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Gross Job Flows over the Past Two Business Cycles: Not all "Recoveries" are Created  
Equal

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## **Gross Job Flows over the Past Two Business Cycles:**

### **Not all “Recoveries” are Created Equal**

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#### **Abstract:**

I compare the behavior of job creation and job destruction over the past two economic downturns. Both periods have brief but sharp rises in job destruction followed by flat net job growth. The dynamics underlying these slow recoveries differ drastically. In 1991-92, job destruction is slow to decline. In 2001, job creation falls dramatically and remains persistently low through 2003. I find this trend qualitatively similar in both manufacturing and service industries. I also find that neither a structural shift of jobs across industries nor increased trade liberalization is a consistent explanation for the recent lack of growth. Instead, the evidence suggests that a large drop in business investment may explain the decline in job creation.

*The views expressed are solely those of the author and do not necessarily reflect the official positions or policies of the U.S. Bureau of Labor Statistics or the views of other staff members.*

## Introduction

Although the National Bureau of Economic Research (NBER) identified the last recession as ending in November 2001, the private sector has lost an additional 1.1 million jobs through June 2003. This job loss occurred despite increases in GDP and labor productivity. Weak job growth also followed the business cycle trough of March 1991. At that time, job growth did not pick up until the latter part of 1992, just as the longest expansion on record began.

In this paper, I compare the patterns of job creation and job destruction underlying the last two recessions and their slow employment recoveries. I define job creation as the gross number of jobs gained at establishments either opening up or expanding their workforce, and similarly define job destruction as the gross number of jobs lost at establishments either closing down or contracting their workforce. I use longitudinal data from the *Business Employment Dynamics* (BED) program of the Bureau of Labor Statistics (BLS). The data include all employees covered under state unemployment insurance programs. The BLS has these estimates publicly available for the private sector for mid-1992 through mid-2003. Data issues, unfortunately, make the release of earlier data by the BLS currently infeasible. To counter these issues, I manually go through the pre-1992 data and create algorithms to deal with these issues. Consequently, I have a time-series of gross job flows that dates back to early 1990 and forward to 2003, allowing a previously impossible comparison of employment dynamics during the last two economic downturns.

I find that while the net employment changes over the past two recessions are similar, their underlying dynamics are quite different. In 1991, job destruction peaks as the recession reaches its height. Job creation changes little during this time. During the stagnant period that follows, job creation again changes little, but the pace of job destruction is slow to decline, leading to the small observed net gains. In 2001, job destruction again peaks as the recession reaches its height. This time, however, there is a dramatic drop in job creation. The pace of job creation continues to fall well into the recovery period. Even though job destruction returns to its

expansion-period pace relatively quickly, net losses in jobs persist because of the exceptionally low rate of job creation that continues well into 2003. A comparison of major industry sectors shows these trends to be qualitatively similar in both manufacturing and services.

In addition, my job flow analysis suggests that structural factors do not account for the drop-off in job creation that persists through the 2002-03 period. I compare the highest and lowest-growing industries of the expansion period. I find no major shifts in their trend patterns of either job creation or job destruction during or after the recent recession. If anything, there is an increase in trend job destruction among the *expanding* industries, which may be reflective of an employment bubble bursting. I also compare manufacturing industries of differing degrees of sensitivity to international trade. I find that industries who tend to gain from trade suffered just as much as, if not more than (from an employment perspective), those who are most sensitive to strong imports.

The next section details the data and defines the relevant job flow concepts. After that, I present the basic evidence on job flows between 1990 and 2003. The following section analyzes whether either structural changes or changes in trade patterns contributed to the recent employment downturn. I then discuss the recent decline in job creation in more detail. The final section discusses my findings and draws conclusions.

## **Data and Definitions**

The data come from the Quarterly Census of Employment and Wages (QCEW), or ES-202, program. The BED data are a longitudinal version of the QCEW data, used for quarterly estimates of gross job gains (also referred to as job creation) and gross job losses (also referred to as job destruction). The BED data are a virtual census of employment, which includes all establishments covered under state unemployment insurance programs.<sup>1</sup> The BED links establishment records over time, providing a longitudinal employment history for each. Record

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<sup>1</sup> The government, self-employed, and private households are the primary exclusions from the BED.

linkage is a detailed process, and it is summarized well in Pivetz, Searson, and Spletzer (2001) and Clayton et al. (2004). The longitudinal nature of the data allows the BLS to estimate the number of jobs gained or lost by establishments each quarter. These estimates are currently available from the third quarter of 1992 through the second quarter of 2003. The BED data, however, goes back to 1990. Major changes to the QCEW program prior to 1992 make it difficult for the BLS to produce estimates that meet official publication standards for this period. Researchers, however, can access the microdata and produce their own estimates for the 1990-92 period.

My data encompass quarterly employment and job flow estimates for all private sector establishments between March 1990 and June 2003. I obtain job flow estimates for the earlier period by using my own linkage algorithm as a supplement to the current BLS methodologies. My technique appeals to the fact that the linkage difficulties stem from the implementation of a specific administrative change (the implementation of the “Multiple Worksite Report”). The nature of the change does not allow a straightforward linkage of some continuous records, and thus creates an overstatement of job creation and destruction. With several identifying assumptions, however, I am able to virtually eliminate this overstatement. In the appendix, I detail the nature of the administrative change and my methods for dealing with it.

For this study, I use the standard BLS definitions of gross job gains and losses as my definitions of job creation and job destruction. I measure changes in employment as those between the third month of employment for each quarter. I define *job creation* as the sum of all employment gains at (i) continuous establishments expanding their employment from some positive level, and (ii) “opening” establishments reporting either positive employment for the first time or after reporting zero employment in the previous quarter. I define *job destruction* as the sum of all employment losses at (i) continuous establishments contracting their employment to a level that is still greater than zero, and (ii) “closing” establishments either disappearing or

reporting zero employment after reporting positive employment in the previous quarter.<sup>2</sup> The more familiar *net change* in employment is simply the difference between all jobs created and all jobs destroyed. Where reported, job flow and net change *rates* are the percentages of the third-month employment average of the current and previous quarters.<sup>3</sup>

Finally, I report estimates seasonally adjusted using the X-12 ARIMA process. I do so separately for the expanding, opening, contracting, and closing establishments at the 3-digit level of the North American Industry Classification System (NAICS). The industry detail is comparable to the 2-digit level of the older SIC system. Reported aggregated estimates are sums of these seasonally adjusted series. For the third quarter of 1992 forward, my seasonally unadjusted data are essentially identical to the published BED data. Due to differing adjustment methodologies, the seasonally adjusted series are slightly different. Overall, the data cover 5.0 million establishments representing 89.3 million employees in March 1990 and 6.4 million establishments representing 107.6 employees in June 2003. On average, establishment expansions and contractions make up about 80 percent of quarterly job creation and destruction, respectively.

### **Employment and Job Flows, 1990-2003**

The period from March 1990 through June 2003 contains a prolonged expansion sandwiched between two economic downturns. Based on the dating of the NBER, the first downturn begins after a business cycle peak in the third quarter of 1990, reaching its trough in the first quarter of 1991. Relative to previous recessions, employment losses are mild, but employment gains during the recovery are slow to materialize (see Figure 1). The second downturn begins as the economy peaks in the first quarter of 2001. Figure 1 illustrates that employment losses (from the business cycle peak) are sharper relative to previous recessions by

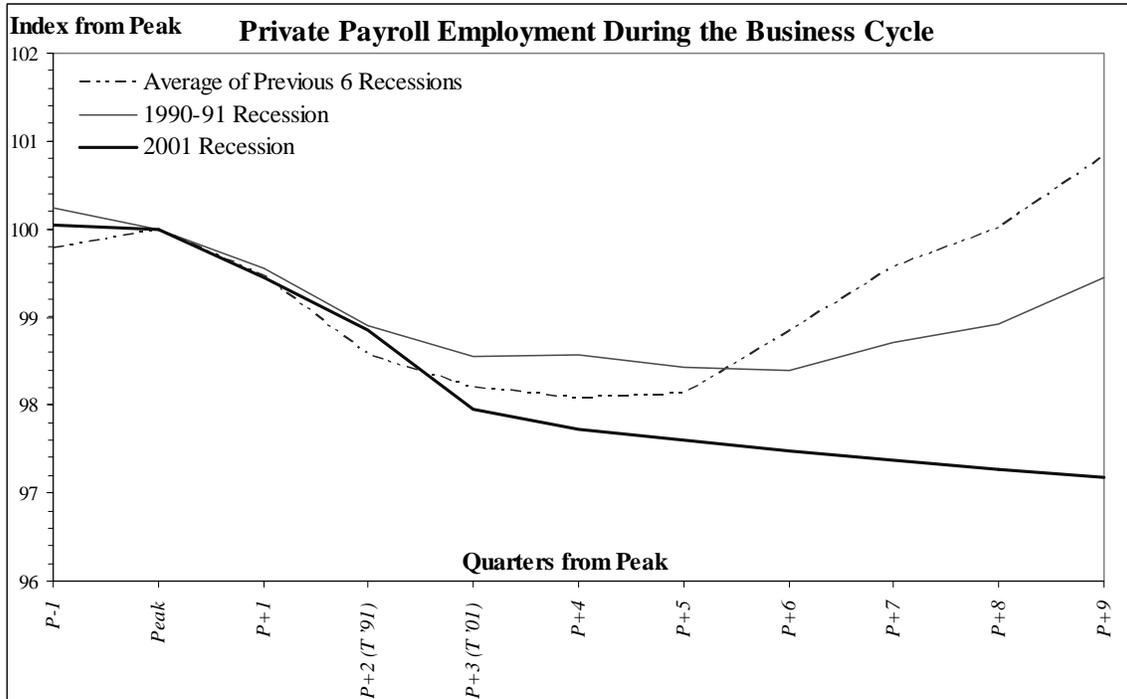
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<sup>2</sup> Given my definitions, openings and closings include re-openings and temporary closing, as well as births and deaths.

