

# Intrinsic Valuation in a Relative Valuation World....

Aswath Damodaran

## The Essence of relative valuation?

---

- In relative valuation, the value of an asset is compared to the values assessed by the market for similar or comparable assets.
- To do relative valuation then,
  - we need to identify comparable assets and obtain market values for these assets
  - convert these market values into standardized values, since the absolute prices cannot be compared This process of standardizing creates price multiples.
  - compare the standardized value or multiple for the asset being analyzed to the standardized values for comparable asset, controlling for any differences between the firms that might affect the multiple, to judge whether the asset is under or over valued

## Relative valuation is pervasive...

---

- Most valuations on Wall Street are relative valuations.
  - Almost 85% of equity research reports are based upon a multiple and comparables.
  - More than 50% of all acquisition valuations are based upon multiples
  - Rules of thumb based on multiples are not only common but are often the basis for final valuation judgments.
- While there are more discounted cashflow valuations in consulting and corporate finance, they are often relative valuations masquerading as discounted cash flow valuations.
  - The objective in many discounted cashflow valuations is to back into a number that has been obtained by using a multiple.
  - The terminal value in a significant number of discounted cashflow valuations is estimated using a multiple.

## The Reasons for the allure...

---

“If you think I’m crazy, you should see the guy who lives across the hall”

*Jerry Seinfeld talking about Kramer in a Seinfeld episode*

“ A little inaccuracy sometimes saves tons of explanation”

H.H. Munro

“ If you are going to screw up, make sure that you have lots of company”

Ex-portfolio manager

## The Market Imperative....

---

- Relative valuation is much more likely to reflect market perceptions and moods than discounted cash flow valuation. This can be an advantage when it is important that the price reflect these perceptions as is the case when
  - the objective is to sell a security at that price today (as in the case of an IPO)
  - investing on “momentum” based strategies
- With relative valuation, there will always be a significant proportion of securities that are under valued and over valued.
- Since portfolio managers are judged based upon how they perform on a relative basis (to the market and other money managers), relative valuation is more tailored to their needs
- Relative valuation generally requires less information than discounted cash flow valuation (especially when multiples are used as screens)

## Relative Valuation in an Intrinsic value world....

---

- Even if you are a true believer in discounted cashflow valuation, presenting your findings on a relative valuation basis will make it more likely that your findings/recommendations will reach a receptive audience.
- In some cases, relative valuation can help find weak spots in discounted cash flow valuations and fix them.
- The problem with multiples is not in their use but in their abuse. If we can find ways to frame multiples right, we should be able to use them better.

# The Four Steps to Deconstructing Multiples

---

- Define the multiple
  - In use, the same multiple can be defined in different ways by different users. When comparing and using multiples, estimated by someone else, it is critical that we understand how the multiples have been estimated
- Describe the multiple
  - Too many people who use a multiple have no idea what its cross sectional distribution is. If you do not know what the cross sectional distribution of a multiple is, it is difficult to look at a number and pass judgment on whether it is too high or low.
- Analyze the multiple
  - It is critical that we understand the fundamentals that drive each multiple, and the nature of the relationship between the multiple and each variable.
- Apply the multiple
  - Defining the comparable universe and controlling for differences is far more difficult in practice than it is in theory.

# 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

## Enterprise Value /EBITDA Multiple

- The enterprise value to EBITDA multiple is obtained by netting cash out against debt to arrive at enterprise value and dividing by EBITDA.

$$\frac{\text{Enterprise Value}}{\text{EBITDA}} = \frac{\text{Market Value of Equity} + \text{Market Value of Debt} - \text{Cash}}{\text{Earnings before Interest, Taxes and Depreciation}}$$

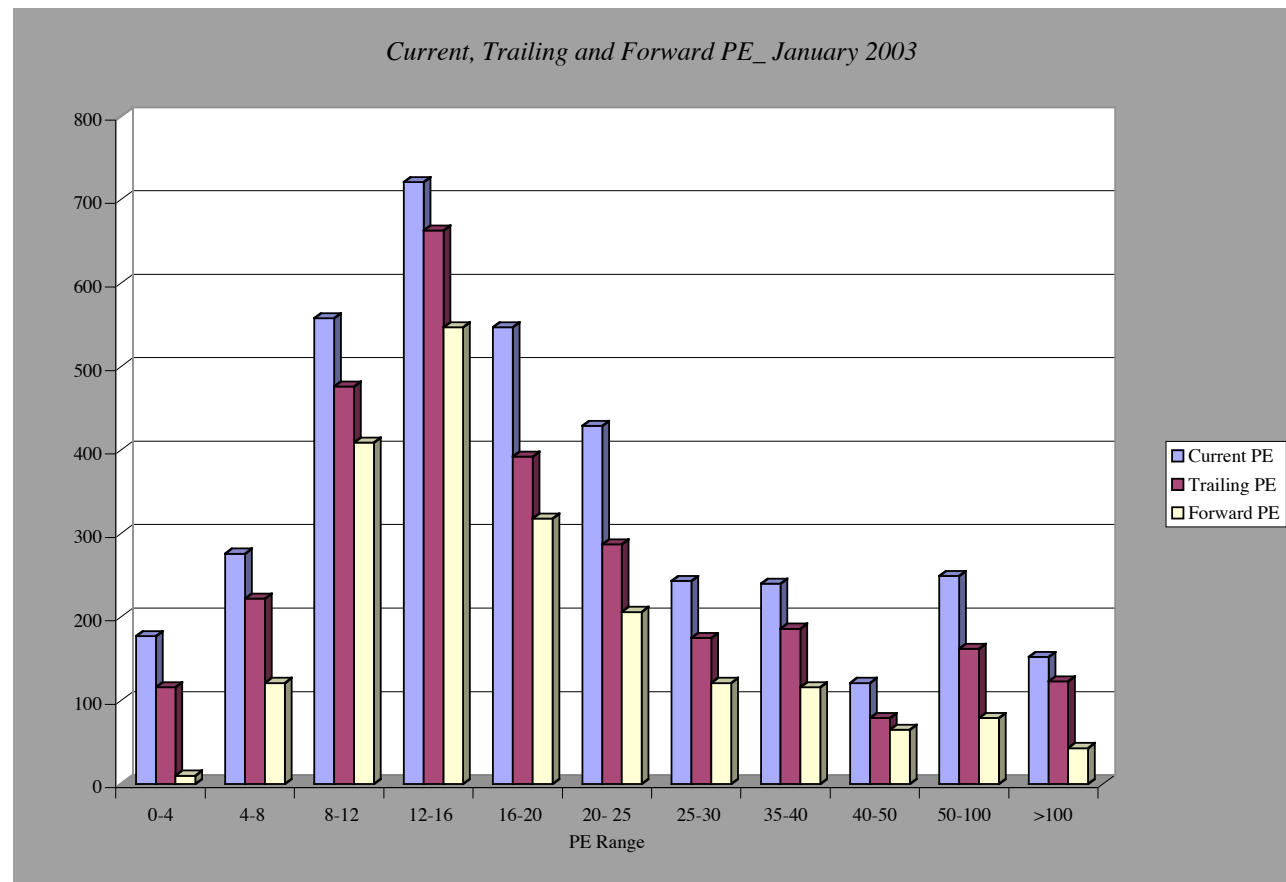
- Why do we net out cash from firm value?
- What happens if a firm has cross holdings which are categorized as:
  - Minority interests?
  - Majority active interests?

