

Which U.S. Stocks Generated the Highest Long-Term Returns?

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Initial Draft: July 2024

Current Draft: November 2024

The Journal of Performance Measurement, forthcoming.

Abstract

This report describes compound return outcomes for the 29,078 publicly-listed common stocks contained in the CRSP database from December 1925 to December 2023. The majority (51.6%) of these stocks had negative cumulative returns. However, the investment performance of some stocks was remarkable. Seventeen stocks delivered cumulative returns greater than five million percent (or \$50,000 per dollar initially invested), with the highest cumulative return of 265 million percent (or \$2.65 million per dollar initially invested) accruing to long-term investors in Altria Group. Annualized compound returns to these top performers were relatively modest, averaging 13.47% across the top seventeen stocks, thereby affirming the importance of “time in the market.” The highest annualized compound return for any stock with at least 20 years of return data was 33.38%, earned by Nvidia shareholders.

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1. Introduction

This study focuses on a simple question, the answer to which has not to my knowledge been previously tabulated and conveyed to investment practitioners or researchers. In particular, I use the Center for Research in Security Prices (CRSP) daily common stock database to measure compound returns for all publicly-listed U.S. common stocks, and to identify the stocks that generated the highest compound rates of return, during the ninety-eight years spanning December 31, 1925 to December 31, 2023.¹ The cumulative return is interpreted for each stock as the final outcome per dollar initially invested to an investor who followed a buy-and-hold strategy, with each dividend reinvested in the same stock, from the first date a stock is included in CRSP until the time of delisting or the end of the sample period. The cumulative return for stocks that delisted prior to the end of the sample includes CRSP's final "delisting return."

It is important to recognize that the buy-and-hold returns studied are directly applicable to only to those hypothetical investors who follow the buy-and-hold strategy described. Bessembinder, Chen, Choi, and Wei (2024) describe some drawbacks of this widely-used measure, and propose a number of alternative methods of measuring long-horizon investor

¹ A list of stocks with the lowest cumulative returns would include 1,560 stocks with compound returns ranging from -99.5% to -100%.

returns.² Nevertheless, buy-and-hold returns are of considerable interest since they could in principle have been captured with what is arguably the simplest possible strategy.³

I obtain return data for all common stocks contained in the CRSP daily return database. As of December 2023, CRSP reported returns for 29,078 distinct common stocks.⁴ Although this study spans ninety-eight calendar years, on average these stocks appear in the CRSP data for only 11.6 years, with a median sample lifetime of just 6.8 years. Only thirty-one stocks are present in the data across all ninety-eight years. To facilitate interpretation across stocks with disparate lives I also compute annualized compound returns.⁵

2. The Distribution of Compound Returns

Table 1 reports summary statistics regarding cumulative compound returns earned on the publicly-listed common stocks contained in the CRSP database. To facilitate interpretation, I report on cumulative returns in percent as well as on the cumulative final wealth per dollar

² I have reported elsewhere outcomes to long-term shareholder in aggregate that are measured in dollars rather than rates of return. These “wealth creation” outcomes are included in Bessembinder (2023), Bessembinder, Chen, Choi, and Wei (2023), Bessembinder (2021), and Bessembinder (2018). The present study is distinguished from these both by the assessment of rates of return per dollar initially invested rather than total dollar amounts, and by a direct focus on returns, rather than returns in excess of Treasury bill rates. See also Dichev (2007) and Dichev and Yu (2011), who focus in particular on “dollar-weighted” returns as an alternative to buy-and-hold returns.

³ I ignore taxation and its inherent complexities entirely. In addition to omitting the effect of capital gains taxes should an investor realize her gains, the computation implicitly assumes that any taxes on reinvested dividends are paid from funds outside the stock studied.

⁴ Common stocks are those securities with CRSP share codes equal to 10, 11, or 12. I identify individual stocks based on the CRSP permno variable. According to the CRSP data guide (available at http://www.crsp.com/files/data_descriptions_guide_0.pdf), the Permno is “a unique permanent identification number assigned by CRSP to each security. Unlike the CUSIP, Ticker Symbol, and Company Name, the Permno neither changes during an issue’s trading history, nor is it reassigned after an issue ceases trading. The user may track a security through its entire trading history in CRSP’s files with one Permno, regardless of name or capital structure changes.” Some firms issue multiple classes of common shares. Since listing dates and returns differ across share classes CRSP assigns a distinct Permno to each.

