The effect of business ownership change on occupational employment and wages

An analysis of business establishment microdata reveals that, after a business changes ownership, employment falls, but wages rise, in occupations that performed analytical, clerical, and production work; by contrast, employment levels are maintained, but wages fall, in service occupations

Dina Itkin

Every year, thousands of U.S. businesses are bought, sold, or merged to raise profits, reduce costs, increase market share, or otherwise interact in the dynamic economy. The national level of business ownership change peaked in the late 1990s, when the Nation was experiencing rapid economic growth, and declined gradually through 2002.[1] After 2003, the number and asset trade value of ownership changes rose steadily again. Volume in 2006 exceeded that in 2005 by 38 percent and surpassed a 2000 record. The year-over-year asset trade volume of ownership change as of July 2007 was up 60 percent globally and 41 percent in the United States.[2]

Existing literature and anecdotal evidence have found varying effects of ownership changes on company profits, labor productivity, wages, and staffing in specific industries. For example, research using Census Bureau data on manufacturing companies found that ownership changes led to reductions in employment and wages at auxiliary (support) offices, but had little effect on employment at production plants.[3] Two other studies—one of manufacturing firms[4] and the other of food-manufacturing firms[5]—found that ownership changes resulted in employment and wage increases overall, but led to job losses in large firms.

Trends in personnel changes in all sectors of the economy are of interest to economists, business owners, and workers, but there is little, if any, recent empirical research on the effects of ownership changes on detailed occupational employment. Such information provides insight into the specific jobs and skill sets that are in demand when firms reorganize or redirect their business strategies.

This study uses a recent large sample of business establishment microdata to examine how overall employment and occupational composition are affected when establishments undergo a change in ownership. The study resulted in a number of interesting findings: after ownership changes, (1) employment levels of occupations that performed analytical, clerical, and production work were least likely to be maintained, and most of these groups' wages shifted toward higher ranges; (2) employment levels of service occupations such as health care, education, and protection services were more likely to be maintained, but most of these groups' wages shifted toward lower ranges, on average; (3) overall, employment declines were seen in establishments that changed ownership; and (4) among the industries that contracted the most, declines were concentrated in occupations that serve a support function in the industry, rather

Dina Itkin is an economist in the Office of Employment and Unemployment Statistics, Bureau of Labor Statistics. E-mail: itkin.dina@bls.gov

than in occupations that are core to the industry's output. These findings tended to be supported across establishments of different sizes, with decreases in the share of support occupations such as office and administrative support, management, and sales occupations in all size classes.

Methodology

This study was conducted with the use of microdata from the Occupational Employment Statistics (OES) survey. The OES program surveys approximately 200,000 establishments every 6 months, taking 3 years to collect its full sample of 1.2 million establishments. Establishments are eligible for selection again after 3 years. The data set consisted of all business establishments that reported to the OES survey twice over a period of 6 years. Those establishments were put into two subsamples on the basis of whether or not they changed ownership, as defined by a change in the Unemployment Insurance (UI) account number. Included in the study were microdata from all 50 States and the District of Columbia, from establishments that reported occupational employment for all of their employees and wage data for most of their employees.[6]

All establishments covered by State Unemployment Insurance have an assigned UI account number. When a firm changes ownership, it normally refiles with the Unemployment Insurance program and receives a new UI number. By contrast, the Quarterly Census of Employment and Wages (QCEW) program's Longitudinal Database (LDB) assigns each establishment a unique LDB number that does not change, even if the ownership changes. A total of 277,027 establishments reported to the OES survey exactly twice during a 6-year period from 2000 to 2006.[7] Of the establishments that reported twice with the same LDB number, 254,829 had the same UI number the second time they reported. These establishments serve as this study's subsample of establishments that did not change ownership (the control subsample). The remaining 22,198 establishments had different UI numbers the second time they reported and serve as the study's subsample of establishments that changed ownership (the ownership change subsample). Each establishment in either subsample has longitudinal occupational staffing data for two points in time. The first reports are included in the predecessor group, whose establishments reported data between 2000 and 2003. The second reports are included in the successor group, whose establishments reported data between 2003 and 2006.

Limitations of the study

Elements of the OES sampling strategy may create a bias toward larger establishments in the study's subsamples. The reason is that sample selection within geographic area and industry group strata is approximately proportional to size, in order to provide the most occupational coverage. Although there are more small units in the subsamples, larger units are more likely to be selected at two points in time and included in the subsamples. This bias is enhanced by the fact that the study uses unweighted employment.

Although a change in UI account number in establishments with the same LDB number represents an ownership change most of the time, limitations to this definition exist. A change in UI number does not necessarily indicate a change in ownership (it could be the result of a change in the type of business entity, as, for example, when a business incorporates), and perhaps not all ownership changes were marked by a UI number change. To facilitate the identification of establishments that changed ownership, factors such as employment, trade names, physical addresses, and telephone numbers were used in determining whether to maintain the LDB number.

The microdata do not differentiate among types of ownership changes, such as mergers, takeovers, divestitures, or buyouts. If the ownership change represents a merger or an acquisition, then changes in the acquiring establishment are not measured; only employment data from the acquired establishment are captured in this study. For example, if an establishment was bought by another company, the study would capture predecessor and successor data only for the establishment with the same LDB number before and after the purchase. A related limitation of the study is that the data do not indicate whether labor was voluntarily or involuntarily removed, or whether it was contracted out or outsourced, after the ownership change. Also, because the time between the first and second reporting is at least 3 years for all establishments, the study might not capture staffing changes that occurred immediately before or after the ownership change. In some cases, the transition might be only partially complete at the second reporting; in other cases, the transition may already have begun at the first reporting, in anticipation of a future takeover.

Overall employment trends

Certain industries were more likely to change ownership relative to other industries in the study subsample and to the economy as a whole. Table 1 shows, in order by column, the industry distributions of establishments that reported twice,

Table 1. Concentration of establishments, by industry sector, in the ownership change subsample and across all establishments, 2000–06

Industry sector	Number of units that reported twice	Number of units that changed ownership	Percent that changed ownership	Percent distribution of ownership change subsample	Average number of private-sector establishments in 2005, QCEW	Percent distribution of private sector establishments in 2005, QCEW
Total	277,027	[1]22,198	8.01	[1]100	[1]8,294,662	[1]100
Information	6,858	793	11.56	3.57	141,871	1.71
Accommodation and food services	15,283	1,760	11.52	7.93	572,791	6.91
Administrative and support and waste management and remediation services	13,436	1,351	10.06	6.09	426,681	5.14
Retail trade	41,261	3,875	9.39	17.46	1,038,585	12.52
Manufacturing	40,480	3,469	8.57	15.63	365,351	4.40
Finance and insurance	10,713	915	8.54	4.12	462,381	5.57
Health care and social assistance	26,317	2,226	8.46	10.03	689,010	8.31
Wholesale trade	18,742	1,516	8.09	6.83	601,625	7.25
Transportation and warehousing	10,221	814	7.96	3.67	212,309	2.56
Real estate and rental and leasing	7,632	576	7.55	2.59	351,329	4.24
Mining	1,618	122	7.54	.55	26,313	.32
Management of companies and enterprises	2,176	162	7.44	.73	43,239	.52
Professional and technical services	16,163	1,126	6.97	5.07	902,710	10.88
Utilities	1,754	121	6.90	.55	16,260	.20
Arts, entertainment, and recreation	6,465	418	6.47	1.88	118,614	1.43
Other services, except public administration	18,805	1,204	6.40	5.42	1,102,054	13.29
Construction	21,357	1,316	6.16	5.93	845,843	10.20
Educational services	11,396	273	2.40	1.23	78,410	.95

[1] Details do not sum to total because some industries are not listed separately and some establishments lack an industry classification. The industry sector of agriculture, forestry, fishing, and hunting is excluded because the OES and QCEW have incomplete coverage of that sector. OES-designated government industries also are excluded.

the industry distributions of establishments that changed ownership, and the percentage of establishments that changed ownership in each industry. The industries listed are sorted by the percent that changed ownership. Industries in which at least 10 percent of establishments changed ownership were information, accommodation and food services, and administrative and support and waste management and remediation services. The two columns headed "Percent distribution..." serve as an indication of industry distribution in the ownership change subsample relative to the industry's representation in the economy. Industries that represented a large proportion of the ownership change subsample relative to the economy as a whole included manufacturing, retail trade, information, health care and social assistance, transportation and warehousing, and accommodation and food services. At the more detailed industry level, the OES data are consistent with other findings[8] which show that, in 2003, most ownership changes were in business services, prepackaged software, commercial banks and bank holding companies, real estate, mortgage bankers and brokers, and oil and gas and petroleum refining.

Overall, there was a decline in total employment from the predecessor group to the successor group after ownership changes. Total employment in the predecessor group was 2,018,250, and total employment in the successor group was 1,890,986, a decrease of more than 6.31 percent.[9] This employment decrease occurred despite overall private-sector employment growth of 2.82 percent between 2002 and 2005.[10] Almost half (10,677) of the 22,198 establishments that changed ownership experienced a decrease in employment, 9,517 saw an increase in employment, and the remaining 2,004 had no change in employment. Although employment decreased overall in the ownership change subsample, employment change varied by industry, establishment size, and occupation.