# 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?

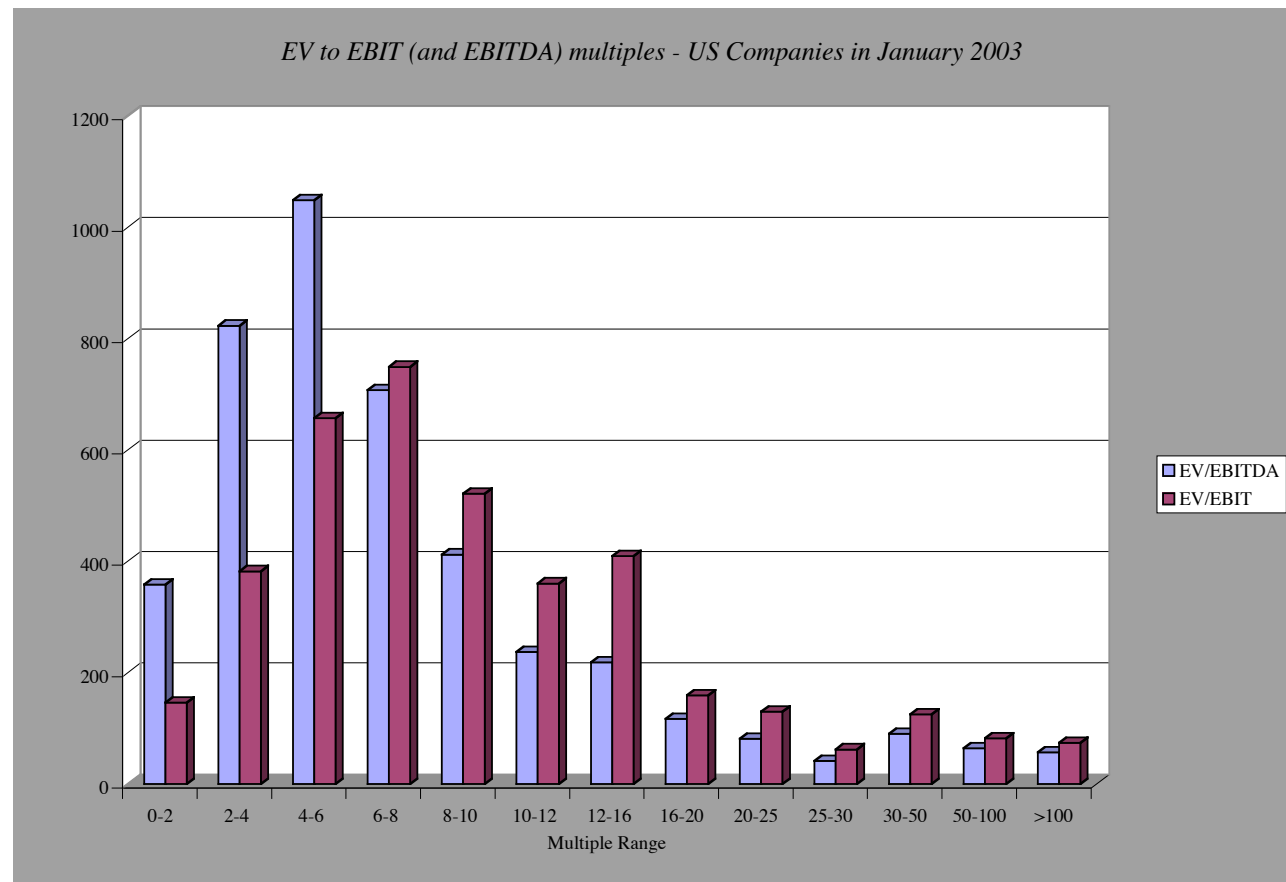
# PE Ratio: Descriptive Statistics for US



## PE: Deciphering the Distribution

	<i>Current PE</i>	<i>Trailing PE</i>	<i>Forward PE</i>
Mean	33.36	32.75	24.46
Standard Error	2.02	2.21	1.20
Median	16.68	15.42	15.29
Skewness	23.78	18.98	15.42
Minimum	0.81	0.92	2.72
Maximum	4382.00	4008.00	1364.00
Count	3721	2973	2035
100th largest	135.33	119.41	55.88
100th smallest	2.18	0.03	7.45

