

The Valuation of Financial Service Firms

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Some Initial Thoughts

" One hundred thousand lemmings cannot be wrong"

Graffiti



Misconceptions about Valuation

- Myth 1: A valuation is an objective search for “true” value
 - Truth 1.1: All valuations are biased. The only questions are how much and in which direction.
 - Truth 1.2: The direction and magnitude of the bias in your valuation is directly proportional to who pays you and how much you are paid.
- Myth 2.: A good valuation provides a precise estimate of value
 - Truth 2.1: There are no precise valuations
 - Truth 2.2: The payoff to valuation is greatest when valuation is least precise.
- Myth 3: . The more quantitative a model, the better the valuation
 - Truth 3.1: One’s understanding of a valuation model is inversely proportional to the number of inputs required for the model.
 - Truth 3.2: Simpler valuation models do much better than complex ones.

Approaches to Valuation

- **Discounted cashflow valuation**, relates the value of an asset to the present value of expected future cashflows on that asset.
- **Relative valuation**, estimates the value of an asset by looking at the pricing of 'comparable' assets relative to a common variable like earnings, cashflows, book value or sales.
- **Contingent claim valuation**, uses option pricing models to measure the value of assets that share option characteristics.

Discounted Cash Flow Valuation

- **What is it:** In discounted cash flow valuation, the value of an asset is the present value of the expected cash flows on the asset.
- **Philosophical Basis:** Every asset has an intrinsic value that can be estimated, based upon its characteristics in terms of cash flows, growth and risk.
- **Information Needed:** To use discounted cash flow valuation, you need
 - to estimate the life of the asset
 - to estimate the cash flows during the life of the asset
 - to estimate the discount rate to apply to these cash flows to get present value
- **Market Inefficiency:** Markets are assumed to make mistakes in pricing assets across time, and are assumed to correct themselves over time, as new information comes out about assets.

Discounted Cashflow Valuation: Basis for Approach

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

where CF_t is the cash flow in period t , r is the discount rate appropriate given the riskiness of the cash flow and t is the life of the asset.

Proposition 1: For an asset to have value, the expected cash flows have to be positive some time over the life of the asset.

Proposition 2: 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.

Equity Valuation versus Firm Valuation

- Value just the equity stake in the business
- Value the entire business, which includes, besides equity, the other claimholders in the firm

I. Equity Valuation

- The value of equity is obtained by discounting expected cashflows to equity, i.e., the residual cashflows after meeting all expenses, tax obligations and interest and principal payments, at the cost of equity, i.e., the rate of return required by equity investors in the firm.

$$\text{Value of Equity} = \sum_{t=1}^{t=n} \frac{\text{CF to Equity}_t}{(1+k_e)^t}$$

where,

CF to Equity_t = Expected Cashflow to Equity in period t

k_e = Cost of Equity

- The dividend discount model is a specialized case of equity valuation, and the value of a stock is the present value of expected future dividends.

II. Firm Valuation

- The value of the firm is obtained by discounting expected cashflows to the firm, i.e., the residual cashflows after meeting all operating expenses and taxes, but prior to debt payments, at the weighted average cost of capital, which is the cost of the different components of financing used by the firm, weighted by their market value proportions.

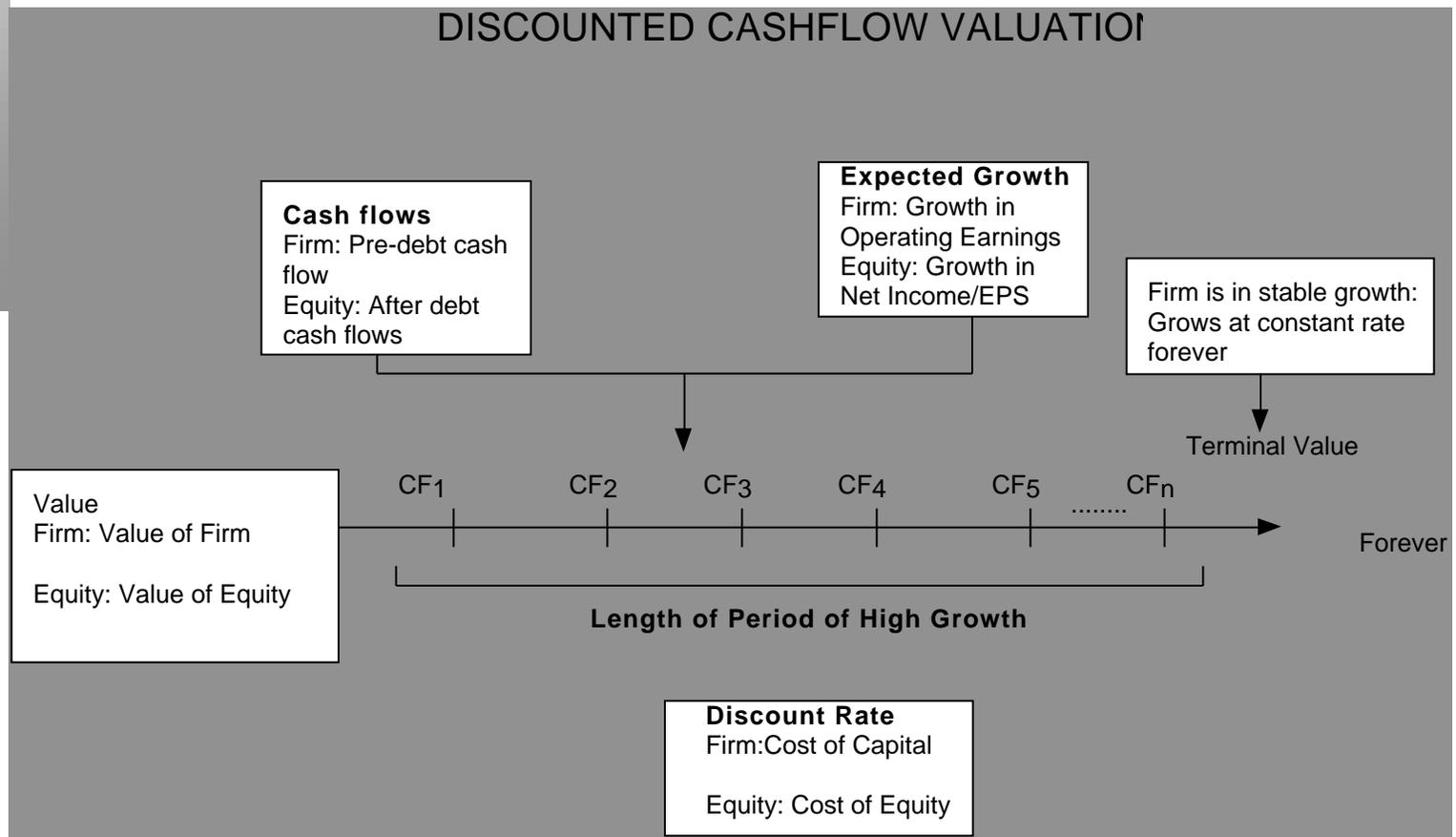
$$\text{Value of Firm} = \sum_{t=1}^{t=n} \frac{\text{CF to Firm}_t}{(1 + \text{WACC})^t}$$

where,

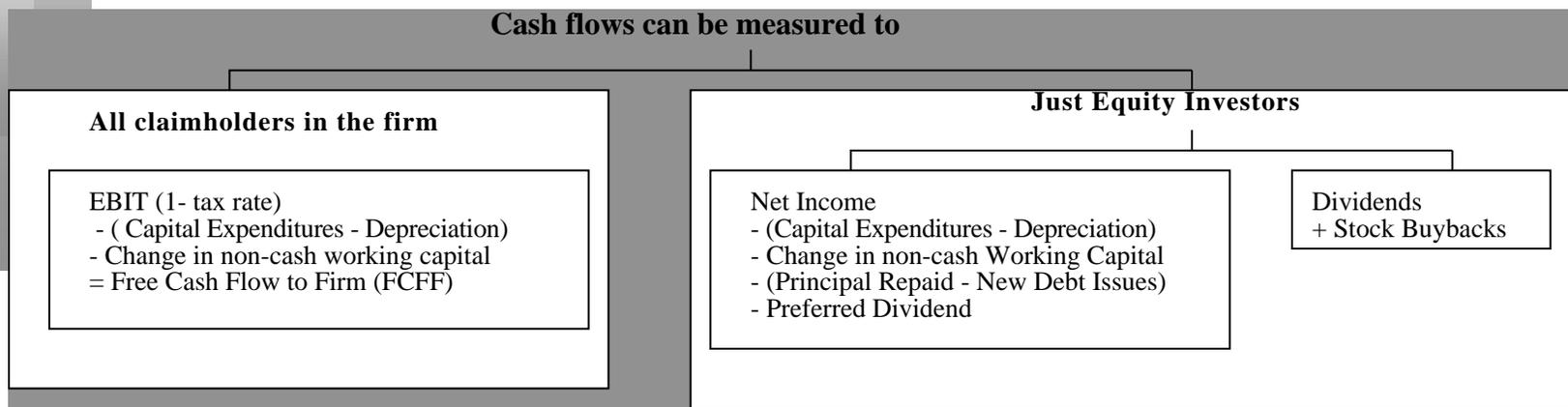
CF to Firm_t = Expected Cashflow to Firm in period t

