Employment dynamics: small and large firms over the business cycle

The use of the dynamic-sizing approach to measuring employment growth by size of firm provides information useful in the debate on small firm versus large firm job creation

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Who creates the most jobs: small businesses or large businesses? This subject has been widely discussed among economists and researchers and is often a topic of political debates citing the important role of small businesses in creating jobs. The small-firm versus large-firm issue is twofold: do small firms create most of the new jobs, or is the share of small firms' net job gains greater than their base share of employment? Economists argue that the answer depends on which methodology is used.[1] New statistics from the Business Employment Dynamics (BED) program of the U.S. Bureau of Labor Statistics (BLS) provide data with which to analyze many of the size class methodological issues, and are a valuable data resource with which to answer these questions.

In September 2003, the BLS began publishing the quarterly BED data series. Since the initial release of the data, the BLS developed two additions: the BED statistics by industry (published in May 2004) and statistics by firm size class (published in December 2005). These new series provide much needed quarterly data with which to observe and understand the dynamics of the job market. When the quarterly net employment change is decomposed into gross job gains and gross job losses, and when gross job gains are further divided into business openings and expansions and gross job losses into business closings and contractions, the resulting business employment statistics reveal the underlying dynamics of the job market.

The latest publication of BED data by firm size was a challenge for the BLS. Initial research showed that the specific methodology used to measure employment changes by size class from a longitudinal database is important because alternative methods generate sharply different results.[2] The evaluation of alternative methods led to the selection of "dynamic sizing" as the Bureau's employment sizing method. Dynamic or momentary sizing, as suggested by Per Davidsson, is based on the allocation of a firm's employment gain or loss during a quarter to each respective size class in which the change occurred.[3] The BLS is the first statistical agency to use this approach in measuring employment growth by size of firm.

This article analyzes quarterly data on gross job gains and gross job losses by size class from the second quarter of 1990 through the third quarter of 2005.[4] First, the article briefly explains the concepts, definitions, and record linkage methodology used by the BLS to generate estimates of these data. Second, an overview is presented of the methodological issues that the BLS faced in selecting the final method for classification of firms by size class. Finally, the discussion focuses on an analysis of the BED size class time series, with special attention on the role and contribution of various size

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classes to gross job gains, gross job losses, and net change in employment over the course of business cycles in the U.S. economy.

Concepts and methodology

The BED statistics are based on the idea of "gross job flows," a new approach in understanding changes in the job market. The concepts of gross job flows emerged through the use of U.S. business establishments' microdata.[5] Researchers used data sources such as the Census Bureau's longitudinal database on manufacturing and State unemployment insurance files in creating a rich body of literature on this subject.[6]

Data on gross job gains and gross job losses reflect adjustments made by businesses in reaction to changing economic events and conditions. The quarterly statistics on gross job gains and gross job losses are derived from the BLS Quarterly Census of Employment and Wages (QCEW) program. The QCEW microrecords are linked across quarters to create a longitudinal history for each establishment, making up the Longitudinal Database. Records are matched by their unique identifiers, including State codes, unemployment insurance numbers, and reporting unit numbers. The objective is to link continuous records and to avoid generating spurious business births and deaths in the event of situations such as changes of ownership, mergers, acquisitions, spin-offs, and other corporate restructuring.

Once the tabulation of these data is complete, establishments can then be aggregated by an employer's Federal tax identification number, known as the Employer Identification Number (EIN), to measure BED data elements by firm. This article focuses on data elements tabulated at the firm level.

BED data elements including employment levels and counts of establishments at opening, expanding, closing and contracting businesses are constructed from the Longitudinal Database. During the tabulation process, the employment reported in the third month of each consecutive quarter is used to measure the over-the-quarter employment change. Gross job gains are equal to the sum of employment at opening firms and the net change in employment at expanding firms. Similarly, gross job losses are the sum of prior quarter employment at currently closing firms and the net change in employment at contracting firms.[7] The net employment growth for all firms can be measured in two ways: the difference between total employment in the current and previous quarters, or the difference between gross job gains and gross job losses in the current quarter.[8]

Four size class methodologies under consideration. There are many ways that firms can be classified into size classes for a longitudinal analysis of employment growth. The BLS considered four specific classification methodologies: quarterly base-sizing, annual base-sizing, mean-sizing, and dynamic-sizing, and ultimately decided on dynamic-sizing as the preferred method. These methods and the criteria for selection are discussed in a 2006 article by Shail Butani and others.[9]

Employment growth is measured as the change in firm size from quarter to quarter. The dynamic-sizing methodology allocates a firm's quarterly employment gain or loss to each respective size class in which the change occurred. Firms are initially assigned to a size class based on their employment in the previous quarter and over-the-quarter employment changes are distributed to the appropriate size category when that size class threshold has been crossed. For example, if a firm grows from 3 employees to 13 employees, the growth of 10 would be allocated as follows: size class 1 to 4 employees would be credited with the growth of 1 employee (the growth from 3 to 4), size class 5 to 9 employees would be credited with the growth of 5 employees (the growth from 4 to 9), and size class 10 to 19 employees would be credited with the growth of 4 employees (the growth from 9 to 13). The methodology of dynamic-sizing was initially proposed by Per Davidsson in two research papers in 1996 and 1998.[10]

Dynamic-sizing is based on a measurement process which assumes continuous linear employment growth or loss from quarter to quarter, with the growth or loss allocated into the appropriate size class at the moment it occurred. In the example of a firm growing from 3 employees in June to 13 employees in September, this growth of 10 employees can be linearly modeled as the growth of 1 employee every 9 days (13 weeks from one quarter to the next quarter, 7 days per week, and 10 employee growth over these 91 days). If a firm's employment change could be measured on a daily basis, and if this employment change occurred linearly within the quarter, then the statistics from this measurement process would be equivalent to the statistics from dynamic-sizing with quarterly point-in-time employment data.

Firm as a unit of analysis. While the other BED data series use the establishment as the unit of analysis, the size class data are based on the firm level. An establishment is defined as an economic unit that produces goods or ser-

vices, usually at a single physical location, and engages in one or predominantly one activity. A firm is a business, either corporate or otherwise, and may consist of one or more establishments.

