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**BUSINESS DEMOGRAPHICS: MEASURING JOB CREATION AND JOB
DESTRUCTION DYNAMICS UNDERLYING NET EMPLOYMENT CHANGE**

Invited paper submitted by the United States Bureau of Labor Statistics*

Summary

One of the most watched economic indicators in the United States is the change in non-agricultural payroll employment. The change in this monthly number can move the stock market and affect interest rate decisions. Yet this number provides only a net change in the number of jobs from month to month. New measures derived by the Bureau of Labor Statistics (BLS) will provide a deeper understanding of the employment decisions of the 8 million business establishments in the private, non-agricultural U.S. economy. These measures provide new information on jobs created and jobs lost, or destroyed.

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Businesses can go through a series of events that define their role in the economy. Constructing new data series demand a thorough review of the ways businesses grow and contract. Businesses open their doors, close, they can reopen, buy and sell all or parts of their work. They can also close forever. The most difficult part of developing these new data is determining when each of these events occur, deciding how to treat each type of event, and then maintaining the reliable use of these decision rules over time. Some of these changes are administrative in nature—such as a change in ownership—that may not meaningfully change the industry, geography, employment or earnings of that business establishment. Similar cases include mergers and consolidations of all or part of a business. We account for these changes because no real economic activity has occurred, and otherwise we would overstate the churning in the economy.

A multi-step process was developed to link business establishments so that we can more accurately measure the level of underlying economic churning. The linkage process consists of three matching procedures: an administrative match, a probability-based weighted match, and an analyst intervention match. This linkage process allow us to more accurately measure the components of the churning underlying net employment changes at the establishment level, without confusing normal administrative and ownership changes.

Business demographics will help economists, policy makers, and business leaders better understand how the labor market works. By decomposing the net change of employment and examining the forces of job creation and job destruction, users can better understand the role of business openings and closings, as well as business expansions and contractions and their overall contribution to economic growth.

At the national level, policy analysts will be able to investigate business cycle traits, looking for factors and trends that contribute to or are characteristics of a recession or a recovery. At the local level, economic development agencies will be able to enhance business inception strategies for key industries that may be affected by these underlying trends.

The data presented in this report are part of a research study underway at BLS, and should not be considered as official data. The quarterly data presented in this paper cover the period from 1998 through the second quarter of 2002.

I. INTRODUCTION

1. One of the most watched economic indicators in the United States is the change in non-agricultural payroll employment. The change in this monthly number can move the stock market and affect interest rate decisions. Yet this number provides only a net change in the number of jobs from month to month. New measures derived by the Bureau of Labor Statistics (BLS) will provide a deeper understanding of the employment decisions of the 8 million business establishments in the private, non-agricultural U.S. economy. These measures provide new information on jobs created and jobs lost, or destroyed. In essence, job creation is the gain in employment resulting from openings and growing establishments. Job destruction is the loss of jobs from closings or declining establishments. The net change in employment in the nation or state in a particular industry is the result of four major components:

- **Openings** of business establishments
- Existing business establishments **expanding** their employment
- Existing business establishments **contracting** their employment, and
- **Closings** of business establishments

2. Examining the four components of net employment change at the establishment level allows economists and policymakers to ask and answer questions that were previously unknown. For example: How do business openings and closings behave throughout the business cycle? What are the dynamics of a recovery? What is a better economic growth policy: maximizing job creation or minimizing job destruction? What industries create and destroy the most jobs? What are the characteristics of a healthy labor market? These are just a sample of some of the questions that can be addressed using the new business demographics data that will help us understand the driving forces behind the net employment change and understand how the pace of job creation and job destruction affects the business cycle.

3. In the next section, we take a closer look at the source data used to generate business demographics. We then explain the rationale for linking establishment records longitudinally and examine the linking methodology. Then, we lay the foundation for defining business demographics by examining the concepts and definitions of job creation and job destruction. In the following section, we examine the uses and users of business demographics. Following that, we broadly examine the new research data for the U.S. covering the past five years and comment about the current business cycle. Lastly, we describe the future of business demographics at the BLS.