WACC = Weighted Average Cost of Capital

Generic DCF Valuation Model



Measuring Cash Flows



What is different about financial service firms?

- ***Debt:*** Debt, for non-financial service firms, is a source of capital. For a financial service firm, debt is more raw material than source of capital.
- ***The Regulatory Overlay:*** Most financial service firms are heavily regulated and there are consequences for valuation:
 - Changes in the regulatory framework can have dramatic consequences on value. Thus, you spend as much time assessing how regulations change as you do analyzing the company.
 - The primary focus on information disclosure in financial service firms seems to be to the regulators and not on investors.
- ***Reinvestment at Financial Service Firms***
 - Defining and estimating what comprises reinvestment at a financial service firm can be problematic.

What are the consequences for valuation?

- **Equity versus Firm:** In general, steer away from valuing the entire firm. Focus on equity value.
- **Estimating Cash Flows:** If you cannot estimate how much a company is reinvesting, you cannot estimate free cashflows to the equity. With financial service firms, it is often very difficult to estimate the free cashflows..

Choices in Discounted Cashflow Valuation

■ Dividend Discount Models

- Assume that what companies pay out in dividends roughly equals what their smoothed out free cashflows to equity are, and discount dividends.

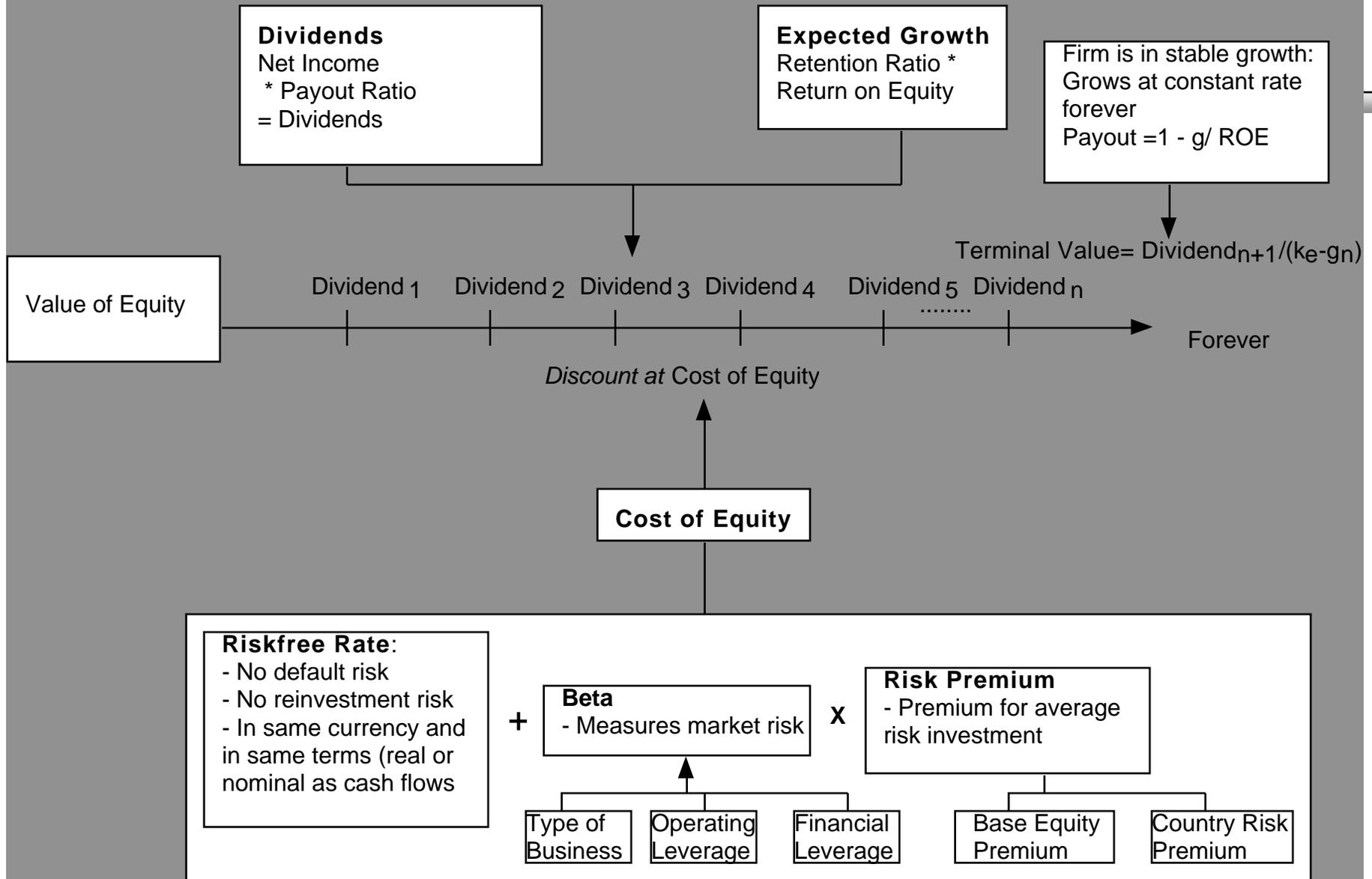
■ Cashflow to Equity Models

- Capitalize Training and Employee Development Expenses: Assume that the biggest capital expenditure in a financial service firm is in human capital and capitalize training and development expenses.
- Investments in Regulatory Capital: To the extent that a financial service firm's capacity to grow is constrained by equity capital ratios, treat retained earnings as an investment in equity capital which generates growth possibilities.

