
Expected Rates of Return: Back to the Future?

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To estimate future returns, one should begin by looking at historical returns over the longest period possible. Such an analysis of equity returns (starting in the 1920s) and fixed-income returns (starting in the 1940s) reveals cyclical patterns in both markets, leading to the conclusion that reversion to the mean exerts a strong pull. Furthermore, using history as a guide, investors would be well advised to revisit their allocations to small-cap stocks, large-cap growth stocks, and intermediate bonds.

In the early 1990s, I began a search for long-term data on the performance associated with certain common stock characteristics, such as low P/E and high dividend yield, and quickly learned that this long-term information did not exist. My goal was to determine if specific traits held up as good stock-selection mechanisms over long periods of time. I found that, although a lot of academic research had been done on this subject, the time periods covered in the studies were very short. I also found a large body of academic work suggesting that a bunch of monkeys throwing darts at the *Wall Street Journal* could pick stocks as well as any professional money manager because the stock market is efficient. Being a professional money manager, I was not flattered by the comparison. Nevertheless, it was difficult to refute the studies that showed in any 10-year period roughly 80 percent of conventionally managed portfolios failed to beat the S&P 500 Index.

Stock-Selection Factors

In my view, measuring money managers against a simple, disciplined index that never varies from its underlying strategy is unfair (the equivalent of an apples-to-oranges comparison). A much fairer measure would be to compare similarly disciplined investment strategies over long periods of time.

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Therefore, I have done just that. Using the Standard & Poor's Compustat database of U.S. securities information, I ran a number of tests to measure long-term performance for a range of common factors. My findings were first published in 1996 under the title *What Works on Wall Street* and covered the period from 31 December 1963 to 31 December 1995. I have recently updated the study through 31 December 2005, published in the third version of the book (O'Shaughnessy 2005). In both the original and extended studies, I found that the market consistently and methodically rewards certain attributes while it punishes others quite severely.

Value Factors. I began by looking at a number of value factors, including share buyback yield and dividend yield as well as P/E, price-to-sales ratio (P/S), and price-to-cash-flow ratio. The annualized rates of return for these factors from 31 December 1963 to 31 December 2005 are shown in **Table 1** for groupings of 50 stocks. Note the difference in annualized return for the 50 lowest-P/S stocks (15.59 percent) and the 50 highest-P/S stocks (–2.60 percent). If an investor had bought only the stocks with the highest P/S, held them a year, and then rebalanced, the portfolio would have lost 2.60 percent a year over the 42-year period, which included two of the biggest bull markets in history. Of course, anyone who has taken an economics course already knows this: Overpaying, or buying stocks at ridiculous valuation levels, will lead to ruin. Yet, the behavioral

Table 1. Sample Backtested Value Factors for 50-Stock Strategy: Annualized Gross Rates of Return Hypothetical Performance Results, 31 December 1963 to 31 December 2005

Factor/Item	Return
<i>50 stocks</i>	
Highest by shareholder yield	14.28%
Highest by dividend yield	12.71
Lowest by P/S	15.59
Highest by P/S	-2.60
Lowest by price to earnings	14.97
Highest by price to earnings	6.89
Lowest by price to cash flow	15.65
Highest by price to cash flow	3.61
All stocks	12.08%

Notes: Based on O'Shaughnessy research using the Standard & Poor's Compustat database. The universe of all stocks consists of all securities in the Standard & Poor's Compustat database with inflation-adjusted market capitalization greater than \$150 million. The 50 stocks are equally weighted and rebalanced annually.

finance camp argues that investors do it routinely because, despite all the data to the contrary, investors are animated by stories—by the new and different. If you ever hear “It is different this time,” grab your wallet and run for the exit. It is never different. At the end of the day, valuation always rules.

Now, 10 years after my study was originally published, every strategy that was shown to be the best in 1996 has continued to be the best. With the book in wide circulation since 1996, that should not have happened. In an efficient market, the advantages associated with the strategies should have been arbitrated away. Behavioral finance provides an explanation why this did not occur, which I will discuss later.

The primary lesson from this analysis is that the less an investor pays for sales, earnings, and so on, the better the return. The data show that an investor who diligently buys the stocks with the lowest P/S and rebalances that portfolio each year to again hold the 50 lowest-P/S stocks will earn a return of nearly 16 percent a year, compared with the market's return of about 12 percent a year for the period studied. Thus, a single factor—buying 50 names with the lowest P/S—can provide enormous alpha over a variety of market environments.

One criticism of the first edition of *What Works on Wall Street* was the use of 50-stock portfolios in the study. What, readers wondered, had happened to the stocks in between the two groups of the 50 stocks with the highest P/S and the 50 stocks with the lowest P/S? In response, for the second version of the book, I examined every ratio by decile for the

entire universe, as shown in Table 2. The results were absolutely consistent. Every time investors believe the story and the hype, every time investors bite on the hook that “this company is different,” investors lose more money. The data are very straightforward: The more an investor is willing to pay for a dollar of a company's sales, the lower the investor's compound return will be. In the decile with the highest-P/S stocks, shown in Table 2, the return over the period (3.22 percent) was less than that of T-bills (5.84 percent).

