates. We find no strong or systematic relationship between net job growth rates and either firm or plant size. However, we find clear evidence that larger employers offer greater job security. For both new jobs and the typical existing job, job durability increases with employer size.

These empirical findings clash sharply with conventional wisdom about the job-creating prowess of small business. One might suspect that the source of disagreement lies with differences between the manufacturing and nonmanufacturing sectors of the economy. We hold open the possibility that careful analysis of job creation activity in the nonmanufacturing sector might produce evidence more congenial to the conventional view, but that view does not rest upon a careful and balanced analysis of the data. Rather, the widely espoused claims about small business and job creation rest upon two common fallacies – the size distribution fallacy and the regression fallacy – and a confusion between net and gross job creation.

As illustrated by several quotations in Box 1, the job-creating prowess of small business is often touted as an argument in favor of preferential tax, subsidy, or regulatory treatment of small businesses. Aside from its questionable factual basis, this type of argument is a

nonsequitur. It has two fundamental problems.

First, the argument neglects the issue of job quality; the mere creation of jobs is not an appropriate economic policy objective. Economic policy is appropriately directed towards wealth creation and the expansion of consumption opportunities. Here, we mean "consumption opportunities" in a broad sense that encompasses not just material goods, but the many factors that influence the quality of life. For economic policy to serve these objectives, it must promote job quality as well as job creation. While there are many exceptions to the basic pattern, the weight of evidence indicates that, on average, larger employers offer better jobs in terms of wages, fringe benefits, working conditions, opportunities for skill enhancement, and job security. [26] Few studies that purportedly demontrate small business's disproportionate contribution to job creation effectively address the issue of job quality. Except for the matter of job durability, we have not addressed the issue in this article.

Second, the argument for preferential treatment of small business fails to comprehend the central theorem of economic policy prescription. This theorem directs attention towards marginal responses to proposed economic policy changes. In contrast, claims about the job-creating prowess of small business are statements about the average behavior of a class of firms. Even if accurate, these statements do not predict how the number (or quality) of jobs would respond to a proposed economic policy change. Careful, well-founded predictions about how the number and quality of jobs respond to changes in the economic environment are the appropriate yardstick for policy evaluation.

In practice, determining how policy changes affect job numbers and quality poses consid-

[26] Brown *et al* (1990) review much of the evidence on how job quality varies with employer size.

erable challenge. Even greater challenges in the political arena confront efforts to implement economically sound policies that target specific sectors or type of firms. Targeted policy proposals invite political conflicts over the precise structure of subsidies, tax breaks, and preferential regulatory treatment. These conflicts are costly for two reasons. First, they inevitably turn into resource-consuming struggles over the redistribution of society's wealth. Second, the outcome usually reflects the relative political strengths of the parties to the conflict, rather than the economic criteria that shaped the original policy proposal. In our view, these practical barriers to successful design and implementation of targeted policies create a strong presumption in favor of neutral, untargeted policies.

Appendix

In table 5, the one-year survival rate for new jobs shows a clear relationship to average plant size but not to current size. How can we reconcile these apparently contradictory results? First, consider some hypothetical employment histories in a simplified setting with only two size classes. Suppose a plant is small at the beginning of the sample, becomes large for one period, and then returns permanently to the small category. This plant is classified as small under the average size measure. Under the current size measure, it is classified as small in most periods but as large in the period that coincides with its one episode of job creation.[27] Consequently, this plant's employment history pulls down the survival rate for small plants under the average size measure, but it pulls down the survival rate for large plants under the current size measure.

As a second hypothetical example, consider a plant that starts out large, becomes small for one period, and then returns permanently to large status. The plant's return to large status involves an episode of persistent job creation. This episode pushes up the new job survival rate for large plants under the average size measure, but it pushes up the rate for small plants under the current size measure.