There are valid arguments for choosing either the firm or the establishment as the unit of analysis for producing size class tabulations. If employment changes are the result of decisions made at corporate headquarters, then the firm is the appropriate unit for analyzing the expansion and contraction of businesses. Conversely, if employment changes are the result of individual establishment decisions based upon local labor market conditions, then the establishment is the appropriate unit to analyze business expansions and contractions. The truth obviously lies somewhere between these two extremes—employment changes at individual establishments are affected by both corporate decisions and by local factors. The BLS believes that firm-level measurement of size classes is more consistent with the role of corporations as the economic decisionmakers than with each individual establishment. The EIN is the firm-level identifier used to create the BED size class statistics.

Small businesses and the number of size classes. What is a small business? Economic literature is full of references to small businesses. However, there is not a consensus among economists as to what constitutes a small business. Depending on the scope of the research and the availability of data, various sizes for small businesses are defined, analyses made, and policies recommended. The U.S. Small Business Administration (SBA) defines a small business for research purposes as an independent business having fewer than 500 employees; however, the SBA's Office of Size Standards also has industry specific definitions of small businesses for government purposes.[11] Additionally, there are other national and statewide advocacy groups in the private sector whose functions are to support and promote the concerns of very small firms, typically fewer than five employees.[12] These "micro businesses" are less affected by economic downturns and act as "shock absorbers" in the economy.[13]

The BED data are based on the nine size classes designated by the Office of Management and Budget as official size class standards for use by Federal agencies in industrial and occupational classifications. However, the BLS also has created two additional size categories to make analysis more compatible with existing size class conventions: a category of 100 or more employees, and a category of 500 or more employees. Data on size classes may be combined to create broader categories; in the absence of a single definition for small or large firms, data users are able to create categories of interest for study.

BED data series: June 1990–September 2005

Frm size class. From June 1990 to September 2005, the private sector has experienced gross job gains averaging 6.6 million jobs each quarter. Which size class is responsible for the most gains?

Firms with fewer than 100 employees contributed an average of 61.4 percent of gross job gains, while firms with fewer than 500 employees contributed 77.2 percent of total gross job gains. Over this same period, private sector average quarterly gross job losses totaled 6.3 million, of which firms with fewer than 100 employees had a 62.3-percent share and firms with fewer than 500 employees had a 77.8-percent share.[14] (See table 1.)

Gross job gains and gross job losses combined yield an average quarterly net gain of 324,000 jobs. Firms with fewer than 100 employees contributed 45.0 percent of the average quarterly net growth, while firms with fewer than 500 employees contributed 63.7 percent. These data show that within this time series, firms with fewer than 500 employees have, on average, contributed the most to net job gains. The share of these firms in total job creation is greater than their share of total employment: on average over this time series, firms with fewer than 500 employees have contained 56.7 percent of economywide employment but have contributed 63.7 percent of net employment gains. (See tables 1 and 2). These numbers are consistent with the conclusions of many studies.[15] The larger contribution of small firms to job growth is evident in both net and gross job gains. This fact coupled with the absence of the regression-to-the-mean fallacy in the dynamic-sizing methodology may settle many controversies surrounding the role of small size businesses in job creation.[16]

Expansions, openings, contractions, and closings. The data have shown that, on average, expanding firms have created about 83 percent of total gross job gains per quarter while opening firms accounted for the remaining 17 percent. The very large firms, those with 1,000 or more employees, accounted for 21.3 percent of gross job gains from expansions, the highest share among the nine size classes. The next largest share belonged to size class 20 to 49 employees, with 15.2 percent of the gross job gains from expansions. These two size groups also had the largest average quarterly shares of gross job losses from contractions, 20.6

Table 1. Average quarterly level and percentage share of gross job gains and losses by firm size, second quarter 1990 through third quarter 2005

[Seasonally adjusted]

Category	Size class (number of employees)									
	Total	1 to 4	5 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to more
	Level (in thousands)									
Gross job gains	6,581	945	761	788	943	602	647	391	319	1,185
At expanding firms	5,487	385	586	661	834	554	611	375	309	1,171
At opening firms	1,094	560	175	128	109	48	35	16	10	14
Gross job losses	6,257	911	740	763	906	574	610	367	298	1,088
At contracting firms	5,181	388	574	638	795	520	566	346	285	1,070
At closing firms	1,076	523	166	125	112	53	44	20	14	19
Net change	324	34	21	25	37	28	37	24	21	97
	Share (percent)[1]									
Gross job gains	100.0	14.4	11.6	12.0	14.3	9.1	9.8	5.9	4.8	18.0
Expansions	100.0	7.0	10.7	12.0	15.2	10.1	11.1	6.8	5.6	21.3
Openings	100.0	51.2	16.0	11.7	9.9	4.4	3.2	1.4	.9	1.3
Gross job losses	100.0	14.6	11.8	12.2	14.5	9.2	9.7	5.9	4.8	17.4
Contractions	100.0	7.5	11.1	12.3	15.3	10.0	10.9	6.7	5.5	20.6
Closings	100.0	48.6	15.4	11.7	10.4	5.0	4.1	1.9	1.3	1.7
Net change	100.0	10.5	6.6	7.8	11.3	8.7	11.3	7.4	6.4	29.9
Cumulative share of net change	—	10.5	17.1	24.9	36.2	45.0	56.3	63.7	70.1	100.0

[1] Share measures the percent of the category represented by each firm size class.

percent and 15.3 percent respectively. (See table 1.)

Firm openings and closings occurred mostly in smaller size classes. In size class 1 to 4 employees, the average quarterly share of gross job gains from openings was 51.2 percent, and of gross job losses from closings was 48.6 percent. This share, unlike expansions and contractions, diminishes as firm size increases.

Size class dynamics. The distribution of firms among the nine size classes is a compelling topic. As one would expect over this time series, the number of firms in each of the size classes has increased across the board. (See table 3.) However, the percent share of firms in each class has increased for two dissimilar classes: firms with 1 to 4 employees and firms with 250 to 499 employees. Firms with 1 to 4 employees have represented more than half of total firms in the private sector. From first quarter 1990 to first quarter 2005, the share of firms in this size class has grown from 52.6 percent to 54.4 percent. The share of size class 5 to 9 employees fell the most, from 21.4 percent to 20.3 percent. Size classes 10 to 19, 20 to 49, and 50 to 99 employees fell as well, by 0.4 percent, 0.2 percent, and 0.1 percent, respectively. While there were some fluctuations over the business cycle, for firms in classes 100 to 249, 500 to 999, and 1,000 or more employees shares were unchanged from their 1990 levels.[17] (See table 3.)

