

# Turnarounds

Jeffrey L. Furman\* and Anita M. McGahan†

*Boston University School of Management, Boston, MA, USA*

For many years, business turnarounds have captured the attention of scholars and fascinated executives. Yet despite their centrality as a business phenomenon, little is known about the prevalence or trajectory of turnarounds. This paper provides evidence on a broad cross-section of publicly traded companies to fill the gap. The results indicate that since 1987 the financial-market premium on businesses with very low performance has been higher than the premium on companies with moderately low performance. Since 1993 the premium escalated dramatically, consistent with the idea that investors became increasingly enthusiastic about the prospect of turnarounds. The evidence suggests that this enthusiasm may be unfounded: During the 1980s and 1990s, businesses that experienced an episode of profitability in the lowest quintile of the economy rarely both retained their organizational stability and rebounded to achieve performance in the top quintile. In particular, very low performers that reported financial results as stable entities for 5 years were 3.4 times as likely to sustain their very low performance as to become very high performers. Similarly, only 3% of businesses that posted very high performance after having survived a 5-year period had been very low performers at the beginning of the period. The paper also identifies several of the exceptional businesses that remained independent, survived, and accomplished turnarounds during the 1980s and 1990s, and shows that the financial markets were not effective at identifying their impending turnarounds *ex ante*. Copyright © 2002 John Wiley & Sons, Ltd.

## INTRODUCTION

Business turnarounds have fascinated executives for decades. Since the inception of Strategy as an academic field, scholars have studied turnarounds to distinguish effective management styles and practices. Yet despite the centrality of turnarounds as a business phenomenon, little systematic evidence is available on the prevalence and trajectory of businesses that succeed in moving from very low profitability to very high profitability. In particular, research in economics and strategy has not generated much information about the frequency with which firms in states of poor performance subsequently achieve superior performance. The antecedent literature also does not focus on the nature of the performance

trajectory as low performers subsequently improve, nor does it provide an indication on whether prospective turnarounds can be identified *ex ante*.

This paper begins to fill the gap by providing evidence on a broad cross-section of the companies that are publicly traded on US financial markets. The dataset covers the period from 1981 to 2000, and includes information on publicly traded firms in the agriculture, mining, manufacturing, transportation, wholesale trade, retail trade, and service sectors. The analysis considers a turnaround at the level of the ‘business segment’, or ‘business’, which is defined as the activities of a corporation within a particular industry as reported to the Securities and Exchange Commission. For example, three of General Electric’s business segments in 1992 were major appliances (SIC 3630), aircraft engines (SIC 3724), and broadcasting (4833). Thus, business segments are akin to but somewhat broader than business units.

\*Correspondence to: Boston University School of Management, 595 Commonwealth Avenue, Boston, MA 02215, USA.  
E-mail: furman@bu.edu  
†amcgahan@bu.edu

In this paper we define a turnaround as a change in business segment profitability from the lowest quintile among all businesses in a specific year to the highest quintile among all businesses in any subsequent year covered in the dataset. This definition of turnaround compares the performance of the business segment during both its early poor years and its later superior years with the performance of all other businesses, regardless of whether they are in the same industry. This broad definition allows for the possibility that either industry-level factors or idiosyncratic factors drive the turnaround.

The results suggest a number of important stylized facts. First, the evidence indicates that investors have long harbored enthusiasm about the prospect of improvements in performance. To assess this, we use a definition of financial market premium based on Tobin's  $q$ , which is the ratio of the financial-market value of a company to the current salvage value of the company's booked assets. This ratio takes on values greater than one when investors bid up the financial-market value of a company to reflect their assessments that its management can deliver more value than if the company's booked assets were sold off.<sup>1</sup> As a result, Tobin's  $q$  effectively measures the extent of investor enthusiasm about a company's future. Better investor assessments about a corporation's prospects generate a higher value of Tobin's  $q$  for the company. For multiple-business firms, the value of Tobin's  $q$  reflects a weighted assessment for each of the company's lines of business. Nonetheless, we use it as the best indicator of investor enthusiasm about a specific line of business within the company.<sup>2</sup> The analysis reveals that the financial-market premium on businesses in the bottom performance quintile has been greater than the premium on third- and fourth-quintile performers since 1987. This suggests that investors are more optimistic about the prospects of very low performers than they are about the prospects of businesses that perform better. Since 1993, the Tobin's  $q$  associated with the parent firms of businesses that performed in the bottom quintile has escalated. In 1999, it was so high that it exceeded the premium even on the top-quintile performers.

Second, the evidence indicates that this enthusiasm may be unfounded. Few companies achieved turnarounds between 1981 and 2000. After 5 years, very low performers—those with profitability in

the bottom quintile—were 3.4 times more likely to have sustained their poor performance (if they had survived in the same corporate form) than to be in the top quintile of performance and were 18 times as likely to have exited the dataset than to have achieved very high performance.<sup>3</sup>

Third, consistent with the previous result, the analysis indicates that very high performers only rarely have histories of turnaround. Of businesses that survive the sample for 5 years under a stable corporate form and also achieve very high performance, only 3% had been bottom-quintile performers at the beginning of the period.

Finally, we include lists identifying the prominent businesses that turned around as well as a list of those businesses that had commanded the highest financial-market premiums while they were bottom-quintile performers. Analysis indicates that the bottom-quintile performers with the highest financial-market premiums were not more likely to achieve higher performance subsequently than other bottom-quartile performers. And none of the prominent businesses that achieved turnarounds had above-average values of Tobin's  $q$  when they were previously in the bottom quintile. These results suggest that investors are not particularly effective at identifying turnarounds *ex ante*.

## METHODS

The first task in examining the prevalence and nature of turnarounds is to define a method for identifying turnarounds in business-segment performance. To do this, we rank all business segments in each year by their accounting profitability (taken as the ratio of operating income to assets) and then divide the lists into quintiles. For any particular year, business segments in the highest profitability quintile ( $Q1$ ) are considered 'very high performers', in the second highest performance quintile ( $Q2$ ) as 'moderately high performers', in the middle quintile ( $Q3$ ) as 'average performers', in the second lowest quintile ( $Q4$ ) as 'moderately low performers,' and in the lowest quintile ( $Q5$ ) as 'very low performers'. Turnarounds are defined as businesses with very low performance ( $Q5$ ) that subsequently achieved very high performance ( $Q1$ ) in any year.

This definition has several notable features. First, turnarounds are defined by comparing the performance of organizations with the economy as a whole rather than with their direct competitors. This approach allows for the possibility that turnarounds are motivated both by industry-level and positioning-level phenomenon. For example, the analysis demonstrates that several firms (although not all firms) in the oil and gas exploration business underwent turnarounds during the period. Business turnarounds observed in this industry may have been motivated by changes in industry structure as well as by idiosyncratic factors that affected the firms differently.<sup>4</sup> Second, under our definition, a business can go through a turnaround more than once if it moves from the lowest quintile to the highest quintile multiple times.<sup>5</sup> Third, this approach does not involve testing for the number of years required before a turnaround takes place. McGahan and Porter (1997b, rev. 1999) study the time required before turnarounds are actualized in a broader analysis of transition probabilities in a Markov model. Their results confirm that turnarounds tend to require periods longer than 1 year but less than about 7 years, which suggests that the length of the panel (at 20 years) is sufficient to identify turnarounds.

The analysis describes the portion of businesses that move between performance quintiles over time, focusing particularly on the prospects for improvement among businesses in the lowest profit quintile and the likelihood that very high performing businesses had once been very low performers. This approach involves identifying statistically significant departures from the patterns that would result were annual changes to be random and not correlated intertemporally. If annual business performance were random and path-independent, then the probability that business  $i$  belongs to any quintile in year  $t+1$  will be independent of its prior performance and thus be equal to 20%. We use this fact to evaluate the significance of deviations from the random outcome. This analysis also assesses whether the financial-market premium is higher on fifth-quintile businesses that subsequently turn around than among fifth-quintile businesses that do not.

The analytical approach has several important features. First, the identification of turnarounds relies exclusively on accounting data reported at the business segment level. Changes in performance quintile may be associated with shifts in

corporate accounting procedures rather than with core improvements in operations. Accounting idiosyncrasies are unlikely to drive the results, however. Even if accounting changes are more prevalent for low-performing firms than for high-performing firms, they would only rarely generate enough improvement in corporate performance to alter the gross ranking of businesses by quintile.

Second, the definition we use in this paper assesses turnarounds by comparing the performance of a particular business segment with the performance of all other segments in the dataset, rather than comparing it with only those segments in the same industry. An alternative perspective on turnarounds would instead emphasize whether a firm improved relative to its direct rivals, and would rule out performance improvements that were common across by direct competitors. The broader definition used here conforms better to idiomatic definitions by focusing on dramatic improvements, even when they are shared by direct rivals.

