

Relative valuation across the entire market: Why not?

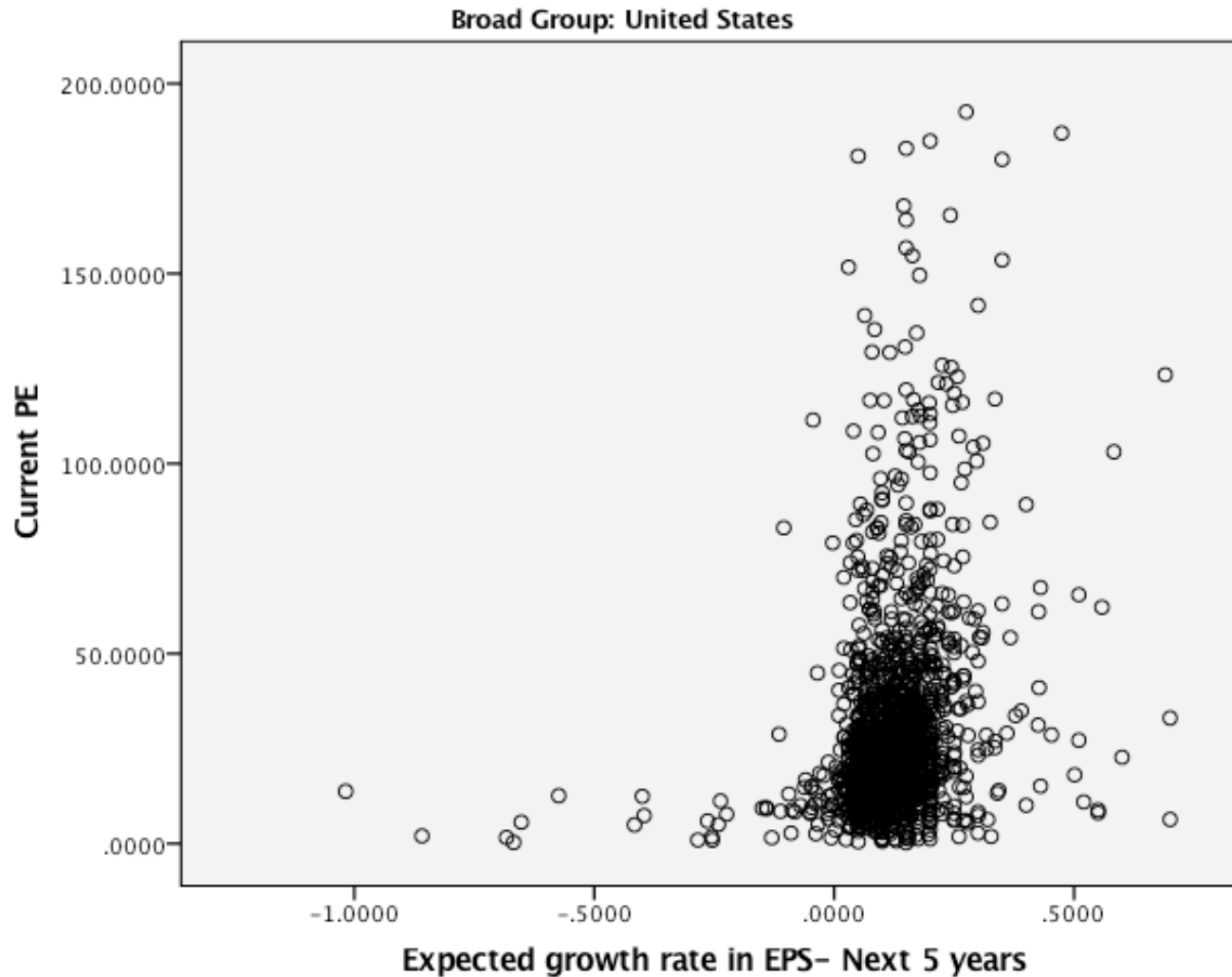
85

- 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.