When dividing firms into two size categories, 1 to 99 employees and 100 or more employees, the series shows small 0.1 percent fluctuations, but has held constant over the last 4 years. Size classes 1 to 499 employees and 500 or more employees show no change in firm share distribution throughout the series.

Even though the count of firms shows only a modest shift, with the addition of about 18 million employees from 1990 to 2005, the distribution of employees shows a more pronounced shift among the size classes.

Table 2 presents the distribution of employment by size class at the end of the first quarter each year from 1990 to 2005. The employment share of firms with 500 or more employees rose from 41.4 percent of total employment in 1990 to 44.2 percent in 2005. Thus, the share of employment in firms with fewer than 500 employees has declined from 58.6 percent in 1990 to 55.8 percent

Table 2. Distribution of employment by size class, March 1990 through March 2005

[Not seasonally adjusted]

March of year	Total, private	Number of employees												
		1 to 4	5 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 to more	1 to 99	100 or more	1 to 499	500 or more
	Level (in thousands)													
1990	89,278	4,809	5,951	7,255	10,354	7,870	9,593	6,461	5,826	31,158	36,239	53,038	52,293	36,985
1991	87,356	4,827	5,895	7,108	10,007	7,514	9,152	6,087	5,685	31,081	35,351	52,006	50,590	36,766
1992	87,024	4,872	5,914	7,094	9,935	7,412	9,053	6,075	5,626	31,042	35,228	51,796	50,356	36,668
1993	88,530	4,963	5,995	7,171	10,048	7,532	9,265	6,221	5,826	31,510	35,709	52,821	51,195	37,335
1994	91,214	5,026	6,093	7,338	10,384	7,748	9,662	6,518	6,021	32,425	36,588	54,626	52,769	38,445
1995	94,561	5,099	6,182	7,508	10,688	8,083	10,068	6,816	6,295	33,823	37,559	57,002	54,443	40,118
1996	96,531	5,139	6,227	7,580	10,863	8,254	10,318	7,017	6,576	34,558	38,062	58,469	55,397	41,134
1997	99,401	5,221	6,304	7,718	11,124	8,420	10,605	7,251	6,893	35,864	38,788	60,613	56,644	42,757
1998	102,204	5,244	6,316	7,782	11,236	8,548	10,851	7,466	7,146	37,615	39,127	63,078	57,443	44,761
1999	104,637	5,296	6,400	7,891	11,417	8,703	11,030	7,589	7,351	38,959	39,707	64,930	58,326	46,311
2000	107,672	5,299	6,446	8,051	11,677	8,941	11,286	7,942	7,557	40,473	40,414	67,258	59,642	48,030
2001	108,561	5,345	6,445	8,066	11,696	8,928	11,419	7,927	7,636	41,100	40,480	68,082	59,825	48,736
2002	105,810	5,377	6,468	8,036	11,591	8,685	11,051	7,591	7,271	39,742	40,156	65,654	58,797	47,013
2003	105,097	5,459	6,506	8,055	11,520	8,618	10,955	7,509	7,131	39,345	40,158	64,939	58,621	46,476
2004	105,915	5,528	6,591	8,141	11,661	8,731	11,028	7,614	7,200	39,421	40,652	65,263	59,294	46,621
2005	107,902	5,606	6,613	8,204	11,801	8,873	11,310	7,813	7,334	40,349	41,096	66,806	60,219	47,683
	Share (percent)													
1990	100.0	5.4	6.7	8.1	11.6	8.8	10.7	7.2	6.5	34.9	40.6	59.4	58.6	41.4
1991	100.0	5.5	6.7	8.1	11.5	8.6	10.5	7.0	6.5	35.6	40.5	59.5	57.9	42.1
1992	100.0	5.6	6.8	8.2	11.4	8.5	10.4	7.0	6.5	35.7	40.5	59.5	57.9	42.1
1993	100.0	5.6	6.8	8.1	11.4	8.5	10.5	7.0	6.6	35.6	40.3	59.7	57.8	42.2
1994	100.0	5.5	6.7	8.0	11.4	8.5	10.6	7.1	6.6	35.5	40.1	59.9	57.9	42.1
1995	100.0	5.4	6.5	7.9	11.3	8.5	10.6	7.2	6.7	35.8	39.7	60.3	57.6	42.4
1996	100.0	5.3	6.5	7.9	11.3	8.6	10.7	7.3	6.8	35.8	39.4	60.6	57.4	42.6
1997	100.0	5.3	6.3	7.8	11.2	8.5	10.7	7.3	6.9	36.1	39.0	61.0	57.0	43.0
1998	100.0	5.1	6.2	7.6	11.0	8.4	10.6	7.3	7.0	36.8	38.3	61.7	56.2	43.8
1999	100.0	5.1	6.1	7.5	10.9	8.3	10.5	7.3	7.0	37.2	37.9	62.1	55.7	44.3
2000	100.0	4.9	6.0	7.5	10.8	8.3	10.5	7.4	7.0	37.6	37.5	62.5	55.4	44.6
2001	100.0	4.9	5.9	7.4	10.8	8.2	10.5	7.3	7.0	37.9	37.3	62.7	55.1	44.9
2002	100.0	5.1	6.1	7.6	11.0	8.2	10.4	7.2	6.9	37.6	38.0	62.0	55.6	44.4
2003	100.0	5.2	6.2	7.7	11.0	8.2	10.4	7.1	6.8	37.4	38.2	61.8	55.8	44.2
2004	100.0	5.2	6.2	7.7	11.0	8.2	10.4	7.2	6.8	37.2	38.4	61.6	56.0	44.0
2005	100.0	5.2	6.1	7.6	10.9	8.2	10.5	7.2	6.8	37.4	38.1	61.9	55.8	44.2

in 2005. While shares fluctuate across the time series, the smallest six size classes show a net decline. Size class 250 to 499 employees has remained steady at 7.2 percent of employment, while size class 500 to 999 employees has gained 0.3 percent. The largest gain occured in size class 1,000 or more employees, which has gained 2.5 percent of employment. These trends may demonstrate that while large firms are gaining a higher share of total employment, small firms are growing and gradually shifting to the large size group.