These two hypothetical employment histories illustrate a more general point: under the current size measure, plant-level employment histories that involve occasional, temporary movements across size-class boundaries increase the new job survival rates for small plants

[27] Recall that our measure of current plant size equals the simple average of current and previous period's employment. Remarks in the text presume that the plant crosses the size-class boundary – once during its job creation episode and a second time after it returns to its initial size.

relative to large plants. Just how prevalent are these occasional boundary-crossing episodes? We know from Davis, Haltiwanger and Schuh (1993, chapter 2) that job creation is concentrated among plants that experience large percentage employment changes, suggesting that much job creation involves boundary crossing. We know from other research (e.g., Lilien 1980) that temporary layoffs in the manufacturing sector are quite important, especially during cyclical downturns. These observations suggest that the second hypothetical example, in particular, captures an important aspect of plant-level employment dynamics.

These remarks reconcile the apparent discrepancy between results based on the two alternative measures of plant size, but they do not indicate which size measure is more appropriate. As we suggested earlier, average plant size is probably a more accurate proxy for the plant's intended scale of operations. More importantly, the average size measure assigns each plant to a fixed category. In contrast, as our examples reveal, the current size measure can attribute job creation to the small plant category, even though the plant is large during most periods – and vice versa.[28] To our mind, this aspect of accounting for job creation by current size class is discomfiting. We believe that using average plant size is a more informative way to examine job creation data, although the current size measure may be preferable for some purposes.

In any case, this issue becomes less nettlesome when we examine the survival of new jobs by ownership type and firm size. A plant's ownership type seldom changes. Since firm size reflects the firm's employment level during the preceding Census of Manufactures, the measured size of a plant's parent firm is unaffected by the plant's subsequent employment

[28]The same problem arises if we use base-year employment to measure employer size.

history.

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Notes:

[a] Job creation and destruction rates are defined in section 2 of the text. Table entries for the creation and destruction rates and the employment shares are means of annual values for the period 1973 to 1988.

[b] Equal to the weighted mean number of employees, computed over all annual observations on the plant during the period 1972 to 1988.

[c] Equal to the simple mean of the plant's current employment and its employment twelve months earlier.

[d] Equal to the number of manufacturing workers employed by the plant's parent firm in the preceding Census of Manufactures. Census years are 1972, 1977, 1982 and 1987.

Table 1
Rates of Job Creation and Destruction by Employer Size, 1973-1988[a]

I. Average Plant Size[b]

Size Class	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
0 to 19 Employees	15.9	17.2	-1.3	4.4
20 to 49	12.6	13.8	-1.1	8.2
50 to 99	11.7	12.6	-0.9	10.1
100 to 249	10.0	11.5	-1.4	18.5
250 to 499	8.5	9.8	-1.3	16.6
500 to 999	7.5	8.5	-1.0	13.8
1000 to 2499	6.6	8.2	-1.6	12.5
2500 to 4999	6.5	8.2	-1.7	7.2
5000 or More	5.9	6.5	-0.6	8.8

II. Current Plant Size[c]

Size Class	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
0 to 19 Employees	18.7	23.3	-4.5	5.2
20 to 49	13.2	15.3	-2.1	8.6
50 to 99	12.2	13.5	-1.3	10.5
100 to 249	9.6	10.7	-1.1	18.5
250 to 499	7.7	8.7	-1.0	16.0
500 to 999	7.0	7.6	-0.6	13.5
1000 to 2499	6.3	7.3	-1.0	12.3
2500 to 4999	6.1	7.5	-1.3	7.0
5000 or More	5.4	5.6	-0.2	8.4

III. Firm Size[d]

Size Class	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
0 to 19 Employees	16.5	18.8	-2.3	5.2
20 to 49	12.3	13.3	-1.0	7.0
50 to 99	11.5	11.9	-0.4	6.8
100 to 249	11.1	11.2	-0.1	9.1
250 to 499	9.8	9.9	-0.1	6.8
500 to 999	9.3	9.8	-0.4	6.2
1000 to 2499	8.8	9.5	-0.7	8.2
2500 to 4999	8.0	9.4	-1.4	7.1
5000 to 9999	7.8	9.1	-1.3	8.5
10000 to 24999	7.1	8.6	-1.5	13.6
25000 to 49999	6.5	8.1	-1.6	9.2
50000 or More	6.3	8.0	-1.6	12.4

