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*The Long-term Returns on the Original
S&P 500 Firms*

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by

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Abstract

The S&P 500 Index, first compiled in March, 1957, is the most widely-used benchmark for measuring the performance of large capitalization, US-based stocks. The index of 500 stocks is continually updated, adding approximately 20 new firms each year that meet Standard and Poor's criteria for market value, earnings, and liquidity while deleting an equal number that fall below these standards or are eliminated by mergers or other corporate changes.

We calculated the return of all 500 of the original S&P 500 firms and the new firms that have been subsequently added to the index. Contrary to earlier studies, we found that the buy-and-hold returns of the 500 original firms have outperformed the returns on the continually updated S&P 500 index and have done so with lower risk. The new firms added to the S&P 500 Index since 1957 have underperformed the original firms in nine of the ten industrial GICS sectors.

We also found that less than one-third of a sector's return from 1957 through 2003 can be attributed to the expansion and contraction of the sector's market value relative to the S&P 500 Index. Sector differences in dividend yields, capitalizations, and the number of firms admitted to the sector accounted for more two-third of the changes in market share.

The underperformance of the continually updated S&P 500 Index is due to the overvaluation of newly admitted firms, which have been caused by the cyclical fluctuations in investor sentiment and price pressures exerted by indexers. Relative to the updated S&P 500 index, the portfolios of original firms became heavily weighted with price-to-earnings stocks, particularly large oil producers that have outperformed growth stocks since 1957.

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Introduction

The S&P 500 Index is the most widely-used benchmark for measuring the performance of large capitalization, US-based stocks. Covering almost all of the 500 largest companies ranked by market value, the S&P 500 Index comprised about 83% of the market capitalization of all regularly traded stocks on the New York, American, and Nasdaq stock exchanges.¹

The index of 500 stocks, first compiled in March, 1957 is continually updated by adding new firms that meet Standard and Poor's criteria for market value, earnings, and liquidity while deleting an equal number that fall below these standards or are eliminated by mergers or other corporate changes.² S&P states that the purpose of updating is to maintain a representative index that includes 500 "leading companies in leading industries of the economy."³ It is well documented that over time the S&P 500 index has outperformed the vast majority of active money managers and mutual funds.⁴ Since the S&P 500 was formulated, more than 900 new firms have been added and a like number deleted from the index.

Joseph Schumpeter called the process by which new firms enter the market, challenge, and eventually destroy the older firms, "creative destruction."⁵ Indeed, many of the giant firms in the original index, such as US and Bethlehem Steel, Union Carbide, and Eastman Kodak have declined while new firms, such as Intel, Microsoft, and Wal-Mart have taken their place. In fact, the market value of the S&P 500 firms that have survived from the original 1957 list is only 31% of the 2003 year end S&P 500's market value.

Many financial advisors counsel clients to continually upgrade their portfolio, claiming that new firms offer investors higher returns than the older, dying companies. These recommendations were supported by the research of Richard Foster and Sarah Kaplan from McKinsey & Co who reported that the new companies added to the S&P 500 Index have generated higher returns than the original

¹ Market value based on the Wilshire 5000 Total Market Index valued at the end of October 2004.

² A list of the selection criteria can be found on S&P's website, www2.standardandpoors.com/spf/pdf/index/500factsheet.pdf.

³ This quotation is found on S&P's website, see above.

⁴ See "The Case for Indexing," The Vanguard Group, September 2003, Siegel, *Stocks for the Long Run*, 3rd edition, 2002, McGraw Hill, Chapter 20, and Malkiel, B., *A Random Walk Down Wall Street*, 2003 edition.

⁵ Joseph Schumpeter, *Capitalism, Freedom, and Democracy*, Harper and Bros, New York, NY, 1942

firms. They stated “without these new firms, the performance of the [S&P 500] index would have been considerably less.”⁶

Our research calculated the return of all 500 of the original S&P 500 firms and the new firms that have been subsequently added to the index. Contrary to Foster and Kaplan’s results, we found that the buy-and-hold returns of the 500 firms that were chosen for the original index in March 1957 have outperformed the returns on the continually updated S&P 500 index used by investment professionals to benchmark their performance and have done so with lower risk. Underperformance of the new firms added to the index were found in virtually all industries: in nine of the ten industrial GICS sectors, the returns of the new firms added to the index fell short of the performance of the original firms.

We also found that industry sectors that have gained market share over time have not always translated into higher stockholder returns, while returns in shrinking sectors often beat the averages. Specifically, less than one-third of a sector’s return can be attributed to the expansion and contraction of the sector’s relative market value, while the remainder is due to differences in dividends and the addition of new firms. These findings argue that updating the S&P 500 Index to include new firms, while it may increase diversification, is not essential to achieve good returns.

History and Transformation of the S&P 500 Index

Standard & Poor’s Corporation first developed industry-wide stock price indices in 1923 and three years later formulated the Composite Index containing 90 stocks.⁷ The Composite Index was expanded to 500 stocks on March 1, 1957 and renamed the S&P 500 Index. At that time, the firms in the S&P 500 Index had a market value of \$173 billion, comprising about 85 percent of the value of all NYSE-listed stocks.

The Index originally contained exactly 425 industrials, 25 railroad, and 50 utility firms. In 1976, 40 financial stocks were added, and the industrial, transportation and utility groups were reduced to 400, 20, and 40, respectively.⁸ In 1988 Standard and Poor’s eliminated fixed sectors with the goal of achieving a diversified and representative portfolio of all stocks trading in US markets. In July 2002 all foreign-based companies, which comprised 1.3% of the market capitalization of the index at that time, were eliminated and replaced by US-based firms.⁹

⁶ *Creative Destruction: Why Companies That Are Built to Last Underperform the Market – and How to Successfully Transform Them*, by Richard Foster and Sarah Kaplan, Random House, New York, 2001. p. 28.

⁷ See Standard and Poor’s *Security Price Index Record*, 2002 Edition, pg. 1

⁸ The only financial stocks in the index in 1957 were consumer finance companies, such as Household International, Beneficial Corp, 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 over-the-counter exchange (which became Nasdaq in 1971) and timely price data were not available.