# Enterprise Value/EBITDA Distribution



# 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.**

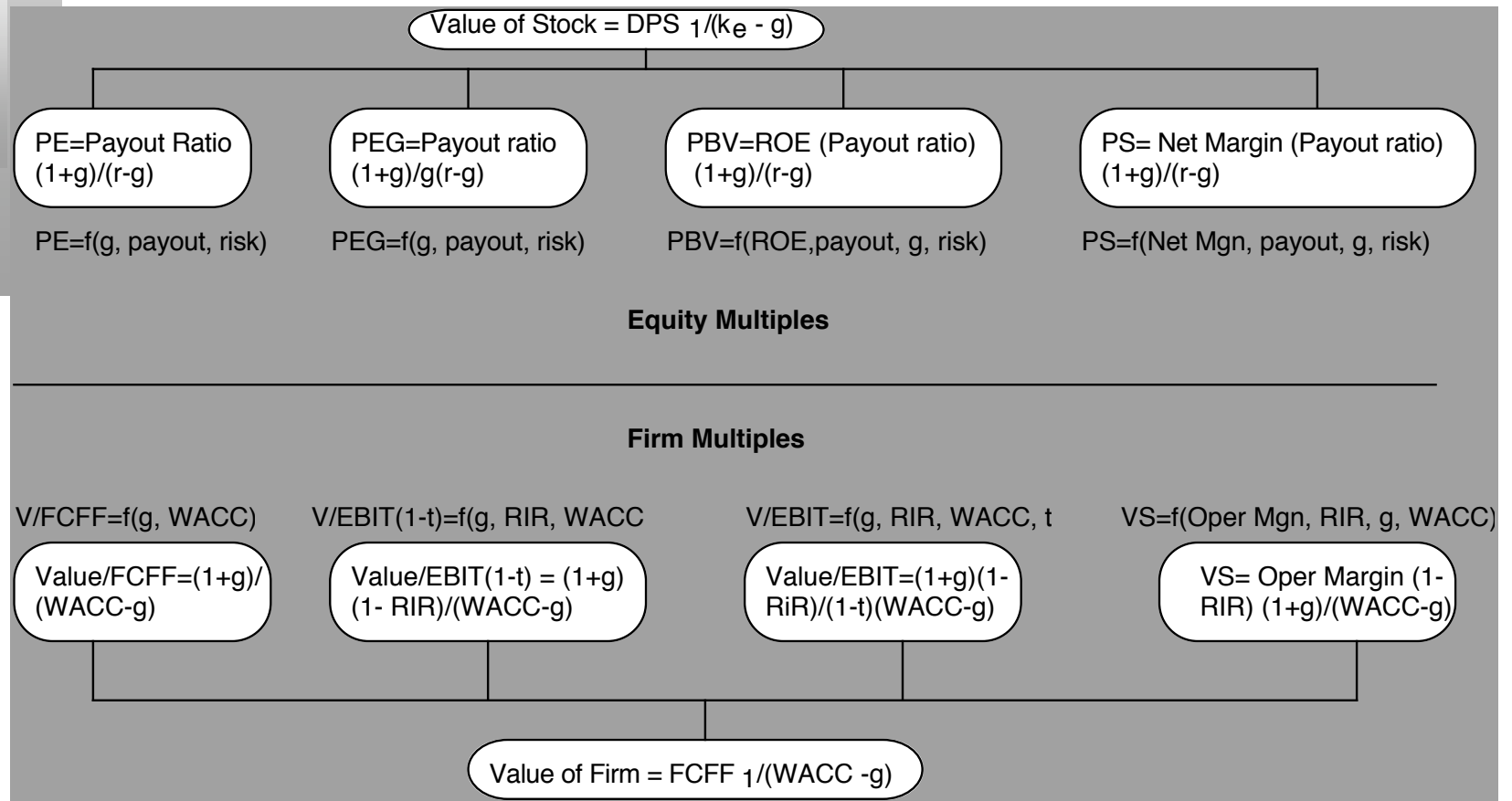
## Relative Value and Fundamentals: Equity Multiples

- Gordon Growth Model: 
$$P_0 = \frac{DPS_1}{r - g_n}$$
- 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,

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



# The Determinants of Multiples...



## Using the Fundamental Model to Estimate PE For a High Growth Firm

- The price-earnings ratio for a high growth firm can also be related to fundamentals. In the special case of the two-stage dividend discount model, this relationship can be made explicit fairly simply:

$$P_0 = \frac{EPS_0 * \text{Payout Ratio} * (1+g) * \frac{(1+g)^n}{(1+r)^n}}{r-g} + \frac{EPS_0 * \text{Payout Ratio}_n * (1+g)^n * (1+g_n)}{(r-g_n)(1+r)^n}$$

- For a firm that does not pay what it can afford to in dividends, substitute FCFE/Earnings for the payout ratio.
- Dividing both sides by the earnings per share:

$$\frac{P_0}{EPS_0} = \frac{\text{Payout Ratio} * (1+g) * \frac{(1+g)^n}{(1+r)^n}}{r-g} + \frac{\text{Payout Ratio}_n * (1+g)^n * (1+g_n)}{(r-g_n)(1+r)^n}$$

