

## Survival and longevity in the Business Employment Dynamics data

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The 1990s saw many sectors of our economy grow apace, through either mergers, buyouts, or new openings. Signs of the times (figuratively and literally, as one bank bought out or merged with another) were on hometown banks, and the fruits of new construction festooned many neighborhoods. In addition to new homes going up, new businesses were moving in to take advantage of the growing wealth in the United States.

Our understanding of new businesses has been limited largely to the manufacturing sector and to the scale of the firm, not to the establishment.<sup>1</sup> The main reason for this shortcoming is limitations on the data available for study. In many countries—including the United States until recently—manufacturing was the only sector for which data with the capability of linking firms across time were compiled on a regular basis. Thus, except for firms in the manufacturing sector, no history of a firm's behavior could be constructed.

This research summary examines the business survival characteristics of all establishments that started in the United States in the late 1990s, when the boom of much of that decade was not yet showing signs of weakness. The analysis present-

ed builds on and extends a report from the Minnesota Department of Economic Security on business churning from 1993 to 1995.<sup>2</sup> The report profiled business births, survival rates, and deaths during the early years of the decade, when the boom was just starting. This article follows the businesses reported on into the recession of 2001 to see how they fared once the economy took a downturn. The analysis follows a birth cohort from the second quarter of 1998 through the next 16 quarters, differing from previous analyses in both focus and time frame. The focus is on only completely new entrants—that is, new firms which open a single establishment. The analysis encompasses all sectors of the economy; survival rates of establishments, as well as several measures of employment, are reported and compared across sectors.

### Data

The data that follow are from the BLS Quarterly Census of Employment and Wages (QCEW) program, which has information on 8.2 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. In addition, outside researchers use the QCEW microdata to investigate topics in the field of labor economics.

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 startup, growth, and failure of a particular establishment concurrently with the timing of those events. Because the program contains establishment-level data (that is, data relating to a specific location), one can observe the characteristics of each establishment, such as its 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 4 years of their lifetime.<sup>3</sup>

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

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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. The resulting cohort contained 212,182 new establishments across the Nation for the second quarter of 1998.

Births were tracked across 16 quarters from March 1998 to March 2002 by a unique identifier. Establishments are the same as firms in the birth quarter. 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 (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 employ-

ment 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 4 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