⁹In 2002, S&P eliminated Royal Dutch Petroleum, Unilever NV, and the Canadian firms Inco Ltd., Alcan Inc., Nortel Networks, Barrick Gold and Placer Dome.

Updating the Index

The total number of new firms added to the S&P 500 Index from its inception in 1957 through 2003 is 917, an average of 20 per year.¹⁰ The number added each year is shown in Figure 1. The highest number of new firms added to the index occurred in 1976, when the S&P added 60 firms, 40 of which, as noted above, were financial. These new companies comprised 10.4% of the market value of the index at the time.¹¹

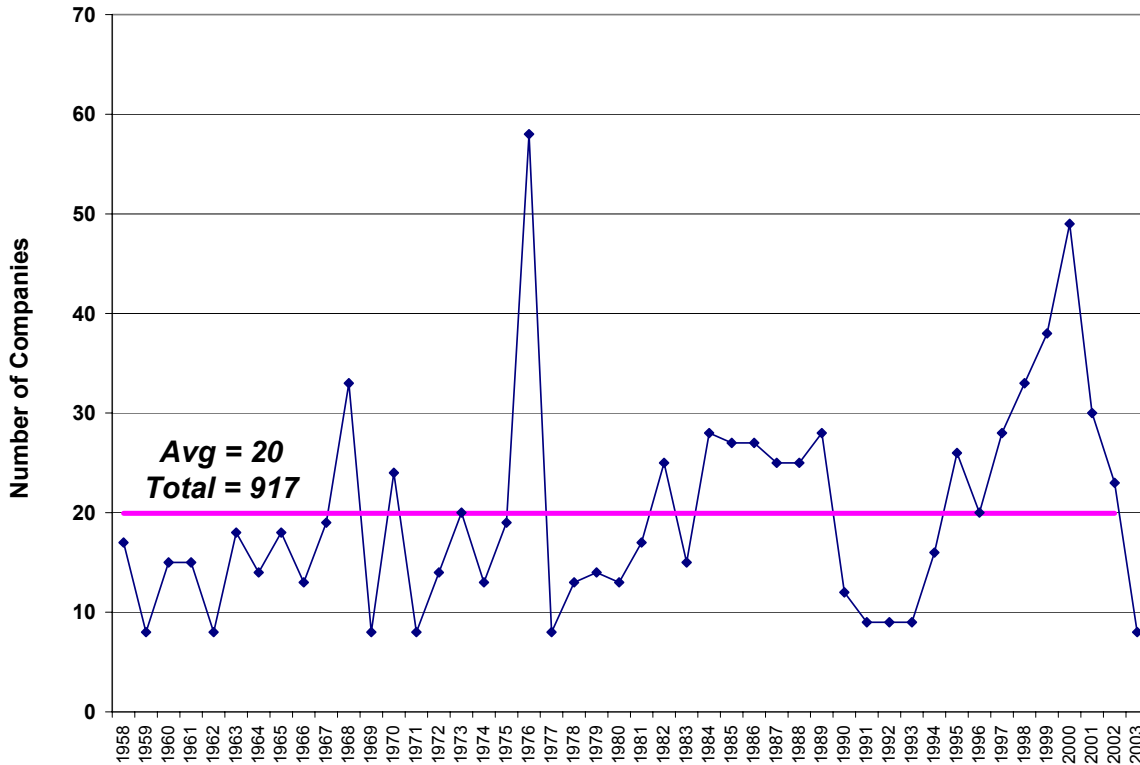


Figure 1: Number of Firms added to the S&P 500 Index

¹⁰ This number may be lower than found on the S&P website since we did not consider a merger of two S&P companies an addition to the index.

¹¹ The addition and deletion of firms are not the only changes that have been made to the index. In order to match the performance of the S&P 500 Index requires that indexers buy and sell shares when existing firms issue or repurchase shares or change their capitalization in some other way. From 1993 through 2002, these capitalization changes have averaged 1.56% of the market value of the index, a figure that rose to 2.49% during the technology boom in 2000. Transactions related to capitalization changes have comprised about 30% of all the transactions that the S&P 500 indexers must undertake, the other 70% are related to the deletion and addition of firms to the index.

In recent years, annual additions have averaged slightly more than 5% of the market value of the index. The percentage was higher during the late 1990s due to addition of new, high-capitalization technology firms. In 2003, the number of new firms added to the index fell to a record-typing low of 8, a level last reached in 1977.

Holding Period Returns to the Original Portfolio of S&P 500 Stocks

To calculate the performance of the original S&P 500 firms, we formed three portfolios. Over time the three portfolios evolve differently depending on the assumptions we make about what investors do with their shares received from a spin-off or when an original firm is merged into another firm or went private. Figure 2 displays the evolution of these portfolios through time.

The first portfolio we analyze is called the **Survivors' Portfolio (SP)**. The survivor portfolio consists only of shares of the original S&P 500 firms. Shares of other firms received through mergers are immediately sold and the proceeds invested in the remaining survivor firms in proportion to their market value. For example, when Mobil Oil was merged into Exxon in 1999, shareholders of Mobil are assumed to sell the shares they received from Exxon-Mobil and invest the proceeds in the remaining survivor firms. The surviving firm is identified as the company whose identifier in the CRSP (Center for Research in Security Prices) "PERMNO" remains unchanged. All spinoffs are immediately sold and the proceeds reinvested in the parent firm. Funds received from privatizations are sold and the proceeds re-invested in the original surviving firms in proportion to their market value.

It is important to note that the evolution of the survivors' portfolio does not assume advance knowledge of which firms survived. Firms are deleted over time when they are privatized or merged into other firms. As a result, there is no presumption that the returns on these firms would outperform the benchmark index and there is no "survivorship bias."

At year end 2003, the Survivors' Portfolio consisted of 125 original firms that have remained intact (except possibly for a name change) from 1957 to the present. Ninety-four of the surviving firms are still in the S&P 500 index, 26 are publicly traded companies not in the index, and five are in bankruptcy proceedings.

The second portfolio is called the **Direct Descendants' Portfolio (DDP)**, which consists of the shares of firms in the survivors' portfolio plus the shares issued by firms acquiring an original S&P 500 firm. In the case of the Mobil-Exxon merger discussed above, we assume that shareholders of Mobil Oil hold the shares of Exxon that were issued in the merger.