IV. Ownerhsip Type of Parent Firm

Ownership Type	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
Single-Unit	12.7	12.9	-0.2	22.3
Multi-Unit	8.1	9.4	-1.3	77.7

Table 2

Job Destruction and Creation Rates by Three Measures of Plant Size, 1973-1988[a]

I. Base-Year Measure of Plant Size[b]

Size Class	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
0 to 19 Employees	25.7	15.4	10.3	5.2
20 to 49	13.6	13.1	0.6	8.5
50 to 99	11.4	12.0	-0.7	10.4
100 to 249	9.5	11.1	-1.7	18.6
250 to 499	7.4	9.9	-2.5	16.0
500 to 999	6.3	9.0	-2.7	13.5
1000 to 2499	5.7	8.4	-2.6	12.3
2500 to 4999	5.4	7.9	-2.5	7.0
5000 to 9999	4.7	7.1	-2.4	8.5

II. Average Plant Size Measure[c]

Size Class	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
0 to 19 Employees	15.9	17.2	-1.3	4.4
20 to 49	12.6	13.8	-1.1	8.2
50 to 99	11.7	12.6	-0.9	10.1
100 to 249	10.0	11.5	-1.4	18.5
250 to 499	8.5	9.8	-1.3	16.6
500 to 999	7.5	8.5	-1.0	13.8
1000 to 2499	6.6	8.2	-1.6	12.5
2500 to 4999	6.5	8.2	-1.7	7.2
5000 or More	5.9	6.5	-0.6	8.8

III. Current Plant Size Measure[d]

Size Class	Gross Job Creation	Gross Job Destruction	Net Job Creation	Employment Share
0 to 19 Employees	18.7	23.3	-4.5	5.2
20 to 49	13.2	15.3	-2.1	8.6
50 to 99	12.2	13.5	-1.3	10.5
100 to 249	9.6	10.7	-1.1	18.5
250 to 499	7.7	8.7	-1.0	16.0
500 to 999	7.0	7.6	-0.6	13.5
1000 to 2499	6.3	7.3	-1.0	12.3
2500 to 4999	6.1	7.5	-1.3	7.0
5000 or More	5.4	5.6	-0.2	8.4

Notes:

[a] Job creation and destruction rates are defined in section 2 of the text. Table entries for the creation and destruction rates and the employment shares are means of annual values for the period 1973 to 1988.

[b] Equal to the number of employees in the initial year of the interval over which the growth rate is calculated.

[c] Equal to the weighted mean number of employees, computed over all annual observations on the plant during the period 1972 to 1988.

[d] Equal to the simple mean of the plant's current employment and its employment twelve months earlier.

Table 3

Shares of Gross Manufacturing Job Creation and Destruction by Employer Size, 1973-1988[a]