Third, because the analysis involves comparing changes in the quintile membership of businesses, questions arise about the absolute level of the performance improvements associated with turnarounds. To confirm these findings, we verify in sensitivity analyses that the absolute levels of performance improvements among turnaround companies are significantly greater than for fifth-quintile performers, and for all businesses as a whole.

Fourth, the analysis deals with business-segment turnarounds rather than with corporate turnarounds. This is consistent with the fact that corporate performance is generated by business-unit performance, and with the idea that business-unit turnarounds are a subject of independent interest. While some prior authors (such as McGahan 1999a, b) have noted that corporate turnarounds are tied to decisions about entry and exit from specific industries, few authors have studied the frequency and trajectory of performance improvements within specific business units.

Fifth, it is important to emphasize that the analysis covers only publicly traded companies. Many organizations that become publicly traded may have experienced turnarounds prior to their initial public offering. This analysis does not account for that experience. A principal advantage of this approach is that it allows us to track the

relationship between financial-market performance, which reflects investor enthusiasm about prospective turnarounds, and the subsequent operating performance of firms.

Sixth, the data at the foundation of this study do not allow us to track the performance of an organization through an acquisition. Consider a very low-performing business that initially operates as a single-business firm, and that posts profitability in the fifth quintile for several years. If this business is acquired, then the dissolution of the single-business firm would be recorded as an 'exit' from the dataset. If the acquiring firm reported on the entity as a new business segment, then the dataset would track the organization as an entry in the acquiring multi-segment organization. The new segment would then be tracked without reference to its prior history of poor performance as an independent organization. Thus, the dataset may exclude some turnarounds associated with acquisition. Note that the dataset would capture a turnaround subsequent to the acquisition as long as the acquired organization continued to post very low performance for at least 1 year under the new ownership. Businesses that underwent turnaround in the year of acquisition itself would be excluded from the dataset.

There is yet another potential issue associated with the tracking of acquired businesses that is worthy of consideration. Suppose that an acquired organization is subsumed into an established business of the acquiring firm. Furthermore, suppose that the merger involves immediately integrating the very low performer with a larger, established high performing business of the acquiring firm. And suppose that, as a result of the integration, the profitability reported for the merged business in the year of the acquisition qualifies as very high performance. The acquired organization would not be tracked in the dataset as a turnaround because the organization's history of very low performance as an independent entity would be lost. Note that this failure to identify a turnaround would occur only if the acquiring firm were to generate a sufficient improvement in the performance of the acquired business as to qualify itself as a very high performer in the year of acquisition.

As a result of either of these considerations, the possibility exists that acquisitions may downwardly bias estimates of the prevalence of turnaround. First, acquisitions create the possibility of

'missed turnarounds'. This would occur in the case in which a segment (a) achieves very low profitability, (b) subsequently enters a period of neither very low nor very high profitability, (c) is then acquired, and (d) finally achieves very high profitability (without experiencing very low profitability in the interim). In this case, the acquisition of the segment would obscure the event of turnaround. A second manner in which acquisition may downwardly bias estimates of turnaround arises due to potential 'double counting' of episodes of low performance. Double counting would occur when (a) a segment that had previously achieved very low profitability is acquired, (b) then achieves very low profitability under the new parent (either by continuing its episode of very low performance or via a new episode of very low performance), (c) and then achieves very high probability under the new parent. In this instance, a turnaround would be noted; however, two episodes of very low performance would be registered. As a result of these concerns, the results should be interpreted as applying to businesses whose corporate form does not change over the period under study.

## DATA

Data for the analysis are drawn from two Compustat files, both of which cover companies with equity that is publicly traded on American markets. The first files are the Compustat Business-Segment Reports for 1981–2000. These reports contain information on corporate activities by industry, which are defined by 4-digit SIC codes. (The activity of a corporation within a 4-digit SIC category is called a 'business segment'.) SEC guidelines require the reporting of information on 4-digit activity that comprises 10% or more of a company's sales. As a consequence, the Business-Segment Reports contain information on up to 10 segments per corporation in each year. Segment data prior to 1981 is excluded because of inconsistent reporting. The Business-Segment Reports are the source of data for each segment on sales, assets, and operating income.

The second files are the Compustat Basic Reports on all active and research companies from 1970 to 2000. These files provide information necessary to assess corporate performance. Data for years prior to 1981 are used only to calculate historical series relevant to Tobin's  $q$ . Tobin's  $q$  is

calculated using the procedure in Lang and Stulz (1994) and McGahan (1999b), which follows Lindenberg and Ross (1981) (also see Salinger, 1984).<sup>6</sup> The Compustat Basic file is also the source for data on the corporation's aggregate sales; assets; the replacement value of assets; the percent of assets in property, plant and equipment; and the percent of the replacement value of assets in property, plant and equipment.

Both the Compustat Business-Segment Reports and the Compustat Basic Reports are screened for anomalies in nearly the same ways as in McGahan (1999b) and McGahan and Porter (1997a, b, and 1999).<sup>7</sup> After the screens, the Business-Segment dataset contains 102 198 records, each of which applies to a corporation's activities in an industry in a specific year.<sup>8</sup> The screened Basic file contains 71 074 observations, each of which applies to a corporation in a specific year.<sup>9</sup>

After merging the files, the dataset contains information on 10 469 corporations that participate in a total of 707 industries defined by 4-digit SIC codes. Nearly 30% of the corporations participate in more than one industry after application of the screens. The primary datasets do not describe how corporations expand, however, and therefore the final dataset does not track whether an exiting business segment is subsequently acquired. On average, industries are populated for 14.6 years, and corporations are represented in the dataset for 6.8 years. Industries contain 9.1 segments in a typical year, and 30.9 segments on average over the period. The dataset contains a total of 20 550 different segments, each of which is tracked independently even through changes in its primary SIC code. The average corporation reports on 1.96 segments and the average segment has assets of \$951 million, which suggests that a typical Compustat segment reflects actual operating activity in several related 4-digit SIC codes.<sup>10</sup>

Table 1 describes the screened data at the corporate level. Panel (a) describes the data by year, and panel (b) describes the data by economic sector. In panel (a), the first column shows the number of corporations in each year. The next two columns show the average values of Tobin's  $q$  and of accounting profit by year. The average value of Tobin's  $q$  is 1.392. Average accounting profit equals 9.47% for the entire sample. Tobin's  $q$  and accounting profit are weakly correlated at 0.022. The next column in panel (a) shows that

corporations report on an average of 1.96 segments.

Panel (b) of Table 1 describes characteristics by sector. Manufacturing includes the largest number of SICs and companies (for this summary, each corporation is assigned to a sector based on the SIC category of its largest segment). The dataset probably does not represent a cross-section of actual economic activity in the service sector. Only 31 service industries are represented because Compustat does not include information on proprietorships, partnerships, or privately held corporations, all of which are significant in the sector. Sectors are similar in the average number of segments per corporation.

## EMPIRICAL RESULTS

Table 2 describes the performance of business segments in each quintile between 1981 and 2000. A number of regularities are apparent. First, the mean profitability of the businesses in the fifth quintile dropped dramatically, especially during the late 1990s and 2000. At the same time, the variance of the performance of fifth-quintile firms increased substantially. The increase in variance reflects the fact that many firms with significant operating losses also had low identifiable assets: the average size of fifth-quintile businesses peaked in 1993 at \$869 million, and then dropped in 1999 to \$377 million. In 2000, with the exit of many dotcoms, the average increased substantially to \$722 million.

