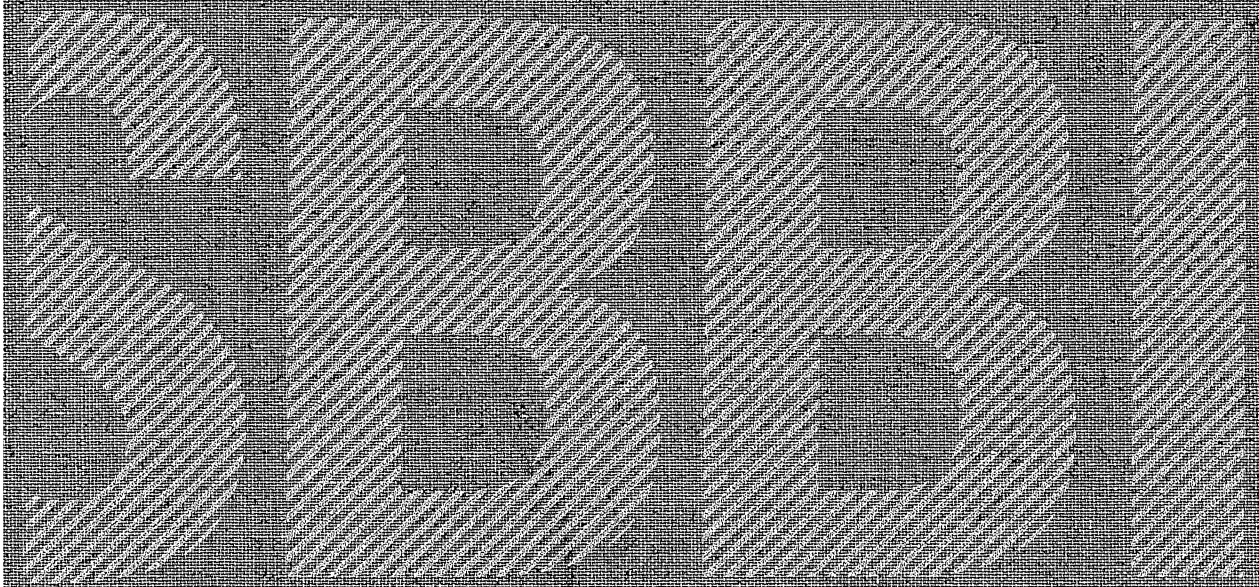
Ibbotson® SBBI®
2012 Valuation Yearbook

Market Results for
Stocks, Bonds, Bills, and Inflation
1926–2011



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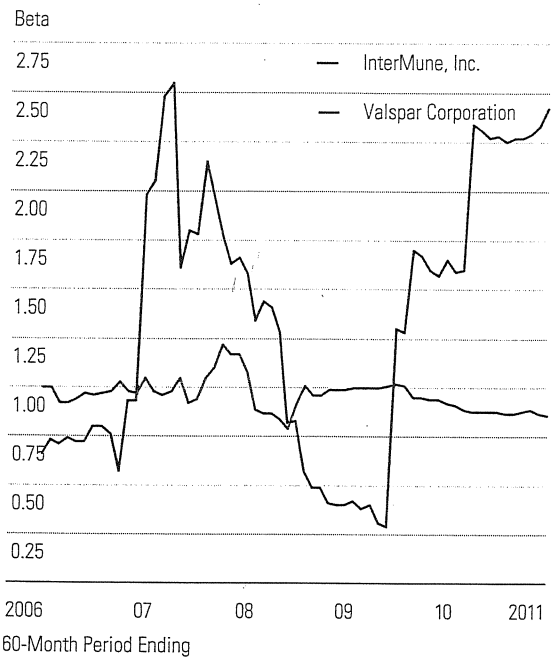
with a high standard error. An example of two companies is presented in Graph 6-3. The current beta of 0.86 for Valspar Corp. has a low standard error of 0.13. On the other hand, InterMune, Inc. has a current beta of 2.42 with a high standard error of 1.00. The chart shows the beta of each company on a rolling 60-month basis, meaning that the beta is calculated over the 60-month period October 31, 2001 through September 30, 2006, then the calculation is carried forward for each consecutive 60-month period through September 30, 2011. The betas of the company with the low standard error, Valspar Corp., exhibit remarkable stability when calculated over different time periods. On the other hand, the betas of the company with the high standard error, InterMune, Inc., display considerable variation depending on the period of the regression.