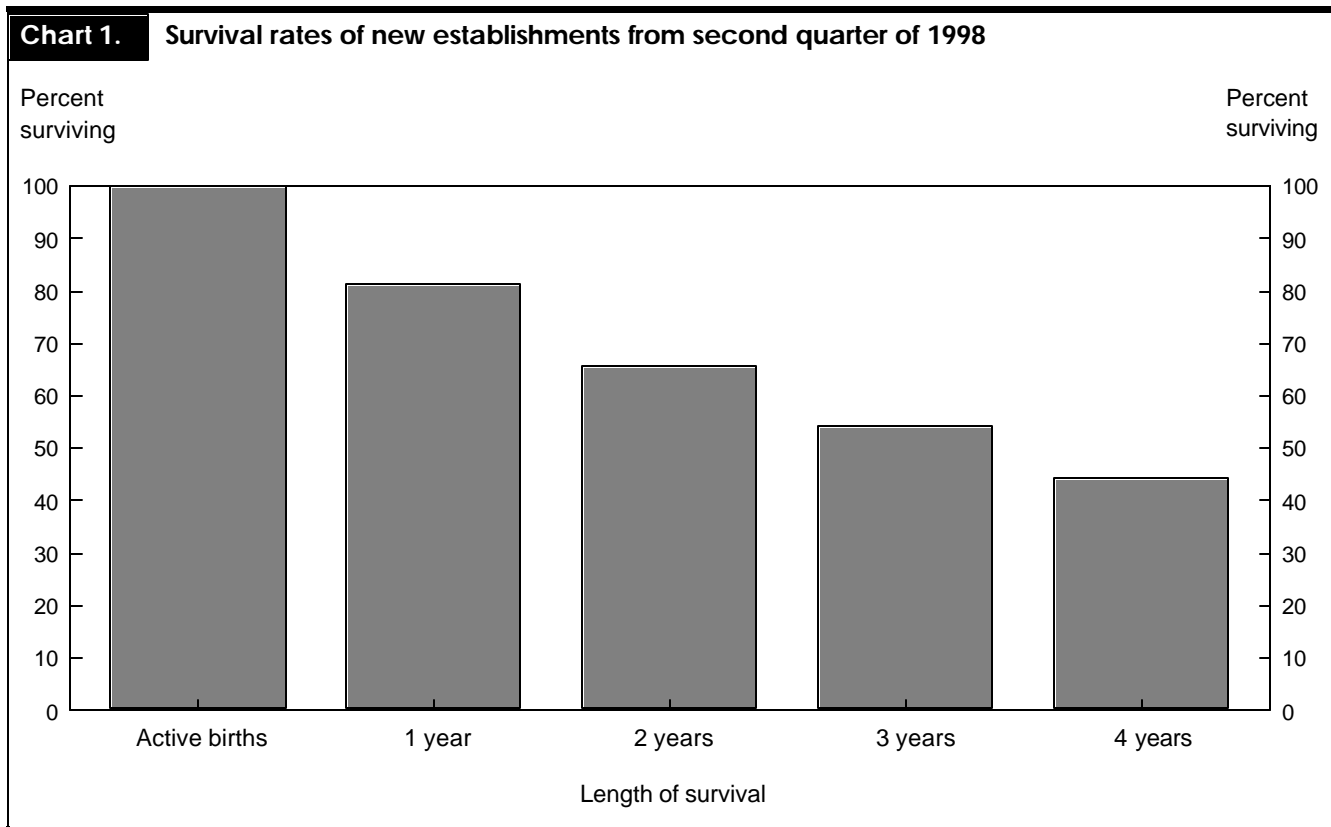
The data show that, across sectors, 66 percent of new establishments were still in existence 2 years after their birth, and 44 percent were still in existence 4 years after. (See chart 1.) It is not surprising that most of the new establishments disappeared within the first 2 years after their birth, and then only a smaller percentage disappeared in the subsequent 2 years. These survival rates do not vary much by industry. (See chart 2.) Despite the early success of the “dot-coms” during the 1990s, the information industry had the lowest 2- and 4-year survival rates, 63 percent and 38 percent, respectively. Education and health services had the highest 2- and 4-year survival rates, 73 percent and 55 percent. According to the conventional wisdom, restaurants should bring down the averages for the sector that includes them, because they are constantly starting and failing. However, the leisure and hospitality sector’s 2- and 4-year survival rates of 65 percent and 44 percent are only slightly below average, despite including restaurants.

Converting these survival rates into exit rates used in previous studies<sup>4</sup> yields similar results. In particular, comparing the manufacturing sector’s results produced by this and the other studies indicates a 4-year exit rate of 52 percent.<sup>5</sup> In the literature, Timothy Dunne, Mark J. Robertson, and Larry Samuelson found a 5-year exit rate of 62 percent, on average, for the three cohorts that they followed,<sup>6</sup> John R. Baldwin and Paul K. Gorecki derived slightly lower 4- and 5-year exit rates (35 percent and 41 percent, respec-

tively),<sup>7</sup> and David B. Audretsch identified a 4-year survival rate of 77.4 percent, which converts to an exit rate closer to that of Baldwin and Gorecki’s than to the numbers found herein.

One also can look at survival rates by asking how many establishments were in operation in the second, third, and fourth years after their birth, conditional on being operational in the previous year. In other words, how many of the establishments that survived the first year were still in business at the end of the second year, how many that made it to the second year still existed in the third, and so forth. One might expect that survival to the previous year is a good indicator of the odds of surviving to the next, but at the national level, these conditional survival rates are fairly stable, increasing somewhat in the third year, but declining again in the fourth. (See table 1.) Only three sectors showed a slight tendency toward increasing survival: natural resources and mining, education and health services, and other services. The information sector showed a somewhat stronger trend in the opposite direction, but most of the sectors showed no tendencies at all.

