Characteristics of Survival: Longevity of Business Establishments in the Business Employment Dynamics Data: *Extensions*   December 2006

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ABSTRACT

In the article, "Survival and Longevity in the Business Employment Dynamics Data," (Monthly Labor Review 2005) Amy Knaup shows that about 60 percent of business establishments that opened in second quarter of 1998 were still in existence 24 months later. The article also examined many other interesting aspects of firm survival, including the characteristics of opening establishments by industry, location, employment levels, ownership status, and their survival rates.

The goal of this paper is to re-examine the characteristics of establishment survival for the period of 1998-2004 using the BLS Longitudinal Database (LDB). The LDB is a relational database of 8.7 million business establishments linked longitudinally based on the micro-data submitted quarterly by States from Unemployment Insurance (UI) tax files. Data elements on these files include information on monthly employment, quarterly wages, and other administrative data. Every business establishment on the database contains a unique identifier that allows for tracking of individual establishments at the micro-level across quarters for the United States.

Keywords: Establishment Survival, Quarterly Census of Employment and Wages

INTRODUCTION

The study of survival analysis is an important topic in understanding the economic and business environment. This study is an extension of previous survival research done by Knaup (2005)[i], examining survival rates of a cohort of establishments for a four year period. In this study, the same cohort in Knaup (2005) is extended an additional three years to create a seven year survival analysis.

DATA

The data that follow are from the BLS Quarterly Census of Employment and Wages (QCEW) program, which has information on 8.7 million establishments in both the public and private sector. These monthly data are compiled on a quarterly basis for State unemployment insurance tax purposes and are edited and submitted to the Bureau of Labor Statistics. A Federal-State cooperative venture between the Bureau and the State Workforce Agencies, the QCEW program collects information from approximately 98 percent of nonfarm payroll businesses in the United States. The program serves as the sampling frame for BLS establishment surveys and is used to generate gross job flows in the Business Employment Dynamics (BED) data series. The QCEW program also publishes timely employment and wage data at the county level for detailed industries. In addition, outside researchers use the QCEW microdata to investigate topics in the field of labor economics, and it is an input to BEA's personal income accounting.

In order to construct a longitudinal database, BLS analysts link the data across quarters, using unique identifiers to track establishments even when their ownership changes. The QCEW program has linked data from the first quarter of 1990 through the most current quarter; the data usually are available 6 months after the end of the reference quarter. The coverage and frequency of the data are unique in the Federal statistical system in that they allow tracking of the start-up, growth, and failure of a particular establishment concurrently with the timing of those events. The program contains establishment-level data (that is, data relating to a specific location); therefore one can observe the characteristics of each establishment, such as its state, county, industry, age, and number of employees.

The BED data series takes advantage of the QCEW's microdata by calculating gross job flows. BED data reveal the high level of employment changes each quarter due to openings, closings, expansions, and contractions of businesses. These four categories illustrate the vast number of business and employment changes that contribute to the overall net change in employment. The job-openings data from the BED constitute a broad category of new businesses that consists of both establishments that are born and establishments that are reopening, including establishments that open on a seasonal basis. The BED data portray quarter-to-quarter comparisons of establishments that are changing, but do not indicate how a consistent set of businesses changes over the quarter. The analysis in this article is different in that it follows a carefully selected cohort of establishments from birth through seven years of their lifetime.[ii]

Births are defined as those establishments which are new in the relevant quarter. Births had no positive employment for the previous four quarters. The data are tested for four quarters prior to the relevant quarter, to prevent seasonal establishments and establishments reopening after a temporary shutdown from showing up in the birth cohort. Furthermore, these new establishments have no ties to any

establishment(s) that existed prior to the relevant quarter. Thus, this approach eliminates changes in ownership from the cohort, as well as new locations of existing firms that might be expected to behave differently from independent establishments. Another reason for not including new locations of existing firms is that they often represent administrative changes in the data rather than actual new locations. To include them would risk skewing the data in terms of both rates of survival and average employment. This study tracked the original 212,182 new establishments across the nation for the second quarter of 1998.

In the original study, births were tracked across 16 quarters from March 1998 through March 2002 and in this study these establishments were tracked an additional 12 quarters from March 2002 to March 2005, creating a seven year survival study. In subsequent quarters, establishments are allowed to be acquired or merged with another firm, to spin off a subsidiary, or to open additional locations. Establishments that were involved in such succession relationships (0.16 percent of the cohort, or 341 establishments) were also tracked across time by following the succeeding establishments. The data on these succeeding establishments were aggregated and assigned a unique identifier that was linked to the original birth establishment. Doing so ensured that no data were lost regarding those establishments which, presumably, were the most successful.