The distribution of the ownership change subsample and the control subsample is shown by establishment size in table 2. In the control subsample, there was an aggregate shift toward medium and large sizes, while in establishments that changed ownership, there was an aggregate shift toward smaller sizes. After establishments changed ownership, the concentration of establishments increased in the 1-to-9-employee and 10-to-49-employee size classes and decreased in the three larger size classes. The concentration in the 1-to-9-employee size class grew by nearly 5 percent in the ownership change subsample, while it grew by

Table 2. Concentration of establishments in the OES sample, by size, in the ownership change subsample and the control subsample, 2000–06

Size of establishment	Ownership change subsample				Control subsample			
	Number of predecessor units	Number of successor units	Difference between number of predecessor and successor units	Percent change	Number of predecessor units	Number of successor units	Difference between number of predecessor and successor units	Percent change
Total	22,198	22,198	…	…	254,829	254,829	…	…
1–9 employees	5,277	5,530	253	4.79	69,585	70,721	1,136	1.63
10–49 employees	9,094	9,151	57	.63	108,834	107,500	–1,334	–1.23
50–249 employees	6,199	5,973	–226	–3.65	60,024	60,101	77	.13
250–999 employees	1,412	1,335	–77	–5.45	14,057	14,170	113	.80
1,000 or more employees	216	209	–7	–3.24	2,329	2,337	8	.34

substantially less in the control subsample. Likewise, the number of 10-to-49-employee establishments increased in the ownership change subsample, while it decreased in the control subsample. These shifts suggest that, after ownership changes, the size distribution of establishments moved toward smaller establishments; that is, more establishments shrank than grew. Because these numbers capture only overall total concentrations at two different times, the last section of this article examines employment changes by establishment size.

Changes by occupational group

Changes in employment levels. After ownership changes, changes in employment were spread across several occupations, with more than half of the occupational groups seeing declines in employment and other occupational groups seeing employment increases. Table 3 presents the changes in employment in each occupational group after ownership changed. As shown in the column headed "Employment difference," the occupations that decreased in employment level were production; office and administrative support; sales and related; management; computer and mathematical science; business and financial operations; architecture and engineering; transportation and material moving; building and grounds cleaning and maintenance; personal care and service; installation, maintenance, and repair; arts, design, entertainment, sports, and media; construction and extraction; and legal occupations.

At the other end of the spectrum, the occupational groups that grew after ownership changes were health care practitioner and technical; protective service; health care support; education, training, and library; food preparation and serving; community and social services; and life, physical, and social science occupations. Because changes in level do not convey growth or decline relative to other occupational groups, an analysis of the employment shares of total predecessor and successor employment follows.

Relative changes in employment shares. Table 3 also shows the percentage-point difference between the predecessor and successor employment shares in both subsamples. Occupational groups are labeled "less likely" or "more likely" to be retained, on the basis of their change in employment share in the ownership change subsample relative to the control subsample. Employees who were less likely to be retained are in occupations whose employment shares (1) shrank in the ownership change subsample while they grew in the control subsample, (2) grew in the ownership change subsample by less than they grew in the control subsample, or (3) shrank in the ownership change subsample by more than they shrank in the control subsample. This set of occupations (those which are less likely to be retained) is plotted to the right of the diagonal in chart 1. For each occupational group shown in the chart, the further the point that is associated with it lies from the origin and the diagonal, the greater is the difference between the employment shares in establishments that changed ownership and in establishments that did not change ownership.

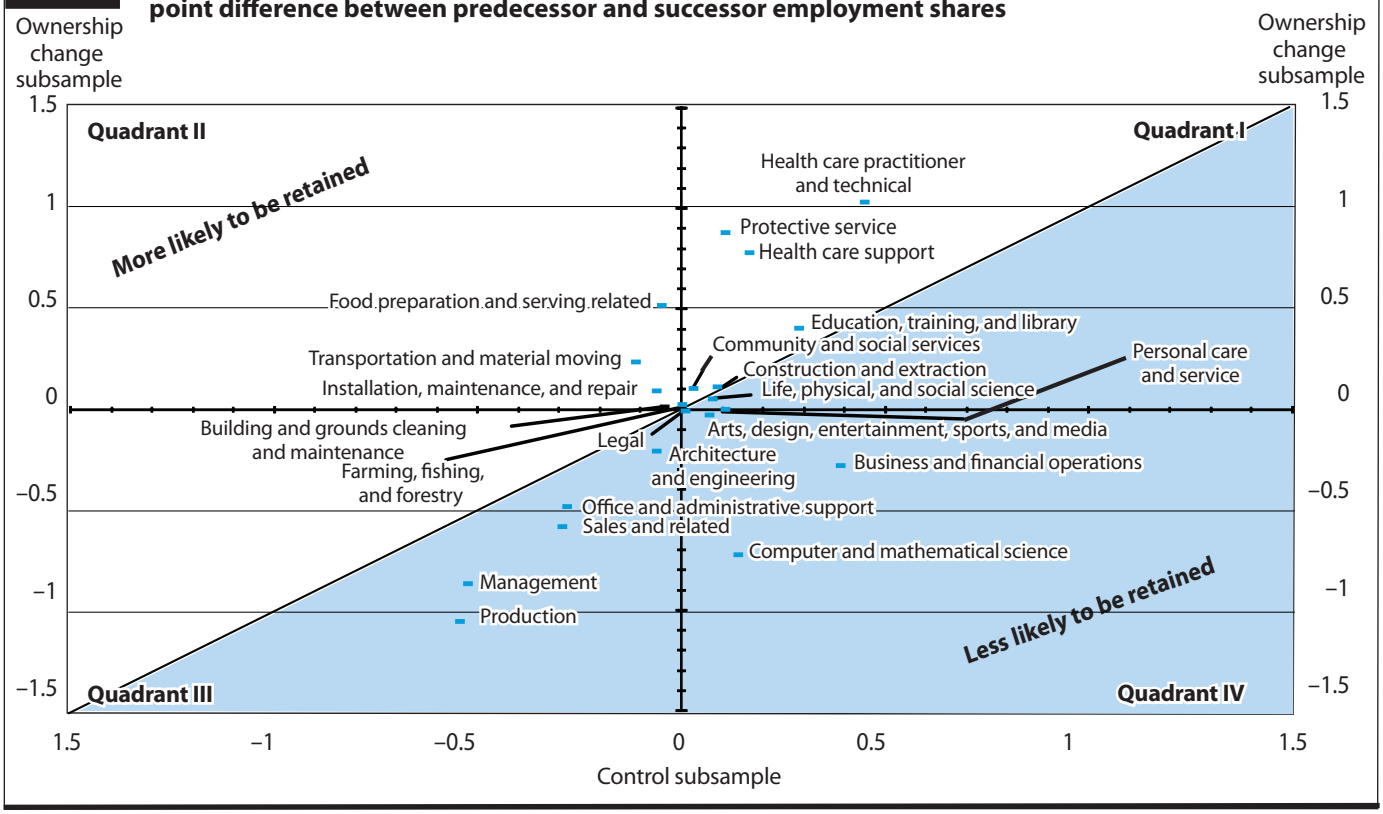
Employees who performed analytical, clerical, and production work were less likely to be retained after ownership changes. The occupational groups that shrank in the ownership change subsample while they grew in the control subsample (occupational groups located in quadrant IV) were computer and mathematical science; busi-

Table 3. Occupational employment level and difference in share in the ownership change subsample and the control subsample, 2000–06

Occupational Group	Percentage-point difference between predecessor and successor employment share		Ownership change subsample					Control subsample				
	Ownership change subsample[1]	Control subsample	Predecessor employment	Successor employment	Employment difference	Predecessor employment share (percent)	Successor employment share (percent)	Predecessor employment	Successor employment	Employment difference	Predecessor employment share (percent)	Successor employment share (percent)
Occupational groups less likely to be retained												
Computer and mathematical science	–0.72	0.14	67,063	49,262	–17,801	3.32	2.61	432,022	472,447	40,425	2.04	2.19
Business and financial operations	–.28	.39	74,172	64,278	–9,894	3.68	3.40	635,571	733,116	97,545	3.00	3.39
Arts, design, entertainment, sports, and media	–.03	.07	19,136	17,435	–1,701	.95	.92	216,138	235,383	19,245	1.02	1.09
Legal	–.01	.01	4,818	4,293	-525	.24	.23	86,609	91,014	4,405	.41	.42
Production	–1.05	–.54	320,946	280,789	–40,157	15.90	14.85	2,217,795	2,149,982	–67,813	10.49	9.95
Management	–.86	–.52	94,876	72,694	–22,182	4.70	3.84	980,344	888,859	–91,485	4.63	4.11
Sales and related	–.58	–.29	199,818	176,232	–23,586	9.90	9.32	1,794,334	1,771,712	–22,622	8.48	8.20
Office and administrative support	–.48	–.28	321,625	292,198	–29,427	15.94	15.45	3,336,426	3,348,698	12,272	15.77	15.49
Architecture and engineering	–.21	–.06	48,962	41,897	–7,065	2.43	2.22	404,330	400,902	–3,428	1.91	1.85
Life, physical, and social science	.05	.08	10,939	11,263	324	.54	.60	176,926	198,318	21,392	.84	.92
Occupational groups more likely to be retained												
Food preparation and serving related	.53	–.03	113,913	116,778	2,865	5.64	6.18	1,069,685	1,086,022	16,337	5.06	5.02
Transportation and material moving	.23	–.11	173,556	166,968	–6,588	8.60	8.83	1,670,394	1,684,016	13,622	7.90	7.79
Installation, maintenance, and repair	.09	–.06	82,013	78,499	–3,514	4.06	4.15	798,334	802,064	3,730	3.77	3.71
Building and grounds cleaning and maintenance	.01	–.04	65,291	61,425	–3,866	3.24	3.25	772,076	780,072	7,996	3.65	3.61
Protective service	.87	.11	68,638	80,719	12,081	3.40	4.27	551,749	587,624	35,875	2.61	2.72
Health care support	.77	.17	66,298	76,718	10,420	3.28	4.06	577,304	626,014	48,710	2.73	2.90
Health care practitioner and technical	1.02	.45	106,778	119,360	12,582	5.29	6.31	1,306,749	1,432,698	125,949	6.18	6.63
Education, training, and library	.40	.29	42,235	47,190	4,955	2.09	2.50	2,262,029	2,375,172	113,143	10.69	10.99
Community and social services	.10	.03	17,429	18,266	837	.86	.97	307,033	321,000	13,967	1.45	1.48
Construction and extraction	.11	.09	58,491	56,922	–1,569	2.90	3.01	858,143	896,039	37,896	4.06	4.14
Groups with a change of less than 0.01 in either subsample												
Personal care and service	(2)	.11	55,579	52,035	–3,544	2.75	2.75	607,194	643,456	36,262	2.87	2.98
Farming, fishing, and forestry	.02	(3)	5,674	5,765	91	.28	.30	90,503	93,366	2,863	.43	.43

[1] Numbers are affected by rounding.
[2] Slight negative differences.
[3] Slight positive difference.