To test for the sensitivity of this approach to the quintile rankings, we examined the absolute levels of performance improvements among businesses that were initially ranked in the fifth quintile. This kind of test is important because surviving fifth-quintile businesses are likely to improve profitability. Indeed, the data reveal that the improvement in profitability—measured as the ratio of operating income to assets—among fifth-quintile businesses that survived for at least one period was 4.3%, which compares favorably to the average 3.3% decline in profitability for all businesses. However, the improvement among fifth-quintile businesses that subsequently ranked in the first quintile was 41.0%. Thus, while it is true that very low performers that survive tend to improve their profitability, the improvement for those businesses

**Table 1. Screened Business-Segment Data**

Year	No. of segs.	No. of corps.	Tobin's $q^a$	Acctg. Profit <sup>b</sup>	Segs. per corp.	Year	No. of segs.	No. of corps.	Tobin's $q^b$	Acctg. Profit <sup>b</sup>	Segs. per corp.
(a) <i>By year</i>											
81	4288	2671	0.954	14.49%	1.61	92	4733	3575	1.237	9.13%	1.33
82	4831	2991	0.991	11.51	1.62	93	5928	4244	1.344	8.90	1.40
83	4887	3122	1.126	12.11	1.56	94	6351	4550	1.269	9.28	1.40
84	4812	3135	1.027	10.43	1.53	95	6434	4725	1.490	9.06	1.36
85	4813	3251	1.099	9.22	1.48	96	5516	4106	1.595	8.55	1.34
86	4791	3332	1.151	10.01	1.44	97	4443	3600	1.594	8.24	1.23
87	4809	3408	1.110	10.40	1.41	98	6392	4122	1.486	7.38	1.55
88	4664	3331	1.094	10.06	1.40	99	6222	3949	2.076	7.06	1.58
89	4558	3303	1.129	9.58	1.38	00	4539	2852	1.667	6.01	1.59
90	4542	3291	1.050	8.50	1.38						
91	4645	3415	1.205	9.13	1.36	Total	20 550	10 469	1.392	9.47%	1.96
(b) <i>By sector</i>											
First digit of SIC	Brief description of sector	No. SICs	No. segs.	No. Corps.	Tobin's $q^a$	Acctg. Profit <sup>b</sup>	Segs. per corp.				
0,1,2	Agriculture, mining	239	5770	2915	1.192	10.72%	2.33				
3	Manufacturing	228	6840	3463	1.309	9.87	2.05				
4	Transportation	44	2788	1632	1.038	8.23	2.00				
5	Wholesale & retail trade	109	2919	2016	1.214	8.82	1.73				
7	Lodging & entertainment	56	2516	1864	2.129	6.71	1.65				
8	Services	31	1049	732	1.502	9.71	1.77				
Total		707	20 550 <sup>c</sup>	10 469 <sup>c</sup>	1.392	9.47%	1.96				

<sup>a</sup> Average value of Tobin's  $q$  for the corporation associated with the segment.

<sup>b</sup> Ratio of operating income to the book value of assets for the business segments.

<sup>c</sup> The reported total differs from the sum of the entries in the column because some corporations change sectoral affiliation during the period under study.

identified as turnarounds is significantly greater than the norm.

Second, the mean Tobin's  $q$  of fifth-quintile businesses began to rise after 1987. Prior to 1987, the mean  $q$  on very low performers was about the same as for low performers. After 1987, the mean  $q$  on fifth-quintile performers became higher than for fourth-quintile firms. This implies that investors expected greater returns from businesses with very low performance than from those with moderately low performance.<sup>11</sup> After 1993, the financial-market premium on fifth-quintile businesses surpassed the premium on both third- and fourth-quintile businesses, indicating a widespread expectation of turnarounds. The financial-market premium on very low performers has exceeded the premium on second-, third-, and fourth-quintile businesses from 1998 to 2000, and in 1999 the financial-market premium on fifth-quintile businesses was even greater than the premium on first-quintile businesses. The implications are astounding:

investor expectations about the prospects for the lowest performing quintile businesses were even greater than for the top performing businesses. A cliché of the dotcom era is borne out in the data: The bigger the losses, the better—poor performance looks like a signal of future prospects.

Table 3 reports on the performance of businesses subsequent to their having ranked in the fifth profitability quintile. (Figure 1 portrays these data graphically.) Because the dataset includes observations for the period from 1981 to 2000, data exist for up to 19 years of performance trajectory after a year of very low performance. About 25% of businesses with fifth-quintile performance do not appear in the data for the subsequent year. Hypothesis testing indicates that this percentage is significantly higher than the average rate of exit for all businesses regardless of performance quintile.<sup>12</sup> Indeed, fifth-quintile performers are significantly more likely than average

**Table 2. Means and Variances of Business Segment Profits and Corporate Tobin's  $q$  by Profitability Quintile, 1981–2000 (Millions of Dollars)**

Year	Mean and Variance in business segment profits					Mean and Variance in corporate Tobin's $q$				
	Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1981	33.93 (355.49)	18.48 (4.16)	12.83 (1.93)	8.3 (1.76)	-1.07 (80.98)	1.19 (0.55)	1.05 (0.48)	0.88 (0.21)	0.82 (0.11)	0.84 (0.16)
1982	30.86 (194.26)	16.35 (3.79)	11.03 (1.72)	5.90 (3.09)	-6.56 (138.16)	1.28 (1.04)	1.07 (0.55)	0.91 (0.26)	0.87 (0.23)	0.83 (0.17)
1983	31.3 (202.78)	16.33 (4.13)	10.99 (1.57)	6.13 (2.97)	-7.33 (174.14)	1.42 (0.96)	1.20 (0.96)	1.04 (0.48)	0.98 (0.31)	0.98 (0.45)
1984	32.58 (200.00)	17.03 (3.81)	11.73 (1.55)	6.73 (2.71)	-7.51 (439.17)	1.32 (0.71)	1.07 (0.27)	0.93 (0.17)	0.91 (0.17)	0.92 (0.18)
1985	29.92 (166.92)	15.50 (3.37)	10.42 (1.58)	5.70 (2.59)	-9.39 (389.76)	1.44 (0.99)	1.14 (0.37)	0.98 (0.19)	0.97 (0.22)	0.96 (0.25)
1986	28.64 (153.31)	14.86 (3.04)	10.01 (1.76)	5.02 (2.59)	-12.41 (765.22)	1.56 (1.55)	1.17 (0.32)	1.06 (0.34)	1.01 (0.31)	0.96 (0.30)
1987	28.17 (249.48)	14.59 (3.02)	9.89 (1.45)	5.37 (2.00)	-7.96 (295.72)	1.53 (1.33)	1.12 (0.35)	1.01 (0.36)	0.94 (0.20)	0.96 (0.31)
1988	29.13 (302.11)	14.67 (3.22)	9.95 (1.34)	5.52 (2.09)	-7.27 (377.21)	1.46 (1.07)	1.13 (0.24)	0.97 (0.19)	0.92 (0.16)	0.99 (0.38)
1989	27.45 (235.65)	14.11 (2.49)	9.46 (1.34)	5.39 (1.93)	-6.08 (140.57)	1.54 (1.08)	1.14 (0.32)	0.98 (0.30)	0.95 (0.15)	1.03 (0.59)
1990	27.06 (468.74)	13.39 (2.43)	9.16 (1.14)	5.17 (1.98)	-6.88 (172.59)	1.50 (1.30)	1.06 (0.34)	0.91 (0.29)	0.86 (0.12)	0.93 (0.44)
1991	25.35 (203.01)	12.68 (2.23)	8.43 (1.10)	4.23 (2.25)	-8.17 (158.29)	1.80 (2.32)	1.24 (0.66)	1.00 (0.24)	0.94 (0.36)	1.05 (1.06)
1992	25.71 (189.14)	13.05 (2.76)	8.76 (0.95)	4.95 (1.80)	-6.83 (193.6)	1.81 (2.15)	1.33 (0.75)	1.05 (0.31)	0.96 (0.34)	1.04 (0.61)
1993	26.24 (218.07)	13.09 (2.59)	8.78 (1.04)	4.81 (1.92)	-8.42 (273.85)	1.92 (2.32)	1.40 (0.80)	1.11 (0.42)	1.07 (0.41)	1.22 (1.01)
1994	26.72 (159.92)	13.66 (2.91)	9.11 (1.07)	5.32 (1.66)	-8.42 (288.63)	1.78 (1.71)	1.34 (0.90)	1.07 (0.48)	1.01 (0.35)	1.16 (0.67)
1995	26.99 (160.61)	13.79 (3.15)	9.17 (1.19)	5.01 (2.26)	-9.70 (354.63)	2.03 (3.51)	1.53 (1.44)	1.23 (2.53)	1.21 (1.49)	1.45 (2.32)
1996	25.88 (144.49)	13.60 (2.74)	9.07 (1.29)	4.99 (2.07)	-10.79 (312.58)	2.26 (4.19)	1.58 (1.76)	1.30 (0.81)	1.27 (0.97)	1.57 (2.01)
1997	26.32 (217.12)	13.85 (2.71)	9.18 (1.66)	5.04 (2.56)	-13.28 (446.02)	2.36 (3.79)	1.58 (1.04)	1.29 (0.62)	1.17 (0.51)	1.57 (2.98)
1998	32.83 (510.8)	13.91 (4.08)	8.38 (1.84)	3.53 (2.97)	-21.76 (2601.33)	2.02 (3.60)	1.48 (1.34)	1.29 (9.70)	1.12 (0.91)	1.53 (2.64)
1999	33.70 (716.18)	13.66 (4.44)	7.97 (2.05)	2.46 (3.93)	-22.48 (817.18)	2.30 (9.15)	1.73 (14.11)	1.26 (2.12)	1.62 (11.35)	3.48 (62.49)
2000	35.45 (684.77)	14.46 (6.42)	8.16 (2.42)	2.18 (4.34)	-30.21 (15551.46)	2.03 (4.24)	1.59 (5.24)	1.35 (3.62)	1.35 (2.45)	2.02 (6.06)