Two-digit NAICS codes were used to group the establishments into 10 sectors: natural resources (NAICS codes 11 and 21); construction (23); manufacturing (31–33); trade, transportation, and utilities (22, 42, 44–45, 48–49); information (51); financial activities (52–53); professional and business services (54–56); education and health services (61–62); leisure and hospitality (71–72); and other services (81). A small percentage (0.02 percent) of establishments that do not have a NAICS industry classification over their lifetime was excluded from the sector analysis. This 10-sector grouping facilitates comparisons of survival rates between industry sectors, as well as comparisons between employment contributions in the initial quarter and over the subsequent 4 years. In the latter regard, average employment in the initial quarter is compared with average employment in subsequent quarters, as well as with the highest employment attained by an establishment, on average, during the 7 years in question. That is, for each industry sector, peak employment, which can be attained by an establishment in any quarter of the given period, is compared with average initial employment.

RESULTS

Across all sectors, the cohort has a survival rate of 44 percent in the fourth year (the end of the previous study) compared to 31 percent in the seventh year. (See Figure 1). This does not deviate from the previous study in that the largest exit of establishments occurred during the first and second years, and after the fourth year the percentage of establishments that exited the cohort slowed considerably. This shows that after four years, the survival rate is decreasing, albeit at a slower rate, and after seven years, a third of all establishments were still in businesses.

Looking at Figure 1, one can see a smoothing of the curve and a dramatic decrease in surviving establishments in the first four years, while the survival rate in years 5-7 decreases in relation to the previous four years. Looking at the survivor rates of the previous year survivors indicates the survivor rates between years. In the first 4 years an average of 81 percent of establishments survived out of the previous year survivors, while after the fourth year, survival of surviving establishments increase to 91 percent in the 7th year. This is the pattern that was expected by the authors when they began their work, and having more data verifies this hypothesis.

Individual industries behaved in a similar manner, whereby the majority of exiting establishments occurred during the first two years and slowed as the cohort was extended. (See Figure 2a and 2b). A pattern forms across industries of their survival rates in relation to the overall survival average. Industries that began with below average survival rates continue to be below the average, and those that began at the average survival rates continue to have survival rages at the average survival rate through the entire period. The same holds true for industries that were above the average survival rate.

Analyzing this survival study by sector shows that (similar to the previous study) the information sector had the lowest 2- and 4-year survival rates, 63 percent and 38 percent respectively; and this trend continued with the information sector having the lowest 6-year survival rates at 28 percent and the lowest 7-year survival rate at 25 percent. (See Figure 2a and 2b). Education and health services continued to have the highest survival rates with a 6- and 7- year survival rates of 45 percent and 42 percent. Restaurants are classified under the Leisure and hospitality sector, which one might assume would have lower survival rates than the average in the cohort, but through seven years, this sector maintains survival rates that are close to the survival rates of the at large cohort. In addition, one might suspect manufacturing to have lower than average survival rates, but according to data shown here, the survival rates are similar to the average.
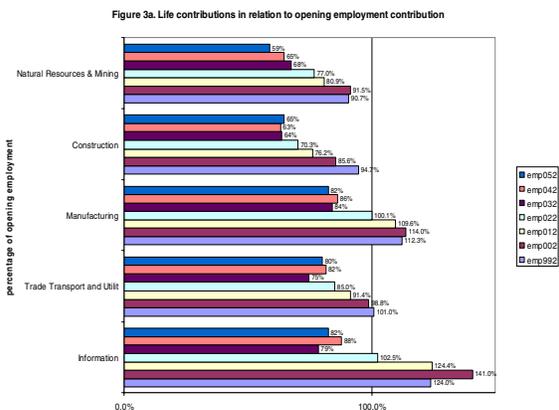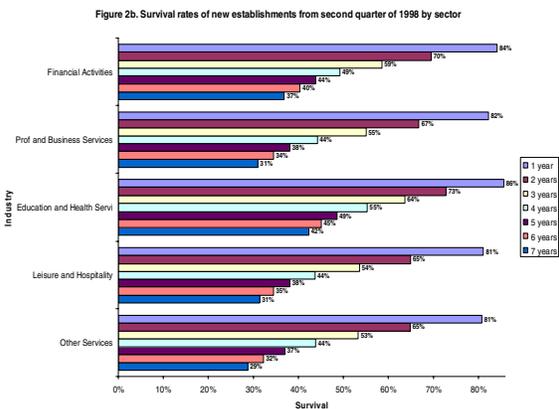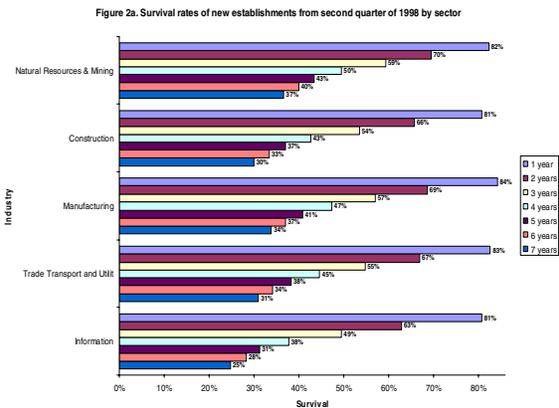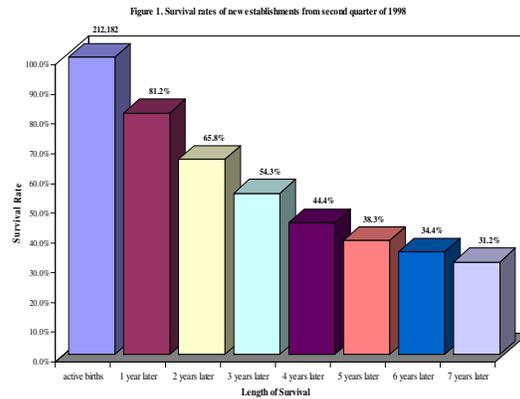
The employment of the surviving establishments in the cohort reveals that as firms continue to exist, their employment grows. The average initial employment by sector in comparison to the average peak employment at the end of the original study at 4 years and at 7 years shows growth in employment in all sectors. (See Table 1). The increase in average employment reinforces the finding that surviving establishments in this cohort, on average, increase employment as they age (Table 2).
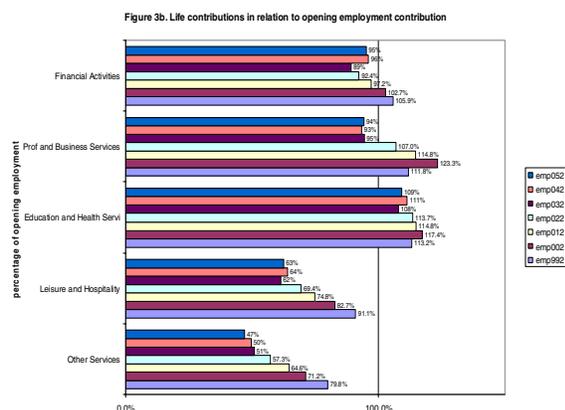
Variance in employment growth contrasts with the fairly stable establishment survival rates. One can see the life contributions of employment in relation to opening contributions, and that employment drops significantly after the fourth year, but remains around the fifth year level for most sectors (See Figure 3a and 3b). With this information, the previous discussion about the manufacturing industry survival rates may bring more insight. Even though the manufacturing sector has average survival rates, employment stays above the initial employment until the 4th year when it returns to 1998/2 level.

