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PERSPECTIVES

Long-Term Returns on the Original S&P 500 Companies

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The S&P 500 Index is the most widely used benchmark for measuring the performance of large-capitalization U.S.-based stocks. Covering almost all of the 500 largest companies ranked by market value, the S&P 500 constitutes about 83 percent of the market capitalization of all regularly traded stocks on the New York, American, and NASDAQ exchanges.[1]

The index of 500 stocks, first compiled in March 1957, is continually updated by the addition of new companies that meet Standard & Poor's Corporation criteria for market value, earnings, and liquidity and the deletion of an equal number that fall below these standards or are eliminated by mergers or other corporate changes.[2] Standard & Poor's states on its website that the purpose of updating is to maintain a representative index that includes 500 "leading companies in leading industries of the economy." Over time, the S&P 500 has outperformed the vast majority of active money managers and mutual funds.[3] Since the S&P 500 was formulated, more than 900 new companies have been added to and a like number deleted from the index.

Schumpeter (1942) called the process by which new companies enter the market, challenge, and eventually destroy the older companies "creative destruction." Indeed, many of the giant companies in the original index, such as U.S. Steel and Bethlehem Steel, Union Carbide, and Eastman Kodak, have declined while new companies, such as Intel Corporation, Microsoft Corporation, and Wal-Mart, have taken their place. In fact, the market value of the S&P 500 companies that have survived from the original 1957 list is only 31 percent of the 2003 year-end S&P 500's market value.

Many financial advisors counsel clients to continually upgrade their portfolio because the new companies offer investors higher returns than the older, dying companies. These recommendations are supported by the research of McKinsey & Company's Foster and Kaplan (2001), who reported that the new companies added to the S&P 500 have generated higher returns than the original companies. They stated that "without these new firms, the performance of the [S&P 500] index would have been considerably less" (p. 28).

In our research, we found, contrary to Foster and Kaplan's results, that the buy-and-hold returns of the 500 companies chosen for the original index in March 1957 have outperformed the returns on the continually updated S&P 500 used by investment professionals to benchmark their performance and have done so with lower risk.

Background

Standard & Poor's first developed industry-wide stock price indices in 1923 and three years later, formulated the Composite Index, which contained 90 stocks.[4] The Composite was expanded to 500 stocks on 1 March 1957 and renamed the S&P 500 Index. At that time, the companies in the S&P 500 had a market value of $173 billion, representing about 85 percent of the value of all NYSE-listed stocks.

The index originally contained exactly 425 industrial, 25 railroad, and 50 utility companies. In 1976, 40 financial stocks were added and the industrial, transportation, and utility groups were reduced to 400, 20, and 40, respectively.[5] In 1988, Standard & Poor's eliminated fixed sectors in order to obtain a diversified and representative portfolio of all stocks trading in U.S. markets. In July 2002, all foreign-based companies, which made up 1.3 percent of the market capitalization of the index at that time, were eliminated and replaced by U.S.-based companies.[6]

The total number of new companies added to the S&P 500 from its inception in 1957 through 2003 is 917, an average of 20 a year.[7] The pattern for numbers added each year is shown in **Figure 1**. The highest number of new companies added to the

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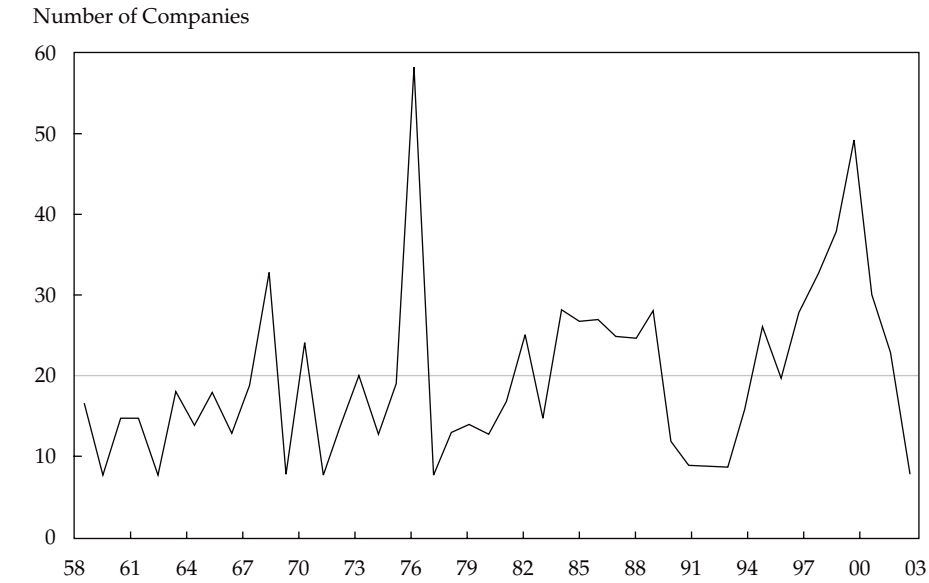
Figure 1. Number of Companies Added Yearly to the S&P 500, March 1957–December 2003



index occurred in 1976, when the S&P added 60 companies, 40 of which were, as noted, financial institutions. These new companies represented 10.4 percent of the market value of the index at the time.[8] In recent years, annual additions have averaged slightly more than 5 percent of the market value of the index. The percentage was higher during the late 1990s as new large-cap information technology companies were added. In 2003, the number of new companies added to the index fell to a record-tying low of eight, a level last reached in 1977.

Holding-Period Returns

To calculate the performance of the original S&P 500 companies, we formed three portfolios. Over time, the three portfolios evolved differently depending on the assumptions we made about what investors did with the shares they received from a spin-off or what happened when an original company was merged into another company or went private. In each of the three portfolios, we assumed that dividends were reinvested in the stock paying the dividend. **Figure 2** displays the evolution of these portfolios through time.

