Valuation: Lecture Note Packet 1
Intrinsic Valuation

Aswath Damodaran

Updated: January 2020

The essence of intrinsic value

- In intrinsic valuation, you value an asset based upon its fundamentals (or intrinsic characteristics).
- For cash flow generating assets, the intrinsic value will be a function of the magnitude of the expected cash flows on the asset over its lifetime and the uncertainty about receiving those cash flows.
- Discounted cash flow valuation is a tool for estimating intrinsic value, where the expected value of an asset is written as the present value of the expected cash flows on the asset, with either the cash flows or the discount rate adjusted to reflect the risk.

The two faces of discounted cash flow valuation

- The value of a risky asset can be estimated by discounting the expected cash flows on the asset over its life at a risk-adjusted discount rate:

$$\text{Value of asset} = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \ldots.. + \frac{E(CF_n)}{(1+r)^n}$$

  where the asset has an n-year life, $E(CF_t)$ is the expected cash flow in period t and r is a discount rate that reflects the risk of the cash flows.

- Alternatively, we can replace the expected cash flows with the guaranteed cash flows we would have accepted as an alternative (certainty equivalents) and discount these at the riskfree rate:

$$\text{Value of asset} = \frac{CE(CF_1)}{(1+r_f)} + \frac{CE(CF_2)}{(1+r_f)^2} + \frac{CE(CF_3)}{(1+r_f)^3} \ldots.. + \frac{CE(CF_n)}{(1+r_f)^n}$$

  where CE(CFt) is the certainty equivalent of $E(CF_t)$ and r_f is the riskfree rate.

Risk Adjusted Value: Two Basic Propositions

- The value of an asset is the risk-adjusted present value of the cash flows:

$$\text{Value of asset} = \frac{E(CF_1)}{(1+r)} + \frac{E(CF_2)}{(1+r)^2} + \frac{E(CF_3)}{(1+r)^3} \ldots\ldots + \frac{E(CF_n)}{(1+r)^n}$$

$$\text{Value of asset} = \frac{CE(CF_1)}{(1+r_f)} + \frac{CE(CF_2)}{(1+r_f)^2} + \frac{CE(CF_3)}{(1+r_f)^3} \ldots\ldots + \frac{CE(CF_n)}{(1+r_f)^n}$$

1. <u>The "IT" proposition:</u> If IT does not affect the expected cash flows or the riskiness of the cash flows, IT cannot affect value.
2. <u>The "DUH" proposition</u>: For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.
3. <u>The "DON'T FREAK OUT" proposition</u>: Assets that generate cash flows early in their life will be worth more than assets that generate cash flows later; the latter may however have greater growth and higher cash flows to compensate.