Average Plant Size[b]	Job Creation	Job Destruction	Employment
0 to 19 Employees	7.6	7.4	4.4
20 to 49	11.3	11.0	8.2
50 to 99	13.1	12.5	10.1
100 to 249	20.3	20.7	18.5
250 to 499	15.6	16.0	16.6
500 to 999	11.4	11.5	13.8
1000 to 2499	9.1	10.1	12.5
2500 to 4999	5.2	5.8	7.2
5000 or More	5.7	5.6	8.8
Current Plant Size[c]			
0 to 19 Employees	10.7	11.8	5.2
20 to 49	12.5	13.0	8.6
50 to 99	14.0	13.8	10.5
100 to 249	19.5	19.5	18.5
250 to 499	13.6	13.6	16.0
500 to 999	10.4	10.1	13.5
1000 to 2499	8.5	8.8	12.3
2500 to 4999	4.7	5.1	7.0
5000 or More	5.0	4.6	8.4
Firm Size[d]			
0 to 19 Employees	9.5	9.6	5.2
20 to 49	9.4	9.1	7.0
50 to 99	8.6	7.9	6.8
100 to 249	11.1	9.9	9.1
250 to 499	7.4	6.6	6.8
500 to 999	6.4	6.0	6.2
1000 to 2499	7.9	7.6	8.2
2500 to 4999	6.2	6.5	7.1
5000 to 9999	7.2	7.6	8.5
10000 to 24999	10.5	11.4	13.6
25000 to 49999	6.6	7.3	9.2
50000 or More	8.6	9.7	12.4
Ownership Type			
Single-Unit	31.1	28.2	22.3
Multi-Unit	69.0	71.6	77.7

Notes:

[a] Table entries show the shares of gross job creation, gross job destruction and employment for U.S. manufacturing. Table entries are average annual values for the period 1973-1988.

[b] Equal to the weighted mean number of employees, computed over all annual observations on the plant during the period 1972 to 1988.

[c] Equal to the simple mean of the plant's current employment and its employment twelve months earlier.

[d] Equal to the number of manufacturing workers employed by the plant's parent firm in the preceding Census of Manufactures. Census years are 1972, 1977, 1982 and 1987.

Table 4

The Share of Employment by Employer Size

I. By Current Size of Establishment[a]

Year	Sector	Data Source	Number of Employees < 50	< 100	≥ 500	≥ 1000
1988	Private	CBP	.43	.56	.19	.13
1988	Nonman.	CBP	.51	.64	.14	.09
1988	Manuf.	CBP	.17	.28	.37	.24
1988	Manuf.	LRD	.11	.22	.40	.26

II. By Average Size of Establishment[b]

Year	Sector	Data Source	Number of Employees < 50	< 100	≥ 500	≥ 1000
1988	Manuf.	LRD	.11	.22	.41	.27

III. By Size of Firm[c]

Year	Sector	Data Source	Number of Employees < 50	< 100	< 500	≥ 5000
1988	Private	SBA			.50	
1988	Manuf.	SBA			.36	
1987	Private	ES	.28	.36	.51	.29
1987	Nonman.	ES	.36	.45	.59	.21
1987	Manuf.	ES	.12	.18	.32	.48
1987	Manuf.	LRD	.09	.16	.35	.42

IV. By Parent Firm Ownership Type

Year	Sector	Data Source	Single Unit	Multiple Units
1987	Private	ES	.45	.55
1987	Nonman	ES	.54	.46
1987	Manuf.	ES	.24	.76
1988	Manuf.	LRD	.20	.80

Notes:

[a] For the LRD, equal to the simple mean of the plant's current employment and its employment twelve months earlier. For the CBP, equal to the number of employees during March of the current year.

[b] Equal to the weighted mean number of employees, computed over all annual observations on the plant during the period 1972 to 1988.

[c] Equal to the number of workers employed by the plant's parent firm.

Data sources:

CBP: Authors' calculations from County Business Patterns (1988). The CBP covers the nonfarm private sector, excluding railroad and domestic household workers.

LRD: Authors' calculations from the Longitudinal Research Database. Unlike the other data sources, the LRD excludes administrative and auxilliary establishments not directly engaged in production activity.
SBA: From Table 17 in Small Business Administration (1991).
ES: Authors' calculations from Enterprise Statistics (1987). The ES data exclude finance, insurance, real estate, public utilities, communications and some service industries.

