

Closure in Valuation: Estimating Terminal Value

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Getting Closure in Valuation

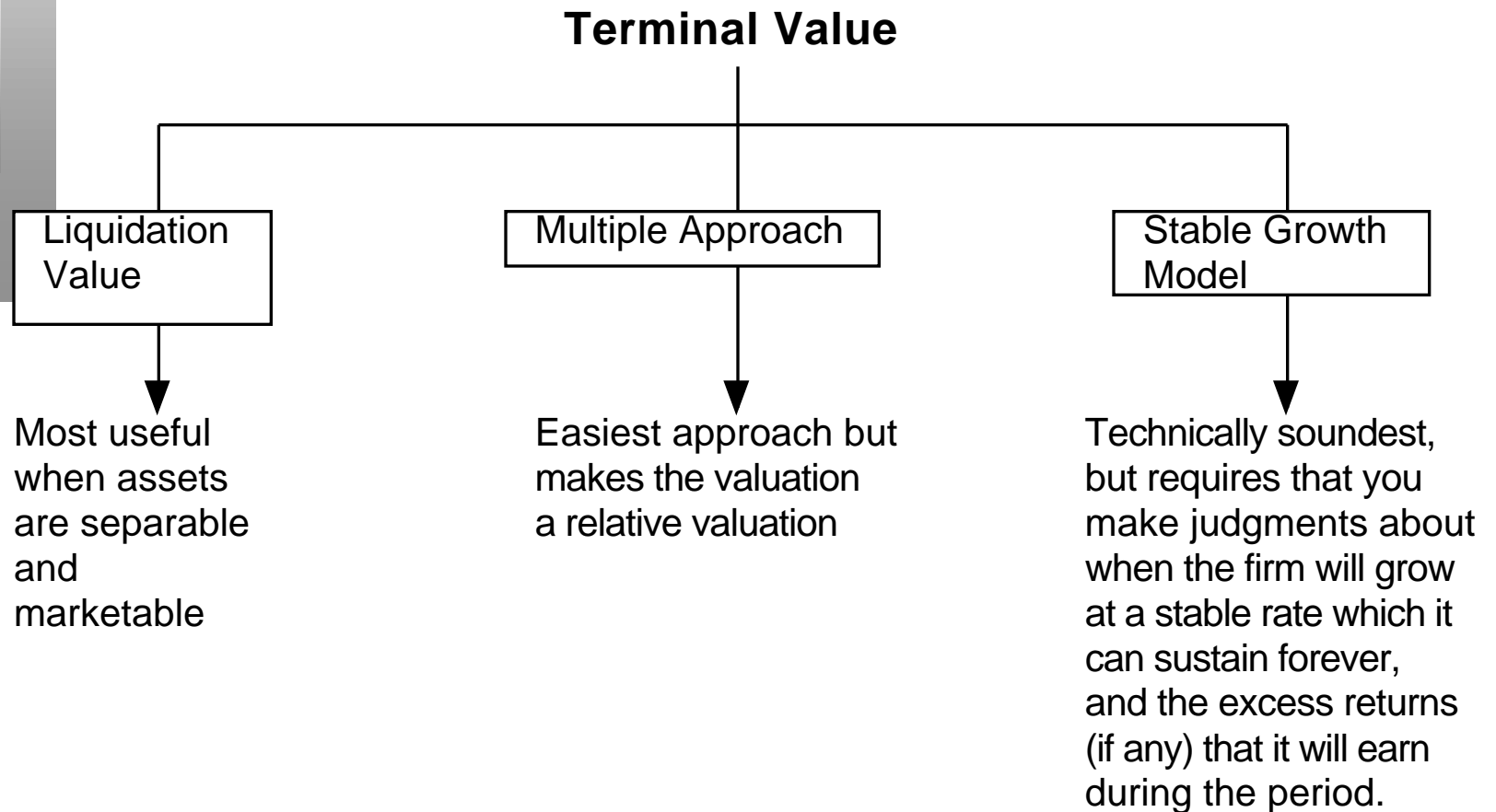
- A publicly traded firm potentially has an infinite life. The value is therefore the present value of cash flows forever.

$$\text{Value} = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}$$

- Since we cannot estimate cash flows forever, we estimate cash flows for a “growth period” and then estimate a terminal value, to capture the value at the end of the period:

$$\text{Value} = \sum_{t=1}^N \frac{CF_t}{(1+r)^t} + \frac{\text{Terminal Value}}{(1+r)^N}$$

Ways of Estimating Terminal Value



Stable Growth and Terminal Value

- When a firm's cash flows grow at a “constant” rate forever, the present value of those cash flows can be written as:

$$\text{Value} = \text{Expected Cash Flow Next Period} / (r - g)$$

where,

r = Discount rate (Cost of Equity or Cost of Capital)

g = Expected growth rate

- This “constant” growth rate is called a stable growth rate and cannot be higher than the growth rate of the economy in which the firm operates.
- While companies can maintain high growth rates for extended periods, they will all approach “stable growth” at some point in time.
- When they do approach stable growth, the valuation formula above can be used to estimate the “terminal value” of all cash flows beyond.