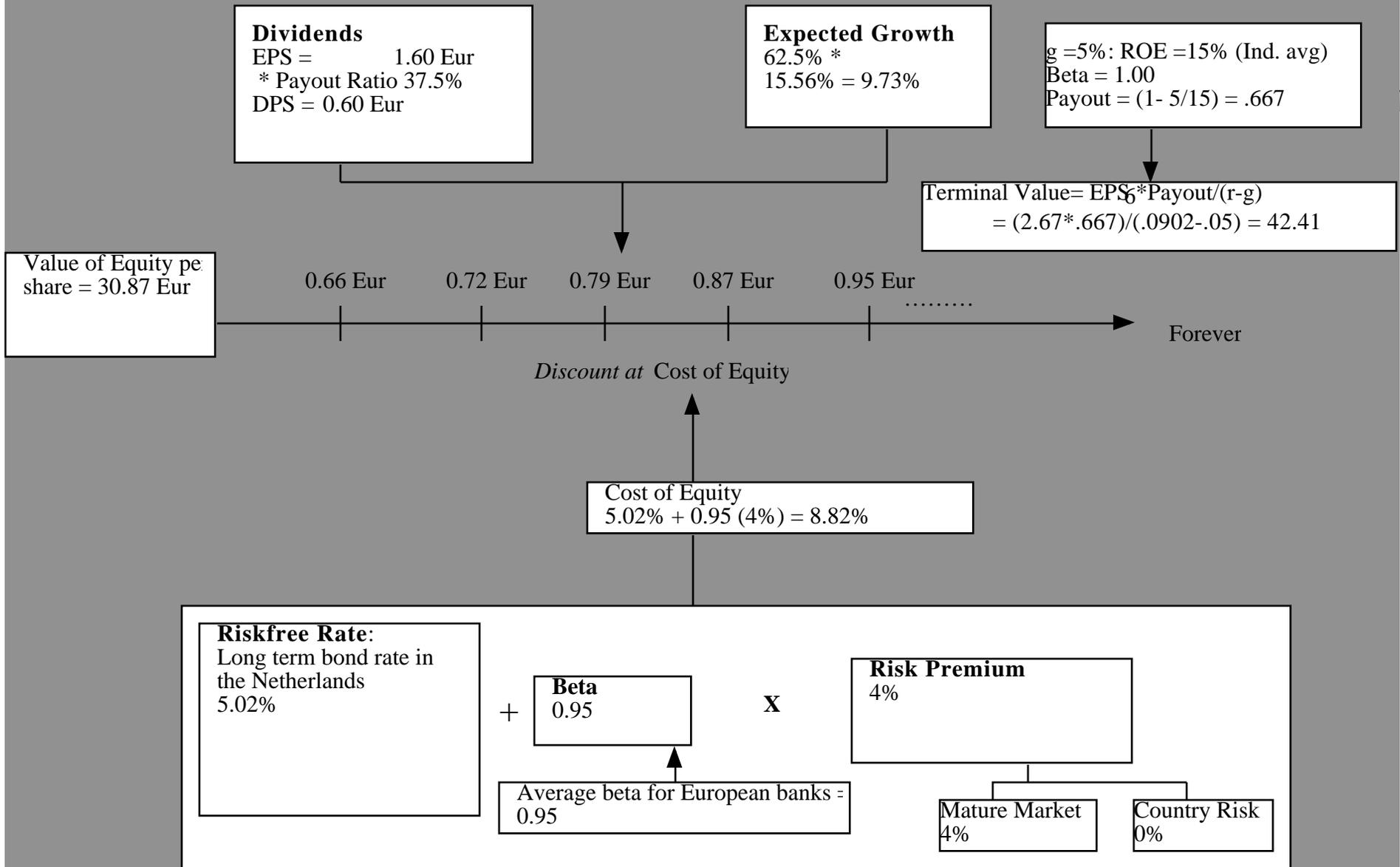
■ Excess Return Models

- Value of equity = Book value of equity + Present value of expected excess equity returns in future years.