If an original firm was taken private, we assume that the cash distributed from the privatization was invested in an indexed portfolio whose returns matched the standard S&P 500 Index.¹² If a firm that was taken private is subsequently reissued to the public again, we assume the portfolio repurchases shares in the reissued company with the funds that had been invested in the index at the time the firm

¹² In some cases, bonds or preferred shares were distributed in a privatization and we assumed that these funds were sold and invested to match the index.

went private. Seventy-four original S&P 500 firms were privatized.¹³ As before, spinoffs are immediately sold and the proceeds reinvested in the parent.

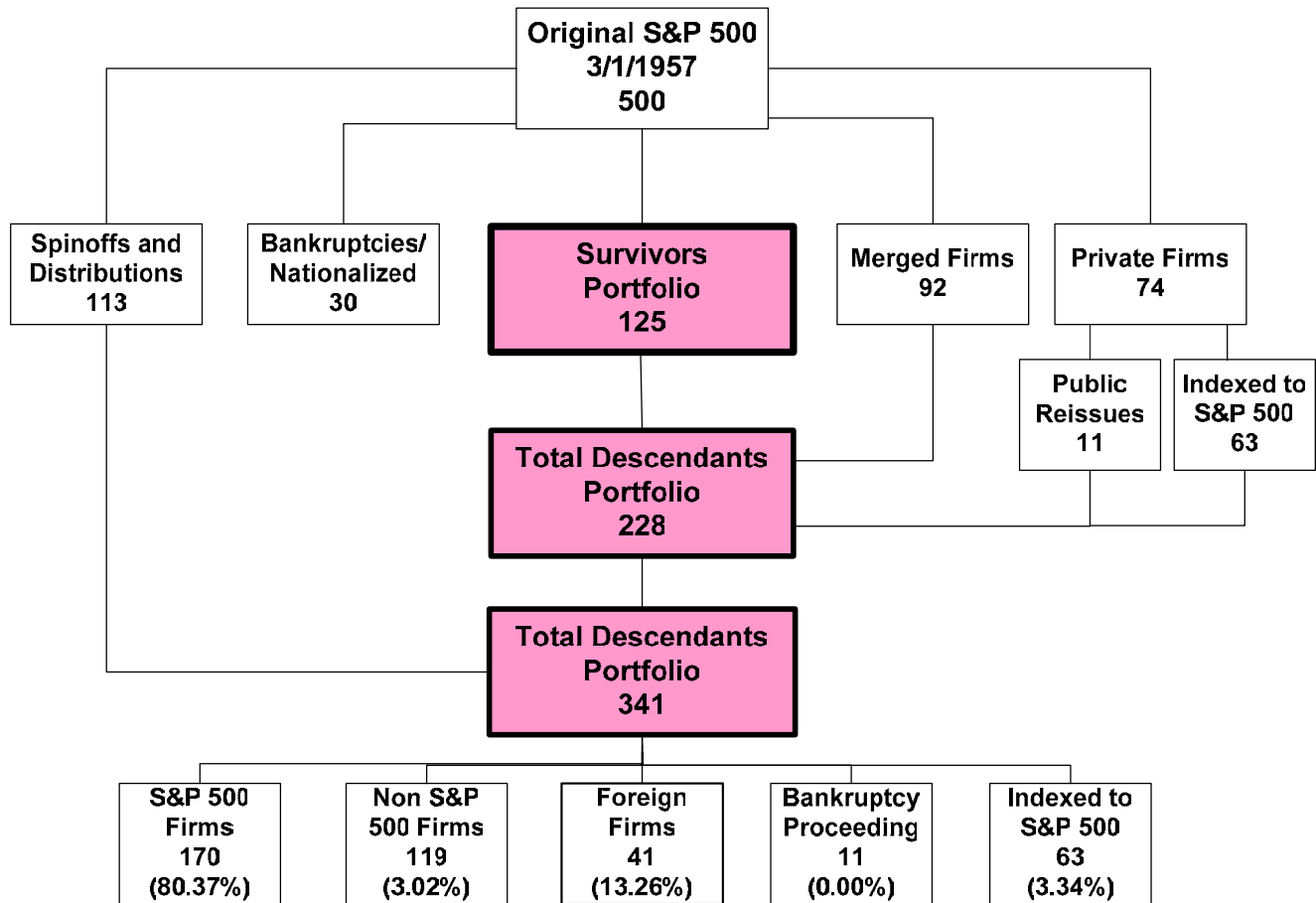


Figure 2: Composition of Original S&P 500 firms on December 31, 2003.

The third portfolio is called the *Total Descendants' Portfolio* (TDP) and includes all firms in the DDP plus all the spinoffs and other stock distributions issued by the firms in the Direct Descendants' Portfolio. The only difference between the TDP and the DDP is that the TDP holds all the spinoffs rather than sell them and reinvest in the proceeds in the parent firm.

The TDP is identical to the portfolio of a totally passive investor who holds all the spinoffs and shares issued from mergers and never sells any stock. For example, when American Telegraph and Telephone distributed its baby bells in 1983 following the government-mandated breakup of the

¹³ For example, when RJR Nabisco was taken private by KKR in 1989, investors in the TDP are assumed to invest the money received for their shares in an S&P 500 index fund. Two years later when KKR reissued Nabisco Holdings, shares were repurchased with the accumulation in the index fund.

monopoly, all the shares of the regional bell companies were held by investors in the TDP. Table 1 shows how the returns are calculated for each of the portfolios.

Portfolio Return Assumptions					
		Firms			
		Survivor	Merged	Distributions	Privatized
Portfolio	Survivor	Held	Sold and Proceeds Reinvested in Remaining Survivor Firms	Reinvested in Parent	Sold and Proceeds Reinvested in Remaining Survivor Firms
	Direct Descendants	Held	Held	Reinvested in Parent	Matched to S&P 500*
	Total Descendants	Held	Held	Held	Matched to S&P 500*

* If privatized firm subsequently re-issued, stock purchased with funds that were matched to S&P 500.