The largest contributor to opening employment for the cohort as a whole was the leisure and hospitality sector, the smallest the information sector. This finding is not surprising in light of average initial employment in the sectors. Leisure and hospitality had the largest average initial employment, with 9 employees per establishment, but its establishments grew by one of the smallest percentages (67 percent), attaining a high of 15 employees, on average, at the peak of those establishments’ growth over the 4-year period studied. (See table 2.) By contrast, the information industry began with an average initial employment of 5, but grew by 211 percent, to almost match the average peak employment of the leisure and hospitality sector. (See table 2.) Of course, while this growth rate is remarkable, it must be measured against the number of establishments in each sector. The leisure and hospitality sector has approximately



5 establishments for every 1 in the information sector in each quarter. (See table 3.) Thus, employment in the leisure sector is at least 5 times that of the information sector. (See table 4.)

A closer look at the growth of the birth cohort reveals a wide variation in the growth of employment in each sector, in contrast to the fairly stable measures of establishment survival across sectors. The information, professional and business services, education and health services, and manufacturing sectors stayed at or above their opening level of employment for the 4 years the study spanned. All other sectors experienced continual decreases in employment in successive years. Thus, looking at employment patterns slightly changes the picture of what a thriving industry sector is. Although, from the perspective of the number of establishments and average employment,

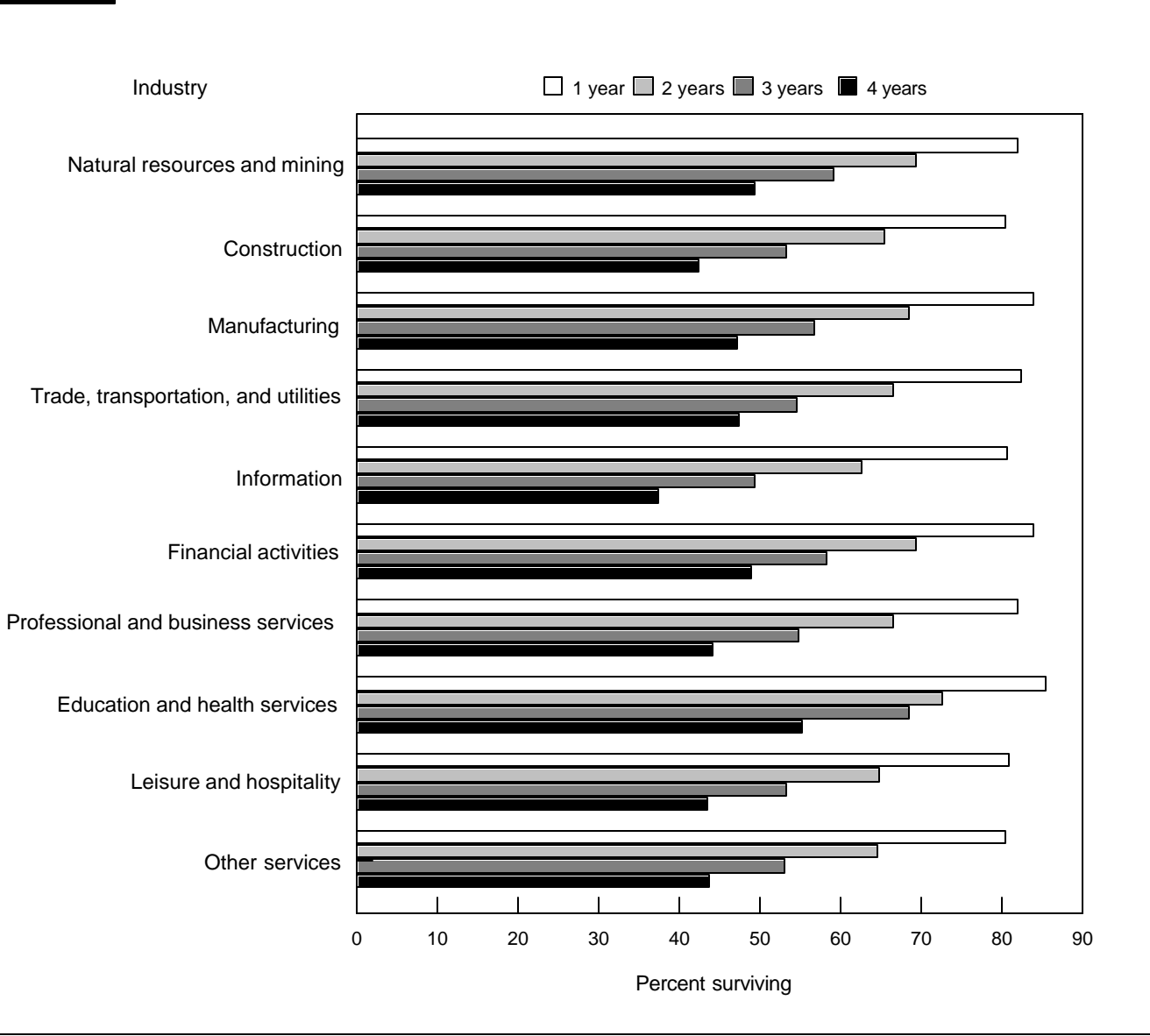
the leisure and hospitality sector appears to be thriving, employment patterns show that the surviving establishments are not as successful overall as establishments in some other sectors. (See chart 3.)