When comparing the change in employment shares over time, similar results occur when large firms are defined at both the 100 and 500 employee levels. From first quarter 1990 to first quarter 2005, firms with 500 or more employees experienced an increase of 2.8 percentage points in the share of total private employment, while the change for firms with 100 or more employees was 2.5 percentage points. The similar changes in employment shares for both boundaries may suggest that rapidly growing firms continue their growth and settle in

Table 3. Distribution of firms by size class, March 1990 through March 2005

[Not seasonally adjusted]

March of year	Total, private	Number of employees												
		1 to 4	5 to 9	10 to 19	20 to 49	50 to 99	100 to 249	250 to 499	500 to 999	1,000 or more	1 to 99	100 to more	1 or 499	500 or more
	Level (in thousands)													
1990	4,226.6	2,222.8	906.3	540.4	343.7	114.6	63.6	18.8	8.5	7.9	4,127.9	98.7	4,210.2	16.3
1991	4,206.6	2,242.0	898.3	530.0	332.5	109.5	60.6	17.7	8.2	7.8	4,112.3	94.4	4,190.6	16.1
1992	4,226.3	2,264.0	901.4	528.9	330.1	108.0	60.1	17.7	8.2	7.8	4,132.5	93.8	4,210.3	16.0
1993	4,300.1	2,312.4	913.5	534.7	334.0	109.6	61.4	18.1	8.4	8.0	4,204.2	95.9	4,283.7	16.4
1994	4,377.3	2,344.6	927.8	547.2	345.0	112.7	64.1	18.9	8.7	8.3	4,277.3	100.0	4,360.3	17.0
1995	4,460.2	2,383.0	940.9	559.6	354.8	117.6	66.7	19.8	9.1	8.8	4,355.9	104.4	4,442.3	17.9
1996	4,508.1	2,408.6	947.2	564.7	360.3	120.2	68.4	20.4	9.5	8.9	4,400.9	107.2	4,489.7	18.4
1997	4,590.7	2,454.3	959.1	575.3	369.0	122.5	70.3	21.0	10.0	9.2	4,480.2	110.4	4,571.5	19.1
1998	4,621.0	2,470.0	960.9	579.6	372.9	124.3	71.8	21.6	10.4	9.6	4,507.6	113.4	4,601.1	19.9
1999	4,685.4	2,503.6	973.3	587.6	379.0	126.6	72.9	22.0	10.7	9.8	4,570.0	115.4	4,665.0	20.5
2000	4,719.3	2,504.4	979.8	599.0	387.4	130.0	74.7	23.0	11.0	10.1	4,600.5	118.8	4,698.2	21.1
2001	4,752.1	2,535.0	979.5	599.9	387.9	130.0	75.5	23.0	11.1	10.1	4,632.4	119.7	4,730.9	21.2
2002	4,761.0	2,552.8	983.5	597.9	384.7	126.7	73.1	22.0	10.5	9.8	4,645.6	115.5	4,740.7	20.3
2003	4,811.3	2,599.6	989.3	599.9	382.8	125.6	72.4	21.8	10.3	9.7	4,697.1	114.2	4,791.3	20.0
2004	4,876.5	2,639.0	1,002.0	605.8	387.4	127.2	72.9	22.1	10.4	9.6	4,761.5	115.0	4,856.4	20.0
2005	4,942.0	2,687.1	1,005.7	610.4	391.9	129.3	74.7	22.7	10.6	9.7	4,824.3	117.7	4,921.7	20.3
	Share (percent)													
1990	100.0	52.6	21.4	12.8	8.1	2.7	1.5	0.4	0.2	0.2	97.7	2.3	99.6	0.4
1991	100.0	53.3	21.4	12.6	7.9	2.6	1.4	.4	.2	.2	97.8	2.2	99.6	.4
1992	100.0	53.6	21.3	12.5	7.8	2.6	1.4	.4	.2	.2	97.8	2.2	99.6	.4
1993	100.0	53.8	21.2	12.4	7.8	2.5	1.4	.4	.2	.2	97.8	2.2	99.6	.4
1994	100.0	53.6	21.2	12.5	7.9	2.6	1.5	.4	.2	.2	97.7	2.3	99.6	.4
1995	100.0	53.4	21.1	12.5	8.0	2.6	1.5	.4	.2	.2	97.7	2.3	99.6	.4
1996	100.0	53.4	21.0	12.5	8.0	2.7	1.5	.5	.2	.2	97.6	2.4	99.6	.4
1997	100.0	53.5	20.9	12.5	8.0	2.7	1.5	.5	.2	.2	97.6	2.4	99.6	.4
1998	100.0	53.5	20.8	12.5	8.1	2.7	1.6	.5	.2	.2	97.5	2.5	99.6	.4
1999	100.0	53.4	20.8	12.5	8.1	2.7	1.6	.5	.2	.2	97.5	2.5	99.6	.4
2000	100.0	53.1	20.8	12.7	8.2	2.8	1.6	.5	.2	.2	97.5	2.5	99.6	.4
2001	100.0	53.3	20.6	12.6	8.2	2.7	1.6	.5	.2	.2	97.5	2.5	99.6	.4
2002	100.0	53.6	20.7	12.6	8.1	2.7	1.5	.5	.2	.2	97.6	2.4	99.6	.4
2003	100.0	54.0	20.6	12.5	8.0	2.6	1.5	.5	.2	.2	97.6	2.4	99.6	.4
2004	100.0	54.1	20.5	12.4	7.9	2.6	1.5	.5	.2	.2	97.6	2.4	99.6	.4
2005	100.0	54.4	20.3	12.4	7.9	2.6	1.5	.5	.2	.2	97.6	2.4	99.6	.4

the size class of firms with 500 or more employees. (See table 2.)

