

Technical Analysis of the Size Premium

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Despite the fact that small stocks have outperformed large stocks over very long periods of time, the existence of a “size premium” is widely debated in academic circles. Small stocks (micro-cap) have outperformed their larger counterparts by an average of 5.4% over the last 75 years. It is widely acknowledged that smaller stocks, on average, have higher returns when measured over long periods of time. Many argue, however, that the outperformance of small stocks is a thing of the past, and when measured over the last twenty years or so excess returns diminish. This article explores two primary methods for calculating the size effect, the small stock premium and the size premium, and their impact on equity forecasting and business valuation.

How Small is Small?

Equities widely varying in size often get grouped together as “small” stocks. But, what is the accepted definition of small? One way to define small stocks is to sort companies by size (in terms of market capitalization) and split the group in half, resulting in two equal sets, “large” and “small.” A better method to determine size is to divide companies into deciles, as done so by the Center for Research in Security Prices (CRSP). Researchers at PricewaterhouseCoopers take it one step further and divide stocks into twenty-five size groupings. Regardless of how many size baskets stocks are broken into for analysis of the size effect, the most common measure for ranking companies into these categories is by market capitalization (stock price multiplied by shares outstanding).

Most of the analysis to follow will focus on the work done by Ibbotson Associates (IA). The value-weighted decile portfolios created by CRSP using stocks traded on the New York Stock Exchange, American Stock Exchange, and the Nasdaq National Market (NYSE/AMEX/NASDAQ) will define the size groupings for this analysis. Although the size effect is observed in all but the first decile (largest companies), only micro-cap stocks, comprising the bottom quintile of capitalization (deciles 9-10) on the NYSE/AMEX/NASDAQ benchmark, are considered “small” in the scope of this analysis.

Comparing the Small Stock Premium and Size Premium

As already mentioned, “small stock premium” and “size premium” are terms used to describe the size effect, but each has a different approach, assumptions, and applications in the market. There is much confusion surrounding these terms due in no small part to the fact that Ibbotson Associates reports both in its popular *Stocks, Bonds, Bills, and Inflation Yearbook (SBBI)*. The reason for this is due to the different markets for which the yearbook is used.

The small stock premium, for example, is meant for use by security analysts in constructing an expected return for a small stock benchmark when forecasting (an input to mean variance optimization). The small stock premium printed in the *SBBI Yearbook* measures the difference in long-term arithmetic averages between the S&P 500 and Small Stocks (the IA Small Stock series is represented by deciles 9-10 of the NYSE from 1926-1981 and the DFA Small Company Fund

thereafter). The small stock premium reported in the *SBBI 2001 Yearbook* is 4.3%, measured over the period 1926-2000.

The size premium, on the other hand, is intended for use in the construction of a forward-looking cost of equity estimate appropriate for discounting future cash flows. Size premia are presented in the *SBBI Yearbook* and *SBBI Valuation Edition Yearbook* for each of ten deciles. This measure of the size effect is considerably more complex than that of the small stock premium, and utilizes the capital asset pricing model (CAPM) as its basis for calculation. The CAPM is used to determine what the expected return of a decile should be given the decile's beta and equity risk premium of the market. Small size-decile portfolios have higher betas and the return above what these higher betas predict is called the size premium. It is important to note that the type of size premium calculated in excess of CAPM is one that has been adjusted for beta.

Table 1: Calculation of a Beta-adjusted Size Premium

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)
Micro-Cap, 9-10	1.36	18.41%	13.18%	10.56%	2.62%

Table 2: Calculation of a Small Stock Premium

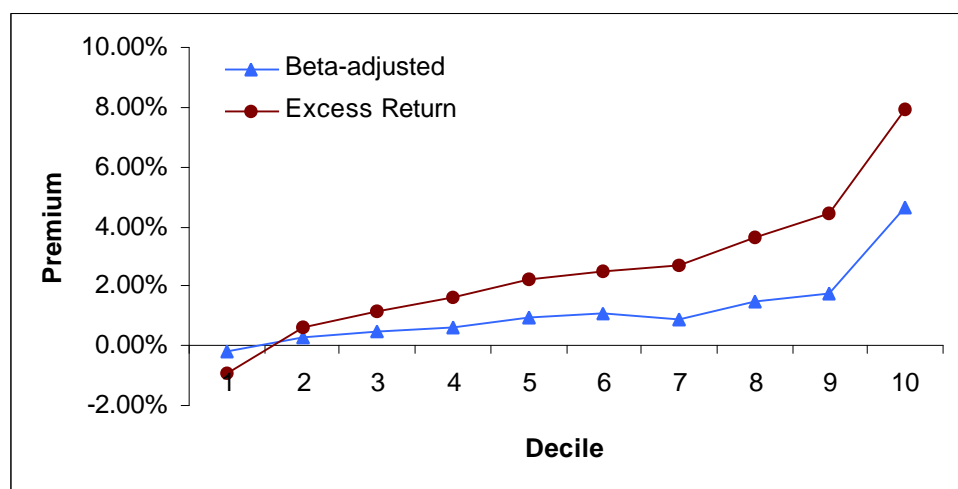
Decile	Small Stock Return	Large Stock Return	Small Stock Premium
Micro-Cap, 9-10	18.41%	12.98	5.43%