II. SOURCE DATA

4. The source data for business demographics is the quarterly unemployment insurance tax reports submitted to State Employment Security Agencies by employers subject to state unemployment insurance (UI) laws. These quarterly reports are submitted to the Bureau of Labor Statistics (BLS) as part of the Covered Employment and Wages Program (ES-202), a federal-state cooperative program. The state reports provide a comprehensive set of information about each business establishment. This includes the establishment's name,

location (county code and physical location address), industry classification (NAICS), monthly employment during the quarter, total quarterly wages, ownership (public or private), known relationships with other establishments (predecessor or successor establishments), federal employer identification number (EIN), unemployment insurance (UI) number, reporting unit number (RUN), along with other administrative data. These administrative records are a quarterly census of nonagricultural employees and cover approximately 47 percent of all workers in agricultural industries. Major exclusions from UI coverage are self-employed workers, most agricultural workers on small farms, all members of the Armed Forces, elected officials in most states, most employees of railroads, some domestic workers, most student workers, and employees of certain small nonprofit organizations. In 2002, the states provided quarterly unemployment insurance tax reports for 8 million establishments representing 129 million employees.

III. LINKAGE METHODOLOGY

5. Businesses can go through a series of events that define their role in the economy. Constructing new data series demand a thorough review of the ways businesses grow and contract. Businesses open their doors, close, they can reopen, buy and sell all or parts of their work. They can also close forever. The most difficult part of developing these new data is determining when each of these events occur, deciding how to treat each type of event, and then maintaining the reliable use of these decision rules over time.

6. For example, one approach to measuring business openings is to count the number of establishments and their employment that show up for the first time. This approach is extremely simple, yet it would not account for businesses that are essentially the same but have been changed for a variety of reasons that result in an administrative change. For example, a change in ownership of a business may not meaningfully change the industry, geography, employment or earnings, such as merely changing ownership of a restaurant. To consider this a “death” and a separate “birth” would overstate the churning in the economy. Similar cases include mergers, consolidations of all or part of a business, and other administrative changes.

7. Treatments or adjustments are considered necessary to address such situations. Also, each methodology carries strengths and weaknesses and will have a certain effect on the calculated data. BLS is reviewing the methods described below and the profile of economic activity that they present. It is reasonable that modifications and improvements will be identified and implemented over time, somewhat changing the results of establishment openings and closings. Thus, the data presented here are the result of the existing administrative processes in each of the states, as well as the subsequent additional linkage processes and analyst reviews at the BLS.

8. Another methodological issue is the timeliness of the linkage information. Most of the predecessor/successor relationships are self-identified through the individual states’ UI processes. However, these self-identified links may flow over a period of time, thus business demographics data constructed at any point in time may miss some links. Research on the extent and magnitude of such delayed links is underway. Correctly identifying all links in

such a dynamic economy will no doubt prove impossible. It is safe to state that correctly identifying all such links across a very dynamic economy is impossible, thus these measures will likely somewhat overstate business births and deaths. Further research and data review may be able to estimate some components of these errors.

9. A multi-step process was developed to link business establishments so that we can more accurately measure the level of underlying economic churning¹. The linkage process consists of three matching procedures: an administrative match, a probability-based weighted match, and an analyst intervention match. First, the administrative match links records by the unemployment insurance (UI) number in combination with its reporting unit number—referred to as a State Employment Security Agencies' identification number (SESA-ID)—and its predecessor and successor identification numbers. Most of the records are linked via the SESA-ID. For those that are not, a match is made using an establishment's predecessor and successor identification number. The predecessor number is the SESA-ID of the establishment that previously owned the given establishment (in the event of a change in business ownership or reporting structure). A successor number is the SESA-ID of the establishment that has taken over the given establishment (in the event of a change in business ownership or reporting structure). The quality of the administrative records is very good, allowing us to link approximately 96 percent of the records as continuous units, depending upon the business cycle.

10. Second, a probability-based weighted match process focuses on the remaining 4 percent of the records and links about one-half of one percent of those. The probability-based weighted match, based on the work of Ivan P. Fellegi and Alan B. Sunter, calculates the probability that a variable's value agrees at random with a given set of variables (exact trade name and exact street address; phone number; ZIP code and EIN; etc.). If the probability that the variable's values agree at random with a given set, then a match is assigned. Then, as a final step, analysts review selected large unmatched records as a quality control standard. Matches that were missed by the probability-based weighted match are linked through analyst intervention (approximately two-tenths of one percent of the records is linked). This linkage process allow us to more accurately measure the components of the churning underlying net employment changes at the establishment level, without confusing normal administrative and ownership changes.

IV. CONCEPTS AND DEFINITIONS

11. Net employment change is a comparison of cross-sectional employment at two points in time: simply the difference in the number of jobs existing in the latter period compared with the previous period. While the net employment change is a useful tool for identifying the overall health of the labor market, it does not answer the question of how that change occurred. To better understand net employment change, it is important to examine the forces beneath the underlying change. The net employment change measured at the establishment level allows us to produce these gross job flow estimates.

