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What Do the Ibbottson Historical Studies Really Prove about Firm Size, Risk and Return?

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What Do the Ibbotson Historical Studies Really Prove about Firm Size, Risk and Return?

By Michael Sack Elmaleh, CPA, CVA, MS, MA

Contrary to widely held opinion, I do not believe that the Ibbotson historical studies of publicly traded equities prove that the greater rates of return achieved by smaller firms are caused by their greater level of risk.

The Ibbotson studies do show two things. First, over long periods of time small and mid capitalization companies generate higher rates of return than larger cap companies. Second, the standard deviations on average rates of return and the computed betas of smaller and mid cap companies are greater than larger cap companies.

However, in order to conclude that these historical findings prove that the publicly traded equity markets reward the bearing of risk two further propositions need to be proven:

1. The standard deviations on rates of return and computed betas are reasonable measures of the risk associated with different sized firms.
2. Differences in the inferred levels of risk causally determine the observed differences in rates of return.

As I will show here, neither of these propositions is proven by the Ibbotson studies.

Are the Higher Historical Standard Deviations for Small and Mid Cap Firms an Indicator of Greater Risk?

At an intuitive level we associate risk with volatility. The higher the volatility, the higher the risk. The standard deviation, a measure of volatility, thus seems like a plausible measure of risk.

The potential problem with utilizing the standard deviation as a differential indicator of risk is that this measure is sensitive to the frequency of observations used in determining it. It is an established statistical principle that the greater the number of observations that go into computing the standard deviation, the lower the standard deviation, all other things being equal. Conversely, a smaller number of measures will lead to higher standard deviations, again all other things being equal.

The number of times a share trades is equivalent to the number of measurements of rate of return. Since larger cap firms are traded more frequently than mid and smaller sized firms, the reported differences in standard deviations may be the result of differences in the frequency that equities are traded, rather than an indication of inherent differences in volatility or risk.

In fact standard deviations are not generally used as a direct measure of risk in modern portfolio theory. Modern portfolio theory utilizes the beta measurement to assess what it calls systematic risk.
What Do the Betas Tell Us about Risk?

The Ibbotson data show that beta measures increase as firm size decreases. While there are different ways of computing the beta the basic idea is that the measure tracks the rate of return of a specific firm’s equity relative to the rate of return of the entire equity market. Beta measures systematic risk.

Systematic risk is what modern portfolio theories such as Capital Asset Pricing Model (CAPM) believe is a key variable in explaining the movement of equity prices. The theory holds that there is an average rate of return for all equities and that specific equities are either riskier or less risky than the market taken as a whole. Under the theory, equities that are riskier than the market as a whole will rise more rapidly when the market rises and fall more dramatically when it falls. Equities that are less risky will rise and fall less than the market as a whole.

A beta measure of 1 indicates that an equity is as risky as the market as a whole. A beta of greater than 1 indicates that the equity is riskier than the market. A beta of less than 1 indicates that the equity is less risky than the market.

The problem with the beta measure is that, in the jargon of philosophy of science, it is theory laden. This means that what you think you are measuring depends upon your underlying theory of how the market operates. To adherents of CAPM, beta measures systematic risk because they say it does, not necessarily because it actually does.

There is no direct evidence that betas actually measure what the theory calls systematic risk. In fact there is no direct evidence that there is any such thing as systematic risk. Betas may just be measuring random noise. Or betas might represent something altogether different than systematic risk.

Are Historically Higher Rates of Return for Smaller Caps the Result of Factors Other Than Risk Differentials?

Users of regression analysis are often warned that correlation is not causation. This admonition is particularly relevant to the analysis of the Ibbotson data. Even if we grant that standard deviations and betas are in fact good measures of systematic risk, the correlation between risk, size and above average rates of return does not prove that the increased rate of return associated with small and mid cap equities is caused by their increased level of risk.

It is possible that there is no causal link between risk and return in the equity market. The correlation may very well be spurious. Alternatively the correlation between firm size and rate of return may be caused by factors other than simple differences in the levels of systematic risk. Let me suggest an alternative explanation as to why small and mid cap returns have achieved higher rates of return than large caps.

Consider the efficient market hypothesis. This theory holds that prices for publicly traded stocks reflect all information relevant to a particular stock at a particular time. According to the theory, information relevant to prices of equities in security markets is so rapidly and efficiently transmitted no one group of investors generally gets a leg up on any other investors. This view explains why it is so hard for any investor to consistently outperform the overall market for any extended period of time.

The efficient market hypothesis generally is applied to the market as a whole, and not specific segments of the market. But what if there were different levels of efficiency in different segments of the market? What if the efficiency of information transfer is related to how widely and frequently the shares were traded? Clearly the more broadly traded large cap stocks receive more attention from stock analysts...
than mid and small cap stocks. Could this differential in attention allow for greater rates of return in smaller and mid cap as opposed to large caps?

**So Who Is Right?**

My explanation as to why small and mid caps have realized greater rates of return than large caps seems as plausible an explanation as the standard one that says larger returns are due to differentials in risk. But the ultimate test of a good model is not how plausible it seems. Nor is it how robust the historical correlations are between the variables in the model. Correlations can be spurious and misleading, or they may be the result of variables not identified in the model. The one scientific way to determine if a model tells us something about the world is to determine if it can generate reliable predictions.

CAPM and its variants claim that price movements reflect expected future income and systematic risk. If this is true then we ought to be able to reliably predict the price movements of publicly traded equities because according to the theory we can measure systematic risk and estimate future cash flows.

To my knowledge no one has been able to reliably and consistently predict the price movements of publicly traded equities utilizing CAPM or Ibbotson Build Up or any other variant of the risk/return model. As far as I know these models cannot be reliably used to predict share prices one year, one month, one week or even one day into the future. In fact I do not think that these models can even reliably predict the direction of price movements.

Of course I could be wrong. Someone may have in fact used some variant of the risk/return models to accurately predict the movement of publicly traded equities. If so would that billionaire please identify him or herself?

The reason why risk/return models cannot accurately predict the price movement of publicly traded equities is that, at best, they are egregious oversimplifications of how real world investment decisions are made. Perceived or actual levels of risk are not the fundamental or sole determinant of the prices investors are willing to pay for equity investments.

**Why All This Matters To Valuators of Closely Held Companies**

The income method of valuation is based upon the risk/return model for publicly traded companies. Generally much more reliable information is available about publicly traded companies than closely held ones. Financial statements of publicly traded companies are always audited. Privately held companies financial statements often are not audited.

Often projections of future income are made by publicly traded firms themselves or by highly paid “independent” analysts who closely follow the fortunes of these companies. Occasionally these projections, in the near term, actually turn out to be accurate. Rarely do closely held companies make forecasts of future income that are vetted by independent analysts.

Beta measurements of specific publicly traded equity are widely available. While I think it is less than clear that these measures represent the systematic risk that portfolio theorists claim they do, these measures objectively measure *something*. Objective measurement of the risk associated with the equity of closely held companies is far more problematic.

Let me finish by asking the valuation community this question. If the risk/return model cannot accurately predict the price movement of publicly traded equities, where the ability to measure risk and future income is relatively good, why would you expect the model to yield accurate predictions about the price of closely held equities, where the ability to measure risk and future income is generally much worse? ■

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