DCF Choices: Equity Valuation versus Firm Valuation

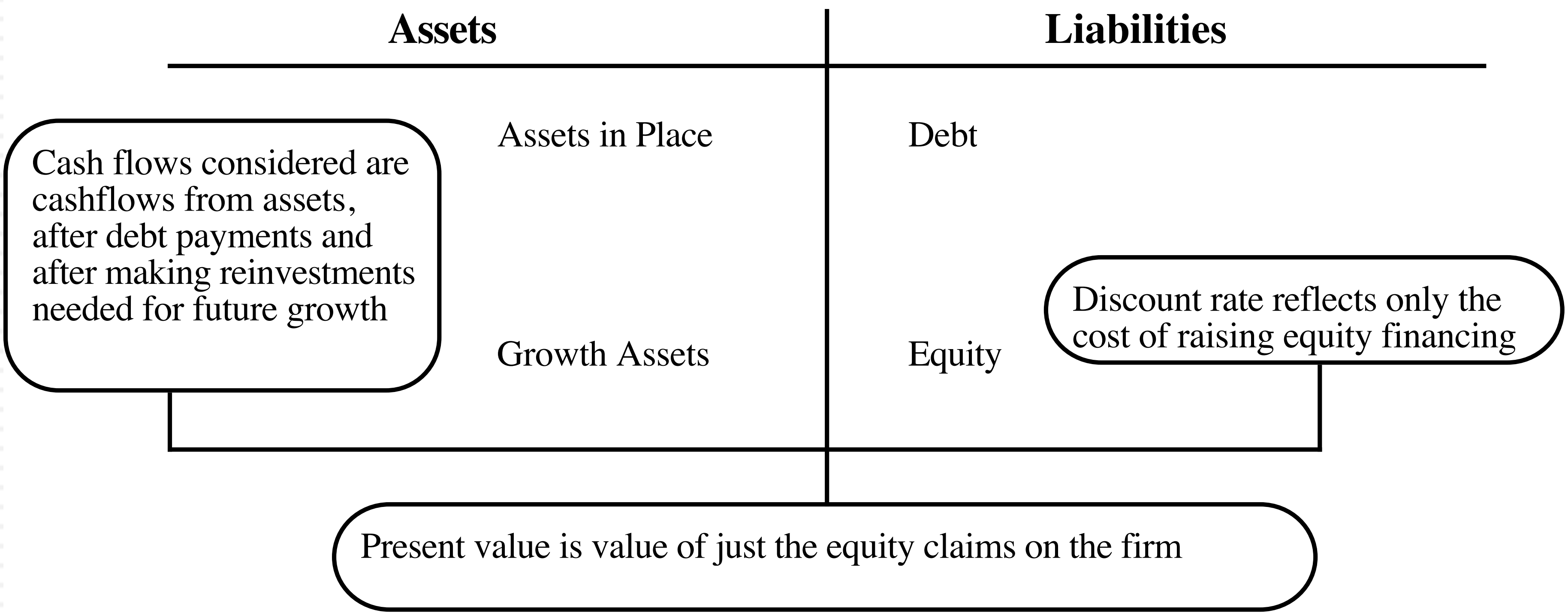
Firm Valuation: Value the entire business

Assets		Liabilities	
Existing Investments Generate cashflows today Includes long lived (fixed) and short-lived(working capital) assets	Assets in Place	Debt	Fixed Claim on cash flows Little or No role in management *Fixed Maturity* *Tax Deductible*
Expected Value that will be created by future investments	Growth Assets	Equity	Residual Claim on cash flows Significant Role in management *Perpetual Lives*