I. PE Ratio versus the market

PE versus Expected EPS Growth: January 2016

86



PE Ratio: Standard Regression for US stocks - January 2016

87

Model Summary^{a,c,d}

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.637 ^b	.406	.405	1134.38185

a. Broad Group = United States

b. Predictors: (Constant), Beta, Expected growth rate in EPS- Next 5 years, Payout ratio

The regression is run with growth and payout entered as decimals, i.e., 25% is entered as 0.25)

Coefficients^{a,b,c}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.759	1.313		6.673	.000
	Expected growth rate in EPS- Next 5 years	75.241	5.170	.363	14.555	.000
	Payout ratio	19.730	.883	.593	22.347	.000
	Beta	-4.079	.848	-.124	-4.810	.000

a. Broad Group = United States

b. Dependent Variable: Trailing PE

c. Weighted Least Squares Regression - Weighted by Market Cap (in US \$)

Problems with the regression methodology

88

- The basic regression assumes a linear relationship between PE ratios and the financial proxies, and that might not be appropriate.
- The basic relationship between PE ratios and financial variables itself might not be stable, and if it shifts from year to year, the predictions from the model may not be reliable.
- The independent variables are correlated with each other. For example, high growth firms tend to have high risk. This multi-collinearity makes the coefficients of the regressions unreliable and may explain the large changes in these coefficients from period to period.

The Multicollinearity Problem

89

		Trailing PE	Expected growth rate in EPS- Next 5 years	Payout ratio	Beta
Trailing PE	Pearson Correlation	1	.168**	.295**	.018
	Sig. (2-tailed)		.000	.000	.328
	N	3140	1768	1724	3022
Expected growth rate in EPS- Next 5 years	Pearson Correlation	.168**	1	-.215**	.022
	Sig. (2-tailed)	.000		.000	.286
	N	1768	2400	1076	2308
Payout ratio	Pearson Correlation	.295**	-.215**	1	-.058*
	Sig. (2-tailed)	.000	.000		.016
	N	1724	1076	1727	1700
Beta	Pearson Correlation	.018	.022	-.058*	1
	Sig. (2-tailed)	.328	.286	.016	
	N	3022	2308	1700	6662

** . Correlation is significant at the 0.01 level (2-tailed).
 * . Correlation is significant at the 0.05 level (2-tailed).
 a. Broad Group = United States

Using the PE ratio regression

90

- Assume that you were given the following information for Disney. The firm has an expected growth rate of 15%, a beta of 1.25 and a 20% dividend payout ratio. Based upon the regression, estimate the predicted PE ratio for Disney.
 - ▣ Predicted PE = 8.76 -4.08 Beta + 75.24 Growth + 19.73 (Payout)

- Disney is actually trading at 20 times earnings. What does the predicted PE tell you?

- Assume now that you value Disney against just its peer group. Will you come to the same valuation judgment as you did when you looked at it relative to the market? Why or why not?