<sup>3</sup> Rate calculation follows the methodology of both the BLS and Davis, Haltiwanger, and Schuh (1996).

the time a trough is reached in the fourth quarter of the same year. In addition, employment losses continue during the recovery, through the second quarter of 2003, the latest available data.

**Figure 1.**

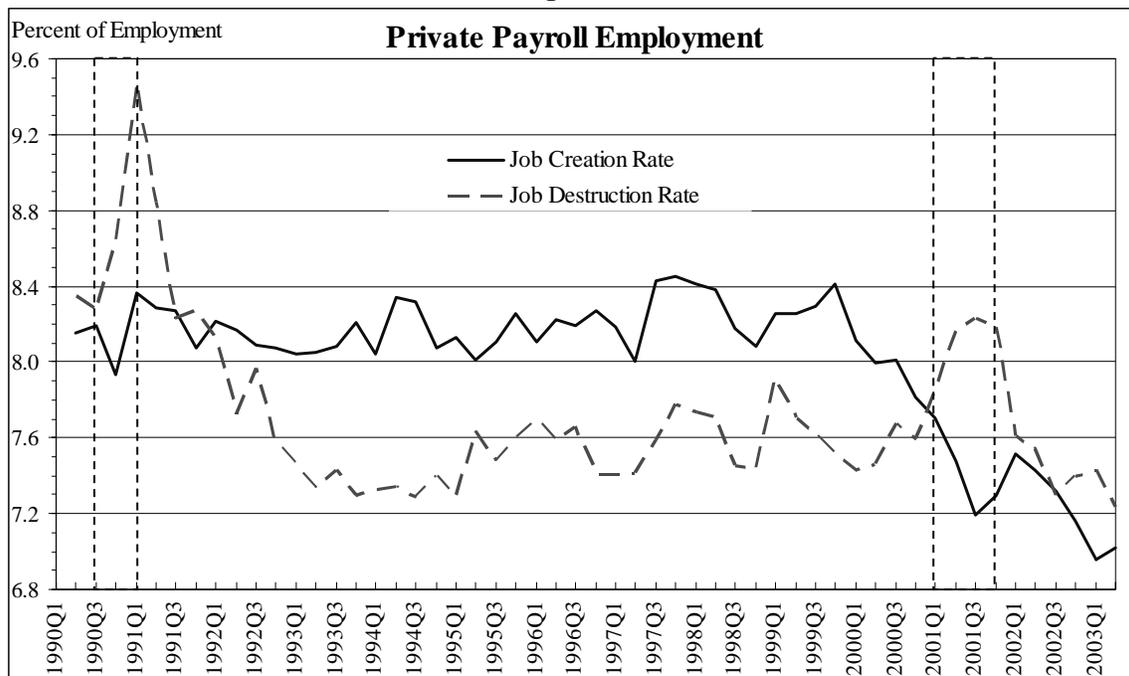


*Notes:* Figure uses the Current Employment Statistics of the BLS. The previous six recessions span 1953 through 1982, and count the double-dip of 1980-82 as a single event. Recent business cycle troughs are noted in parentheses.

Unlike previous downturns, the two most recent recessions have prolonged jobless spells during their subsequent recoveries. Based on the net employment changes over these two periods, one could conclude that there are many similarities in the behavior of the labor market over these two periods. The job flows underlying these net changes, however, show that the two recessions and their subsequent recoveries are quite different. Figure 2 shows the quarterly rates of job creation and job destruction from the second quarter of 1990 through the second quarter of 2003. Remember that the net employment change in a given quarter is the difference between the job creation rate and the job destruction rate. The NBER-dated peaks and troughs are outlined. Both recessions have relatively high rates of job destruction, with large spikes of job loss at or near each trough. The spike in job destruction in the first quarter of 1991 is particularly large, encompassing 9.5 percent of employment. The spike in job destruction in 2001 is not as great

(8.2 percent of employment), but persists at this rate over three quarters. The job destruction rate declines in both recovery periods, but does so much slower in the earlier recovery. After the 1991 trough, the pace of job loss does not reach a rate of 7.5 percent (its average rate during the subsequent expansion) until the end of 1992. Following the 2001 trough, the job destruction rate is 7.5 percent after only two quarters, and continues to fall thereafter. Job creation is markedly different during the two recessions and recoveries. Between 1990 and 1992, the job creation rate diverges little from 8.2 percent of employment, which is also its average during the subsequent expansion. The pace of job creation peaks at 8.4 percent by the end of 1999. By the end of 2000, the job creation rate is 7.8 percent. As the business cycle peaks, the job creation rate continues to decline, reaching a low of 7.2 percent in the third quarter of 2001. Job creation picks up somewhat after the trough, rising back to 7.5 percent by the first quarter of 2002, but its pace begins another steep decline, this time to 7.0 percent, by the first quarter of 2003. Its rate in the second quarter is only slightly higher.

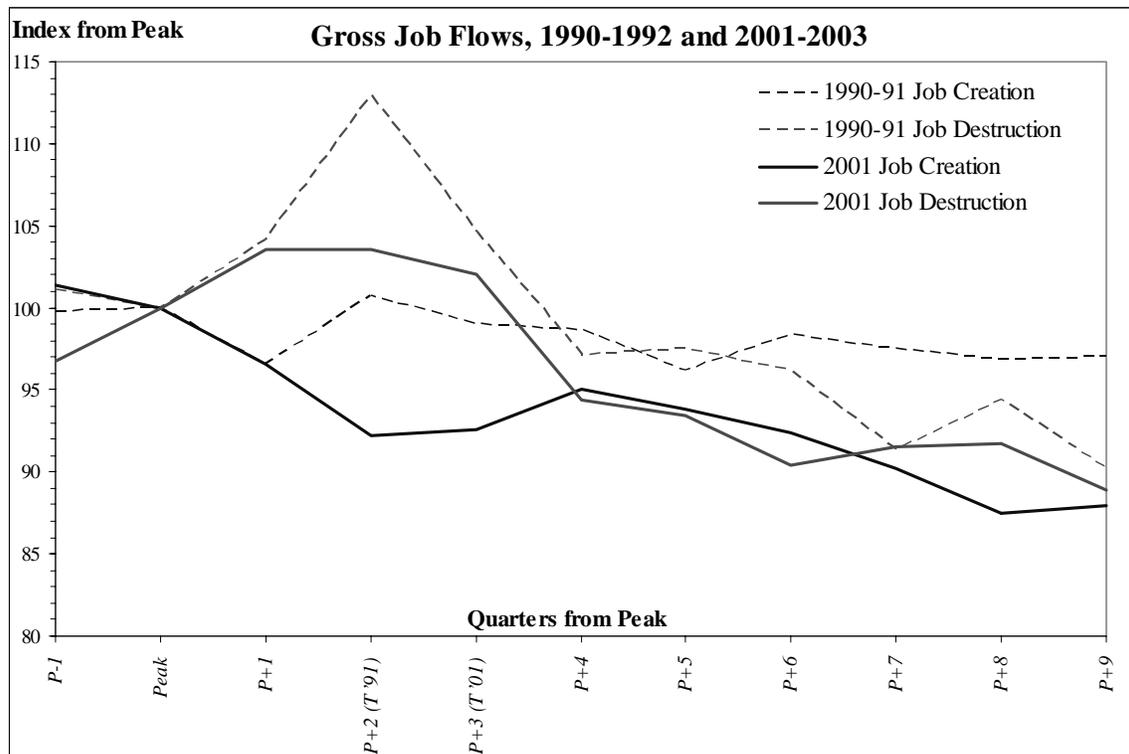
**Figure 2.**



Notes: Estimates are based on author's calculations from the BED data of the BLS. See text for details.

Thus, while the past two recessions and subsequent recoveries seem quite similar on the surface, they are starkly different in their underlying dynamics. In particular, the pace of job creation between 2001 and 2003 is well below its historical norm, and accounts for the lack of job growth that occurs following the business cycle trough. In contrast, the flat job growth that follows the 1991 trough stems from a relatively slow decline in the pace of job losses, rather than any drop-off in job creation. Figure 3 illustrates the differences best by depicting job flows during the two recessions as a percentage of their level at each business cycle peak. In relative terms, the 1990-91 recession has a distinct episode of job loss that remains persistently higher long after the trough, while the 2001 recession has a substantial decline in job creation that continues well into the recovery period.