12. Gross job flows represent the extent of the job reallocation process and measure the job gains and loses at the establishment level. A net increase in employment can result from

either opening establishments or expanding establishments. A net decrease in employment can result from either closing establishments or contracting establishments.

13. We define a business establishment as an economic unit that produces goods or services and is engaged in one or predominantly one economic activity (represented by a NAICS code). An establishment is generally a single physical location, where business is conducted or services or industrial operations are performed (for example, a factory, mill, store, hotel movie theatre, mine, farm, airline terminal, sales office, warehouse, or central administrative office). BLS is using the establishment concept for its data at this time. Potential improvements in the file may allow calculating similar statistics at the firm or enterprise levels.

14. We formally define establishment-level employment changes as follows:

15. **Openings** are either establishments with positive third month employment for the first time in the current quarter or with positive third month employment in the current quarter following zero employment in the previous quarter. This definition includes establishments that may close for a short time and then reopen, such as for highly seasonal businesses. A business establishment birth is a subset of openings and is defined as an establishment for which no predecessor in any previous period is identified that achieves nonzero employment for the first time.

16. **Expansions** are establishments with positive employment in the third month in both the previous and current quarters, with a net increase in employment over this period.

17. **Closings** are either establishments with positive third month employment in the previous quarter, with no positive employment reported in the current quarter, or with positive third month employment in the previous quarter followed by zero employment in the current quarter. A business death is a subset of closings and defined as an establishment that over some period of time either ceases reporting with no successor identified or decreases employment to zero and does not resume operations (report positive employment) for the subsequent four quarters.

18. **Contractions** are establishments with positive employment in the third month in both the previous and current quarters, with a net decrease in employment over this period.

19. All establishment-level employment changes are measured from the third month of each quarter. Not all establishments change their employment levels; these establishments count towards estimates of total employment, but do not affect estimates of job creation and job destruction.

20. Job flows 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. Job flow rates can be added and subtracted just as their levels can. For instance the difference between the job creation rate and the job destruction rate is the net growth rate. Job flow estimates are calculated for the private sector only and record employment changes between the third month of each quarter.

21. The scope for these data is limited to the private, nonagricultural sector excluding private households and data from Puerto Rico and the Virgin Islands.

V. MAGNITUDE AND CYCLICALITY OF JOB CREATION AND JOB DESTRUCTION IN THE U.S.

22. The U.S. economy is in a state of constant restructuring. This process allows ideas to be tested in the marketplace and meet the unknown needs and wants of consumers. But as a result, some producers find that their ideas are rejected in the marketplace and must adapt. They adapt by restructuring the way they operate, adjusting their labor and capital inputs, and once again, testing their new ideas in the marketplace. Some business establishments are successful at adapting and survive this grueling process of meeting the needs and wants of consumers. Others do not, and are forced to exit the marketplace. This process of constant restructuring can be illustrated using business demographic data.

23. Previous studies, see Davis and Haltiwanger (1992), Anderson and Meyer (1994), Pivetz, Searson and Spletzer (2001), document how individual business establishments adjust their workforce in response to supply and demand shocks. These studies identify “stylized facts” about how micro-level based decisions can be aggregated to form macro-based statistics such as job creation and job destruction. These studies have mainly focused on measuring job flows in terms of their magnitude, cyclicality, persistence, and distribution (geographically or industrially). We will focus on measuring the magnitude and cyclicality of job flows in the U.S. Previous research has found that the magnitude of job flows is substantial during all phases of the business cycle and that job reallocation is counter-cyclical. In other words, jobs may be easier to destroy but are harder to create; hence, job destruction fluctuates more over the business cycle than job creation².