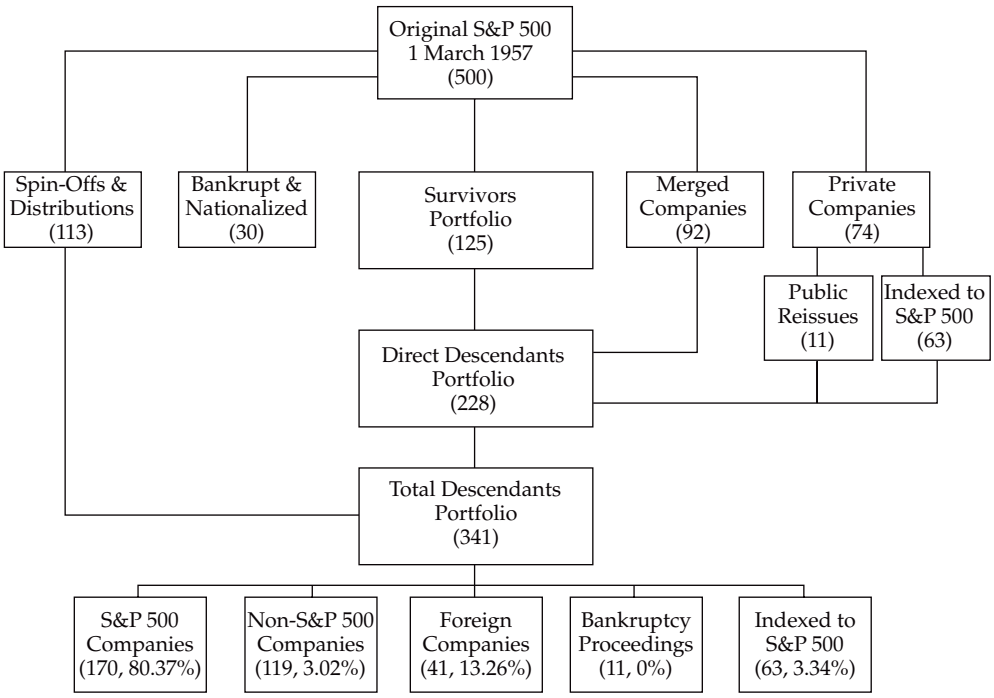
The first portfolio, the Survivors Portfolio (SP), consists of shares of only the original S&P 500 companies. Shares of other companies received through mergers were immediately sold, and the proceeds were invested in the remaining survivor companies in proportion to their market value. For example, when Mobil Oil was merged into Exxon in 1999, shareholders of Mobil were assumed to sell the shares they received from Exxon Mobil and to invest the proceeds in the remaining survivor companies. We identified the surviving company as the one whose CRSP "permno" remained unchanged. All spin-offs were immediately sold, and the proceeds were reinvested in the parent company. Funds received from privatizations were sold, and the proceeds were reinvested in the original surviving companies in proportion to their market values.

Note that the evolution of the Survivors Portfolio did not assume advance knowledge of which companies would survive. Companies were deleted over time when they were privatized or merged into other companies. As a result, investors could easily have matched these returns over time and these data contain no survivor bias.

At year-end 2003, the Survivors Portfolio consisted of 125 original companies that remained intact (except possibly for a name change) from 1957 to the present. Ninety-four of the surviving companies are still in the S&P 500, twenty-six are publicly traded companies not in the index, and five are in bankruptcy proceedings.

The second portfolio, the Direct Descendants Portfolio (DDP), consists of the shares of companies in the Survivors Portfolio plus the shares issued by companies that acquired an original S&P 500 company. In the case of the Mobil–Exxon merger, in contrast to what was done with the SP portfolio, we assumed that shareholders of Mobil Oil held the shares of Exxon that were issued in the merger instead of selling and reinvesting the proceeds in the remaining survivor companies.

Figure 2. Evolution of Original S&P 500 Companies by 31 December 2003



If an original company was taken private, we assumed that the cash distributed from the privatization was invested in an indexed portfolio whose returns matched the standard S&P 500.[9] If the shares of a company that was taken private were subsequently reissued to the public, we assumed the portfolio repurchased shares in the reissued company with the funds that had been invested in the index at the time the company went private. Seventy-four original S&P 500 companies were privatized in the period studied.[10] As for the SP, spin-offs were immediately sold, with the proceeds reinvested in the parent.

The third portfolio, the Total Descendants Portfolio (TDP), includes all companies in the Direct Descendants Portfolio plus all the spin-offs and other stocks distributed by the companies in the DDP. So, the only difference between the TDP and the DDP is that the TDP holds all the spin-offs.

The TDP is identical to the portfolio of a totally passive investor who held all the spin-offs and shares issued from mergers and never sold any stock. For example, when American Telephone and Telegraph (AT&T) distributed its Baby Bells in 1983 following the government-mandated breakup of the monopoly, all the shares of the regional Bell companies were held by investors in the TDP.

Exhibit 1 shows how the returns were calculated for each portfolio. Note that the return data compiled in the CRSP databases assume that spin-offs are immediately sold and the proceeds reinvested in the parent company, as we did for the DDP, but many investors do hold the spun-off companies—doing so is often both tax and transaction-cost efficient—which is why we computed the returns of the TDP.[11]

Figure 2 shows that through mergers, bankruptcies, nationalizations, and privatizations, the original 500 companies were reduced to 339 names by 31 December 2003. Of these, 170 were still in the S&P 500 in 2003, and these companies represented

Exhibit 1. Portfolio Return Actions

Portfolio	Survivor	Merged	Distributions	Privatized
Survivor	Held	Sold and proceeds reinvested in remaining survivor companies	Reinvested in parent	Sold and proceeds reinvested in remaining survivor companies
Direct Descendants	Held	Held	Reinvested in parent	Matched to S&P 500[a]
Total Descendants	Held	Held	Held	Matched to S&P 500[a]

[a]If a privatized company subsequently reissued shares, the stock was purchased with funds that were matched to the S&P 500.

80.4 percent of the market value of the final accumulation of the TDP. Just under 3 percent of the final accumulation of the TDP, 119 companies, are U.S.-based companies not currently in the S&P 500; 41 companies, 13.3 percent of the final accumulation, are foreign companies headquartered outside the United States; and 11 companies are in bankruptcy proceedings. The companies privatized and not reissued constitute approximately 3 percent of the market value of the TDP.

Returns on Spin-Offs vs. Parents. Although we found no significant difference between the overall returns of the DDP and TDP portfolios, **Table 1** shows that individual companies experienced some significant differences between returns of the parent companies and returns of the spin-offs.

By far the most important spin-offs from the original S&P 500 companies belonged to AT&T, the largest and most widely held stock when the index was founded. Investors who held all of AT&T's spin-offs received a return of 10.50 percent a year, only 35 bps behind the performance of the S&P 500 since 1957, whereas the return on the parent company was only 7.85 percent, far below the market average.

But spin-offs do not always outperform the parent. Praxair, a natural gas producer, underperformed its parent (Union Carbide), and Mirant, a provider of energy products and services that was spun off by Southern Company in 2001, declared bankruptcy in 2003. Similarly, investors who held the spin-offs of rail stocks were generally hurt by the relatively poor returns of the oil, gas, and other real properties that were distributed to shareholders.

Calculation of Portfolio Returns. We analyzed the returns to each of the three portfolios from two *initial* allocations of the original S&P 500 companies—value weighted and equally weighted. We carried out no rebalancing in any portfolio after this initial allocation was made.