One of the surprises presented by the data is that manufacturing, thought to be a beleaguered sector, is still thriving. The sector's survival rates are above average, and its employment stayed above the initial level until the fourth year, when it fell back to the 1998 level. (See chart 3.) These data show that, despite a good number of closing plants, employment has increased in the surviving establishments, keeping employment levels stable for the birth cohort of this sector. Another sector of interest is professional and business services, with average 2- and 4-year survival rates, but one of the best 4-year employment patterns. (See charts 2 and 3.) The contrast between this

sector and the information sector is striking: whereas the strong employment pattern of the information sector is attenuated by its small employment size (17,794), the professional and business services sector was one of the largest contributors to opening employment (137,908). (See table 2.)

Most sectors saw a greater decline in employment in the fourth year after their birth, during which the recession occurred. (See chart 3.) The shift from increasing employment in the second year to decreasing employment in the third may be an early indication of the recession that followed. This behavior is in contrast to the increase in the average size of surviving establishments. (See table 5.) Thus, the increase in average size in the third year was no longer able to offset the decline in employment caused by business deaths.

**Chart 2. Survival rates of new establishments from second quarter of 1998, by sector**



WHAT EMERGES FROM THIS CHARACTERIZATION of the second-quarter 1998 birth cohort of establishments is that, for most sectors of the economy, those businesses which manage to survive do grow. While establishment survival rates are fairly consistent across sectors, the contributions to employment of surviving establishments varies wide-

ly. Some sectors experience consistent decreases in overall employment from year to year, while other, more prosperous sectors increase their employment levels.

Caution is advised in judging the success of an industry sector only by its survival rates. In comparing the sectors with the lowest and highest

survival rates, it becomes clear that, despite having the lowest survival rates, the information sector had stronger employment growth than the education and health services sector had. (See chart 3 and table 5.) However, overall employment in education and health services was more stable (see table 4) and approximately 3 times the employment in

**Table 1. Survival rates of previous year's survivors, by sector and years since birth, 1999–2002**

NAICS supersector	First year (1999)	Second year (2000)	Third year (2001)	Fourth year (2002)
National .....	81.2	81.0	82.6	81.7
Natural resources and mining .....	82.3	84.5	85.4	83.4
Construction .....	80.7	81.5	81.5	79.5
Manufacturing .....	84.2	81.6	83.0	83.2
Trade, transportation, and utilities .....	82.6	80.9	81.9	81.7
Information .....	80.8	77.8	78.7	76.2
Financial activities .....	84.1	82.7	84.2	84.1
Professional and business services .....	82.3	81.2	82.5	80.3
Education and health services .....	85.6	85.1	87.5	86.9
Leisure and hospitality .....	81.2	80.1	82.5	81.6
Other services .....	80.7	80.3	82.3	82.3

**Table 2. Contributions to initial employment, average initial employment, and average peak employment, by sector**

NAICS supersector	Employment in second quarter 1998	Average initial employment	Average peak employment
National .....	798,066	3.8	7.9
Natural resources and mining .....	21,809	6.8	14.8
Construction .....	98,750	3.6	8.1
Manufacturing .....	45,670	6.2	14.0
Trade, transportation, and utilities .....	139,125	3.3	6.7
Information .....	17,794	4.7	14.6
Financial activities .....	45,098	3.0	6.4
Professional and business services .....	137,908	3.4	9.0
Education and health services .....	57,068	4.9	10.8
Leisure and hospitality .....	152,668	9.1	15.2
Other services .....	69,736	1.8	2.7