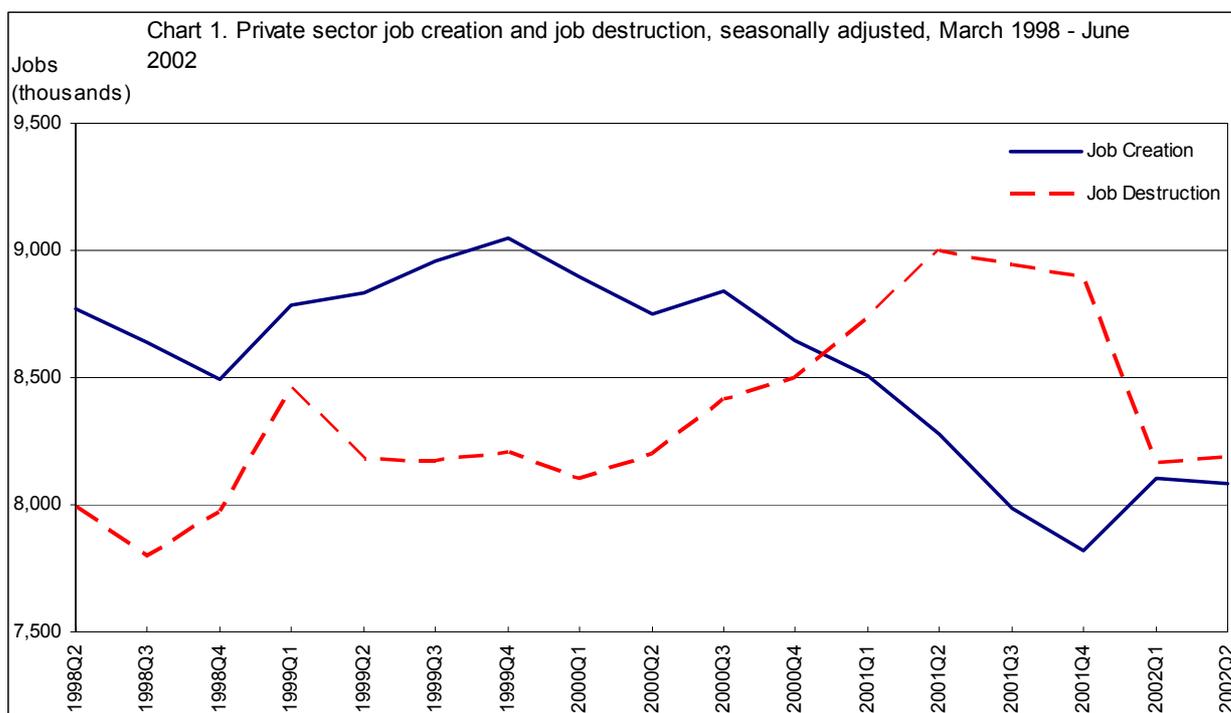
24. The data presented in this report are part of a research study underway at BLS, and should not be considered as official data. The quarterly data presented in this paper cover the period from 1998 through the second quarter of 2002.

25. Below we illustrate the magnitude and cyclicality of job creation and job destruction in the U.S. economy (Chart 1).

26. Job creation peaked in the last quarter of 1999 and began a steady decline throughout 2000. This decline continued over the second and third quarters of 2001, and reached a trough of in the fourth quarter. In the first two quarters of 2002, job creation increased, but only slightly. Job destruction reached a low-point in the first quarter of 2000 and began a steady increase throughout the rest of the year. Job destruction reached a peak in the second quarter of 2001 and remained near this level for the remainder of the year. In the first two quarters of 2002, job destruction dropped sharply, comparable to 1999 levels.

27. The seasonally adjusted trends of job creation and job destruction indicate several major turning points, and one major crossing point, between March 1998 and June 2002. Job creation peaked in late 1999 and job destruction troughed in early 2000, which are

approximately one year before the crossing point for these two series. By the first quarter of 2001, job destruction outpaced job creation, leading to negative employment growth.



28. Job destruction reached a peak by June of 2001, but job creation continued to decline until December 2001. The two trends seemed to stabilize in the first half of 2002. While job destruction was near its historical levels, job creation remained well below its previous levels.

VI. USES AND USERS

29. Business demographics will help economists, policy makers, and business leaders better understand how the labor market works. By decomposing the net change of employment and examining the forces of job creation and job destruction, users can better understand the role of business openings and closings, as well as business expansions and contractions and their overall contribution to economic growth.

30. At the national level, policy analysts will be able to investigate business cycle traits, looking for factors and trends that contribute to or are characteristics of a recession or a recovery. At the local level, economic development agencies will be able to enhance business inception strategies for key industries that may be affected by these underlying trends.

VII. THE FUTURE OF BUSINESS DEMOGRAPHICS AT BLS

31. The BLS has invested several years developing the databases, the linkage methodologies, and the tabulations previewed here. When the methodologies are fully reviewed, BLS expects to begin publishing these data on a quarterly and annual basis. Data for states and smaller geographic levels are also possible, although confidentiality restrictions will determine how much detail can be published. Extensions of the data derived from this program include industry survival rates.

NOTES

¹ Pivetz, Searson and Spletzer, «Measuring Job and Establishment Flows with BLS Longitudinal Micodata», *Monthly Labor Review*, Vol. 124, No. 4, April 2001, pp. 13-20.

² Bingley, Eriksson, Werwatz, “Beyond ‘Manucentrism’—Some Fresh Facts about Job and Worker Flows,” Working Paper 99-09, Centre for Labour Market and Social Research, October 1999, p. 12.

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