

# Tracking job growth in private industry

*Small, young firms are very important to the process of job generation, according to three recent studies of the behavior of individual employers*

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The job generation process has been one of the most heavily debated public policy issues of recent years. Governments at the Federal, State, and local levels have invested heavily in programs designed to create jobs—including urban and general economic development plans, tax credits and incentives, and public sector employment programs—and to improve the ability of individuals to compete effectively in the labor market by providing basic education and training in new and expanding fields. Much current interest centers on the problem of matching unemployed workers from declining industries to opportunities in areas with expanding manpower needs, such as high technology and defense-related activities. An interesting legislative approach, the Small Business Research Innovation Act,<sup>1</sup> is a proposal to set aside Federal research money for small businesses in order to spur technological innovation and create new jobs. The success of efforts to increase employment through economic policy hinges on the ability to understand the job creation process, identify the job creators, and develop policy initiatives that enhance their potential.

Aggregate data on employment levels and changes by industry and geographic area provide meaningful information on overall labor market trends, but are limited for the study of job creation in that they essentially portray net results. The employment changes reported

monthly by the Bureau of Labor Statistics are the result of many thousands of production-function decisions made by individual employers, based on the relationship between their particular output and labor requirements. To understand the process of job creation, it is necessary to go beyond the aggregated data, and examine the multitude of business decisions at the establishment level.

This article summarizes the findings and methodology of some of the recent innovative labor market studies of this type in the private sector. Emphasis is placed on the microdata-based study of the job creation process under the direction of David Birch, director of the Massachusetts Institute of Technology (MIT) Program on Neighborhood and Regional Change.<sup>2</sup> Similar studies by the Institute of Urban and Regional Development of the University of California at Berkeley, under the direction of Michael B. Teitz,<sup>3</sup> and by the Brookings Institution<sup>4</sup> will also be summarized. These efforts, with appropriate refinement and extension, have the potential to improve significantly the body of labor market information used to guide the development of economic policy in this country.

## The MIT program

David Birch of MIT has developed a theoretically simple approach to the analysis of the job creation process, based on the employment histories of nearly 6 million individual employers. Each firm in the MIT data base is characterized on the basis of location, size of employment, parent company affiliation, industry, and

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age. By comparing changes in these characteristics over time, Birch was able to trace in some detail the path of economic transformation of individual firms. By aggregating the changes in these characteristics for all establishments in a given sector or area, he was able to describe the overall labor market changes in that sector or area and, most importantly, how these changes occurred.

Some highlights:

- Overall employment change in a private-sector labor market is the result of:
  - Births of new firms
  - Expansions of existing firms
  - Firms going out of business
  - Firms reducing their work forces
  - Firms moving their places of business
- The sum of the flows causing job losses (concerns going out of business or reducing their work forces) is nearly the same in all areas. The job loss rate averages about 8 percent annually.
- The job loss rate is quite high. Every area loses about 50 percent of its jobs every 5 years.
- Differences in net employment growth are largely the result of differences in the rates at which job losses are replaced. This replacement rate varies greatly from area to area.
- There are significant differences in the rates at which net new jobs are generated in various parts of the country.
- The establishments generating new jobs tend to be:
  - *Small*. About two-thirds of all net new jobs between 1969 and 1976 were created by firms with 20 or fewer employees.
  - *Young*. About 80 percent of all "replacement" jobs between 1969 and 1976 were generated by establishments in business 4 years or less.
  - *Volatile*. Job generators tend to move through periods of expansion and retrenchment as they grow.
- Virtually none of the difference in the job generation capability of labor markets is due to firms moving their staffs and physical plants to different areas. Few businesses relocate, and when they do, they move short distances.

The MIT studies are basically a longitudinal analysis of the individual establishment data collected by Dun and Bradstreet (D&B). The D&B files are based on establishment reports of all businesses with commercial credit ratings. The data are used by D&B for its credit rating operation, but are commercially available to other enterprises for market research, mailing list preparation, billing, and associated activities. D&B collects many useful economic observations, including the year the estab-

lishment started, location, employment, sales, major industry, and any branch or subsidiary relationships. The information is collected by a full-time staff of 1,700 reporters, assisted by 500 part-time employees.