## A Simple Example

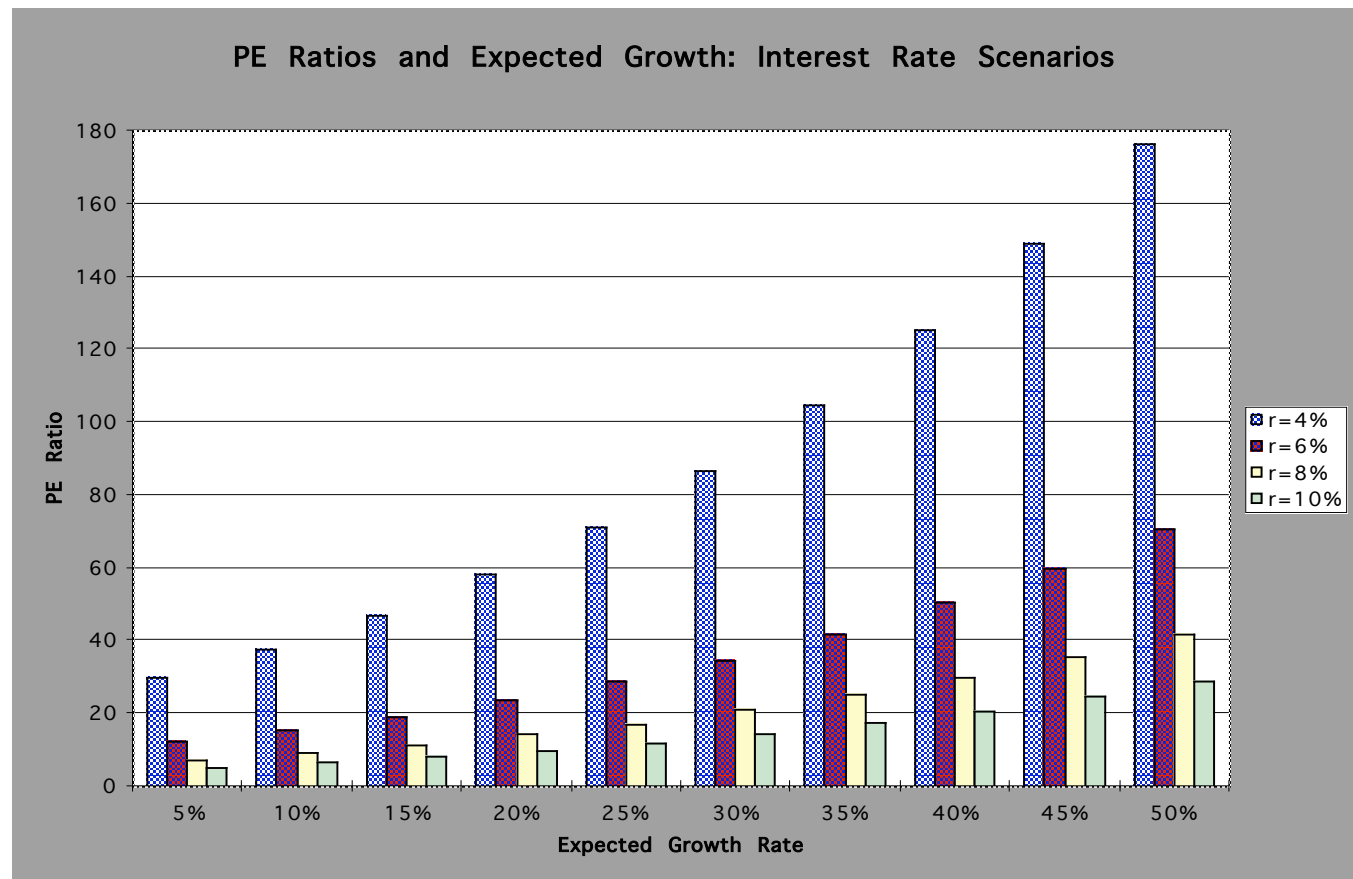
- Assume that you have been asked to estimate the PE ratio for a firm which has the following characteristics:

Variable	High Growth Phase	Stable Growth Phase
Expected Growth Rate	25%	8%
Payout Ratio	20%	50%
Beta	1.00	1.00
Number of years	5 years	Forever after year 5