The gradual increase in the relative employment share of large size firms may be caused by the net effect of several factors. While some firms grow large enough over time to become members of size class 500 or more employees, there is a constant addition of employment from opening businesses in the smaller size classes. Size classes 1 to 4, 5 to 9, and 10 to 19 employees are the only classes to have generated net gains from openings and closings over this time series. In the third quarter of 2005, employment gains at opening firms in all size classes constituted 16.5 percent of total gross job gains and 5.6 percent of net employment growth. (See table 1.)

Additionally, it is possible that a number of firms that grow rapidly over time may move into higher size classes, but may not surpass the 500 employee mark. These growing firms do not affect the employment share of large firms with 500 or more employees. These two factors can help to explain the inner workings of this gradual employment shift.

Although the general trend shows an increasing share

of employment for the larger size classes, this trend may be halted or temporarily disrupted by the relative shares of gross job gains and gross job losses in small and large firms throughout the business cycle. (See tables 2 and 3.) For example, during the recession of 2001, on average, large firms, those with 500 or more employees, contributed 59.1 percent of net job losses; their share of employment began to drop and continued to do so until 2004. The employment share of large firms still has not yet reached its pre-recession level. In contrast, during the 1990–91 recession, small firms, those with fewer than 500 employees, contributed an overwhelming 80.3 percent of net losses. As a result, the employment share of large firms remained unchanged in 1992 and continued to grow slowly until 2001.

Gross job gains and losses and business cycles. Do gross job gains and gross job losses by firm size have business cycle properties? To answer this question, we divided the time series into four distinct periods:

- 1990–II to 1992–I: the quarters of net job loss associated with the 1990–91 recession;
- 1992–II to 2001–I: the recovery and expansion period after the early 1990–91 recession;
- 2001–II to 2003–II: the quarters of net job loss associated with the 2001 recession; and
- 2003–III to 2005–III: the current recovery period.

If employers react similarly during various phases of the business cycle, regardless of firm size, then the average quarterly shares of gross job gains and gross job losses would be expected to remain steady across size classes. Table 4 and chart 1 show that firms of different size classes do indeed behave differently throughout these periods. Moreover, a single class may not exhibit the same behavior during more than one recession or expansion. In fact, firms with 1 to 499 employees and those with 500 or more employees have had opposite impacts on the job market during these two recessions.

Gross job gains for firms with 500 or more employees reached the prerecession level in the second quarter of 1993, nine quarters after the official end of the 1991 recession and started on an upward trend. These firms contributed, on average, 23.5 percent of gross job gains per quarter during mid-1990s expansion period. This share decreased slightly to 22.7 percent during the 2001 recession, and fell to 22.5 percent during the recovery period. (See table 4 and chart 1.) As of the third quarter of 2005, 15 quarters after the official end of the 2001 recession, gross job gains of these firms still have not recovered from the 2001 recession, where gains still remain significantly lower than the pre-recession level.

For small firms, those with 1 to 499 employees, gross job gains reached levels seen before the 1991 recession in the third quarter of 1993, only one quarter after the large firms. Again, as with the large firms, gross job gains of small firms have not yet recovered to pre-2001 levels.

In contrast, the gross job losses of both small and large firms are currently at a level comparable to historical lows. For large firms, the average quarterly share of gross job losses began at 21.9 percent during the 1990s expansion, and rose to 25.2 percent during the 2001 recession. The average share of gross job losses has since dropped to 21.5 percent. (See table 4 and chart 1.)

These figures show that the increase in gross job losses for firms with 500 or more employees contributed greatly to net job losses during the recent employment contraction, far more than in the 1990–91 recession. While these larger firms have contributed significantly to the current employment expansion, present net gains do not appear to be attributable to a rise in gross job gains, but rather to a fall in the level of gross job losses.

Firms with 500 or more employees were responsible for an average share of 59.1 percent of net jobs lost per quarter during the 2001 recession and those job-declining quarters immediately following. This is in sharp contrast to the 39.2-percent share of net growth this size group experienced during the expansionary period following the 1990 recession. Firms with fewer than 500 employees contributed 40.9 percent of the net losses during the latest employment downturn and 60.8 percent of net job gains during the preceding expansion.[18] (See table 4 and chart 1.) This low level of gross job losses combined with middling levels of gross job gains make the present recovery one of less job losses rather than one of more job creation.

Recovery and rates of gross job gains and losses. During a typical economic downturn, employers minimize their workforce in order to adjust for the lower levels of aggregate demand. When the recession is over and demand returns to pre-recession levels, laid-off workers are often called back to work and job gains activities improve. One should expect that in the course of the recession gross job gains fall and gross job losses rise, causing a net loss in total employment. In the post recession period, if employees are called back or hiring is resumed in the affected companies, gross job gains rise and gross job losses fall, leading to net employment gains.

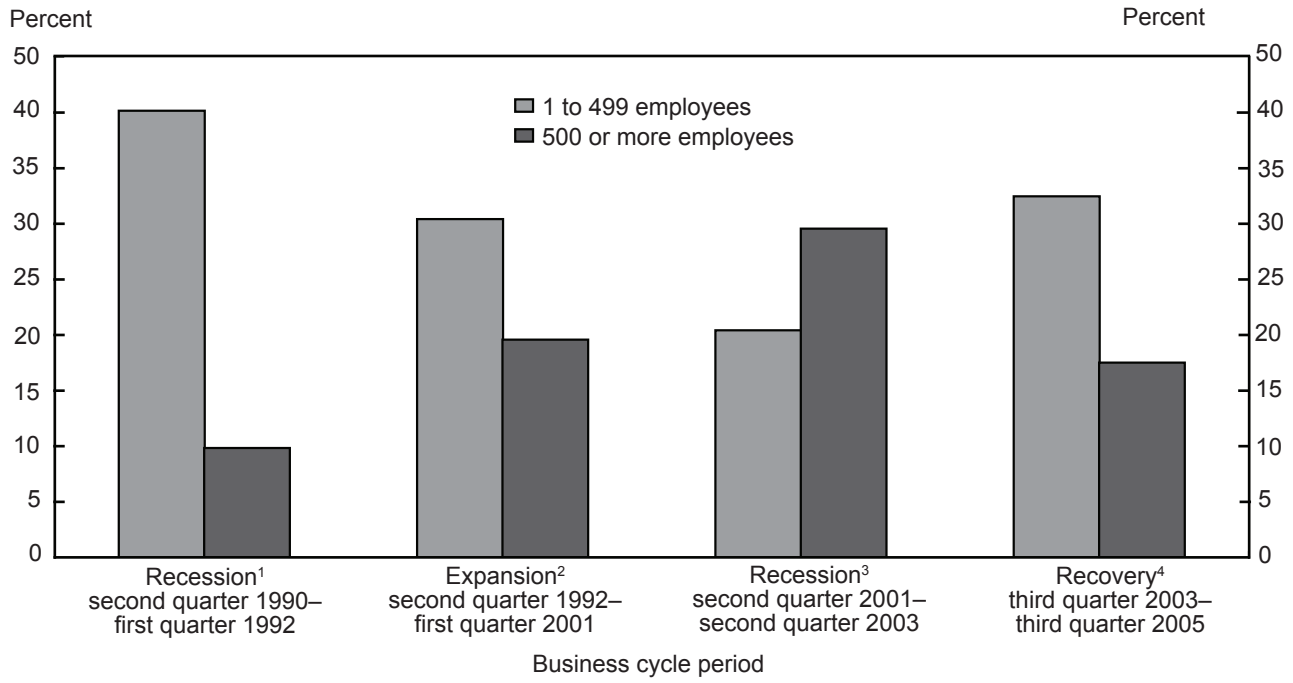
In the 2001 recession and recovery, this hiring and firing