Files containing all D&B establishments for the years 1969, 1972, 1974, and 1976 were used by the MIT project group to build a data base. A micro history of each employer was developed by matching the firms from year to year by the unique identifying number assigned by D&B. (That number stays the same as long as the establishment is in the file, regardless of any change in location, size, or industry.) This economic history then allows a detailed analysis of changes in employment, location, corporate affiliation, and life cycles. When the data are aggregated on the basis of various characteristics, it is possible to identify the types of firms that created the greatest number of jobs.

Any review of the MIT findings must be tempered by an understanding of both the nature of the D&B files and the techniques used by MIT staff to build the data base. It should be emphasized that the D&B file was not designed as a time series or census of activity in a particular area or industry. As a result, a number of problems arise when the data are used for longitudinal analysis.

A major problem with the MIT model is that births of firms tend to be underreported for the years covered by the study. D&B makes no effort to enter historical data for each newly reported firm in its files. This means, for example, that a firm appearing on the 1975 D&B file for the first time might actually have started operations in 1972. Consequently, the MIT model treats any newly reported firm which is known to have been established before the period being studied as a new listing, rather than a birth. These new listings are excluded from any aggregate analysis of economic change during the current and previous periods. They are, however, incorporated into the base-period employment for the analysis of future periods.

A second problem is attributable to the 2- and 3-year intervals between the observations forming the model's history. A large number of firms, particularly smaller firms, are formed and go out of business within a year or two. Because the MIT studies use data gathered at intervals greater than the life cycles of these firms, any aggregate measure of employment change will understate the actual number of business births and deaths occurring during an interval.

A third problem involves D&B's treatment of branch establishments. Employment in branches is often understated or even unreported because branches do not usually receive separate credit ratings. And, because D&B does not report the year that branch offices are started, the MIT model assumes that all new branch listings are births. However, because a 1976 D&B study of 1,000

firms indicated that nondisaggregated headquarters employed only 16 percent of all employees in headquarters and branch establishments, the MIT team did not consider the nondisaggregation of branch data to be a major problem.

The D&B file also has the same general problems of other large-scale employer data bases regarding geographical and industrial coding, clerical errors, and employer reporting mistakes. Errors of this type are extremely difficult to identify or measure without the use of costly employer validation visits. The MIT team developed an elaborate editing process which attempts to account for most of these deficiencies. However, an evaluation of the results of the MIT studies should take into account the nature of the D&B file and the problems inherent in constructing a history of nearly 6 million employers.

*Components of change.* The extent to which an area's job pool expands or contracts over time depends on the balance between those changes increasing the job pool—business births, expansions, and immigration—and those decreasing the job pool—business deaths, contractions, and outmigration. All of these events are occurring simultaneously in every labor market. For employment to increase over time, births, expansions, and immigration must be greater than those components causing employment decreases.

The following tabulation summarizes the percentage employment changes resulting from the different components of employment change. Data are averaged for all States during three periods. (The MIT project also produced similar data by neighborhood, city, Standard Metropolitan Statistical Area, region, and for individual States.)

	1969-72	1972-74	1974-76
Births . . . . .	5.6	5.5	6.7
Deaths . . . . .	5.2	4.5	5.7
Expansions . . . . .	4.7	5.3	4.4
Contractions . . . . .	2.9	2.6	3.4
Inmigration . . . . .	.1	.1	.1
Outmigration . . . . .	.03	.05	.01

This tabulation reveals several important characteristics of the employment change process. As noted, relocation is not significant, contrary to popularly held opinions. At the city level, migration of firms becomes more important, but its net effect on total employment remains insignificant when compared to the other factors. When firms move, they usually move short distances, as from an inner city to a suburb. Most of the observed firm outmigrations during 1969-76 were from New York City and Washington, D.C., to the surrounding suburbs.