**Table 3. The Fates of Very Low-Performing Business Segments Percentage of Business Segments by Profit Quintile Years Following Very Low Performance**

# Years after very low performance	In years following a year of very low performance										
	Percentage exit from dataset (%)	Percentage in quintile					Z value for quintile <sup>a</sup>				
		Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1	25.2	0.019	0.039	0.074	0.232	0.636	<b>-54.61</b>	<b>-48.65</b>	<b>-38.17</b>	<b>9.53</b>	<b>131.90</b>
2	40.5	0.045	0.075	0.117	0.250	0.513	<b>-40.31</b>	<b>-32.69</b>	<b>-21.76</b>	<b>13.15</b>	<b>81.61</b>
3	51.0	0.067	0.098	0.137	0.252	0.446	<b>-30.29</b>	<b>-23.33</b>	<b>-14.29</b>	<b>11.85</b>	<b>56.06</b>
4	59.2	0.087	0.114	0.147	0.260	0.392	<b>-22.88</b>	<b>-17.51</b>	<b>-10.76</b>	<b>12.19</b>	<b>38.96</b>
5	65.3	0.104	0.131	0.161	0.251	0.353	<b>-17.25</b>	<b>-12.43</b>	<b>-7.03</b>	<b>9.14</b>	<b>27.57</b>
6	69.6	0.118	0.139	0.171	0.242	0.330	<b>-13.28</b>	<b>-9.83</b>	<b>-4.69</b>	<b>6.79</b>	<b>21.01</b>
7	73.0	0.129	0.143	0.174	0.246	0.309	<b>-10.34</b>	<b>-8.32</b>	<b>-3.84</b>	<b>6.64</b>	<b>15.86</b>
8	76.2	0.127	0.158	0.168	0.256	0.290	<b>-9.51</b>	<b>-5.40</b>	<b>-4.10</b>	<b>7.30</b>	<b>11.70</b>
9	78.8	0.140	0.153	0.176	0.240	0.291	<b>-7.02</b>	<b>-5.46</b>	<b>-2.84</b>	<b>4.64</b>	<b>10.68</b>
10	81.5	0.156	0.150	0.185	0.233	0.276	<b>-4.63</b>	<b>-5.23</b>	-1.57	<b>3.47</b>	<b>7.97</b>
11	83.6	0.158	0.165	0.199	0.221	0.257	<b>-3.88</b>	<b>-3.27</b>	-0.12	<b>1.96</b>	<b>5.31</b>
12	85.8	0.158	0.167	0.210	0.246	0.220	<b>-3.43</b>	<b>-2.74</b>	0.84	<b>3.74</b>	1.60
13	87.8	0.164	0.177	0.218	0.250	0.192	<b>-2.53</b>	-1.65	1.25	<b>3.53</b>	-0.60
14	89.5	0.150	0.170	0.240	0.255	0.185	<b>-3.07</b>	-1.84	2.46	<b>3.38</b>	-0.92
15	91.1	0.158	0.174	0.234	0.258	0.177	<b>-2.17</b>	-1.32	1.73	<b>2.96</b>	-1.20
16	92.2	0.150	0.150	0.252	0.255	0.194	<b>-2.16</b>	<b>-2.16</b>	<b>2.22</b>	<b>2.36</b>	-0.26
17	93.6	0.163	0.152	0.225	0.275	0.185	-1.24	-1.61	0.82	2.51	-0.49
18	94.1	0.167	0.185	0.241	0.278	0.130	-0.87	-0.38	1.06	2.02	-1.83
19	95.3	0.150	0.175	0.250	0.275	0.150	-0.79	-0.40	0.79	1.19	-0.79

<sup>a</sup>Z-values of hypothesis test that probability of business's being in quintile *X* in the years following a year of very low performance differs from random (i.e., result of  $H_0$ : cell  $\text{Pr} = 0.20$ ). Boldfaced type indicates tests significant for  $p < 0.05$ .

to exit in each year up to 17 years subsequent to their poor performance.

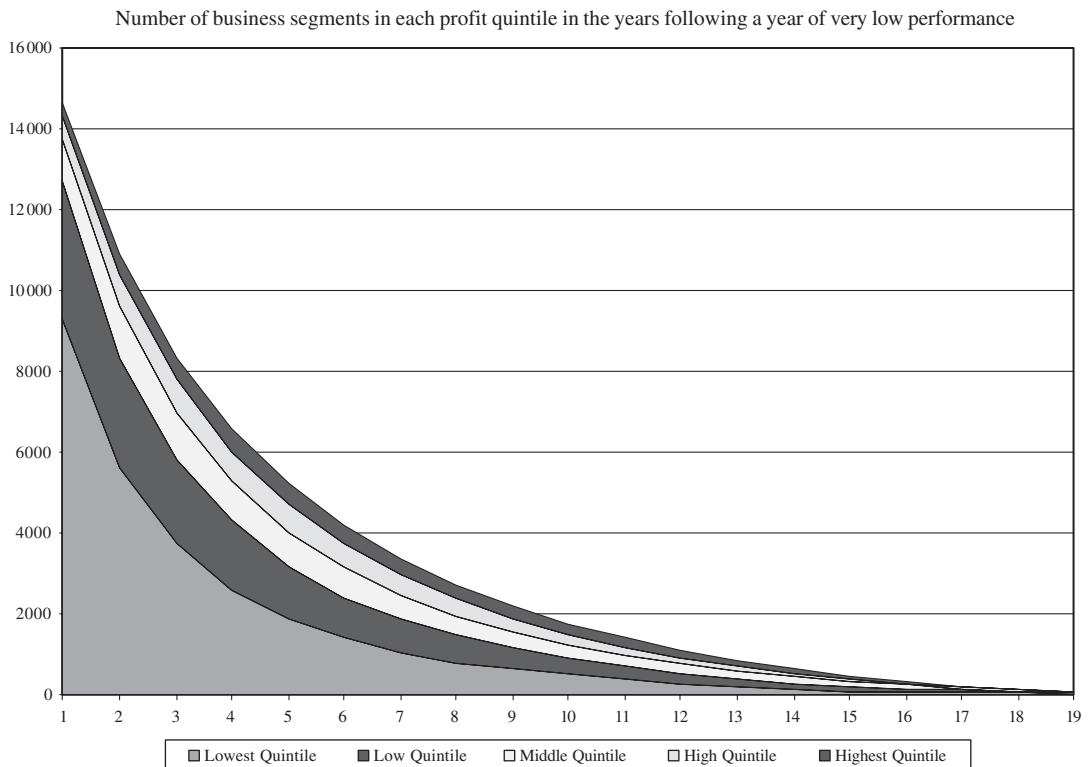
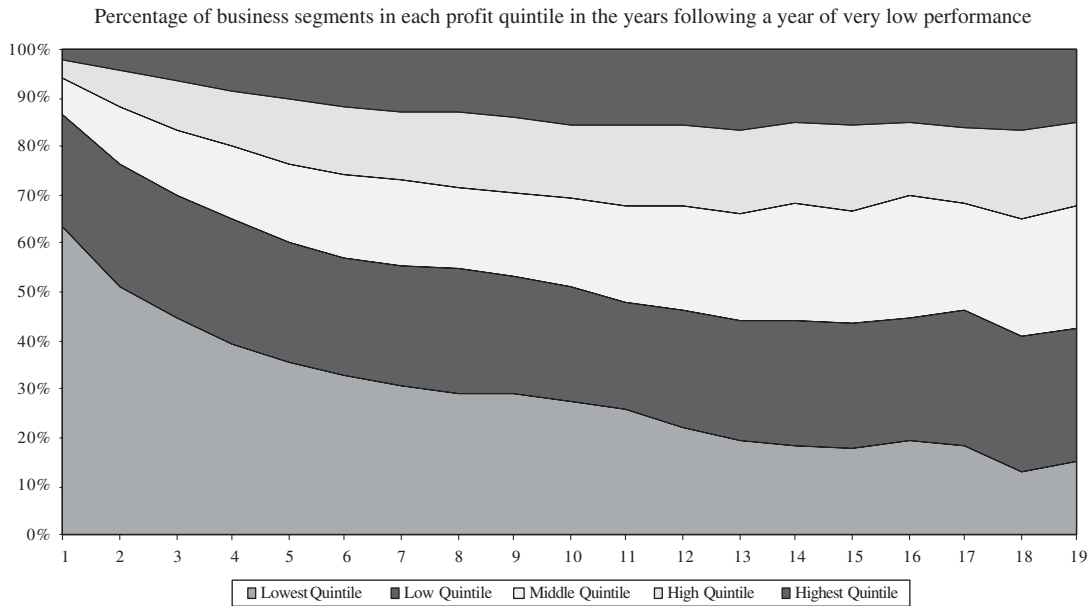
The results in Table 3 also indicate that the fifth-quintile performers that survived were more likely to sustain very low performance than to become high performers. In the first year after fifth-quintile performance, 63.6% of survivors persisted as very low performers, while just 1.9% of survivors posted first-quintile performance. After 5 years, 35.3% of survivors persisted in the fifth quintile, with just 10.4% of survivors in the first quintile. Thus, after 5 years, about 3% of the businesses that originally posted fifth-quintile performance both survived and ranked in the first quintile.<sup>13</sup> After 15 years, just 8.9% survived, with 15.9% of survivors in the first quintile; thus, just 1% of fifth-quintile performers had become first-quintile performers after 15 years. Hypothesis testing suggests that the outcomes for previously very low performing businesses do not follow a uniform distribution. Specifically, for each of the 11 years after a business has achieved fifth-quintile performance, its probability of remaining in the bottom quintile (conditional on not exiting the dataset) is statistically greater than random (20%); similarly, for each of the 17 years after a year of very low