Table 4. Average quarterly level and share of net job change and gross job gains and losses during economic recessions and expansion

[Seasonally adjusted]

Size class (number of employees)	Recession, 1990-II–1992–I		Expansion, 1992–II–2001–I		Recession, 2001–II–2003–II		Recovery, 2003–III–2005–III	
	Level (thousands)	Share (percent)	Level (thousands)	Share (percent)	Level (thousands)	Share (percent)	Level (thousands)	Share (percent)
Net job changes								
Total, private	–275	100.00	625	100.00	-467	100.00	442	100.00
1 to 4	–10	3.69	45	7.25	14	–2.98	49	11.43
5 to 9	–21	7.60	36	5.69	–3	0.64	26	5.83
10 to 19	–33	12.16	47	7.46	–16	3.50	33	7.26
20 to 49	–55	19.90	72	11.57	–40	8.52	52	11.29
50 to 99	–40	14.71	58	9.29	–42	8.98	41	8.99
100 to 249	–42	15.12	74	11.82	–57	12.31	51	11.79
250 to 499	–20	7.15	49	7.77	–46	9.88	35	7.48
500 to 999	–7	2.37	42	6.77	–49	10.50	28	5.65
1,000 or more	–48	17.30	202	32.38	–227	48.64	126	30.28
1 to 99	–159	58.06	258	41.26	–87	18.67	201	45.40
100 or more	–115	41.94	367	58.74	–380	81.33	241	54.60
1 to 499	–221	80.33	380	60.85	–191	40.86	287	64.96
500 or more	–54	19.67	245	39.15	–276	59.14	155	35.04
Gross job gains								
Total, private	6,101	100.00	6,780	100.00	6,352	100.00	6,440	100.00
1 to 4	904	14.81	949	14.00	937	14.75	973	15.12
5 to 9	729	11.95	770	11.36	748	11.78	763	11.85
10 to 19	753	12.34	802	11.83	772	12.16	781	12.12
20 to 49	905	14.84	965	14.24	912	14.36	919	14.26
50 to 99	583	9.56	621	9.16	569	8.96	574	8.92
100 to 249	617	10.11	672	9.91	607	9.56	612	9.50
250 to 499	364	5.97	408	6.02	366	5.76	371	5.77
500 to 999	286	4.68	336	4.95	299	4.71	303	4.71
1,000 or more	959	15.72	1257	18.54	1,141	17.96	1,143	17.75
1 to 99	3,875	63.51	4,108	60.59	3,939	62.01	4,010	62.27
100 or more	2,227	36.49	2,672	39.41	2,413	37.99	2,430	37.73
1 to 499	4,856	79.59	5,188	76.51	4,912	77.32	4,994	77.54
500 or more	1,245	20.41	1,593	23.49	1,440	22.68	1,447	22.46
Gross job losses								
Total, private	6376	100.00	6155	100.00	6,819	100.00	5,998	100.00
1 to 4	914	14.34	904	14.69	923	13.54	925	15.42
5 to 9	750	11.77	735	11.94	751	11.02	737	12.29
10 to 19	786	12.33	755	12.27	789	11.57	747	12.46
20 to 49	960	15.06	893	14.51	952	13.96	867	14.45
50 to 99	624	9.78	563	9.15	611	8.96	534	8.90
100 to 249	659	10.33	598	9.71	664	9.74	560	9.34
250 to 499	384	6.02	359	5.84	412	6.04	336	5.61
500 to 999	292	4.58	293	4.76	348	5.11	275	4.59
1,000 or more	1,007	15.79	1055	17.13	1,368	20.06	1,017	16.95
1 to 99	4,034	63.27	3,850	62.55	4,026	59.05	3,810	63.51
100 or more	2,342	36.73	2,305	37.45	2,792	40.95	2,189	36.49
1 to 499	5,077	79.63	4,808	78.10	5,102	74.83	4,707	78.46
500 or more	1,299	20.37	1,348	21.90	1,716	25.17	1,292	21.54

Chart 1. **Average quarterly share of net change for firms with 1 to 499 employees and firms with 500 or more employees during the business cycle, 1990–2005**



[1] Quarters of net job loss associated with the 1990–91 recession.
[2] Recovery and expansion period.
[3] Quarters of net job loss associated with the 2001 recession.
[4] Current recovery period.