Chart 1. **The effect of business ownership change on different types of occupations, 2000–06: percentage-point difference between predecessor and successor employment shares**



ness and financial operations; arts, design, entertainment, sports, and media; and legal occupations. The following occupational groups shrank by more in the ownership change subsample than they shrank in the control subsample (occupational groups located to the right of the diagonal in quadrant III): production, management, sales and related, office and administrative support, and architecture and engineering occupations. Life, physical, and social science occupations grew in the ownership change subsample, but by less than they grew in the control subsample (the occupational group located to the right of the diagonal in quadrant I).

By contrast, employees who were more likely to be retained were in occupations that (1) grew in the ownership change subsample while they shrank in the control subsample or (2) grew in the ownership change subsample by more than they grew in the control subsample. (None shrank in the ownership change subsample by less than they shrank in the control subsample.) The set of occupations in which employees were more likely to be retained is plotted to the left of the diagonal in the chart.

Service-related jobs, such as health care, education, and protection, were the most likely to be retained after ownership changes. The occupational groups that grew in the ownership change subsample while they shrank in the control subsample (those occupations located in quadrant II) were food preparation and serving related; transportation and material moving; installation, maintenance, and repair; and building and grounds cleaning and maintenance occupations. Occupational groups that grew by more in the ownership change subsample than in the control subsample (those located to the left of the diagonal in quadrant I) included protective service; health care support; health care practitioner and technical; education, training, and library; community and social services; and construction and extraction occupations. The types of jobs that were less likely or more likely to be retained after ownership changes varied by industry, as the next section details.

Changes within occupational groups

Examining detailed changes within occupational groups helps uncover trends among different business functions, such as human resources, marketing, and sales. The occupations discussed in this section and listed in table 4

Table 4. Difference between predecessor and successor occupational employment level and share in the ownership change subsample, by detailed occupation, 2000–06

Occupation	Predecessor employment level	Successor employment level	Predecessor employment share	Successor employment share	Difference in share[1]	Percent change in share[1]
Management occupations						
Chief executives	4,000	2,514	0.2	0.13	–0.07	–32.95
Marketing managers	3,802	2,286	.19	.12	–.07	–35.83
Compensation and benefits managers	534	783	.03	.04	.01	56.23
Business and financial operations occupations						
Claims adjusters, examiners, and investigators	1,973	1,249	.10	.07	–.03	–32.41
Compliance officers, except agriculture, construction, health and safety, and transportation	1,172	1,660	.06	.09	.03	51.12
Logisticians	698	1,536	.03	.08	.05	134.68
Management analysts	10,323	6,430	.51	.34	–.17	–33.53
Financial analysts	5,110	3,170	.25	.17	–.09	–33.81
Computer and mathematical science occupations						
Computer programmers	9,777	4,261	.48	.23	–.26	–53.49
Computer systems analysts	14,673	9,258	.73	.49	–.24	–32.65
Network systems and data communications analysts	2,149	4,562	.11	.24	.13	126.48
Operations research analysts	2,603	1,418	.13	.08	–0.05	–41.86
Architecture and engineering occupations						
Aerospace engineers	1,518	932	.08	.05	–.03	–34.44
Electrical and electronics drafters	864	1,143	.04	.06	.02	41.12
Mechanical engineering technicians	1,441	873	.07	.05	–.03	–35.29
Community and social services occupations						
Child, family, and school social workers	1,574	2,309	.08	.12	.04	56.54
Education, training, and library occupations						
Middle school teachers, except special and vocational education	2,456	3,440	.12	.18	.06	49.47
Special education teachers, middle school	575	732	.03	.04	.01	35.79
Special education teachers, secondary school	688	1,076	.03	.06	.02	66.86
Teacher assistants	5,092	8,839	.25	.47	.22	85.26
Arts, design, entertainment, sports, and media occupations						
Graphic designers	1,609	1,968	.08	.10	.02	30.61
Merchandise displayers and window trimmers	867	1,081	.04	.06	.01	33.02
Coaches and scouts	530	719	.03	.04	.01	44.49
Radio and television announcers	522	1,019	.03	.05	.03	108.11
Reporters and correspondents	593	1,113	.03	.06	.03	100.34
Technical writers	972	633	.05	.03	–.01	–30.50
Health care practitioner and technical occupations						
Physician assistants	1,716	669	.09	.04	–.05	–58.35
Respiratory therapists	1,676	2,391	.08	.13	.04	52.29
Diagnostic medical sonographers	663	852	.03	.05	.01	37.08
Radiologic technologists and technicians	2,943	3,901	.15	.21	.06	41.50
Psychiatric technicians	646	1,377	.03	.07	.04	127.50
Surgical technologists	1,557	2,016	.08	.11	.03	38.26
Medical records and health information technicians	2,568	3,259	.13	.17	.05	35.46
Health care support occupations						
Home health aides	15,642	21,588	.78	1.14	.37	47.30
Medical assistants	3,033	3,916	.15	.21	.06	37.79
Medical equipment preparers	641	1,190	.03	.06	.03	97.80
Protective service occupations						
Private detectives and investigators	742	1,306	.04	.07	.03	87.77
Personal care and service occupations						
Nonfarm animal caretakers	516	1,231	.03	.07	.04	154.30
Residential advisors	565	828	.03	.04	.02	56.43
Sales and related occupations						
Securities, commodities, and financial services sales agents	3,039	1,943	.15	0.1	–.05	–31.74
Travel agents	663	826	.03	.04	.01	32.83

See footnote at end of table.

Table 4. Continued—Difference between predecessor and successor occupational employment level and share in the ownership change subsample, by detailed occupation, 2000–06

Occupation	Predecessor employment level	Successor employment level	Predecessor employment share	Successor employment share	Difference in share[1]	Percent change in share[1]
Demonstrators and product promoters	2,493	939	.12	.05	–.07	–59.76
Real estate sales agents	560	758	.03	.04	.01	44.77
Office and administrative support occupations						
Payroll and timekeeping clerks	3,241	4,104	.16	.22	.06	35.12
Credit authorizers, checkers, and clerks	1,855	979	.09	.05	–.04	–43.63
Interviewers, except eligibility and loan	2,987	3,761	.15	.20	.05	34.39
Meter readers, utilities	639	839	.03	.04	.01	40.06
Legal secretaries	1,758	1,117	.09	.06	–.03	–32.15
Medical secretaries	3,331	5,994	.17	.32	.15	92.12
Insurance claims and policy processing clerks	1,631	2,621	.08	.14	.06	71.53
Office machine operators, except computer	1,825	1,135	.09	.06	–.03	–33.63
Farming, fishing, and forestry occupations						
Farmworkers, farm and ranch animals	550	1,025	.03	.05	.03	98.53
Construction and extraction occupations						
Helpers—pipelayers, plumbers, pipefitters, and steamfitters	1,294	788	.06	.04	–.02	–34.95
Installation, maintenance, and repair occupations						
Control and valve installers and repairers, except mechanical door	729	903	.04	.05	.01	32.41
Telecommunications line installers and repairers	2,791	3,477	.14	.18	.05	32.97
Coin, vending, and amusement machine servicers and repairers	605	885	.03	.05	.02	56.00
Production occupations						
Aircraft structure, surfaces, rigging, and systems assemblers	1,737	508	.09	.03	–.06	–68.76
Electrical and electronic equipment assemblers	10,291	5,960	.51	.32	–.19	–38.18
Engine and other machine assemblers	2,275	1,219	.11	.06	–.05	–42.77
Slaughterers and meatpackers	10,402	5,007	.52	.26	–.25	–48.62
Forging machine setters, operators, and tenders, metal and plastic	1,831	696	.09	.04	–.05	–59.43
Cutting, punching, and press machine setters, operators, and tenders, metal and plastic	11,262	6,789	.56	.36	–.20	–35.66
Multiple machine tool setters, operators, and tenders, metal and plastic	4,935	2,717	.24	.14	–.10	–41.23
Bindery workers	1,710	674	.08	.04	–.05	–57.97
Extruding and forming machine setters, operators, and tenders, synthetic and glass fibers	1,729	931	.09	.05	–.04	–42.59
Separating, filtering, clarifying, precipitating, and still machine setters, operators, and tenders	1,554	1,018	.08	.05	–.02	–30.13
Helpers—production workers	13,215	16,798	.65	.89	.23	35.66
Transportation and material moving occupations						
Bus drivers, transit and intercity	4,929	2,464	.24	.13	–.11	–46.64
Service station attendants	794	975	.04	.05	.01	31.3
Crane and tower operators	669	853	.03	.05	.01	36.25

[1] Numbers are affected by rounding.

are the 70 occupations with substantial growth or decline[11] after the ownership changes and with employment of at least 500 in the predecessor and successor groups. The table shows each occupation's employment level and employment share in the ownership change subsample's predecessor group and successor group, and the difference between them. The occupations are categorized by occupational group. Residual ("all other") occupations are not shown.