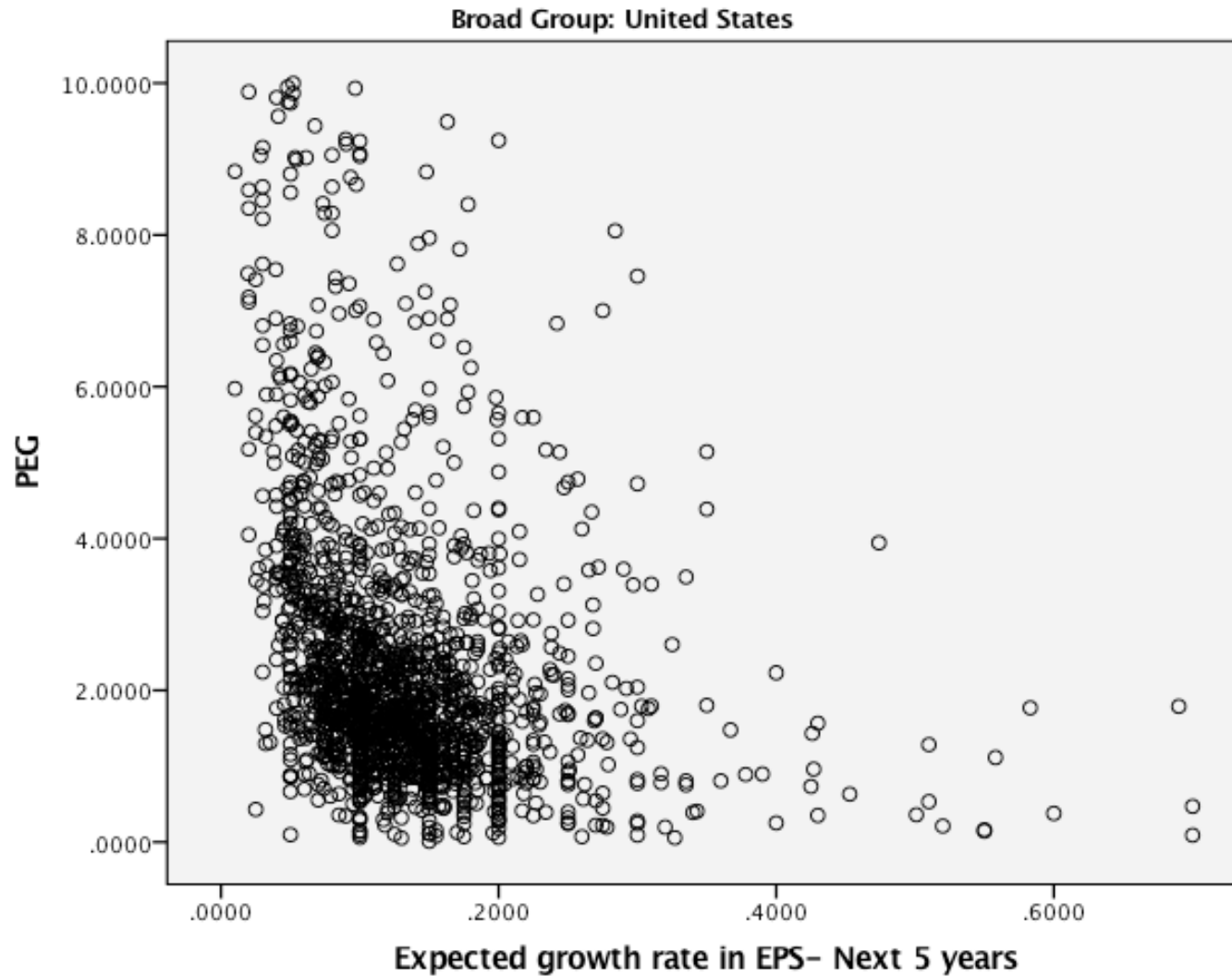
The value of growth

91

Date	Market price of extra % growth	Implied ERP
Jan-16	0.75	6.12%
Jan-15	0.99	5.78%
Jan-14	1.49	4.96%
Jan-13	0.577	5.78%
Jan-12	0.408	6.04%
Jan-11	0.836	5.20%
Jan-10	0.55	4.36%
Jan-09	0.78	6.43%
Jan-08	1.427	4.37%
Jan-07	1.178	4.16%
Jan-06	1.131	4.07%
Jan-05	0.914	3.65%
Jan-04	0.812	3.69%
Jan-03	2.621	4.10%
Jan-02	1.003	3.62%
Jan-01	1.457	2.75%
Jan-00	2.105	2.05%