⁵ More specifically, I first compute the number of years (NYEARS) that each stock is present in the database based on the number of elapsed days between the dates of the first and last returns in CRSP, relative to 365.25 (days per year). The annualized compound return is one plus the cumulative return computed across all days raised to the power (1/NYEARS), less one. I do not report annualized returns for the 1,327 stocks that are present in the data for less than one year, since the computation in those cases would implicitly assume that the performance observed during the partial year would have persisted for twelve months. The implicit assumption can introduce large errors, in particular in cases where a stock earns a high return during a short life-span.

initially invested.⁶ Panel A of Table 1 pertains to all 29,078 common stocks. The mean outcome across stocks is a cumulative compound return of 22,840%, or equivalently, final wealth of \$229.40 per dollar initially invested. By way of comparison, cumulative inflation in the U.S. for the full 1926 to 2023 sample period was 1,614%, or 2.94% annualized.⁷

However, the median cumulative compound return across stocks is -7.41%, as 51.64% of stocks realized negative compound returns over their full lives in the CRSP database. The fact that the mean compound return outcome is strongly positive while the median outcome is negative is attributable to positive skewness in the distribution of compound stock returns.⁸ Positive skewness arises in part because there is no hard ceiling on the potential magnitude of positive returns, while as long as legal systems incorporate limited liability no return can be less than -100%.

I next report on outcomes for stocks grouped based on the period of time over which return data is available on CRSP. A stock can have a relatively short life in the CRSP database for three reasons, including (i) it was initially listed nearer to the end of the sample period in December 2023, (ii) it was delisted for negative, performance-based, reasons, or (iii) it was delisted due to being merged or acquired. It should be kept in mind that delisting events and their reasons are only observable *ex-post*.

⁶ The cumulative return in percent is the cumulative wealth per dollar initially invested less one, times one hundred. An Excel file that contains compound return outcomes for all sample stocks is available for download at the website [Do Stocks Outperform Treasury Bills | ASU W. P. Carey](#).

⁷ Equivalently, \$1 at the end of 1925 had the same purchasing power as \$17.1366 at the end of 2023. Inflation is based on Bureau of Labor Statistics series CUUR000SA0 (CPI for all urban consumers) available at [Bureau of Labor Statistics Data](#).

⁸ For discussion of the positive skewness introduced by compounding see, for example, Fama and French (2018), Bessembinder (2018), Farago and Hjalmarsson (2023), and Heaton, Polson and Witte (2017).

Panel B of Table 1 reports on outcomes after excluding the 1,327 stocks with less than one year of return data on CRSP. Performance is slightly improved after this exclusion, as the mean cumulative compound return is 23,934% (final wealth of 240.34 per dollar initially invested), and the median outcome is a cumulative compound return of -5.00%. Compound returns are negative for 51.01% of these stocks. The mean annualized compound return is -9.07% while the median is -0.74%.

It is worth taking note of the divergence between the mean annualized compound return for the stocks in Panel B, which is -9.07% and the mean cumulative compound return, which is not only positive, but is economically large, equal to 22,841%. This divergence also reflects the skewness induced by compounding. The principle at work can be illustrated with a simple example. Suppose there are only two stocks, with annualized compound returns of 5% and -5%, respectively. The distribution of annualized returns is symmetric about a mean of zero. However, if these annualized returns pertained to outcomes over 30 years, then the cumulative compound returns are $1.05^{30} - 1 = 332.2\%$ and $0.95^{30} - 1 = -78.5\%$, respectively. The cross-stock mean compound return is 126.8%, and the distribution is highly asymmetric around zero. That is, compounding induces skewness into the distribution of long-horizon returns, even if there is no skewness in the distribution of annualized returns. In the actual data reported in Panel B of Table 1 the skewness coefficient for the cumulative compound return is over 150, while the skewness coefficient for the annualized compound return is near zero.

Panel C of Table 1 provides summary statistics for the 10,217 stocks with short return histories of between one and five years. While delistings can occur for reasons such as takeovers that tend to be associated with positive abnormal returns, these stocks displayed very poor performance overall, with the mean annualized return equal to -19.80% and the median

equal to -20.64%. More than five of every eight (63.15%) of these stocks suffered negative compound returns.

Panel D pertains to the 12,395 stocks with return histories greater than five but less than twenty years. Even in this longer-lived group the majority of stocks performed poorly, as 51.85% had negative compound returns, and the median compound return was -1.30% annualized or -11.50% on a cumulative basis. However, due to positive skewness in the distribution of cumulative returns, the cross-sectional mean cumulative return for this group was 194.33%, or \$2.94 per dollar initially invested.

Finally, Panel E pertains to the 5,139 stocks with return histories longer than twenty years. The median time in the database for these stocks is 29.8 years, while the mean time in the database is 34.7 years. Three quarters (75.15%) of these stocks had positive compound returns. However, the median annualized compound return for these stocks is a relatively modest 7.54%.