Table 2 shows the returns, standard deviations, and Sharpe ratios of the portfolios and compares them with those of the actual (value-weighted) S&P 500. All six of the portfolios of the original S&P 500 stocks outperformed the S&P 500 benchmark, and all had higher Sharpe ratios. From 1 March 1957 through 31 December 2003, the S&P 500 registered a 10.85 percent annualized compound return. The compound returns on the value-weighted and equally weighted TDP beat the updated (actual) index by, respectively, 55 bps and 129 bps annually over the past 47 years.

The superior performance of the TDP is noteworthy because it was the most transaction cost–efficient and tax-efficient strategy for accumulating wealth from the original S&P 500 stocks. The TDP involved fewer transactions than required of a standard S&P 500 fund because no shares were ever sold in the open market and the only shares purchased arose from dividends or reissues of privatized companies. Furthermore, the TDP was the most tax-efficient strategy because, with few exceptions, no capital gains were realized as no shares were ever sold.[12]

These results mean that the 500 companies chosen by Standard & Poor's in 1957 have, on average, outperformed the nearly 1,000 new companies added to the index during the subsequent half century.

Table 1. Returns to Spin-Offs and to Parent Companies, March 1957–December 2003

Company	Annual Return with Spin-Offs	Annual Return with Spin-Offs Reinvested	Gain in Annual Return	Spin-Offs
A. Spin-offs whose returns exceeded parent				
AT&T Corp.	10.50%	7.85%	2.64%	Baby Bells
Sears, Roebuck and Co.	11.32	10.01	1.31	Morgan Stanley, Allstate Insurance Co.
Olin Corp.	10.88	8.58	2.30	Squibb Beechnut
Ford Motor Co.	11.64	11.25	0.39	Associates First Capital Corp.
American Brands	14.55	14.42	0.13	Gallaher Group
B. Spin-offs whose returns fell short of parent				
Atchison, Topeka, and Santa Fe	11.36%	13.42%	–2.05%	Catellus, Santa Fe Energy, Santa Fe Gold
Union Carbide Corp.	9.98	10.51	–0.53	Praxair
Southern Company	11.03	12.17	–1.14	Mirant Corp.
General Motors Corp.	8.28	8.45	–0.17	Raytheon, Delphi
E.I. du Pont de Nemours and Company	8.30	8.40	–0.11	General Motors

Table 2. Performance of Portfolios, March 1957–December 2003

Portfolio Initial Weighting	Geometric Return	Arithmetic Return	Standard Deviation	Sharpe Ratio[a]
Survivors Portfolio				
Value	11.31%	12.38%	15.72%	0.4343
Equal	12.28	13.75	18.45	0.4446
Direct Descendants Portfolio				
Value	11.35%	12.45%	15.93%	0.4331
Equal	12.18	13.67	18.55	0.4375
Total Descendants Portfolio				
Value	11.40%	12.53%	16.09%	0.4337
Equal	12.14	13.63	18.53	0.4357
S&P 500				
Value	10.85%	12.14%	17.02%	0.3871

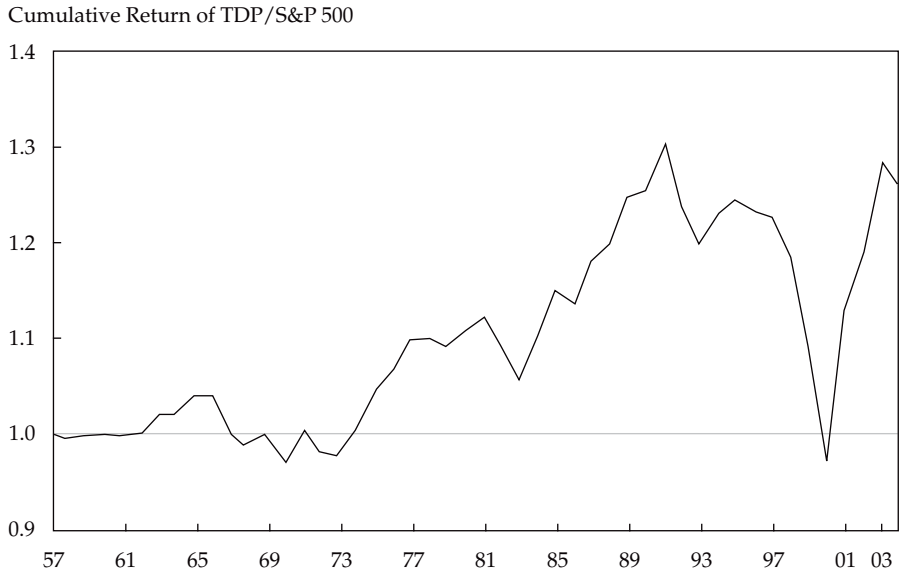
[a]Defined as $[E(R_p) - E(R_f)]/\sigma_p$, where R_p = portfolio return, R_f = risk-free U.S. T-bill rate, and σ_p = standard deviation of annual portfolio returns.

Figure 3 shows a yearly relative comparison of the cumulative returns on the value-weighted TDP and the S&P 500 from 1957 through 2003. The two returns are nearly coincident in the early years because the two portfolios were nearly identical. In the late 1980s, the cumulative return on the TDP rose to a high of 30 percent above the S&P 500. During the 1990s, the relative performance of the TDP declined, and at the end of 1999, the cumulative return on the TDP temporarily fell below that of the S&P 500. This decline was a result of the technology bubble, which vastly inflated the returns to the new technology entrants in the updated S&P 500; the TDP had a very small technology weighting. When technology shares fell, the TDP again outperformed the updated S&P 500. In Appendix A, the differences in the annualized returns between the TDP and the S&P 500 are reported on a yearly basis.

Changes in Market Value vs. Investor Returns. The market value of the updated (actual) S&P 500 companies has risen at a 9.13 percent annual rate since the index was founded, increasing from $172 billion in 1957 to $10.3 trillion by 31 December 2003. In contrast, the market value of the Survivors Portfolio grew at only a 6.44 percent annual rate, reaching $3.2 trillion by the end of 2003. Yet, the return on the Survivors Portfolio was greater than the return on the S&P 500.

Investor return is a *per share* concept, whereas market value records prices times aggregate number of shares. Return to investors includes reinvested dividends that are absent from market value data. Furthermore, market value data are affected by changes in the capitalization of individual companies, the issuance of new shares, spin-offs, and new, higher-valued companies replacing lower-valued, deleted companies in the index. It was the confusion between market value and investor returns that led Foster and Kaplan to their erroneous conclusions.