Table 1: Portfolio Return Assumptions

It should be noted that the return data compiled in the CRSP data bases assume that spinoffs are immediately sold and the proceeds reinvested in the parent firm, as we have done for the direct descendants’ portfolio.¹⁴ But many investors do hold the spun-off firms and doing so is often both tax and transaction-cost efficient. It is for this reason that we have also computed the returns of the Total Descendants’ Portfolio

Figure 2 shows that through mergers, bankruptcies, nationalizations and privatizations, the original 500 firms have been reduced to 339 on December 31, 2003. Of these, 168 are still in the S&P 500 Index and these firms comprise 80.4% of the market value of the final accumulation of the TDP. One hundred nineteen firms, comprising just under 3% of the final accumulations of the TDP are US-based firms not currently in the S&P 500 Index; 41 firms, comprising 13.3% of the final accumulation are foreign and headquartered outside the US, and 11 firms are in bankruptcy proceedings. The firms privatized and not reissued constitute approximately 3% of the market value of the portfolio.

The returns on Spin-offs versus the Parent

Although there was not a significant difference in the overall returns of the DDP and TDP portfolios, Table 2 shows that for individual companies there were some significant differences between the return of the parent firms and the returns of the spinoffs.

By far the most important spinoffs from the original S&P 500 firms belonged to American Telephone and Telegraph, the largest and most widely held stock when the index was founded. Investors who held all of AT&T’s spinoffs received a return of 10.50% per year, only 35 bps behind the performance of the S&P 500 Index since 1957, while the return on parent company was only 7.85%, far below the market average.

¹⁴ See description of “Return” calculation in *Data Description Guide for the CRSP US Stock Database and the CRSP US Indices Database*, Version CA276.200303.2, pg 184.

Spinoffs whose Return Exceed Parent					
	Company	Annual Return w/ Spinoffs	Ann. Ret w/ Spinoffs Reinvested	Gain in Annual Return	Spinoffs
1	AT&T	10.50%	7.85%	2.64%	Baby Bells
2	Sears, Roebuck	11.32%	10.01%	1.31%	Morgan Stanley, Allstate
3	Olin Corp.	10.88%	8.58%	2.30%	Squibb Beechnut
4	Ford	11.64%	11.25%	0.39%	Associates First Capital
5	American Brands	14.55%	14.42%	0.13%	Gallaher Group
Spinoffs whose Return Fell Short of Parent					
	Company	Annual Return w/ Spinoffs	Ann. Ret w/ Spinoffs Reinvested	Loss in Annual Return	Spinoffs
1	Atchison, Topeka, Santa Fe	11.36%	13.42%	-2.05%	Catellus, Santa Fe Energy, Santa Fe Gold
2	Union Carbide	9.98%	10.51%	-0.53%	Praxair
3	Southern Co.	11.03%	12.17%	-1.14%	Mirant Corp
4	General Motors	8.28%	8.45%	-0.17%	Raytheon, Delphi
5	Du Pont	8.30%	8.40%	-0.11%	General Motors

Table 2: Effect of spinoffs on returns on specific companies

But spinoffs do not always outperform the parent. Praxair, a natural gas producer, underperformed its parent Union Carbide and Mirant Corp., a provider of energy products and services and spun-off by Southern Co. in 2001, declared bankruptcy in 2003.. Similarly, investors who held the rail stocks were generally hurt by the relatively poor returns of the spinoffs of oil, gas, and other real properties.

Calculation of the Returns on the original S&P 500 portfolios

The returns from each of these three portfolios are analyzed from two *initial* allocations of the original S&P 500 firms: value-weighted and equally-weighted. There is no rebalancing in any portfolio after this initial allocation is made.

Table 3 shows the returns, standard deviation, and Sharpe ratios of all the portfolios and compares them to the standard S&P 500 Index. 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 March 1, 1957 through December 31, 2003, the S&P 500 Index registered a 10.85% annualized compound return. The compound return on the value-weighted and equally-weighted TDP was 11.40% and 12.14% per year respectively, beating the updated Index by 55 and 129 basis points annually over the past 47 years.

Portfolio	Initial Weighting	Geometric Return	Arithmetic Return	Standard Deviation	Sharpe Ratio
Survivors Portfolio	Value	11.31%	12.38%	15.72%	0.4343
	Equal	12.28%	13.75%	18.45%	0.4446
Direct Descendants	Value	11.35%	12.45%	15.93%	0.4331
	Equal	12.18%	13.67%	18.55%	0.4375
Total Descendants	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

Table 3: Performance of Portfolios of Original S&P 500 Firms

The superior performance of the TDP is noteworthy since, as noted above, it is the most transaction-cost and tax-efficient strategy of accumulating wealth from the original S&P 500 stocks. The TDP involves fewer transactions than required of a standard S&P 500 index fund since no shares are ever sold in the open market, and the only shares purchased arise from dividends or reissues of privatized companies. Furthermore the TDP is the most tax-efficient strategy since, with very few exceptions, no capital gains are realized as no shares are ever sold.¹⁵

These results mean that these 500 firms chosen by Standard and Poor's in 1957 have, on average, outperformed the nearly one thousand new firms that had been added to the index over the subsequent half century.

Figure 3 shows a yearly relative comparison of the cumulative return on the value-weighted TDP to the S&P 500 Index 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% above the S&P 500 Index. During the 1990s the relative performance of the TDP declines, and at the end of 1999 the cumulative return on the TDP temporarily falls behind the S&P 500 Index. This decline is due to the technology bubble which vastly inflated the returns to the new technology entrants in the updated S&P 500 index while the TDP had a very small technology weighting. When technology shares fell, the TDP again outperformed the standard, updated S&P 500 Index.

¹⁵ There are a few cases where a stock distribution is not considered a non-taxable event by the IRS.