Equity valuation: Value just the equity claim in the business

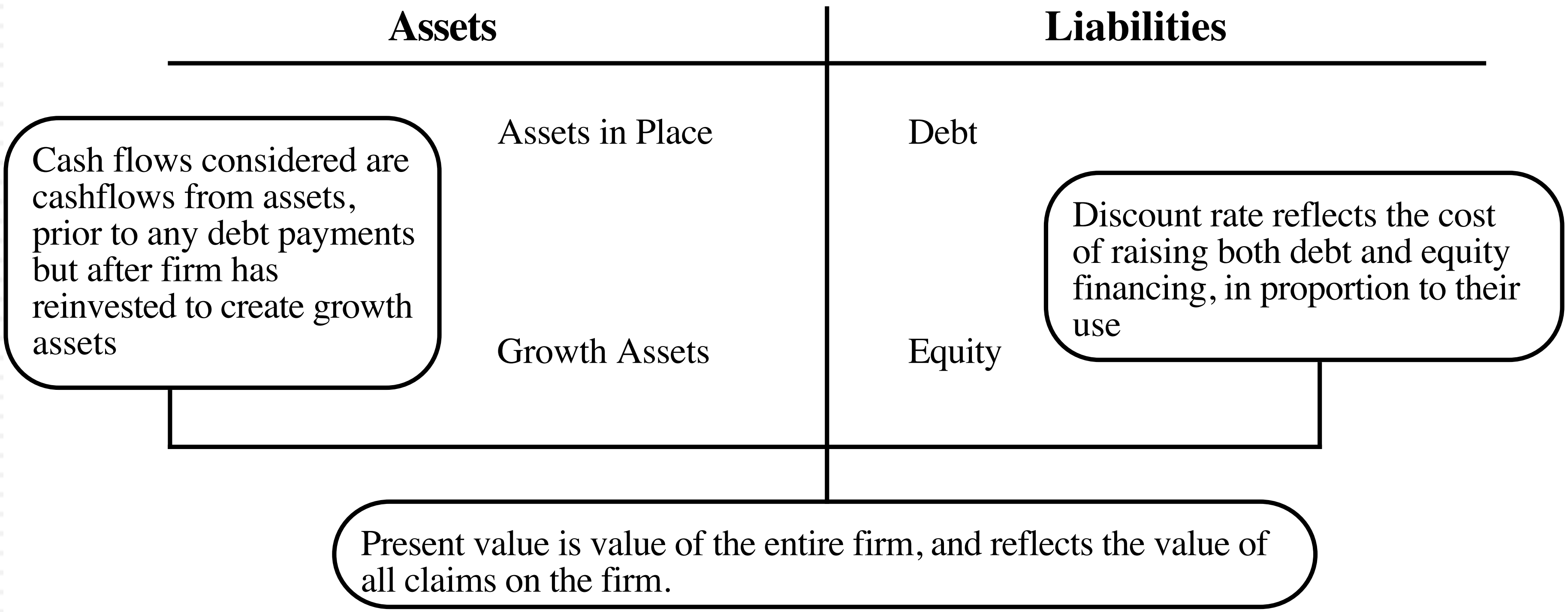
Equity Valuation

Figure 5.5: Equity Valuation



Firm Valuation

Figure 5.6: Firm Valuation



Firm Value and Equity Value

- To get from firm value to equity value, which of the following would you need to do?
  a. Subtract out the value of long term debt
  b. Subtract out the value of all debt
  c. Subtract the value of any debt that was included in the cost of capital calculation
  d. Subtract out the value of all liabilities in the firm
- Doing so, will give you a value for the equity which is
  a. greater than the value you would have got in an equity valuation
  b. lesser than the value you would have got in an equity valuation
  c. equal to the value you would have got in an equity valuation

Cash Flows and Discount Rates

- Assume that you are analyzing a company with the following cashflows for the next five years.

Year	CF to Equity	Interest Expense (1-t)	CF to Firm
1	$ 50	$ 40	$ 90
2	$ 60	$ 40	$ 100
3	$ 68	$ 40	$ 108
4	$ 76.2	$ 40	$ 116.2
5	$ 83.49	$ 40	$ 123.49
Terminal Value	$ 1603.0		$ 2363.008

- Assume also that the cost of equity is 13.625% and the firm can borrow long term at 10%. (The tax rate for the firm is 50%.)
- The current market value of equity is $1,073 and the value of debt outstanding is $800.

Equity versus Firm Valuation

- Method 1: Discount CF to Equity at Cost of Equity to get value of equity
  - Cost of Equity = 13.625%
  - Value of Equity = $50/1.13625 + 60/1.13625^2 + 68/1.13625^3 + 76.2/1.13625^4 + (83.49+1603)/1.13625^5$ = **$1073**
- Method 2: Discount CF to Firm at Cost of Capital to get value of firm
  - Cost of Debt = Pre-tax rate (1- tax rate) = 10% (1-.5) = 5%

  Cost of Capital = 13.625% (1073/1873) + 5% (800/1873) = 9.94%
  - PV of Firm = $90/1.0994 + 100/1.0994^2 + 108/1.0994^3 + 116.2/1.0994^4 + (123.49+2363)/1.0994^5$ = $1873
  - Value of Equity = Value of Firm - Market Value of Debt

    = $ 1873 - $ 800 = **$1073**

First Principle of Valuation

- Discounting Consistency Principle: Never mix and match cash flows and discount rates.
- Mismatching cash flows to discount rates is deadly.
  - Discounting cashflows after debt cash flows (equity cash flows) at the weighted average cost of capital will lead to an upwardly biased estimate of the value of equity
  - Discounting pre-debt cashflows (cash flows to the firm) at the cost of equity will yield a downward biased estimate of the value of the firm.