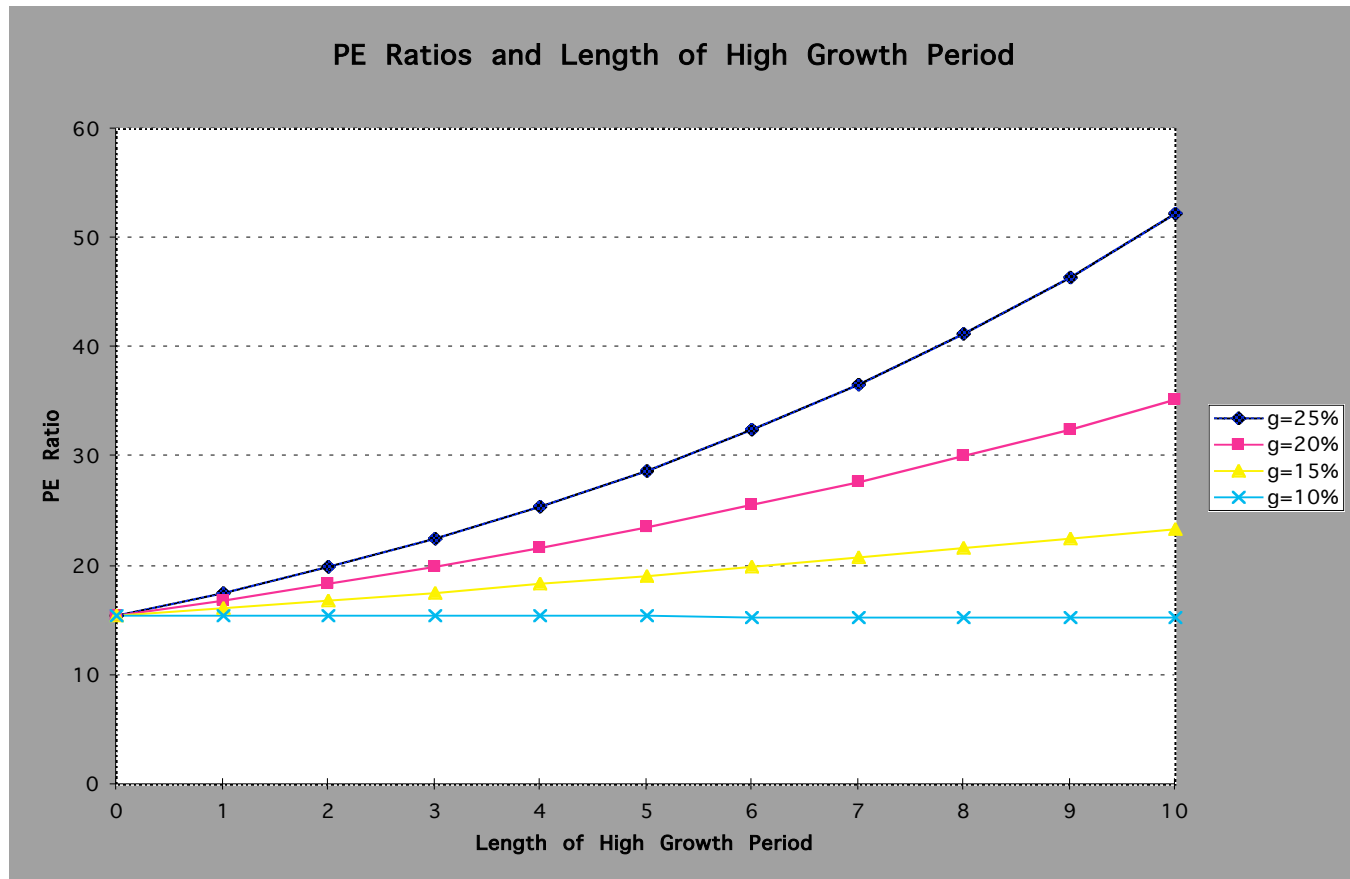
- Riskfree rate = T.Bond Rate = 6%
- Required rate of return = 6% + 1(5.5%)= 11.5%

$$PE = \frac{0.2 * (1.25) * \frac{(1.25)^5}{(1.115)^5}}{(.115 - .25)} + \frac{0.5 * (1.25)^5 * (1.08)}{(.115 - .08) (1.115)^5} = 28.75$$