The rates of job loss from business deaths and contractions are roughly the same from year to year. The

business death rates varied about 1 percent with the direction of the business cycle during the period of this study. This trend also holds at the State and city levels. The following tabulation compares the rates of employment loss and gain during the 1972-76 period for 10 metropolitan areas selected to demonstrate a variety of overall growth rates:

Area	Percent gain	Percent loss	Overall percent change
Houston . . . . .	62.7	35.7	27.0
Charlotte . . . . .	48.0	40.4	7.5
Dayton . . . . .	36.4	31.4	5.1
Rochester . . . . .	33.7	29.3	4.5
Boston . . . . .	37.4	33.7	3.8
Baltimore . . . . .	36.5	32.9	3.5
Hartford . . . . .	36.6	35.5	1.1
Worcester . . . . .	24.6	25.1	.5
New Haven . . . . .	27.0	29.5	-2.6
Greenville . . . . .	26.9	35.1	-8.4

Perhaps even more important than the relatively small range in employment loss rates is the fact that the job loss rates were generally greater in areas with the highest growth rates (that is, Houston and Charlotte). It is also interesting to note that the employment loss rate averages about 8 percent per year in most of the areas. Compounding that employment loss rate means that an area must replace about 50 percent of its jobs every 5 years to maintain its employment base.

Among the 10 metropolitan areas, the range of employment gain rates is almost 2½ times greater than the range of employment loss rates. The employment gain rates were, as might be expected, highest in the fast-growth areas. Generally, differences in employment growth rates are the result of variations in the employment gains from new firms starting up and existing firms expanding operations, rather than differences in employment losses resulting from layoffs, or from firms going out of business or migrating to other areas.

The Birch study indicates that an area must replace an average of 8 percent of its jobs every year to maintain a constant employment level. And, to expand its employment base, an area must obviously generate additional jobs. In Phoenix, for example, nonagricultural employment increased 2.9 percent, or from 613,000 to 631,000, in 1980. To attain that growth rate, the Phoenix economy actually had to generate approximately 66,700 jobs, of which almost 75 percent replaced job losses.

*Firm size and location.* Two-thirds of all net new jobs were created by firms with 20 employees or fewer, and about four-fifths were created by firms with 100 employees or fewer, according to the MIT model of 5.6 million businesses between 1969 and 1976. The results here are consistent with other research which found that,

**Table 1. Percent of net new jobs created and percent of total employment by firm size and region, 1972-76**

Region	Firm size				
	20 or fewer workers	21 to 50 workers	51 to 100 workers	101 to 500 workers	More than 500 workers
Northeast:					
Percent of net jobs created	177.1	6.5	-17.4	-33.3	-32.9
Percent of total employment	21.7	12.8	10.5	23.4	31.7
North Central:					
Percent of net jobs created	67.2	12.0	5.2	3.1	12.4
Percent of total employment	20.5	12.7	10.2	22.9	33.8
South:					
Percent of net jobs created	53.5	11.2	5.5	9.4	20.4
Percent of total employment	22.0	12.6	10.0	23.1	32.3
West:					
Percent of net jobs created	59.5	11.6	6.3	9.3	13.3
Percent of total employment	23.3	13.6	10.8	22.2	30.0

Source: David Birch, *The Job Generation Process*, mimeo (MIT Program on Neighborhood and Regional Change, February 1979).

over the last 10 years, small businesses created 3 million jobs, while the 1,000 largest firms recorded virtually no net gains in employment.<sup>5</sup>

In 1976, small firms accounted for only about 24 percent of the private-sector employment in the country, while registering 66 percent of the employment growth. Firms with over 500 employees account for about 27 percent of employment but only 13.3 percent of job generation. Firms in the middle range generated the least employment growth. The relatively strong job generating capacity of small firms must be interpreted in relationship to the behavior of larger firms, for growth in their proportion of total employment may indicate either an increase in employment in small firms or a decrease in employment in larger firms.

Table 1 shows that another important pattern of job generation is that the slower growth areas rely more heavily on smaller businesses to generate new jobs; larger firms generate a greater percentage of net jobs in the faster growth areas. Across regional lines, small firms are the major creators of new jobs. Between 1972 and 1976, firms with 50 or fewer employees generated basically all net new jobs in the Northeast, almost 80 percent in the North Central, and about two-thirds of the new jobs in the South and West. The distribution of overall employment by size of firm was roughly the same from region to region, but there were wide disparities in the percentage of jobs generated by size class. In the Northeast, all but the small establishments were actually net job losers during 1972-76.

*Age of firm.* Another distinguishing characteristic of job generators is their youth. According to the MIT model, about 80 percent of the replacement jobs are created by establishments which have been operating less than 4 years. This proportion is remarkably similar among regions.