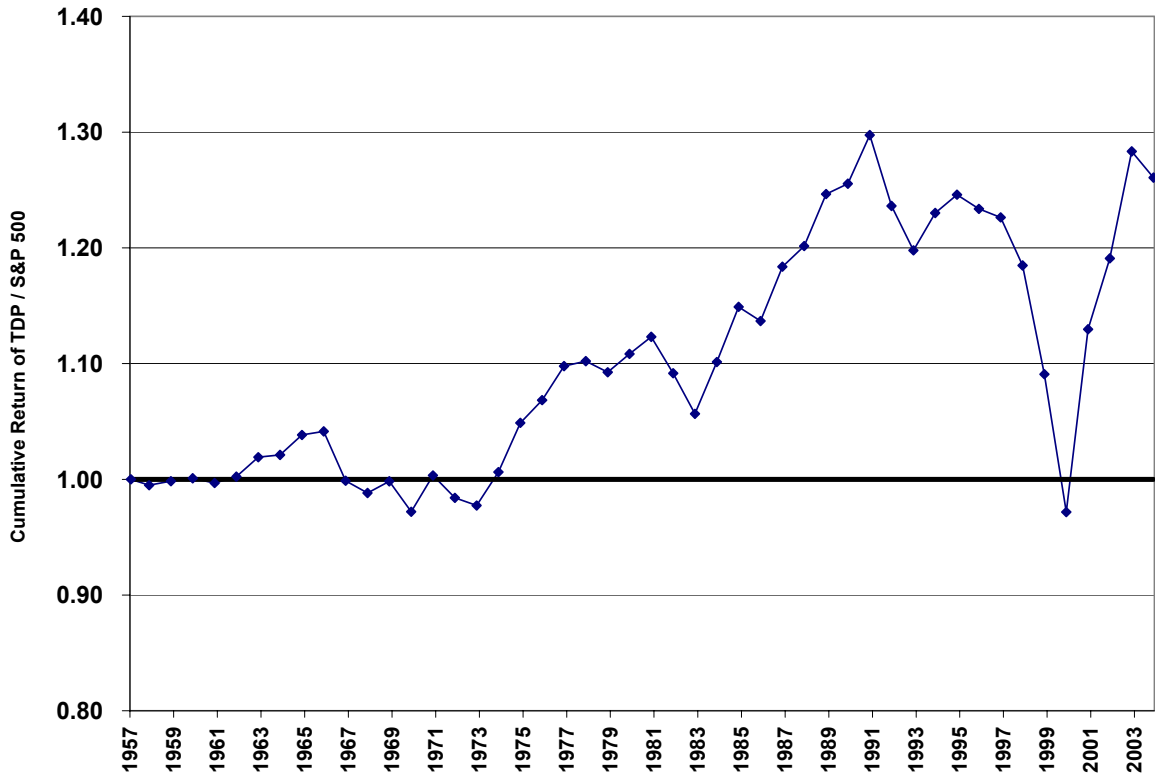


Figure 3: Cumulative performance of value-weighted Total Dependents Portfolio relative to S&P 500

Difference Between Changes in Market Value and Investor Return

The market value of the updated S&P 500 Index firms has risen at a 9.13% annual rate since the index was founded, increasing from \$172 billion in 1957 to \$10.3 trillion by December 31, 2003. In contrast, the market value of the Survivors' Portfolio has grown at only a 6.44% annual rate, reaching \$3.2 trillion by the end of 2003. Yet the return on the survivor's portfolio was greater than the return on the S&P 500 index.

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

Long-term Returns of the Original S&P 500 firms.

Table 4 shows the annualized returns from March 1, 1957 through December 31, 2003 of the twenty largest market-value firms on March 1, 1957, Table 5 displays the twenty best-performing survivor firms, and Table 6 records the twenty best-performing firms from the Total Descendants' Portfolio.¹⁶

Rank Return	Rank Market Cap 1957	Original Name → 2003 Name (→ = Merger ► = Name Change)	Total Accumulation of \$1 (including spinoffs)	Annual Return
1	12	Royal Dutch Petroleum	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	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 Roebuck	151.51	11.32%
11	8	Texas Co ► Texaco (1959) → Chevron-Texaco (2001)	128.63	10.93%
12	20	Phillips Petroleum ► ConocoPhillips (2002)	119.61	10.76%
13	1	American Telephone & 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	Du Pont E I De Nemours & Co	41.82	8.30%
16	3	General Motors	41.47	8.28%
17	17	Aluminun Company of America ► Alcoa (1999)	37.74	8.06%
18	19	Eastman Kodak	35.33	7.91%
19	9	U S Steel ► USX Corp (1986) ► USX Marathon (1991) ► Marathon Oil (2000)	8.25	4.61%
20	18	Bethlehem Steel	0.00	-13.54%

Table 4: Returns of the Largest 20 Companies from the Original S&P 500

Of the twenty largest firms in 1957, nine were oil firms and the five best performers – Royal Dutch Petroleum, Shell Oil, Socony Mobil, Standard Oil of Indiana (now BP Amoco), and Standard Oil of New Jersey (now Exxon-Mobil) were also oil companies. Each of these firms outperformed the S&P 500 Index by between 2% and 3% per year over 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 Index, while Phillips Petroleum (now Conoco-Phillips) just fell short of the index's performance.

The material and manufacturing stocks, such as Union Carbide (now part of Dow Chemical), DuPont, General Motors, and Alcoa lagged the market significantly. US Steel would have given

¹⁶ Data on the returns of each firm of the original S&P 500 is available from the authors.

investors an even lower return had it not purchased and then sold Marathon Oil. Bethlehem Steel, once the second largest steel manufacturer in the world behind US Steel, went bankrupt in 2001 and is the only one of the twenty largest stocks to lose money for investors.

Despite the losers, an equal investment placed in each of the 20 largest S&P 500 firms when the index was founded would have generated a 11.40% return for investors, 55 basis point greater than the S&P 500. Interestingly, this return is exactly equal to the return received in the value-weighted total descendants portfolio.¹⁷

Table 5 lists the twenty top performing stocks for the survivors of the 500 original S&P 500 firms. Many of these firms, such as Merck, Abbott Labs, Pfizer, Coca-Cola, Colgate-Palmolive, PepsiCo, Wrigley, Heinz, outperformed the market by large margins over the past half century.

The single best performing firm of the original S&P 500 Index is Philip Morris, recently renamed the Altria Group. Philip Morris yielded an annual return of 19.75% and beat the S&P 500 Index by almost 9% per year since the index's inception. \$1,000 placed in an S&P 500 Index fund on February 28, 1957 would have grown, with reinvested dividends, to almost \$125,000 by December 31, 2003. But \$1,000 put in Phillip Morris would have grown to almost \$4.6 million.