The median cumulative return for these long-lived stocks is 813.44% and the cross-stock mean compound return is 128,779% (or \$1,289 per dollar originally invested). The relatively large median and mean cumulative outcomes for these stocks reflect that returns for these stocks are compounded over long time horizons. Even among these long-lived stocks, some perform very poorly; the tenth percentile of the cumulative return distribution is -94.8%. However, the distribution of cumulative outcomes is strongly asymmetric, reflecting the skewness induced by compounding. The 90th percentile of the distribution of compound returns is large, equal to 30,698%, while the mean is larger yet, equal to nearly 129,000%. A mean outcome can exceed the 90th percentile outcome only a relatively few outcomes are extremely large. I next identify the top performing stocks.

3. The Top Performing Stocks

Table 2 reports outcomes for the thirty stocks with the highest cumulative compound returns among the 29,078 stocks that have appeared in the CRSP database since December 1925.⁹ The magnitudes of these returns are remarkable, ranging from 2.41 million percent, or \$24,098 per dollar initially invested (Emerson Electric Company) to 265.5 million percent, or \$2.65 million per dollar initially invested (Altria Group, previously named Philip Morris). In addition to Altria, the top five stocks listed on Table 2 are Vulcan Materials (\$393,492 per dollar initially invested), Kansas City Southern (\$361,757 per dollar initially invested), General Dynamics Corp. (\$220,850 per dollar initially invested), and Boeing (\$212,206) per dollar initially invested).

One striking observation that can be drawn from the data in Table 2 is that the highest cumulative returns delivered by individual common stocks are attributable to annualized returns that are only moderately high. The median annualized return across the thirty stocks listed on Table 2 is 13.03%, while the mean is 13.05%.¹⁰ The largest annualized return among the thirty stocks is Altria Group's 16.29%. However, these moderately high returns are compounded over long time periods, averaging 92.1 years. The stock with the shortest listing period (72 years)

⁹ The company names listed in Tables 2 to 5 are those most recently associated by CRSP to each permno. In many cases the entity represented by the permno will have had other names at earlier times. Name changes can occur at the times of mergers, acquisitions, and divestitures, among other reasons.

¹⁰ These annualized returns may appear particularly modest relative to data reported in many Finance texts that indicate a mean annual return to the overall U.S. market since 1926 that exceeds 12% per year. However, these texts typically report the *arithmetic* mean of annual market returns. The annualized compound returns reported here are *geometric* means, which are always lower than corresponding arithmetic means (with the difference approximately equal to half the return variance). For comparison, I calculate the geometric mean annual return to the value-weighted portfolio of all CRSP common stocks over the full 1926 to 2023 sample period to be 9.947%, equivalent to a compound return of 10,862 dollars per dollar initially invested.

among those on Table 2 is Northrup Grumman, which entered the database in December of 1951.

The data on Table 2 also illustrate how modest differences in annualized returns lead to large differences in cumulative returns. Altria Group and Vulcan materials are both present in the sample data for ninety-eight years. Altria's compound annualized return of 16.29% is 1.16 times as large as Vulcan's 14.05% outcome, but Altria's cumulative compound return is 6.75 times as large as Vulcan's. On balance, the data reported in Table 2 support the relevance of the adage focused on the importance of "time in the market."

Some institutional investors such as pension funds, charitable institutions, and endowments have investment horizons that are, for practical purposes, open ended. On the other hand most individual investors have horizons shorter than the 98 years for which CRSP data is available or the 72 years that comprises the shortest calendar time interval over which returns are computed for the stocks in Table 2. I next report on the stocks with the highest annualized returns, even if they were not present in the data for a sufficiently long period to appear on Table 2. I report results separately for short-lived stocks (between one and five years of available return data) in Table 3, medium-lived stocks (more than five but less than or equal to twenty years of available return data) in Table 4, and long-lived stocks (more than twenty years of available return data) in Table 5.

Table 3 reports on the 30 stocks with the highest annualized compound returns among those stocks with greater than one and less than five years return data. Annualized returns for these stocks are much higher than those reported in Table 2 for the stocks with the highest cumulative compound returns, ranging from 177.1% per year (Poly Company America Inc., from June 1979 to March 1981) to 526.17% per year (Gemini Energy Corporation, from January 1990

to April 1991). The divergence in annualized returns across Tables 2 and 3 illustrates the fact that, while very high annualized returns are observed in the historical data over relatively short periods, such dramatic returns have historically not been sustained over long intervals. Indeed, although all stocks with return data available for between one and five years are eligible to be included on Table 3, the high annualized return stocks listed there are those with return data available for a median of just 1.25 years. Among the thirty stocks listed on Table 3 only one, Biohaven Limited, was present in the sample at the end of 2023, while all others were delisted at earlier dates, in most cases because the firms were acquired.