Figure 3. Cumulative Performance of Value-Weighted Total Descendants Portfolio Relative to S&P 500, March 1957–December 2003



Long-Term Returns of Original Companies. **Table 3** shows the annualized returns from 1 March 1957 through 31 December 2003 of the 20 largest companies (as measured by market value on 1 March 1957) from the original S&P 500. **Table 4** displays the 20 best performing survivor companies, and **Table 5** records the 20 best performing companies from the Total Descendants Portfolio.[13]

Of the 20 largest companies in 1957 shown in Table 3, 9 were oil companies and the 5 best performers were oil companies. Each of these companies outperformed the S&P 500 by 2–3 percentage points a year in the 46-year period. Of the four remaining oil companies, Gulf Oil (now part of Chevron Texaco), Standard Oil of California (which changed its name to Chevron), and Texaco also outperformed the S&P 500; Phillips Petroleum (now ConocoPhillips) fell just short of the index's performance.

Despite the generally good performance of oil stocks, the superior performance of the original S&P 500 companies is not solely a result of the better performance of the oil sector. With the oil companies excluded, the value-weighted TDP still beats the S&P 500 by 23 bps a year, and the return on the equally weighted total portfolio actually rises if the oil sector is excluded.

Of the top 20 from the original companies, the material and manufacturing stocks, such as Union Carbide (now part of Dow Chemical), DuPont, General Motors, and Alcoa, lagged the market significantly. U.S. Steel would have given investors an even lower return had it not purchased and then sold Marathon Oil. Bethlehem Steel, once the second largest steel manufacturer (behind U.S. Steel) in the world, went bankrupt in 2001 and is the only stock of the 20 largest stocks to have lost money for investors. Despite these losers, an equal investment placed in each of the 20 largest S&P 500 companies when the index was founded would have generated an 11.40 percent return for investors, 55 bps greater than the return on the S&P 500.

Many of the 20 top-performing survivors shown in Table 4 outperformed the market by large margins over the past half century. The single best performing company, survivor or not, of the original S&P 500 is Philip Morris (recently renamed the Altria Group). Philip Morris yielded an annual return of 19.75 percent and has beaten the S&P 500 by almost 9 percentage points a year since the index's inception; $1,000 placed in an S&P 500 fund

Table 3. Returns of the Largest 20 Companies from the Original S&P 500, March 1957–December 2003

Rank by Return	Rank by 1957 Market Cap	From Original Name to 2003 Name (→ = Merger; ► = Name Change)	Total Accumulation of $1[a]	Annual Return
1	12	Royal Dutch Petroleum Co.	$398.84	13.64%
2	14	Shell Oil → Royal Dutch Petroleum (1985)	323.96	13.14
3	13	Socony Mobil Oil ► Mobil (1966) → Exxon Mobil (1999)	322.41	13.13
4	16	Standard Oil of Indiana ► Amoco (1985) → BP Amoco (1998)	285.31	12.83
5	2	Standard Oil of New Jersey ► Exxon (1972) ► Exxon Mobil (1999)	254.00	12.55
6	5	General Electric Co.	220.04	12.21
7	6	Gulf Oil ► Gulf Corp. → Chevron (1984) ► Chevron Texaco (2001)	214.12	12.14
8	11	International Business Machines	196.50	11.94
9	10	Standard Oil of California ► Chevron (1984) ► Chevron Texaco (2001)	172.29	11.62
10	15	Sears	151.51	11.32
11	8	Texas Co. ► Texaco (1959) → Chevron Texaco (2001)	128.63	10.93
12	20	Phillips Petroleum ► ConocoPhillips Co. (2002)	119.61	10.76
13	1	American Telephone and Telegraph ► AT&T (1994)	107.16	10.50
14	7	Union Carbide & Carbon ► Union Carbide (1957) → Dow Chemical (2001)	86.20	9.98
15	4	DuPont	41.82	8.30
16	3	General Motors	41.47	8.28
17	17	Aluminum Company of America ► Alcoa (1999)	37.74	8.06
18	19	Eastman Kodak	35.33	7.91
19	9	United States Steel ► USX Corp. (1986) ► USX Marathon (1991) ► Marathon Oil (2000)	8.25	4.61
20	18	Bethlehem Steel Co.	0.00	–13.54

[a]Includes spin-offs.

Table 4. Returns of the 20 Top Survivors, March 1957–December 2003

Rank by Return	Rank by 1957 Market Cap	From Original Name to 2003 Name (→ = Merger; ► = Name Change)	Total Accumulation of $1[a]	Annual Return
1	215	Philip Morris Companies ► Altria Group (2003)	$4,626.40	19.75%
2	197	Abbot Labs	1,281.33	16.51
3	299	Bristol-Myers ► Bristol-Myers Squibb (1989)	1,209.44	16.36
4	487	Sweets Co. ► Tootsie Roll Industries (1966)	1,090.96	16.11
5	143	Pfizer	1,054.82	16.03
6	83	Coca-Cola Co.	1,051.65	16.02
7	117	Merck and Co.	1,032.64	15.97
8	216	Pepsico	866.07	15.54
9	239	Colgate-Palmolive Co.	761.16	15.22
10	275	Crane Co.	736.80	15.14
11	277	H.J. Heinz Co.	635.99	14.78
12	188	Wm. Wrigley Jr. Co.	603.88	14.65
13	72	American Tobacco ► American Brands (1969) ► Fortune Brands (1997)	580.03	14.55
14	180	Kroger Co.	546.79	14.41
15	255	Schering Corp. → Schering-Plough Corp. (1971)	537.05	14.36
16	31	Procter & Gamble	513.75	14.26
17	227	Hershey Foods Corp.	507.00	14.22
18	76	American Home Products Corp. ► Wyeth (2002)	461.19	13.99
19	198	General Mills	420.49	13.77
20	12	Royal Dutch Petroleum	398.84	13.64

[a]Includes spin-offs.

on 28 February 1957 would have grown, with reinvested dividends, to almost $125,000 by 31 December 2003, but $1,000 put in Philip Morris would have grown to almost $4.6 million.

Note that 18 of the 20 best performers in the Survivors Portfolio are from the pharmaceutical and consumer staples industries. All these companies have strong consumer brand names and are marketed on an international basis.

Table 5 shows that many of the 20 top performers in the TDP, which includes the original S&P 500 companies that were merged into other companies as well as those survivor companies, rode the coattails of other successful companies. For example, through mergers, the shareholders of Thatcher Glass, General Foods, California Packing, National Dairy Products, and Standard Brands became shareholders of Philip Morris and shared in its success.

Sector Returns. **Figure 4** shows how market value shares of the major sectors, defined by the GICS (Global Industry Classification Standard), of the original S&P 500 in 1957 changed between then and today.[14] The upward jump in the financial sector's share in 1976 occurred when Standard & Poor's added 40 financial companies to the index.