Table 2. Annualized Gross Rates of Return for P/S by Decile for Entire Equity Universe: Hypothetical Performance Results, 31 December 1963 to 31 December 2005

Decile/Measure	Return
1 (lowest P/S)	15.87%
2	14.71
3	14.58
4	13.70
5	12.90
6	12.33
7	10.82
8	9.46
9	6.78
10 (highest P/S)	3.22
All stocks	12.08%

Notes: Based on O'Shaughnessy research using the Standard & Poor's Compustat database. The universe of all stocks consists of all securities in the Standard & Poor's Compustat database with inflation-adjusted market capitalization greater than \$150 million. The stocks in each decile are equally weighted and rebalanced annually.

As investment professionals, we like to think that what we do is quite glamorous. It is not. Anyone who can do basic arithmetic and stick to an underlying discipline has the makings of a great portfolio manager. I often think of Woody Allen's quip: “80 percent of success is just showing up.” Well, 99 percent of investment success is just diligently following an investment strategy through all the ups and downs of the market.

Growth Factors. In addition to value factors, I also analyzed the impact of growth factors—such as one-year relative price strength, return on equity, profit margin, and one-year sales growth—on stock selection. The annualized rates of return for the period from 31 December 1963 to 31 December 2005 are shown in Table 3 (again for the 50-stock strategy). Growth factors on a stand-alone basis did not work

Table 3. Sample Backtested Growth Factors for 50-Stock Strategy: Annualized Gross Rates of Return, 31 December 1963 to 31 December 2005

Factor/Item	Return
<i>50 stocks</i>	
Highest by one-year relative price strength	11.16%
Lowest by one-year relative price strength	2.33
Highest by return on equity	8.22
Lowest by return on equity	4.60
Highest by profit margin	11.11
Lowest by profit margin	-2.62
Highest by one-year sales growth	-0.21
Lowest by one-year sales growth	8.24
All stocks	12.08%

Notes: Based on O'Shaughnessy research using the Standard & Poor's Compustat database. The universe of all stocks consists of all securities in the Standard & Poor's Compustat database with inflation-adjusted market capitalization greater than \$150 million. The 50 stocks are equally weighted and rebalanced annually.

nearly as well as value factors did because the typical growth company has a high P/S, a high price-to-book ratio, and a high price-to-cash-flow ratio—in other words, a high-expectations company. Investors have high hopes for growth companies, and when those high hopes are not met, a stock's price can drop like a stone.

Blending Value and Growth Factors. Next, I considered the value added from combining factors. Essentially, all the stock-selection strategies we follow today at Bear Stearns Asset Management use a blend of value and growth factors—unless the client wants a pure play on the value side.

Each strategy goes through a three-step process before it is put into production. First, we test the model over as much data as are available. Typically, the annual data go back to 1950 and the monthly data go back to 1963. I cannot overemphasize the importance of this historical perspective. By back-testing factors, we can see

- the worst-case scenario for a strategy,
- the strategy's biggest peak-to-trough decline,
- how long the strategy took to recover from that peak-to-trough decline,
- how many 10 percent or greater drops from peak to trough the strategy experienced and the duration of those periods,
- how long the strategy took to recover from any 10 percent or greater drop,

- the batting average, or percentage of various periods over which that strategy outperforms its benchmark (i.e., percentage of rolling one-year periods, five-year periods, etc.), and
- how often the strategy beat its benchmark and by what magnitude.

The ability to look at the historical data associated with a strategy provides an insight and understanding unavailable to more conventional managers.

Batting averages and base rates are among the most telling pieces of statistical information about securities, yet they are the most disregarded. Psychologists have proven this by showing that people totally ignore base rates in lieu of relying on their intuition to make judgments. For example, participants in an experiment were told about a mythical town of 100,000 residents in which 70,000 were lawyers and 30,000 were engineers. In the first round, participants were asked to guess, based only on a list of names given to them, how many names on the list were lawyers and how many were engineers. The majority guessed that all the names on the list were lawyers, surmising that reliance on the base rate information would mean that at least 70 percent of their responses would be correct. In the second round, participants received names and meaningless descriptive information for each hypothetical resident, such as Mary is 32 years old, likes to go to the opera, and enjoys watching the TV show "Grey's Anatomy." With this added information, the participants largely ignored the underlying base rate information and instead began betting whether Mary and her attributes resembled a lawyer or an engineer. In the third round, participants reviewed stereotypical information on each of the hypothetical residents: For example, Tom is 42 years old, is shy, likes mathematical puzzles, and does not like going out on Saturday night. Therefore, the participants labeled Tom an engineer. Even when the base rate was raised to 90–95 percent lawyers, participants still bet that Tom was an engineer. It is not much of a stretch to recognize that, all too often, investment professionals make judgments about stocks in the same way.

It is important to understand that with these strategies, we are making assumptions only about a factor group—not any individual member of the group. Take, for example, Google. At a stock price close to 500, it certainly is a high-P/S stock and may very well continue to defy the odds. I am absolutely silent on the prospects for Google. I am, however, not at all silent on the general prospects for stocks with P/S in the top decile. That cohort of stocks will perform very, very poorly. Any investor who thinks he or she may want to bet against the house should think again. Basically, the goal of these strategies is to bet with the batting average.

The second step we take when placing a strategy into production is to test it in an out-of-sample data period. The strategy can work in-sample, but it needs to work out-of-sample as well. Once we pass that hurdle, we add another one—the third step in the process. We divide the database in two by using a random number generator and run the strategy on the two newly created databases. The strategy has to pass this third test before it can be put into production. We also prefer, but do not require, that the strategy test well outside North America so that it has similar alpha in the Euro zone and the Far East. It does not always happen, but we love when it does.