regime was not followed. Gross job gains fell at the onset of the downturn while gross job losses increased dramatically, resulting in a net loss in employment. After the official end of the recession during the fourth quarter of 2001, gross job gains rose for one quarter and then resumed a downward trend, lasting until the third quarter of 2003. Gross job losses, however, peaked in the middle of the recession, the third quarter of 2001, returned to pre-recession levels in the first quarter of 2002, and then continued to fall until the fourth quarter of 2002. The improvement in the job market, therefore, was initiated by a slowdown in the pace of gross job losses, not by a stream of gross job gains. This phenomenon—the fall of gross job gains rates and a historically low level of gross job loss rates—is evident in all size classes and continues up to the third quarter of 2005, the latest quarter for which data were available.[19] (See chart 2.) For example, the rate of gross job gains in firms with 500 or more employees was 3.6 percent in the fourth quarter of 2000, and fell to 3.3 percent by the third quarter of 2005. Gross job losses however, fell from 3.3 percent to 2.7 percent over the same period. Firms with fewer than 500 employees showed similar changes, with the rate of gross job gains *falling* from 8.7 percent to 8.3 percent and the rate of gross job losses *falling* from 8.5 percent to 7.8 percent. In both of these size classes, drops in the rate of gross job losses exceeded declines in the rate of gross job gains, causing a positive net change in total employment. Therefore the current recovery of the labor market has been mainly the result of decreased gross job losses, rather than increased gross job gains.

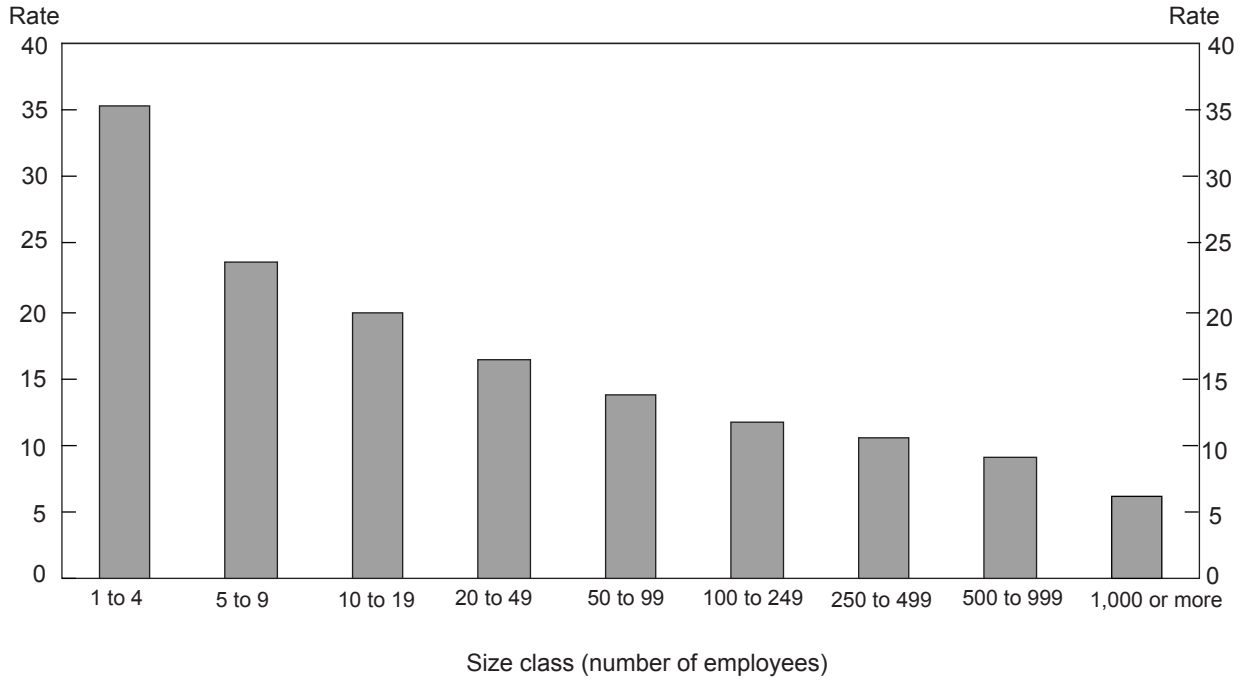
In other words, these net employment gains appear to be predominantly from *fewer layoffs, plant closings and other labor force reducing events*, and to a lesser extent from greater business openings and expansions that the economy typically experiences during an economic recovery.

Additionally, note that the rates of gross job gains of these two size classes peaked at different points preceding the 2001 recession. (See chart 2.) The rate of gross job gains in firms with 1 to 499 employees (small firms) peaked in 2001, while the rate for firms with 500 or more employees (large firms) peaked far earlier, in 1998. As the BED size class data series continues over time, it will be interesting to see if this early reaction of large firms to an

Chart 2. **Gross job gains and gross job losses as a percent of employment in private sector firms, June 1990–March 2005, seasonally adjusted**

NOTE: Shaded area represents recession period.

Chart 3. Average job allocation rates by firm size, second quarter 1990 through third quarter 2005



economic downturn constitutes a pattern and if it could perhaps be used as a leading indicator of what lies ahead in the job market.

Job reallocation rate and size of firm. The job reallocation rate is the sum of the rate of gross job gains and the rate of gross job losses. This figure may be used as a measure of job turnover, the "churning" beneath the surface of the job market. Data on job reallocation rates by firm size reveal two facts. First, the average job reallocation rates for each class are inversely related to the size of the firms. This means the larger firms have lower turnover rates. (See chart 3.)

Second, job reallocation rates for all size classes are declining. The rates for all size classes have been relatively flat throughout the 1990s expansion period and are now on a decline during the current recovery. These low post recession job reallocation rates stem mainly from a fall in the rate of gross job losses.

IN SUM, THE FOLLOWING FINDINGS result from analysis of BLS firm size class data:

- Small firms, those with 1 to 499 employees, create about 64 percent of new jobs.
- The share of growth of small firms is larger than their base share of employment. This growth, however, causes small firms to become large, increasing the employment share of large firms over time.
- Firms of different size classes behave differently throughout the phases of the business cycle. The contribution of large firms to the net job gains during the current economic recovery appears to have come from a fall in the level of gross job losses, rather than increased job creation. The share of gross job gains for this group has not yet reached its pre-recession levels.
- The bulk of net job losses in the 1991 recession occurred in small firms, while large firms have generated the majority of job losses during the economic slowdown of 2001. □

NOTES

[1] Steven J. Davis, John C. Haltiwanger, and Scott Schuh, *Job Creation and Job Destruction,* (Cambridge, MIT Press, 1966), Chapter 4.