Through the addition of new companies and the transformation of old companies, a profound change has occurred in the investing landscape over the past half century. On the one hand, the three smallest sectors in 1957 (financials, health care, and information technology) had become the three largest sectors by the end of 2003. Financials grew from less than 1 percent of the market value of the S&P 500 to more than 20 percent; health care grew from 1.2 percent to 13.3 percent; and information technology grew from 3.1 percent to 17.7 percent. On the other hand, the two largest sectors in 1957, materials and energy, have shrunk dramatically. The materials sector includes companies engaged in commodity-related manufacturing, such as chemicals, steel, and paper. These companies made up more than a quarter of the market's value in 1957 but had become the second smallest sector in the index by 2003. The energy sector also shrank dramatically—from 20 percent of the market to only 6 percent today.

Table 6 provides a comparison of the sector allocations of the Total Descendants Portfolio and the actual (continually updated) S&P 500 in 1957 and in 2003, as well as their returns over that period. The sector returns based on the original companies in the index (the TDP) outpaced the sector returns of the updated S&P 500 in *every* sector except consumer discretionary (see Note 14). In other words, the outperformance of the original companies in the S&P 500 was not concentrated in one sector but was present in all sectors of the economy.

Table 5. Returns of the 20 Top-Performing Stocks from Total Descendants Portfolio, March 1957–December 2003

Rank by Return	Rank by 1957 Market Cap	From Original Name to 2003 Name (→ = Merger; ► = Name Change)	Total Accumulation of $1[a]	Annual Return
1	215	Philip Morris ► Altria (2003)	$4,626.40	19.75%
2	473	Thatcher Glass → Rexall Drug (1966) ► Dart Industries (1969) → Dart & Kraft (1980) ► Kraft (1986) → Philip Morris (1988)	2,742.27	18.42
3	447	National Can → Triangle Industries (1985) → Pechiney SA (1989)	2,628.72	18.31
4	485	Dr. Pepper → Private (1984) → Dr. Pepper Seven Up (1993) → Cadbury Schweppes (1995)	2,392.22	18.07
5	458	Lane Bryant → Limited Stores (1982) ► Limited Inc. (1982)	1,997.87	17.62
6	65	General Foods → Philip Morris (1985)	1,467.10	16.85
7	197	Abbot Labs	1,281.33	16.51
8	234	Warner-Lambert Corp. → Pfizer (2000)	1,225.25	16.40
9	259	Celanese Corp. → Hoechast AG (1987) → Aventis (1999)	1,220.16	16.39
10	299	Bristol-Myers ► Bristol-Myers Squibb (1989)	1,209.44	16.36
11	433	Columbia Pictures → Coca-Cola (1982)	1,154.27	16.25
12	487	Sweets Co. ► Tootsie Roll Industries (1966)	1,090.96	16.11
13	274	American Chicle Co. → Warner-Lambert (1962) → Pfizer (2000)	1,069.50	16.06
14	143	Pfizer	1,054.82	16.03
15	83	Coca-Cola	1,051.65	16.02
16	267	California Packing Corp. → Del Monte (1978) → RJ Reynolds Industries (1979) → Private (1989) → RJR Nabisco Holdings (1991) → Philip Morris (2000)	1,050.10	16.01
17	117	Merck	1,032.64	15.97
18	348	Lorillard Tobacco Co. → Loews Theatres (1968) ► Loews Corp. (1971)	1,026.20	15.96
19	66	National Dairy Products → Dart & Kraft (1980) ► Kraft (1986) → Philip Morris (1988)	1,011.39	15.92
20	218	Standard Brands → Nabisco Brands (1981) → RJ Reynolds (1985) ► RJR Nabisco (1986) → Private (1989) → RJR Nabisco Holdings (1991) → Philip Morris (2000)	1,002.98	15.90

[a]Includes spin-offs.

The original companies in the consumer discretionary sector underperformed the updated sector for two reasons. First, General Motors, which represented more than 43 percent of the sector's market value in 1957, realized a poor annualized return from March 1957 through December 2003 of only 8.28 percent a year, far below the 11.09 percent a year return to the entire sector.[15] Second, Wal-Mart, one of the best performing stocks in market history, was classified in the consumer discretionary sector until 2003, but Standard & Poor's switched it to the consumer staples sector that year.

Sector Shifts and Sector Returns. Changes in the relative market value of a sector correlate only weakly with returns in that sector. Investors often ignore stocks in declining market sectors, such as energy, and the low prices for their stocks result in superior investor returns. Expanding sectors frequently become overvalued, thus attracting new companies, which results in overexpansion, excess capacity, and a sharp subsequent decline in share prices.

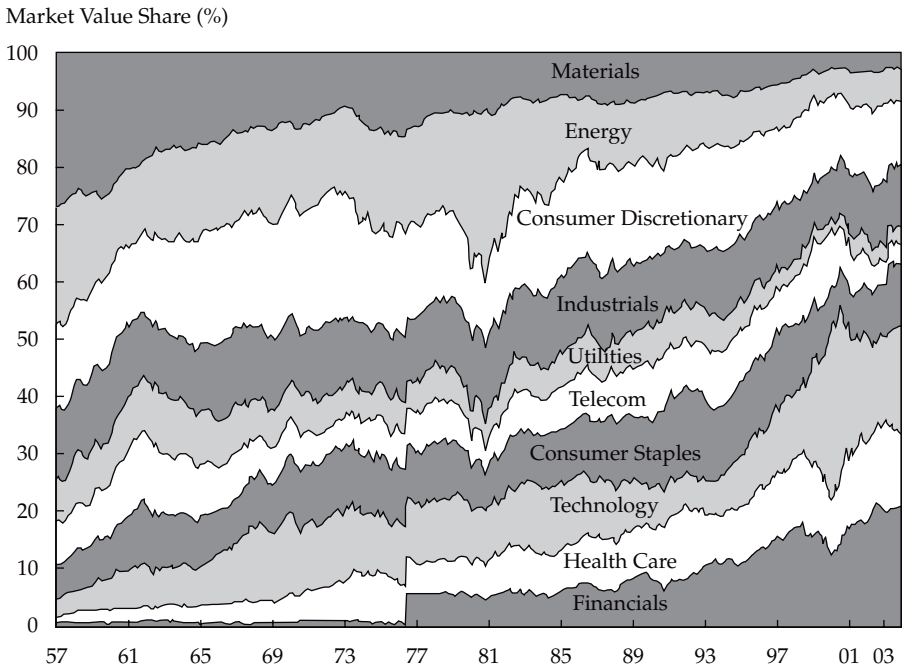
Figure 5 plots the return of each sector against the change in the weighting of the sector from 1957 through 2003. The energy and consumer discretionary sectors had above-average returns despite being contracting sectors, whereas the financials sector had below-average returns although it was expanding. The information technology sector had returns that were slightly above average, but without IBM (which dominated the index in the 1950s and 1960s), technology also would have had below-average returns.