Table 5

Survival and Persistence Rates for All Jobs, New Jobs, and Lost Jobs in Manufacturing, 1973-1988[a]

	One-Year Survival Rate		*One-Year Persistence Rate*
	All Jobs	*New Jobs*	*Newly-Destroyed Jobs*
Average Plant Size[b]			
0 to 19 employees	0.83	0.62	0.84
20 to 49	0.84	0.65	0.84
50 to 99	0.87	0.69	0.82
100 to 249	0.88	0.71	0.82
250 to 499	0.90	0.71	0.80
500 to 999	0.92	0.71	0.80
1000 to 2499	0.92	0.71	0.82
2500 to 4999	0.92	0.75	0.80
5000 or More	0.93	0.75	0.82
Current Plant Size[c]			
0 to 19 employees	0.77	0.70	0.86
20 to 49	0.85	0.70	0.84
50 to 99	0.86	0.71	0.83
100 to 249	0.89	0.70	0.81
250 to 499	0.91	0.68	0.79
500 to 999	0.92	0.68	0.80
1000 to 2499	0.93	0.68	0.81
2500 to 4999	0.92	0.73	0.79
5000 or More	0.94	0.71	0.83
Firm Size[d]			
0 to 19 employees	0.81	0.65	0.86
20 to 49	0.87	0.66	0.82
50 to 99	0.88	0.67	0.81
100 to 249	0.89	0.70	0.81
250 to 499	0.90	0.70	0.82
500 to 999	0.90	0.69	0.81
1000 to 2499	0.90	0.70	0.81
2500 to 4999	0.91	0.70	0.82
5000 to 9999	0.91	0.70	0.81
10000 to 24999	0.91	0.71	0.81
25000 to 49999	0.92	0.70	0.82
50000 or More	0.92	0.76	0.82
Ownership Type			
Single-Unit Firm	0.87	0.67	0.82
Multi-Unit Firm	0.91	0.71	0.82

Notes:

[a] The one-year survival rate for all jobs equals one minus the job destruction rate, as reported in Table 1. The one-year survival rate for new jobs equals the fraction

created between year $t-1$ and t that are still present at the same location in year $t+1$. The one-year persistence rate of newly-destroyed jobs equals the fraction of jobs lost between year $y-1$ and t that have not reappeared at the same location by year $t+1$. All table entries are average annual values for the period 1973 to 1988.

[b] Equal to the weighted mean number of employees, computed over all annual observations on the plant during the period 1972 to 1988.

[c] Equal to the simple mean of the plant's current employment and its employment twelve months earlier.

[d] Equal to the number of manufacturing workers employed by the plant's parent firm in the preceding Census of Manufactures. Census years are 1972, 1977, 1982 and 1987.

Box 1

Small Business and Job Creation: Reciting the Conventional Wisdom

From 1970 to 1980 small businesses accounted for most of the 20 million new jobs generated in the United States.

Leonard Silk, *New York Times,* April 9, 1986

Little companies currently employ 53% of the total U.S. work force, and during the past decade created virtually all net new jobs.

Adam Zagorin, *Time,* July 12, 1993

Small firms created virtually all new jobs between 1988 and 1991.

David Birch, Cognetics Inc. press release, 1993

As always, the key [to job creation] is to spur hiring by new companies, the small businesses of fewer than 500 workers that accounted for fully two-thirds of job creation in the 1980s.

Stephen Roach, *New York Times,* March 14, 1993

The term, "Great American Job Machine," is appropriately applied to American small business.

U.S. Small Business Administration,
State of Small Business Report, 1988, p. 35.

Moreover, government regulation tends to be especially burdensome to small business, which created most of the jobs in the 1980s.

Henry F. Meyers, *Wall Street Journal* ("The Outlook" column), March 8, 1993

Small businesses have become the superstars of job creation, producing up to 80 percent of new jobs in recent years. ... Considering the success of small businesses in today's service sector and their willingness to take on and retain new employees, it would be innovative and economically sound for the Clinton Administration and Congress to give business a tax credit for hiring additional people.

Muriel Siebert, *New York Times,* January 6, 1992

The large increase in the effective tax rate on many small firms is likely to retard the economy's recovery momentum because small firms account for practically all the job creation in the U.S. economy.