# PE and Growth: Firm grows at $x\%$ for 5 years, 8% thereafter

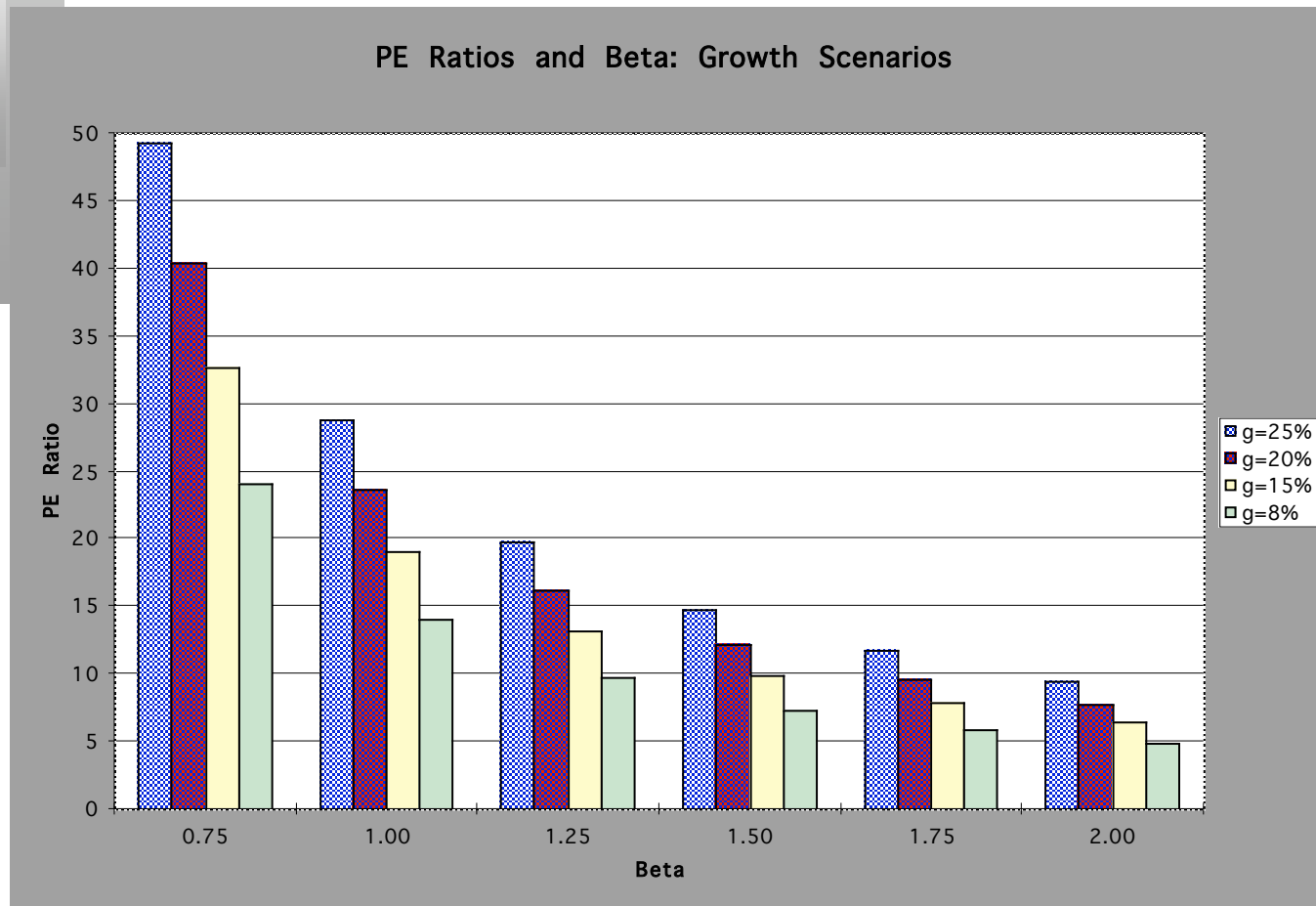


# PE Ratios and Length of High Growth: 25% growth for n years; 8% thereafter

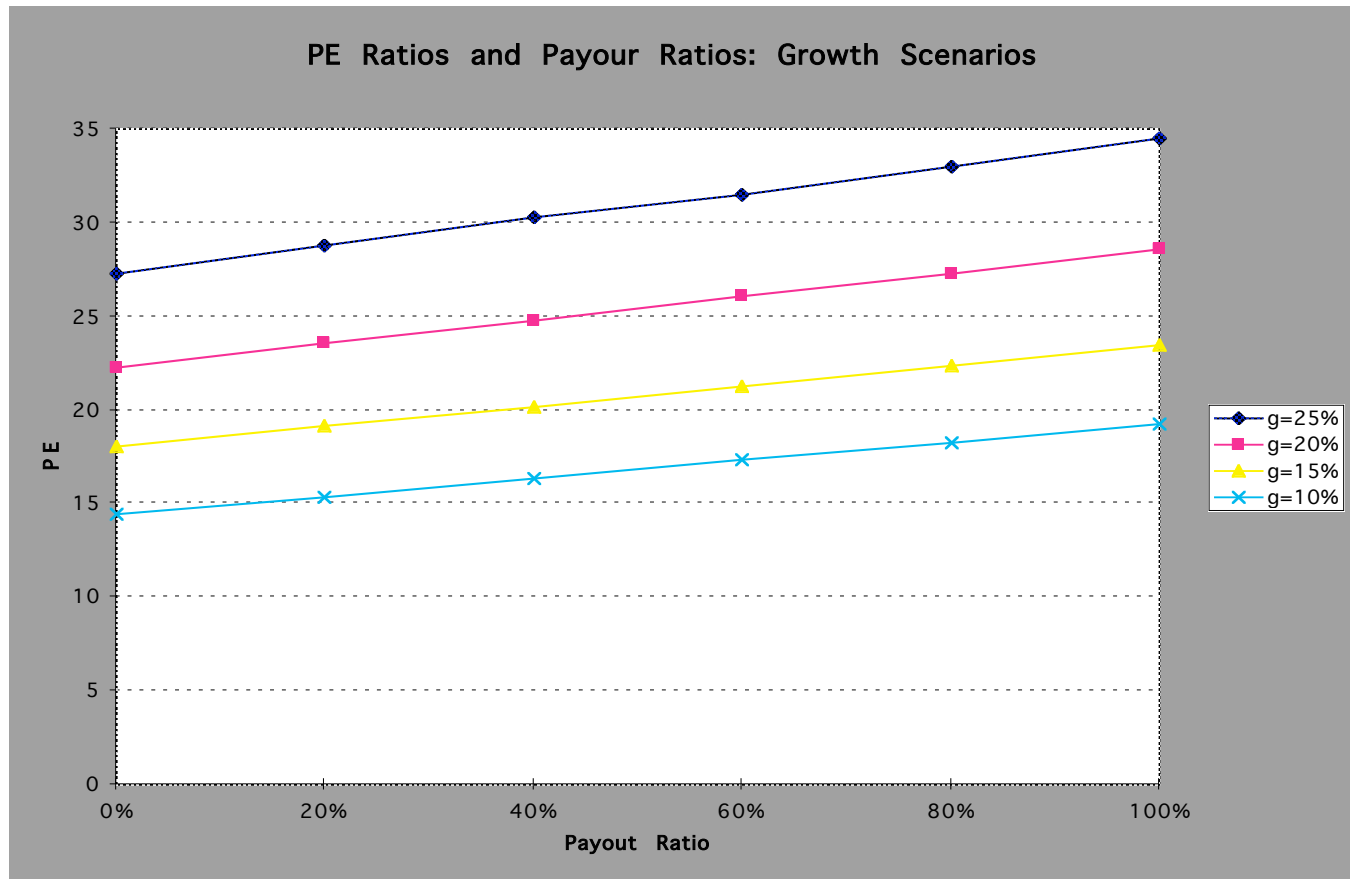


# PE and Risk: Effects of Changing Betas on PE Ratio:

Firm with  $x\%$  growth for 5 years; 8% thereafter



# PE and Payout



# 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 PE Ratios across a Sector

<i>Company Name</i>	<i>PE</i>	<i>Growth</i>
<i>PT Indosat ADR</i>	<i>7.8</i>	<i>0.06</i>
<i>Telebras ADR</i>	<i>8.9</i>	<i>0.075</i>
<i>Telecom Corporation of New Zealand ADR</i>	<i>11.2</i>	<i>0.11</i>
<i>Telecom Argentina Stet - France Telecom SA ADR B</i>	<i>12.5</i>	<i>0.08</i>
<i>Hellenic Telecommunication Organization SA ADR</i>	<i>12.8</i>	<i>0.12</i>
<i>Telecomunicaciones de Chile ADR</i>	<i>16.6</i>	<i>0.08</i>
<i>Swisscom AG ADR</i>	<i>18.3</i>	<i>0.11</i>
<i>Asia Satellite Telecom Holdings ADR</i>	<i>19.6</i>	<i>0.16</i>
<i>Portugal Telecom SA ADR</i>	<i>20.8</i>	<i>0.13</i>
<i>Telefonos de Mexico ADR L</i>	<i>21.1</i>	<i>0.14</i>
<i>Matav RT ADR</i>	<i>21.5</i>	<i>0.22</i>
<i>Telstra ADR</i>	<i>21.7</i>	<i>0.12</i>
<i>Gilat Communications</i>	<i>22.7</i>	<i>0.31</i>
<i>Deutsche Telekom AG ADR</i>	<i>24.6</i>	<i>0.11</i>
<i>British Telecommunications PLC ADR</i>	<i>25.7</i>	<i>0.07</i>
<i>Tele Danmark AS ADR</i>	<i>27</i>	<i>0.09</i>
<i>Telekomunikasi Indonesia ADR</i>	<i>28.4</i>	<i>0.32</i>
<i>Cable &amp; Wireless PLC ADR</i>	<i>29.8</i>	<i>0.14</i>
<i>APT Satellite Holdings ADR</i>	<i>31</i>	<i>0.33</i>
<i>Telefonica SA ADR</i>	<i>32.5</i>	<i>0.18</i>
<i>Royal KPN NV ADR</i>	<i>35.7</i>	<i>0.13</i>
<i>Telecom Italia SPA ADR</i>	<i>42.2</i>	<i>0.14</i>
<i>Nippon Telegraph &amp; Telephone ADR</i>	<i>44.3</i>	<i>0.2</i>
<i>France Telecom SA ADR</i>	<i>45.2</i>	<i>0.19</i>
<i>Korea Telecom ADR</i>	<i>71.3</i>	<i>0.44</i>

## PE, Growth and Risk

---

Dependent variable is: PE

R squared = 66.2%    R squared (adjusted) = 63.1%

Variable	Coefficient	SE	t-ratio	prob
Constant	13.1151	3.471	3.78	0.0010
Growth rate	121.223	19.27	6.29	$\leq 0.0001$
Emerging Market	-13.8531	3.606	-3.84	0.0009

Emerging Market is a dummy: 1 if emerging market  