The following equation is a regression of the 10 GICS sectors' excess return, y_t, on the change in the market share of the sector, x_t:

$$y_t = 0.001 + 0.0753x_t + \varepsilon_t,$$

where t equals 1.934. The regression had an R^2 of 0.3187, indicating that less than one-third of the

Figure 4. Market Sector Shares, March 1957–December 2003



excess return for each sector is associated with the change in the sector weight. The other two-thirds of the return is associated with the addition of new companies, dividends, or changes in the capitalization of existing companies.

Reasons for Underperformance of New Stocks

Our finding that the new companies added to the index since 1957 have, on average, actually *reduced* the return to investors should not reflect poorly on Standard & Poor's Index Committee or the companies selected by this committee. In fact, Standard & Poor's wisely resisted adding a number of technology and Internet companies in the late 1990s to the index, although these stocks attained very large market values.[16]

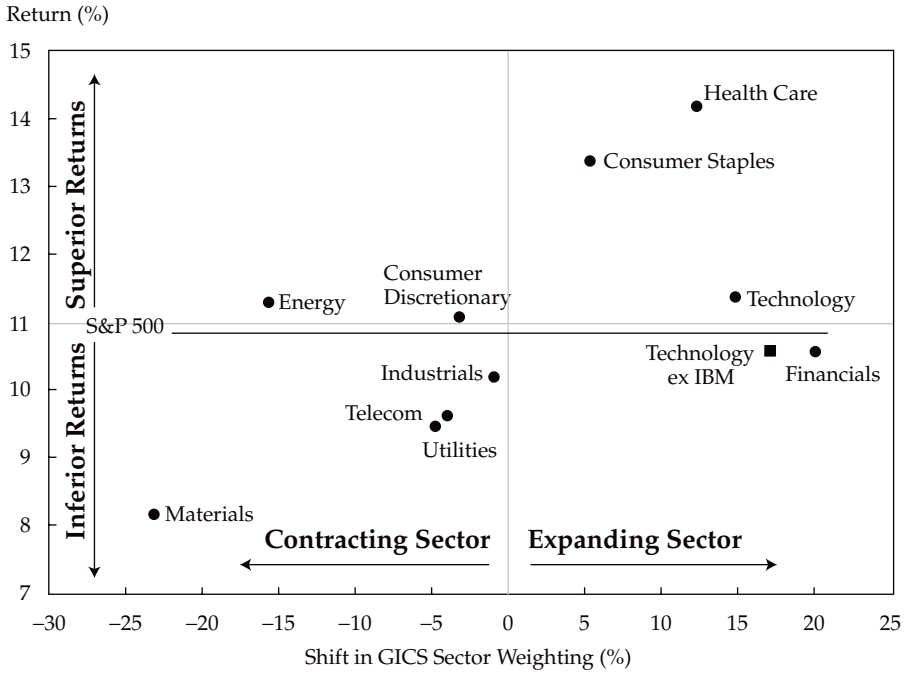
Cyclical Overvaluation of New Companies. Despite Standard & Poor's scrutiny, pressure comes from investors to add high-market-value companies when a vacancy occurs in the index. Therefore, when investor demand for a particular

Table 6. Sector Returns and Market Cap Share for Total Descendants Portfolio and S&P 500, March 1957–December 2003

		TDP		Actual S&P 500		
Sector	Original S&P 500 Market Cap Share 1957	Market Cap Share 2003	Annual Return March 1957–2003	Market Cap Share Final	Annual Return March 1957–2003	Difference (TDP – S&P)[a]
Consumer discretionary	14.58%	6.86%	9.80%	11.30%	11.09%	–1.29
Consumer staples	5.75	20.19	14.43	10.98	13.36	1.07
Energy	21.57	31.82	12.32	5.80	11.32	1.01
Financials	0.77	1.12	12.44	20.64	10.58	1.86
Health care	1.17	6.07	15.01	13.31	14.19	0.82
Industrials	12.03	10.33	11.17	10.90	10.22	0.95
Information technology	3.03	3.10	11.42	17.74	11.39	0.03
Materials	26.10	10.33	9.41	3.04	8.18	1.23
Telecommunications	7.45	5.94	10.47	3.45	9.63	0.84
Utilities	7.56	4.25	9.97	2.84	9.52	0.45

[a]In percentage points.

Figure 5. Relationship between Change in Market Value and Return in Each Sector, Data for March 1957–December 2003



sector is high, as it was for the oil service stocks in the 1978–80 energy bubble and for the information technology and telecommunications services stocks in the 1998–2000 bubble, these companies become candidates for admission to the index. Their high prices relative to their fundamentals lead to a downward bias to future returns.[17]

For example, the underperformance of the updated (actual S&P 500) energy sector is primarily a result of the oil and gas extractors, many of which were added during the energy boom of the early 1980s. In fact, 12 of the 13 energy stocks that were added during the 1980s (including Texas Oil and Gas, McDermott International, Pennzoil, Rowan Companies, Baker Hughes, and Helmerich & Payne) underperformed the index.

The telecom sector also experienced a boom that resulted in the addition of overpriced stocks that dragged down the performance of the sector. This sector added virtually no new companies from 1957 through the early 1990s. But in the late 1990s, companies such as WorldCom, Global Crossing, and Qwest Communications entered the index and subsequently underperformed the average by a large margin. In June 1999, WorldCom constituted more than 16 percent of the sector's market value; by the time it was deleted from the index in May 2002, it had lost 97.9 percent of its value. Qwest lost more than 65 percent of its value after it was admitted, and Global Crossing lost more than 98 percent of its value before it was deleted in October 2001.

The technology sector has been hurt by companies added when the public's demand for technology stocks was high. Of the 125 technology companies added to this sector since its founding, 36 were added in 1999 and 2000, and two-thirds of these 36 companies have underperformed the sector's return since their admittance. Companies admitted in 1999 underperformed the sector by 4 percent a year, and those admitted in 2000 subsequently underperformed the sector by 12 percent annually. Despite the huge success of such companies as Intel, Microsoft, Cisco Systems, and Dell Corporation, the drag from the addition of overpriced technology companies has significantly hurt the performance of this important sector.