Table 4 reports on the 30 stocks with the highest annualized compound return among those stocks with greater than five and less than or equal to twenty years return data. Annualized returns for these stocks range from 56.47% (Rolm Corporation, from September 1976 to November 1984) to 119.64% (Ascend Communications Inc., from May 1994 to June 1999). While impressive, these annualized returns are all lower than those reported in Table 2. While all stocks with return data available for between five and twenty years are eligible to be included on Table 4, the stocks listed there are those with return data available for a median of just 6.03 years, again illustrating that very high annualized returns historically are observed for short intervals only. None of the thirty stocks listed on Table 4 was present in the sample at the end of 2023; that is all delisted at earlier dates, again most likely because the firms were acquired. Eight of these high-performing stocks exited the database between 1997 and 1999, during the period sometimes referred to as the “dot com bubble.”

Finally, Table 5 reports on the 30 stocks with the highest annualized compound returns among the long-lived stocks for which more than twenty years of return data is available. The highest annualized compound return for this group is 33.38% per year, earned by Nvidia

shareholders during the 25 years from the firm's January 1999 IPO through the end of the sample. This equates to a cumulative compound return of 131,500%, or \$1,316 per dollar initially invested.¹¹ Other top performing stocks include Plenum Publishing Corp, whose shareholders earned 32.09% per year from December 1972 to July 1998, Netflix Inc., whose shareholders earned 32.06% per year from its May 2002 IPO to the end of the sample in December 2023, Amazon, whose shareholders earned 31.78% per year from its May 1997 IPO to the end of the sample, Axon Enterprise Inc., whose shareholders earned 31.13% per year from its June 2001 IPO (when the firm was named Taser International) to the end of the sample in December 2023, and Sperry Corporation, whose shareholders earned 28.82% per year from May 1933 until its June 1955 merger with Remington Rand, Inc.

The median number of years with available return data among the thirty high performing stocks listed on Table 5 is 25.6 years. Fourteen of these stocks were still listed at the end of the sample period, while sixteen were delisted prior to that date. The longest-lived stock listed on Table 5 is Home Depot, whose shareholders earned 25.85% per year during the forty-two and one fourth years from the firm's September 1981 IPO to the end of the sample in December 2023. Notably, none of the stocks listed on Table 5, which enumerates the stocks with the highest annualized returns among those with more than twenty years of return data, also appear on the Table 2 list of stocks with the highest cumulative compound returns across all months. This result again affirms that the highest annualized returns attained by any stock are systematically lower among those stocks with longer lives.

¹¹ Since this study's sample period ends as of December 2023, these outcomes do not include Nvidia's well-documented appreciation during the first half of 2024.

4. Implications

Aside from the obvious advantage that being familiar with the stocks listed in Tables 2 to 5 of this study could prove useful in future trivia contests, the simple results presented here have some important implications for investors and investment management. First, as noted, the outcomes, and in particular the fact that those stocks that delivered cumulative returns exceeding five million percent did so with relatively modest annualized returns that averaged 13.5%, demonstrate the practical importance of time in the market. Compounding may or may not comprise “the eighth wonder of the world,” but its effects are dramatic, particularly over long intervals.¹² Second, while some extremely high annualized return outcomes, such as the 119% per year earned by Ascend Communications shareholders over a five-year period, can be identified in the historical data, the maximum returns observed in the data reliably decrease when considering stocks with longer lives. That is, extremely high annual returns never persist over longer horizons. Third, the data indicate that remarkable returns in some cases accrue to investors in firms that engage in staid lines of business. The 39 million percent cumulative return earned by investors in Vulcan Materials (which describes itself as a “producer of construction aggregates—primarily crushed stone, sand and gravel—and a major producer of asphalt” comprises a striking example.

Finally, the data presented here, and in particular the fact that the median compound return for U.S. listed common stocks is negative even while the cross-stock mean as well as the compound return on the overall stock market are strongly positive reaffirms the importance of positive skewness in the distribution of long-horizon market outcomes. While the positive

¹² The quotation “Compound interest is the eighth wonder of the world. He who understands it, earns it ...” has been (controversially) attributed to Albert Einstein. See www.quoteinvestigator.com.

skewness demonstrated herein pertains to *ex post* outcomes for individual stocks, compounding also introduces skewness into the *ex ante* (future) distribution of portfolio outcomes.¹³ While we only observe one *historical* path for the overall market, there are many possible future paths. Financial planning that focuses on assumptions regarding mean (“expected”) rates of return is useful, but it should be kept in mind that positive skewness implies that most individual possible future outcomes (for both individual stocks and for diversified stock portfolios) are less than their respective mean outcomes.

