Single-Rate Discounting

Properly Valuing a Cash Flow Stream

NPV uses discount rates to weigh short-term versus long-term cash flows. For an uncertain cash flow stream that has not been decomposed (i.e., no future decisions and a very simple risk profile like a simple financial debt instrument), the appropriate discount rate varies depending on the amount of the Market risk. When there is none, the risk-free rate should be used. When there is a positive amount, a higher discount rate should be used.

Hurdle Rates

Although an over-simplification, some analysts will instead repeatedly use the same 'hurdle rate' to find the NPV of all cash flow streams. The most sophisticated use of a hurdle rate adds or subtracts a risk premium to reflect the project's specific risk characteristics, although this is done in an ad hoc or arbitrary fashion.

Imagine the owner of two different enterprises, each enterprise using a different hurdle rate to value cash flow streams. If the same potential cash flow stream was presented to each enterprise, each enterprise would value the stream differently, even though the owner would value each stream identically. (Note that if the cash flow stream has a complex effect on RAEV, then that effect must be modeled explicitly.)

WACC

For publicly-traded corporations, the most common hurdle rate is the weighted average cost of capital (WACC). Although there is more than one way of calculating a corporation's WACC, it is generally found by calculating the weighted average of the expected return rate of all the corporation's investors, including both debtors and shareholders. The shareholders' expected return rate is estimated by looking into the recent past for the CAPM Beta and Market characteristics. Necessarily, the WACC is a backward-looking summary of the corporation's overall risk characteristics.

The expected return of a corporation's stock is determined by its Market risk. The reasoning behind using WACC as a hurdle rate is that it represents the minimum amount of return needed to satisfy the investors. However, WACC makes no adjustment for the amount of Market risk in the cash flow stream. A cash flow stream with a good deal of Market risk will increase the expected return of the corporation's stock. Likewise, a cash flow stream with a small amount of Market risk would decrease the expected return of the corporation's stock.

Decomposing the Stream

Simple cash flow streams like those above are a very special case in business as the real world is thankfully much more interesting than that. An EOM model details multiple possibilities occurring over time. Each possibility requires its own discount rate, which again depends upon the amount of Market risk in the possibility.

Instead of proper discounting, an analyst may use a single discount rate throughout an entire model as an approximation. Some analysts will tinker with the single discount rate within a "reasonable range" to see how the valuation and strategy changes. If the strategy doesn't change much, an analyst may use that as a signal that the strategy is both good and robust. Unfortunately, the only way to know if any

single discount rate is even halfway reasonable is to build an EOM model and compare. From experience with hundreds of properly-discounted real-world business valuations and strategies, I have found that using a single discount rate, regardless of what the discount rate is, almost always returns valuations and strategies that are far from optimal. I have re-run the model with a single discount rate to find a more "conventional strategy" just so I could see how much value would be lost. In nearly every case, using a single discount rate would have led to a significant shift in strategy and a large loss in value.

To quickly test this for yourself, experiment with pricing a financial call option with various discount rates against the known Black-Scholes solution. It's an eye-opening exercise to see how far off using a single discount rate (like WACC) is in pricing even such a simple option.

Example – Economic Recovery or Recession

Let's look at a simple example that would fit into a tiny decision tree. Say there are two equally-likely outcomes one year from today: "Recession" and "Recovery". In the case of recession, we expect that, on average, the Economic Markets will fall by 20%. In the case of recovery, we expect that, on average, the Economic Markets will rise by 35%. A company has two projects that each has an equally-likely chance of returning $100M or $0. The difference between the projects is that one pays only in a recession and the other in recovery. Using a single discount rate would price these two projects the same, but the project that pays in a recession is worth substantially more than one that pays in a recovery. Many people would intuitively grasp that getting paid in a recession has a higher risk-adjusted economic value (RAEV) (if this seems counter-intuitive, consider Market risk, shareholder portfolios, and the prices of goods and services in each scenario).

Although the expected reward is the same in both cases, the recovery project increases Market risk, while the recession project decreases Market risk. Thus, a lower discount rate should be used for payoffs that could occur in a recession and a higher discount rate should be used for payoffs that could occur in a recovery. The use of a single discount rate could have caused the company to pass on a valuable opportunity. As a third project example, consider the "risk free" case, in which $50M is returned in both possible scenarios. In this case, the value of the project today must be equal to that of a risk-free bond that pays $50M (since the payoffs are identical). Note that the recession project, which decreases Market risk, is even more valuable than the risk-free project which is Market-neutral.

Using a single discount rate like WACC not only prevents us from capturing full value, it creates confusion as it frustrates our intuition. Since a decision-maker would not be able to reconcile the discrepancy, they may artificially change the probability of the recession, leading to "garbage in". A model with clarity would represent the market information contained in the recession and recovery scenarios by using a different discount rate for each scenario, resulting in different values for each project. Using all information at our disposal without adding any information that isn't really there is much simpler and easier. An EOM model may contain a different discount rate for every possibility in the model, whether the model has a hundred possibilities or a billion.