0 if not

## Is Telebras under valued?

---

- Predicted PE =  $13.12 + 121.22 (.075) - 13.85 (1) = 8.35$
- At an actual price to earnings ratio of 8.9, Telebras is slightly overvalued.
- Consider Hellenic Telecom:
  - Predicted PE as a developed market company =  $13.12 + 121.22 (.12) = 27.66$
  - Predicted PE as an emerging market company =  $13.12 + 121.22 (.12) - 13.85 = 13.82$
  - At its actual PE ratio of 12.8, Hellenic is massively undervalued as a developed market company but close to fairly valued as an emerging market company.

## PBV/ROE: European Banks

<i>Bank</i>	<i>Symbol</i>	<i>PBV</i>	<i>ROE</i>
Banca di Roma SpA	BAHQE	0.60	4.15%
Commerzbank AG	COHSO	0.74	5.49%
Bayerische Hypo und Vereinsbank AG	BAXWW	0.82	5.39%
Intesa Bci SpA	BAEWF	1.12	7.81%
Natexis Banques Populaires	NABQE	1.12	7.38%
Almanij NV Algemene Mij voor Nijver	ALPK	1.17	8.78%
Credit Industriel et Commercial	CIECM	1.20	9.46%
Credit Lyonnais SA	CREV	1.20	6.86%
BNL Banca Nazionale del Lavoro SpA	BAEXC	1.22	12.43%
Banca Monte dei Paschi di Siena SpA	MOGG	1.34	10.86%
<b>Deutsche Bank AG</b>	<b>DEMXX</b>	<b>1.36</b>	<b>17.33%</b>
Skandinaviska Enskilda Banken	SKHS	1.39	16.33%
Nordea Bank AB	NORDEA	1.40	13.69%
<b>DNB Holding ASA</b>	<b>DNHLD</b>	<b>1.42</b>	<b>16.78%</b>
ForeningsSparbanken AB	FOLG	1.61	18.69%
Danske Bank AS	DANKAS	1.66	19.09%
<b>Credit Suisse Group</b>	<b>CRGAL</b>	<b>1.68</b>	<b>14.34%</b>
KBC Bankverzekeringsholding	KBCBA	1.69	30.85%
Societe Generale	SODI	1.73	17.55%
<b>Santander Central Hispano SA</b>	<b>BAZAB</b>	<b>1.83</b>	<b>11.01%</b>
National Bank of Greece SA	NAGT	1.87	26.19%
San Paolo IMI SpA	SAOEL	1.88	16.57%
BNP Paribas	BNPRB	2.00	18.68%
Svenska Handelsbanken AB	SVKE	2.12	21.82%
UBS AG	UBQH	2.15	16.64%
Banco Bilbao Vizcaya Argentaria SA	BBFUG	2.18	22.94%
ABN Amro Holding NV	ABTS	2.21	24.21%
UniCredito Italiano SpA	UNCZA	2.25	15.90%
Rolo Banca 1473 SpA	ROGMBA	2.37	16.67%
Dexia	DECCT	2.76	14.99%
Average		1.60	14.96%

## PBV versus ROE regression

---

- Regressing PBV ratios against ROE for banks yields the following regression:  
$$\text{PBV} = 0.81 + 5.32 (\text{ROE}) \quad R^2 = 46\%$$
- For every 1% increase in ROE, the PBV ratio should increase by 0.0532.