**Figure 3.**



*Notes:* Estimates are based on author's calculations from the BED data of the BLS. Job flows are measured relative to their levels at the relevant NBER-dated business cycle peak.

### *Industry Comparisons*

Job losses in the past two downturns occur disproportionately in manufacturing, as Table 1 illustrates. In both periods, manufacturing loses a considerable amount of jobs even as the other industries begin a recovery. It is important to see whether manufacturing job flows behave differently than other industries. I present a broad comparison of the manufacturing sector to a grouping of service, financial and information sectors, based on the NAICS industry coding.<sup>4</sup> I replicate Figure 2 with estimates for manufacturing (Figure 4) and services, finance, and information (Figure 5.)

<b>Table 1. Net Changes in Employment (Thousands of Jobs), 1990-1992 and 2001-2003</b>		
	<i>June 1990 to March 1991</i>	<i>March 1991 to September 1992</i>
Manufacturing	-834	-343
Non-manufacturing	-1,026	+446
Total Private Sector	-1,860	+103
	<i>March 2001 to December 2001</i>	<i>December 2001 to June 2003</i>
Manufacturing	-1,218	-1,224
Non-manufacturing	-1,520	+121
Total Private Sector	-2,738	-1,103

*Notes:* Estimates are based on author's calculations from the BED data of the BLS.

The first thing to note from Figure 4 is that job reallocation in manufacturing is considerably lower than in the rest of the private sector. For instance, job creation averages just 5.0 percent of manufacturing employment between 1993 and 2000, while job destruction averages just 4.9 percent. This compares with average private-sector rates of 8.2 and 7.5 percent, respectively. Manufacturing job flows have several notable differences and similarities with the private-sector job flows. Despite the differences in magnitude, the patterns of job destruction are generally similar, particularly during the two recessions, but there are some distinctions. Manufacturing job losses during the expansion period have a slower decline. In addition, the pace of job destruction following both troughs is more persistent in manufacturing. In fact, job destruction in manufacturing remains quite high well into 2003. Job creation trends in

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<sup>4</sup> Manufacturing corresponds to NAICS sectors 31 through 33, while my grouping of service, financial, and information industries correspond to NAICS sectors 51 through 81, excluding private households.

manufacturing and in the total private sector are remarkably similar. Both have similar job creation rates during the 1990-91 recession and subsequent expansion, and both exhibit a steep and persistent decline in job creation between 2001 and 2003. Note, though, that job creation peaks over two years earlier in manufacturing than in the total private sector.

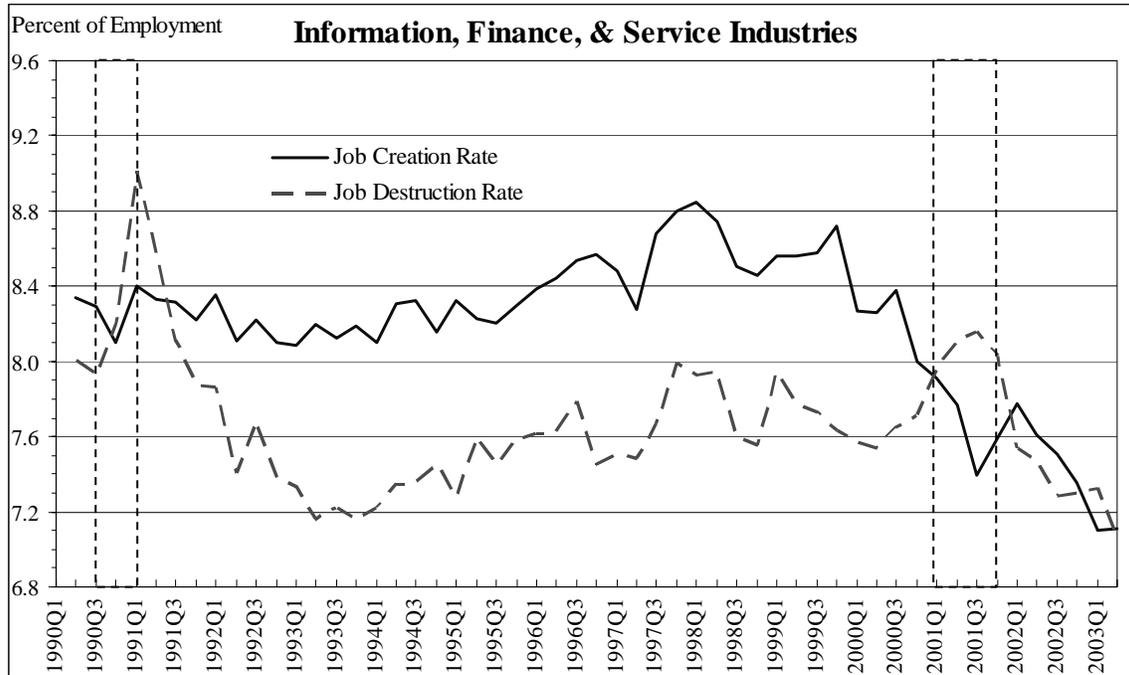
**Figure 4.**



*Notes:* Estimates are based on author's calculations from the BED data of the BLS. See text for details.

Figure 5 shows that job flows in information, financial, and service industries (which average three times as many workers as manufacturing) are nearly identical to those for the total private sector, in both trends and magnitude. The 1991 peak in job destruction is notably lower for these industries. In addition, the pace of job creation during the expansion period, particularly from 1997 through 2000, is considerably higher. Other notable trends, however, such as the steep, persistent drop in job creation between 2000 and 2003, occur in these industries just as they do in the total private sector.

**Figure 5.**



Notes: Estimates are based on author's calculations from the BED data of the BLS. See text for details.

### Some Structural Factors and Job Flows

Some argue that structural change may account for the recent lack of growth in the labor market. For example, Groshen and Potter (2003) argue that an acceleration of these structural changes may account for the current lack of growth. They study the employment growth rates of all major industries during the recession and recovery periods of the past several economic downturns. They group industries by whether they went through a cyclical or structural change in each downturn. Cyclically changing industries are those with employment changes that generally follow the business cycle, while structurally changing industries are those with more permanent changes (i.e., relative gains or losses that persist through both the recession and recovery). They find that 79 percent of employment falls into the “structural” category during the 2001-03 period, compared to 57 percent in the 1990-92 period and 51 percent in the two preceding downturns, implying that structural employment reallocation across industries plays an important role in the recent downturn. Indeed, in replicating the analysis of Groshen and Potter with three-digit

NAICS industries, I find that 74 percent of employment falls into the “structural” category during 2001-03, compared with 68 percent during the 1990-92 period.

There has also been popular speculation that the current lack of job growth is the result of the permanent reallocation of jobs overseas. The reallocation may stem from either the contraction or closing of firms unable to compete with their foreign counterparts.<sup>5</sup>

Hampering the debate over these hypotheses is a lack of appropriate data with which to test them. The U.S. labor market is dynamic, reallocating about 15 percent of jobs each quarter—analyses of the net changes in industry employment fail to capture these dynamics. In addition, even with data such as the BED it is difficult to identify the portion of reallocation attributable to permanent changes in the economy, whether they are across industries or across borders. While data on job flows cannot provide definitive answers on these topics, they *can* illustrate whether the underlying dynamics, both within and across industries, *are consistent* with these arguments.

Below, I analyze whether the growth and job flows of particular industries have differential responses to the recent business cycle. I first compare industries with the greatest growth over the 1990’s to those with the least growth. Using the same analysis, I then compare the job flows of manufacturing industries with differing levels of trade exposure. For each analysis, I present the net employment growth rates and job flows independent of business cycle trends, using a linear de-trending.<sup>6</sup> Trend net growth estimates are thus the growth rate of industry  $i$  at time  $t$ ,  $N_{it}$ , less the private-sector growth rate at time  $t$ ,  $N_t$ . For job flows, it is slightly more complex, since a) there are large persistent differences in industry-level job flows,<sup>7</sup> and b) job flow trends contain information about the long-run growth of an industry. The former point implies that a simple differencing of estimates will provide a poor measure of trend job flow

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<sup>5</sup> Klein, Schuh, and Triest (2003) discuss the effects of international competition on manufacturing as well, though their most recent data is only through 1994.

<sup>6</sup> I use a linear de-trending since most cyclical movements occur at the endpoints of my sample period. Nonlinear filters, such as an HP filter, tend to be less efficient at time-series endpoints.