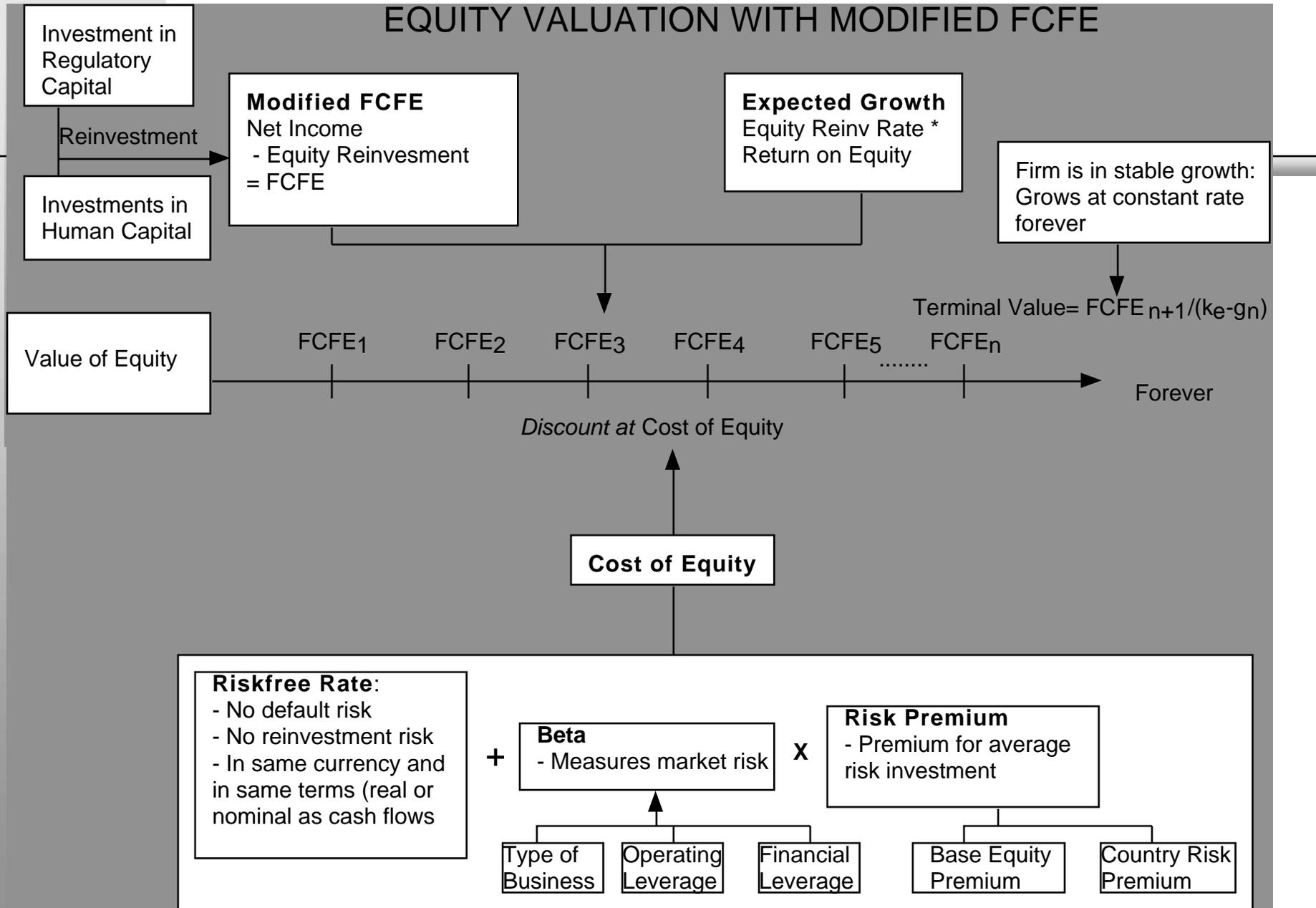
EQUITY VALUATION WITH DIVIDENDS



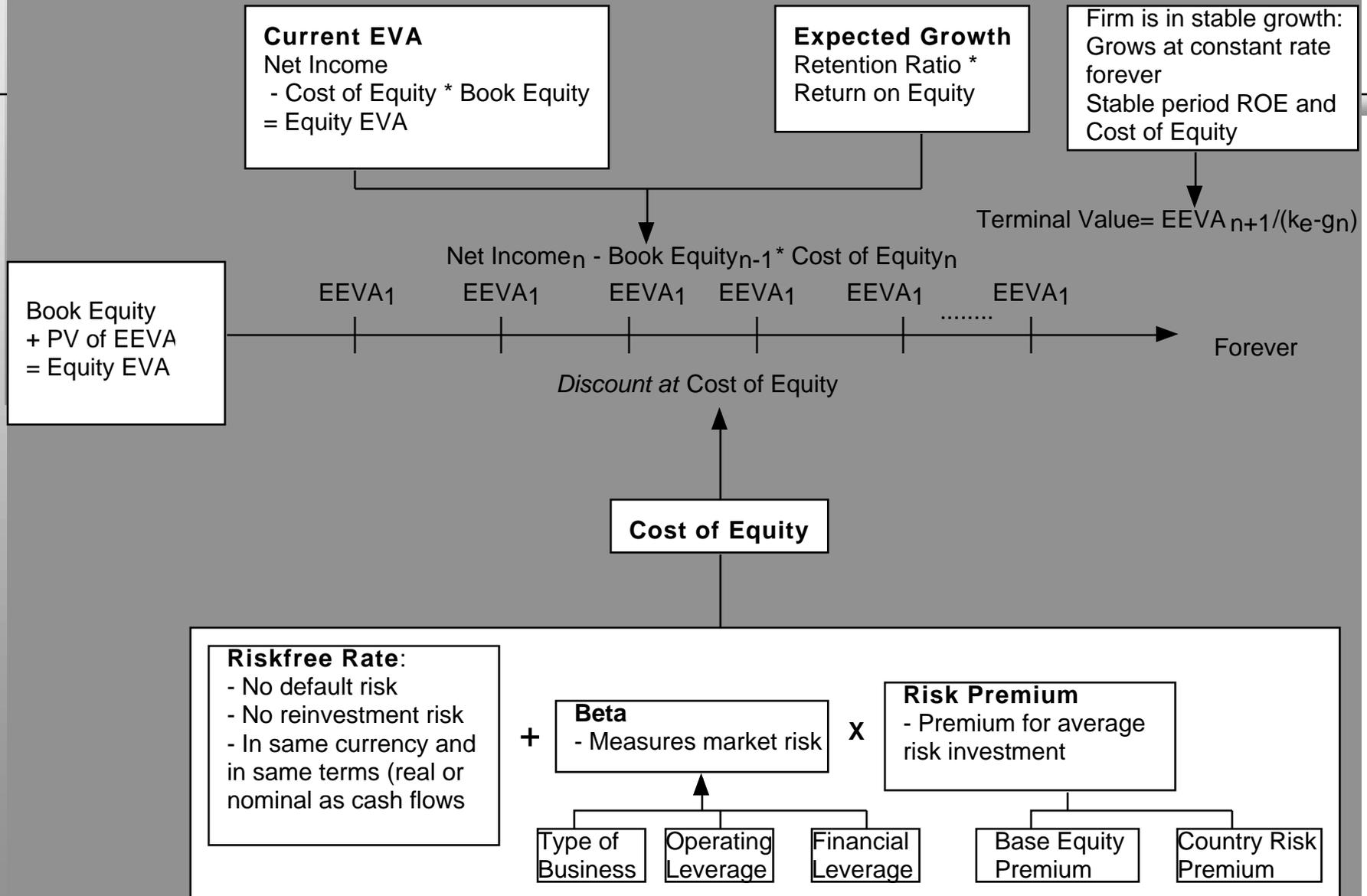
VALUING ABN AMRO



EQUITY VALUATION WITH MODIFIED FCFE



EQUITY VALUATION WITH EQUITY EVA



EQUITY VALUATION WITH EQUITY EVA

Current EVA
 Net Income = \$ 3104
 - Equity cost = \$ 1645
 = Equity EVA= \$ 1459

Expected Growth
 $.60 * 20\% = 12\%$

Firm is in stable growth:
 Growth rate = 5%
 Return on Equity = 15%
 Cost of equity = 9.40%

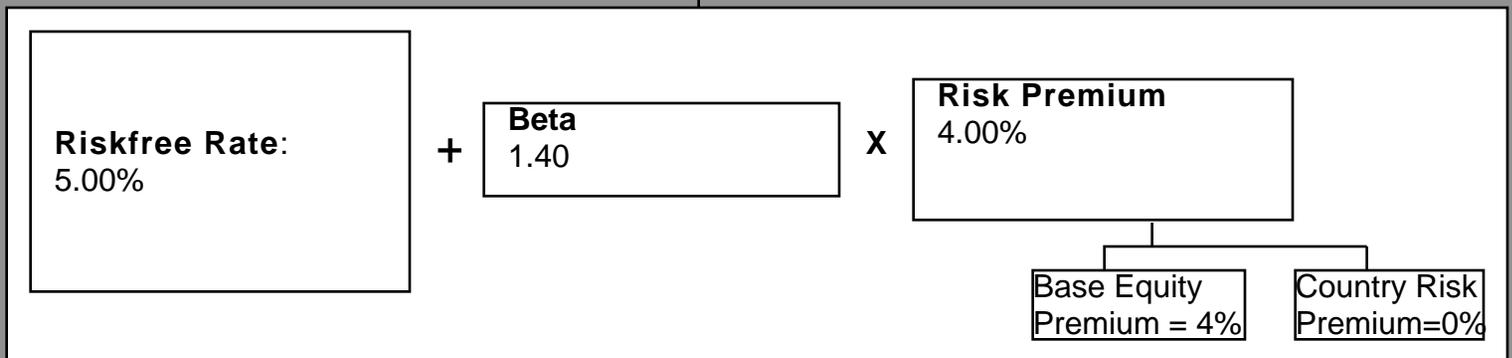
	Net Income	\$3,599	\$4,031	\$4,515	\$5,057	\$5,664	
	- Equity Cost (see below)		\$1,908	\$2,137	\$2,393	\$2,680	\$3,002
	Excess Equity Return		\$1,692	\$1,895	\$2,122	\$2,377	\$2,662
							Forever

Terminal Value = $\$2220 / (.094 - .05) = 50,459$

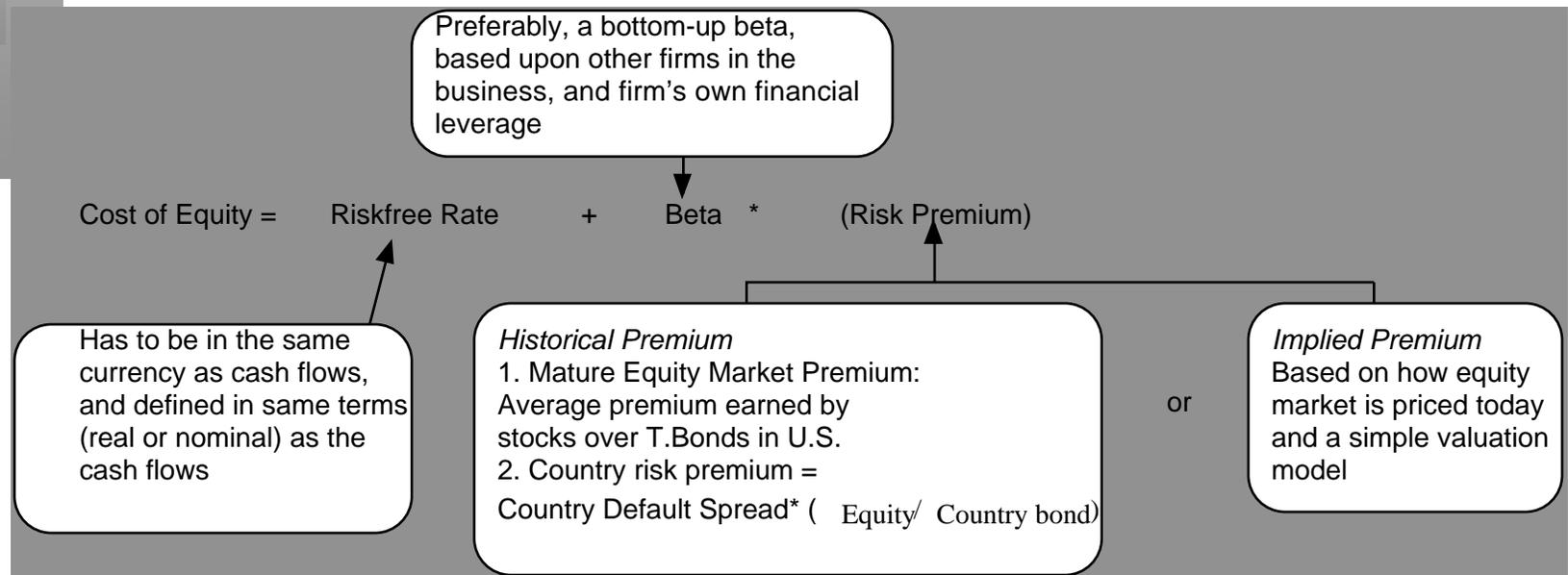
Book Equity = 17997
 + PV of EVA = 38334
 = Equity EVA = 56331
 Value/sh = \$50.26

Discount at Cost of Equity

Cost of Equity
 10.60%



I. Discount Rates: Cost of Equity



Everyone uses historical premiums, but..