Let me illustrate how we blend growth and value factors in stock selection by describing the Systematic Small Cap Growth Equity stock screening process, a strategy that is now closed to new investors. It is a simple strategy. We begin the process by considering only small-cap stocks, defined as having \$200 million to \$2 billion in market capitalization—currently about 3,000 stocks. Because several billion dollars are to be invested in this strategy, the liquidity of each stock is key. Thus, each stock is required to pass a trading volume requirement. The next filter is P/S, the value factor, which tops out at 1.5, indicating that we are willing to spend only \$1.50 for each \$1.00 of sales. Following that, the stocks must share two growth characteristics: positive earnings gains over the prior year as well as excellent three- and six-month price appreciation. The next screen is a handful of accounting red-flag variables. Of the stocks that survive the process, the 50 companies with the highest one-year price appreciation are purchased on an equally weighted basis.

Cheapness married to relative price appreciation is one of the strongest signals we have identified. Essentially, the strategy that I just described buys cheap stocks on the mend; it is intuitive and simple. And despite the fact that the strategy is explained in *What Works on Wall Street* and despite the fact that we have been using it in real time for the past 10 years, it continues to have excellent alpha generation. Over the past 42 years, this strategy has generated approximately 1,000 bps in annualized excess return over its benchmark, the Russell 2000 Growth Index.¹

In my opinion, this strategy is successful for one reason—discipline. Most money managers do not suffer from a dearth of good ideas, but more often than not, they lack the discipline required to execute those ideas consistently. Someone once said that thinking is easy, acting is hard, and acting like you think is virtually impossible. Essentially, the strategic process that we are required to follow forces us to act like we think. It forces us to stick to the strategy even

when it is underperforming, leaving us fully invested when the strategy inevitably rebounds. This requires that the investor ignore the desire to attempt to beat the market each and every quarter. Indeed, based on data going back to 1950, we can estimate for our clients in how many quarters a particular strategy is likely to underperform and by what magnitude. Our clients understand from the beginning that no matter what happens, we will not change the strategy because of short-term market conditions.

Expected Equity Returns

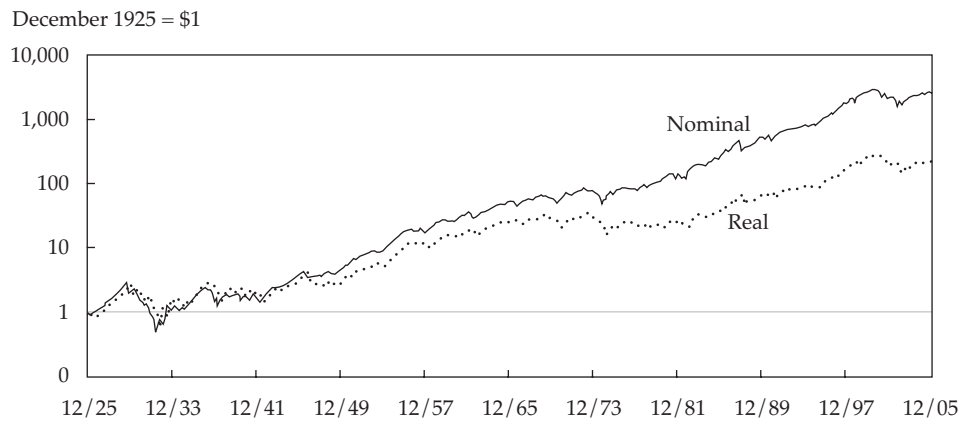
In 2001, one of the largest pension plans in the United States asked Bear Stearns Asset Management to undertake a study to determine which stock traits govern long-term performance. To calculate the ERISA-required expected rate of return on plan assets, the pension fund was using market returns over the past 20 years to project future returns. The plan was uncomfortable with this approach and wanted to refine it by gaining an insight into what traits and information have, over long periods, contributed to excess return.

We began by reviewing the data made famous in Jeremy Siegel's great work *Stocks for the Long Run* (Siegel 2002)—the top line in **Figure 1**. It shows the uninterrupted rise of a \$1 investment in the S&P 500 from December 1925 to December 2005 (\$2,675.56). I have two concerns about relying too heavily on this observation. First, the 10 percent annualized return presented here is an almost 90-year average. We are a bit naive if we tacitly assume that every investor, or indeed *any* investor, is certain to earn what it took the stock market 90 years to disgorge. Second, this is a nominal return, not an actual or real return. It does not take into account the pernicious effects of inflation. The real return over the same period is shown in the bottom line of **Figure 1**, which, with an ending value of \$242.07 in December 2005, is certainly not as dramatic as the nominal return but is still at a healthy 7 percent annualized rate.

Next, we tackled the question of what the appropriate historical period and period length should be to achieve the most accurate forecasted return for the next 20 years. We considered and then discarded S&P 500 rolling three-month real returns because they are all noise. Given this fact, it is fascinating that investment managers are judged on quarterly performance. Investment committees that insist on making decisions based on quarterly performance are, in fact, making decisions based solely on meaningless market noise. The S&P 500 rolling 12-month real returns are not much better than the quarterly returns; the performance smoothes out a bit but not enough to draw any good inference from the underlying data.

¹The nontaxable composite is used in the analysis.