Limits on Stable Growth

- The stable growth rate cannot exceed the growth rate of the economy but it can be set lower.
 - If you assume that the economy is composed of high growth and stable growth firms, the growth rate of the latter will probably be lower than the growth rate of the economy.
 - The stable growth rate can be negative. The terminal value will be lower and you are assuming that your firm will disappear over time.

Growth Patterns

- A key assumption in all discounted cash flow models is the period of high growth, and the pattern of growth during that period. In general, we can make one of three assumptions:
 - there is no high growth, in which case the firm is already in stable growth
 - there will be high growth for a period, at the end of which the growth rate will drop to the stable growth rate (2-stage)
 - there will be high growth for a period, at the end of which the growth rate will decline gradually to a stable growth rate(3-stage)
 - Each year will have different margins and different growth rates (n stage)

Determinants of Growth Patterns

- Size of the firm
 - Success usually makes a firm larger. As firms become larger, it becomes much more difficult for them to maintain high growth rates
- Current growth rate
 - While past growth is not always a reliable indicator of future growth, there is a correlation between current growth and future growth. Thus, a firm growing at 30% currently probably has higher growth and a longer expected growth period than one growing 10% a year now.
- Barriers to entry and differential advantages
 - Ultimately, high growth comes from high project returns, which, in turn, comes from barriers to entry and differential advantages.
 - The question of how long growth will last and how high it will be can therefore be framed as a question about what the barriers to entry are, how long they will stay up and how strong they will remain.

Stable Growth and Fundamentals

- The growth rate of a firm is driven by its fundamentals - how much it reinvests and how high project returns are. As growth rates approach “stability”, the firm should be given the characteristics of a stable growth firm.

<i>Model</i>	<i>High Growth Firms usually</i>	<i>Stable growth firms usually</i>
DDM	<ol style="list-style-type: none">1. Pay no or low dividends2. Have high risk3. Earn high ROC	<ol style="list-style-type: none">1. Pay high dividends2. Have average risk3. Earn ROC closer to WACC
FCFE/ FCFF	<ol style="list-style-type: none">1. Have high net cap ex2. Have high risk3. Earn high ROC4. Have low leverage	<ol style="list-style-type: none">1. Have lower net cap ex2. Have average risk3. Earn ROC closer to WACC4. Have leverage closer to industry average

The Dividend Discount Model: Estimating Stable Growth Inputs

- Consider the example of ABN Amro. Based upon its current return on equity of 15.79% and its retention ratio of 53.88%, we estimated a growth in earnings per share of 8.51%.
- Let us assume that ABN Amro will be in stable growth in 5 years. At that point, let us assume that its return on equity will be closer to the average for European banks of 15%, and that it will grow at a nominal rate of 5% (Real Growth + Inflation Rate in NV)
- The expected payout ratio in stable growth can then be estimated as follows:

$$\text{Stable Growth Payout Ratio} = 1 - g / \text{ROE} = 1 - .05 / .15 = 66.67\%$$

$$g = b (\text{ROE})$$

$$b = g / \text{ROE}$$

$$\text{Payout} = 1 - b$$

The FCFE/FCFF Models: Estimating Stable Growth Inputs

- The soundest way of estimating reinvestment rates in stable growth is to relate them to expected growth and returns on capital:

$$\text{Reinvestment Rate} = \text{Growth in Operating Income} / \text{ROC}$$

- For instance, Cisco is expected to be in stable growth 13 years from now, growing at 5% a year and earning a return on capital of 16.52% (which is the industry average). The reinvestment rate in year 13 can be estimated as follows:

$$\text{Reinvestment Rate} = 5\% / 16.52\% = 30.27\%$$

V. Beyond Inputs: Choosing and Using the Right Model

Discounted Cashflow Valuation

Summarizing the Inputs

- In summary, at this stage in the process, we should have an estimate of the
 - the current cash flows on the investment, either to equity investors (dividends or free cash flows to equity) or to the firm (cash flow to the firm)
 - the current cost of equity and/or capital on the investment
 - the expected growth rate in earnings, based upon historical growth, analysts forecasts and/or fundamentals
- The next step in the process is deciding
 - which cash flow to discount, which should indicate
 - which discount rate needs to be estimated and
 - what pattern we will assume growth to follow

Which cash flow should I discount?