¹³ The degree of positive skewness in long-horizon returns is mainly determined by the volatility of short horizon returns, and is therefore reduced but not eliminated by portfolio diversification. See Farago and Hjalmarsen (2023) for a rigorous treatment.

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Table 1: Summary Statistics for Cumulative and Annualized Buy-and-Hold Returns

	<u>Years of Data</u>	<u>Cumulative Gross Wealth Per Dollar</u>	<u>Cumulative Compound Return (%)</u>	<u>Annualized Compound Return (%)</u>
Panel A: All stocks that contain Return Data (N = 29,078)				
Mean	11.61	229.40	22840.22%	NA
Median	6.78	0.92	-8.05%	NA
10th Percentile	1.63	0.02	-98.38%	NA
90th Percentile	28.10	12.36	1136.27%	NA
Skewness	2.40	154.23	154.23	NA
Panel B: All stocks with Return Data for at Least One Year (N = 27,751)				
Mean	12.14	240.34	23933.62%	-9.07%
Median	7.30	0.95	-5.00%	-0.74%
10th Percentile	1.97	0.02	-98.14%	-58.24%
90th Percentile	28.67	13.37	1237.18%	22.10%
Skewness	2.37	150.67	150.67	0.33
Panel C: Stocks with One to Five Years Return Data (N = 10,217)				
Mean	2.83	0.98	-2.25%	-19.80%
Median	2.71	0.53	-46.80%	-20.64%
10th Percentile	1.43	0.02	-98.03%	-77.77%
90th Percentile	4.48	2.33	133.05%	36.11%
Skewness	0.26	6.96	6.96	1.01
Panel D: Stocks with Five to Twenty Years Return Data (N = 12,395)				
Mean	10.46	2.94	194.33%	-5.98%
Median	9.61	0.88	-11.50%	-1.30%
10th Percentile	5.66	0.01	-98.61%	-40.08%
90th Percentile	16.93	6.86	585.88%	20.10%
Skewness	0.58	12.84	12.84	-0.46
Panel E: Stocks with More than Twenty Years Return Data (N = 5,139)				
Mean	34.69	1288.79	128779.19%	4.82%
Median	29.82	9.13	813.44%	7.54%
10th Percentile	21.73	0.05	-94.82%	-10.20%
90th Percentile	54.04	307.98	30697.74%	15.02%
Skewness	1.80	64.86	64.86	-1.22