*Percent of jobs created*

Years in business	North			
	Northwest	Central	South	West
Less than 4 . . . . .	75.5	80.8	80.4	80.9
5 to 8 . . . . .	10.4	8.4	9.9	8.8
9 to 12 . . . . .	7.5	6.0	5.1	5.5
13 or more . . . . .	6.6	4.8	4.6	4.8

The correlation between age and employment growth was also found in a California study of additions to employer payroll during the 1976-77 period.<sup>6</sup> This study concluded that small firms less than a year old had much higher rates of payroll accession than other firms, accounting for 4.4 percent of total employment and more than 11 percent of the total payroll accessions.

The use of age of business as a variable to study employment growth patterns is a characteristic unique to the D&B files. No other major employer data base contains the year that a business was started. (The California study compared unemployment insurance employer records over 5 calendar quarters to identify new firms and to track their subsequent movements.)

*Industry developments.* As would be expected, service-producing industries generated most of the new jobs. In fact, the service sector was responsible for virtually all of the employment growth during the 1972-76 period, increasing its share of total nonfarm employment from 67.9 percent to 70.6 percent. (This employment shift to service industries is also reflected in aggregate BLS data, shown in table 2.) Manufacturing firms in the MIT model actually generated no net new jobs, although certain high-technology industries showed strong employment growth. Service industries kept employment bases rela-

**Table 2. Employment of industry divisions characterized by large and by small establishments, and changes, 1974-80**

Industry	Employment (in thousands)			Average size of establishment, 1980	Percentage of total growth	Percentage employment change
	March 1980	March 1974	Change, 1974-80			
Total, private sector . . . . .	73,720	63,089	10,631	17	100.0	16.9
Small-establishment industries:						
Trade . . . . .	20,068	16,537	3,531	13	...	21.4
Finance, insurance, and real estate . . . . .	5,090	4,107	983	13	...	23.9
Services . . . . .	17,636	13,191	4,445	13	...	33.7
Construction . . . . .	4,087	3,878	209	18	...	5.4
Total . . . . .	...	...	9,168	12	86.2	...
Large-establishment industries:						
Manufacturing . . . . .	20,722	20,027	695	62	...	3.3
Mining . . . . .	990	665	325	32	...	32.8
Transportation and public utilities . . . . .	5,127	4,684	443	27	...	9.5
Total . . . . .	...	...	1,463	49	13.8	...

Source: U.S. Bureau of Labor Statistics.

tively stable in many areas where manufacturing industries were incurring severe losses.

Job generation is a cheaper, simpler process in the less capital-intensive service industries. There are few barriers to entry by new firms in most of this sector. Because many of the industries provide “custom designed” products, their production tends to be quite labor-intensive. The demand for business, health, and personal services has risen dramatically and is reflected in the number of new jobs.

*Corporate structure.* Job creation patterns are strongly affected by the corporate structure of the generating firms. Job creation resulting from the birth of new establishments increasingly reflects the branching activities of existing firms. The share of employment created by branching activity increased from approximately 50 percent to over 70 percent in all regions between 1974 and 1976. However, after having established branches, corporations are less likely to expand them. The majority of expansion growth is accounted for by independent firms, that is, firms having no branches or subsidiaries. The following tabulation shows percentage employment gains by region and type of establishment during 1974–76:

	<i>Births</i>			
	<i>Independent</i>	<i>Headquarters</i>	<i>Subsidiary</i>	<i>Branch</i>
Northeast . . . .	23.6	2.0	1.4	72.0
North Central . .	19.9	1.4	1.1	77.6
South . . . . .	25.2	1.6	1.4	71.7
West . . . . .	24.0	1.7	1.1	72.2

  

	<i>Expansions</i>			
	<i>Independent</i>	<i>Headquarters</i>	<i>Subsidiary</i>	<i>Branch</i>
Northeast . . . .	58.2	21.1	6.7	14.0
North Central . .	54.5	20.9	5.0	19.6
South . . . . .	54.2	17.4	5.7	22.7
West . . . . .	56.9	22.2	4.6	16.3

Independent firms accounted for about 20 to 25 percent of the employment gained by births of new firms and 50 to 60 percent of the employment gained by expansion of existing firms between 1974 and 1976. Overall, independent firms accounted for about one-half of the total jobs created during the 1974–1976 period. These trends in job generation by corporate structure are quite consistent from region to region but do vary by industry. Independents play a more important role in trade and services—the growing sectors of the economy. Branching tends to be more important in manufacturing industries. It is also noteworthy that more than 65 percent of all manufacturing jobs generated in the South were in branches controlled by corporations headquartered in other parts of the country, mainly the Northeast and North Central sections. By 1976, branches accounted for roughly 40 percent of all job re-

placement activities in the South, and an even greater share in manufacturing.