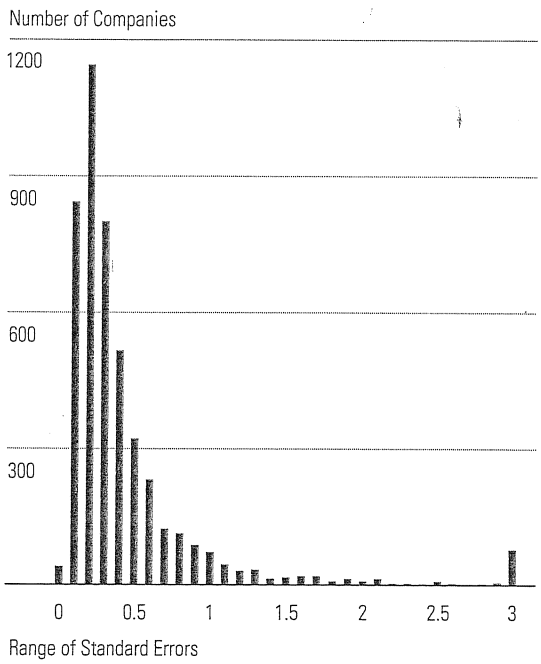
Graph 6-3: 60-Month Rolling Betas with High versus Low Standard Error



Data from October 2001–September 2011.
*Betas calculated using five years of monthly excess return data.

The standard error provides another statistical clue to help determine the reliability of the beta produced by the regression. To better illustrate the typical range of standard errors with respect to beta estimation, Graph 6-4 shows the distribution of standard error statistics across the population of companies in the *Ibbotson® Company Beta Reports*.

Graph 6-4: Standard Error Distribution



Data from October 2006–September 2011.

Beta Adjustment Methodologies

In calculating beta estimates for cost of capital projections, we are seeking a forward-looking or prospective beta. What we have measured using historical data in the beta regression is a historical beta. In this section we will examine two of the most common techniques used to adjust betas from historical to prospective or forward-looking.

Blume

One of the first academics to study whether historical betas are reliable estimates of future systematic risk was Marshall Blume.[2] What Blume found is that betas tend to revert toward their mean value, or the market beta of one. This means that high historical betas (those in excess of one) tend to over-estimate betas in future time periods, and low historical betas (those under one) tend to underestimate betas in future time periods.

Blume's analysis regressed estimates of beta in one period against estimates in the previous period. By performing this analysis over different time periods, Blume was able to develop a convergence tendency that could be measured by the following formula:

$$\beta_1 = 0.371 + 0.635\beta_0$$

where:
β_1 = prospective beta; and
β_0 = historical beta.

The formula tells us that the forecast of next year's beta is equal to 0.635 times this year's historical beta plus 0.371.

Stated another way, betas will trend toward the market average of one (the market beta) times 0.371 plus 0.635 times the historical beta.

What are the practical implications of Blume's analysis? The Blume equation has the impact of lowering high historical betas and increasing low historical betas. A historical beta of 1.40 becomes an adjusted beta of 1.26 under the Blume methodology. Similarly, a historical beta of 0.80 becomes an adjusted beta of 0.88.

In short, Blume suggests that all betas using historical regression techniques should be adjusted in this fashion. The closer a historical beta is to 1.0, the less the magnitude of the adjustment. The Blume equation is often referred to as the 1/3 + 2/3 adjustment. When simplified, the adjustment procedure takes 1/3 plus 2/3(β_0). Use of this type of adjustment procedure is common and will be discussed further in the commercial beta section.

Vasicek

Vasicek has proposed another beta adjustment technique that considers the statistical accuracy of the beta calculation.[3] The Vasicek adjustment seeks to overcome one weakness of the Blume model by not applying the same adjustment to every security; rather, a security-specific adjustment is made depending on the statistical quality of the regression.

The Vasicek adjustment process focuses on the standard error of the beta estimate—the higher the standard error, the lower the statistical significance of the beta estimate. Therefore, a company beta with a high standard error should have a greater adjustment than a company beta with a low standard error. The Vasicek formula is as follows:

$$\beta_{s1} = \frac{\sigma^2_{\beta s0}}{\sigma^2_{\beta 0} + \sigma^2_{\beta s0}}\beta_0 + \frac{\sigma^2_{\beta 0}}{\sigma^2_{\beta 0} + \sigma^2_{\beta s0}}\beta_{s0}$$

where:
β_{s1} = the Vasicek adjusted beta for security **s**;
β_{s0} = the historical beta for security **s**;
β_0 = the beta of the market, industry, or peer group;
$\sigma^2_{\beta 0}$ = the variance of betas in the market, industry, or peer group; and
$\sigma^2_{\beta s0}$ = the square of the standard error of the historical beta for security **s**.

While the Vasicek formula looks intimidating, it is really quite simple. The adjusted beta for a company is a weighted average of the company's historical beta and the beta of the market, industry, or peer group. How much weight is given to the company and historical beta depends on the statistical significance of the company beta statistic. If a company beta has a low standard error, then it will have higher weighting in the Vasicek formula. If a company beta has a high standard error, then it will have lower weighting in the Vasicek formula. In all cases, the Vasicek weights will sum to one.

An advantage of this adjustment methodology is that it does not force an adjustment to the market as a whole. Instead, the adjustment can be toward an industry or some other peer group. This is most useful in looking at companies in industries that on average have high or low betas. If evaluating the beta for a company in the petroleum refining industry, which traditionally has had betas below one, it may be more desirable to adjust the beta of that company toward the industry average rather than toward the market average of one.

Because this method varies by company and allows for adjustment toward industry averages, we have selected the Vasicek adjustment technique for our beta calculations.