Changes in employment levels. Occupations with the greatest decline in employment level (by more than 1,500 employees) across all occupational groups in the ownership change subsample were computer programmers, computer systems analysts, four "assembly" production occupations, management analysts, transit and intercity bus drivers, financial analysts, demonstrators and product promoters, and marketing managers. Occupations that exhibited the greatest growth in employment level (by more than 1,500

employees) were home health aides, teacher assistants, production worker helpers, medical secretaries, and network systems and data communications analysts.

Relative changes in employment shares. It is useful to examine in detail the occupational groups that fared poorly after ownership changes. Table 4 also shows (see columns titled "Predecessor employment share" and "Successor employment share") that, in the computer and mathematical science group, which shrank the most in the ownership change subsample and grew in the control subsample, there were decreases in the employment shares of computer programmers, operations research analysts, and computer systems analysts. Network systems and data communications analysts, by contrast, were in higher demand. Among business and financial operations occupations, which had the second-largest difference in employment in the ownership change subsample relative to occupations in the control subsample, financial analysts and management analysts were most likely to be cut. Meanwhile, logisticians and compliance officers (except agriculture, construction, health and safety, and transportation) were most likely to grow. In the management group, compensation and benefits managers saw the greatest employment increase after ownership changes, while marketing managers saw decreases in employment share.

One possible interpretation of these observations is that if the establishment is acquired by an establishment with similar staff, the employees who are more likely to be let go are those who appear to have redundant occupations. For example, an establishment that is acquired may no longer need a separate information technology or marketing department. Instead, it may have an increased need for occupations such as network systems and data communications analysts or human resources personnel to facilitate the organizational transition.Other occupations that deal more directly with customers or output, such as home health aides, medical secretaries, teacher assistants, and production assembly workers, might need to be retained in order to maintain good customer service or productivity. These occupations tend to be closely related to the core output of the establishment, while the others tend to serve as operational support. The decline in certain technical jobs also might be explained by outsourcing, although this interpretation is not examined here.[12]

Occupational composition by wage range

A brief analysis of occupational employment share by wage range reveals that, after ownership changed, the wages of the employees performing analytical and administrative work shifted upwards, while the wages of the employees performing low-skilled service work or physical labor shifted downwards. Until November 2005, the OES microdata included data on detailed occupational employment in the wage ranges defined in table 5.[13] Different occupational groups generally have their employment distributions concentrated in different wage ranges. For instance, management and computer and mathematical occupations were employed mostly in wage ranges starting at $21.50 to $27.24 and running through $55.50 to $69.99. Production and personal care and service occupations, however, were employed mostly in ranges beginning at $6.75 to $8.49 and going through $17.00 to $21.49. (The actual employment distributions are not shown in the table.)

A shift in employment concentration from relatively lower paid employees to relatively higher paid employees occurred in several occupational groups. In these groups, either high-paid workers were retained or hired more often than low-paid workers, or low-paid workers were more likely to lose their jobs after ownership changes. A shift from low to high wage ranges occurred in analytical and administrative occupational groups such as management; architecture and engineering; computer and mathematical science; business and financial operations; health care practitioner and technical; community and social services; office and administrative support; and arts, design, entertainment, sports, and media, among other occupations. If high pay is correlated with tenure and knowledge, then high-earning workers may be the most costly to replace. This shift from low to high wage ranges also may be a result of businesses laying off workers with less tenure: although workers in analytical and administrative occupations were less likely to be retained after ownership changes, the employees who remained had higher wages.

Conversely, employees who performed low-skilled service, physical labor, or personal service work exhibited a shift toward lower wage ranges, possibly because the low-paid workers were retained or hired at higher rates than their higher paid counterparts or because higher paid workers received pay cuts. Among these workers were food preparation and serving related, sales and related, protective service, personal care and service, construction and extraction, production, transportation and material moving, and health care support occupations. Although many of these lower skilled service, physical-labor-intensive, or personal service occupations were most likely to be retained after ownership changes, they experienced

Table 5. Difference between predecessor and successor employment shares, by hourly wage range, ownership change subsample, 2000–06[1]

Occupational major group	Difference between predecessor and successor percent employment, by wage range, excluding 2006 and November 2005 successors and corresponding predecessors											
	Under $6.75	$6.75 to $8.49	$8.50 to $10.74	$10.75 to $13.49	$13.50 to $16.99	$17.00 to $21.49	$21.50 to $27.24	$27.25 to $34.49	$34.50 to $43.74	$43.75 to $55.49	$55.50 to $69.99	$70.00 and over
Wages shifted higher												
Management	–0.33	–0.25	–0.70	–0.99	–1.80	–1.73	–2.74	–1.24	0.61	3.51	2.50	3.15
Architecture and engineering	–	–.08	.12	–.29	–.49	–2.66	–3.75	.91	2.66	2.03	1.12	.46
Computer and mathematical science	.08	–.16	–1.27	.22	–2.31	–2.18	–.26	4.37	2.59	–.27	–.51	–.29
Business and financial operations	.45	.23	–.63	1.15	–2.48	–3.65	–1.29	.87	2.51	1.63	.92	.29
Health care practitioner and technical	–.64	–1.31	–3.16	–3.18	–1.42	–3.97	.55	7.04	4.69	.47	.36	.57
Office and administrative support	–.17	.36	–3.77	1.67	2.36	–.55	.22	.01	–.09	–.03	([2])	([3])
Community and social services	–2.82	–3.02	–3.90	3.90	2.27	3.46	1.14	.53	–1.74	–	–	–
Building and grounds cleaning and maintenance	–2.23	–8.69	11.12	.52	.54	–.78	–.29	–.05	–.11	–.01	–	–
Farming, fishing, and forestry	–27.17	2.11	11.51	6.23	3.31	1.22	1.75	–	–	–	–	–
Arts, design, entertainment, sports, and media	–1.34	.83	1.70	1.66	–1.09	–2.97	–3.89	3.27	1.13	1.06	.14	–.50
Life, physical, and social science	–	.17	–.18	2.22	–2.22	–4.56	–5.46	.92	.63	2.05	2.75	2.36
Legal	–	–.08	–.49	–5.10	2.28	1.20	–3.55	–1.29	–2.90	–.52	2.00	8.17
Wages shifted lower												
Food preparation and serving related	6.49	.30	–4.73	–.96	–.91	–.20	.02	.01	.00	–.02	–	–
Protective service	–2.17	–1.10	10.00	5.79	–.68	–2.26	–4.30	–3.80	–1.15	–.30	–.03	–
Education, training, and library	–.88	.99	.14	14.65	–5.56	–7.21	2.35	–2.96	–4.47	1.66	.93	.35
Personal care and service	–2.42	8.77	12.32	–2.25	–5.62	–6.25	–3.10	–.99	–.42	–.03	–	–
Construction and extraction	2.26	1.90	.45	4.30	.62	–1.66	–3.88	–2.86	–.99	–.10	–.03	–
Installation, maintenance, and repair	.51	–.45	–.96	1.96	–2.37	2.22	–2.98	2.18	–.04	–.02	–.01	–
Production	.51	6.02	–3.47	–3.55	–3.03	2.61	–.34	1.29	.03	–.03	–.01	–
Transportation and material moving	2.63	4.24	–3.76	–.11	–.92	1.30	–.74	.01	–.33	–.34	–.66	–1.34
Health care support	–2.37	2.14	6.11	–4.13	-1.77	–.19	.23	.03	–.05	–	–	–
Sales and related	4.37	–.37	–1.14	1.04	–1.29	–1.35	–1.22	.17	.04	.03	–.07	–.20

[1] Excludes 2006 and November 2005 successors and corresponding predecessors.
[2] Slight negative difference.
[3] Slight positve difference.
NOTE: Dash indicates fewer than 10 establishments reporting occupations.

downward shifts in their wages. This phenomenon could have occurred either because management was more likely to spare cheaper labor and employees in these occupations were willing to work at lower wages or because higher wage workers were replaced with lower wage workers. Table 5 shows the difference between the predecessor and successor employment shares for each occupational group in each wage range.[14] This study does not examine wage range shifts in detailed occupations within occupational groups; therefore, it does not explain whether an occupational group's wages shifted to lower ranges because more low-paid occupations were hired within the group or because more high-paid occupations within the group were laid off or accepted pay cuts.

