Portfolio123 Virtual Strategy Design Class
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Supplement 1 – Cost of Capital; (1) Intro and Challenges

Here's an introduction to cost of capital, or WACC (weighted average cost of capital). By itself, it's not a vital factor. But it is an essential part of other things that can be very valuable.

There isn't any hard and fast answer to WACC. But I can offer some things that will get you going with strategies that require you to input a cost-of-capital assumption.

The Basic Definition

First, here's the basic definition, and it really is quite sensible: We combine the cost of debt, the cost of preferred equity and the cost of common equity by weighting these items in accordance with the percent of each capital type in company's capital structure. If cost of debt is 6% and cost of common is 10% and the company's cap structure is 35% debt and 65% equity, then its WACC is 8.6%; based on (.35*.06)+(.65*.1).

Be aware that you don't use WACC every time you need to discount some sort of cash stream. WACC is the cost of all capital components combined. Sometimes you'll use that. And sometimes, you'll confine yourself to Cost of Equity. The choice depends of the relationship between the cash stream whose value you need to discount and the capital associated with that cash flow. I won't go further with this item now but will address it as needed in connection with subsequent topics; in each case I'll say whether we should use WACC or COE and explain the reason for the choice.

As to WACC, you may at first glance suppose cost of debt is easy but that it's cost of equity that forces us to work up a sweat. Believe it or not, however, you can't even rest easy with cost of debt.

Practical Problems Computing Cost of Debt

You'd think all you need to do is divide interest by debt. We can do that. We have interest. We have debt. And we have the data we'd need to use an average rather than period-end debt figure, and we can adjust for tax deductibility of interest. What we can't do, however, is keep up with a lot of incredibly oddball things that can come up in financial statements. Some of the bizarre raw cost-of-debt percentages we see stem from the mismatch between interest expense (a running tally over a period of time) and debt (a snapshot of just one point in time, a snapshot that may or may not be distorted by averaging). For example, if a company retires a lot of its debt just before the end of the 12 month period at which you're looking, dividing interest by either the period-end or even average is likely to produce an unreasonably high cost of debt calculation. The reverse would be an issue if the company issues a lot of date very late in an accounting period.

But wait. It gets worse. I truly believe that 600-700 years from now, people will look back even at today's elite databases and say "Oh, how quaint. Thank goodness we don't still do that!" Think of it the way we react to a Guttenberg printing press. One of the shortcomings of data is that it can't keep up with the sometimes mind-blowing varieties of ways accountants and financial officers can record debt costs. Consider, for example, Madison Square Garden (MSG). The Knicks players' understanding of the triangle offense, however bad it may be, is light years ahead of data providers' abilities to cope with a balance sheet that reports zero debt combined with an income statement that regularly reports significant interest expense. Have fun in the footnotes! For a combination of reasons, there are many instances in which a seemingly simple cost-of-debt formula will produce patently ridiculous results.

Practical Problems Computing Cost of Preferred Equity

Cost of preferred is subject to pretty much the same problems as we see with cost of debt, except in cost of preferred, we can also have fun debates over whether preferred should be stated at face or liquidating value (well, maybe not as much fun as other things we might come up with, but fun nonetheless).

Practical Problems Computing Cost of Common Equity

Cost of equity . . . oy vey. Frankly, this is at best a theoretical number that doesn't really exist in a tangible way. The only hard-and-fast equity cost we can identify is dividend, but looking at the world, we know this is far short of the full amount. Many stocks have zero yields and many others have yields below the rate available on risk-free investments, a senseless situation since we should always expect a more risky investment to involve a higher cost of capital than a lower- or zero-risk situation. But we're not really sure what we should add to dividend yield. Some try adding the dividend growth rate. That's hard for non-dividend payers and if you try it and look at results, you're not likely to be impressed. Some may flip P/E upside down and look at earnings yield, or even earnings yield plus dividend yield. That sounds really good. But try it out. You'll see an uncomfortably large number of hard-to-swallow results, probably because P/E (and, hence earnings yield) can be far bouncier than what we'd expect from a cost of capital.

So then, we have the famous capital asset pricing model (CAPM). As those who've studied finance know and as others can learn by Googling, it equates cost of on equity (which is labeled "required return") as RF + (B*(RM-RF)).

