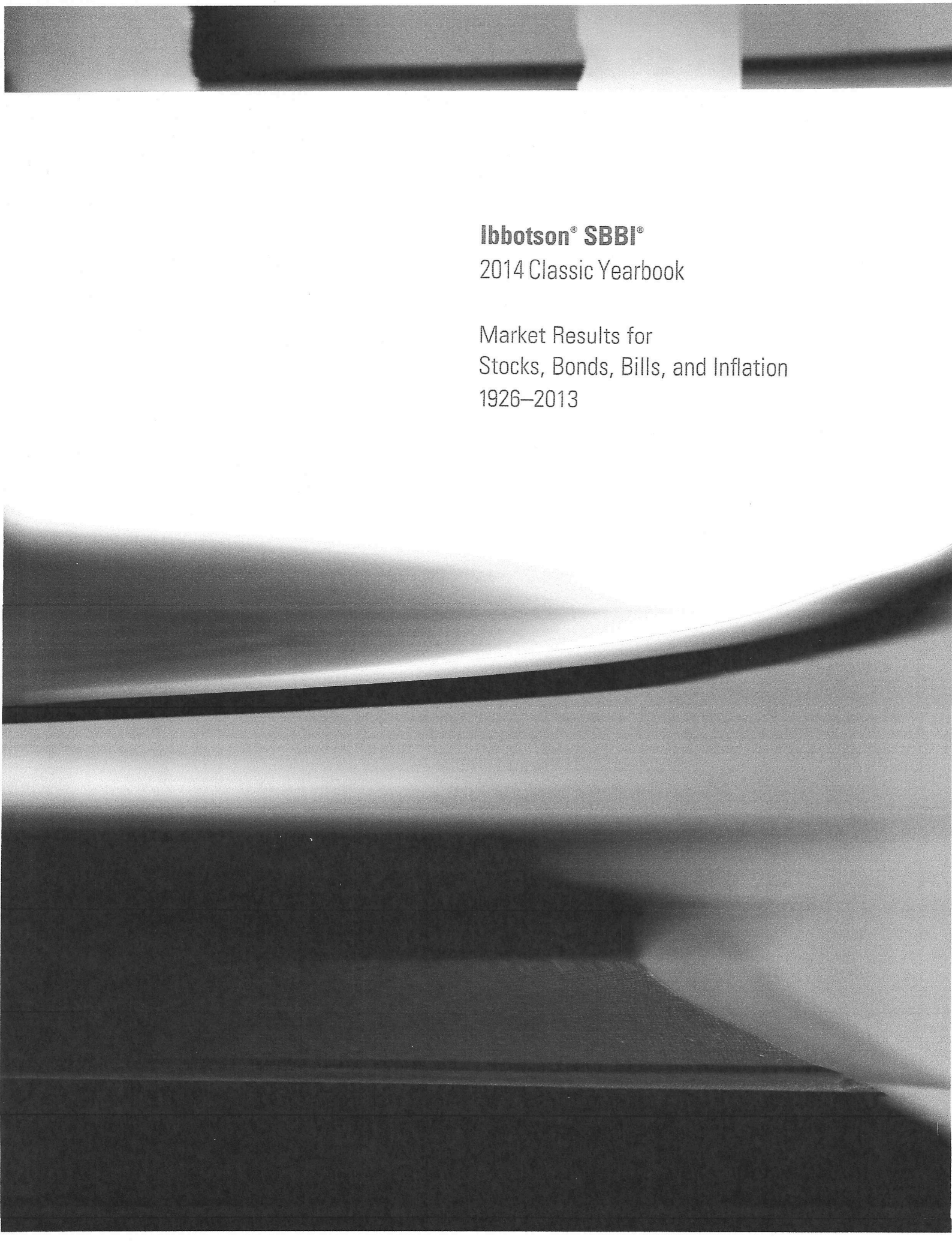


# Ibbotson® SBBI®

## 2014 Classic Yearbook

Market Results for
Stocks, Bonds, Bills, and Inflation
1926–2013

Markit Flash Eurozone Manufacturing PMI December data reached a 31-month high of 52.7 (versus 51.6 in November). New orders and output lifted the index as both showed their highest readings since spring 2011. Growth is uneven across the eurozone. The China Flash Manufacturing PMI (based on 85 percent–90 percent of final data points) was modestly lower sequentially and barely above 50 (50.5 December reading versus 50.8 in November).