Figure 1. S&P 500 Nominal and Real Returns, December 1925–December 2005



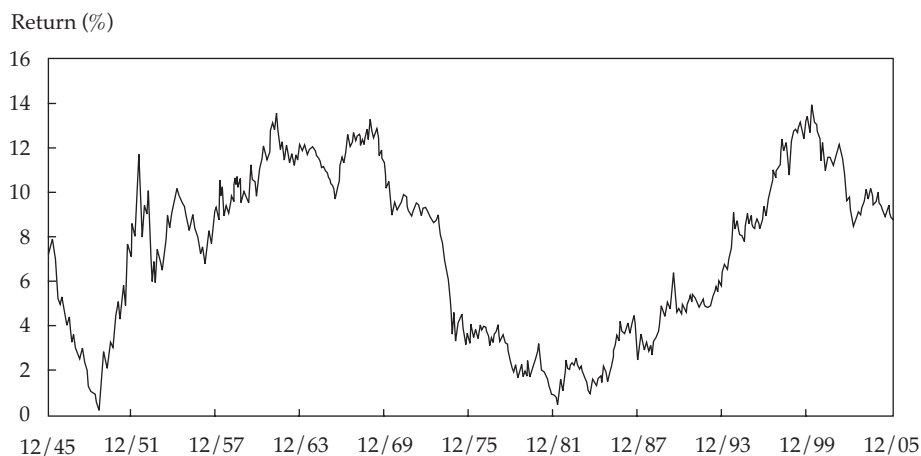
Source: Based on data from Ibbotson EnCorr Analyzer.

Because ERISA requires a 20-year return forecast, we then looked at S&P 500 rolling 20-year real rates of return, which are shown in **Figure 2**. This view has almost no noise and almost all signal. If we randomly select any 20-year period from these data, on average and on a rolling basis, the real return is approximately 7 percent. But specific 20-year periods yield a return well below or well above that 7 percent. The worst 20-year real rate of return in history followed the stock market crash in 1929. Perhaps not surprisingly, by 1949, investors absolutely shunned the stock market. *Life* magazine wrote a piece at the time asking why 9 percent dividend yields on AT&T stock did not entice investors. Clearly, investors were not attracted because of the scars they received from living through the

Great Depression and the stock market crash aftermath. Behavioral finance tells us that investors remember that which is vivid and easy to recall. We found by looking at these data that investors make decisions by using the rearview mirror. If the rearview mirror reflects poor stock market performance, investors will stay away, and vice versa.

The data also clearly indicate that reversion to the long-term mean is as close to an ironclad rule in financial markets as anything we have been able to find. Roger Ibbotson found the same results using similar data for the 1800s. The pattern for both centuries is up and down, indicating that investors become elated and then despair, continuously repeating the cycle. One can see in Figure 2 that

Figure 2. S&P 500 Rolling 20-Year Real Returns, December 1945–December 2005



Source: Based on data from Ibbotson EnCorr Analyzer.

reversion to the mean kicked in when investors, not as dominated by those who remembered the 1929 crash and the Great Depression, reentered the market in the 1950s, finally recognizing the good value available. Through the 1950s and 1960s, stocks retained a golden allure. In the late 1960s, the “Nifty Fifty” stocks were all the rage. They were called “one-decision” stocks because as soon as the decision was made to buy them, they could be put in a lockbox and held in anticipation of sure appreciation without further regard for valuation.

The 1970s was the worst decade for stock returns in 100 years—even worse than the 1930s (on an inflation-adjusted basis). On 13 August 1979, the *Business Week* cover story “The Death of Equities” argued that Baby Boomers would never invest in the stock market after its debilitating performance over the previous decade. Instead, the article predicted that Baby Boomers would invest in collectibles, commodities, and real estate. And of course, we have all just lived through the stock market bubble that ended in early 2000. The bursting of the internet bubble marked the end of the highest 20-year real rate of return in the history of the S&P 500; the next best market performance ended in 1832. The 13.85 percent annualized real rate of return for the 20 years prior to March 2000 is unprecedented.

The turning points in the cycles of appreciation and depreciation coincide with the turning points in the market’s P/E and yield. At the lowest points, the yield was in the 6–8 percent range and the P/E, in many instances, was in the single digits. At the highest points, the yield was negligible and the P/E was through the roof. Valuation measures such as these can help to determine where the market is at any given time in the cycle and to gauge where it is headed. The picture drawn by the graph of S&P 500 rolling 20-year real returns illustrates clearly that the latest reversion to the mean began in April 2000. We first created this graph in early 2002, and we said the same thing then that we are saying now: For the S&P 500, it was a wonderful party in the 1980s and 1990s, but in the ensuing 20 years, it will not be as much fun.

Our next step was to look at all the 20-year extremes in real rates of return over the entire period from December 1925 to December 2005. We defined as extreme those instances in which the S&P 500 had a real return of 2 percent or lower or 12 percent or higher for the previous 20 years. Each time that happened, we analyzed where the market was 20 years later. When the S&P 500 returned 2 percent or lower for the prior 20 years (59 occurrences), the minimum return 20 years later was nearly 9 percent a year. The maximum return, which occurred in March 2000, was 13.85 percent, and the average

return was about 11.2 percent. Our conclusion is that whenever the S&P 500 is pulling out of a poor 20-year real rate of return, it is a screaming buy signal for the index.