performance, the probability of a business (that survives in the dataset) achieving top quintile profits is significantly lower than 20%.

Table 4 shows the performance histories of firms that subsequently posted very low performance. (Figure 2 depicts these data graphically.) The table is helpful for discerning how fifth-quintile performance emerges. If the patterns in the table were to show that very low performance emerges quickly even for firms with histories of high performance, then the financial-market premiums on companies might be associated with a view that very low performance is transitory. The evidence in Table 4 is not consistent with this possibility, however. Over 60% of fifth-quintile performers with a history had fifth-quintile performance in the prior year. Five years prior to very low performance, just 5% were very high performers.<sup>14</sup> Thus, we cannot conclude that expectations about turn-arounds were based on a longer track record of prior performance.

The analysis raises questions about how very high performance arises from if not from low performance. Table 5 shows that 20% of first-quintile performers have no performance histories in the dataset. (Figure 3 presents these





**Figure 1.** The fates of very low performing business segments. Percentage of business segments in each profit quintile in the years following a year of very low performance. Number of business segments in each profit quintile in the years following a year of very low performance.

graphically.) Of those with at least 1 year of history, nearly three-quarters had first-quintile performance in the prior year. The table also

shows that very high performance is much more persistent than other kinds of performance. Even 19 years prior to first-quintile performance, 40%

**Table 4. The History of Very Low Performing Business Segments Number and Percentage of Business Segments in each Profit Quintile in the Years Prior to a Year of Very Low Performance**

# Years prior to "very low" performance	Number of segments entering dataset	Number of segments exiting dataset	In years prior to a year of very low performance									
			Number of business segments in quintile					Percent of business segments in quintile				
			Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1	19 576	4209	462	812	1309	3444	9340	0.030	0.053	0.085	0.224	0.608
2	18 609	6 693	828	1109	1495	2846	5638	0.069	0.093	0.125	0.239	0.473
3	17 631	8 307	935	1114	1318	2190	3767	0.100	0.119	0.141	0.235	0.404
4	16 668	9 295	902	1021	1124	1697	2629	0.122	0.138	0.152	0.230	0.357
5	15 706	9 917	792	867	943	1308	1,879	0.137	0.150	0.163	0.226	0.325
6	14 747	10 188	661	682	776	1024	1416	0.145	0.150	0.170	0.225	0.311
7	13 785	10 200	527	544	608	835	1071	0.147	0.152	0.170	0.233	0.299
8	12 853	10 024	438	443	467	681	800	0.155	0.157	0.165	0.241	0.283
9	11 941	9 707	340	361	374	507	652	0.152	0.162	0.167	0.227	0.292
10	11 033	9 304	269	287	301	380	492	0.156	0.166	0.174	0.220	0.285
11	10 103	8 799	198	234	219	285	368	0.152	0.179	0.168	0.219	0.282
12	9 156	8 221	143	172	162	214	244	0.153	0.184	0.173	0.229	0.261
13	7 970	7 316	106	132	112	145	159	0.162	0.202	0.171	0.222	0.243
14	6 700	6 237	81	94	78	97	113	0.175	0.203	0.168	0.210	0.244
15	5 416	5 118	56	53	49	66	74	0.188	0.178	0.164	0.221	0.248
16	4 314	4 121	38	36	31	31	57	0.197	0.187	0.161	0.161	0.295
17	3 430	3 324	22	17	15	19	33	0.208	0.160	0.142	0.179	0.311
18	2 152	2 099	9	13	7	10	14	0.170	0.245	0.132	0.189	0.264
19	907	885	6	2	3	5	6	0.273	0.091	0.136	0.227	0.273

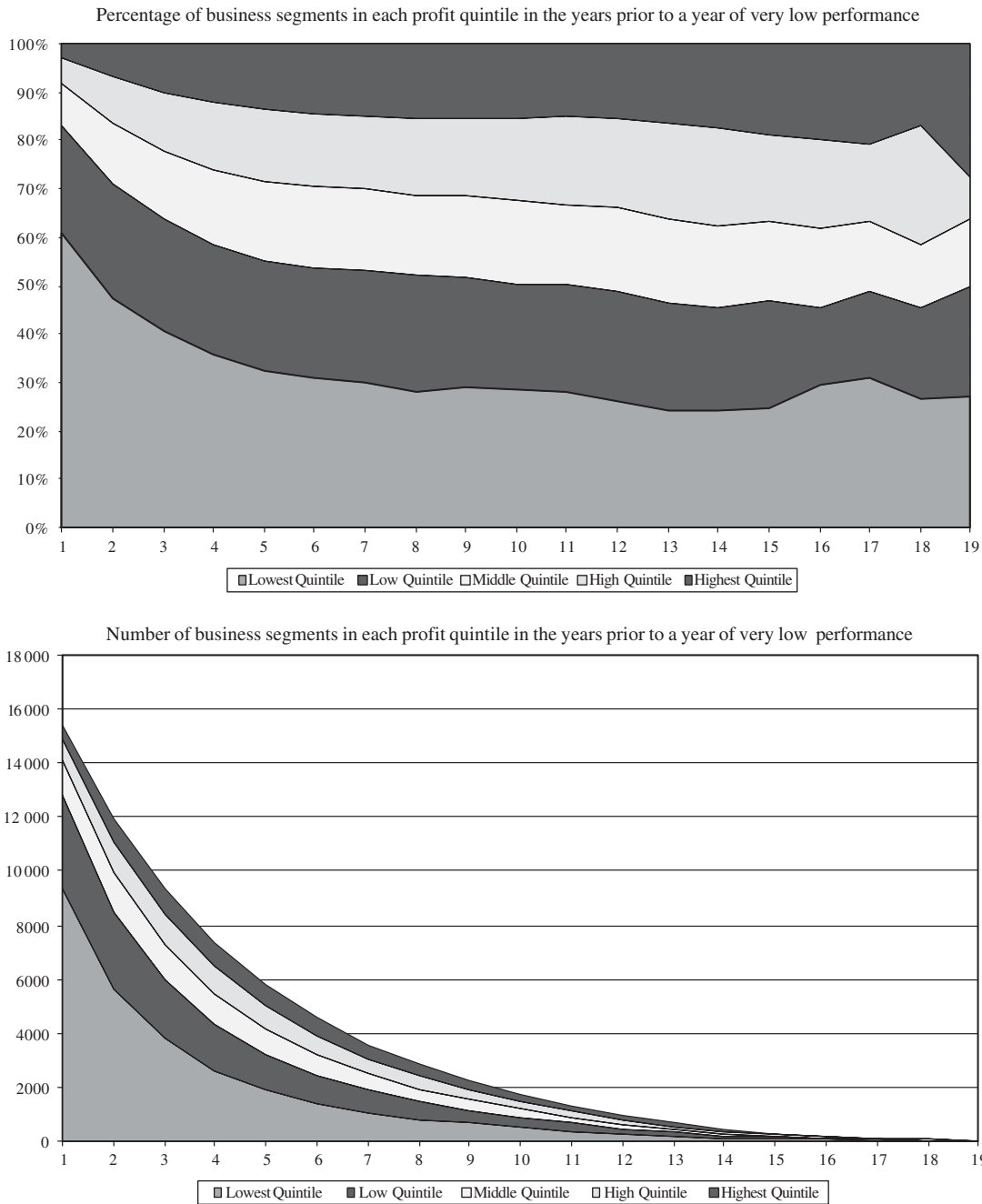
of those with long histories ranked in the top quintile.