Price Pressure from Indexing. Another reason for superior performance of the original companies relates to the overvaluation of new companies caused by price pressure exerted on new stocks by indexers that must buy shares of the companies added to the popular S&P 500 benchmark. A study published by Standard & Poor's in September 2000 noted that in the 1990s, from the announcement date to the effective date of admission in the S&P 500 stock index, shares for admitted stocks rose by an average of 8.49 percent (see Bos 2000). A more recent study (Blitzer and Dash 2004) indicates that these price jumps have been reduced in recent years, but the cause may be speculators

Table 7. Composition of Total Descendants and S&P 500 Portfolios on 31 December 2003

Sector	TDP	S&P 500	Difference (TDP – S&P)[a]
Energy	34.82%	5.80%	29.02
Consumer staples	19.27	10.98	8.29
Industrials	12.01	10.90	1.11
Health care	6.67	13.31	–6.65
Materials	6.78	3.04	3.74
Consumer discretionary	6.54	11.30	–4.76
Telecommunications	4.72	3.45	1.27
Utilities	4.04	2.84	1.20
Financials	2.67	20.64	–17.98
Information technology	2.50	17.74	–15.24

[a]In percentage points.

who purchase companies that are candidates for admission and thereby send the prices upward before the announcement.

Value Bias of Original Portfolios. One of the reasons for the superior performance of the Total Descendants Portfolio is that it has higher weights in sectors that have outperformed over time and tend to have low P/Es. **Table 7** shows the sector weights on 31 December 2003 of the TDP and the actual S&P 500. Investors in the TDP are significantly overweight in the energy sector and moderately overweight in the consumer staples sector. Both of these sectors have outperformed the S&P 500. TDP investors are underweight in the health care, financials, and technology sectors.

Because the original portfolios became underweight in technology companies and overweight in energy companies, they took on a significant value bias over time. On 31 December 2003, the average P/E, based on the last 12 months of reported earnings, was 15 for the TDP compared with 22 for the S&P 500. The performance of value stocks exceeded that of growth stocks from 1957 through 2003.[18]

Conclusion

Many in the financial community believe that the active updating of companies in the S&P 500 is essential to obtaining the high returns that this index has recorded over the past half century. Our findings argue that updating the S&P 500 to include new companies, although it may increase diversification, is not essential to achieving good returns. We found that a portfolio of the original 500 stocks chosen by Standard & Poor's in 1957 to launch their index outperformed the actual (updated) S&P 500 over the subsequent 46-year period and with lower risk. Furthermore, the original companies in 9 of the 10 GICS industry sectors outperformed the new companies that were subsequently added to the index.

This study also shows a weak relationship between returns to a GICS sector and the relative change in aggregate market value of that sector. Some sectors that have outperformed the S&P 500, such as energy, have shrunk dramatically, while other sectors that have expanded greatly, such as financials and technology, have produced mediocre or below-average returns. Less than one-third of a sector's return in excess of the S&P 500 is associated with the expansion or contraction of a sector.

The underperformance of the new companies added to the S&P 500 has several reasons. Temporary overvaluation of a company's stock because of fluctuations in investor sentiment unrelated to company fundamentals may push a company's valuation high enough to qualify for admittance to the index. This overvaluation will result in a downward bias in future returns. Price pressure comes from indexers who must buy the stock when a new company is admitted to the index. Finally, the original stocks were often ignored by investors, leaving their price low relative to fundamentals, which gave the portfolio a value bias. Therefore, this research provides further evidence that value stocks have outperformed growth stocks on a risk-adjusted basis since 1957.

This article qualifies for 0.5 PD credit.

Appendix A. Difference in Annual Return between the TDP and the S&P 500 by Year

	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980	1981	1982
1957	–58																									
1958	–10	50																								
1959	4	38	28																							
1960	–9	8	–8	–41																						
1961	5	22	14	7	68																					
1962	36	55	55	64	120	154																				
1963	34	50	50	55	90	99	23																			
1964	54	70	73	82	116	130	112	197																		
1965	52	66	67	74	100	107	85	114	35																	
1966	–1	5	1	–3	4	–7	–55	–77	–194	–369																
1967	–12	–8	–12	–17	–14	–25	–69	–90	–177	–274	–131															
1968	–1	4	0	–3	2	–6	–38	–49	–106	–150	–2	114														
1969	–24	–22	–26	–32	–31	–41	–74	–88	–138	–177	–98	–84	–243													
1970	3	7	4	2	7	1	–21	–27	–60	–77	12	51	23	335												
1971	–12	–9	–12	–16	–13	–20	–43	–50	–82	–99	–33	–12	–50	67	–221											
1972	–16	–13	–17	–20	–18	–25	–46	–53	–81	–97	–40	–24	–57	20	–152	–80										
1973	4	8	5	4	8	3	–13	–16	–37	–45	11	31	16	91	10	113	252									
1974	28	33	32	32	38	36	25	25	10	7	62	84	79	149	107	195	284	311								
1975	38	43	42	43	49	48	39	40	27	26	79	100	99	164	131	209	287	306	258							
1976	51	57	57	58	65	65	57	59	49	50	101	123	124	186	161	232	300	317	301	340						
1977	50	55	56	57	63	63	56	58	48	49	94	113	113	165	141	196	243	239	194	168	37					
1978	44	48	48	49	54	54	46	48	38	38	79	95	93	137	112	156	189	173	117	80	–24	–92				
1979	49	53	53	55	60	59	53	54	46	47	85	101	100	140	118	157	187	173	128	101	34	32	171			
1980	53	58	58	59	65	65	59	60	53	54	91	106	105	143	123	160	187	174	135	114	64	75	174	176		
1981	38	42	42	42	47	46	39	40	31	31	64	75	73	104	82	111	130	111	66	40	–12	–27	–3	–85	–266	
1982	23	26	26	25	29	27	20	19	10	9	38	48	43	70	47	70	84	60	11	–18	–70	–96	–96	–182	–322	–388
1983	39	43	43	43	47	46	40	41	33	33	62	73	70	97	79	103	118	100	63	43	5	–2	18	–19	–73	53
1984	55	59	59	60	65	64	60	61	55	56	85	96	95	122	106	131	147	134	106	92	64	69	98	84	64	202
1985	49	53	53	54	58	57	52	53	47	48	75	85	83	108	92	114	128	114	85	71	44	45	67	50	28	122
1986	62	67	67	68	73	73	69	71	65	67	94	105	104	129	115	137	152	142	118	108	86	93	119	111	102	196
1987	66	70	70	72	76	77	73	75	70	71	97	108	107	131	118	139	153	143	122	113	94	101	124	119	112	191
1988	77	81	82	83	88	89	86	88	84	86	112	122	122	146	135	156	169	162	144	137	121	130	155	153	151	225
1989	78	82	83	84	89	90	87	89	85	87	112	122	122	145	134	154	167	160	143	136	121	130	152	150	148	213
1990	86	90	91	93	98	99	96	99	95	97	122	132	132	154	145	164	177	170	156	150	138	147	169	169	168	228
1991	68	72	72	73	77	78	74	76	72	73	96	104	104	123	112	129	139	131	114	106	92	96	112	108	102	148
1992	57	60	60	61	64	64	61	62	57	58	79	86	85	103	91	106	115	105	87	79	64	66	78	71	64	101
1993	63	67	67	68	72	72	68	70	66	67	87	95	94	111	101	115	124	115	99	92	78	81	94	89	83	119
1994	65	68	69	70	73	74	71	72	68	69	89	96	95	112	102	116	124	116	101	94	81	85	97	92	87	120
1995	61	64	64	65	69	69	65	67	63	64	82	89	88	104	94	107	115	107	91	84	72	74	85	80	74	104
1996	58	61	61	62	65	65	62	63	59	60	78	85	84	99	89	101	108	100	85	78	66	68	77	72	66	94
1997	47	50	49	50	53	52	49	49	45	46	63	69	67	81	71	82	88	79	63	55	43	43	51	44	38	62
1998	24	26	25	25	27	26	22	22	17	16	32	37	34	46	35	44	49	38	20	11	–2	–5	0	–9	–18	1
1999	–8	–6	–7	–8	–7	–9	–15	–16	–21	–23	–9	–6	–10	0	–13	–5	–2	–15	–36	–46	–61	–67	–66	–77	–89	–76
2000	32	34	33	33	36	35	31	31	27	27	41	46	44	56	46	55	59	50	34	27	15	13	19	12	4	22
2001	44	46	46	46	49	48	45	45	42	42	57	62	60	72	63	72	77	69	55	48	38	38	44	38	33	51
2002	61	63	63	64	67	67	64	64	62	62	78	83	82	94	86	96	101	94	62	77	68	69	77	73	69	88
2003	55	57	57	58	61	61	58	58	55	56	70	75	74	86	78	87	92	85	73	67	58	59	65	61	57	75