Table 2: CRSP Common Stocks with the Highest Cumulative Returns

Company Name (Most Recent)	First Return Date	Last Return Date	Years	Cumulative Gross Wealth Per Dollar	Cumulative Compound Return (%)	Annualized Compound Return (%)
ALTRIA GROUP INC	31-Dec-25	29-Dec-23	98.00	2,655,290	265528900.62%	16.29%
VULCAN MATERIALS CO	31-Dec-25	29-Dec-23	98.00	393,492	39349084.13%	14.05%
KANSAS CITY SOUTHERN	31-Dec-25	13-Dec-21	95.95	361,757	36175578.11%	14.27%
GENERAL DYNAMICS CORP	28-Jan-26	29-Dec-23	97.92	220,850	22084880.36%	13.39%
BOEING CO	5-Sep-34	29-Dec-23	89.32	212,206	21220526.33%	14.72%
INTERNATIONAL BUSINESS MACHS COR	31-Dec-25	29-Dec-23	98.00	175,437	17543644.18%	13.11%
EATON CORP PLC	31-Dec-25	29-Dec-23	98.00	151,173	15117167.57%	12.94%
S & P GLOBAL INC	14-Feb-29	29-Dec-23	94.87	128,787	12878643.34%	13.20%
COCA COLA CO	31-Dec-25	29-Dec-23	98.00	123,724	12372265.06%	12.71%
PEPSICO INC	31-Dec-25	29-Dec-23	98.00	86,360	8635937.80%	12.30%
ABBOTT LABORATORIES	1-Mar-37	29-Dec-23	86.83	78,038	7803730.36%	13.85%
UNIVERSAL CORP	11-Nov-27	29-Dec-23	96.13	70,318	7031700.72%	12.31%
DEERE & CO	29-Jun-33	29-Dec-23	90.50	69,886	6988538.63%	13.12%
HERSHEY CO	1-Dec-27	29-Dec-23	96.08	69,099	6909822.15%	12.30%
WYETH	29-Apr-26	15-Oct-09	83.47	57,024	5702341.59%	14.02%
JOHNSON & JOHNSON	25-Sep-44	29-Dec-23	79.26	54,281	5427968.94%	14.75%
ARCHER DANIELS MIDLAND CO	31-Dec-25	29-Dec-23	98.00	51,811	5181049.17%	11.71%
C V S HEALTH CORP	27-Sep-28	29-Dec-23	95.26	46,939	4693845.60%	11.95%
U S T INC	31-Dec-25	5-Jan-09	83.02	43,963	4396203.50%	13.74%
EXXON MOBIL CORP	31-Dec-25	29-Dec-23	98.00	40,273	4027183.13%	11.43%
NORTHROP GRUMMAN CORP	10-Dec-51	29-Dec-23	72.05	39,495	3949426.66%	15.82%
TRANE TECHNOLOGIES PLC	31-Dec-25	29-Dec-23	98.00	39,238	3923693.49%	11.40%
F M C CORP	22-Apr-31	29-Dec-23	92.69	37,001	3699995.48%	12.02%
CATERPILLAR INC	2-Dec-29	29-Dec-23	94.08	36,903	3690210.17%	11.83%
BRISTOL MYERS SQUIBB CO	8-Sep-33	29-Dec-23	90.31	34,867	3486607.85%	12.28%
TOOTSIE ROLL INDS INC	31-Dec-25	29-Dec-23	98.00	34,401	3440011.10%	11.25%
PFIZER INC	17-Jan-44	29-Dec-23	79.95	28,990	2898900.69%	13.71%
KROGER CO	26-Jan-28	29-Dec-23	95.93	28,345	2834362.61%	11.28%
WALGREENS BOOTS ALLIANCE INC	15-Feb-34	29-Dec-23	89.87	27,053	2705196.76%	12.03%
EMERSON ELECTRIC CO	5-Sep-44	29-Dec-23	79.32	24,098	2409682.63%	13.57%

Table 3: Highest Annualized Returns, CRSP Common Stocks with One to Five Years Return Data

Company Name (Most Recent)	First Return Date	Last Return Date	Years	Cumulative Gross Wealth Per Dollar	Cumulative Compound Return (%)	Annualized Compound Return (%)
GEMINI ENERGY CORP	16-Jan-90	23-Apr-91	1.27	10.23	923.08%	526.17%
AUSPEX PHARMACEUTICALS INC	5-Feb-14	4-May-15	1.24	6.45	544.96%	348.00%
SYNTHORX INC	7-Dec-18	22-Jan-20	1.13	5.39	439.25%	345.41%
E TEK DYNAMICS INC	2-Dec-98	30-Jun-00	1.58	10.54	954.25%	344.16%
HENLEY MANUFACTURING CORP	21-Dec-87	19-Jan-89	1.08	4.74	373.68%	319.79%
SOFTWARE COM	24-Jun-99	17-Nov-00	1.40	7.11	610.51%	303.93%
ACTIVE SOFTWARE INC	13-Aug-99	15-Aug-00	1.01	3.97	297.13%	291.61%
GULFMARK OFFSHORE INC	16-Nov-17	15-Nov-18	1.00	3.90	289.85%	290.21%
ANORMED INC	4-Nov-05	7-Nov-06	1.01	3.84	283.52%	278.32%
NETWORK SOLUTIONS INC DE	26-Sep-97	8-Jun-00	2.70	36.15	3515.23%	277.23%
BIOHAVEN LTD	4-Oct-22	29-Dec-23	1.24	5.16	415.66%	276.40%
BROADCAST COM INC	17-Jul-98	20-Jul-99	1.01	3.74	273.79%	268.82%
I P C INFORMATION SYSTEMS INC	5-May-98	14-Jun-00	2.11	14.13	1313.13%	250.09%
DICKSON ELECTRONICS CORP	14-Dec-72	6-Mar-74	1.23	4.62	362.22%	248.37%
APPNET INC	18-Jun-99	13-Sep-00	1.24	4.72	371.67%	248.30%
COLLEGE BOUND INC	22-Jan-90	16-Apr-92	2.23	15.50	1450.00%	241.04%
RECEPTOS INC	9-May-13	27-Aug-15	2.30	16.57	1557.14%	238.51%
DESERT SUN MINING CORP	11-Aug-04	5-Apr-06	1.65	7.33	632.67%	234.11%
FIRST AMERICAN FINANCIAL TX INC	23-Feb-82	2-May-83	1.19	4.08	308.33%	226.76%
WAVEFRONT TECHNOLOGIES INC	3-Jun-94	15-Jun-95	1.03	3.26	226.00%	213.26%
CENTURY GREETINGS INC	29-Mar-76	30-Jun-77	1.26	4.15	315.20%	210.44%
KAYEX CORP	11-Jun-79	20-Aug-80	1.20	3.85	284.97%	208.54%
EDGCOMB STEEL NEW ENGLAND INC	18-May-84	22-Jan-86	1.68	6.55	554.55%	205.20%
AVEXIS INC	11-Feb-16	14-May-18	2.26	12.08	1107.76%	201.72%
HALL MARK ELECTRONICS CORP	22-May-92	1-Jul-93	1.11	3.21	221.42%	185.88%
NEW RIVER PHARMACEUTICALS INC	5-Aug-04	19-Apr-07	2.70	17.07	1606.67%	185.44%
CHAPARRAL STEEL CO DE	1-Aug-05	14-Sep-07	2.12	9.15	814.98%	183.86%
FORTY SEVEN INC	28-Jun-18	6-Apr-20	1.78	6.35	534.55%	182.89%
ATLANTIC CO	19-Sep-67	15-Nov-68	1.16	3.31	231.14%	180.52%
POLY CO AMER INC	21-Jun-79	31-Mar-81	1.78	6.13	513.33%	177.09%