It is of note that 18 of the twenty best-performing firms are from the pharmaceutical and consumer staples industries. All these firms have strong consumer brand names and are marketed on an international basis.

Table 6 lists the 20 top performing firms from the Total Descendants' Portfolio. These include the original S&P 500 firms that were merged into other firms as well as those survivor firms. Many of the top-performing firms rode on the coattails of other successful firms: Through mergers the shareholders of Thatcher Glass, General Foods, California Packing, National Dairy Products, and Standard Brands all became shareholders of Philip Morris and shared in its success.

¹⁷ The superior performance of the original portfolios analyzed in the previous section is not solely due to the better performance of the oil sector. Excluding the oil firms, the value-weighted TDP still beat the S&P 500 Index by 23 basis points a year, and the return on the equally-weighted total portfolio actually rises if we exclude the oil sector.

Rank Return	Rank Market Cap 1957	Original Name → 2003 Name (→ = Merger ► = Name Change)	Total Accumulation	Annual Return
1	215	Philip Morris ► Altria (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 Inc.	1,054.82	16.03%
6	83	Coca-Cola	1,051.65	16.02%
7	117	Merck	1,032.64	15.97%
8	216	Pepsico	866.07	15.54%
9	239	Colgate-Palmolive	761.16	15.22%
10	275	Crane Co.	736.80	15.14%
11	277	Heinz	635.99	14.78%
12	188	Wrigley	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 (1971)	537.05	14.36%
16	31	Procter & Gamble	513.75	14.26%
17	227	Hershey Foods	507.00	14.22%
18	76	American Home Products ► Wyeth (2002)	461.19	13.99%
19	198	General Mills	420.49	13.77%
20	12	Royal Dutch Petroleum	398.84	13.64%

Table 5: Returns of the 20 top “Survivors”

Rank Return	Rank Market Cap 1957	Original Name → 2003 Name (→ = Merger ► = Name Change)	Total Accumulation	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 → Pfizer (2000)	1,225.25	16.40%
9	259	Celanese Corp. → Hoechst 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 → Warner-Lambert (1962) → Pfizer (2000)	1,069.50	16.06%
14	143	Pfizer Inc.	1,054.82	16.03%
15	83	Coca-Cola	1,051.65	16.02%
16	267	California Packing Corp → Del Monte (1978) → Reynolds RJ 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 → Loew's Theatres (1968) ► Loew's 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) → Reynolds RJ Industries (1985) ► RJR Nabisco (1986) → Private (1989) → RJR Nabisco Holdings (1991) → Philip Morris (2000)	1,002.98	15.90%

Table 6. Returns on 20 top-performing Stocks from Total Descendants' Portfolio

GICS Sector Returns

Figure 4 shows the share of the market value of the major sectors of the original S&P 500 Index in 1957 and the sector weights today.¹⁸ The upward jump in the financial sector's share in 1976 occurred when Standard and Poor's added 40 financial firms to the index.

Through the addition of new firms and the transformation of old firms, there has been a profound change in the industry over the past half century. The three smallest sectors in 1957 (Financials,

¹⁸ While Standard & Poor's developed the current GICS (Global Industry Classification Standard) definitions in 2001, we were able to map firms into the sectors by using SIC (Standard Industry Classification) codes as well as S&P's Security Price Index Record which contains the complete company history of S&P industry groups.

Health Care, and Information Technology) became the three largest sectors by the end of 2003. Financials grew from less than one percent of the market value of the S&P 500 Index to over 20%, Health Care grew from 1.2% to 13.3%, and information technology grew from 3.1% to 17.7%.

On the other hand, the two largest sectors in 1957, materials and energy, have shrunk dramatically. The Materials sector includes firms engaged in commodity-related manufacturing, such as chemicals, steels, paper, etc. These firms comprised over one-quarter of the market's value in 1957 but have become the second smallest sector in the index today. The energy sector has also shrunk dramatically – from 20% of the market to only 6% today.