Table 6. Employment by industry sector, in the ownership change subsample and across all establishments, 2000–06

Industry	Total employment in predecessor units	Total employment in successor units	Difference between predecessor and successor employment	Percent change from predecessor to successor employment	Percent change betweeen 2002 and 2005 average annual employment, QCEW
Information	112,318	80,285	–32,033	–28.52	–9.16
Professional and technical services[1]	80,795	61,069	–19,726	–24.41	6.02
Management of companies and enterprises[1]	26,810	21,305	–5,505	–20.53	2.81
Finance and insurance	75,040	60,222	–14,818	–19.75	4.13
Manufacturing	490,076	425,913	–64,163	–13.09	–6.70
Transportation and warehousing[1]	88,433	78,448	–9,985	–11.29	2.74
Retail trade	247,052	229,464	–17,588	–7.12	1.58
Utilities	14,661	13,766	–895	–6.10	–7.02
Construction[1]	62,733	61,213	–1,520	–2.42	8.76
Real estate and rental and leasing[1]	12,794	12,524	–270	–2.11	4.79
Wholesale trade[1]	74,235	72,673	–1,562	–2.10	2.41
Other services, except public administration[1]	28,956	28,785	–171	–.59	1.84
Accommodation and food services	119,095	119,452	357	.30	6.61
Arts, entertainment, and recreation	21,136	21,495	359	1.70	3.86
Educational services	80,642	84,732	4,090	5.07	9.91
Administrative and support and waste management and remediation services	175,422	185,003	9,581	5.46	6.35
Health care and social assistance	286,663	309,902	23,239	8.11	7.01
Mining[1]	5,672	9,630	3,958	69.78	10.76

[1] Ownership change subsample employment difference and overall employment difference had opposite signs.

NOTE: Table excludes agriculture, forestry, fishing, and hunting because the OES and QCEW have incomplete coverage of this sector. Table also excludes OES-designated government industries.

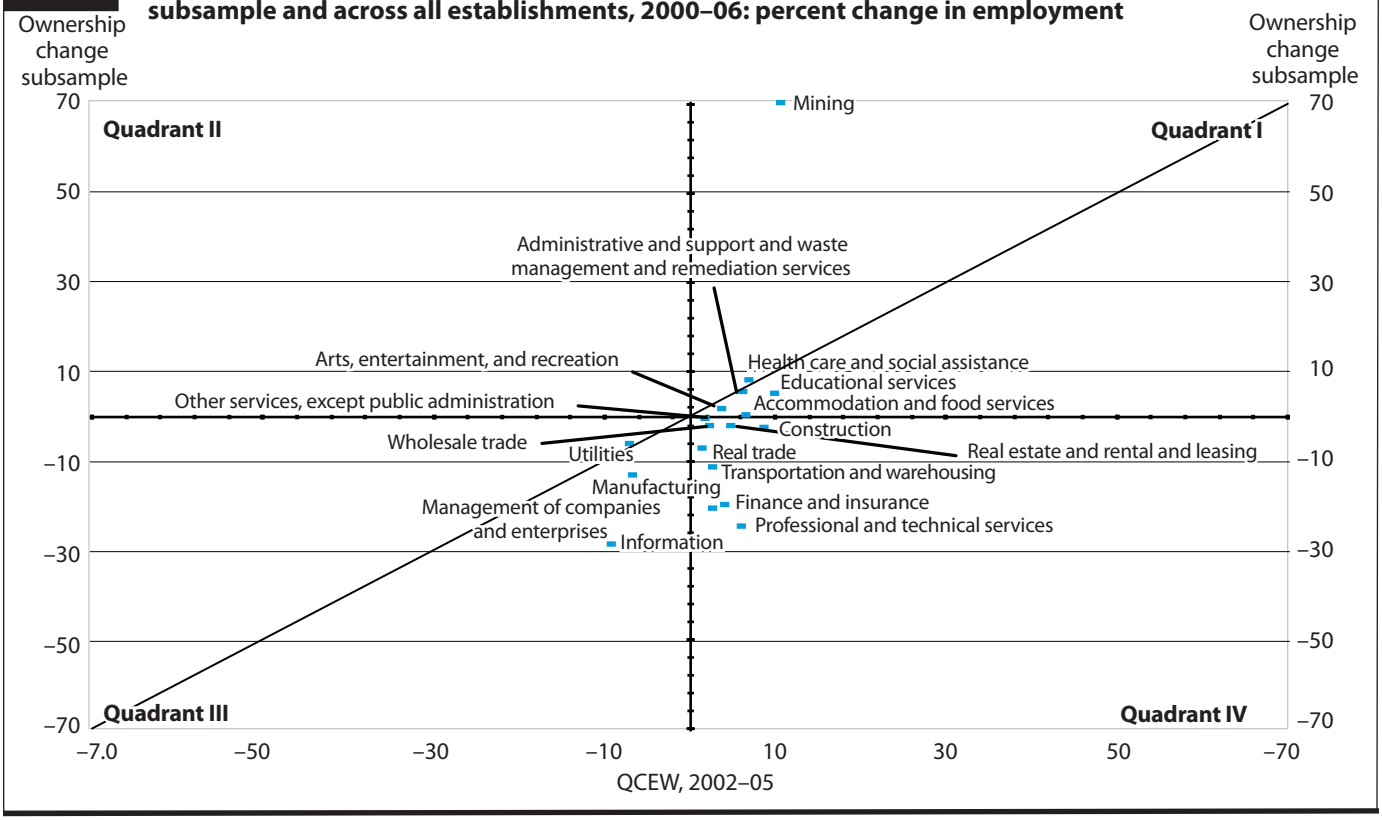
Sectors most affected by ownership changes

Table 6 shows total employment by industry sector in the ownership change subsample predecessor and successor groups, as well as the employment change and the percent change in employment from the predecessor to the successor groups.[15] To provide a basis for comparison with all establishments in the economy, the last column contains the percent change between 2002 and 2005 QCEW average annual private-sector employment. (See also chart 2.)

About half of the sectors contracted in the ownership change subsample while they grew overall in the economy: professional and technical services; management of companies and enterprises; finance and insurance; transportation and warehousing; retail trade; construction; real estate and rental and leasing; wholesale trade; and other services, except public administration. Moreover, all sectors except mining and except health care and social assistance either shrank in the ownership change subsample while they grew overall, or grew in the subsample by a smaller percentage than they grew overall. The information and manufacturing sectors contracted substantially more in the ownership change subsample than they contracted across all establishments. In the information sector, employment in establishments that changed ownership fell by 29 percent, while employment in all establishments in this sector fell by 9 percent over the same period. Sectors that grew in the ownership change subsample, but by less than the industry grew as whole, were accommodation and food services; arts, entertainment, and recreation; administrative and support and waste management and remediation services; and educational services. Mining grew the most in the ownership change subsample relative to the economy. Much of this growth was due to oil and gas extraction and will be discussed in the next section.

That some industries experienced particularly large employment declines in the ownership change subsample relative to the economy as a whole might explain some large declines in occupational groups that are central to those industries. For instance, in May 2006, sales and related occupations made up 54 percent of the retail trade industry. The large employment drop in retail trade establishments that changed ownership (despite overall expansion) between 2000 and 2006 might explain the cross-industry observation that sales and related occu-

Chart 2. **The effect of business ownership change on industry employment in the ownership change subsample and across all establishments, 2000–06: percent change in employment**



pations shrank by more in the ownership change subsample than they shrank across establishments in the control subsample. Similarly, one might speculate that the contraction in professional and technical services establishments and in information establishments contributed to the large decline in computer and mathematical science occupations. Likewise, the contraction in manufacturing establishments might have contributed to the large decline in production occupations, which made up 53 percent of the manufacturing sector in May 2006. Without a closer look at the data, however, the relationship between the decline in the industry sector and the overall employment decline of core occupations is not entirely clear. To see whether industries are more likely to reduce or retain employment in core occupations or in operational support occupations, the next section examines changes in the occupational composition of detailed industries.

Occupational change by detailed industry

In every establishment, workers in certain occupations are central to its industry's core business function, and these workers tend to be employed in relatively high concentrations. Establishments also employ operational support, or auxiliary, workers in occupations that support the core business function. Occupations that serve as support in some industries can be the core of other industries. For example, in the accounting services industry, billing clerks might be a core occupation while janitors are an operational support occupation. By contrast, in the building services industry, janitors might be considered the core occupation while billing clerks are an operational support occupation. Core occupations can be thought of as those most directly related to the establishment's output.

Earlier studies of OES data show that when establishments shrink, they tend to shed support jobs at higher rates than they shed core occupations.[16] In what follows, 10 industries are examined in further detail to see whether, when the declines in employment accompany ownership changes, the declines also are concentrated in support occupations. The results show that 5 of the highlighted industries experienced a shift in their employment concentration from support to core occupations after an ownership change, 3 others experienced a shift in employment concentration from core occupations to support oc-

cupations, and 2 had little difference in the overall mix of core and support occupations after the change.

The 10 industries that contracted the most after ownership changes were computer systems design and related services, wired telecommunication carriers, motor vehicle parts manufacturing, department stores, grocery stores, securities and commodity contracts intermediation and brokerage, management of companies and enterprises, scheduled air transportation, depository credit intermediation, and plastics product manufacturing. These industries either expanded in the overall economy or shrank by a lesser magnitude in the overall economy than they did in the ownership change subsample. At the other end of the spectrum, oil and gas extraction experienced the highest growth in the ownership change subsample (767 percent) and the third-highest increase in employment level after ownership changes, and the industry grew by a substantially greater magnitude in the subsample than it did in the economy. Tables 7–10 show how the employment of core and support occupations changed after an ownership change in these selected industries. The percentage of industry employment in the predecessor establishments represents each occupational group's employment share in the industry, out of total industry employment of the predecessor establishments. Likewise, the percentage of industry employment in the successor establishments represents each occupational group's employment share in the industry, out of total industry employment in the successor establishments.

Industries with increased concentrations of core occupations. In most industries with large employment declines, a change in ownership resulted in an increased employment share of core occupations and a decreased share of operational support occupations. For example, as shown in table 7, in scheduled air transportation there was an increase in the share of core occupations—personal care and service occupations, which include flight attendants; and transportation and material moving occupations, which include pilots. At the same time, there was a decrease in the share of support occupations—office and administrative support; and installation, maintenance, and repair occupations. It is possible that the decrease was due to increased outsourcing in the industry, although this article does not examine that possibility.