## Under and Over Valued Banks?

<i>Bank</i>	<i>Actual</i>	<i>Predicted</i>	<i>Under or Over</i>
Banca di Roma SpA	0.60	1.03	-41.33%
Commerzbank AG	0.74	1.10	-32.86%
Bayerische Hypo und Vereinsbank AG	0.82	1.09	-24.92%
Intesa Bci SpA	1.12	1.22	-8.51%
Natexis Banques Populaires	1.12	1.20	-6.30%
Almanij NV Algemene Mij voor Nijver	1.17	1.27	-7.82%
Credit Industriel et Commercial	1.20	1.31	-8.30%
Credit Lyonnais SA	1.20	1.17	2.61%
BNL Banca Nazionale del Lavoro SpA	1.22	1.47	-16.71%
Banca Monte dei Paschi di Siena SpA	1.34	1.39	-3.38%
Deutsche Bank AG	1.36	1.73	-21.40%
Skandinaviska Enskilda Banken	1.39	1.68	-17.32%
Nordea Bank AB	1.40	1.54	-9.02%
DNB Holding ASA	1.42	1.70	-16.72%
ForeningsSparbanken AB	1.61	1.80	-10.66%
Danske Bank AS	1.66	1.82	-9.01%
Credit Suisse Group	1.68	1.57	7.20%
KBC Bankverzekeringsholding	1.69	2.45	-30.89%
Societe Generale	1.73	1.74	-0.42%
Santander Central Hispano SA	1.83	1.39	31.37%
National Bank of Greece SA	1.87	2.20	-15.06%
San Paolo IMI SpA	1.88	1.69	11.15%
BNP Paribas	2.00	1.80	11.07%
Svenska Handelsbanken AB	2.12	1.97	7.70%
UBS AG	2.15	1.69	27.17%
Banco Bilbao Vizcaya Argentaria SA	2.18	2.03	7.66%
ABN Amro Holding NV	2.21	2.10	5.23%
UniCredito Italiano SpA	2.25	1.65	36.23%
Rolo Banca 1473 SpA	2.37	1.69	39.74%
Dexia	2.76	1.61	72.04%

## Using the entire crosssection: A regression approach

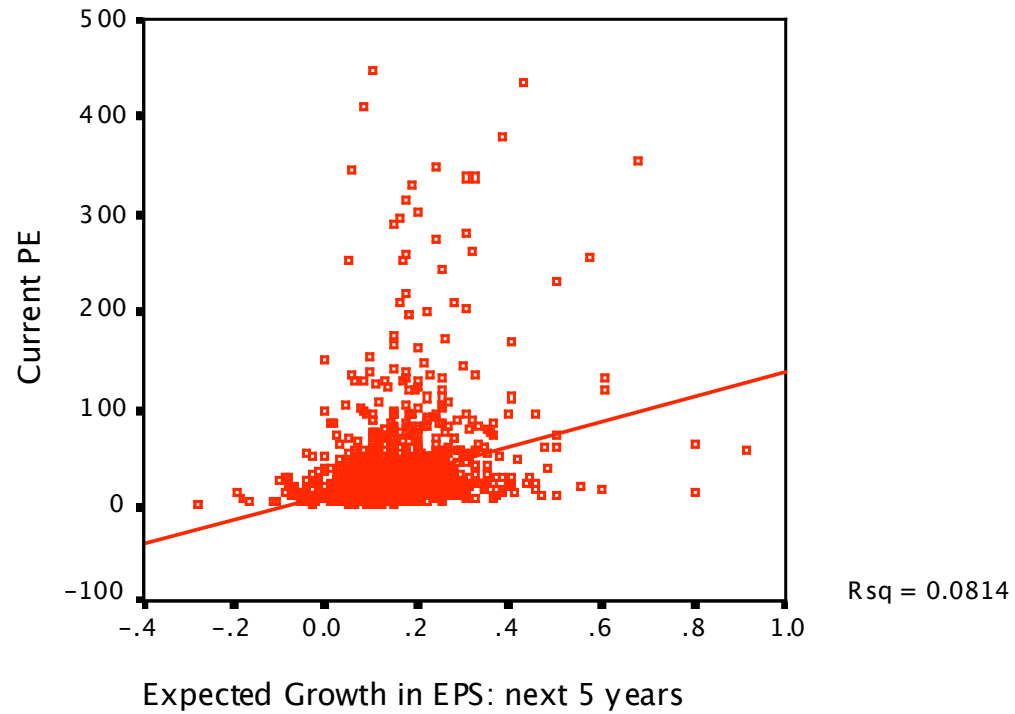
---

- In contrast to the 'comparable firm' approach, the information in the entire cross-section of firms can be used to predict PE ratios.
- The simplest way of summarizing this information is with a multiple regression, with the PE ratio as the dependent variable, and proxies for risk, growth and payout forming the independent variables.

# PE versus Growth

PE versus Expected Growth Rate- January 2003

All companies in the US





# PE Ratio: Standard Regression

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.572 <sup>a</sup>	.327	.325	2229.487353015641000

a. Predictors: (Constant), Value Line Beta, Expected Growth in EPS: next 5 years, Payout Ratio

Coefficients<sup>a,b</sup>

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B		Correlations		
		B	Std. Error	Beta			Lower Bound	Upper Bound	Zero-order	Partial	Part
1	(Constant)	-22.234	3.670		-6.059	.000	-29.436	-15.033			
	Payout Ratio	45.637	3.194	.376	14.289	.000	39.370	51.904	.303	.409	.368
	Expected Growth in EPS: next 5 years	262.095	13.954	.490	18.782	.000	234.713	289.477	.435	.508	.484
	Value Line Beta	.882	2.835	.008	.311	.756	-4.682	6.446	-.018	.010	.008

a. Dependent Variable: Current PE

b. Weighted Least Squares Regression – Weighted by Market Cap \$ (Mil)

## The value of growth

---

Time Period	Value of extra 1% of growth	Equity Risk Premium
January 2003	2.621	4.10%
July 2002	0.859	4.35%
January 2002	1.003	3.62%
July 2001	1.251	3.05%
January 2001	1.457	2.75%
July 2000	1.761	2.20%
January 2000	2.105	2.05%

The value of growth is in terms of additional PE...