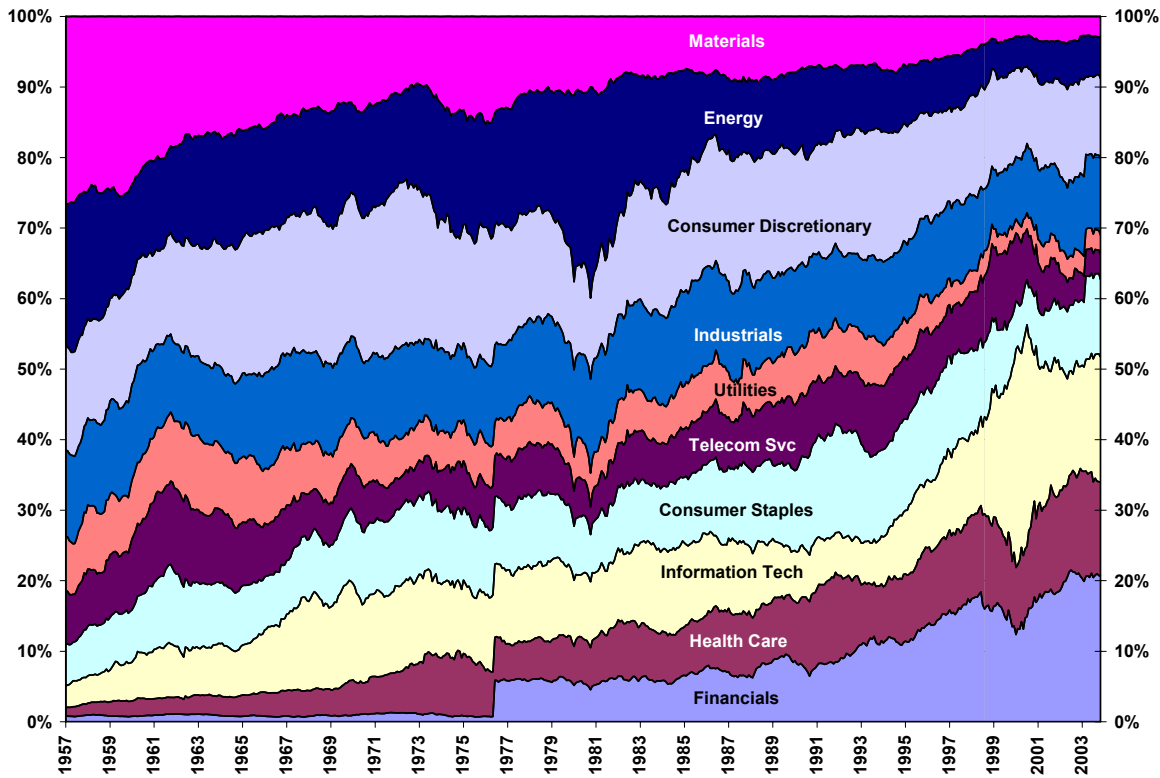


Figure 4 Market Sector Share, 1957-2003

Table 7 lists the sector returns of the original and continually updated S&P 500 Index. The sector returns based on the original firms in the index outpaced the sector returns based on the updated S&P 500 Index in *every* sector except consumer discretionary.¹⁹ This means that the outperformance of the original firms in the S&P 500 Index was not concentrated in one sector, but present in all the sectors of the economy.

¹⁹ As noted in footnote 7 above, the current GIC classification was begun in 1999. Prior to that date we matched firms to the current classifications.

Sector	Original S&P 500	Total Descendants Portfolio		Actual S&P 500		Difference
	Market Cap 1957	Market Cap 2003	Annual Return	Market Cap Final	Annual Return	
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 Tech	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%
Telecom Svc	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%

Table 7: Sector Returns on Total Descendants Portfolio and S&P 500 Index

The original firms in the consumer discretionary sector underperformed the updated sector for two reasons. First, General Motors, which comprised over 43% of the sector's market value in 1957, realized a poor return of only 8.28%, far below the 11.09% return to the entire sector.²⁰ Secondly, Wal-Mart, one of the best performing stocks in market history, was classified in the consumer discretionary sector until 2003, when S&P switched it to the consumer staples sector. The underperformance of General Motors and the superior performance of Wal-Mart are the reasons the original firms in the consumer discretionary sector could not outperform the new firms added.

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 results in superior investor returns. On the other hand, expanding sectors frequently become overvalued, attracting new firms that result in overexpansion, excess capacity, and a sharp subsequent decline in share prices.

²⁰ Without GM, the original sector's return would be 79 basis points higher, whereas the updated sector would have only been 43 basis points higher.

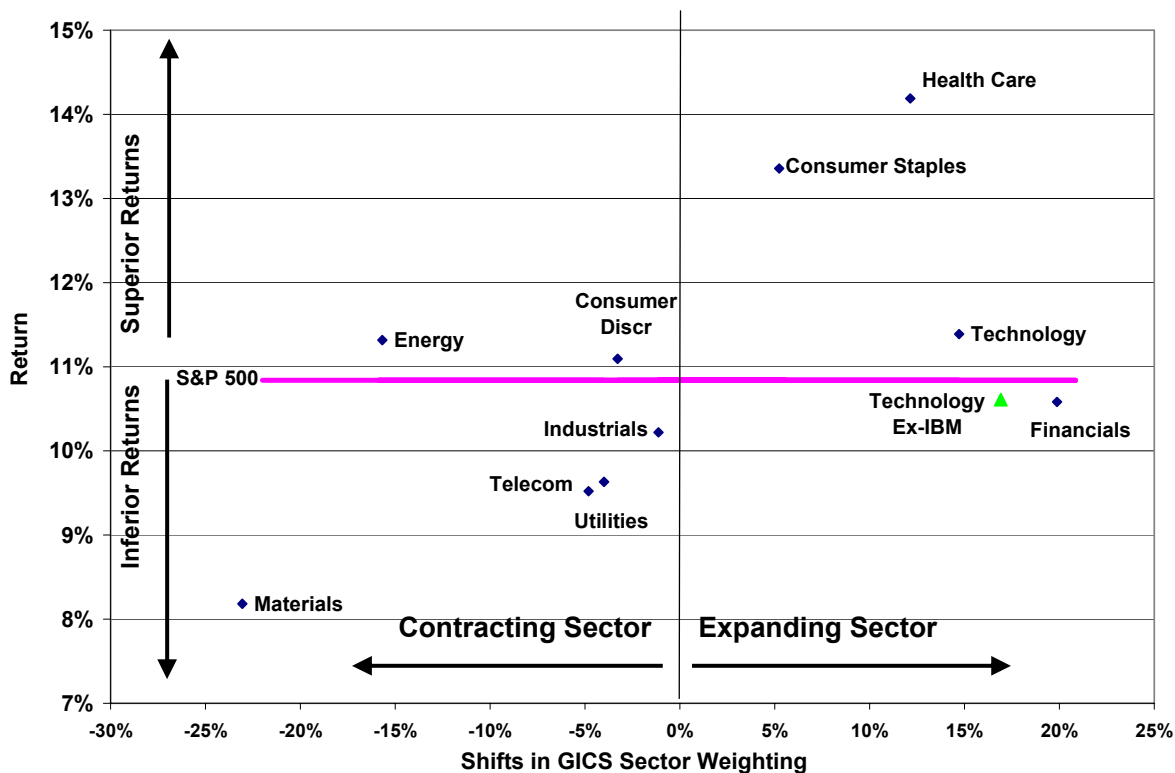


Figure 5: Relation between Change in Market Value and Return in each Sector

Figure 5 plots the return of each sector against the change in the weighting of the sector from 1957 through 2003. Energy and Consumer Discretionary had above-average returns despite contracting sectors, while Financials had below average returns and Information Technology had slightly above average returns, but without IBM, which dominated the index in the 1950s and 1960s, technology would have also had below average returns. Eq. (1) below is a regression of the sectors' returns, y_t , on the change in the market share of the GIC sector, x_t .

$$(1) \quad y_t = 0.1095 + .0753x_t + \epsilon_t ; R^2 = 0.3187. \\ (t = 1.934)$$

Where, y_t is the sector's return and x_t is the change of its share of market value. An R^2 of 0.31 indicates that less than one-third of the excess returns is associated with the change in the sector weight. The other two-thirds of the return is due to the addition of new firms or changes in the capitalization of existing firms.