Similarly, wired telecommunications carriers that changed ownership had increased shares of installation, maintenance, and repair; computer and mathematical science; and architecture and engineering occupations, and decreased shares of office and administrative support, management, and business and financial operations occupations. Finally, in securities and commodity contracts intermediation and brokerage, there likewise was an increase in the shares of core occupations such as business and financial operations occupations and sales and related occupations (the latter of which includes securities, commodities, and financial services sales agents) and a decline in support occupations, with computer and mathematical science occupations falling from 28 percent before the ownership changes to 14 percent afterwards and office and administrative support occupations dropping from 19 percent to 15 percent of total employment.

In depository credit intermediation (which shrank in the ownership change subsample, but grew overall in the economy), which consists of credit unions and commercial banks, the share of core business and financial operations occupations rose from 14 percent to 18 percent of total employment. The share of core office and administrative support occupations, which include tellers and similar core occupations employed in banks, was relatively stable at 61 percent, and sales and related occupations increased from 4 percent to 6 percent of total employment in the industry. The share of support occupations, such as management, computer and mathematical science, and legal occupations, fell.

Like the aforementioned industries, management of companies and enterprises (which shrank in the ownership change subsample, but grew overall in the economy), in which operational support is the core business function, had increases in all core occupations and decreases in nonessential functions. This observation confirms previous behavioral research which found that when company headquarters and auxiliary offices undergo mergers or acquisitions, their chief executives tend to protect their immediate subordinates, managers, and administrators.[17]

Industries with decreased concentrations of core occupations. Sometimes a change in ownership resulted in a decreased employment share of core occupations and an increased share of operational support occupations. Industries that followed this trend included service industries such as grocery stores and department stores. In department stores and grocery stores, sales and related occupations represent the core of the business function. After an ownership change, the share of sales and related occupations in department stores fell from 73 percent to 67 percent, as shown in table 8. Similarly, in grocery stores, the share of sales and related occupations fell from 38 percent to 36 percent. In both of these industries, the share of management occupations and office and administrative support occupations rose after a change in ownership.

In plastics product manufacturing establishments, the

Table 7. Industries with increased concentrations of core occupations, 2000–06

Occupational major group	Predecessor employment	Successor employment	Predecessor employment share	Successor employment share	Percentage-point difference
NAICS 4811, Scheduled air transportation					
Total, all occupations	25,159	20,549	…	…	…
Management	376	188	1.49	.91	–.58
Business and financial operations	767	684	3.05	3.33	.28
Computer and mathematical science	115	139	.46	.68	.22
Architecture and engineering	640	170	2.54	.83	–1.72
Legal	11	11	.04	.05	.01
Arts, design, entertainment, sports, and media	133	89	.53	.43	–.10
Health care practitioner and technical	12	15	.05	.07	.03
Protective service	11	7	.04	.03	–.01
Food preparation and serving related	91	65	.36	.32	–.05
Personal care and service	6,892	6,234	27.39	30.34	2.94
Sales and related	178	153	.71	.74	.04
Office and administrative support	7,356	5,902	29.24	28.72	–.52
Installation, maintenance, and repair	3,531	1,761	14.03	8.57	–5.46
Transportation and material moving	4,968	5,074	19.75	24.69	4.95
NAICS 5171, Wireless telecommunication carriers					
Total, all occupations	42,629	30,277	…	…	…
Management	3,351	834	7.86	2.75	–5.11
Business and financial operations	4,807	3,293	11.28	10.88	–.40
Computer and mathematical science	5,915	5,990	13.88	19.78	5.91
Architecture and engineering	3,116	2,570	7.31	8.49	1.18
Life, physical, and social science	416	152	.98	.50	–.47
Legal	161	33	.38	.11	–.27
Arts, design, entertainment, sports, and media	575	78	1.35	.26	–1.09
Health care practitioner and technical	4	7	.01	.02	.01
Protective service	12	6	.03	.02	–.01
Building and grounds cleaning and maintenance	26	13	.06	.04	–.02
Sales and related	4,114	2,543	9.65	8.40	–1.25
Office and administrative support	13,138	7,404	30.82	24.45	–6.37
Construction and extraction	8	5	.02	.02	–.002
Installation, maintenance, and repair	6,937	7,277	16.27	24.03	7.76
Production	3	33	.01	.11	.10
Transportation and material moving	21	39	.05	.13	.08
NAICS 5231, Securities and commodity contracts intermediation and brokerage					
Total, all occupations	9,093	3,482	…	…	…
Management	1,711	687	18.82	19.73	.91
Business and financial operations	1,370	1,214	15.07	34.87	19.80
Computer and mathematical science	2,533	489	27.86	14.04	–13.81
Legal	119	26	1.31	.75	–.56
Sales and related	992	540	10.91	15.51	4.60
Office and administrative support	1,735	509	19.08	14.62	–4.46
NAICS 5221, Depository credit intermediation					
Total, all occupations	28,275	21,465	…	…	…
Management	2,881	1,774	10.19	8.26	–1.93
Business and financial operations	3,860	3,762	13.65	17.52	3.87
Computer and mathematical science	2,718	1,378	9.61	6.42	–3.20
Architecture and engineering	88	59	.31	.27	–.04
Life, physical, and social science	45	49	.16	.23	.07
Legal	80	19	.28	.09	–.19
Arts, design, entertainment, sports, and media	116	59	.41	.27	–.14
Protective service	51	29	.18	.14	–.05
Building and grounds cleaning and maintenance	43	25	.15	.12	–.04

Table 7. Continued—Industries with increased concentrations of core occupations, 2000–06

Occupational major group	Predecessor employment	Successor employment	Predecessor employment share	Successor employment share	Percentage-point difference
Sales and related	1,081	1,249	3.82	5.82	1.99
Office and administrative support	17,255	13,010	61.03	60.59	–.44
Installation, maintenance, and repair	40	47	.14	.22	.08
Transportation and material moving	9	4	.03	.02	–.01
NAICS 5511, Management of companies and enterprises					
Total, all occupations	26,541	20,953	…	…	…
Management	3,829	3,691	14.43	17.62	3.19
Business and financial operations	3,480	3,581	13.11	17.09	3.98
Computer and mathematical science	1,930	1,748	7.27	8.34	1.07
Architecture and engineering	788	778	2.97	3.71	.74
Life, physical, and social science	441	324	1.66	1.55	–.12
Community and social services	82	64	.31	.31	.00
Legal	218	211	.82	1.01	.19
Education, training, and library	8	30	.03	.14	.11
Arts, design, entertainment, sports, and media	257	324	.97	1.55	.58
Health care practitioner and technical	736	59	2.77	.28	–2.49
Protective service	148	91	.56	.43	–.12
Food preparation and serving related	410	101	1.54	.48	–1.06
Building and grounds cleaning and maintenance	370	132	1.39	.63	–.76
Sales and related	1,369	1,066	5.16	5.09	–.07
Office and administrative support	7,478	6,122	28.18	29.22	1.04
Construction and extraction	259	139	.98	.66	–.31
Installation, maintenance, and repair	886	530	3.34	2.53	–.81
Production	1,892	670	7.13	3.20	–3.93
Transportation and material moving	1,400	1,283	5.27	6.12	.85

NOTE: Detailed data on employment may not sum to total employment because not all occupational groups are listed.

share of production occupations fell from 59 percent to 57 percent and the share of transportation and material moving occupations also fell. By contrast, the share of office and administrative support occupations and management occupations rose. This conjunction of events supports Donald Siegel and Frank Lichtenberg's finding that in manufacturing firms, only production personnel, as opposed to nonproduction employees, experienced relative employment declines.[18]

Industries without a clear shift in either core or support occupations. Two of the 10 industries examined in this section show little difference in the overall mix of core and support occupations. However, there was a shift in employment among the core occupations in these industries. As table 9 shows, in motor vehicle parts manufacturing the share of labor-intensive production occupations rose from 65 percent to 67 percent while architecture and engineering occupations; installation, maintenance, and repair occupations; and transportation and material moving occupations each decreased slightly. There was little change in support occupations, such as management occupations and office and administrative support occupations.