The Effects of Mismatching Cash Flows and Discount Rates

- Error 1: Discount CF to Equity at Cost of Capital to get equity value
  - PV of Equity = $50/1.0994 + 60/1.0994^2 + 68/1.09943 + 76.2/1.0994^4 + (83.49+1603)/1.0994^5 = \$1248$
  - Value of equity is overstated by \$175.
- Error 2: Discount CF to Firm at Cost of Equity to get firm value
  - PV of Firm = $90/1.13625 + 100/1.13625^2 + 108/1.13625^3 + 116.2/1.13625^4 + (123.49+2363)/1.13625^5 = \$1613$
  - PV of Equity = \$1612.86 - \$800 = \$813
  - Value of Equity is understated by \$ 260.
- Error 3: Discount CF to Firm at Cost of Equity, forget to subtract out debt, and get too high a value for equity
  - Value of Equity = \$ 1613
  - Value of Equity is overstated by \$ 540

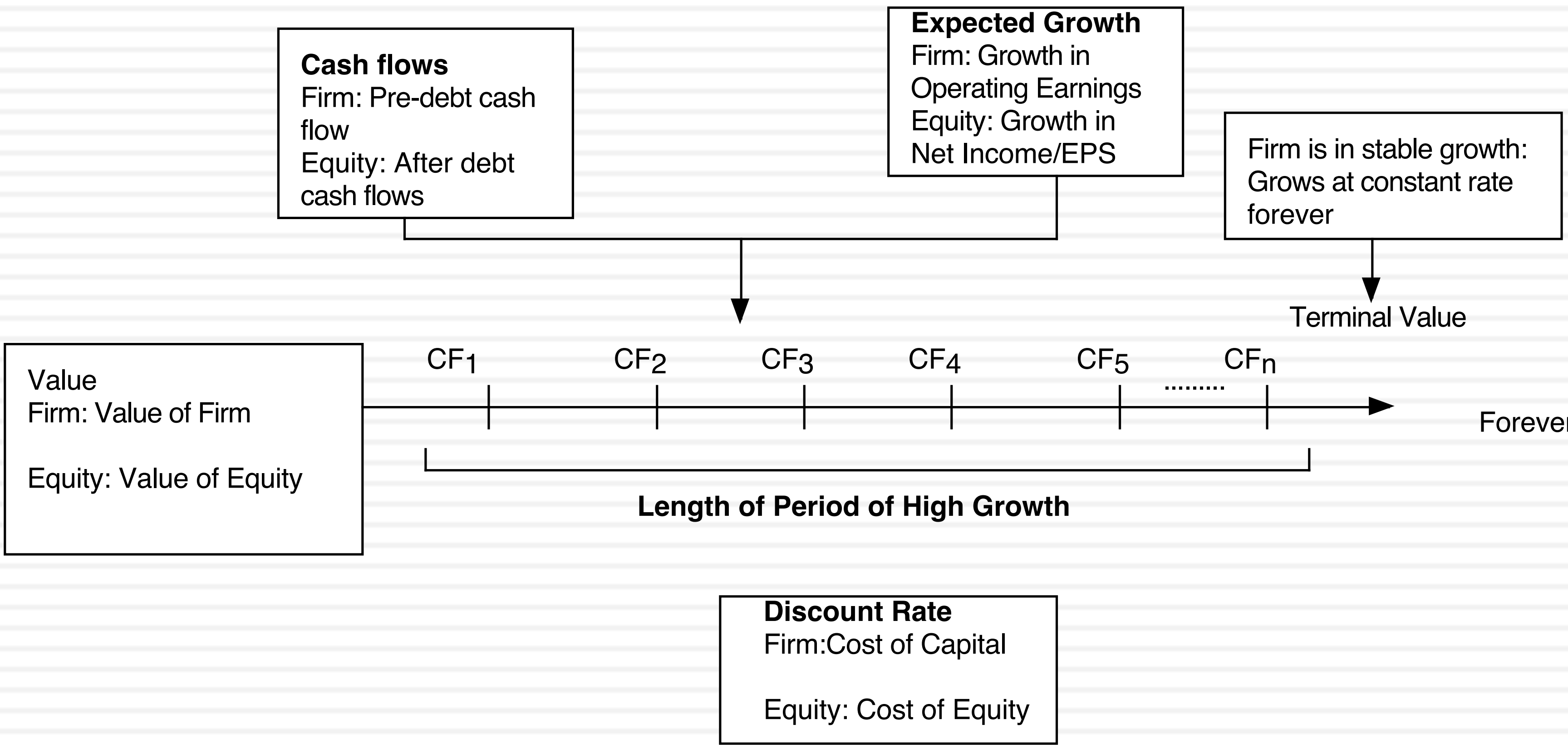
DCF: First Steps

Discounted Cash Flow Valuation: The Steps

1. Estimate the discount rate or rates to use in the valuation
    1. Discount rate can be either a cost of equity (if doing equity valuation) or a cost of capital (if valuing the firm)
    2. Discount rate can be in nominal terms or real terms, depending upon whether the cash flows are nominal or real
    3. Discount rate can vary across time.
2. Estimate the current earnings and cash flows on the asset, to either equity investors (CF to Equity) or to all claimholders (CF to Firm)
3. Estimate the future earnings and cash flows on the firm being valued, generally by estimating an expected growth rate in earnings.
4. Estimate when the firm will reach "stable growth" and what characteristics (risk & cash flow) it will have when it does.
5. Choose the right DCF model for this asset and value it.