Reasons for Underperformance of New Stocks

Our finding that the new firms added to the index since 1957 on average have actually *reduced* the return to investors should not reflect poorly on Standard and Poor's Index Committee or the firms

selected by this committee. In fact, S&P wisely resisted adding a number of technology and internet firms in the late 1990s into the index although they attained huge market values.²¹

Cyclical Overvaluation of New Firms

Despite S&P's restraint, there is pressure to add firms of high market value when there is a vacancy in the index. Therefore, when investor demand for a particular sector is high, such as for the oil service stocks in the 1978-80 energy bubble or the technology and telecommunications stocks in the 1998-2000 bubble, these stocks become candidates for admission to the index. Their high price relative to fundamentals leads to a downward bias to future returns.²²

For example, the underperformance of the updated energy sector is due primarily to 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, such as Texas Oil and Gas, McDermott International, Pennzoil, Rowan, Baker Hughes, Helmerich & Payne, underperformed the index.

The telecommunications sectors 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 firms from 1957 through the early 1990s. But in the late 1990s, new firms, such as WorldCom, Global Crossing, and Qwest entered the index and subsequently underperformed the average by a large margin. In June of 1999 WorldCom constituted over 16% of sector's market value, but subsequently lost 97.9% of its value by the time it was deleted from the index in May 2002. Qwest lost over 65% of its value since it was admitted, while Global Crossing lost over 98% of its value before it was deleted in October 2001.

The technology sector, despite a few very successful firms, has been hurt by firms that have been added when the public's demand for technology stocks is high. Thirty six of the 125 technology firms that have been added to this sector since its founding occurred in 1999 and 2000, and two-thirds of these have underperformed the sector's return since their admittance. Firms admitted in 1999 underperformed the sector by 4% per year and those admitted in 2000 subsequently underperformed the sector by 12% annually. Despite the huge success of firms such as Intel, Microsoft, Cisco, and Dell, the drag from the addition of overpriced technology firms significantly hurt the performance of this important sector.

Price Pressure from Indexing

Another reason for superior performance of the original firms relates to the overvaluation of new firms caused by price pressure exerted on new stocks by indexers that must buy shares of the firms added to this popular benchmark. Standard and Poor's Corporation published a study in September 2000 that noted that from the announcement date to the effective date of admission in the S&P 500

²¹ During the internet boom, S&P only admitted AOL, in January 1999 and Yahoo in December, 1999.

²² Ritter, Jay, 'Hot Issue' Market of 1980, *Journal of Business*, 1984 (vol. 57, no. 2), pp 215-240 documents a similar phenomena in the poor performance of initial public offerings during hot issue markets.

stock index, that over the previous decade shares rose by an average of 8.49%.²³ A more recent study indicates that these price jumps have been reduced in recent years, but this may be due to speculators who purchase firms that are candidates for admission, in turn pushing their price upward before the announcement.²⁴

Value Bias of Original Portfolios

One of the reasons for the superior performance of the original portfolios is that the Total Descendants' Portfolio had a higher weights in sectors that outperformed over time and tended to have lower price-to earnings ratios. Table 8 shows the sector weights of the Total Descendants' portfolio on December 31, 2003 and compares this to the weights in the S&P 500 Index. Investors in the TDP are significantly overweight in the energy sector and moderately overweight in the consumer staples sector. Both of these sectors outperformed the S&P 500 Index. On the other hand, investors in the TDP are underweight in the health care, financials and information technology sectors.

Sector	Total Descendants	S&P 500	Difference
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%
Telecom Services	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%

Table 8: Composition of Total Descendants and S&P 500 portfolios on December 31, 2003.

Because the original portfolios became underweight in technology firms and overweight in energy firms, they took on a significant “value” bias over time. On December 31, 2003, the average price to earnings ratio, based on the last 12 months of reported earnings, was 15 on the TDP compared to 22 for the S&P 500 Index. Since the performance of “value” stocks has exceeded those of “growth”

²³ Roger Bos, “Event Study: Quantifying the Effect of Being Added to an S&P Index,” Standard and Poor’s, September 2000.

²⁴ See Srikant Das, “Index Effect Redux,” Standard and Poor’s, September 8, 2004

stocks from 1957 through 2003,²⁵ this explains some of the out performance of the original portfolios.

Summary

Many in the financial community believe that the active updating of firms in the S&P 500 Index is essential to obtain the high returns that this index has recorded over the past half century. This study shows that this is not the case. We find that a portfolio of the original 500 stocks chosen by Standard and Poor's to formulate their index in 1957 have outperformed the standard, updated S&P 500 Index over the subsequent 46 year-period and with lower risk. Furthermore, the original firms in nine of the ten GICS industry sectors have outperformed the new firms added to these sectors.

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

There are several reasons for the underperformance of the new firms added to the S&P 500 Index. Temporary overvaluation of a firm's stock, due to fluctuations in investor sentiment unrelated to firm fundamentals, may push a firm's valuation high enough to qualify for admittance to the index. This overvaluation will result in a downward bias in future returns. Another source of overvaluation is the price pressures exerted by indexers who must buy the stock when a new firm is admitted to the index. Finally, the original portfolios had higher weights in value stocks with low prices relative to fundamentals, such as energy and they were underweight in technology stocks.

²⁵ Among the recent studies documenting superior performance of low P-E stocks are, Ibbotson Associates, *Stocks, Bonds, Bills, Inflation 2004 Yearbook* and James O'Shaughnessy, *What Works on Wall Street*, Revised Edition, McGraw-Hill, 1998. Important historical studies of the outperformance of low P-E stocks are ; S. F. Nicholson, "Price-Earnings Ratios," *Financial Analysts Journal*, July/August 1960, pp. 43-50; 2) S. Basu, "Investment Performance of Common Stocks in Relation to their Price-Earnings Ratio: A Test of the Efficient Market Hypothesis," *Journal of Finance*, 32 (June 1977), pp. 663-82..

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