<sup>7</sup> For examples with other data sources, see Anderson and Meyer (1994), Foote (1998), and Burgess, Lane, and Stevens (2000).

movements. The latter point implies that correcting for these differences in too simple a manner (e.g., a difference-in-difference approach) will distort the underlying industry growth trend. To account for both issues, I use the *excess reallocation rate* measure, which Davis, Haltiwanger, and Schuh (1996) define as the sum of the job creation and job destruction rates, less the absolute value of the net growth rate. Excess reallocation measures the amount of turnover independent of growth in a particular period. As such, it simultaneously captures the persistent differences in industry job reallocation while retaining industry differences in growth trends. I take the excess reallocation rate for the private sector,  $\overline{XR}$ , averaged across all quarters in the sample, and divide it by the excess reallocation rate for the industry,  $\overline{XR}_i$ , also averaged across all quarters. I use this ratio to normalize the industry job flow rates to the private-sector rates, which makes a linear differencing possible. Formally, my trend estimates for net growth, job creation ( $C_{it}$ ), and job destruction ( $D_{it}$ ) are

$$\tilde{n}_{it} = N_{it} - N_t, \quad \tilde{c}_{it} = \left( \frac{\overline{XR}}{\overline{XR}_i} \right) C_{it} - C_t, \quad \tilde{d}_{it} = \left( \frac{\overline{XR}}{\overline{XR}_i} \right) D_{it} - D_t,$$

$$\text{where } \overline{XR}_i = \frac{1}{T} \sum_t (C_{it} + D_{it} - |N_{it}|), \text{ and similarly for } \overline{XR}.$$

#### *Expanding versus Declining Industries*

If, as Groshen and Potter (2003) suggest, the lack of job growth during the recent recovery stems from an accelerated pace of structural change, it should be evident in the industry-level rates of job creation and job destruction. My replication of Groshen and Potter's analysis with the BED data is generally consistent with their suggestion, but this approach only appeals to industry *net* employment changes. The industry gross job flows would provide stronger evidence either for or against their argument. The structural reallocation of jobs from declining industries to expanding industries is a phenomenon that dates back several decades. If this reallocation accelerated in the recent downturn then, all else equal, one should observe a relatively higher

pace of job destruction among historically declining industries and a relatively higher pace of job creation among historically expanding industries during this period.

To explore this hypothesis, I separate 3-digit NAICS industries based on their employment growth between December 1993 and December 2000. I define “Expanding” industries as those with growth at least one standard deviation greater than the private sector rate over this period (about 18 percent), and “Declining” industries as those with growth less than one standard deviation below the private sector rate. By this definition, there are 11 expanding 3-digit industries, which notably include, internet publishing and services, telecommunications, and professional and administrative services. There are also 16 declining industries, which primarily include manufacturing plants in the food, textile, apparel, paper, printing, chemicals, and primary metal industries.<sup>8</sup> I list all industries in Table A.2 of the appendix. Table 2 shows the employment trends of each group. There are stark differences in growth between the two groups during the expansion, but both groups lost jobs (albeit at different rates) through the business cycle trough and through the end of the sample period.

<b>Table 2. Growth in Expanding and Declining Industries</b>				
<b>Group</b>	<i>Employment (in thousands)</i>			
	Dec. 1993	Dec. 2000	Dec. 2001	June 2003
Expanding Industries	16,461	24,253	23,098	22,604
	Change:	7,792	-1,155	-498
Declining Industries	7,662	6,904	6,485	6,171
	Change:	-758	-419	-314

*Notes:* Estimates are based on author’s calculations from the BED data of the BLS. See appendix for details of industry groupings.

The trend growth and job flow patterns for expanding industries are in Figure 6a and the patterns for declining industries are in Figure 6b. Expanding industries (by definition) gain a disproportionate share of jobs during the expansion, though they also lose a disproportionate

<sup>8</sup> There are also six resource and mining industries that meet the criteria for a declining industry, but are excluded. They make up a very small share of employment, but their trend job flows are large and volatile enough to make an analysis with them included difficult to interpret.

share of jobs during the two recessions. Declining industries (by definition) lose a disproportionate share of jobs during the expansion, but their recession-period losses are much closer to the national trend, producing a somewhat countercyclical trend growth pattern.

Job creation in expanding industries is above average (as represented by the “0” line), relative to the business cycle. This is true almost throughout the entire period, with an exception during the 1990-91 recession, when it is roughly similar to the national trend. Job destruction follows the national trend very closely from 1990 through the end of 2000. Job losses then rise well above the national trend and persist at this level through mid-2003. Within declining industries, both job creation and destruction are well above the national trend throughout the early 1990’s. Their trends, however, decline through 2000. By 1995, job creation falls below the national trend. The pace continues to decline and does not stabilize until early 2000. Afterward, the trend is constant but still well below the national trend. The pace of job destruction declines but remains high through 2000, at which time it stabilizes at a rate comparable with the national trend. There is a slight dip in trend job destruction in 2002, but overall, job losses in these industries follow the national trend from 2001 through 2003.

Taken together, the evidence does not support the argument that job losses in the recent downturn are the result of an accelerated pace of between-industry reallocation. While there does seem to be some structural adjustment within the declining industries, their reallocation trends actually decline over time. In addition, the period in question is the time of the *least* turbulence (relative to the national trend) for these industries. If there exist any structural shifts between 2001 and 2003, they occur among the industries that grew the most over the 1990’s. These industries have a sharp increase in trend job destruction that persists through these years. Regardless, trend job creation remains above the national rate at a proportion similar to that of the preceding expansion period. Thus, my job flow findings are consistent with the work of Groshen and Potter on two of three counts. Most importantly, the evidence from this and previous sections suggests that the latest prolonged downturn in the labor market is unique, and quite different from

the 1990-92 downturn. The evidence also suggests that patterns of between-industry structural change are prevalent throughout the sample period. The evidence does not suggest, however, that an accelerated pace of this structural change substantially contributed to the recent lack of job growth.

*Manufacturing Job Flows and Trade Exposure*

There is some speculation that industries that face strong international competition were more susceptible to permanent job losses during the recent downturn. As these industries recover from an adverse aggregate shock, increased competition may reallocate lost jobs to countries with lower labor costs. If this hypothesis were true, all else equal, one should observe high rates of job destruction and low rates of job creation among the industries most sensitive to trade during the recent downturn. Industries that either gain from trade (through exports) or are independent of trade should be relatively unaffected.

**Figure 6a.**

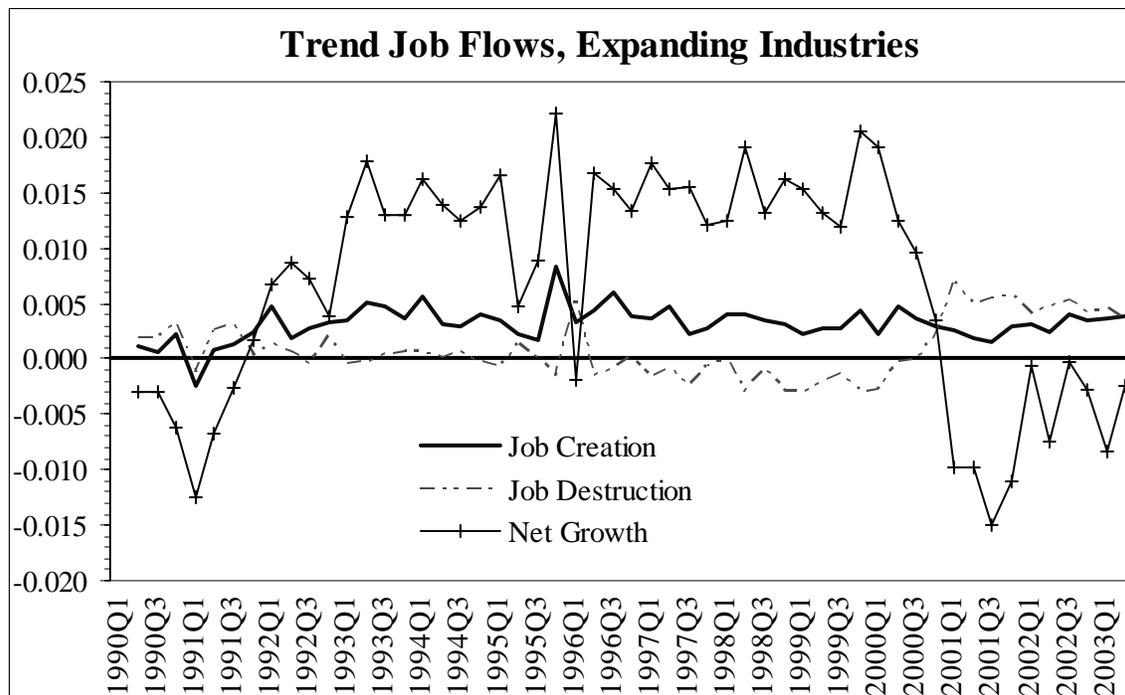
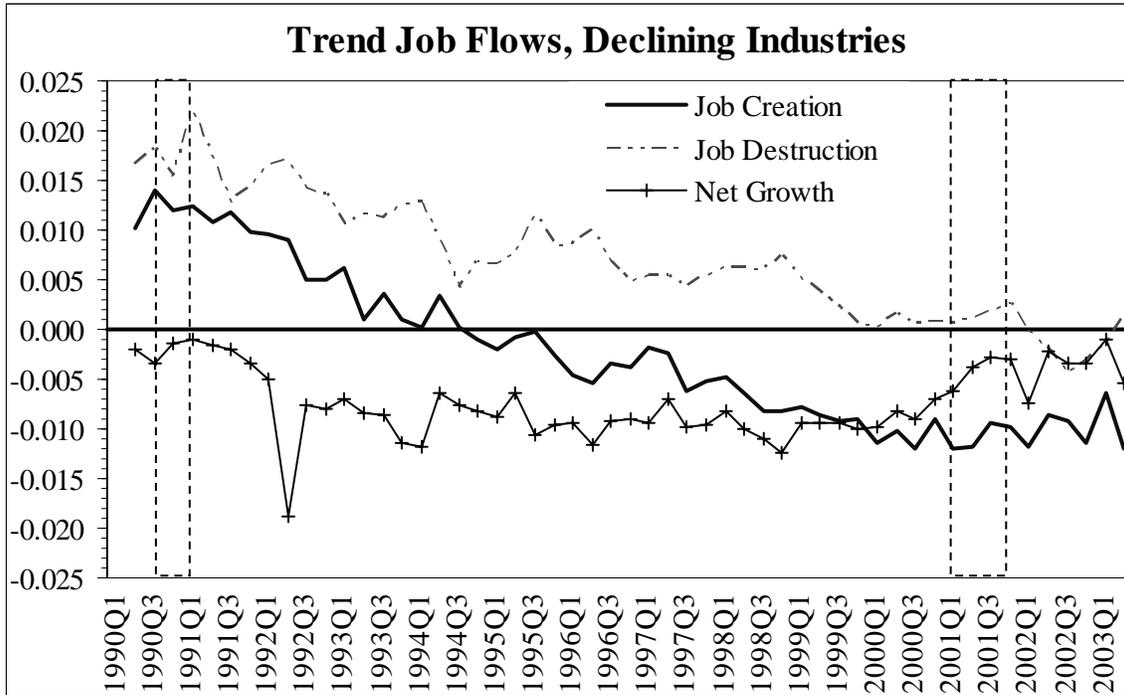