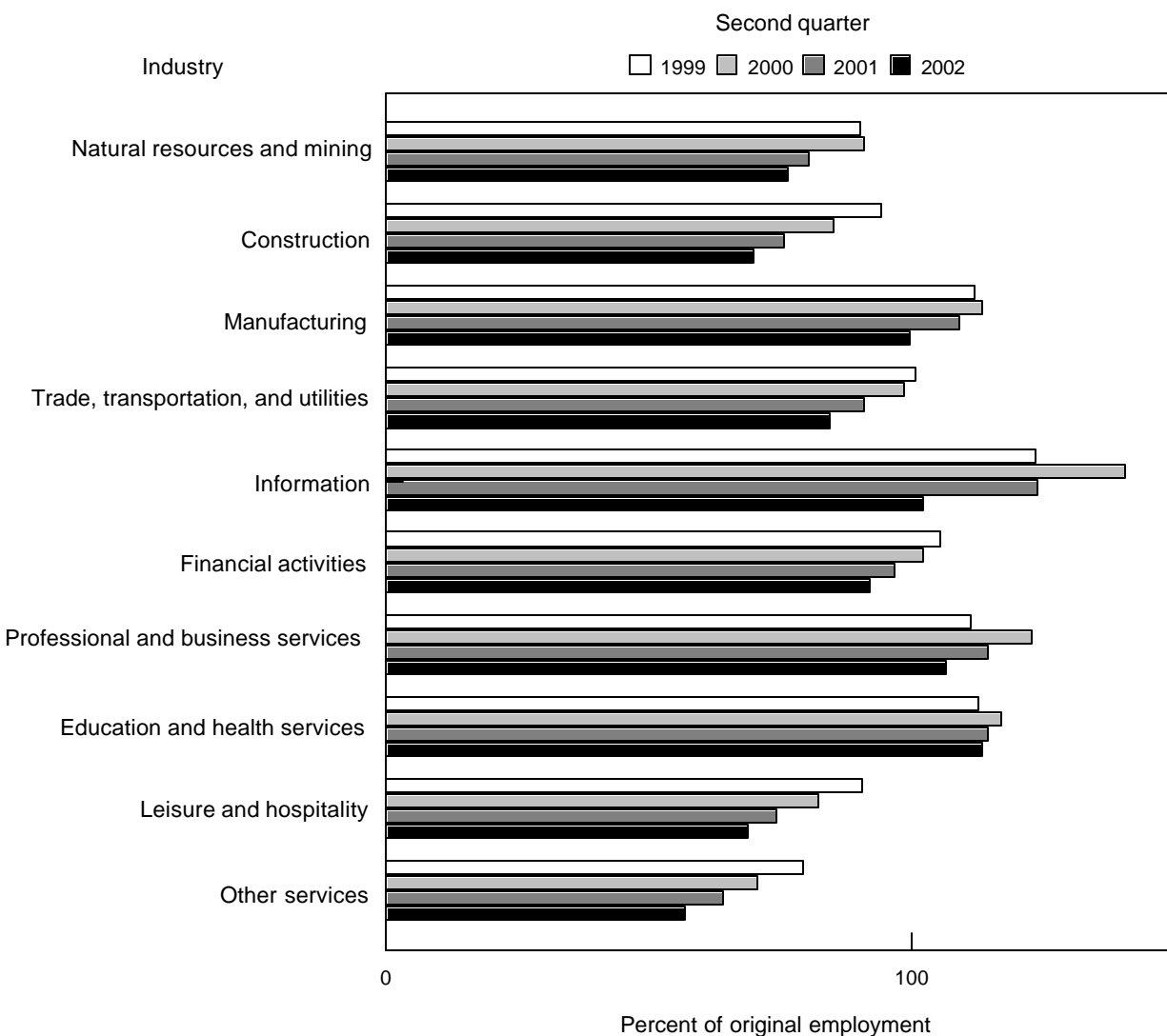
**Table 3. Surviving establishments, by sector and year since birth, 1998–2002**