### The Brookings Microdata Project

The Brookings Institution used the United States Establishment and Enterprise Microdata files, developed by the U.S. Small Business Administration, to examine the components of employment change between 1978 and 1980. These files are basically updates of the D&B files used by Birch. The major conclusions from the Brookings project:

- Between 1978 and 1980, 55 percent of the net employment growth was in establishments with fewer than 20 employees. About 78 percent of the net 1978–80 growth was in establishments with under 100 workers.
- Approximately one half of this employment growth represents branching or establishment of subsidiaries by large firms.
- Small independent firms generate new jobs at a rate about equal to their proportion of total employment.
- The proportion of employment growth accounted for by these small firms increases in regions and industries with declining employment, and decreases in regions and industries with expanding employment.

The Brookings analysis of employment growth between 1978 and 1980 both differs from and confirms some of Birch’s major hypotheses regarding the behavior of small business. Both studies confirm the turbulent job generating behavior of establishments with fewer than 100 employees. However, it should be noted that the studies differ as to how to classify small branches of larger firms. The Brookings project, for the most part, excludes these establishments from the discussion of small business behavior.

Like the MIT study, the Brookings project also emphasizes the importance of examining small business behavior relative to the performance of larger firms. Finally, the Brookings project introduces a more recent data source for the study of the job generation process—the 1978 and 1980 United States Establishment and Enterprise Microdata files.

### The University of California study

The study by the University of California Institute of Urban and Regional Development used individual employer records from the mandatory unemployment insurance system to analyze the job generation process. The study, directed by Michael Teitz, was based on records for a sample of just over 25,000 California employers from the 1975–79 period. The Teitz study differed from the MIT project in terms of sample size, geographic coverage, reference period, and data source. However, the results are remarkably similar to those noted by Birch.

- During 1975–79, establishments with fewer than 20 employees accounted for 56 percent of the net gains in employment. (Birch estimated that such firms contributed about two-thirds of the net job gains.)
- Firms less than 2 years old accounted for a much greater share of the net employment growth than older firms.
- More than 90 percent of the net new jobs in the young, small firms were in the nonmanufacturing sector.
- Job losses resulting from layoffs and from firms going out of business or undergoing ownership changes varied by size class. Teitz found that at least 7 percent of jobs existing in companies with fewer than 10 workers at the beginning of their second year of business had disappeared by the third year. This is in line with Birch's estimated overall job loss rate of about 8 percent per year. In general, Teitz noted an even greater degree of volatility—alternating periods of expansion and retrenchment—in the job generation process than did Birch.

The Teitz study provides some other interesting observations on the job generation process. In particular, Teitz found that, while small new firms dominated the job creating process, most of the new employment growth was concentrated in a small percentage of these firms. He also concluded that, in the California manufacturing sector, larger firms are the major generators of net new jobs.

The Teitz study is important in several respects. First, it introduces another data source—the administrative records of the unemployment insurance system—which may be used to build a history of individual employers. While these data are affected by the same general types of problems faced by users of the D&B file, Teitz's discussion and treatment of these problems should help other analysts of the unemployment insurance micro data. Secondly, the study tends to confirm some of the provocative conclusions of the Birch study regarding the nature of the job generation process. Perhaps just as importantly, Teitz's study provides more documentation on how the quality of labor market information can be improved by examining the individual employer data. Finally, Teitz introduces an interesting concept regarding the concentration of employment growth in a relatively few small firms. Further study of this characterization of the job generation process should be an important part of any effort to develop improved job generation strategies.

### **The future of micro research**

In coming years, at least three major sources of individual establishment data will be available to the policy analyst: the D&B data base; unemployment insurance rec-

ords; and the U.S. Department of Commerce's Standard Statistical Establishment List. Each source has its respective strengths and limitations for breaking down and analyzing macro labor force movements. Each of these important data bases is the byproduct of an administrative record keeping system which was not designed for time series analysis. The characteristics of the D&B file, the basis for the MIT and Brookings studies, were described above in conjunction with the discussion of the MIT project.