Table 4: Highest Annualized Returns, CRSP Common Stocks with Five to Twenty Years Return Data

Company Name (Most Recent)	First Return Date	Last Return Date	Years	Cumulative Gross Wealth Per Dollar	Cumulative Compound Return (%)	Annualized Compound Return (%)
ASCEND COMMUNICATIONS INC	13-May-94	24-Jun-99	5.12	56.04	5504.50%	119.64%
MYOKARDIA INC	29-Oct-15	16-Nov-20	5.05	21.37	2036.75%	83.28%
FIRST USA INC	28-May-92	27-Jun-97	5.08	20.99	1999.50%	81.99%
S D L INC	16-Mar-95	13-Feb-01	5.92	33.59	3258.93%	81.07%
H F S INC	10-Dec-92	17-Dec-97	5.02	17.95	1694.85%	77.72%
U S ROBOTICS CORP	11-Oct-91	12-Jun-97	5.67	25.61	2461.06%	77.12%
MAGNA BANCORP INC	12-Mar-91	31-Oct-97	6.64	42.03	4102.98%	75.56%
LEADER HEALTHCARE ORGANIZATION	10-Sep-75	25-Aug-81	5.96	26.09	2508.70%	72.84%
HOE R & CO INC	2-Jul-62	1-Jul-69	7.00	44.46	4345.91%	71.95%
CONTINENTAL CONVEYOR & EQUIP	14-Dec-72	21-Jul-78	5.60	20.66	1965.61%	71.70%
METAL MANAGEMENT INC	7-Mar-03	14-Mar-08	5.02	14.90	1390.32%	71.21%
ANACOR PHARMACEUTICALS INC	24-Nov-10	23-Jun-16	5.58	19.50	1849.90%	70.25%
RADIOFONE CORP	23-May-77	1-Dec-82	5.53	18.09	1708.70%	68.84%
C I C FINANCIAL CORP	27-May-76	14-Sep-82	6.30	25.17	2416.84%	66.83%
NATIONAL STUDENT MARKETING DEL	2-Jan-76	2-Mar-81	5.17	13.25	1224.80%	64.89%
U S L D COMMUNICATIONS CORP	9-Jul-90	22-Dec-97	7.46	37.05	3605.22%	62.31%
CELLULAR COMMUNICATIONS INTL INC	12-Aug-91	25-Mar-99	7.62	40.00	3900.00%	62.28%
HOUSTON OIL & MINERALS CORP	10-Oct-72	23-Apr-81	8.54	60.34	5933.84%	61.65%
T V GUIDE INC	19-Nov-93	12-Jul-00	6.65	24.35	2335.24%	61.65%
JACKSON NATIONAL LIFE INS CO	27-Feb-78	25-Nov-86	8.74	66.25	6524.78%	61.53%
CHARTER OIL LTD	2-Jul-62	6-Dec-68	6.43	21.85	2084.62%	61.50%
WESTMARC COMMUNICATIONS INC	22-Jun-84	3-Jan-90	5.54	14.04	1304.44%	61.17%
DUVAL CORP	2-Jul-62	9-Sep-68	6.19	17.68	1668.04%	59.01%
FEDERATED INVESTORS INC	14-Dec-72	1-Nov-82	9.88	91.54	9054.32%	57.93%
A B R INFORMATION SERVICES INC	26-May-94	22-Jul-99	5.16	10.55	955.17%	57.90%
MINIMED INC	25-Jul-95	28-Aug-01	6.10	15.67	1467.35%	57.04%
ADVANCE P C S	8-Oct-96	24-Mar-04	7.46	28.78	2777.54%	56.88%
WELLTECH INC	29-Apr-74	1-Jun-79	5.09	9.90	890.48%	56.88%
CHEM NUCLEAR SYS INC	10-Sep-76	28-Oct-82	6.13	15.73	1473.33%	56.73%
ROLM CORP	15-Sep-76	21-Nov-84	8.19	39.05	3805.26%	56.47%