- Use Equity Valuation

- (a) for firms which have stable leverage, whether high or not, and
- (b) if equity (stock) is being valued

- Use Firm Valuation

- (a) for firms which have leverage which is too high or too low, and expect to change the leverage over time, because debt payments and issues do not have to be factored in the cash flows and the discount rate (cost of capital) does not change dramatically over time.
- (b) for firms for which you have partial information on leverage (eg: interest expenses are missing..)
- (c) in all other cases, where you are more interested in valuing the firm than the equity. (Value Consulting?)

Given cash flows to equity, should I discount dividends or FCFE?

- Use the Dividend Discount Model
 - (a) For firms which pay dividends (and repurchase stock) which are close to the Free Cash Flow to Equity (over an extended period)
 - (b) For firms where FCFE are difficult to estimate (Example: Banks and Financial Service companies)
- Use the FCFE Model
 - (a) For firms which pay dividends which are significantly higher or lower than the Free Cash Flow to Equity. (What is significant? ... As a rule of thumb, if dividends are less than 80% of FCFE or dividends are greater than 110% of FCFE over a 5-year period, use the FCFE model)
 - (b) For firms where dividends are not available (Example: Private Companies, IPOs)

What discount rate should I use?

- Cost of Equity versus Cost of Capital
 - If discounting cash flows to equity -> Cost of Equity
 - If discounting cash flows to the firm -> Cost of Capital
- What currency should the discount rate (risk free rate) be in?
 - Match the currency in which you estimate the risk free rate to the currency of your cash flows
- Should I use real or nominal cash flows?
 - If discounting real cash flows -> real cost of capital
 - If nominal cash flows -> nominal cost of capital
 - If inflation is low (<10%), stick with nominal cash flows since taxes are based upon nominal income
 - If inflation is high (>10%) switch to real cash flows

Which Growth Pattern Should I use?

■ If your firm is

- large and growing at a rate close to or less than growth rate of the economy, *or*
- constrained by regulation from growing at rate faster than the economy
- has the characteristics of a stable firm (average risk & reinvestment rates)

Use a Stable Growth Model

■ If your firm

- is large & growing at a moderate rate (Overall growth rate + 10%) *or*
- has a single product & barriers to entry with a finite life (e.g. patents)

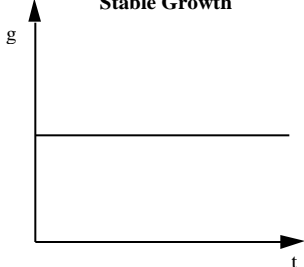
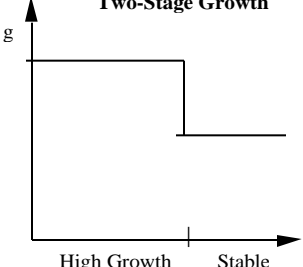
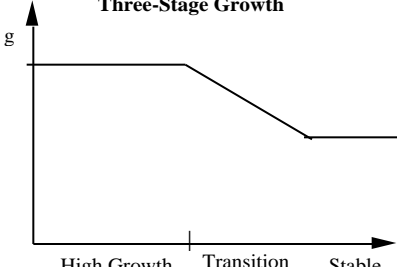
Use a 2-Stage Growth Model

■ If your firm

- is small and growing at a very high rate ($>$ Overall growth rate + 10%) *or*
- has significant barriers to entry into the business
- has firm characteristics that are very different from the norm

Use a 3-Stage or n-stage Model

The Building Blocks of Valuation

Choose a			
Cash Flow	<p style="text-align: center;"><i>Dividends</i></p> <p>Expected Dividends to Stockholders</p>	<p style="text-align: center;"><i>Cashflows to Equity</i></p> <p>Net Income - (1 - τ_c) (Capital Exp. - Deprec'n) - (1 - τ_c) Change in Work. Capital = Free Cash flow to Equity (FCFE) [τ_c = Debt Ratio]</p>	<p style="text-align: center;"><i>Cashflows to Firm</i></p> <p>EBIT (1 - tax rate) - (Capital Exp. - Deprec'n) - Change in Work. Capital = Free Cash flow to Firm (FCFF)</p>
& A Discount Rate	<p style="text-align: center;"><i>Cost of Equity</i></p> <ul style="list-style-type: none"> <i>Basis:</i> The riskier the investment, the greater is the cost of equity. <i>Models:</i> CAPM: Riskfree Rate + Beta (Risk Premium) APM: Riskfree Rate + β_j (Risk Premium): n factors 		<p style="text-align: center;"><i>Cost of Capital</i></p> <p>WACC = $k_e (E/(D+E))$ + $k_d (D/(D+E))$ k_d = Current Borrowing Rate (1-t) E,D: Mkt Val of Equity and Debt</p>
& a growth pattern	<p style="text-align: center;">Stable Growth</p> 	<p style="text-align: center;">Two-Stage Growth</p>  <p style="text-align: center;">High Growth Stable</p>	<p style="text-align: center;">Three-Stage Growth</p>  <p style="text-align: center;">High Growth Transition Stable</p>