Figure 6b.



Notes: Estimates are based on author's calculations from the BED data of the BLS. See text for details.

To test the trade hypothesis, I group manufacturing industries by their level of trade exposure. I use data on imports ( $I$ ), exports ( $X$ ), and the value of shipments ( $Q$ ) compiled by the U.S. International Trade Administration. These data primarily use the *Annual Survey of Manufactures* of the U.S. Census Bureau and are readily available for 3-digit NAICS sector annually for 1997 through 2001. I group the industries into four categories. "Trade Sensitive" industries are industries that have relatively high imports and low exports. These industries include textile product and apparel makers, wood and furniture makers, and primary metals industries. "Trade Gaining" industries are those with high exports and relatively low imports, and include chemicals, plastics, and machinery. "High-Volume Trade" industries are those that are very open to trade and have high exports and imports. They include computers, electrical equipment, and transportation equipment. Finally, "Trade-Independent" industries are those that have low imports and exports. They include food and beverage manufacturing, paper and printing, and fabricated metals manufacturing. In Table 3, I report the 1997 estimates of each

group's import penetration ratio, export share, and index of trade-openness.<sup>9</sup> The *import penetration ratio* ( $I/(Q + I - X)$ ) is the ratio of imports to domestic consumption, where consumption is defined as shipments plus imports less exports. The *export share* is the ratio of exports to shipments ( $X / Q$ ). Finally, the measure of *trade-openness* is the sum of exports and imports as a share of the sum of shipments and imports ( $(I + X)/(Q + I)$ ). The trade sensitive industries are the smallest of the three groups, in terms of value of shipments. These industries, along with high-volume trading industries, have the highest import penetration ratios. High-volume trading industries have the highest export shares (followed by trade-gaining industries), and consequently have the greatest openness to trade. Trade-independent industries have considerably lower trade measures relative to the other three groups.

<b>Group</b>	<i>1997 Values</i>			
	<b>Value of Shipments</b> ( <i>Q</i> , \$ billion)	<b>Import Penetration</b> [ $I/(Q + I - X)$ ]	<b>Export Share</b> [ $X/Q$ ]	<b>Trade Openness Index</b> [ $(I + X)/(Q + I)$ ]
Trade Sensitive	530.6	0.266	0.107	0.325
High-Volume Trade	1,126.8	0.289	0.237	0.417
Trade Gainers	904.2	0.156	0.184	0.291
Trade Independent	1,273.2	0.072	0.066	0.129
All Manufacturing	3,834.7	0.187	0.149	0.289

*Notes:* Estimates based on author's calculations from industry data by the U.S. International Trade Administration. See appendix for details of industry groupings.

Figures 7a through 7d present the trend growth and job flow rates for each group. Figure 7a presents the evidence for trade-sensitive industries. As one might expect, job growth in these industries have been well below the national trend. This is especially true during the two recessions and in the years immediately preceding and following the 2001 recession. These losses occur primarily through high rates of trend job destruction that persist through 2003. Job creation is somewhat above the national trend early in the sample period and somewhat below the

<sup>9</sup> There is an increasing level of trade between 1997 and 2001, but the ordinal rankings of industries' trade measures are essentially constant across the years. Thus, I only report the 1997 estimates.

trend later on, but the differences are small in comparison to the behavior of job destruction. By itself, this evidence suggests that trade liberalization indeed adversely affects the most sensitive industries: they destroy jobs at a rate well above the national trend, and it is exacerbated during the recent recession and subsequent stagnant recovery.

The evidence in Figures 7b and 7c, however, casts serious doubt on this claim. In these figures, which present the evidence for trade-gaining and high-volume trading industries, respectively, trend job losses (both net and gross) are much greater between 2001 and 2003 relative to the losses in trade sensitive industries. The major differences occur during the expansion period where, between 1994 and 1998, trade-gaining and high-volume trading industries destroyed jobs near the national rate, while trade-sensitive industries destroyed jobs above that rate. The only divergent trends are among industries with low imports and exports (Figure 7d). These industries have relatively high trend rates of both job creation and destruction at the beginning of the period, but they exhibit a steady decline that eventually stabilizes. If anything, the patterns mimic those of the declining industries in Figure 6b. This is no surprise, however, since four of the seven trade-independent industries are also in the earlier-defined declining group.

Figure 7a.

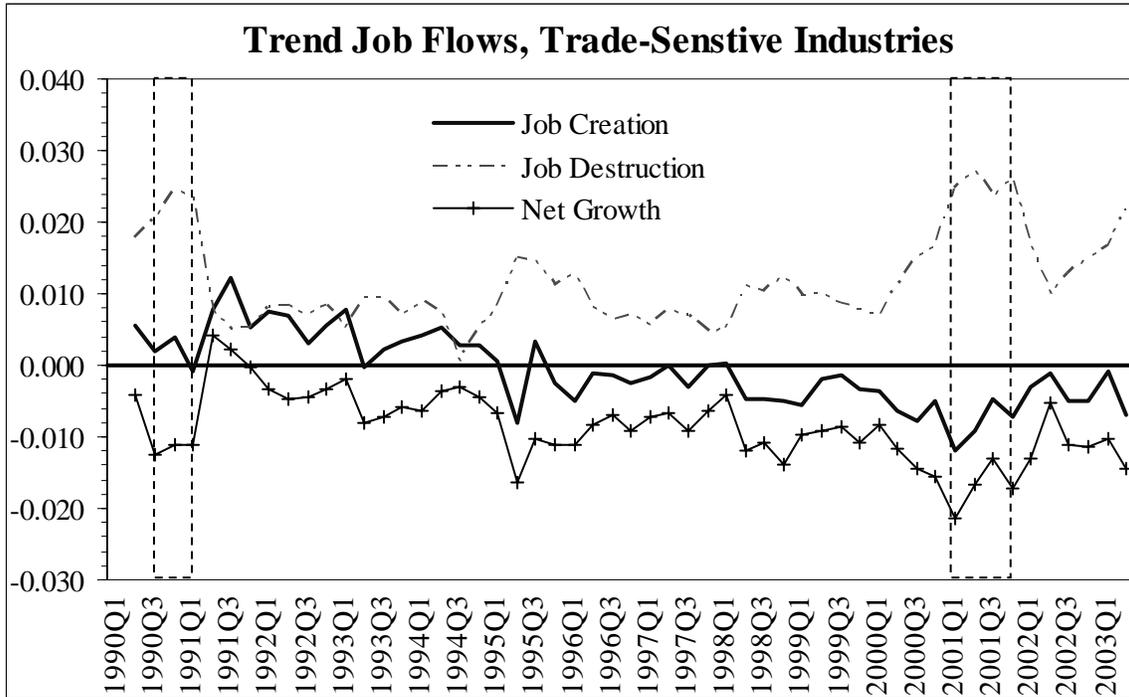


Figure 7b.