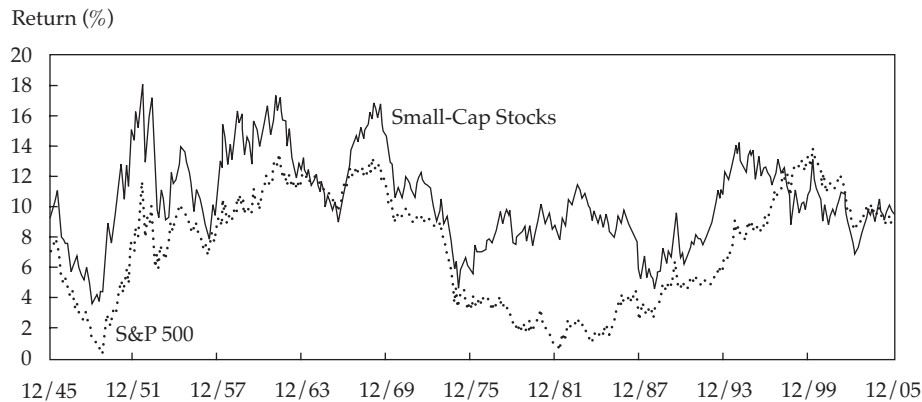
Conversely, when the S&P 500 is coming off of an unusually high 20-year real rate of return, the news is rather dire. Based on the 71 times this happened, the minimum return 20 years after the index enjoyed a real return of 12 percent or higher was 0.55 percent. The maximum real return was 4.42 percent, and the average was 2.8 percent. With this knowledge, we concluded that pension plan managers would be best served by using a real expected rate of return for the S&P 500 in the 3–5 percent range. Given our current position in the cycle, we expect that for the next 15 years, the S&P 500 will provide a real rate of return below its historical 7 percent average.

If our study indicated that 200 years of data support the concept of mean reversion, what are other models saying? To answer this question, we evaluated three of the most popular models for estimating equity returns: the market-implied expected rate of return, the capital asset pricing model (CAPM), and the equity cost of capital (ECOC). The expected real return for the next 20 years calculated by using these models ranges from 4 percent to 7 percent, with the CAPM producing the highest estimate, which was produced using an equity risk premium of 5.4 percent—a monstrously large assumption.² In assuming that investors will earn such a high equity risk premium, the CAPM generates the highest estimate. The point, however, is that our methodology puts us in the ballpark in terms of expectations because these three models are also suggesting similar results.

Small-Cap Stocks. If large-cap S&P 500–style stocks are not going to do well for the next 15 years or so, what will? We began by looking at small-cap stocks. Small-cap stocks have outperformed large-cap stocks on a real-return basis in virtually all 20-year holding periods—so much so that more than 20 years ago, Rolf Banz (1981) coined the term “small-cap premium.” He said, all other things being equal, an investor will earn a bigger premium investing in small-cap stocks than in large-cap stocks. Nonetheless, **Figure 3** shows that the small-cap premium waxes and wanes over time. From the late 1990s through 2004, the small-cap premium was actually negative. In fact, the market is just now emerging from the largest negative premium between large-cap and small-cap stocks ever witnessed.

²The equity risk premium is a prospective risk premium derived by Dimson, Marsh, and Staunton (2002) using 101 years of world market returns.

Figure 3. Rolling 20-Year Real Returns for Large-Cap and Small-Cap Stocks, December 1945–December 2005



Notes: Small-cap stocks are 9th and 10th deciles by market capitalization. Large-cap stocks are represented by the S&P 500.

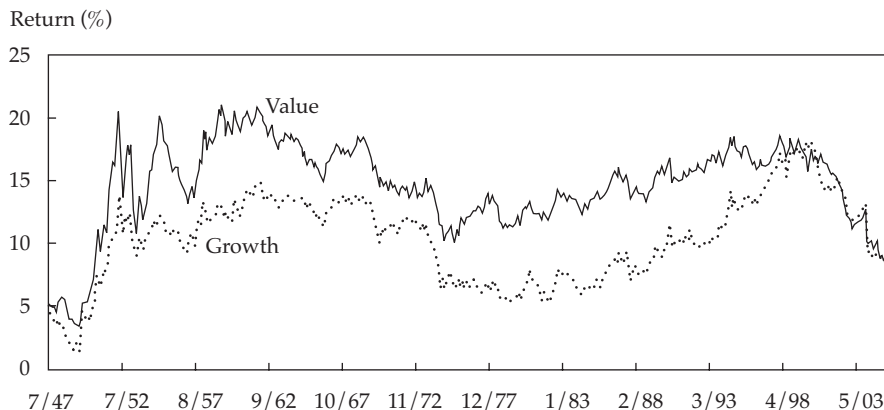
Source: Based on data from Ibbotson EnCorr Analyzer.

The small-cap premium is inversely proportional to the real return on large-cap stocks, meaning that when large-cap stocks are performing exceptionally well, the small-cap premium is low to negative; when large-cap stocks are doing extremely poorly, the small-cap premium is quite high. We believe that financial markets have just experienced a “99-year flood event” in which everything that usually works very well did not and everything that usually does not work well worked brilliantly. In the future, reversion to the mean at both the style and cap levels will continue. History says to buy small-cap stocks now, and despite a few breathers from time to time, they will continue to outperform through 2020. At a minimum, long-term investors should have a market weight in small- and mid-cap

stocks, which is 25 percent of the U.S. market. More aggressive investors would be at 35 percent.