In housing, recent quarterly results from the homebuilders indicate that the demand response to higher mortgage interest rates was significant. Toll Brothers' net new order growth decelerated from 49 percent in the January quarter to 36 percent in the quarter ending in April, 26 percent by July quarter-end, and just 6 percent growth in the October-ending quarter. However, the housing recovery has not been derailed; industry orders should rebound as the sticker shock effect wears off and interest rates stabilize. While many macroeconomic indicators look positive we see a relatively small pool of undervalued firms in the industrials space, mainly in select automakers.

**Consumer Defensive**

The year started strong for the consumer defensive sector, based on investors' quest for yield and optimism for merger and acquisitions fueled by Berkshire Hathaway's acquisition of H.J. Heinz. However, as the Federal Reserve hinted at tapering quantitative easing, the market saw a new opportunity for yield, and consumer defensive shares traded down. While we find that consumer defensive names are trading at roughly fair value, we continue to believe there are pockets of value in the space, since roughly two thirds of the 100 or so consumer defensive companies that Morningstar covers have either a wide or narrow economic moat.

Consumers have continued to trade down to lower-priced options in some household categories (like cleaning products, food storage, and laundry detergent), but personal-care offerings generally have held up fairly well. However, the competitive landscape remains fierce. In our opinion, promotional spending isn't a sustainable or profitable strategy over the long run, but rather product innovation ultimately will drive long-term, profitable growth.

**Real Estate**

Real estate appears to have ended 2013 on a pause. Home prices had been going up faster and faster each month; now those month-to-month growth rates have begun to slow. Home prices closed out 2013 with December to December increases of about 13.6 percent, with most of the bigger gains happening earlier in the year. Therefore, next year's growth is likely to slow, perhaps as low as a 5 percent growth rate.

Existing home sales had a huge spike over the summer as buyers rushed to beat interest-rate increases. Existing home sales got as high as 5.4 million units on a seasonally adjusted, annualized rate in July, then fell 10 percent to 4.9 million units in November. Even housing starts are nothing to write home about (when looking at three-month-averaged data). The final starts number for all of 2013 is likely to come in at just 925,000, well below most forecasts for a million or more, as momentum in the early part of the year died over the summer.

**Utilities**

Utilities investors rode more ups and downs in 2013 than they have in many years while they watched the market steadily climb past them. With a 12 percent total return in 2013 through mid-December, utilities returned less than half what the S&P 500 has and trailed every sector except real estate. Still, the sector's 12 percent return was above its 8 percent average annual return during the past decade, and it showed the sector's total-return staying power regardless of interest-rate sentiment. We continue to think a dip on market fears about rising interest rates offers an opportunity for long-term investors to pick up high-quality utilities that offer steady, positive total returns.

Adding to the sector's attractiveness going into 2014 is its average 4 percent dividend yield, nearly double the average S&P 500 dividend yield and more than 1 percentage point higher than 10-year U.S. Treasuries. Our analysis of returns going back 20 years suggests that 10-year U.S. Treasuries could climb to 4 percent from 3 percent today, with little impact on utilities' total returns. We think utilities with 3 percent to 5 percent earnings growth prospects during the next few years offer a compelling risk-adjusted total-return package for any investor.

### Long-Term Government Bonds

The long-term government bond total return index, constructed with an approximate 20-year maturity, closed 2013 at a level of $109.14 (based on year-end 1925 equaling $1.00). Based on the capital appreciation component alone, the $1.00 index closed at $1.19, a 0.2 percent capital gain over the period 1926–2013. This indicates that the majority of the positive historical returns on long-term government bonds were due to income returns. The compound annual total return for long-term government bonds was 5.5 percent.

### Intermediate-Term Government Bonds

One dollar invested in intermediate-term bonds at the end of 1925, with coupons reinvested, fell to $92.98 by year-end 2013, compared to $93.99 at year-end 2012. The compound annual total return for intermediate-term government bonds was 5.3 percent. Capital appreciation caused $1.00 to increase to $1.71 over the 88-year period, representing a compound annual growth rate of 0.6 percent.