The second major employer micro file is administered at the State level by the State Employment Security Agencies, and at the national level by BLS. The State agencies maintain micro files of all employers covered by unemployment insurance (UI) laws. (The California UI micro file was the basis for the Teitz study.) For the first calendar quarter of the year, each State Employment Security Agency submits to BLS a tape containing the name, account number, address, SIC code, 3 months of employment data, and total quarterly wages of each UI-covered establishment. This information serves as the sampling frame for most of the major BLS surveys. The UI universe file, in contrast to the D&B file, represents an almost complete census of nonagricultural firms and is updated on an annual basis.<sup>7</sup>

As previously indicated, the analytical use of the D&B file currently is limited by its noncomprehensive nature, a weakness in accounting for new births, the quality of the SIC coding, and the irregular updates of employer information. The D&B file has also been subject to irregular changes in file maintenance procedures which makes the development of a longitudinal data base even more difficult. These problems are, for the most part, handled better by the UI universe file. The major weaknesses of the UI file for micro analysis involve the difficulties in maintaining series continuity, determining employer affiliations, and identifying and breaking out the employment of multi-establishment firms.

A third major employer file, the Commerce Department's Standard Statistical Establishment List (SSEL), is currently being developed from various Census Bureau, Internal Revenue Service, and Social Security Administration records. The SSEL, when complete, will include all known multi- and single-establishment employers. Most data will be updated on an annual basis. The SSEL will be particularly strong in the breakout of multi-establishment employment.

Preliminary indications are that improvements in economic analysis could be achieved by coordinating the efforts of the MIT and Brookings project, and from the continued refinement and development of the UI and SSEL files. At the moment, however, most reconciliation work is hindered by the need to maintain confidentiality of employer responses to government surveys. Legislation is currently being developed by the U.S. Depart-

ment of Labor to permit sharing of statistical information among data bases under procedures which would safeguard the confidentiality of responses, when this sharing is feasible. Each file could then serve, at a minimum, as a quality control check for the other files in

terms of employer location, size, and industrial activity. Eventually, the attributes of these files might be combined to build an employer data base that would significantly improve the ability to trace the process of job creation. □

——— FOOTNOTES ———

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<sup>1</sup> This legislation was passed by Congress on July 12, 1982, and is awaiting Presidential signature. See, "A Battle over R&D Funding," *The Washington Post*, Feb. 18, 1982, p. A22.

<sup>2</sup> Various aspects of the MIT project are discussed in David Birch, *The Job Generation Process*, mimeo (MIT Program on Neighborhood and Regional Change, February 1979); *Choosing a Place to Grow: Business Location Decisions in the 1970's*, mimeo (January 1981); *Corporate Evolution: A Micro-Based Analysis*, mimeo (January 1981); and David Birch, "Who Creates Jobs," *Public Interest*, Fall 1981, pp. 3-14.

<sup>3</sup> Michael B. Teitz, *Small Business and Employment Growth in Cali-*

*fornia*, mimeo (Berkeley, Calif., Institute of Urban and Regional Development, University of California, March 1981).

<sup>4</sup> Catherine Armington and Marjorie Odle, *Sources of Employment Growth 1978-1980*, mimeo (Washington, Business Microdata Project, The Brookings Institution, March 1981).

<sup>5</sup> Stanley Pratt, editor of *Venture Capital Journal*, in "Striking It Rich," *Time*, Feb. 15, 1982, p. 36.

<sup>6</sup> State of California Employment Development Department, *Employment Service Potential, Volume I, The Dimensions of Labor Turnover* (September 1979), p. 111.

<sup>7</sup> BLS is initiating a comprehensive evaluation of the UI name and address files that will yield significant improvements in their utility for economic analysis.

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#### A note on communications

The *Monthly Labor Review* welcomes communications that supplement, challenge, or expand on research published in its pages. To be considered for publication, communications should be factual and analytical, not polemical in tone. Communications should be addressed to the Editor-in-Chief, *Monthly Labor Review*, Bureau of Labor Statistics, U.S. Department of Labor, Washington, D.C. 20212.

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