Table 1 illustrates how the size premium is calculated for Micro-Cap stocks (deciles 9-10 of the NYSE/AMEX/NASDAQ). All data presented in this table uses the longest possible historical range Ibbotson Associates provides data for, 1926-2000. (1) Beta is estimated using monthly total returns of micro-cap stocks in excess of the 30-day U.S. Treasury bill versus the S&P 500 in excess of the 30-day U.S. Treasury bill. (2) Arithmetic Mean Return measures the achieved performance of micro-cap stocks using annual returns from 1926-2000. (3) The next column simply subtracts the 75-year income return on 20-year government bonds (5.22%) from the achieved return in the previous column. (4) CAPM Return in Excess of Riskless Rate is calculated by multiplying the beta from step 1 with the long-horizon equity risk premium (7.76%). This is the predicted return in excess of the riskless rate given the level of systematic risk for micro-cap stocks. (5) The final step is to subtract the predicted return in step 4 from the actual return in step 3 resulting in the size premium (return in excess of CAPM). In stepping through the example above, please note that each component has been rounded for presentation and may not add up perfectly.

From the *SBBI 2001 Yearbook*, the small stock premium is approximately 4.3% while the size premium, adjusted for beta, is only 2.6%. This is not a fair comparison, though, because the basket of stocks used in both methods is different. Table 2 demonstrates that even using the same

basket of 9-10 decile NYSE/AMEX/NASDAQ stocks from CRSP as the small stock benchmark, the small stock premium would be 5.4%. The large difference in results is attributed to the beta adjustment of the size premium. The portion of return due to systematic risk of similar size companies is being removed from the premium. Removing the return stemming from beta enables us to isolate the return due solely to size, not making any assumptions about the riskiness of a company because the systematic risk has been factored out. This provides a measure of size that can be added to either a CAPM or buildup method cost of equity estimate. The risk that has been removed from the size premium still needs to be accounted for, but in another part of the model: the CAPM will account for risk through the use of beta, while the buildup method will adjust for risk through the company-specific risk premium.

The calculation of a beta-adjusted size premium and an excess return small stock premium can be compared across all 10 deciles. As illustrated in Graph 1, the simple excess return method used in the small stock premium calculation yields higher premia across all but the first decile. The excess return premia were calculated in Graph 1 by subtracting the annual total return of the S&P 500 from the annual total return of each decile grouping of NYSE/AMEX/NASDAQ stocks. Compare this with the beta-adjusted premia derived using the size premium in excess of CAPM method. In equity forecasting on an asset class level it may be more appropriate to use the excess return small stock method, but in business valuation the beta-adjusted method is most relevant and still allows for other risk premia to be added in.



Graph 1: Size Effect Comparison (1926-2000)

Application to Business Valuation

A beta-adjusted size premium is appropriate for application in business valuation because it accounts for return due to size and reduces the possibility of double counting risk factors (other premia). After removing the return due to systematic risk (beta), return from risk must be added back to the model in the form of industry and/or company-specific risk premia. Should the small stock premium calculation be used instead, a company-specific risk premium cannot be added without the risk of double counting.

The small stock premium simply measures the excess return of small over large stocks. Included in that premium are all types of factors contributing to the overall return of small stocks. This makes for a good proxy of small stocks as a whole; however, in business valuation the main concern is applying this knowledge to a subject company when developing a very specific estimate for the firm's cost of equity. Should the valuation practitioner desire to add a company-specific premium, there is a risk of double counting if used in conjunction with a small stock premium. While it is possible to use the small stock premium and company-specific premium together, the excess return represented by the small stock premium comes from sources that are not easily identifiable. It is, therefore, extremely difficult to determine whether or not double counting has occurred. By creating a cost of equity estimate that uses a beta-adjusted size premium, there is less risk of double counting when adding a company-specific premium.

Summary

Determining the appropriate method for calculating return due to size has been a topic of debate for some time. There are two primary ways to measure a premium for size: the small stock premium and the size premium. The small stock premium calculates the arithmetic difference between small and large stocks, while the size premium is a process that removes the return due to beta and isolates the return attributable solely to size. The size premium is more appropriate for cost of equity estimation as it is designed to reduce the risk of double counting when adding other premia (such as a company-specific premium).

Ibbotson Associates is the primary provider of data for both the size premium and small stock premium through its *SBBI (Classic and Valuation Edition) Yearbooks*. Part of the confusion surrounding the appropriate method for calculating the size effect is the fact that Ibbotson provides both calculations in the yearbooks. Furthermore, those subscribers who do not purchase the yearbooks annually, may find that they are not caught up with the changes in methodology that have been implemented over the years. Prior to 1995, the *SBBI Yearbook* reported the small stock premium as the only measure of the size effect. From 1995 through present, *SBBI* has presented the beta-adjusted size premium as a superior method for calculating the size effect for use in business valuation. Understanding the calculation of both methods is necessary whether creating inputs used in forecasting or in valuing a company.