### Treasury Bills

One dollar invested in Treasury bills at the end of 1925 was worth $20.58 by year-end 2013, with a compound annual growth rate of 3.5 percent. Treasury bill returns followed distinct patterns, described on the next page. Moreover, Treasury bills tended to track inflation; therefore, the average annual inflation-adjusted return on Treasury bills (or real riskless rate of return) was only 0.5 percent over the 88-year period. This real return also followed distinct patterns.

#### Patterns in Treasury Bill Returns

During the late 1920s and early 1930s, Treasury bill returns were just above zero. (These returns were observed during a largely deflationary period.) Beginning in late 1941, the yields on Treasury bills were pegged by the government at low rates while high inflation was experienced.

Treasury bills closely tracked inflation after March 1951, when Treasury bill yields were deregulated in the U.S. Treasury-Federal Reserve Accord. (Treasury bill returns after that date reflect free market rates.) This tracking relationship has weakened since 1973. From about 1974 to 1980, Treasury bill returns were consistently lower than inflation rates. From 1981 to 2008, real returns on Treasury bills have been positive, with the exception of 2002–2005. Real treasury bill returns were also negative from 2009 to 2013.

#### Federal Reserve Operating Procedure Changes

The disparity between performance and volatility for the periods prior to and after October 1979 can be attributed to the Federal Reserve's new operating procedures. Prior to this date, the Fed used the federal funds rate as an operating target. Subsequently, the Fed de-emphasized this rate as an operating target and, instead, began to focus on the manipulation of the money supply (through nonborrowed reserves). As a result, the federal funds rate underwent much greater volatility, thereby bringing about greater volatility in Treasury returns.

In the fall of 1982, however, the Federal Reserve again changed the policy procedures regarding its monetary policy. The Fed abandoned its new monetary controls and returned to a strategy of preventing excessive volatility in interest rates. Volatility in Treasury bill returns from the fall of 1979 through the fall of 1982 was significantly greater than that which has occurred since.

### Inflation

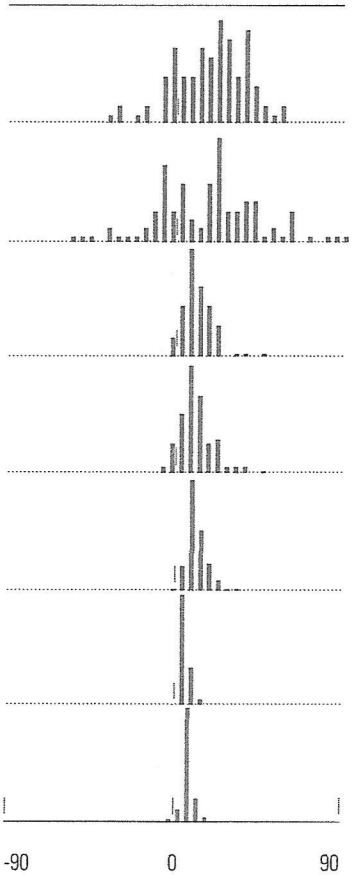
The compound annual inflation rate over 1926–2013 was 3.0 percent. The inflation index, initiated at $1.00 at year-end 1925, grew to $13.00 by year-end 2013. The entire increase occurred during the postwar period. The years 1926–1933 were marked by deflation; inflation then raised consumer prices to their 1926 levels by the middle of 1945. After a brief postwar spurt of inflation, prices rose slowly over most of the 1950s and 1960s. Then, in the 1970s, inflation reached a pace unprecedented in peacetime, peaking at 13.3 percent in 1979. The 1980s saw a reversion to more moderate, though still substantial, inflation rates averaging about 5 percent. Inflation rates continued to decline in the 1990s with a compound annual rate of 2.9 percent.

### Summary Statistics of Total Returns

Table 2-1 presents summary statistics of the annual total returns on each asset class over the entire 88-year period of 1926–2013. The data presented in these exhibits are described in detail in Chapters 3 and 6.

**Table 2-1:** Basic Series: Summary Statistics of Annual Total Returns

| Series | Geometric Mean (%) | Arithmetic Mean (%) | Standard Deviation (%) | Distribution (%) |
|---|---|---|---|---|
| Large Company Stocks | 10.1 | 12.1 | 20.2 | |
| Small Company Stocks* | 12.3 | 16.9 | 32.3 | |
| Long-Term Corporate Bonds | 6.0 | 6.3 | 8.4 | |
| Long-Term Government Bonds | 5.5 | 5.9 | 9.8 | |
| Intermediate-Term Government Bonds | 5.3 | 5.4 | 5.7 | |
| U.S. Treasury Bills | 3.5 | 3.5 | 3.1 | |
| *Inflation* | *3.0* | *3.0* | *4.1* | |




Data from 1926–2013. * The 1933 Small Company Stocks Total Return was 142.9 percent.