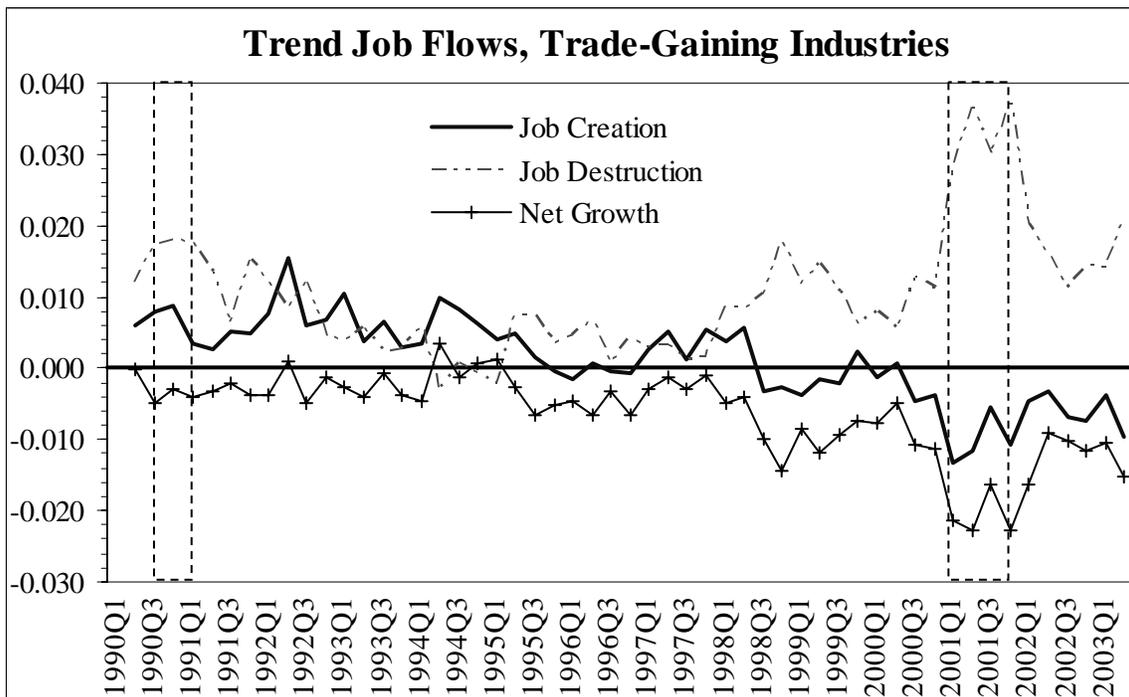


Figure 7c.

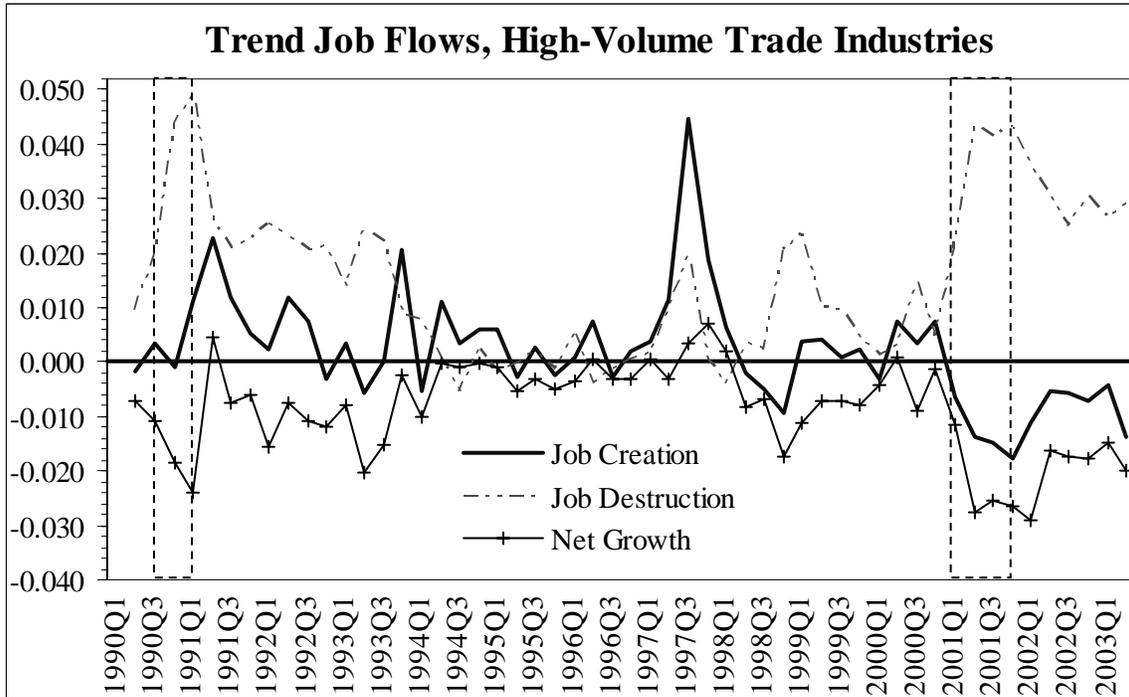
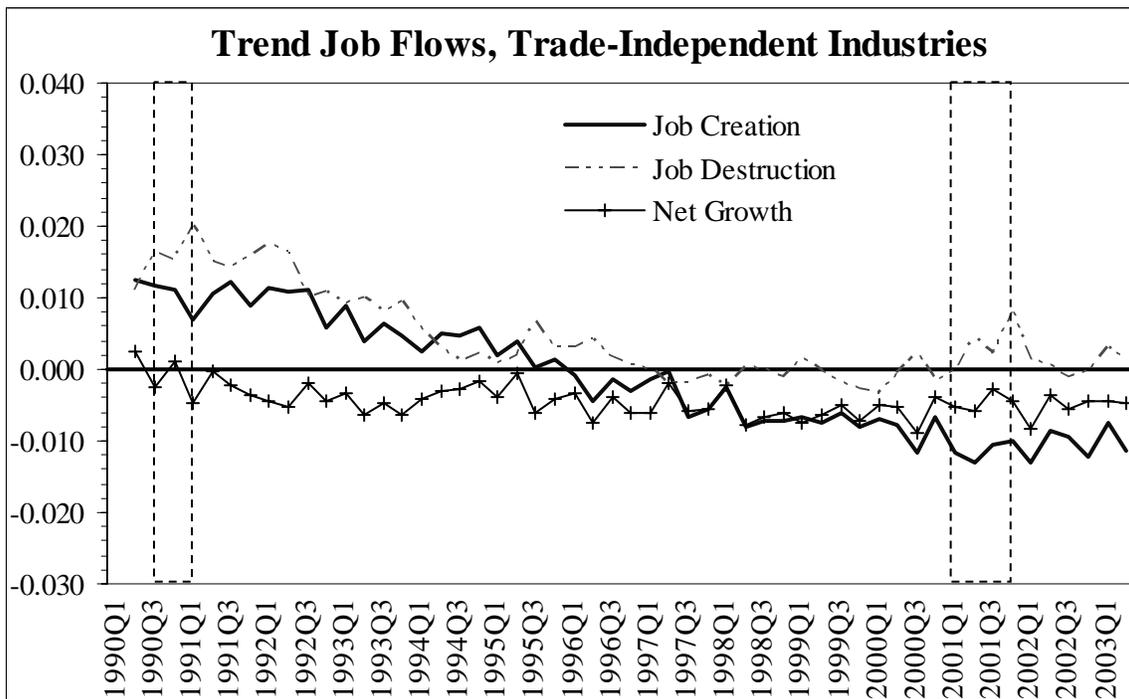


Figure 7d.



Notes: Estimates are based on author's calculations from the BED data of the BLS. See text for details.

## The Recent Decrease in Job Creation

The above evidence on job flows shows that the last two recessions and their subsequent recovery periods are quite different. Job destruction spikes and then declines during the 1990-92 downturn, while job creation is relatively unchanged. Job destruction spikes and then declines during the 2001-03 downturn, but job creation decreases and persists at a dramatically low rate through the end of the sample period. Which of these two outcomes is closer to the historical norm? Evidence from previous research suggests that the 2001-03 downturn is unlike other recessions. Job flow data for the entire private sector is not available pre-1990, but Davis, Haltiwanger, and Schuh (1996) have job flow estimates for manufacturing for 1972 through 1993 based on the Census Bureau's *Census of Manufactures* and *Annual Survey of Manufactures*.<sup>10</sup> I overlay these estimates with my manufacturing estimates in Figure 8. The data are relatively comparable, with two caveats. First, most of the Census estimates are based on smaller samples, and thus estimates are somewhat more volatile. Second, the sample nature of the Census data makes it easier to track continuing plants, which reduces the potential for overstatement of job flows, so their average estimates may be somewhat lower. One can see the effects of these differences where the two series overlap between 1990 and 1993. With these caveats in mind, it is evident how starkly different the behavior of job creation is from 2000 through 2003 when compared to earlier years. There are other periods where a decrease in job creation is at least as dramatic, but no other time when it is as persistent. Conversely, the behavior of job destruction is comparable to earlier years. In fact, the large spikes in job destruction in 1991 and 2001 are small compared to the sharp losses in 1975, 1980, and 1982. Foote (1998) argues that manufacturing is different than other industries, but his argument is directed towards its patterns of job destruction. Both job destruction and *job creation* patterns in manufacturing, though, are strikingly similar in behavior to the information, finance, and service industries (see Figures 4 and 5). While the

