



Relative PE

Aswath Damodaran

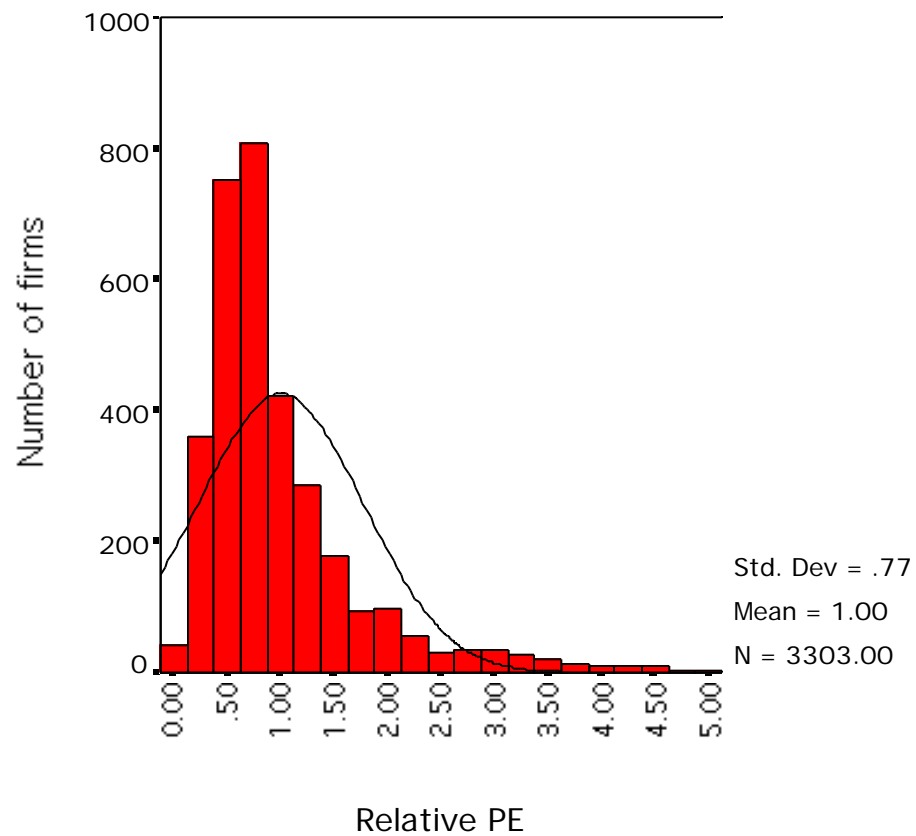
Relative PE: Definition

- The relative PE ratio of a firm is the ratio of the PE of the firm to the PE of the market.

$$\text{Relative PE} = \text{PE of Firm} / \text{PE of Market}$$

- While the PE can be defined in terms of current earnings, trailing earnings or forward earnings, consistency requires that it be estimated using the same measure of earnings for both the firm and the market.
- Relative PE ratios are usually compared over time. Thus, a firm or sector which has historically traded at half the market PE (Relative PE = 0.5) is considered over valued if it is trading at a relative PE of 0.7.

Relative PE: Cross Sectional Distribution



Relative PE: Distributional Statistics

- The average relative PE is always one.
- The median relative PE is much lower, since PE ratios are skewed towards higher values. Thus, more companies trade at PE ratios less than the market PE and have relative PE ratios less than one.

Relative PE: Determinants

- To analyze the determinants of the relative PE ratios, let us revisit the discounted cash flow model we developed for the PE ratio. Using the 2-stage DDM model as our basis (replacing the payout ratio with the FCFE/Earnings Ratio, if necessary), we get

$$\text{Relative PE}_j = \frac{\frac{\text{Payout Ratio}_j * (1 + g_j) * \left[1 - \frac{(1 + g_j)^n}{(1 + r_j)^n} \right]}{r_j - g_j} + \frac{\text{Payout Ratio}_{j,n} * (1 + g_j)^n * (1 + g_{j,n})}{(r_j - g_{j,n})(1 + r_j)^n}}{\frac{\text{Payout Ratio}_m * (1 + g_m) * \left[1 - \frac{(1 + g_m)^n}{(1 + r_m)^n} \right]}{r_m - g_m} + \frac{\text{Payout Ratio}_{m,n} * (1 + g_m)^n * (1 + g_{m,n})}{(r_m - g_{m,n})(1 + r_m)^n}}$$

where $\text{Payout}_j, g_j, r_j$ = Payout, growth and risk of the firm

$\text{Payout}_m, g_m, r_m$ = Payout, growth and risk of the market

Relative PE: A Simple Example

- Consider the following example of a firm growing at twice the rate as the market, while having the same growth and risk characteristics of the market:

	<i>Firm</i>	<i>Market</i>
Expected growth rate	20%	10%
Length of Growth Period	5 years	5 years
Payout Ratio: first 5 yrs	30%	30%
Growth Rate after yr 5	6%	6%
Payout Ratio after yr 5	50%	50%
Beta	1.00	1.00
Riskfree Rate = 6%		