Note that in Table 2-1, the arithmetic mean returns are always higher than the geometric mean returns. The difference between these two means is related to the standard deviation, or variability, of the series. [See Chapter 6.]

The "skylines" or histograms in Table 2-1 show the frequency distribution of returns on each asset class. The height of the common stock skyline in the range between +10 and +20 percent, for example, shows the number of years in 1926–2013 that large company stocks had a return in that range. The histograms are shown in 5 percent increments to fully display the spectrum of returns as seen over the last 88 years, especially in stocks.

Riskier assets, such as large company stocks and small company stocks, have low, spread-out skylines, reflecting the broad distribution of returns from very poor to very good. Less risky assets, such as bonds, have narrow skylines that resemble a single tall building, indicating the tightness of the distribution around the mean of the series. The histogram for Treasury bills is one-sided, lying almost entirely to the right of the vertical line representing a zero return; that is, Treasury bills rarely experienced negative returns on a yearly basis over the 1926–2013 period. The inflation skyline shows both positive and negative annual rates. Although a few deflationary months and quarters have occurred recently, the last negative annual inflation rate occurred in 1954.

### Capital Appreciation, Income, and Reinvestment Returns

Table 2-2 provides further detail on the returns of large company stocks, long-term government bonds, and intermediate-term government bonds. Total annual returns are shown as the sum of three components: capital appreciation returns, income returns, and reinvestment returns. The capital appreciation and income components are explained in Chapter 3. The third component, reinvestment return, reflects monthly income reinvested in the total return index in subsequent months in the year. Thus, for a single month the reinvestment return is zero, but over a longer period of time it is non-zero. Since the returns in Table 2-2 are annual, reinvestment return is relevant.

The annual total return formed by compounding the monthly total returns does not equal the sum of the annual capital appreciation and income components; the difference is reinvestment return. A simple example illustrates this point. In 1995, an "up" year on a total return basis, the total annual return on large company stocks was 37.58 percent. The annual capital appreciation was 34.11 percent and the annual income return was 3.04 percent, totaling 37.15 percent. The remaining 0.43 percent (37.58 percent minus 37.15 percent) of the 1995 total return came from the reinvestment of dividends in the market. For more information on calculating annual total and income returns, see Chapter 5.

Monthly income and capital appreciation returns for large company stocks are presented in Appendix A: Tables A-2 and A-3, respectively. Monthly income and capital appreciation returns are presented for long-term government

This phenomenon can also be viewed graphically, as depicted in the Graph 7-2. The security market line is based on the pure CAPM without adjusting for the size premium. Based on the risk (or beta) of a security, the expected return should fluctuate along the security market line. However, the expected returns for the smaller deciles of the NYSE/AMEX/NASDAQ lie above the line, indicating that these deciles have had returns in excess of that which is appropriate for their systematic risk.

**Table 7-6:** Size-Decile Portfolios of the NYSE/AMEX/NASDAQ Long-Term Returns in Excess of CAPM

| Decile | Beta* | Arithmetic Mean Return (%) | Actual Return in Excess of Riskless Rate** (%) | CAPM Return in Excess of Riskless Rate† (%) | Size Premium (Return in Excess of CAPM) (%) |
|---|---|---|---|---|---|
| 1-Largest | 0.91 | 11.13 | 6.03 | 6.37 | -0.33 |
| 2 | 1.03 | 13.09 | 8.00 | 7.20 | 0.80 |
| 3 | 1.10 | 13.68 | 8.59 | 7.66 | 0.93 |
| 4 | 1.13 | 14.12 | 9.03 | 7.84 | 1.19 |
| 5 | 1.16 | 14.88 | 9.79 | 8.07 | 1.72 |
| 6 | 1.19 | 15.11 | 10.02 | 8.26 | 1.75 |
| 7 | 1.24 | 15.48 | 10.39 | 8.64 | 1.75 |
| 8 | 1.30 | 16.62 | 11.53 | 9.05 | 2.48 |
| 9 | 1.35 | 17.23 | 12.14 | 9.37 | 2.76 |
| 10-Smallest | 1.40 | 20.88 | 15.79 | 9.77 | 6.01 |
| *Mid-Cap 3-5* | *1.12* | *14.02* | *8.93* | *7.79* | *1.14* |
| Low-Cap 6-8 | 1.23 | 15.51 | 10.41 | 8.54 | 1.87 |
| Micro-Cap 9-10 | 1.36 | 18.38 | 13.29 | 9.45 | 3.84 |

Data from 1926–2013.