[2] Cordelia Okolie, "Why size class methodology matters in analyses of net and gross job flows," *Monthly Labor Review*, July 2004, pp. 3–12.

[3] Per Davidsson, "Methodological Concerns in the Estimation of Job Creation in Different Firm Size Classes" Jönköping International Business School (1996 Working Paper) on the Internet at: **http://www.ihh.hj.se/eng/research/publications/wp/1996–1%20Davidsson.pdf** (accessed June 2005); and Per Davidsson, Leif Lindmark, and Christer Olofsson, "The Extent of Overestimation of Small Firm Job Creation—An Empirical Examination of the Regression Bias," Small Business Economics, 1998, pp. 87–100.

[4] Prior to third quarter 1992, Multiple Worksite Report processing had not become fully operational. Because the BED data series is based at the establishment level, data is published beginning at this point, where firms composed of multiple establishments could submit data for each establishment. However, because this size class analysis is based at the firm level, these breakouts are not necessary. For the purpose of this research, the data series has been expanded back to second quarter 1990 in order to demonstrate the differences between the 1990 and 2000 recessions. Due to the improvements in reporting, caution should be used when comparing data collected before and after September 1992.

[5] For more details on gross job flows, see Davis, Haltiwanger, and Schuh, *Job Creation and Job Destruction*; John M. Abowd, John Haltiwanger, and Julie Lane, "Integrated Longitudinal Employer-Employee Data for the United States," *American Economic Review: Papers and Proceedings*, May 2004, pp. 224–29; Timothy R. Pivetz, Michael A. Searson, and James R. Spletzer, "Measuring job and establishment flows with BLS longitudinal microdata," *Monthly Labor Review*, April 2001, pp. 13–20.

[6] Timothy Dunne, Mark J. Roberts, and Larry Samuelson, "Patterns of Firm Entry and Exit in U.S. Manufacturing Industries," *Rand Journal of Economics*, winter 1988, pp. 495–515; Timothy Dunne, Mark J. Roberts, and Larry Samuelson, "Plant Turnover and Gross Employment Flows in the U.S. Manufacturing Sector," *Journal of Labor Economics*, January 1989, pp. 48–71; Davis, Haltiwanger, and Schuh, Job Creation and Destruction; James R. Spletzer, "The Contribution of Establishment Births and Deaths to Employment Growth," *Journal of Business and Economic Statistics,* January 2000, pp. 113–26; and Christopher L. Foote "Trend Employment Growth and the Bunching of Job Creation and Destruction," *Quarterly Journal of Economics*, August 1988, pp. 809–34.

[7] It is important to note that gross job gain and gross job loss statistics measure the sum of firm level net employment changes, and do not measure the flow of individual workers into and out of the unit. For example, if a firm increases employment from 50 workers to 60 workers, these 10 additional jobs are classified as gross job gains. This addition of 10 jobs during the quarter may have occurred with the addition of 10 new hires, or through any combination of hires and separations. Counts of hires and separations are published monthly by the Job Openings and Labor Turnover Survey (JOLTS) program at the BLS.

[8] For more on BED concept and methodology, see James R. Spletzer, R. Jason Faberman, Akbar Sadeghi, David M. Talan, and Richard L. Clayton, "Business Employment Dynamics," *Monthly Labor Review*, April 2004, pp. 29–42.

[9] Shail J. Butani, Richard L. Clayton, Vinod Kapani, James R. Spletzer, David M. Talan, and George S. Werking, Jr., "Business Employment Dynamics: tabulation by employer size" *Monthly Labor Review*, February 2006, pp. 3–22.

[10] Davidsson, "Methodological Concerns in the Estimation of Job Creation in Different Firm Size Classes"; and Davidsson, Lindmark, and Olofsson, "The Extent of Overestimation of Small Firm Job Creation—An Empirical Examination of the Regression Bias."

[11] See Guide to SBA's Definitions of Small Business, on the Internet at **http://www.sba.gov/size/indexguide.html.**

[12] Organizations include National Association for the Self-Employed (www.nase.org); Micro Business Development (www.microbusiness.org); Micro-Business USA (www.microbusinessusa.org); Micro Business Cooperative Extension (http://fcs.okstate.edu/microbiz/).

[13] Derek Leebeart, "How Small Businesses Contribute to U.S. Economic Expansion." *E-Journal USA: Economic Perspective,* January 2006.

[14] Long-term average share is used in this analysis. The shares of size classes in gross job gains, gross job losses, and net change in employment are highly seasonal and cyclical. For example, the net change share for firms with 500 or more employees was 14.3 in the second quarter of 2005, but rose to 48.1 percent in the third quarter of 2005.

[15] D. Birch, *The Job Generation Process, Final Report to Economic Development Administration, Program on Neighborhood and Regional Change* (Cambridge, MIT Press, 1979); J. Baldwin and G. Picot, "Employment Generation by Small Producers in the Canadian Manufacturing Sector," *Small Business Economics*, 1995, pp. 317–31; and P. Davidsson, L. Lindmark, and C. Olofsson, "The trend toward smaller scale during the 1980's: empirical evidence from Sweden," paper presented at ICSB's 40th World Conference, Sydney, June 1995.

[16] For a detailed discussion on small firm job creation debate, see Per Davidsson, "Methodological Concerns in the Estimation of Job Creation in Different Firm Size Classes."

[17] Please note that these figures are not seasonally adjusted and are compared on an annual basis.

[18] For more information on comparing these two recessions, see Shail Butani, George Werking, and Vinod Kapani, "Employment dynamics of individual companies versus multicorporations," *Monthly Labor Review,* December 2005, pp. 3–15; and Jason R. Faberman, "Gross Job Flows over the Past Two Business Cycles: Not all 'Recoveries' are Created Equal," BLS Working Paper, 2004.

[19] Gross job gains and gross job losses for any size class are expressed as rates by dividing their levels by the average of employment in the current and previous quarters. This provides a symmetric growth rate. The rates are calculated for the components of gross job gains and gross job losses and then summed to form their respective totals. These rates can be added and subtracted just as their levels can. For instance, the difference between the gross job gains rate and the gross job losses rate is the net growth rate.