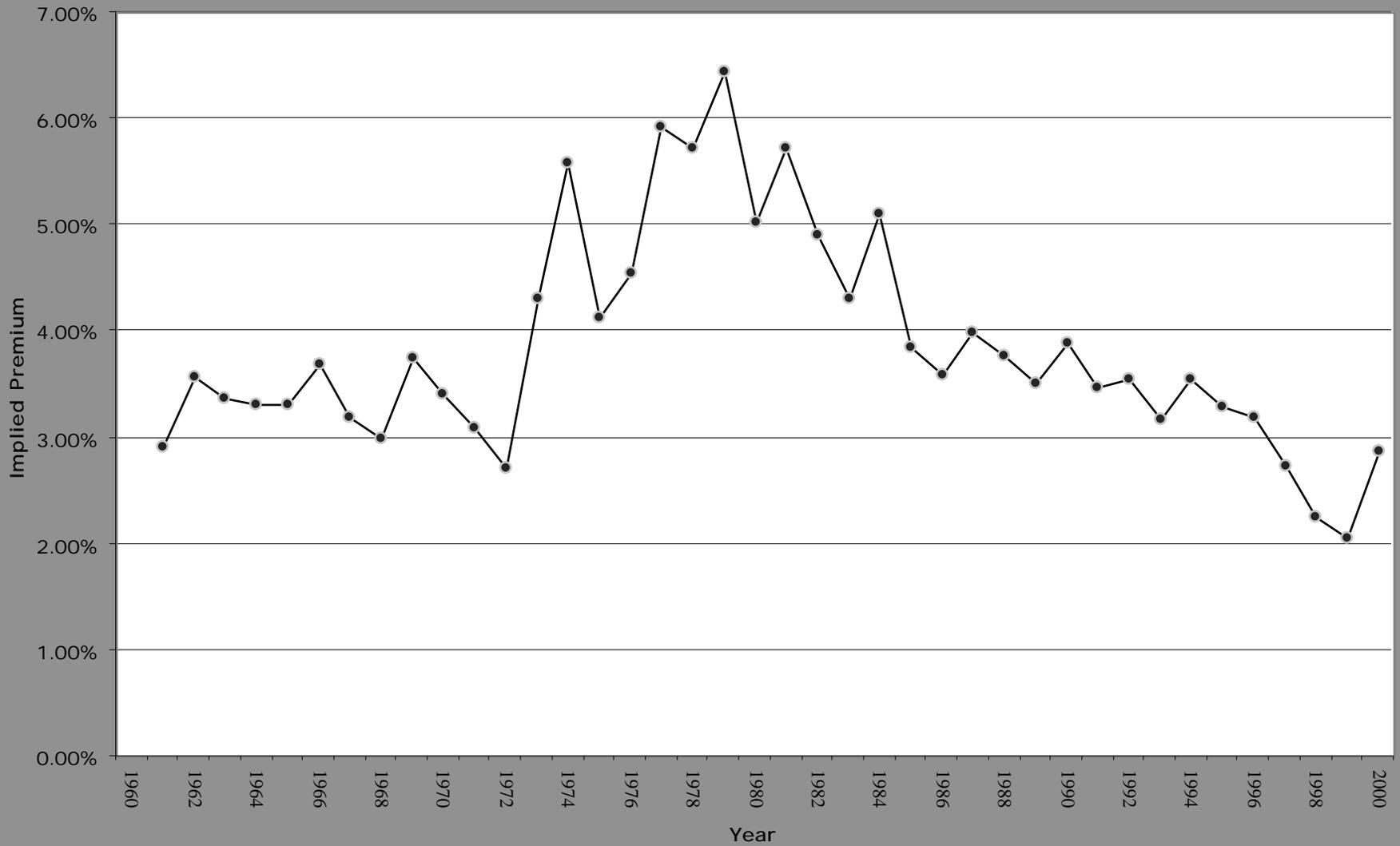
- The historical premium is the premium that stocks have historically earned over riskless securities.
- Practitioners never seem to agree on the premium; it is sensitive to
 - How far back you go in history...
 - Whether you use T.bill rates or T.Bond rates
 - Whether you use geometric or arithmetic averages.
- For instance, looking at the US:

<i>Historical period</i>	<i>Stocks - T.Bills</i>		<i>Stocks - T.Bonds</i>	
	<i>Arith</i>	<i>Geom</i>	<i>Arith</i>	<i>Geom</i>
1928-2000	8.41%	7.17%	6.53%	5.51%
1962-2000	6.41%	5.25%	5.30%	4.52%
1990-2000	11.42%	7.64%	12.67%	7.09%

Implied Equity Premiums

- If we use a basic discounted cash flow model, we can estimate the implied risk premium from the current level of stock prices.
- For instance, if stock prices are determined by the simple Gordon Growth Model:
 - $\text{Value} = \text{Expected Dividends next year} / (\text{Required Returns on Stocks} - \text{Expected Growth Rate})$
 - Plugging in the current level of the index, the dividends on the index and expected growth rate will yield a “implied” expected return on stocks. Subtracting out the riskfree rate will yield the implied premium.
- The problems with this approach are:
 - the discounted cash flow model used to value the stock index has to be the right one.
 - the inputs on dividends and expected growth have to be correct
 - it implicitly assumes that the market is currently correctly valued

Implied Premium for US Equity Marke



An Intermediate Solution

- The historical risk premium of 5.51% for the United States is too high a premium to use in valuation. It is
 - As high as the highest implied equity premium that we have ever seen in the US market (making your valuation a worst case scenario)
 - Much higher than the actual implied equity risk premium in the market
- The current implied equity risk premium is too low because
 - It is lower than the equity risk premiums in the 60s, when inflation and interest rates were as low
- The average implied equity risk premium between 1960-2000 in the United States is about 4%. We will use this as the premium for a mature equity market.

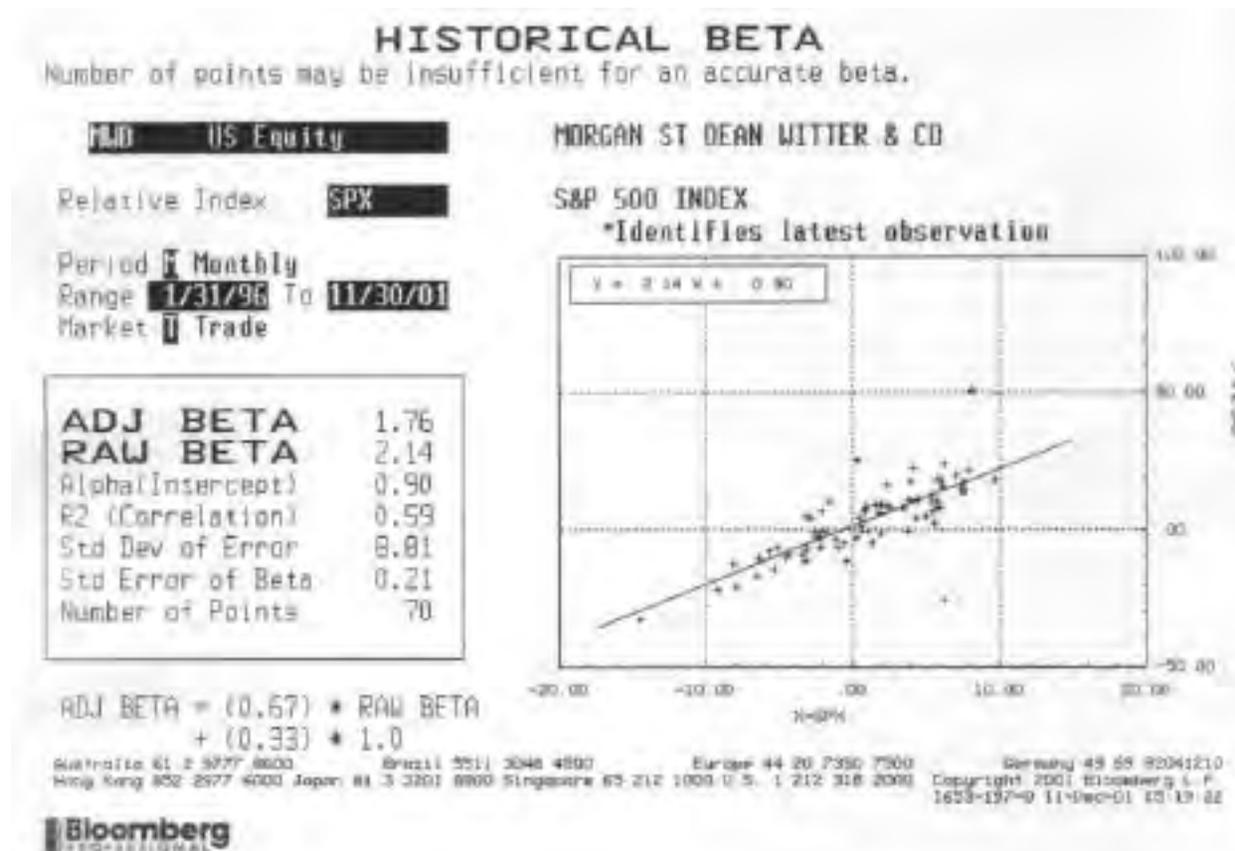
Estimating Beta

- The standard procedure for estimating betas is to regress stock returns (R_j) against market returns (R_m) -