Risk Free Rate

RF is the risk-free rate of return; we use a treasury rate. Many pick the shortest term rate they can find, but you can make a good case for picking a term that matches the expected time horizon of the investment. There is no hard and fast rule. For us on P123, the 10-yeart treasury rate, Close(0,#TNX)/10, is fine. By the way, notice that you divide Close(0,#tnx) by 10 to get the number down to a ratio of 100; the database we use for this item reports it in units of 1000, based on the face value of the standard fixed-income instrument. So far, so good. This is fine for RF.

Equity Risk Premium

RM-RF means return on the market minus the risk free rate. We can shorten it simply by calling it a risk premium (RP), which is the extra return capital contributors demand as compensation for the risk of by passing treasuries and investing in risky equities. At this point, we're talking about the equity market as a whole; the asset class.

We multiply RP (or RM=RF if you prefer) by B, beta. That's the measure of company-specific risk we know and love (sort of). A beta of 1.00 means the stock is exactly as risky as the equity market as a whole, so the equity risk premium for this stock is exactly equal to that of the market. A beta of 1.35 means the stock is 35% more volatile than the market so the equity risk premium for this stock is 35% greater than that of the general equity market. And of course it works the same way for betas below 1.00. A stock with a beta of 0.92 is deemed less (only 92%) volatile than the overall equity market and worthy of a risk premium that is 92% as great.

On paper, that nails it. (This is a Nobel Prize winning model that is a major contributor to financial knowledge, although not necessarily day-to-day WACC computations!) Implementation, however, can be messy.

What's RP? Damned if I know. One thing I'm absolutely sure of is that you can't simply tally it based on historical data. If we do that, we'll wind up every now and then with absurdly high numbers if the sample period covers significant bull moves, and possibly negative numbers. Cost of equity cannot be negative, not ever!!!!! I really can't give you any definitive number for RP. And it's not just me. That's even so for a guy named Ibbotson, who built a significant research company based on efforts to analyze risk premiums. He likewise can't produce a definitive number, but at least he hit a personal financial jackpot when he sold his firm to Morninstar! So what do we do? We trot out the "h word;" heuristics. Just pick a number in the 4%-5% range. That's generally accepted as a good sensible estimate (but please, please, please don't ask me to derive it!).

OK. We're getting there. We can use P123 to give us a reasonable risk free rate. And we can simply plug in what is at least a well-accepted proxy for RP. We're two thirds of the way home. And it gets even better – the last item we need, beta, is available right here on P123! Or is it . . . .

Beta

Do you notice how, nowadays, P123 no longer gives you a single beta number. We make you choose between Beta3Y (a beta calculated with reference to three year's worth of data), Beta5Y (a beta calculated with reference to five year's worth of data, or BetaFunc, a function that gives you more flexibility in determining how to calculate beta. We used to give you a single Beta number and you can still get it among our "deprecated" items. But consider the implication of our having abandoned the single figure and provided flexibility.

Beta is calculated on the basis of historical relationships (observed volatilities) between the market and a stock. What's the correct periodicity (monthly returns? daily returns?)? What's the correct sample period? Like beauty, beta is in the eye of the beholder. That wouldn't necessarily be a problem if it measured what a casual observer might want to think it measures: something inherent in the stock that gives rise to a certain level of volatility relative to the market. Such a metric ought to be tolerably stable; not necessarily fixed for all time, but something that changes in a manner that's reasonably related to changes in the company itself. In truth, however, Beta is none of those things. Beta is nothing more than a report card; a tally of what a stock did relative to the market over a chosen period of time. Given the way stocks and markets move, sometimes this is consistent with the sort of sensible fundamental characteristics that would seem relevant to cost of equity, and sometimes inconsistent with anything that anyone might accept as reasonably related to anything. Do your own survey of betas across a wide swath of companies. See how many of them appear ridiculous. It's not you. It's beta, which is simply a naïve report card that may or may not have any relationship to actual risk. Horrifyingly risky companies can have low, or even negative betas if the measurement period includes a time frame when the stock was uncharacteristically stable, or even worse, a period in which it displayed frightening volatility but in a direction opposite that of the market (a phenomenon that will generate very low or negative betas – and negative betas are beyond crazy; they imply a cost of equity below the risk-free rate).

Throwing Up Our Hands, But Just Temporarily

So forget the basic CAPM. Please don't use it. If you like the idea, you'll have to cope with some complexity and wall-off the more absurd possibilities. That will be demonstrated in the next installment.