In sum, the first part of the analysis shows that turnarounds were quite rare over the 1981–2000 period, despite investor expectations to the contrary. Businesses with very low performance were significantly more likely to exit than average. Only a small portion of fifth-quintile survivors became first-quintile performers, despite investor expectations to the contrary.

In the second part of the analysis, we examine businesses that did achieve turnarounds. Table 6 compares the Tobin's  $q$  for fifth-quintile business segments that subsequently turned around with the Tobin's  $q$  for all fifth-quintile businesses.<sup>15</sup> Tests on the hypothesis of a significant difference in Tobin's  $q$  appear in the final column. With the exception of only 3 of the 19 years during this period, the difference between these two groups is statistically indistinguishable from zero.<sup>16</sup> Only in 1983 and 1985 does the average Tobin's  $q$  for turnaround business segments significantly exceed the average for the other very-low performing segments. Thus, except in 1983 and 1985, investors did not value businesses poised for turnaround more highly than those that without subsequent

turnarounds, suggesting that investors are not prescient in anticipating turnarounds. In 1999, the year for which the financial-market premium on fifth-quintile businesses was highest, businesses poised for turnaround had an average value of Tobin's  $q$  that was significantly less than the average for fifth-quintile businesses that did not turnaround in 2000. This outcome, which almost certainly identifies the 'dotcom' effect of the year, is nonetheless surprising. One possible explanation is that investors expected that turnaround would require 5–6 years, and thus that the turnarounds have not yet materialized. However, such beliefs would only be justified if the prospects for turnarounds (or the potential magnitude of turnarounds) in the future increase to levels entirely unprecedented in the previous two decades.

Table 7 lists for each year in the sample (a) the largest businesses (by sales) that achieved a turnaround in that year specifically, (b) the largest fifth-quintile businesses (by sales) in that year that subsequently achieved a turnaround, and (c) the business in that year that had the highest Tobin's  $q$  among fifth-quintile performers. Columns (a) and (b) identify a number of prominent businesses that successfully achieved turnarounds in performance,



**Figure 2.** The history of very low performing business segments. Percentage of business segments in each profit quintile in the years prior to a year of very low performance. Number of business segments in each profit quintile in the years prior to a year of very low performance.

including Chrysler (automotive operations), Phillips Petroleum (refining marketing-transportation), Boeing (combat aircraft), Motorola (Semiconductors), and Sprint Fon Group (long-

distance communications services). Column (c) lists the very low performing businesses that had the greatest investor expectations for future performance. Consistent with expectations, the

**Table 5. The History of Very High Performing Business Segments Number and Percentage of Business Segments in each Profit Quintile in the Years Prior to a Year of Very High Performance**

# Years prior to very high performance	Number of segments in dataset	Number of segments exiting dataset	In years prior to a year of very high performance									
			Number of business segments in quintile					Percentage of business segments in quintile				
			Q1	Q2	Q3	Q4	Q5	Q1	Q2	Q3	Q4	Q5
1	19 573	3981	11 531	2691	680	408	282	0.205	0.205	0.206	0.200	0.185
2	18 607	6506	7830	2363	818	595	495	0.209	0.208	0.208	0.200	0.174
3	17 630	8010	5708	1928	828	592	564	0.213	0.210	0.211	0.200	0.167
4	16 668	8763	4344	1632	751	599	579	0.213	0.214	0.213	0.199	0.160
5	15 705	9164	3428	1362	671	528	552	0.215	0.217	0.217	0.197	0.155
6	14 747	9342	2757	1128	551	465	504	0.216	0.219	0.218	0.195	0.152
7	13 786	9313	2216	925	487	400	445	0.218	0.219	0.219	0.195	0.149
8	12 854	9146	1759	808	431	359	351	0.218	0.220	0.221	0.196	0.145
9	11 943	8880	1418	644	381	303	317	0.218	0.217	0.226	0.194	0.144
10	11 035	8508	1152	530	331	236	278	0.218	0.219	0.227	0.195	0.141
11	10 107	8082	889	448	260	203	225	0.218	0.220	0.224	0.197	0.142
12	9161	7555	683	367	199	183	174	0.218	0.220	0.220	0.200	0.141
13	7976	6741	495	297	177	132	134	0.214	0.220	0.220	0.207	0.139
14	6706	5804	353	214	139	107	89	0.215	0.215	0.221	0.209	0.139
15	5420	4789	253	141	93	78	66	0.216	0.216	0.215	0.212	0.141
16	4317	3906	156	97	63	51	44	0.218	0.211	0.210	0.212	0.150
17	3429	3203	95	45	31	26	29	0.240	0.201	0.199	0.201	0.160
18	2151	2021	55	30	15	12	18	0.266	0.187	0.177	0.195	0.174
19	907	857	20	12	6	6	6	0.280	0.192	0.172	0.196	0.160

majority of these represent recent entrants to high technology sectors with the perceived potential to change the dimensions of competition in their industries. These include Genentech (DNA product R&D), ASK Corporation (solar collectors), Texcel International (pollution control machinery), Associated Communications (cellular telephony), Summit Technology (medical equipment), and 3DO Company (multimedia technology licensing).

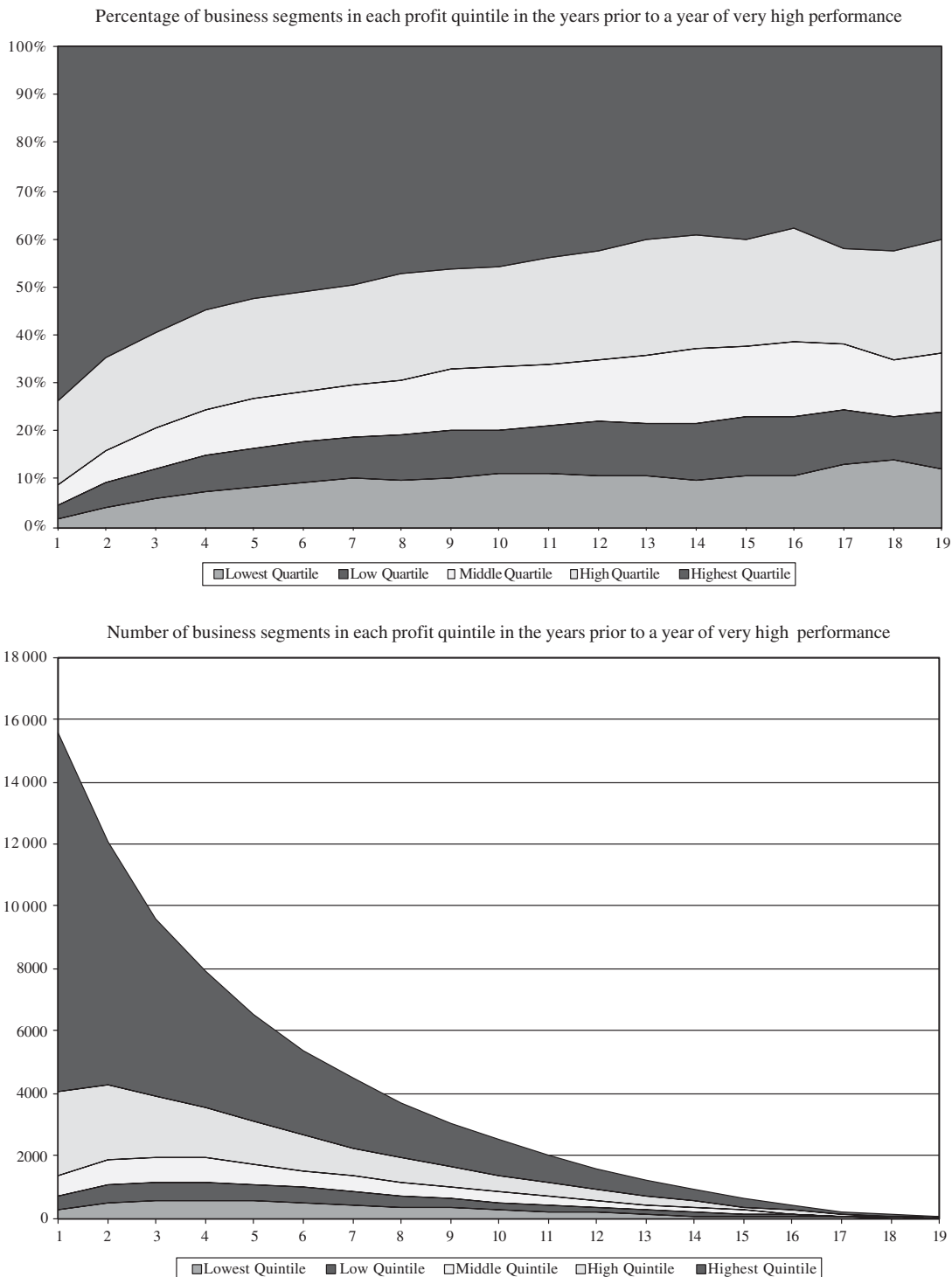
In a supplementary analysis, we examined the importance of industry effects on measured turnarounds. The results indicate that, for turnarounds, 14.9% of the profit improvement is associated with increases in industry-average profitability. The remaining 85.1% is idiosyncratic to the positioning of the business within the industry. These figures were obtained in a simple regression of industry dummies on the change in profitability obtained by turnarounds. Changes in industry-average performance are significantly less important than changes in competitive positioning to turnarounds. This regularity is particularly striking in light of the fact that, for all businesses, 58.1% of changes in profitability are associated with changes in the industry average. Thus,

