I have been involved with the Ibbotson yearbooks in a variety of capacities since 2000, and one constant is that I continue to get asked for guidance on how to use the size premium published in the Ibbotson SBBI Valuation Yearbook. Morningstar publishes a comprehensive range of cost of capital statistics for use in the buildup method and capital asset pricing model (CAPM), so that valuators can use their own expertise in choosing the right measures of risk premia, date ranges, and other adjustments to their model. That said, a little guidance never hurt, right?

For all of you who have been spending long nights toiling over the decision to choose micro-cap, 10th decile, 10a, or 10b size premia, this article is for you (that, and some sleep). I would also like to address the folks who have shut down their capacity to choose between overlapping data options, preferring to be told by publishers like Morningstar exactly how they should be constructing their valuation models. The profession of business valuation is both art and science. Accumulated expertise is what balances the art and science. Ayn Rand said man’s most important attribute is “his reasoning mind.” This article is about applying our reasoning minds in constructing our valuation models.

The application of different size premia is widely debated and often contested in litigation. I will outline a process for helping valuation professionals choose between overlapping size premium categories.

SIZE PREMIA

I think Morningstar (and previously Ibbotson Associates) has been clear that our beta-adjusted size premia are intended for use in either the buildup or CAPM models. The beta-adjusted size premium calculation is our purest methodology for isolating firm return that is solely due to size. In other words, we are measuring the return that is attributable to firm size which cannot be explained by other systematic factors. This is far superior to the simple “small stock premium,” which simply measures the excess return of small stocks over large stocks.¹

Morningstar believes that our size premium methodology is an elegant extension of the CAPM because it allows us to treat other risk factors that would influence a firm’s cost of equity in other parts of the model without concern for double-counting them. Another such risk factor is industry risk, which can be addressed for a buildup method in the form of a published industry premium from Morningstar or in an artful application by the practitioner. For a CAPM, the industry risk can be addressed in one of the following ways:

1. Use a peer group/industry Beta from Morningstar Cost of Capital Yearbook, ValuSource, and Value Line.
2. Combine individual company Betas from any number of sources (including Bloomberg, S&P Compustat, Value Line, Morningstar.com, and Yahoo! Finance).
3. Manually combine peer firm returns into a blended index that is regressed against a market benchmark.

While we are only addressing size adjustments in this article, a proper cost of capital estimate requires as much attention on the equity risk premium, riskless rate, industry adjustment, and company-specific factors. Whether we are talking about size premium or other component parts to the cost of capital, the metrics that are the cleanest to apply are ones that measure only what they are intended to, and pose as little risk of double-counting other factors as possible.

OVERLAPPING CATEGORIES

The meat and potatoes of this article is a discussion of how to use the various

size premium metrics that Morningstar provides when size-based category breakpoints overlap. For example, we have the choices for a small firm valuation shown in Table 1.

What to do with all those choices? If I have a small firm with an estimated equity value of $120 million, I could choose among the micro-cap, 10th decile, or 10b category for my size premium. The range of size premium for this one firm would be between 3.74 and 9.53 percent. This range would have a tremendous effect on the firm’s enterprise value.

There are two decision paths I see folks take when making this choice. The dark and scary path is where practitioners choose the size premium that achieves the self-serving goal of influencing the enterprise value in the direction most desired. In many cases this leads them to choose the highest size premium number (9.53 percent in the data above), because this will lead to the lowest enterprise value for tax purposes, marital dissolution, acquisition valuation, etc. The path of enlightenment, on the other hand, is when practitioners choose the size premium that is most statistically relevant for their application.

**PATH OF ENLIGHTENMENT**

There are two primary factors in determining which size premium to use. First, identify how close to a size category boundary your subject company falls. Second, determine how confident you are in your estimate of equity value. With this information, you can make the right choice. That’s all there is to it.