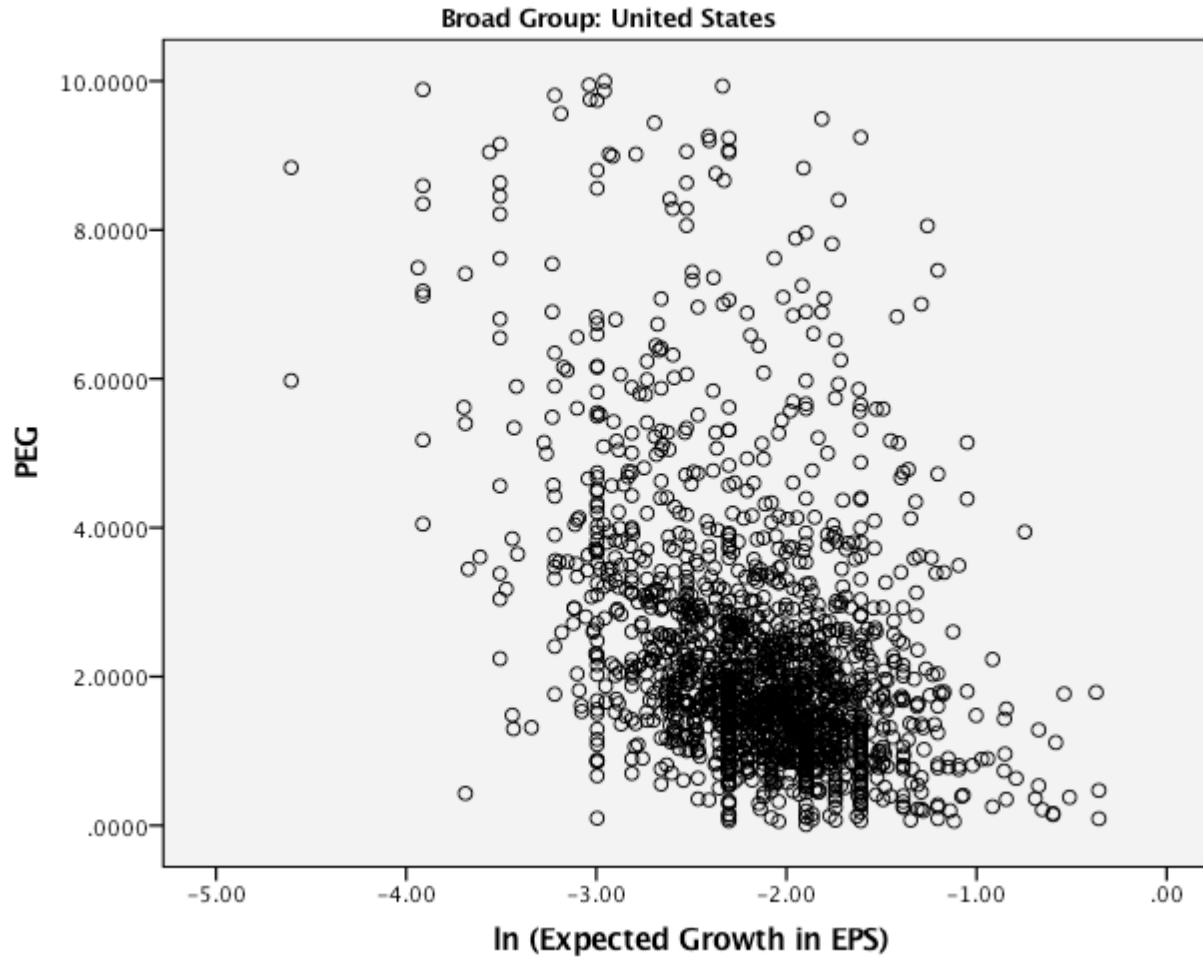
II. PEG Ratio versus the market PEG versus Growth

92



PEG versus $\ln(\text{Expected Growth})$

93



PEG Ratio Regression - US stocks

January 2016

94

Model Summary^{a,c,d}

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.717 ^b	.514	.513	133.686530

a. Broad Group = United States

b. Predictors: (Constant), ln (Expected Growth in EPS), Payout ratio, Beta

c. Dependent Variable: PEG

d. Weighted Least Squares Regression - Weighted by Market

Coefficients^{a,b,c}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-.580	.265		-2.187	.029
	Payout ratio	1.848	.109	.420	16.980	.000
	Beta	-.675	.106	-.159	-6.361	.000
	ln (Expected Growth in EPS)	-1.248	.087	-.348	-14.427	.000

a. Broad Group = United States

b. Dependent Variable: PEG

c. Weighted Least Squares Regression - Weighted by Market Cap (in US \$)

Negative intercepts...and problem forecasts..

95

- When the intercept in a multiples regression is negative, there is the possibility that forecasted values can be negative as well. One way (albeit imperfect) is to re-run the regression without an intercept.

Coefficients^{a,b,c}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	ln (Expected Growth in EPS)	-1.277	.052	-1.008	-24.640	.000
	Beta	-.878	.083	-.355	-10.614	.000
	Payout ratio	1.027	.118	.215	8.731	.000

a. Broad Group = United States

b. Dependent Variable: PEG

c. Linear Regression through the Origin

I. PE ratio regressions across markets – January 2016

96

Region	Regression – January 2016	R ²
US	PE = 8.76 + 75.24 g _{EPS} + 19.73 Payout – 4.08 Beta	40.5%
Europe	PE = 13.43 + 54.46 g _{EPS} + 17.63 Payout - 4.16 Beta	24.7%
Japan	PE = 20.10+ 26.46 g _{EPS} + 24.87 Payout – 7.60 Beta	28.4%
Emerging Markets	PE = 15.13 + 40.99 g _{EPS} + 9.03 Payout - 2.14 Beta	11.5%
Australia, NZ, Canada	PE = 7.31 + 73.42 g _{EPS} + 13.94 Payout – 3.73 Beta	26.8%
Global	PE = 12.51 + 87.48 g _{EPS} + 11.48 Payout - 3.96 Beta	27.5%

g_{EPS}=Expected Growth: Expected growth in EPS or Net Income: Next 5 years

Beta: Regression or Bottom up Beta

Payout ratio: Dividends/ Net income from most recent year. Set to zero, if net income < 0