industry effects are important, but they are not as important to turnarounds as idiosyncratic positioning effects.

The 'dotcom' effect is apparent in the most recent years of the data: Netscape Communications and Amazon.com exhibit the highest Tobin's  $q$  among fifth-quintile firms in 1995 and 1998, respectively. While some of the businesses associated represented in column (c) did achieve moderate performance, none of the businesses with the highest Tobin's  $q$  (listed in column (c)) subsequently turned around their performance to become a very high performer.

## CONCLUSION

Analysis on a broad cross-section of companies that were publicly traded on US financial markets between 1981 and 2000 reveals that business turnarounds among businesses that remained independent entities were rare despite investor expectations to the contrary. In the analysis, turnarounds are defined as movements from very low performance—measured by the ratio of



**Figure 3.** The history of very high performing business segments. Percentage of business segments in each profit quintile in the years prior to a year of very high performance. Number of business segments in each profit quintile in the years prior to a year of very high performance.

**Table 6. The History of Very High Performing Business Segments Percentage of Business Segments in each Profit Quintile in the Years Prior to a Year of Very High Performance**

Year	For segments that will turnaround			For all Q5 segments			Z-value <sup>a</sup>
	Avg <i>q</i>	Var <i>q</i>	Number	Avg <i>q</i>	Var <i>q</i>	Number	
1981	0.89	0.19	143	0.84	0.16	858	1.28
1982	0.80	0.17	70	0.83	0.17	967	-0.59
1983	1.39	1.98	61	0.98	0.45	978	<b>2.26</b>
1984	0.96	0.18	68	0.92	0.18	963	0.75
1985	1.16	0.45	67	0.96	0.25	962	<b>2.39</b>
1986	0.98	0.21	75	0.96	0.30	959	0.36
1987	1.07	0.27	60	0.96	0.31	962	1.58
1988	1.25	1.45	52	0.99	0.38	932	1.55
1989	1.04	0.29	56	1.03	0.59	912	0.13
1990	0.95	0.16	35	0.93	0.44	908	0.28
1991	1.11	1.00	71	1.05	1.06	930	1.49
1992	1.02	0.24	39	1.04	0.61	947	-0.24
1993	1.39	1.88	69	1.22	1.01	1186	1.01
1994	1.11	0.40	38	1.16	0.67	1270	-0.57
1995	1.70	5.48	32	1.45	2.32	1284	0.60
1996	1.40	0.31	14	1.57	2.01	1102	-1.10
1997	1.59	0.38	11	1.57	2.98	884	0.10
1998	1.55	3.37	48	1.53	2.63	1278	0.07
1999	1.76	2.31	13	3.48	62.49	1245	<b>-3.60</b>
Total	1.13	0.97	1022	1.31	5.34	20434	

<sup>a</sup> Z-value of hypothesis test of difference in Tobin's *q* between segments that will turnaround and all Q5 segments.

operating income to assets in a specific business segment—to very high performance by a business that does not exit either because its assets are retired or because it is acquired. Some of the main findings are that businesses with fifth-quintile performance were 3.4 times as likely to sustain very low performance after 5 years (when they survived) as to post first-quintile performance; that just 3% of first-quintile performers underwent turnarounds over the prior 5 years; and that even 15 years after fifth-quintile performance only about one in three surviving businesses achieved performance in the first or second quintiles in any year subsequent to their very low performance. In short, the prospects are dim that very low performing businesses will turn around as stable entities.

The paper raises important questions worthy of further study. First, additional analysis is necessary to establish conclusively the time required for turnarounds to take place and to clarify patterns of performance associated with turnarounds. While this study covers a 20-year panel dataset, there is significant evidence that some businesses require more than 10 years to effect a turnaround. Sophisticated statistical techniques and a longer panel would reveal additional regularities on the trajectory of turnarounds. In addition, more

refined econometric analysis might identify turnaround candidates *ex ante* as well as demonstrate patterns in the processes and dynamics of turnaround activity. Interesting questions in this line might deal with (a) the prior performance patterns of those firms that achieve turnarounds (such as whether very low performance emerges quickly or slowly and whether it emerges from moderately low performance or average performance) and (b) whether the post-turnaround performance is similar to the performance of businesses with histories of high performance. Additional research is also needed on whether changes in performance are correlated for direct competitors and whether the prospects for turnaround are different for acquired businesses than for businesses whose corporate affiliation does not change.

Second, the study raises fundamental questions about how investor expectations of turnaround develop. In light of the very low prospects for turnaround, investor enthusiasm for very low performing businesses that are not acquired appears mistaken.<sup>17</sup> Investor exuberance for fifth-quintile firms is especially great in the years 1999–2000, a finding that is consistent with the emergence of a 'dotcom' effect; however, financial markets had been overly optimistic about the prospects for turnaround long before the prospect

**Table 7. Largest Firms (in Terms of Sales) Involved in Turnarounds and Highest Tobin's  $q$  Among Businesses in Fifth Profit Quintile**

Year	(A) Turnarounds accomplished <sup>a</sup>	(B) Turnarounds imminent <sup>b</sup>	(C) Businesses in quintile 5 whose firms have highest Tobin's $q$
1981		Amoco Corp (refining-marketing-transportation)	Genentech Inc (DNA product R&D)
1982	Occidental Petroleum Corp. (on-offshore exploration-prod.)	Chrysler Corp (automotive operations)	Genentech Inc (DNA product R&D))
1983	Navistar International (trucks)	LSI Logic Corp (integrated circuit design-manuf.)	ASK Corporation (solar collectors)
1984	Chrysler Corp (automotive operations)	Sprint Fon Group (long-distance communications)	Ernst (EC) Inc (electrical contracting)
1985	RCA Corp (broadcasting)	Motorola Inc (semiconductor products)	Orion Pictures Corp (entertainment)
1986	Phillips Petroleum Co (refining marketing-transportation)	Levi Strauss Assoc (apparel)	Consolidated Stores Corp (wholesale operations)
1987	Mobil Corp (chemicals)	Richfood Holdings Inc (wholesale food distribution)	Texcel International (pollution control machinery)
1988	Amoco Corp (refining marketing-transportation)	General Electric Co (major appliances)	Associated Communications (cellular telephony)
1989	Boeing Co (commercial transportation equip.)	Nash Finch Co (grocery stores)	Associated Communications (cellular telephony)
1990	Philip Morris Cos Inc (beer)	McDonnell Douglas Corp (combat aircraft)	Summit Technology Inc (medical equipment)
1991	McDonnell Douglas Corp (combat aircraft)	Caterpillar Inc (machinery)	Aura Systems Inc (magnetics technology R&D)
1992	Woolworth Co (specialty stores)	McDonnell Douglas Corp (military aircraft)	Summit Technology Inc (medical equipment)
1993	Motorola Inc (semiconductor products)	Lockheed Martin Corp (search, aeronautical, & nautical)	3DO Company (multimedia technology licensing)
1994	Caterpillar Inc (machinery)	Siemens (power, distrib., & transformers)	Summit Technology Inc (medical equipment)
1995	Georgia-Pacific Corp (pulp-paper)	Siemens (motor vehicle parts & accessories)	Netscape Communications Co. (internet software and services)
1996	Procter & Gamble Co (beauty care)	Quaker Oats Co (beverages)	PLC Systems Inc (medical laser systems)
1997	Sprint Fon Group (long-distance comm services)	Sunoco Products Co (fiber cans, tubes, drums)	Columbia Laboratories Inc (pharmaceuticals)
1998	Lockheed Martin Corp (electronic systems)	Pfizer Inc (pharmaceutical preparations)	Amazon.com Inc (catalog and mail-order houses)
1999	Royal Dutch/Shell Group (chemicals)	Sunoco Inc (petroleum refining)	Kana Communications (prepackaged software)
2000	Pfizer Inc (pharmaceuticals)		

<sup>a</sup> Firms that previously experienced a very low performance ( $Q5$ ) that achieved very high performance ( $Q1$ ) in this year.