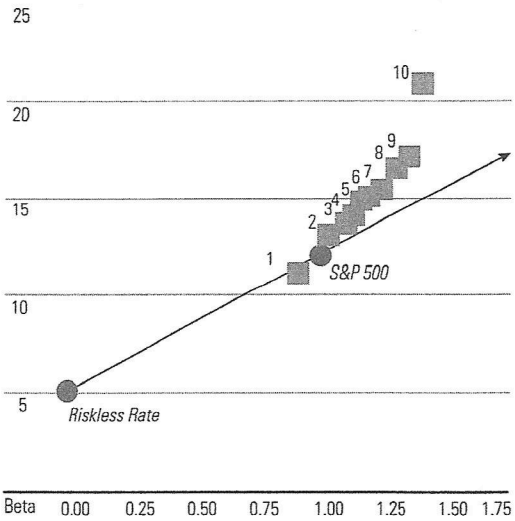
*Betas are estimated from monthly returns in excess of the 30-day U.S. Treasury bill total return, January 1926–December 2013.

**Historical riskless rate measured by the 88-year arithmetic mean income return component of 20-year government bonds (5.09 percent).

†Calculated in the context of the CAPM by multiplying the equity risk premium by beta. The equity risk premium is estimated by the arithmetic mean total return of the S&P 500 (12.05 percent) minus the arithmetic mean income return component of 20-year government bonds (5.09 percent) from 1926–2013.

Source: Morningstar and CRSP. Calculated (or Derived) based on data from CRSP US Stock Database and CRSP US Indices Database ©2014 Center for Research in Security Prices (CRSP®), The University of Chicago Booth School of Business. Used with permission.

**Graph 7-2:** Security Market Line Versus Size-Decile Portfolios of the NYSE/AMEX/NASDAQ




Data from 1926–2013.

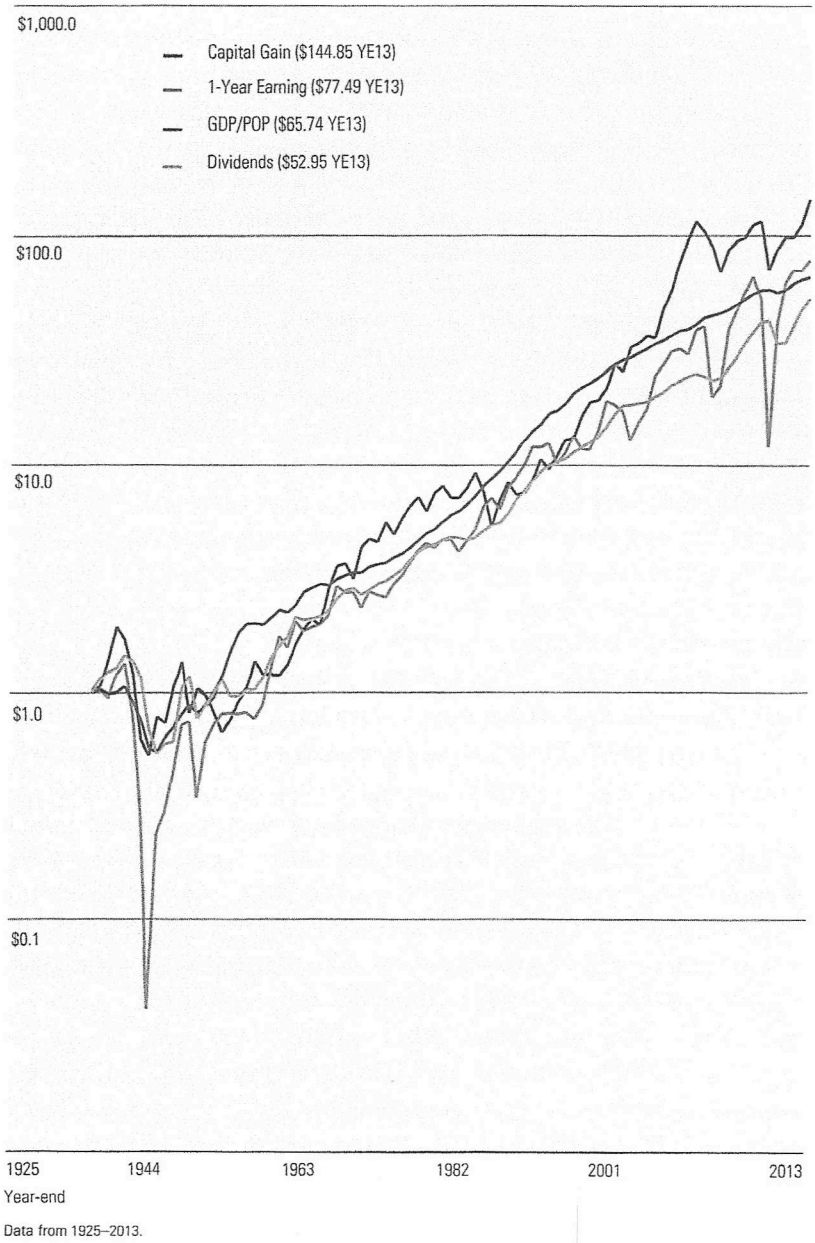
### Serial Correlation in Small Company Stock Returns