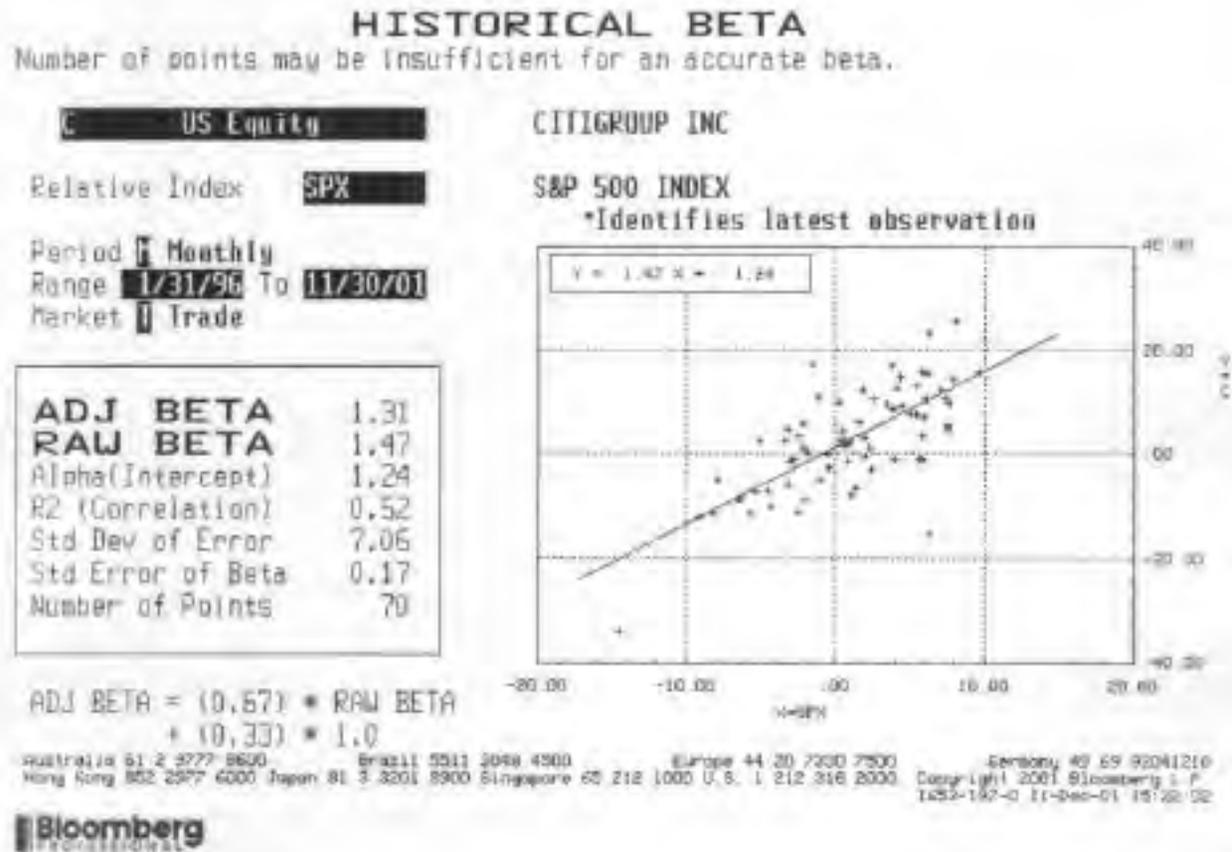
$$R_j = a + b R_m$$

- where a is the intercept and b is the slope of the regression.
- The slope of the regression corresponds to the beta of the stock, and measures the riskiness of the stock.
- This beta has three problems:
 - It has high standard error
 - It reflects the firm's business mix over the period of the regression, not the current mix
 - It reflects the firm's average financial leverage over the period rather than the current leverage.

Beta Estimation: The Noise Problem



Beta Estimation: The Changing Firm Problem



Determinants of Betas

- **Product or Service:** The beta value for a firm depends upon the sensitivity of the demand for its products and services and of its costs to macroeconomic factors that affect the overall market.
 - Cyclical companies have higher betas than non-cyclical firms
 - Firms which sell more discretionary products will have higher betas than firms that sell less discretionary products
- **Operating Leverage:** The greater the proportion of fixed costs in the cost structure of a business, the higher the beta will be of that business. This is because higher fixed costs increase your exposure to all risk, including market risk.
- **Financial Leverage:** The more debt a firm takes on, the higher the beta will be of the equity in that business. Debt creates a fixed cost, interest expenses, that increases exposure to market risk. The beta of equity alone can be written as a function of the unlevered beta and the debt-equity ratio

$$\beta_L = \beta_u (1 + ((1-t)D/E))$$

where

β_L = Levered or Equity Beta

β_u = Unlevered Beta

t = Corporate marginal tax rate

D = Market Value of Debt

E = Market Value of Equity

The Solution: Bottom-up Betas

- The bottom up beta can be estimated by :

- Taking a weighted (by sales or operating income) average of the betas of the different firms in the same business

$$\beta_j = \frac{\text{Operating Income}_j}{\text{Operating Income}_{\text{Firm}}}$$

(The beta of a business can be estimated by looking at other firms in the same business)

- The bottom up beta is a better estimate of the true beta when

- It has lower standard error ($SE_{\text{average}} = SE_{\text{firm}} / \sqrt{n}$ (n = number of firms))
- It reflects the firm's current business mix and financial leverage
- It can be estimated for divisions and private firms.

Citigroup's Bottom-up Beta

<i>Business</i>	<i>Beta</i>	<i>Net Income Weight</i>
Investment Banking	1.40	45%
Commercial Banking	1.10	42%
Portfolio Management	1.25	13%
Bottom-up Beta = $1.40 (.45) + 1.10 (.42) + 1.25 (.13) = 1.2545$		

11. Expected Growth in Income and Fundamentals

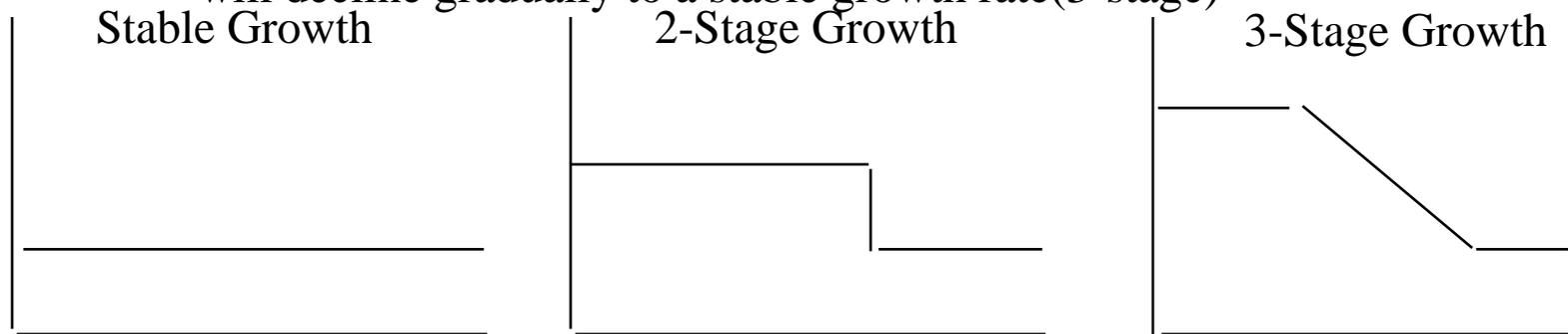
- Expected Growth rate_{EPS} = Dividends/ Net Income * ROE
= Retention Ratio * Return on Equity
- For ABN Amro
 - ROE= Net Income / BV of Equity
= 15.56%
 - Retention Ratio = 1 - Dividends/ Net Income
= 67.5%
 - Expected Growth Rate = (.1556)*(.625) = 9.73%
- Proposition: No firm can expect its income to grow over time without reinvesting some of the income back into the business.
- Proposition: The reinvestment needs of a firm, for a given growth rate, should be inversely proportional to the quality of its investments.