In computer systems design and related services (which shrank in the ownership change subsample, but grew overall in the economy), there were shifts within the core and support occupational groups, but there was no clear shift toward core occupations. Among core occupations, computer and mathematical science occupations and architecture and engineering occupations saw their employment shares remain relatively stable while the share of installation, maintenance, and repair occupations, which include computer repairers, increased from 2 percent to 5 percent. Among support occupations, office and administrative support occupations shrank while sales and related occupations grew. Core detailed occupations that *increased* the most included sales engineers; logisticians; network systems and data communications

Table 8. Industries with decreased concentrations of core occupations, 2000–06

Occupational major group	Predecessor employment	Successor employment	Predecessor employment share	Successor employment share	Percentage-point difference
NAICS 4521, Department stores					
Total, all occupations	72,158	63,752	…	…	…
Management	1,072	1,026	1.49	1.61	.12
Business and financial operations	475	232	.66	.36	–.29
Computer and mathematical science	13	8	.02	.01	–.01
Arts, design, entertainment, sports, and media	540	571	.75	.90	.15
Health care practitioner and technical	637	622	.88	.98	.09
Health care support	35	29	.05	.05	([1])
Protective service	1,350	1,295	1.87	2.03	.16
Food preparation and serving related	759	576	1.05	.90	–.15
Building and grounds cleaning and maintenance	230	342	.32	.54	.22
Personal care and service	715	823	.99	1.29	.30
Sales and related	52,902	42,904	73.31	67.30	–6.02
Office and administrative support	11,556	13,805	16.01	21.65	5.64
Construction and extraction	38	24	.05	.04	–.02
Installation, maintenance, and repair	216	310	.30	.49	.19
Production	387	369	.54	.58	.04
Transportation and material moving	1,218	816	1.69	1.28	–.41
NAICS 4451, Grocery stores					
Total, all occupations	83,107	75,679	…	…	…
Management	1,186	1,107	1.43	1.46	.04
Business and financial operations	172	167	.21	.22	.01
Computer and mathematical science	9	16	.01	.02	.01
Arts, design, entertainment, sports, and media	241	295	.29	.39	.10
Health care practitioner and technical	1,554	1,830	1.87	2.42	.55
Health care support	368	372	.44	.49	.05
Protective service	451	239	.54	.32	–.23
Food preparation and serving related	8,731	8,915	10.51	11.78	1.27
Building and grounds cleaning and maintenance	883	610	1.06	.81	–26
Personal care and service	807	37	.97	.05	–.92
Sales and related	31,705	27,393	38.15	36.19	–1.96
Office and administrative support	24,598	22,598	29.60	29.86	.26
Farming, fishing, and forestry	108	53	.13	.07	–.06
Installation, maintenance, and repair	386	218	.46	.29	–.18
Production	5,066	4,959	6.10	6.55	.46
Transportation and material moving	6,842	6,870	8.23	9.08	.84
NAICS 3261, Plastics product manufacturing					
Total, all occupations	19,991	17,835	…	…	…
Management	758	708	3.79	3.97	.18
Business and financial operations	265	348	1.33	1.95	.63
Computer and mathematical science	59	56	.30	.31	.02
Architecture and engineering	595	815	2.98	4.57	1.59
Life, physical, and social science	77	9	.39	.05	–.33
Arts, design, entertainment, sports, and media	29	38	.15	.21	.07
Health care practitioner and technical	3	12	.02	.07	.05
Building and grounds cleaning and maintenance	98	89	.49	.50	.01
Sales and related	202	282	1.01	1.58	.57
Office and administrative support	1,509	1,435	7.55	8.05	.50
Construction and extraction	346	116	1.73	.65	–1.08
Installation, maintenance, and repair	1,384	1,115	6.92	6.25	–.67
Production	11,708	10,191	58.57	57.14	–1.43
Transportation and material moving	2,954	2,616	14.78	14.67	–.11

[1] Slight negative percentage-point difference.

NOTE: Detailed data on employment may not sum to total employment because not all occupational groups are listed.

Table 9. Industries without a clear shift in either core or support occupations, 2000–06

Occupational major group	Predecessor employment	Successor employment	Predecessor employment share	Successor employment share	Percentage-point difference
NAICS 3363, Motor vehicle parts manufacturing					
Total, all occupations	35,706	26,443	…	…	…
Management	1,045	716	2.93	2.71	–.22
Business and financial operations	717	618	2.01	2.34	.33
Computer and mathematical science	132	122	.37	.46	.09
Architecture and engineering	2,834	1,811	7.94	6.85	–1.09
Life, physical, and social science	49	58	.14	.22	.08
Arts, design, entertainment, sports, and media	61	75	.17	.28	.11
Health care practitioner and technical	37	38	.10	.14	.04
Protective service	36	33	.10	.12	.02
Building and grounds cleaning and maintenance	154	103	.43	.39	–.04
Sales and related	474	312	1.33	1.18	–.15
Office and administrative support	1,610	1,287	4.51	4.87	.36
Construction and extraction	537	378	1.50	1.43	–.07
Installation, maintenance, and repair	2,075	1,186	5.81	4.49	–1.33
Production	23,033	17,730	64.51	67.05	2.54
Transportation and material moving	2,910	1,976	8.15	7.47	–.68
NAICS 5415, Computer systems design and related services					
Total, all occupations	33,688	15,081	…	…	…
Management	2,937	1,196	8.72	7.93	–.79
Business and financial operations	3,520	1,507	10.45	9.99	–.46
Computer and mathematical science	15,005	6,792	44.54	45.04	.50
Architecture and engineering	2,519	936	7.48	6.21	–1.27
Life, physical, and social science	113	93	.34	.62	.28
Legal	36	16	.11	.11	([1])
Arts, design, entertainment, sports, and media	595	269	1.77	1.78	.02
Protective service	54	24	.16	.16	([1])
Sales and related	1,025	801	3.04	5.31	2.27
Office and administrative support	6,767	2,535	20.09	16.81	–3.28
Installation, maintenance, and repair	533	717	1.58	4.75	3.17
Production	471	66	1.40	.44	–.96
Transportation and material moving	65	78	.19	.52	.32

[1] Slight negative percentage-point difference.

NOTE: Detailed data on employment may not sum to total employment because not all occupational groups are listed.

analysts; computer software engineers, systems software; computer software engineers, applications; and computer support specialists. Meanwhile, the core detailed occupations that *decreased* the most after a change in ownership included industrial engineers; computer specialists, all other; computer programmers; and computer hardware engineers.

An example of an industry that grew after ownership changes. The same study which found that shrinking establishments shed support occupations first also found that growing establishments add support occupations first.[19] In order to contrast employment changes among industries that grew after ownership changes with those which declined, one growing industry is examined in detail.

The oil and gas extraction industry (which grew by a greater magnitude in the subsample than it did overall) exhibited a drastic shift from essential labor-intensive occupational groups to operational support occupations, despite the fact that each occupational group increased in

Table 10. Example of an industry that grew after ownership change, 2000–06

Occupational major group	Predecessor employment	Successor employment	Predecessor employment share	Successor employment share	Percentage-point difference
NAICS 2111, Oil and gas extraction					
Total, all occupations	441	3,824	…	…	…
Management	36	534	8.16	13.96	5.80
Business and financial operations	30	997	6.80	26.07	19.27
Computer and mathematical science	8	224	1.81	5.86	4.04
Architecture and engineering	33	329	7.48	8.60	1.12
Life, physical, and social science	10	400	2.27	10.46	8.19
Legal	2	139	.45	3.63	3.18
Sales and related	2	200	.45	5.23	4.78
Office and administrative support	68	486	15.42	12.71	–2.71
Construction and extraction	126	210	28.57	5.49	–23.08
Installation, maintenance, and repair	31	64	7.03	1.67	–5.36
Production	28	76	6.35	1.99	–4.36
Transportation and material moving	63	117	14.29	3.06	–11.23

NOTE: Detailed data on employment may not sum to total employment because not all occupational groups are listed.

employment level in the successor establishments. Core construction and extraction occupations in the industry held a dominant 29-percent share before ownership changes, but only a 6-percent share afterwards, while the share of support business and financial operations occupations increased from almost 7 percent to a dominant 26 percent after ownership changes. In addition to construction and extraction occupations, the following labor-intensive occupational groups decreased in employment share after ownership changes: installation, maintenance, and repair; production; and transportation and material moving occupations. In addition to business and financial operations occupations, the following operational support occupations increased in employment share after ownership changes: management; computer and mathematical science; architecture and engineering; life, physical, and social science; and legal occupations. These findings in the establishments that changed ownership in the oil and gas extraction industry are consistent with those of a separate study of recent trends in occupational employment across all establishments in the industry.[20] This research found that, during the recent spate of oil and gas price increases, the overall staffing of the industry was shifting away from extraction activities and toward exploration.

Occupational employment by establishment size

This final section shows that changes in occupational composition that followed ownership changes varied by the size of the establishment. Establishments were grouped into five size classes before and after the ownership change: 1 to 9 employees; 10 to 49 employees; 50 to 249 employees; 250 to 999 employees; and 1,000 or more employees. In order to focus on changes in occupational composition within size classes, the subsample was then divided into five size groups based on deviations of fewer than two size classes: very small, small, medium, large, and very large.[21] Establishments chosen for the study were limited to the 21,923 out of the 22,198 establishments that changed by fewer than two size classes: 17,166 establishments that did not change size class, 2,598 establishments that decreased by one size class, and 2,159 establishments that increased by one size class.[22] As was done in the industry analysis, the percent employment of each occupational group in predecessor and successor establishments was calculated for every size group. The predecessor employment share represents the percentage of occupational employment out of total predecessor employment in the size group, and the successor employment share represents the percentage of occupational employment out of total successor employment in the size group. As before, growth indicates growth in the employment share, or relative importance of the occupation, not necessarily growth in the employment level. The changes in occupational share are shown in table 11.