NAICS supersector	Second quarter 1998	First year (1999)	Second year (2000)	Third year (2001)	Fourth year (2002)
National .....	212,182	172,379	139,543	115,194	94,116
Natural resources and mining .....	3,198	2,633	2,224	1,900	1,585
Construction .....	27,536	22,219	18,099	14,748	11,728
Manufacturing .....	7,326	6,168	5,031	4,174	3,473
Trade, transportation, and utilities .....	41,797	34,518	27,928	22,863	18,674
Information .....	3,793	3,063	2,384	1,877	1,430
Financial activities .....	14,853	12,490	10,333	8,698	7,314
Professional and business services .....	40,992	33,743	27,389	22,599	18,152
Education and health services .....	11,594	9,923	8,444	7,389	6,420
Leisure and hospitality .....	16,834	13,661	10,941	9,024	7,367
Other services .....	39,783	32,113	25,783	21,214	17,458

**Table 4. Total employment of survivors, by sector and years since birth, 1999–2002**

NAICS supersector	First year (1999)	Second year (2000)	Third year (2001)	Fourth year (2002)
National .....	792,131	781,506	721,103	670,111
Natural resources and mining .....	19,781	19,945	17,636	16,789
Construction .....	93,468	84,550	75,256	69,426
Manufacturing .....	51,271	52,055	50,073	45,732
Trade, transportation, and utilities .....	140,462	137,448	127,135	118,266
Information .....	22,064	25,085	22,131	18,241
Financial activities .....	47,745	46,314	43,855	41,665
Professional and business services .....	154,160	170,016	158,281	147,618
Education and health services .....	64,594	67,017	65,534	64,881
Leisure and hospitality .....	139,041	126,323	114,154	105,941
Other services .....	55,664	49,639	45,027	39,932

**Chart 3. Employment patterns of survivors by sector, as a percentage of original employment**



**Table 5. Average employment of survivors, by sector and years since birth, 1999–2002**

NAICS supersector	First year (1999)	Second year (2000)	Third year (2001)	Fourth year (2002)
National .....	4.6	5.6	6.3	7.2
Natural resources and mining .....	7.5	9.0	9.3	10.6
Construction .....	4.2	4.7	5.1	5.9
Manufacturing .....	8.3	10.3	12.0	13.2
Trade, transportation, and utilities .....	4.1	4.9	5.6	6.3
Information .....	7.2	10.5	11.8	12.8
Financial activities .....	3.8	4.5	5.0	5.7
Professional and business services .....	4.6	6.2	7.0	8.1
Education and health services .....	6.5	7.9	8.9	10.1
Leisure and hospitality .....	10.2	11.5	12.7	14.4
Other services .....	1.7	1.9	2.1	2.3

the information sector in any given year.

Still, the employment contributions of these two sectors were nowhere near those of sectors which had only aver-

age growth, namely, professional and business services, and leisure and hospitality. In fact, the negative impact of average survival rates in professional

and business services was mitigated by the sector's having one of the best employment patterns over the 4 years studied. □

## Notes

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<sup>1</sup> See, for example, 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; John R. Baldwin and Paul K. Gorecki, "Firm Entry and Exit in the Canadian manufacturing sector, 1970–1982," *Canadian Journal of Economics*, May 1991, pp. 300–23; Jose Mata and Pedro Portugal, "Life Duration of New Firms," *Journal of Industrial Economics*, September 1994, 227–45; David Audretsch, "New-Firm Survival and the Technological Regime," *Review of Economics and Statistics*, August 1991, pp. 441–50; and David B. Audretsch and Talat Mahmood, "New-Firm Survival: New Results Using a Hazard Function," *Review of*

*Economics and Statistics*, February 1995, pp. 97–103. These studies have been concerned mainly with the behavior of firms even when the unit of collection is the establishment.

<sup>2</sup> *Business Births and Deaths: The Dynamics of Business Churning in Minnesota* (Minnesota Department of Economic Security, Research and Statistics Office, May 1997).

<sup>3</sup> 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.

<sup>4</sup> Identical to death rates as used in this article.

<sup>5</sup> Forty-eight percent of manufacturing establishments were still in existence 4 years after their birth; thus, 52 percent had exited the market.

<sup>6</sup> Dunne, Roberts, and Samuelson, "Patterns' Firm Entry and Exit."

<sup>7</sup> Baldwin and Gorecki, "Firm Entry and Exit."