Some Key Questions to ask about Fundamentals

- Was the return on equity earned last year correctly estimated?
 - Accounting measurement of earnings
 - Accounting measurement of book value of equity
- Is the return on equity sustainable?
 - State of the economy
 - Size of the company
 - Competitiveness of the marketplace
 - Regulatory changes
- Is the retention ratio correctly estimated?
 - Stock Buybacks versus dividends paid
 - New stock issues
- Is the retention ratio sustainable?

III. 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)



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 Characteristics

- In stable growth, firms should have the characteristics of other stable growth firms. In particular,
 - The risk of the firm, as measured by beta, should reflect that of a stable growth firm.
 - Beta should move towards one
 - Firms that earn substantial excess returns will have a difficult time maintaining these in perpetuity.
 - The return on equity should converge on the cost of equity.
 - The retention ratio of the firm should reflect the expected growth rate and the firm's return on equity
 - Retention Rate = Expected Growth Rate / Return on Equity

Amro and MSDW: Stable Growth Inputs

	High Growth	Stable Growth
■ Amro		
• Beta	0.95	1.00
• Return on Equity	15.56%	15%
• Expected Growth Rate	9.73%	5%
• Retention Rate	62.5%	$5\%/15\% = 33.33\%$
■ MSDW		
• Beta	1.40	1.10
• Return on Equity	20%	15%
• Expected Growth Rate	12%	5%
• Retention Rate	60%	$5/15 = 33.33\%$

Dealing with Cross Holdings

- When the holding is a majority, active stake, the value that we obtain from the cash flows includes the share held by outsiders. While their holding is measured in the balance sheet as a minority interest, it is at book value. To get the correct value, we need to subtract out the estimated market value of the minority interests from the firm value.
- When the holding is a minority, passive interest, the problem is a different one. The firm shows on its income statement only the share of dividends it receives on the holding. Using only this income will understate the value of the holdings. In fact, we have to value the subsidiary as a separate entity to get a measure of the market value of this holding.
- Proposition 1: It is almost impossible to correctly value firms with minority, passive interests in a large number of private subsidiaries.

The Paths to Value Creation in a DCF Framework

- Using the DCF framework, there are four basic ways in which the value of a firm can be enhanced:
 - The income from existing assets to the firm can be increased, by either
 - increasing pre-tax earnings from existing assets
 - reducing tax burden
 - The expected growth rate in these cash flows can be increased by either
 - Increasing the retention ratio (reinvest more)
 - Improving the return on equity (use existing equity more effectively)
 - The length of the high growth period can be extended to allow for more years of high growth. To do this, you would need to
 - Create new barriers to entry
 - Augment existing competitive advantages
 - The cost of equity can be reduced by
 - Shifting to less discretionary products and away from more discretionary ones..
 - Changing your business mix
 - Reducing operating leverage
 - Matching financing to assets.

A Basic Proposition

- For an action to affect the value of the firm, it has to
 - Affect current earnings (or)
 - Affect future growth (or)
 - Affect the length of the high growth period (or)
 - Affect the discount rate (cost of equity)
- **Proposition 1: Actions that do not affect current cash flows, future growth, the length of the high growth period or the discount rate cannot affect value.**

Value-Neutral Actions

- Stock splits and stock dividends change the number of units of equity in a firm, but cannot affect firm value since they do not affect cash flows, growth or risk.
- Accounting decisions that affect reported earnings but not cash flows should have no effect on value.
 - Changing inventory valuation methods from FIFO to LIFO or vice versa in financial reports but not for tax purposes
 - Changing the depreciation method used in financial reports (but not the tax books) from accelerated to straight line depreciation
 - Major non-cash restructuring charges that reduce reported earnings but are not tax deductible
 - Using pooling instead of purchase in acquisitions cannot change the value of a target firm.
- Decisions that create new securities on the existing assets of the firm (without altering the financial mix) such as tracking stock cannot create value, though they might affect perceptions and hence the price.

The Value of Control?

- If the value of a firm run optimally is significantly higher than the value of the firm with the status quo (or incumbent management), you can write the value that you should be willing to pay as:
- Value of control = Value of firm optimally run - Value of firm under status quo

Relative Valuation

- **What is it?:** The value of any asset can be estimated by looking at how the market prices “similar” or ‘comparable” assets.
- **Philosophical Basis:** The intrinsic value of an asset is impossible (or close to impossible) to estimate. The value of an asset is whatever the market is willing to pay for it (based upon its characteristics)
- **Information Needed:** To do a relative valuation, you need
 - an identical asset, or a group of comparable or similar assets
 - a standardized measure of value (in equity, this is obtained by dividing the price by a common variable, such as earnings or book value)
 - and if the assets are not perfectly comparable, variables to control for the differences
- **Market Inefficiency:** Pricing errors made across similar or comparable assets are easier to spot, easier to exploit and are much more quickly corrected.

Definitional Tests

- Is the multiple consistently defined?
 - **Proposition 1: Both the value (the numerator) and the standardizing variable (the denominator) should be to the same claimholders in the firm. In other words, the value of equity should be divided by equity earnings or equity book value, and firm value should be divided by firm earnings or book value.**
- Is the multiple uniformly estimated?
 - The variables used in defining the multiple should be estimated uniformly across assets in the “comparable firm” list.
 - If earnings-based multiples are used, the accounting rules to measure earnings should be applied consistently across assets. The same rule applies with book-value based multiples.

An Example: Price Earnings Ratio: Definition

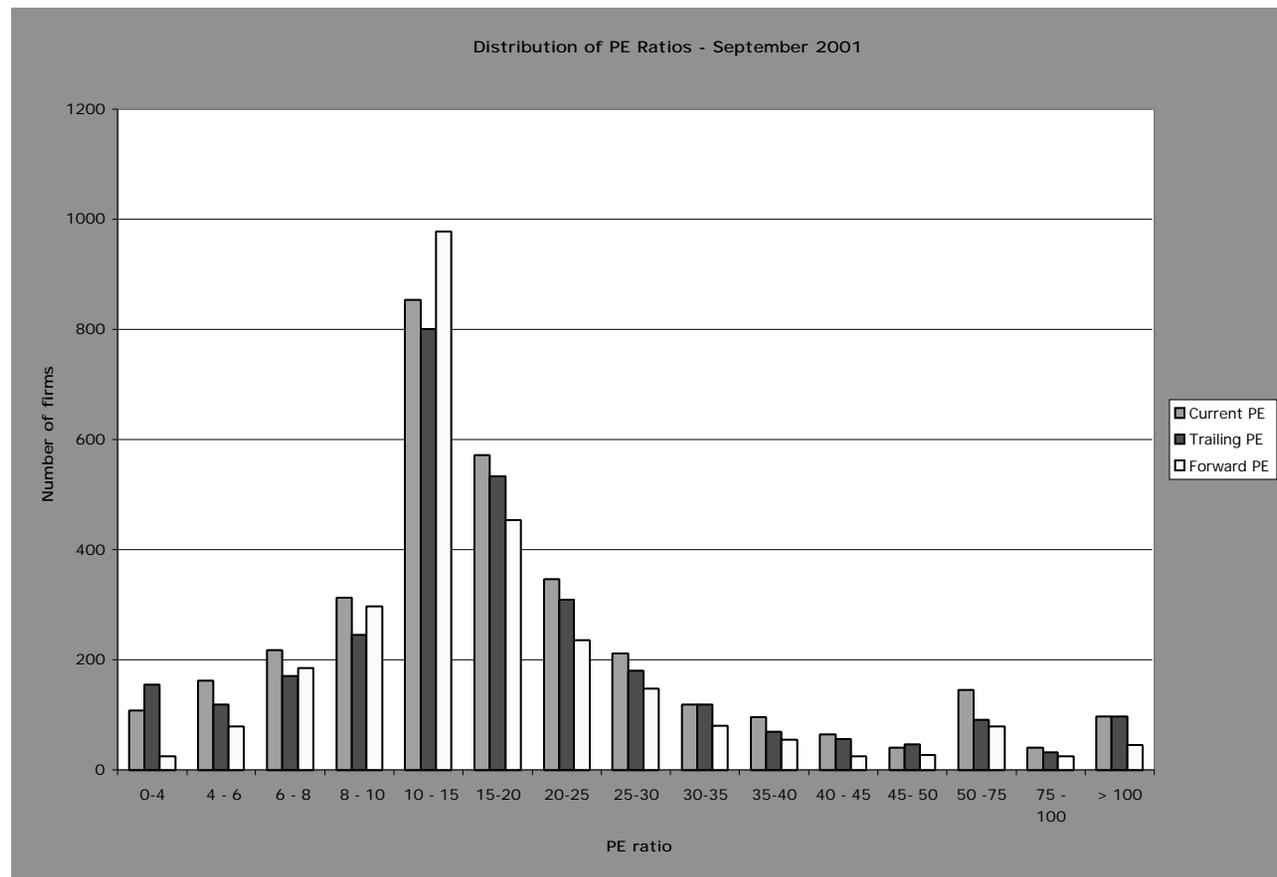
$$\text{PE} = \text{Market Price per Share} / \text{Earnings per Share}$$