II. Price to Book Ratio: Fundamentals hold in every market

97

Region	Regression – January 2016	R ²
US	$PBV = -1.68 + 14.59 g_{EPS} - 0.99 \text{ Beta} + 3.79 \text{ Payout} + 19.58 \text{ ROE}$	50.2%
Europe	$PBV = 2.66 + 6.30 g_{EPS} - 1.40 \text{ Beta} + 9.39 \text{ ROE} + 1.80 \text{ Payout}$	40.6%
Japan	$PBV = 2.01 + 2.15 g_{EPS} - 1.18 \text{ Beta} + 0.97 \text{ Payout} + 8.28 \text{ ROE}$	29.1%
Emerging Markets	$PBV = -0.43 + 2.71 g_{EPS} - 0.74 \text{ Beta} + 2.48 \text{ Payout} + 18.91 \text{ ROE}$	34.1%
Australia, NZ, Canada	$PBV = -1.20 + 8.97 g_{EPS} - 0.69 \text{ Beta} + 1.01 \text{ Payout} + 21.90 \text{ ROE}$	55.4%
Global	$PBV = 0.22 + 5.41 g_{EPS} - 0.95 \text{ Beta} + 2.68 \text{ Payout} + 16.09 \text{ ROE}$	43.1%

g_{EPS}=Expected Growth: Expected growth in EPS/ Net Income: Next 5 years

Beta: Regression or Bottom up Beta

Payout ratio: Dividends/ Net income from most recent year. Set to zero, if net income < 0

ROE: Net Income/ Book value of equity in most recent year.

III. EV/EBITDA – January 2016

98

Region	Regression – January 2016	R squared
United States	EV/EBITDA= 19.54 + 3.64 g - 1.97 WACC – 12.71 DFR – 3.30 Tax Rate	2.3%
Europe	EV/EBITDA= 17.28 + 18.82 g - 17.94 WACC – 7.55 DFR – 9.10 Tax Rate	9.0%
Japan	EEV/EBITDA= 22.49 + 1.75 g - 79.45 WACC – 6.03 DFR – 19.00 Tax Rate	%
Emerging Markets	EV/EBITDA= 50.71 + 9.57 g - 212.55 WACC – 18.27 DFR – 21.40 Tax Rate	5.9%
Australia, NZ & Canada	EV/EBITDA= 25.86+ 10.10 g - 162.14 WACC – 1.41 DFR – 10.50 Tax Rate	8.6%
Global	EV/EBITDA= 27.42 + 6.90 g -55.15 WACC – 12.03 DFR – 16.20 Tax Rate	3.7%

g = Expected Revenue Growth: Expected growth in revenues: Near term (2 or 5 years)

DFR = Debt Ratio : Total Debt/ (Total Debt + Market value of equity)

Tax Rate: Effective tax rate in most recent year WACC = Cost of capital (in US\$)

IV. EV/Sales Regressions across markets...

99

Region	Regression – January 2016	R Squared
United States	EV/Sales = 7.42 + 2.47 g+ 2.96 Operating Margin – 2.20 DFR- 9.90 Tax rate	10.1%
Europe	EV/Sales = -0.89 + 9.81 g+ 14.63 Operating Margin + 14.91 DFR- 6.10 Tax rate	31.4%
Japan	EV/Sales = 2.02 - 0.48 g+ 8.73 Operating Margin +2.50 DFR- 5.00 Tax rate	13.6%
Emerging Markets	EV/Sales = 5.66 + 5.05 g+ 7.86 Operating Margin -0.55 DFR- 9.80 Tax rate	14.3%
Australia, NZ & Canada	EV/Sales = -0.35 + 12.03 g+ 5.34 Operating Margin + 13.95 DFR- 2.60 Tax rate	36.3%
Global	EV/Sales =4.73+ 3.53 g+ 6.92 Op. Margin + 3.83 DFR- 9.20 Tax rate	11.5%

g =Expected Revenue Growth: Expected growth in revenues: Near term (2 or 5 years)

ERP: ERP for country in which company is incorporated

Tax Rate: Effective tax rate in most recent year; Operating Margin: Operating Income/ Sales ⁹⁹