David Hale, *Wall Street Jounal,* July 30, 1993

Because small business has created such a high percentage of all the new jobs in our nation over the last 10 or 15 years, our plan includes the boldest targeted incentives for small business in history. We propose a permanent investment tax credit for the small firms in this country, ...

President Bill Clinton, 1993 State of the Union Address

We agree with the President that we have to put more people to work, but remember this: 80 to 85 percent of the new jobs in this country are created by small business. So the climate for starting and expanding businesses must be enhanced with tax incentives and deregulation, rather than imposing higher taxes and more governmental mandates.

Representative Robert Michel, House Minority Leader, in the Republican Response to the 1993 State of the Union Address

What do Bill Clinton, George Bush and Bob Dole have in common? All have uttered one of the most enduring homilies in American political discourse: That small businesses create most of the nation's jobs. This old chestnut got a heavy workout recently as Washington wrangled over the $500 billion budget package. Clinton invoked it to defend an equipment-purchase tax break aimed mostly at small businesses; Republicans cited it while denouncing the packages's tax hike on upper-income earners.

Susan Dentzer, *U.S. News and World Report,* August 16, 1993

Box 2
ILLUSTRATION OF THE SIZE DISTRIBUTION FALLACY

	Firm 1	Firm 2	Firm 3	Small Firms	Big Firms	All Firms
Year 1 Employment	300	550	650	300	1200	1500
Year 2 Employment	50	340	1210	390	1210	1600
Net Change	-250	-210	560	90	10	100

Small Firm Share of Net Job Creation $= (390 - 300)/(1600 - 1500) = .9$

This illustration uses data on the size distribution of employment to calculate job creation shares. The calculation uses only the data that appear in the three rightmost columns. Changes in the distribution of employment by firm size are fallaciously used to draw an inference about the share of job creation accounted for by small firms.

Box 3

ILLUSTRATION OF A CONFUSION BETWEEN NET AND GROSS JOB CREATION

	Firm 1	Firm 2	Firm 3	Small Firms	Big Firms	All Firms
Year 1 Employment	300	600	600	300	1200	1500
Year 2 Employment	350	400	800	350	1200	1550
Net Change	50	-200	200	50	0	50

Small Firm Share of Net Job Creation = $50/50 = 1$

Small Firm Share of Gross Job Creation = $50/(50 + 200) = .2$

This illustration calculates job creation shares from longitudinal data on individual firms. The calculation makes use of longitudinal data to calculate net firm-level employment changes. The net firm-level employment changes are aggregated over firms within a size class and then expressed as a fraction of the aggregate net change. Following the common practice of prominent analysts and government agencies like the U.S. Small Business Administration, continuing firms are assigned to a size category using base-year employment. The last two lines show how the small firm share of net job creation misrepresents the actual distribution of newly-created jobs by size of firm.

Box 4
ILLUSTRATION OF THE REGRESSION FALLACY

	Firm 1	Firm 2	Firm 3	Small Firms	Big Firms	All Firms
Year 1 Employment	450	550	600	450	1150	1600
Year 2 Employment	550	450	600	450	1150	1600
Year 3 Employment	450	550	600	450	1150	1600
Year 2 Growth Rate	.22	-.18	0	**.22**	**-.09**	0
Year 3 Growth Rate	-.18	.22	0	**.22**	**-.09**	0

This illustration calculates net job creation rates for individual firms and by size class of firms. Following the common practice of prominent analysts and government agencies like the U.S. Small Business Administration, continuing firms are assigned to a size category using base-year employment. Year 1 (year 2) is the base year when calculating year-2 (year-3) growth rates. Although each firm employs the same number of workers in year 1 as in year 3, the net growth rate for small firms – as calculated – exceeds the net growth rate for big firms in both years 2 and 3. This apparent puzzle reflects a bias in the estimated size-growth relationship induced by temporary changes in the level of employment at individual firms.