In four of the last ten years, large-capitalization stocks (deciles 1–2 NYSE/AMEX/NASDAQ) have outperformed small-capitalization stocks (deciles 9–10 NYSE/AMEX/NASDAQ). This has led some to speculate that there is *no size premium, but statistical evidence suggests that peri*ods of underperformance should be expected. For instance, since 1926, large-capitalization stocks have outperformed small-capitalization stocks nearly 50 percent of the time.

It should be noted, however, that large-capitalization stocks' average historical outperformance has been less than the average historical outperformance of small-capitalization stocks.

History tells us that small companies are riskier than large companies. Table 7-1 [see page 100] shows the standard deviation (a measure of risk) for each decile of the NYSE/AMEX/NASDAQ. As one moves from larger to smaller deciles, the standard deviation of return grows. Investors are compensated for taking on this additional risk by the higher returns provided by small companies. It is important to note, however, that the risk/return profile is over the long term. If small companies did not provide higher long-term returns, investors would be more inclined to invest in the less risky stocks of large companies.

**Graph 11-10:** Capital Gains, GDP Per Capita, Earnings, and Dividends
Index (Year-End 1925 = $1.00)




Data from 1925–2013.

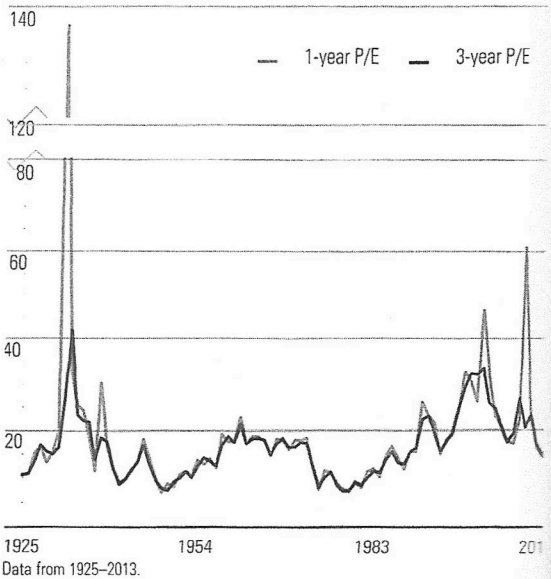
*Earnings, dividends, and capital gains are supplied by corporate productivity.* Graph 11-10 illustrates that earnings and dividends have historically grown in tandem with the overall economy (GDP per capita). However, GDP per capita did not outpace the stock market. This is primarily because the P/E ratio increased 1.87 times during the same period. So, assuming that the economy will continue to grow, all three should continue to grow as well.