Large-Cap Stocks. A look at the Fama–French data, illustrated in **Figure 4**, shows that large-cap value stocks typically outperform large-cap growth stocks. The Fama–French analysis evaluated all rolling 20-year periods back to 1927 using growth and value indices created based on stocks’ price-to-book ratios as the delineating factor. Their results are consistent with the data that I presented in *What Works on Wall Street* because—and I repeat—valuation matters. Large-cap growth strategies are, for the most part, grounded in hope rather than in reality. They are based on expectations rather than on concrete financial data presented in companies’ financial statements.

Figure 4. Rolling Fama–French Large-Cap Value vs. Large-Cap Growth 20-Year Returns, July 1947–December 2005



Sources: Based on Fama–French large-cap growth and large-cap value monthly data series and data from Ibbotson EnCorr Analyzer.

But—and recall my earlier 99-year flood analogy—in late 1999, for the first time ever, large-cap growth stocks outperformed large-cap value stocks (judged on the previous rolling 20-year period). Investors began to throw the rule book out the window, particularly in 1999. Analysts were inventing new ways to value companies—ways that appeared to be consistent with what was happening in the marketplace. After the market crashed, however, all of the outlandish metrics that had been created to value what could not be valued were, of course, thrown out.

Figure 5 traces the large-cap value premium over the past 58 years. The premium reached its greatest differential versus large-cap growth, 7.77 percentage points (pps), over the 20 years ending in 1959. The lowest differential occurred in 2000, with a negative delta compared with large-cap growth stocks of 1.63 pps for the previous 20 years. But with an average premium of just more than 4 pps, we conclude that a large-cap value strategy will do significantly better in the future than a large-cap growth strategy will. But a growth-at-a-reasonable-price (GARP) strategy with a 1–2 percent annualized real rate of return through 2020 is possible, so some exposure to traditional growth stocks is appropriate. We suggest allocating about 45 percent of an equity portfolio to a large-cap value strategy and about 30 percent to a large-cap growth strategy. The remainder, of course, should be allocated to a small- or mid-cap strategy.

Expected Fixed-Income Returns

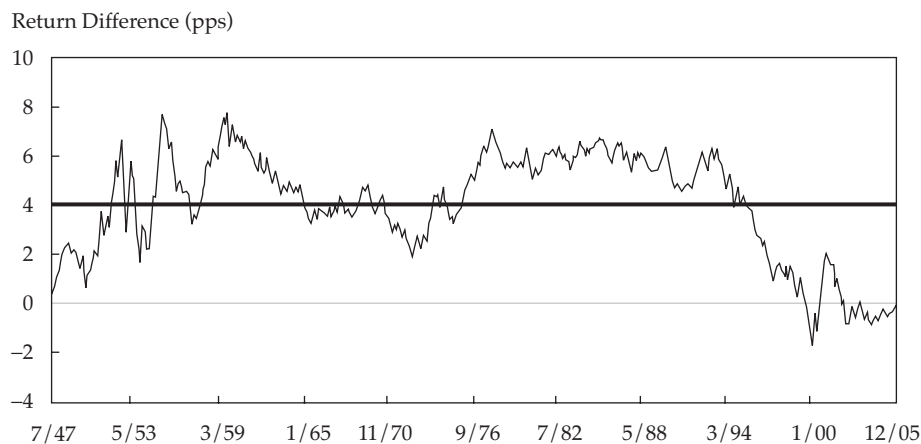
The pension plan for which we conducted this study was also interested in historical, real fixed-

income returns and the implications for future returns. **Figure 6** shows the rolling 20-year real rates of return for long-term corporate bonds from December 1945 to December 2005. The graph shows an astounding number of 20-year periods, beginning in the early 1950s, over which long-term corporate bonds lost money. It amazes me that an investment with such a long history of multiple 20-year periods of negative real returns is considered a safe investment. The long-term corporate bond is actually a very risky investment.

Nothing of a similar nature exists in the equity markets; none of the 20-year periods for stocks had a negative real return. Although the S&P 500 produced an average annualized return of 11 percent over the period from January 1973 to December 2005, the fixed-income market generated negative returns in 41 quarters, or 31 percent of the time. During this period, the worst real rate of return for bonds was a 3.12 percent annualized loss for the 20 years ending in 1981. Of course, 1981 was also a once-in-a-lifetime buying opportunity, with interest rates through the roof. At that inflection point, investors who bought long bonds had a wonderful ride to the highest real rate of return in the history of the asset class. Unless real interest rates fall from today's levels to below zero, it will be extraordinarily difficult to duplicate this return in long-term bonds anytime soon. For pension plans that require strong returns over the next 20 years, long-term bonds are not the place to be.

Given our expectation that long-term bonds will not provide needed returns in the future, we examined historical fixed-income returns to determine

Figure 5. Rolling Fama–French Large-Cap Value Minus Large-Cap Growth 20-Year Returns, July 1947–December 2005



Sources: Based on Fama–French large-cap growth and large-cap value monthly data series and data from Ibbotson EnCorr Analyzer.