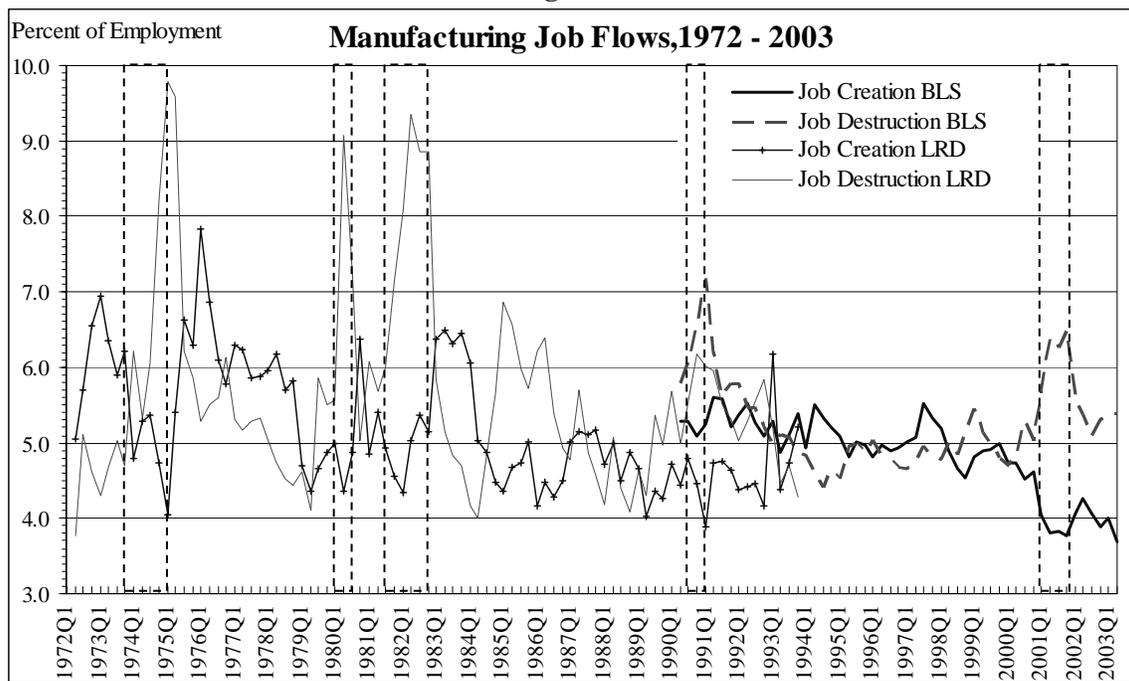
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<sup>10</sup> I thank John Haltiwanger for providing these estimates. They are publicly available at <http://www.bsos.umd.edu/econ/haltiwanger/download.htm>.

evidence is not definitive, it strongly suggests that the large, persistent decrease in job creation makes the most recent economic downturn unlike any other in the past 30 years.

What caused such a drastic and unique downturn? This remains an open question, but the behavior of business investment and its relation to gross job creation provides some clues. Real investment in equipment and software falls 8.4 percent during the 2001 recession and remains 5.0 percent below its peak value through the third quarter of 1992.<sup>11</sup> Similarly, the pace of job creation falls 7.4 percent during the recession and is 12.1 percent below its peak value by the second quarter of 2003. Between 1990 and 1992, investment falls only 3.4 percent during the recession and is 6.0 percent *higher* than its peak value by the third quarter of 1992. Job creation changes little in either the recession or recovery periods, indicating that both investment and job creation have similar trends in both downturns.

**Figure 8.**

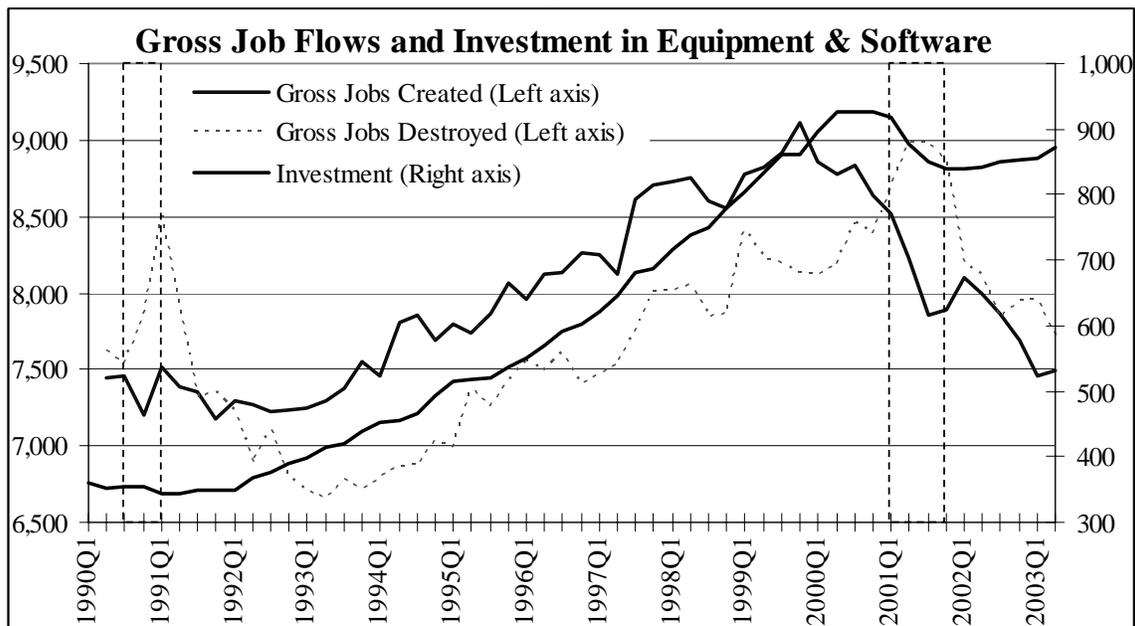


Notes: Estimates are based on author's calculations from the BED data of the BLS and Longitudinal Research Database of the Census Bureau. See text for details.

<sup>11</sup> Percentages are based on National Income Product Account estimates from the Bureau of Economic Analysis.

Figure 9 illustrates the movement of job creation and business investment between 1990 and 2003. It shows the quarterly levels of job creation and job destruction (both in thousands of employees) compared to investment in equipment and software (in billions of chained 2000 dollars).<sup>12</sup> The patterns of job creation and investment are very similar throughout the period. Evident in the figure are the relatively flat patterns of job creation and investment between 1990 and 1992 and the substantial declines in both series between 2001 and 2003. Job creation and investment also track each other well during the expansion period, with both series increasing considerably. Consequently, the Pearson correlation between the two series is a robust 0.78 over. Job *destruction* and investment also track each other closely, but do so primarily during the expansion. Job destruction and investment generally move in opposite directions during the two recessions.

**Figure 9.**



Notes: Estimates are based on author's calculations from the BED data of the BLS and the National Income Product Accounts of the Bureau of Economic Analysis. See text for details.

This evidence suggests an important relation between gross job creation and business investment. As with job creation, evidence from previous business cycles suggests that the recent

<sup>12</sup> I show estimates in levels rather than rates since comparable data on the appropriate denominator for investment (the total stock of capital) is not readily available.

decline in business investment runs counter to its historical trends. Eighteen months into the recoveries of the previous seven recessions, real gross private investment is an average of 10.0 percent higher than its peak level. Eighteen months into the current recovery, real gross private investment is 4.9 percent *lower* than its peak level.<sup>13</sup> An economic relation between investment and job creation is easy to perceive, since the former is a gross flow of capital inputs and the latter a gross flow of labor inputs. It is also conceivable that the relation between job destruction and investment would be weaker, since labor is less costly to adjust (and hence more responsive to aggregate shocks) than capital. Whether a labor market downturn stems from high job destruction or low job creation may depend on whether a macroeconomic shock propagates through aggregate demand or investment. Further research can identify whether the nature of a shock or other factors determine these relations.

## **Conclusions**

Between 1990 and 1992, the U.S. private sector has a dramatic spike in job destruction with job losses slow to decline until the latter half of 1992. Throughout this period, creation changes little. This leads to a net loss of 1.9 million jobs during the recession and a gain of only 103,000 jobs over the following 18 months. There are also large job losses between 2001 and 2003. The private sector loses 2.7 million jobs during the recession and an additional 1.1 million over the following 18 months. This time, however, after a spike during the recession, the pace of job destruction quickly returns to its pre-recession pace. The large, persistent job losses instead stem from a dramatic decline in job creation. This decline begins a year before the business cycle peak and continues (with a brief revival in early 2002) through mid-2003.

Groshen and Potter (2003) suggest that an accelerated pace of structural change may have led to the most recent period of prolonged job loss. My findings suggest that patterns of

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<sup>13</sup> Note that these statistics are for gross private investment, of which investment in equipment and software is a component. The latter statistic is not available in real dollars prior to 1990.

structural change are indeed prevalent dating back to 1990. Declining industries lose jobs throughout the period, and do so with a job destruction rate well above the national trend. Expanding industries gain jobs throughout, though their net gains are more responsive to the business cycle. Expanding industries have an above-average rate of job creation beginning in 1991 and continuing through 2003. Trend job destruction generally follows national patterns, though it increases in 2000. Nevertheless, the evidence *does not* support the hypothesis that these trends accelerated during the recent downturn. Between 2000 and 2003, job destruction in declining industries generally follows the national trend. Trend job creation begins low and remains so throughout. Neither job flow deviates from its pattern during this time, however. In other words, within traditionally declining industries, *neither trend job creation nor trend job destruction change during the recent slowdown*, implying that an accelerated pace of structural change is likely not the cause of the observed jobless spell. The same is true of trend job creation in the expanding industries. Trend job destruction does increase for expanding industries during this time. This is inconsistent with a structural change hypothesis, but it does create an empirical puzzle. It may be reflective of an employment bubble bursting, though there is no comparable increase in trend job creation that precedes it. Given their large losses, manufacturing has received most of the attention during the recent downturn. This evidence suggests that further research on traditionally expanding industries is warranted as well.