***Forward-Looking Earnings Model***

Roger G. Ibbotson and Peng Chen forecast the equity risk premium through a supply side model using historical data. They utilized an earnings model as the basis for their supply side estimate. The earnings model breaks the historical equity return into four pieces, with only three historically being supplied by companies: inflation, income return, and growth in real earnings per share. The growth in the P/E ratio, the fourth piece, is a reflection of investors' changing prediction of future earnings growth. The past supply of corporate growth is forecasted to continue; however, a change in investors' predictions is not. P/E rose dramatically from 1980 through 2001 because people believed that corporate earnings were going to grow faster in the future. This growth in P/E drove a small portion of the rise in equity returns over the same period.

Graph 11-11 illustrates the price to earnings ratio from 1926 to 2013. The P/E ratio, using one-year average earnings, was 10.22 at the beginning of 1926 and ended the year 2013 at 19.11, an average increase of 0.71 percent per year. The highest P/E was 136.55 recorded in 1932, while the lowest was 7.07 recorded in 1948. Ibbotson Associates revised the calculation of the P/E ratio from a one-year to a three-year average earnings for use in equity forecasting.

**Graph 11-11:** Large Company Stocks P/E Ratio




Data from 1925–2013.

This is because reported earnings are affected not only by the long-term productivity, but also by "one-time" items that do not necessarily have the same consistent impact year after year. The three-year average is more reflective of the long-term trend than the year-by-year numbers. The P/E ratio calculated using the three-year average of earnings had an increase of 0.67 percent per year.

The historical P/E growth factor, using three-year earnings, of 0.67 percent per year is subtracted from the equity forecast, because it is not believed that P/E will continue to increase in the future. The market serves as the cue. The current P/E ratio is the market's best guess for the future of corporate earnings and there is no reason to believe, at this time, that the market will change its mind. Using this top-down approach, the geometric supply-side equity risk premium is 4.08 percent, which equates to an arithmetic supply-side equity risk premium of 6.12 percent.

Another approach in calculating the premium would be to add up the components that comprise the supply of equity return, excluding the P/E component. Thus, the supply of equity return only includes inflation, the growth in real earnings per share, and income return. The forward-looking earnings model calculates the long-term supply of U.S. equity returns to be 9.37 percent:

$$SR = [(1+CPI)\times(1+g_{REPS})-1]+Inc+Rinv$$

$$9.37\%^{*} = [(1+2.96\%)\times(1+2.07\%)-1]+4.05\%+0.22\%$$

*difference due to rounding

where:

- SR = the supply of the equity return;
- CPI = Consumer Price Index (inflation);
- $g_{REPS}$ = the growth in real earning per share;
- Inc = the income return;
- Rinv = the reinvestment return.

The equity risk premium, based on the supply-side earnings model, is calculated to be 4.11 percent on a geometric basis:

$$SERP = \frac{(1+SR)}{(1+CPI)\times(1+RRf)}-1$$

$$4.11\%^{*} = \frac{1+9.37\%}{(1+2.96\%)\times(1+2.04\%)}-1$$

*difference due to rounding

where:

- SERP = the supply-side equity risk premium;
- SR = the supply of the equity return;
- CPI = Consumer Price Index (inflation);
- RRf = the real risk-free rate.

Converting the geometric average into an arithmetic average results in an equity risk premium of 6.14 percent:

$$R_A = R_G + \frac{\sigma^2}{2}$$

$$6.14\%^{*} = 4.11\% + \frac{20.19\%^2}{2}$$

*difference due to rounding

where:

- $R_A$ = the arithmetic average;
- $R_G$ = the geometric average;
- $\sigma$ = the standard deviation of equity returns.

As mentioned earlier, one of the key findings of the Ibbotson and Chen study is that P/E increases account for only a small portion of the total return of equity. The reason we present supply-side equity risk premium going back only 25 years in Table 11-7 (see next page) is because the P/E ratio rose dramatically over this time period, which caused the growth rate in the P/E ratio calculated from 1926 to be relatively high. The subtraction of the P/E growth factor from equity returns has been responsible for the downward adjustment in the supply side equity risk premium compared to the historical estimate. Beyond the last 25 years, the growth factor in the P/E ratio has not been dramatic enough to require an adjustment.

Table 11-7 presents the supply side equity risk premium, on an arithmetic basis, beginning in 1926 and ending in each of the last 25 years.