Five occupational groups grew in establishments of all sizes: life, physical, and social science; health care practi-

Table 11. Percentage-point difference between predecessor and successor employment share in the ownership change subsample, by establishment size, 2000–06

Occupational major group	Establishment size				
	Very small	Small	Medium	Large	Very large
Management	–1.03	–1.33	–0.86	–0.33	–1.14
Business and financial operations	.64	.52	.13	([1])	–1.48
Computer and mathematical science	–.04	.15	.09	.10	–2.62
Architecture and engineering	–.04	.05	.06	–.11	–.26
Life, physical, and social science	.02	.13	.03	.06	.02
Community and social services	.08	.04	–.08	.18	.28
Legal	([1])	–.04	.03	–.06	–.04
Education, training, and library	.30	.10	.34	.31	1.54
Arts, design, entertainment, sports, and media	–.15	.23	.02	([1])	–.30
Health care practitioner and technical	.14	.17	.29	1.06	2.86
Health care support	.42	.36	.22	.97	1.58
Protective service	.02	.27	1.04	.83	.63
Food preparation and serving related	.26	–.46	–.02	.21	.79
Building and grounds cleaning and maintenance	.19	.04	([1])	–.48	.56
Personal care and service	–.40	–.07	.07	–.36	.50
Sales and related	–.78	–.78	–1.04	–1.19	–.73
Office and administrative support	–1.10	–.22	–.60	–.11	–.36
Farming, fishing, and forestry	.07	.08	([1])	.01	.03
Construction and extraction	.60	.09	–.01	.11	.04
Installation, maintenance, and repair	–.33	–.11	.02	.47	–.45
Production	.50	.45	–.03	–1.21	–2.24
Transportation and material moving	.64	.33	.30	–.47	.81

[1] Less than 0.05 percentage-point difference.

tioner and technical; health care support; education, training, and library; and protective service occupations. In contrast, three occupational groups shrank in establishments of all sizes: management occupations (with its decrease the most in small, very small, and very large establishments), sales and related occupations (with its decrease the most in medium and large establishments), and office and administrative support occupations (with its decrease the most in very small establishments). The direction and magnitude of changes in all other occupational groups, however, varied.

Analytical and production occupations—business and financial operations; architecture and engineering; legal; arts, design, entertainment, sports, and media; and production occupations—did not grow in large and very large establishments. Service occupations—personal care and service; food preparation and serving related; community and social services; health care support; health care practitioner and technical; education, training, and library; building and grounds cleaning and maintenance; and transportation and material moving occupations—tended to grow the most in very large establishments.

One interesting observation is that production occupations grew only in very small or small establishments and shrank in larger establishments. In fact, there was an inverse correlation between the establishment size and the effect of ownership change on production occupations. This correlation may be the result of larger companies being able to capture economies of scale. Another observation is that computer and mathematical occupations were fairly stable in all but the very large establishments. After ownership changes, the share of computer and mathematical occupations fell by 2.6 percent, the largest change of all occupational groups in any establishment size.

An overview by size group also reveals some trends. Very small predecessor establishments, on the whole, were dominated by sales and related occupations and office and administrative support occupations. After ownership changes, the greatest decreases were in management, office and administrative support, and sales and related occupations, and the greatest increases were in business and financial operations and transportation and material moving occupations. In the small size group, the greatest changes were, again, decreases in management occupations and sales and related occupations and an increase in business and financial operations occupations.

In the medium size group, the greatest changes were an increase in protective service occupations and decreases in sales

and related occupations and management occupations. In the large size group, the greatest changes were an increase in health care practitioner and technical occupations and decreases in production occupations and sales and related occupations. Finally, in the very large size group, the greatest changes were an increase in health care practitioner and technical occupations and health care support occupations and decreases in computer and mathematical science, production, business and financial operations, and management occupations.

OCCUPATIONS THAT WERE LEAST LIKELY to be retained after ownership changes were those which performed analytical, clerical, and production work, and most of these groups' wages shifted toward higher ranges. These occupations tended to be support occupations in the industries in which their employment shares declined. Some of them declined in establishments of all sizes, although many shrank the most in large and very large establishments. Analytical and production occupations did not grow in large establishments.

In contrast, many of the jobs that were *more* likely to be retained after ownership changes were those which performed service work, such as health care and education, and most of these groups' wages shifted toward lower ranges. Very large establishments were most likely to retain their service occupations after changing ownership.

This article leaves room for future research on the effect of ownership changes on occupational employment and wages. The methodology for identifying specific types of ownership changes and capturing more predecessor and successor establishment staffing data can be refined. Further regression analysis can be conducted on the effect of ownership changes on core and support business functions, on wages by detailed occupation, and on staffing by industry or geographic location. OES data are an important input in understanding and predicting the labor market outcomes of business dynamics. □

Notes

[1] Counts include mergers, full- or partial-interest acquisitions, divestitures, and leveraged buyouts valued at $5 million. See *Statistical Abstract of the United States, 2006* (U.S. Census Bureau, 2007), Table 751, "Mergers and Acquisitions—Summary, 1990 to 2003."

[2] "What Goes Up, Must Come Down?" *Mergers & Acquisitions: The Dealermaker's Journal*, July 2007, pp. 10-11; on the Internet at **search.ebscohost.com.proxy2.library.jhu.edu/login.aspx?direct=true&db=buh&AN=25593842&site=ehost-live** (visited Sept. 8, 2007).

[3] Donald Siegel and Frank Lichtenberg, "The Effect of Ownership Changes on the Employment and Wages of Central-Office and Other Personnel," *Journal of Law and Economics*, October 1990, pp. 383–408.

[4] Robert McGuckin and Sang Nguyen, *The impact of ownership changes: a view from labor markets* (U.S. Census Bureau, Center for Economic Studies, 2001).

[5] Robert McGuckin, Sang Nguyen, and Arnold Reznek, "On Measuring the Impact of Ownership Change on Labor: Evidence from U.S. Food-Manufacturing Plant-Level Data," in John Haltiwanger, Marilyn Manser, and Robert Topel (eds.), *Labor Statistics Measurement Issues*, NBER Studies in Income and Wealth, vol. 60 (Chicago, University of Chicago Press, 1998).

[6] Approximately 2 percent of the wage data were imputed.

[7] In addition, 1,233 establishments reported 3 times, and 5 firms reported 4 times; these 1,238 firms were excluded from the ownership change subsample. The exclusion of establishments that reported more than twice should not introduce significant bias into the subsample.

[8] See, for example, the Thomson Financial Merger and Corporate Transactions database, on the Internet at **www.census.gov/compendia/statab/2006/tables/06s0752.xls**. Mergers, full- or partial-interest acquisitions, divestitures, and leveraged buyouts valued at $5 million or more are listed in the database.

[9] The method for obtaining published OES estimates applies weights for each sample establishment in each panel of the survey in order to represent all establishments that were part of the in-scope frame from which the panel was selected. In the study presented in this article, employment was not adjusted by the unit sampling weights.

[10] According to QCEW annual private-sector employment figures, total employment was 107,577,281 in 2002 and 110,611,016 in 2005.

[11] Occupations listed are those whose employment shares grew or declined by at least 0.01 percentage point *and* 30 percent from the predecessor to the successor group.

[12] For a discussion of the outsourcing of technical jobs, see Ashkok Bardhan and Cynthia Kroll, "The New Wave of Outsourcing," Fisher Center Research Report No. 1103 (Berkeley, CA, Fisher Center for Real Estate & Urban Economics, November 2003), on the Internet at **repositories.cdlib.org/iber/fcreue/reports/1103** (visited Sept. 26, 2008); Alan Blinder, "How Many U.S. Jobs Might Be Offshorable?" CEPS Working Paper No. 142 (Princeton, NJ, Center for Economic Policy Studies, March 2007), on the Internet at **www.princeton.edu/~ceps/workingpapers/142blinder.pdf** (visited Sept. 26, 2008); and J. Bradford Jensen and Lori G. Kletzer, "Measuring Tradable Services and the Task Content of Offshorable Services Jobs," paper presented at the National Bureau of Economic Research Conference on Research in Income and Wealth, titled "Labor in the New Economy," November 16–17, 2007, Washington, DC, on the Internet at **people.ucsc.edu/~lkletzer/TradableServices&Job_task_content_110907.pdf** (visited Sept. 26, 2008).

[13] Because the wage range definitions were revised in November 2005, the successor data collected with November 2005 and May 2006 reference dates, as well as their corresponding predecessor records, were removed from the subsample solely for this wage analysis. The wage analysis used 14,828 unique establishments (29,656 predecessor and successor records).

[14] The employment share of an occupational group in, for example, the wage range headed "Under $6.75" is the percentage of employment in that occupational group out of total employment in the occupational group.

[15] A few establishments changed their industry classification when they reported the second time, but most that did so did not change industry sector. For consistency, the successors' industries were assigned to the predecessors'.

[16] Zachary Warren, "Occupational Shares in Growing and Shrinking Establishments," *Occupational Employment and Wages* (Bureau of Labor Statistics, May 2005), pp. 1–14; see especially p. 5.

[17] Andre Shleifer and Robert Vishny, "Value Maximization and the Acquisition Process," *Journal of Economic Perspectives*, winter 1988, pp. 7–20.

[18] Siegel and Lichtenberg, "The Effect of Ownership Changes."

[19] Warren, "Occupational Shares."

[20] Jeffrey Holt, "Recent Changes in Occupational Employment and Wages in Oil and Gas Extraction," internal BLS document, 2008.

[21] The *very small* group consisted of establishments with 1–9 employees before the ownership change and either 1–9 employees or 10–49 employees after the ownership change. The *small* group comprised establishments whose predecessors were in the 10–49-employee size class and whose successors stayed in the same size class or changed by one size class. The *medium* group encompassed establishments whose predecessors were in the 50–249-employee size class and whose successors were in the same size class or one size class below or above it. The *large* group consisted of establishments whose predecessors were in the 250–999-employee size class and whose successors were in the same size class or one size class below or above it. Finally, the *very large* group comprised establishments whose predecessors started in the employee size class of 1,000 or more and whose successors either remained in this size class or contracted to the 250–999-employee size class.

[22] Excluded from the study were the 246 establishments that changed by two size classes, the 25 establishments that changed by three size classes, and the 4 establishments that changed by four size classes. Small units might have been acquired by larger corporations with the intent to expand them, so their occupational employment changes are relative extremes.