Generic DCF Valuation Model

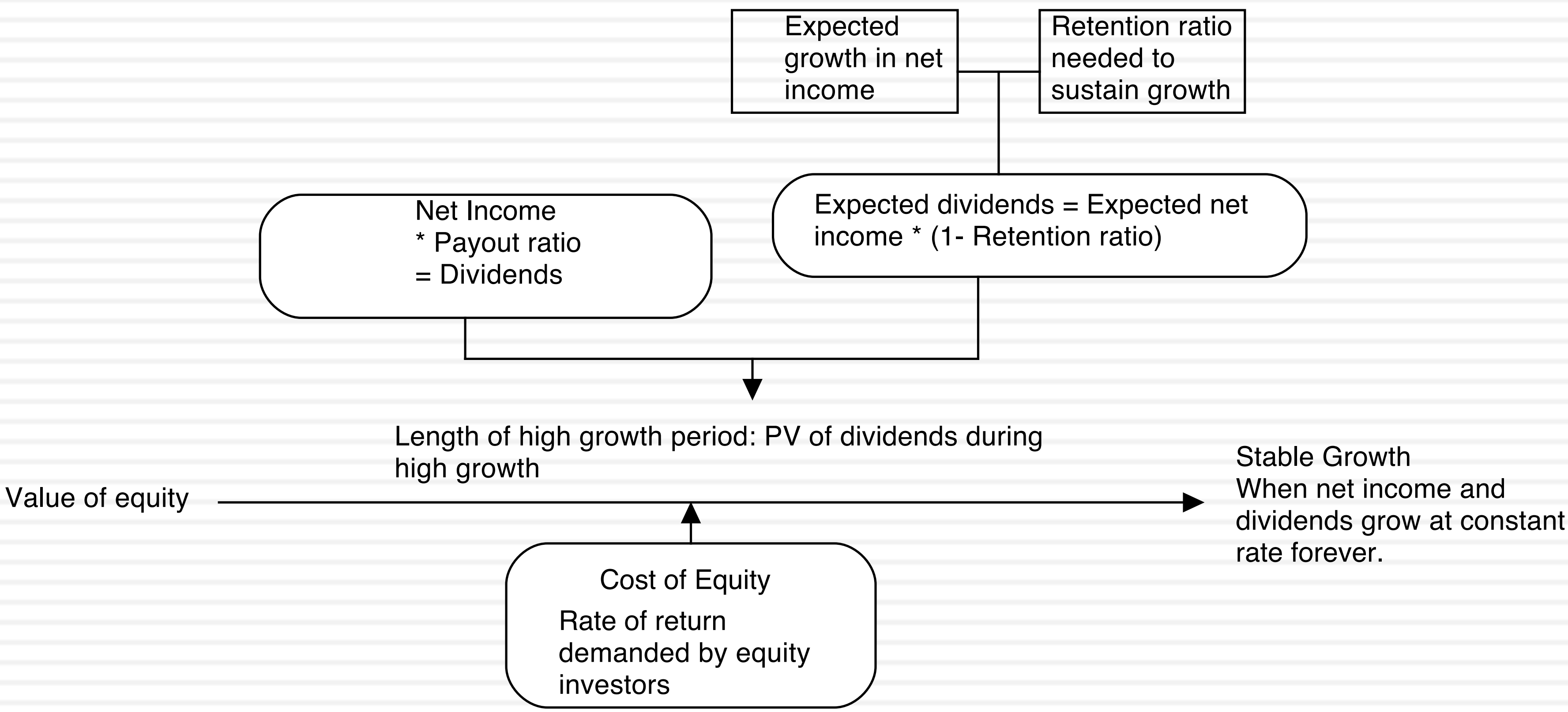
DISCOUNTED CASHFLOW VALUATION



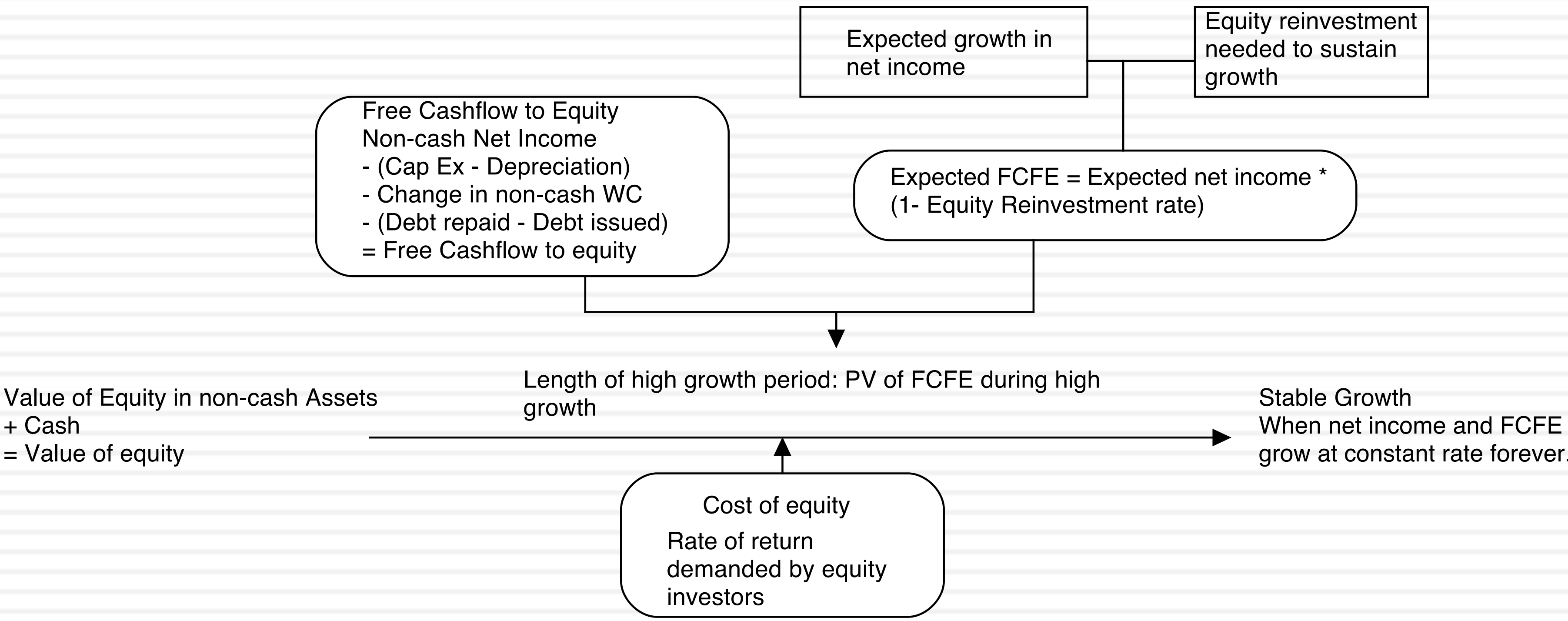
Same ingredients, different approaches…

Input	Dividend Discount Model	FCFE (Potential dividend) discount model	FCFF (firm) valuation model
Cash flow	Dividend	Potential dividends = FCFE = Cash flows after taxes, reinvestment needs and debt cash flows	FCFF = Cash flows before debt payments but after reinvestment needs and taxes.
Expected growth	In equity income and dividends	In equity income and FCFE	In operating income and FCFF
Discount rate	Cost of equity	Cost of equity	Cost of capital
Steady state	When dividends grow at constant rate forever	When FCFE grow at constant rate forever	When FCFF grow at constant rate forever

Start easy: The Dividend Discount Model



Moving on up: The “potential dividends” or FCFE model



To valuing the entire business: The FCFF model