Table 5: Highest Annualized Returns, CRSP Common Stocks with Over Twenty Years Return Data

Company Name (Most Recent)	First Return Date	Last Return Date	Years	Cumulative Gross Wealth Per Dollar	Cumulative Compound Return (%)	Annualized Compound Return (%)
NVIDIA CORP	22-Jan-99	29-Dec-23	24.94	1,316.00	131500%	33.38%
PLENUM PUBLISHING CORP	14-Dec-72	21-Jul-98	25.60	1,243.52	124252%	32.09%
NETFLIX INC	23-May-02	29-Dec-23	21.60	406.94	40594%	32.06%
AMAZON COM INC	15-May-97	29-Dec-23	26.63	1,551.73	155073%	31.78%
AXON ENTERPRISE INC	7-Jun-01	29-Dec-23	22.56	452.55	45155%	31.13%
SPERRY CORP OLD	3-May-33	30-Jun-55	22.16	273.82	27282%	28.82%
LIN BROADCASTING CORP	14-Dec-72	3-Oct-95	22.80	299.50	29850%	28.41%
COMPUTER DATA SYSTEMS INC	31-Jul-75	16-Dec-97	22.38	257.76	25676%	28.15%
PIONEER GROUP INC	16-Apr-79	24-Oct-00	21.53	202.40	20140%	27.98%
TIME WARNER INC NEW	19-Mar-92	14-Jun-18	26.24	541.01	54001%	27.11%
BIOMET INC	17-Dec-82	25-Sep-07	24.77	353.94	35294%	26.73%
COGNIZANT TECHNOLOGY SOLS CORP	19-Jun-98	29-Dec-23	25.53	396.11	39511%	26.40%
KEURIG GREEN MOUNTAIN INC	21-Sep-93	2-Mar-16	22.45	188.93	18793%	26.30%
MANOR CARE INC	14-Dec-72	25-Sep-98	25.78	393.08	39208%	26.08%
MICROSOFT CORP	13-Mar-86	29-Dec-23	37.80	6,225.98	622498%	26.00%
EXPRESS SCRIPTS HOLDING CO	9-Jun-92	20-Dec-18	26.53	457.25	45625%	25.97%
HOME DEPOT INC	22-Sep-81	29-Dec-23	42.27	16,627.40	1662640%	25.85%
SUNAMERICA INC	2-Jul-62	31-Dec-98	36.50	4,263.36	426236%	25.73%
POOL CORP	13-Oct-95	29-Dec-23	28.21	576.72	57572%	25.27%
NEUTROGENA CORP	17-Apr-73	30-Sep-94	21.46	123.62	12262%	25.17%
PHILIPPINE LONG DISTANCE TEL	2-Oct-62	18-Oct-94	32.05	1,299.79	129879%	25.07%
METROMEDIA INC	22-Jun-62	21-Jun-84	22.00	132.70	13170%	24.88%
N V R INC	18-Nov-93	29-Dec-23	30.11	727.32	72632%	24.46%
ECKERD JACK CORP	23-Jan-64	30-Apr-86	22.27	129.31	12831%	24.40%
INTUITIVE SURGICAL INC	13-Jun-00	29-Dec-23	23.55	168.10	16710%	24.31%
AAON INC	3-Jan-91	29-Dec-23	32.99	1,217.25	121625%	24.03%
LOGICON INC	14-Dec-72	1-Aug-97	24.63	198.55	19755%	23.96%
ADOBE INC	13-Aug-86	29-Dec-23	37.38	3,039.55	303855%	23.93%
UNITEDHEALTH GROUP INC	17-Oct-84	29-Dec-23	39.20	4,479.41	447841%	23.92%
NATIONAL COMPUTER SYSTEMS INC	14-Dec-72	19-Sep-00	27.77	361.09	36009%	23.63%