CONCLUSION

Patterns from the original study by Knaup (2006) show similar findings by extending the cohort to a seven year study in this research. Survival rates in the extension demonstrate that survival rates decrease at a decreasing rate. Sectors that had above average survival rates, also continued to have above average survival rates, and those that had below average survival rates continued to have above average survival rates. More importantly, businesses that manage to survive grow, and increase employment as tenure increases. This shows that even as establishments exit the cohort, the increase in hiring by surviving establishments produces job growth needed in the economy. Continued research in survival analysis by industry and size class may provide insights into the U.S. labor market, and could potentially yield a predictive model for establishment survival.

APPENDIX: FIGURES AND TABLES

Figure 1. Survival rates of new establishments from second quarter of 1998

Figure 2a. Survival rates of new establishments from second quarter of 1998 by sector

Figure 2b. Survival rates of new establishments from second quarter of 1998 by sector

Figure 3a. Life contributions in relation to opening employment contribution

Figure 3b. Life contributions in relation to opening employment contribution

[i] Knaup, Amy, E. "Survival and Longevity in the Business Employment Dynamics Data." <u>Monthly Labor Review</u>. May 2005. 50-56.
[ii] For a discussion of the BED data series, see James R. Spletzer, R. Jason Faberman, Akbar Sadeghi, David M. Talan, and Richard L. Clayton, "Business Employment Dynamics: new data on gross job gains and losses," Monthly Labor Review, April 2004, 29–42.

TABLE 1:
Contributions to initial employment, average initial employment, and average peak employment, by sector

NAICS Supersector	Employment in 1998/2	Average Initial Employment	Average Peak Employment (4 year peak)
Natural Resources and Mining	21,809	6.8	21.3 (14.8)
Construction	98,750	3.6	12.3 (8.1)
Manufacturing	45,670	6.2	21.8 (14.0)
Trade, Transportation, and Utilities	139,125	3.3	11.5 (6.7)
Information	17,794	4.7	25.6 (14.6)
Financial Activities	45,098	3.0	10.5 (6.4)
Professional and Business Services	137,908	3.4	16.6 (9.0)
Education and Health Services	57,068	4.9	16.2 (10.8)
Leisure and Hospitality	152,668	9.1	24.2 (15.2)
Other Services	69,736	1.8	3.9 (2.7)

TABLE 2: Average employment of survivors, by sector and year from birth

NAICS Supersector	1st year (1999)	3rd year (2001)	5th year (2003)	7th year (2005)
Natural Resources and Mining	7.5	9.3	10.6	10.9
Construction	4.2	5.1	6.2	7.7
Manufacturing	8.3	12.0	12.8	15.2
Trade, Transportation, and Utilities	4.1	5.6	6.5	8.6
Information	7.2	11.8	11.8	15.6
Financial Activities	3.8	5.0	6.2	7.8
Professional and Business Services	4.6	7.0	8.3	10.2
Education and Health Services	6.5	8.9	10.6	12.3
Leisure and Hospitality	1.2	12.7	14.6	18.1
Other Services	1.7	2.1	2.4	2.9
National	4.6	6.3	7.4	9.2