Another hypothesis suggests that changing trade patterns have made certain industries more susceptible to international competition during slowdowns and increases the reallocation of jobs overseas. The massive losses in manufacturing (i.e., the sector most affected by international trade) lend credence to this reasoning. Between 2000 and 2003, however, I find that manufacturing industries most sensitive to international competition fare no worse than the manufacturing industries that gain from trade. The losses in manufacturing may be more reflective of a slowdown in global aggregate demand. According to estimates from the Bureau of Economic Analysis, the real value of exports falls 10.4 percent between the first and fourth

quarters of 2001, and exports are still 8.4 percent lower than their first quarter, 2001 levels by mid-2003. These decreases are well below the historical business cycle norms, suggesting that the flagging levels of exports may directly contribute to the sharp job losses in manufacturing.

Finally, job flow evidence from other data sources suggest that the recent decline in the pace job creation has no precedent in at least 30 years. The drop in job creation parallels a similarly unusual drop in business investment, and the patterns of both gross job creation and investment in equipment and software track each other closely between 1990 and 2003. Conversely, gross job destruction and investment only move together during the expansion period, and generally move in opposite directions during each recession. Whether low job creation or high job destruction dominates during a recession may depend on the relative impacts of shocks to investment versus shocks to aggregate demand. One must also consider other factors outside the labor market. Between 2000 and 2003, the U.S. experienced a rapid decline in stock market values, the September 11 terrorist attacks, corporate accounting scandals, and geopolitical uncertainties resulting from the war in Iraq. These events may have had a direct effect on job creation via increased uncertainty that reduced the incentive to hire, or an indirect effect via reductions in the incentive to invest in new capital. Further research will enhance our understanding of the job losses over the last two downturns, and the evidence I present in this paper will no doubt aid in guiding this research.

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## Appendix

Implementation of the “Multiple Worksite Report” (MWR) in the early 1990’s caused serious complications to the LDB linkage process. The MWR was implemented so that multi-establishment firms could easily report the employment and payroll of their separate establishments. Prior to the MWR, many firms reported their multiple establishments as a single UI record. Consequently, the MWR implementation caused a widespread restructuring of the UI establishment records of many large firms. This restructuring generally involved the breaking out of a single UI record into multiple establishment records. The UI account number remained the same during these changes, but the reporting unit numbers (by which the BED links establishment records) did not. In addition, predecessor and successor unit information (which the BED linkage process uses to identify routine administrative changes) was often not reported for the MWR implementation. As a result, the linkage process failed to identify these changes and instead counted the MWR implementations as employment changes due to closing and opening establishments. This created large job flow overstatements in 1991/1 and 1992/2, and a minor overstatement in 1993/1.

To correct for these overstatements, I appeal to the characteristics of the MWR implementation to create a linkage strategy. First, I note that MWR implementation occurs at the state level. Most states introduced the MWR in the first quarter of 1991, while Ohio did so in two stages, in the second quarter of 1992 and the third quarter of 1993.<sup>14</sup> Some states already had a similar report in place, and so did not have to restructure their accounts. Other states also included predecessor and successor record information, allowing a successful linkage with the LDB algorithm. Thus, I only have to focus on a subset of states, minimizing my chances of making a false match. Second, UI account numbers should not change in a MWR implementation. This is not necessarily true of other administrative changes. Third, since these

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<sup>14</sup> Further analysis showed that a single, very large multi-state firm had a similar account restructuring in the first quarter of 1992. I deal with its restructuring in a similar manner to the MWR changes, but do not report the results of this match for confidentiality reasons.

changes are theoretically only changes in paperwork, there should be no movement of employment across industries or locations, which sometimes occurs in the data during corporate mergers and other account restructurings. Finally, the UI data have a fine level of geographic and industry detail (county level, and either 4-digit SIC or 6-digit NAICS, respectively). Large employment fluctuations at these levels of detail are relatively rare and thus easily identifiable in the data.

Given these characteristics, I use a three-step process. The first step calculates job flows using the standard BED methodology. From this, I take the subset of establishments classified as openings or closings. By only looking at this subset, I tacitly assume that MWR restructurings cannot be part of other administrative changes, which I find to be entirely plausible. The second step identifies within-state linkages by UI account number, county, and detailed industry. When doing so, I make every effort to ensure that records are correctly linked to each other within these match cells. The final step recognizes that, in practice, some new records will have different industry codes than their predecessor. To account for this, the final pass takes the remaining unlinked records and attempts to match by UI account number and county. In general, this step produces less than 10 percent of the total matches I identify.

My approach is not without risks. First, there exists the possibility of producing false matches of truly opening and closing establishments. I am not too concerned with this possibility since the false match would have to occur among opening and closing establishments within both the same firm and the same county, an occurrence that is generally rare, especially among larger establishments (which are disproportionately represented among the potentially affected UI records). Second, there exists the possibility that I miss links that occur either within UI accounts and across counties or across entirely different UI accounts. Since I have no predecessor or successor record information, I cannot identify these matches without increasing the chances of a false match among other records. Thus, missed linkages potentially remain after my identification. While this may seem troublesome, administrative changes of this nature are

inconsistent with the implementation procedures of the MWR, so I am confident in my final estimates.

Table A.1 lists the number of matches made by and the effects of my identification strategy in the three quarters of interest. Note that the matches should significantly reduce employment changes at opening and closing establishments. Matches will also slightly increase employment changes at continuing establishments, since newly-matched records often have legitimate changes in employment during these quarters. Note that matches in the first quarter of 1991 occur across most of the U.S., while matches in the second quarter of 1992 and first quarter of 1993 are only in Ohio. Overall, my final job flow estimates in the problem quarters are comparable to those in other quarters.

<b>Table A.1. Results of Match Identification for Potential MWR Issues</b>				
	<b>Initial Estimate</b>		<b>Corrected Estimate</b>	
	<i>Thousands of Employees</i>	<i>Percent of Employment</i>	<i>Thousands of Employees</i>	<i>Percent of Employment</i>
First Quarter, 1991				
Changes at Openings	5,321	6.0	2,270	2.5
Changes at Closings	5,462	6.1	2,103	2.4
Changes at Expansions	4,402	4.9	4,685	5.3
Changes at Contractions	7,784	8.7	8,376	9.4
Second Quarter, 1992				
Changes at Openings	3,156	3.6	1,887	2.1
Changes at Closings	2,481	2.8	1,226	1.4
Changes at Expansions	6,642	7.5	6,747	7.6
Changes at Contractions	4,310	4.9	4,401	5.0
First Quarter, 1993				
Changes at Openings	2,111	2.4	1,835	2.1
Changes at Closings	2,171	2.4	1,871	2.1
Changes at Expansions	4,706	5.3	4,752	5.3
Changes at Contractions	6,319	7.1	6,388	7.1

*Note:* Listed employment changes are prior to seasonal adjustment.

<b>Table A.2. NAICS Industries In Each Category</b>	
<b>Expanding Industries (NAICS)</b>	<b>Declining Industries (NAICS)</b>
Specialty Trade Contractors (238) Electronics & Appliance Stores (443) Rail Transportation (482)* Support for Transportation (488) Internet Publishing (516) Telecommunications (517) Internet Services & Data Processing (518) Financial Investment Services (523) Professional, Scientific, & Technical Services (541) Administrative & Support Services (561) Amusement & Recreation (713)	Foods (311) Textile Mills (313) Textile Product Mills (314) Apparel (315) Leather & Allied Products (316) Paper (322) Printing (323) Petroleum & Gas Products (324) Chemicals (325) Primary Metals (331) Wholesale Electronic Markets (425) Water Transportation (483) Pipeline Transportation (486) Postal Service [private employment] (491)* Central Bank Monetary Authorities (521)* Performing Arts, Sports, & Related Industries (711)
<b>Trade Gaining Industries (NAICS)</b>	<b>High-Volume Trade (NAICS)</b>
Textile Mills (313) Chemicals (325) Plastics & Rubber Products (326) Machinery (333)	Computers & Electronics (334) Electrical Equipment (335) Transportation Equipment (336)
<b>Trade Sensitive Industries (NAICS)</b>	<b>Trade-Independent Industries (NAICS)</b>
Textile Product Mills (314) Apparel (315) Leather & Allied Products (316) Wood Products (321) Primary Metals (331) Furniture (337) Misc. Manufacturing (339)	Foods (311) Beverages & Tobacco (312) Paper (322) Printing (323) Petroleum & Gas Products (324) Nonmetallic Minerals (327) Fabricated Metals (332)

\* Private employment in these industries is very small, averaging less than 25,000.