- There are a number of variants on the basic PE ratio in use. They are based upon how the price and the earnings are defined.
- Price:
 - is usually the current price
 - is sometimes the average price for the year
- EPS:
 - earnings per share in most recent financial year
 - earnings per share in trailing 12 months (Trailing PE)
 - forecasted earnings per share next year (Forward PE)
 - forecasted earnings per share in future year

Descriptive Tests

- What is the average and standard deviation for this multiple, across the universe (market)?
- What is the median for this multiple?
 - The median for this multiple is often a more reliable comparison point.
- How large are the outliers to the distribution, and how do we deal with the outliers?
 - Throwing out the outliers may seem like an obvious solution, but if the outliers all lie on one side of the distribution (they usually are large positive numbers), this can lead to a biased estimate.
- Are there cases where the multiple cannot be estimated? Will ignoring these cases lead to a biased estimate of the multiple?
- How has this multiple changed over time?

PE Ratio: Descriptive Statistics



Analytical Tests

- What are the fundamentals that determine and drive these multiples?
 - **Proposition 2: Embedded in every multiple are all of the variables that drive every discounted cash flow valuation - growth, risk and cash flow patterns.**
 - In fact, using a simple discounted cash flow model and basic algebra should yield the fundamentals that drive a multiple
- How do changes in these fundamentals change the multiple?
 - The relationship between a fundamental (like growth) and a multiple (such as PE) is seldom linear. For example, if firm A has twice the growth rate of firm B, it will generally not trade at twice its PE ratio
 - **Proposition 3: It is impossible to properly compare firms on a multiple, if we do not know the nature of the relationship between fundamentals and the multiple.**

Relative Value and Fundamentals

$$P_0 = \frac{DPS_1}{r - g_n}$$

- Gordon Growth Model:

- Dividing both sides by the earnings,

$$\frac{P_0}{EPS_0} = PE = \frac{\text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

- Dividing both sides by the book value of equity,

$$\frac{P_0}{BV_0} = PBV = \frac{ROE * \text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

- If the return on equity is written in terms of the retention ratio and the expected growth rate

$$\frac{P_0}{BV_0} = PBV = \frac{ROE - g_n}{r - g_n}$$

- Dividing by the Sales per share,

$$\frac{P_0}{Sales_0} = PS = \frac{\text{Profit Margin} * \text{Payout Ratio} * (1 + g_n)}{r - g_n}$$

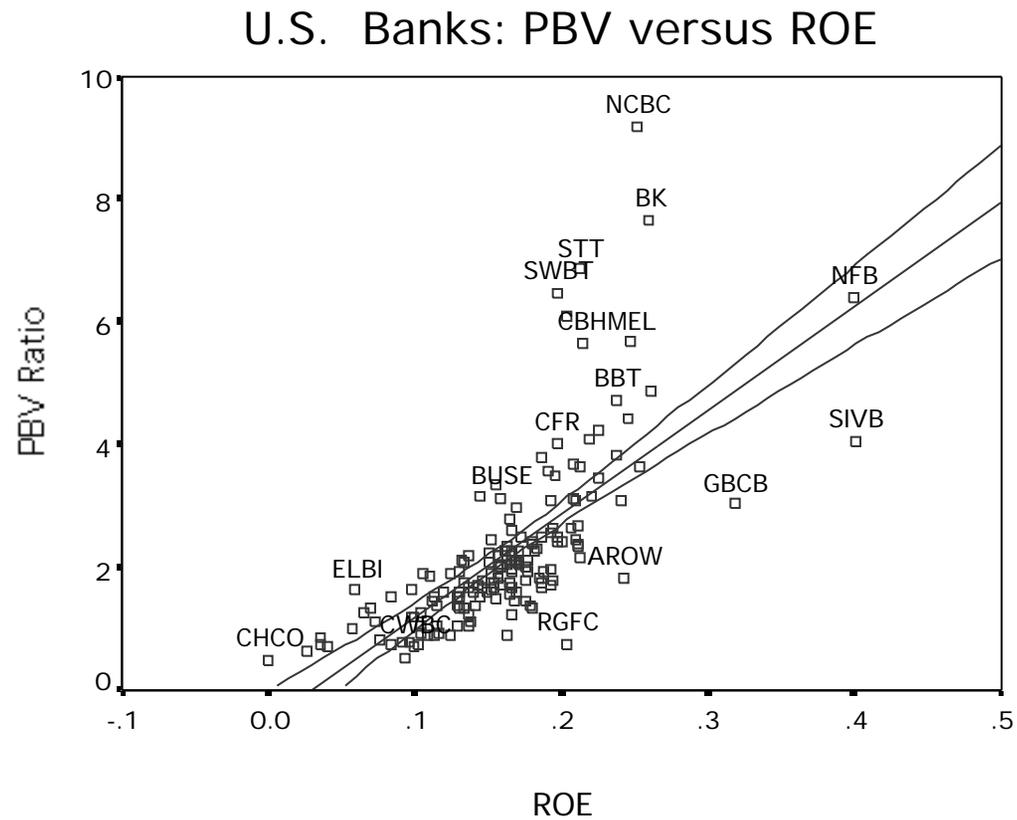
What to control for...

Multiple	Variables that determine it...
PE Ratio	Expected Growth , Risk, Payout Ratio
PBV Ratio	Return on Equity , Expected Growth, Risk, Payout
Ratio	
PS Ratio	Net Margin , Expected Growth, Risk, Payout Ratio
EVV/EBITDA	Expected Growth, Reinvestment rate , Cost of capital
EV/ Sales	Operating Margin , Expected Growth, Risk,
Reinvestment	

Application Tests

- Given the firm that we are valuing, what is a “comparable” firm?
 - While traditional analysis is built on the premise that firms in the same sector are comparable firms, valuation theory would suggest that a comparable firm is one which is similar to the one being analyzed in terms of fundamentals.
 - **Proposition 4: There is no reason why a firm cannot be compared with another firm in a very different business, if the two firms have the same risk, growth and cash flow characteristics.**
- Given the comparable firms, how do we adjust for differences across firms on the fundamentals?
 - **Proposition 5: It is impossible to find an exactly identical firm to the one you are valuing.**

Comparing PBV Ratios: Investment Banks



PBV versus ROE

Dependent variable is: PBV

$$\text{Price to Book}_{\text{U.S. BANKS}} = -0.481 + 16.885 \text{ ROE} \quad R^2 = 49\%$$

(2.07) (12.47)

- Every 1% difference in return on equity, translates into a difference of price to book ratio of 0.16885.
- For any given firm, say Bank of New York, with a return on equity of 26%, you would get a predicted price to book ratio:

$$\text{PBV} = -0.481 + 16.885 (.26) = 3.91$$

Back to Lemmings...