(continued)

Appendix A. Difference in Annual Return between the TDP and the S&P 500 by Year (continued)

	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1983	515																				
1984	490	465																			
1985	295	190	–145																		
1986	344	290	187	492																	
1987	305	256	179	318	164																
1988	326	291	243	356	292	434															
1989	300	266	221	303	242	286	121														
1990	303	275	241	308	264	301	236	318													
1991	207	171	125	165	102	85	–31	–95	–628												
1992	149	111	63	89	26	–4	–110	–174	–464	–324											
1993	164	131	91	117	67	49	–25	–55	–200	–17	306										
1994	161	131	96	119	75	62	3	–16	–111	34	214	128									
1995	141	112	78	98	56	41	–13	–32	–115	–1	117	16	–135								
1996	128	100	67	84	45	30	–19	–36	–107	–12	74	–9	–96	–61							
1997	91	63	29	42	2	–16	–65	–86	–155	–82	–27	–119	–223	–264	–480						
1998	25	–6	–43	–36	–78	–103	–157	–184	–259	–210	–189	–297	–430	–520	–757	–1,017					
1999	–58	–92	–132	–131	–178	–210	–268	–302	–384	–356	–361	–482	–630	–740	–966	–1,186	–1,340				
2000	45	19	–11	–3	–37	–54	–94	–111	–162	–114	–86	–145	–198	–208	–243	–175	186	–1,497			
2001	73	51	25	34	5	–7	–39	–51	–89	–42	–8	–48	–77	–69	–70	13	292	964	472		
2002	111	91	70	80	57	49	23	17	–11	37	75	49	38	58	75	159	385	833	541	602	
2003	96	77	55	65	42	33	8	2	–26	17	50	24	12	26	37	106	289	637	352	284	–236

Notes

1. This market value is based on the Wilshire 5000 Total Market Index as of the end of October 2004.
2. A list of the selection criteria can be found on S&P's website (www.standardandpoors.com).
3. See, for example, "The Case for Indexing" (2003); Siegel (2002, chap. 20); Malkiel (2003).
4. See Standard & Poor's Corporation (2002).
5. The only financial stocks in the index in 1957 were consumer finance companies, such as Household International, Beneficial Corporation, and CIT Financial. Banks were not added to the index until 1976. One of the reasons given for the early exclusion of bank stocks was that most banks were trading on the OTC exchange (which became NASDAQ in 1971), so timely price data were not available.
6. In 2002, S&P eliminated Royal Dutch Petroleum, Unilever, and the Canadian companies Inco, Alcan, Nortel Networks, Barrick Gold Corporation, and Placer Dome.
7. This number may be lower than that found on the S&P website because we did not consider a merger of two S&P companies to be an addition to the index.
8. Additions and deletions of companies are not the only changes that have been made to the index. Matching the performance of the S&P 500 requires that indexers buy and sell shares when existing companies issue or repurchase shares or change their capitalizations in some other way. From 1993 through 2002, these capitalization changes averaged 1.56 percent of the market value of the index, a figure that rose to 2.49 percent during the technology boom in 2000. Transactions related to capitalization changes have represented about 30 percent of all the transactions that S&P 500 indexers must undertake; the other 70 percent of changes are related to the deletion and addition of companies to the index.
9. In some cases, bonds or preferred shares were distributed in a privatization; in this case, we assumed the funds were sold and invested to match the index.
10. For example, when RJR Nabisco was taken private by Kohlberg Kravis Roberts and Company (KKR) in 1989, we assumed investors in the DDP invested the money received for their shares in an S&P 500 index fund. Two years later when KKR reissued Nabisco Holdings, we assumed those shares were repurchased with the accumulation in the index fund.
11. See the description of "Return" calculation in the Data Description Guide for the CRSP US Stock Database and the CRSP US Indices Database, Version CA276.200303.2, p. 184.
12. In a few cases, a stock distribution would have been considered a taxable event by the U.S. IRS.
13. Data on the returns of each company of the original S&P 500 are available from the authors.
14. Although S&P developed the current GICS definitions in 2001, we were able to map companies into the sectors by using SIC codes and S&P's Security Price Index Record, which contains the complete company history of S&P industry groups.
15. Without GM, the original sector's return would be 79 bps higher, whereas the updated sector would be only 43 bps higher.
16. During the Internet boom, S&P admitted only AOL (in January 1999) and Yahoo (in December 1999). For a more complete description of this period and the price behavior of Yahoo, see Siegel (2005).
17. Ritter (1984) documented a similar phenomenon behind the poor performance of IPOs during "hot issue" markets.
18. Among the recent studies documenting superior performance of low-P/E stocks are Ibbotson Associates (2004) and O'Shaughnessy (1998). Important historical studies of the outperformance of low-P/E stocks are Nicholson (1960) and Basu (1977).

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