**Table 11-7:** Supply-Side and Historical Equity Risk Premium Over Time

| Period Length (Yrs.) | Period Dates | g(P/E) | Arithmetic Average Supply Side Equity Risk Premium (%) | Arithmetic Average Historical Equity Risk Premium (%) |
|---|---|---|---|---|
| 88 | 1926–2013 | 0.67* | 6.12 | 6.96 |
| 87 | 1926–2012 | 0.46* | 6.09 | 6.70 |
| 86 | 1926–2011 | 0.40 | 6.07 | 6.62 |
| 85 | 1926–2010 | 0.59 | 5.97 | 6.72 |
| 84 | 1926–2009 | 0.94 | 5.57 | 6.67 |
| 83 | 1926–2008 | 0.79 | 5.53 | 6.47 |
| 82 | 1926–2007 | 1.15 | 5.74 | 7.06 |
| 81 | 1926–2006 | 0.75 | 6.22 | 7.13 |
| 80 | 1926–2005 | 0.65 | 6.29 | 7.08 |
| 79 | 1926–2004 | 0.83 | 6.18 | 7.17 |
| 78 | 1926–2003 | 1.09 | 5.94 | 7.19 |
| 77 | 1926–2002 | 1.17 | 5.65 | 6.97 |
| 76 | 1926–2001 | 1.53 | 5.71 | 7.43 |
| 75 | 1926–2000 | 1.49 | 6.06 | 7.76 |
| 74 | 1926–1999 | 1.52 | 6.32 | 8.07 |
| 73 | 1926–1998 | 1.40 | 6.35 | 7.97 |
| 72 | 1926–1997 | 1.20 | 6.37 | 7.77 |
| 71 | 1926–1996 | 0.87 | 6.46 | 7.50 |
| 70 | 1926–1995 | 0.74 | 6.47 | 7.37 |
| 69 | 1926–1994 | 0.59 | 6.32 | 7.04 |
| 68 | 1926–1993 | 0.90 | 6.17 | 7.22 |
| 67 | 1926–1992 | 1.15 | 5.98 | 7.29 |
| 66 | 1926–1991 | 1.12 | 6.12 | 7.39 |
| 65 | 1926–1990 | 0.67 | 6.36 | 7.16 |
| 64 | 1926–1989 | 0.60 | 6.72 | 7.45 |

Data from 1926–2013. *Contains earnings estimate(s).

### Long-Term Market Predictions

The supply side model estimates that stocks will continue to provide significant returns over the long run, averaging around 9.37 percent per year, assuming historical inflation rates. The equity risk premium, based on the top-down supply-side earnings model, is calculated to be 4.08 percent on a geometric basis and 6.12 percent on an arithmetic basis.

In the future, Ibbotson and Chen predict increased earnings growth that will offset lower dividend yields. The fact that earnings will grow as dividend payouts shrink is in line with the Miller and Modigliani Theory.

The forecasts for the market are in line with both the historical supply measures of public corporations (i.e. earnings) and overall economic productivity (GDP per capita). ■

## Endnotes

1 The standard deviation is the square root of the variance; hence the term "mean-variance" in describing this form of the optimization problem.

2 Markowitz, Harry M., Portfolio Selection: Efficient Diversification of Investments, New York: John Wiley & Sons, 1959.

3 For more information about Morningstar *EnCorr*® software, refer to the Investment Tools and Resources page at the back of this book, or within the United States, call +1 866 910-0840. Outside the United States, call +44 020 3107-0020.

4 It is also possible to conduct a simulation using entire data sets, that is, without estimating the statistical parameters of the data sets. Typically, in such a nonparametric simulation, the frequency of an event occurring in the simulated history is equal to the frequency of the event occurring in the actual history used to construct the data set.

5 The expected capital gain on a par bond is self-evidently zero. For a zero-coupon (or other discount) bond, investors expect the price to rise as the bond ages, but the expected portion of this price increase should not be considered a capital gain. It is a form of income return.

6 See Chapter 12, "Wealth Forecasting with Monte Carlo Simulation" for more information.

7 See Markowitz and Usmen [2003].

8 Ranking investment strategies by forecasted GM is sometimes described as applying the Kelly Criterion; an idea promoted by William Poundstone [2005].

9 Other researchers have also proposed using GM and CVaR as the measures or reward and risk in an efficient frontier. See for example Sheikh and Qiao, [2009].

10 "Long-Run Stock Returns: Participating in the Real Economy," Roger G. Ibbotson and Peng Chen, Financial Analysts Journal, January/February 2003.