<sup>b</sup> Firms with very low performance ( $Q5$ ) in this year that achieve very high performance ( $Q1$ ) in some future year.

of a 'New Economy'. The study also raises questions about whether the ex ante premium on the typical turnaround is justified by the subsequent financial performance of the business. Additional research is needed to relate the total return to shareholders with their ex ante expectations (akin to the herd behavior studied by Banerjee, 1992).

Third, additional research is needed to match prescriptive assertions about turnaround management to the findings on turnaround efficacy. While some laudatory management techniques may be effective at motivating employees, generating customer enthusiasm, and securing supplier contracts, they may not result in direct performance improvements. And some managerial approaches may be more effective than others in accelerating turnarounds, for example. Investors and executives may make better decisions if they were armed with robust criteria for evaluating the prospects for the turnaround of a specific business ex ante.

Finally, the paper's findings also suggest possible extensions with respect to established theories and new findings on organizational change. For example, the behavioral theories of Cyert and March (1963) and the subsequent evolutionary view of Nelson and Winter (1982) propose that sustained low performance leads organizations to change their patterns of behavior. Recent work emphasizes that organizational, cognitive, and social conditions may both temper and be tempered by the incidence of a turnaround. For example, Killaly (1998) considers the empirical example of change in the telecommunications industry, investigating whether firms' ability to undertake major changes is conditioned by their experience. Recent work by Greve (1998) and Martin and Mitchell (1998) suggest that cognitive framing and local search have a strong influence on organizational processes for introducing new products, especially in emerging or turbulent markets. The results suggest that turnarounds may involve complex social processes as well as economic incentives. Further study may allow subsequent researchers to distinguish those organizations that actually attempt turnarounds from the low performers that do not seek profit improvement (perhaps because they plan to exit). When turnaround attempts are identifiable, the results presented in this paper may be refined to yield greater insight about the cognitive, social,

and organizational processes associated with the accomplishment of turnarounds.

### Acknowledgements

Thanks to the Boston University Systems Research Center and BUILDE for generous financial support. We are grateful to Iain Cockburn, Kenneth Hatten, Margaret Kyle, Kwanghui Lim, and an anonymous referee for comments.

### NOTES

1. One important source of value may be intangible assets that are not booked on the company's balance sheet because they are not easy to acquire on a market.
2. There are three related reasons why this approach is justified. First, any alternative rule that allocates Tobin's  $q$  to a line of business is problematic. Second, any bias created by this approach tends to work against the paper's key hypotheses. Third, the average number of businesses held by corporations in a specific year is about 1.5 (see exhibit 1, panel (a)), which suggests that the amount of bias is likely to be Tobin's  $q$  low.
3. Exit from the dataset does not necessarily reflect exit from the economy as a whole. Exit occurs under a range of circumstances, including bankruptcy, the sale of a segment by a corporation, and the absorption into a sister segment. It is worth noting that the rate of exit from the dataset is substantial among high performers as well as among low performers. Nonetheless, very low performers exit the dataset at a rate significantly higher than that of the population as a whole, suggesting that the exit of low performers is an important economic phenomenon.
4. One advantage of our definition is that it disqualifies as a turnaround a business that continues to post moderate performance while the profitability of its direct competitors drops dramatically. It is important to consider the implications of this approach for capturing the circumstance in which the measured performance of a business improves relative to its rivals because competitors' performance has declined, despite no actual internal improvements in the business. Our economy-wide definition of turnarounds requires that a business radically improve its performance relative to all firms in the economy, not just its competitors, in order to qualify as a turnaround. Thus, our definition is likely to disqualify as 'turnarounds' those businesses that improve relative to rivals but do not improve intertemporally.
5. This definition of a turnaround does not require that a business post high performance both prior and subsequent to its episode of very low performance. An alternative definition of turnarounds—one that required a radical drop in performance followed by a radical improvement—is narrower than the definition used here, and would capture a



- subset of those businesses that we identify as turnarounds using our definition.
6. The numerator in Tobin's  $q$  equals the sum of (i) the market value of outstanding equity at year end, and (ii) the book value of preferred stock and debt. The denominator in Tobin's  $q$  is the sum of (i) the replacement value of inventory (which is assessed by recreating the schedule of inventory acquisition given the method of inventory accounting; and by applying the rate of inflation to the schedule); (ii) the replacement value of property, plant and equipment (which is assessed by recreating the schedule of acquisition; by applying a rate of depreciation of 5%; and by estimating price changes from the GDP deflator for non-residential fixed investments), and (iii) the book value of assets other than inventory and property, plant and equipment. The replacement value of inventory and of PP&E are calculated on the assumption that the replacement value equaled the book value in 1970.
  7. There is one difference in the screening process. Prior authors had eliminated companies with less than \$50 million in assets on the theory that the market values of these companies may have been distorted by infrequent trading. We retain these smaller firms because we believe that their omission would create a greater bias in measuring turnarounds than their inclusion induces in measuring Tobin's  $q$ .
  8. The original Business-Segment Reports for 1981–2000 contain 210 100 records on segments by year. A total of 4309 observations are excluded because they do not contain a primary SIC code. Another 27 458 observations are excluded because they are assigned to industries with the titles 'not elsewhere classified', 'non-classifiable establishments', and 'government, excluding finance'. 'Depository institutions' with SICs between 6000 and 6999—which are 21 092 in number—are also excluded. Four thousand six hundred and ninety observations are excluded because they represent the single organization in an SIC category in a particular year. The effects of industry cannot be distinguished from the effects of competitive position for these segments; these are omitted in order to allow sensitivity analysis to a definition of turnaround based in industry-specific profitability. Observations on small segments with sales of less than \$10 million (35 096 records) and with assets of less than \$10 million (8068 records) are excluded because these segments typically represent non-operating activities such as the disposition of assets prior to exit and specialized pension accounting activities. Another 7189 observations cannot be associated with a corporation in the screened Basic file and are eliminated.
  9. The original Basic file for 1981–2000 contains 140 339 observations on corporations by year. The five hundred and twenty-one observations for corporations with market values of zero. Another 2716 observations are excluded for lack of information on accounting profits, and 66 028 observations are excluded for lack of information on the distribution of assets by segment.
  10. This suggestion is supported by Montgomery (1994, p. 164), who reports that the Fortune 500 participated in an average of 10 to 11 different 4-digit SICs during the period from 1985 to 1992. If a business segment in Compustat contains activity that should be assigned to a different 4-digit category, then the estimate of industry performance may be dampened. If the aggregation smoothes differences in the competitive positions of operating business units, then estimates of differences in characteristics also may be dampened. The aggregation essentially introduces noise into estimates of each type. As a result, the results must not be interpreted as applying at the level of operating business units.
  11. Recall that for diversified companies we use the Tobin's  $q$  of the parent company as the best available proxy for the financial market premium associated with each individual business segment. This is likely to introduce noisiness into the assessment of the financial market premium on turnarounds.
  12. The rate of exit within 1 year for all businesses is 18.9%.
  13. The 3% is equal to the portion that survived (34.7%) times the portion of survivors with  $QI$  performance (10.4%).
  14. The 5% is equal to the portion with a 5-year history (36.9%) times the historical portion with  $QI$  performance (13.7%).
  15. Recall that we have assigned the Tobin's  $q$  for the corporate parent to the business segment for this portion of the analysis. References to a business's Tobin's  $q$  thus imply the Tobin's  $q$  for the corporation of which the business is a member.
  16. The difference is statistically indistinguishable from zero for all years in an analysis that only includes the 479 turnarounds that are single-business companies. For this group, the average value of Tobin's  $q$  in the initial year is 1.29, which is comparable to the average value for all fifth-quintile single-business firms of 1.52.
  17. Note that because we cannot observe which exiting segments represent retired assets and which may be acquisitions, we cannot interpret Tobin's  $q$  results for businesses that do not remain independent throughout the period.

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