Not following yet? Let’s take it a step further. In the example above, where we have a firm estimated at $120 million of equity, this is close to the top breakpoint of the 10b category, toward the middle of the 10th decile, and toward the bottom of the micro-cap. There are always going to be more companies included in the micro-cap than in the 10th decile, and more companies in the 10th decile than in the 10b category. More companies are usually better, since that means more statistical significance in the data. However, once we get to a large enough number of companies, more data doesn’t necessarily add much significance. The 10th decile was as small as 49 companies, back in March of 1926. This is still significant. While Morningstar doesn’t publish the split between historical number of companies in 10a and 10b, it is fair to say that it is approximately half of what it was back in the 1920s (since our breakpoint definition comes from the Center for Research in Security Prices at the University of Chicago’s Graduate School of Business, which would have used only NYSE stocks to split back in the 1920s).

Are 25 companies too few? I might be concerned if we were only using data from the 1920s, but after that it really picks up and we add a tremendous amount of firm data to even the smallest breakpoint we publish.2

Since the number of companies in the data set is not a determining factor, we should pick the most “conservative” category that has the most “relevance” for

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2 See Table 7–8 of the 2009 Ibbotson SBBI Valuation Yearbook.
our subject firm. In this case, it is clearly the 10th decile. We need to balance the confidence that our subject firm actually falls within a particular size category with the need to tailor that size grouping as tightly as possible to make the peers relevant to our analysis. The micro-cap category is too broad for this case, since our $120 million subject firm would fall in the lower range of the category; and the 10b is too narrow, since our subject company would barely squeeze in under the top breakpoint before sliding into 10a. We can say with confidence that the 10th decile puts our $120 million company among the most peers of similar size.

Graph 1 (page 16) shows each size premium category. The peak of each premium is the number of companies in the category, and the range spreads down from the peak to the x-axis where the outer limits are the market value breakpoints for the category. For example, 10b (the smallest category) has 1,182 companies ranging from approximately $2 to $136 million in market value. This is a conceptual illustration that shows how practitioners can think about assigning a size category to their subject company. In our $120 million example, it is clear that we can squeeze into the upper end of 10b (along the x-axis), but decile 10 is much more relevant because its midpoint between upper and lower bounds hovers around the low $100 million range. Focusing as close to the center of the size grouping as possible suggests that your subject company falls nicely within the range of peers that make up its size premium estimate.

Now let’s examine the issue of confidence in our estimate of equity value. Where did that $120 million estimate come from, anyway? Some practitioners make their initial estimate of equity value based on fundamentals, past transactions, or market comparables. The truth is that equity value is what we are trying to solve for, not what we start with. In the example above, let’s say we started with a price/earnings ratio of 20 from the subject company’s peer group (from the Morningstar Cost of Capital Yearbook) and combined that with the subject company’s $6 million in earnings, to arrive at a $120 million estimate of “price,” or equity value:

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\begin{align*}
\text{Price subject company} = \text{$6 million} & = 20 \\
\text{Price} = 20 \times \$6 \text{ million} \\
\text{Price} = \$120 \text{ million}
\end{align*}
\]

That’s great, but it is only one measure, and it is based on public companies, which my hypothetical subject company is not. Therefore, I am not that confident in my $120 million estimate, and I shouldn’t contend that my estimate is precise when I apply it to the size premium breakpoints. In other words, my firm could just as easily be worth $140 million as it is $120 million, which would bump it out of the 10b size category into 10a. This is a big reason why the 10th decile is the best category, and how “confidence” in bucketing plays a role in choosing the appropriate size premium.

Of course we shouldn’t just use one approximation of equity value to bucket into a size category. The more comparables and fundamentals you can use, the better. Then you should have a scattering of equity estimates. Let’s say we followed this exercise and found that our estimates for a firm’s equity value were $60 million, $120 million, and $180 million. The average is $120 million, but as you can see once again, the 10th decile, which ranges from around $2 million to $218 million, is still the best choice to provide relevant peer companies of similar size.

DEFINITIONS OF SIZE

All of this suggests the question: Is “price” (or market capitalization) the best measure of size for determining size premium? Ask yourself this: How big is a company? If I told you that a firm had net income of $15 million, would that inform you as to its size? What if I told you that a firm had 25 employees, is that clear enough? Net income doesn’t help because companies of all sizes produce a wide range of income. A firm like Yahoo has a market cap of more than $23 billion, yet it had net income of only $15 million. When Citigroup or Time Warner have negative net income, they shouldn’t then be classified as small companies. The advertising agency Bark Group has only 25 employees, but its market capitalization of equity is over $21 billion. There may be statistical relationships between a wide range of factors and firm size, but market capitalization is still the most relevant.