Figure 6. Long-Term Corporate Bond Rolling 20-Year Real Compound Returns, December 1945–December 2005



Source: Based on data from Ibbotson EnCorr Analyzer.

which bond strategy would produce the best results. A comparison of intermediate- and long-term bond returns shows that a shorter-duration strategy is preferable. Despite the fact that interest rates declined significantly over the 32-year period from January 1973 to December 2005, intermediate-term bond returns (8.18 percent) were nearly equal to long-term bond returns (8.36 percent) and exhibited 30 percent less volatility. For those quarters when the S&P 500 was negative, intermediate-term bonds outperformed long-term bonds in 28 out of 41 quarters, or 68 percent of the time, with intermediates producing an average quarterly return of 1.19 percent (4.8 percent annualized) compared with 0.73 percent (2.9 percent annualized) for long bonds. The standard deviation on intermediate-term bonds was 4.49 percent versus 6.01 percent for long-term bonds; the Sharpe ratio for intermediates was significantly higher, at 0.45 compared with 0.38 for long-term bonds; and the correlation with equities was lower—0.21 compared with 0.27 for long-term bonds. For managers who run balanced portfolios, intermediate-term bonds deserve serious consideration because, historically at least, they provide almost all the return of long-term bonds with less risk and lower correlation with equities. Also, they tend to outperform long-term bonds when greater returns are most needed—when equity returns are negative.

Influences on Long-Term Performance

Behavioral finance has made an important contribution to the field of investments by explaining how markets become, and more importantly remain,

inefficient. According to behavioral finance, the lack of efficiency can be attributed to recurring patterns of human interactions with the market. Behavioral finance considers the way investors make decisions as opposed to the way economists believe investors make decisions. Additionally, demographics, which describe the characteristics of a given population, can provide powerful assistance to behavioral finance in understanding the relationship between human behavior and the markets.

Demographics. A common refrain from demographers is that the 78 million Baby Boomers—the largest generation in U.S. history—will profoundly affect both the economy and the stock market, but the big question is how. Currently, consumer spending accounts for 60–70 percent of GDP, with the largest spenders being those between the ages of 45 and 54. Many prognosticators, including Harry Dent (1998) in his book *The Roaring 2000s*, have plotted the number of 45- to 54-year-olds in the economy against the DJIA and have found a strong correlation between the two measures. Because the number of 45- to 54-year-olds will decline precipitously from 2010 to 2020, those who subscribe to the strength of this relationship believe the DJIA is inevitably lumbering toward a huge bust in the same time frame. The problem, however, is that this relationship held until 1987, after which it weakened substantially. If the two measures had remained in sync, the DJIA would be higher than 20,000 today.

Why did the two measures disengage? One reason is that the Baby Boomers behave very differently from previous generations. Baby Boomers break every rule of saving for retirement and every rule regarding when they should retire. They also

understand that they have a long life expectancy and are far more willing to hold a more aggressive portfolio than their parents, who sold equities at retirement age to buy fixed-income securities. When U.S. Social Security was first adopted in the 1930s, age 65 was chosen as the retirement age because, actuarially speaking, the typical U.S. worker was dead by that time. At today's life expectancies, the comparable age would be 85. Essentially, Baby Boomers are investing differently from their parents out of recognition of their longer life expectancy.

A second possible reason for the change in the relationship between the number of 45- to 54-year-olds and the DJIA is that investors are aware of the theory and have priced it into the market.

A third reason is demographer Jonathan Pontell's idea that the Baby Boom is a myth. He believes this monolithic generation should be viewed as at least two groups: (1) Baby Boomers, born between 1946 and 1953, and (2) "Generation Jones," born between 1954 and 1965. He claims that attitudinal studies of each group indicate that the two groups have very little in common. The Baby Boomers were the "low-fruit crowd"—those who were able to buy a house that had not gone up in price and were able to get a mortgage at a low rate of interest. They also were able to secure a job easily because their services were in demand. In contrast, Generation Jones found that the prices of the houses they wanted to buy had been jacked up by their 10-year-older siblings who were there before them. Their job opportunities were also scarcer because the Baby Boomers had preceded them into the labor market. As a consequence, these two groups' experiences led to very different attitudes about investing.

Demographics can definitely add substance and tremendous value to the discussion about future return estimates. A prime example is the ratio of middle-aged investors to young investors. This link to market performance was discovered in a study conducted by a trio of academics—John Geanakoplos, Michael Magill, and Martine Quinzii (2002). They found that when this ratio rises (i.e., more middle-aged investors than younger investors), P/Es expand; when it falls, P/Es contract. From the start of the 20th century, the birth cycle has experienced a 20-year boom/bust pattern. At the present time, the ratio is declining and is expected to decline through 2018.

The anti-demographics crowd claims it does not matter what Baby Boomers do because all that matters is what the big money does. According to the U.S. Federal Reserve Board, in 2001, the richest 1 percent of the U.S. population owned 53 percent of all equities and the richest 10 percent owned 88 percent of all equities. Therefore, they believe that

what the rest of the population does or does not do with their 401(k) plans is meaningless. In their view, ultimately, the group who owns all of the wealth will determine how the markets behave.

Behavioral Economics. Behavioral economics, the study of why investors consistently commit the same errors in decision making, can also provide great insight into the vagaries of the market.

Several theories in behavioral economics help explain investor behavior: prospect theory, myopic loss aversion and narrow framing, fear of regret, and hindsight bias. Prospect theory says that investors are risk seeking for losses but risk averse for gains and that most investors hate losses so much that they hold their losing stocks and sell their winners, requiring a two-to-one payoff before gain taking and loss avoiding are viewed in the same light. Another common stumbling block for investors is that because they do not wish to appear stupid, they too often follow the herd even when the herd is doing something stupid (internet stocks, anyone?)—known as the fear of regret. And of course, everyone who deals with a client deals with a behavioral issue called "hindsight bias" on almost a daily basis. Hindsight bias is when clients fervently believe, after something important has occurred, that you as a professional money manager should have known about it ahead of time. And mistakenly, they also believe that they knew about it ahead of time.

Other examples of investor behavior that negatively affect investing success are availability error, the halo effect, mental anchoring, overconfidence, and representativeness. Essentially, the lesson from behavioral economics is that if investors are able to change their focus, broaden their view, and not rely on the "experts" to plot their course, they can and will be able to change their future and enjoy greater success in their investing strategies.

Conclusion

Our findings suggest several strategies for portfolios with a long-term horizon of 2025. First, de-emphasize S&P 500 funds. Investors indexing a portion of their portfolio should switch to a more inclusive index, such as the Wilshire 5000 Index or the Russell 3000 Index. The allocations to small- and mid-cap stocks should be increased. At a minimum, portfolios should mimic the market weight of approximately 75 percent large-cap stocks and 25 percent small- and mid-cap issues. Sophisticated investors with higher return expectations should consider raising allocations for small- and mid-cap stocks to 35 percent of the overall equity portfolio.

Other recommendations are to overweight large-cap value stocks relative to large-cap growth stocks. Investors who are currently overweight large-cap growth stocks should reduce exposure to, at a minimum, an equal allocation between large-cap growth and large-cap value stocks. A more optimal weighting for the large-cap stock component of the portfolio would be 60 percent large-cap value and 40 percent large-cap growth. Intermediate-term bonds should be emphasized over long-term bonds for investors seeking a balanced portfolio. Those investors fortunate enough to be invested in long-term bonds over the past 20 years enjoyed a once-in-a-lifetime rally, but on both an absolute and a risk-adjusted basis, intermediate-term bonds will outperform long-term bonds over the next 20 years.

Finally, investors would do well to add alternative investments to their portfolios. The markets should return to rationality in the next 20 years, and such investment vehicles as long-short hedge funds that can short overvalued securities may provide strong relative performance.

This article qualifies for 0.5 PD credits.

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REFERENCES

Banz, Rolf. 1981. "The Relationship between Return and Market Value of Common Stocks." *Journal of Financial Economics*, vol. 9, no. 1 (March):3–18.

Dent, Harry S. 1998. *The Roaring 2000s: Building the Wealth and Lifestyle You Desire in the Greatest Boom in History*. New York: Simon & Schuster.

Dimson, Elroy, Paul Marsh, and Mike Staunton. 2002. *Triumph of the Optimists: 101 Years of Global Investment Returns*. Princeton, NJ: Princeton University Press.

Geanakoplos, John, Michael J.P. Magill, and Martine Quinzii. 2002. "Demography and the Long-Run Predictability of the Stock Market" (August). USC CLEO Research Paper No. C02-21; Cowles Foundation Discussion Paper No. 1380. Available at SSRN: <http://ssrn.com/abstract=329840>.

O'Shaughnessy, James P. 2005. *What Works on Wall Street: A Guide to the Best-Performing Investment Strategies of All Time*. 3rd ed. New York: McGraw-Hill.

Siegel, Jeremy J. 2002. *Stocks for the Long Run: The Definitive Guide to Financial Market Returns and Long-Term Investment Strategies*. 3rd ed. New York: McGraw-Hill.

Question and Answer Session

James P. O'Shaughnessy

Question: Do you incorporate any qualitative insights into your analysis?

O'Shaughnessy: No. Our analysis is entirely quantitative. I can visit with and interview the CEO, but my opinion will be just as worthless as the opinions of everyone else.

Question: What is your sell discipline?

O'Shaughnessy: We factor into our process a sell discipline that we call "rebalancing." We rebalance many of our strategies quarterly for nontaxable investors and every 12 months for taxable investors, taking all gains long term and all losses short term. The rebalancing process is the ultimate sell discipline. We also use a "red-flag" discipline that can result in securi-

ties being sold prior to the scheduled rebalance.

By not letting emotions get involved on the sell side, we are able to harvest the alpha that we have generated. A good example is a strategy we managed in 1999 that owned QUALCOMM. QUALCOMM's stock price rose 1,000 percent in 1999. I wanted to override the decision to kick it out of the model, but because we stuck with the discipline, we managed to take all of those gains and avoid the fate of other QUALCOMM investors.

At the rebalance, any name that no longer qualifies under the criteria of the model is removed. Any name that continues to qualify but has done very well is sold down to an equal-weighted position, and we take some money off the table. Obviously, new names

are also added to the strategy when rebalancing.

Prior to the rebalancing date, a security can be removed for one of five reasons: (1) the company fails to certify as required by the U.S. Sarbanes-Oxley Act of 2002, which is generally a very, very bad thing; (2) the federal government alleges fraud against the company, which generally happens a couple of weeks after Reason 1; (3) the stock price declines by 50 percent, which generally happens months ahead of Reasons 1 and 2; (4) the company legitimately restates its financials such that the company would not have qualified at the time it was purchased; and (5) the company is acquired by another and the acquiring company does not meet our characteristics.