Even with market capitalization representing the most relevant measure of size, we still must acknowledge the bias introduced in first having to estimate size in order to establish a size premium category, ultimately resulting in a firm value that defines “size.” The logic is circular. For those of you interested in factors other than market capitalization, the Duff & Phelps Risk Premium Report (D&P Report) provides seven alternative measures of size. The D&P Report also provides regression statistics for people who choose to extrapolate the findings to companies significantly smaller than the smallest size grouping presented.

THE IMPACT OF DISTRESS

To date, the D&P Report has been the primary source for size-based risk premium data that segregates financially distressed companies into a separate bucket, leaving only healthy companies in the standard results. It may not surprise you that high financial risk companies represented over 25 percent of the data set in recent years of
the D&P Report (though this number was historically much lower).

Morningstar has spent a good part of 2009 evaluating predictive ability to measure financial distress, and we found that standard measures can be improved. In the October 2009 issue of Business Valuation Update, Warren Miller and James Harrington’s article “A Timely New Study on Bankruptcy Prediction Models from Morningstar” compares the Altman Z-Score to a newer model called Distance-to-Default. The results showed that the Distance-to-Default model outperformed the Z-Score, providing us a better predictive measure of default.

While the D&P Report is based on the Z-Score for segregating high financial risk companies from the data, the Morningstar yearbooks have never separated the distressed firms from the healthy ones. The main reason why Morningstar has not separated the financially distressed companies from the rest is that we were looking for a better predictor of financial distress than Z-Score provided. We found this in the Distance-to-Default model. We then asked the Center for Research in Security Prices to apply the Distance-to-Default methodology to historical data going back to the 1960s so we could evaluate whether there was merit in segmenting the distressed firms from the healthy ones. Healthy and distressed portfolios were created across all standard Morningstar size categories. The results showed that the distressed portfolios underperformed the healthy portfolios across all size categories. We then applied this data to create beta-adjusted size premia, resulting in lower size premia for the distressed firms. This would lead to higher firm values for distressed companies when this data is applied to a discounted cash flow model.

Since we found that distressed firms have historically performed poorly, and investors were not compensated with extra return for the extra risk they took on, we are uncomfortable applying this data to a forward-looking cost of capital model at this time.

Why doesn’t Morningstar pull out the financially distressed firms from our cost of capital data? Traditional default prediction models like Z-Score don’t work as well as newer models like Distance-to-Default, and when we do apply newer models to the historical data, we find the results contradict the risk-return tradeoff. D&P segregates high financial risk companies from their data because they believe, as many would expect, that highly leveraged, financially distressed firms have higher returns than their counterparts. In the analysis we performed with the invaluable assistance from the Center for Research in Security Prices, we have found the opposite to be the case. As Miller and Harrington concluded in their 2009 article:

When valuing a business as a going concern, a firm is assumed to continue operations into the indefinite future. Does this mean that you need to remove distressed companies from public company risk premiums when applying the latter to the valuation of healthy, going concern private entities? It does not. Although the firm is presumed to be a going concern, predictive ability is never 100 percent. Applying risk premium data based on a portfolio of primarily healthy companies with a small slice of potentially distressed companies acknowledges the less-than-100 percent chance that a subject firm will be perfectly healthy for the indefinite future.

FINER CATEGORIES

The relationship between firm size and return continues to be an area that receives a good deal of attention. For practitioners who value very small companies and might feel that size premia categorization is easy, Morningstar is about to stir the pot again. New analysis of the smallest companies now allows us to dissect the size premium into further categories (cutting 10a and 10b each in half), providing even more choices for the seasoned valuation professional.

Firms like Morningstar, Duff & Phelps, and others publish a wealth of data on cost of capital so that practitioners have the resources to find their own solutions based on their knowledge and experience. We could simplify what is presented and give only one option for each scenario you might encounter, but that assumes that business valuation is a pure science. There is still a place for interpretation of information in this field. Data providers hope to provide business valuation practitioners with the data and tools needed to form intelligent cost of capital estimates. In this article I offered guidance in regard to the use of overlapping size premium categories. Having choices is something to value, not fear. Enjoy your freedom.