Estimating Relative PE

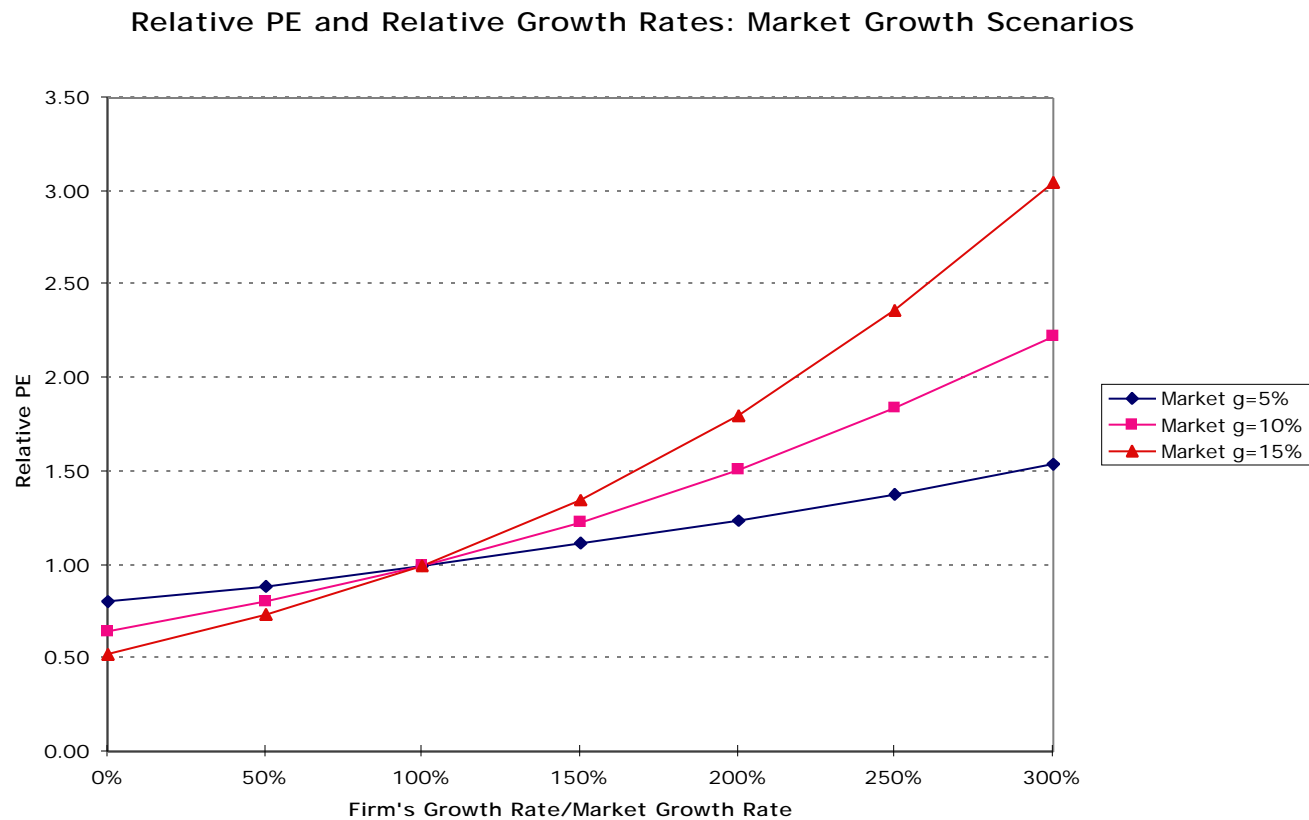
- The relative PE ratio for this firm can be estimated in two steps. First, we compute the PE ratio for the firm and the market separately:

$$PE_{\text{firm}} = \frac{0.3 * (1.20) * 1 - \frac{(1.20)^5}{(1.115)^5}}{(.115 - .20)} + \frac{0.5 * (1.20)^5 * (1.06)}{(.115 - .06) (1.115)^5} = 15.79$$

$$PE_{\text{market}} = \frac{0.3 * (1.10) * 1 - \frac{(1.10)^5}{(1.115)^5}}{(.115 - .10)} + \frac{0.5 * (1.10)^5 * (1.06)}{(.115 - .06) (1.115)^5} = 10.45$$

- Relative PE Ratio = $15.79/10.45 = 1.51$

Relative PE and Relative Growth



Relative PE: Another Example

- In this example, consider a firm with twice the risk as the market, while having the same growth and payout characteristics as the firm:

	<i>Firm</i>	<i>Market</i>
Expected growth rate	10%	10%
Length of Growth Period	5 years	5 years
Payout Ratio: first 5 yrs	30%	30%
Growth Rate after yr 5	6%	6%
Payout Ratio after yr 5	50%	50%
Beta in first 5 years	2.00	1.00
Beta after year 5	1.00	1.00
Riskfree Rate = 6%		

Estimating Relative PE

- The relative PE ratio for this firm can be estimated in two steps. First, we compute the PE ratio for the firm and the market separately:

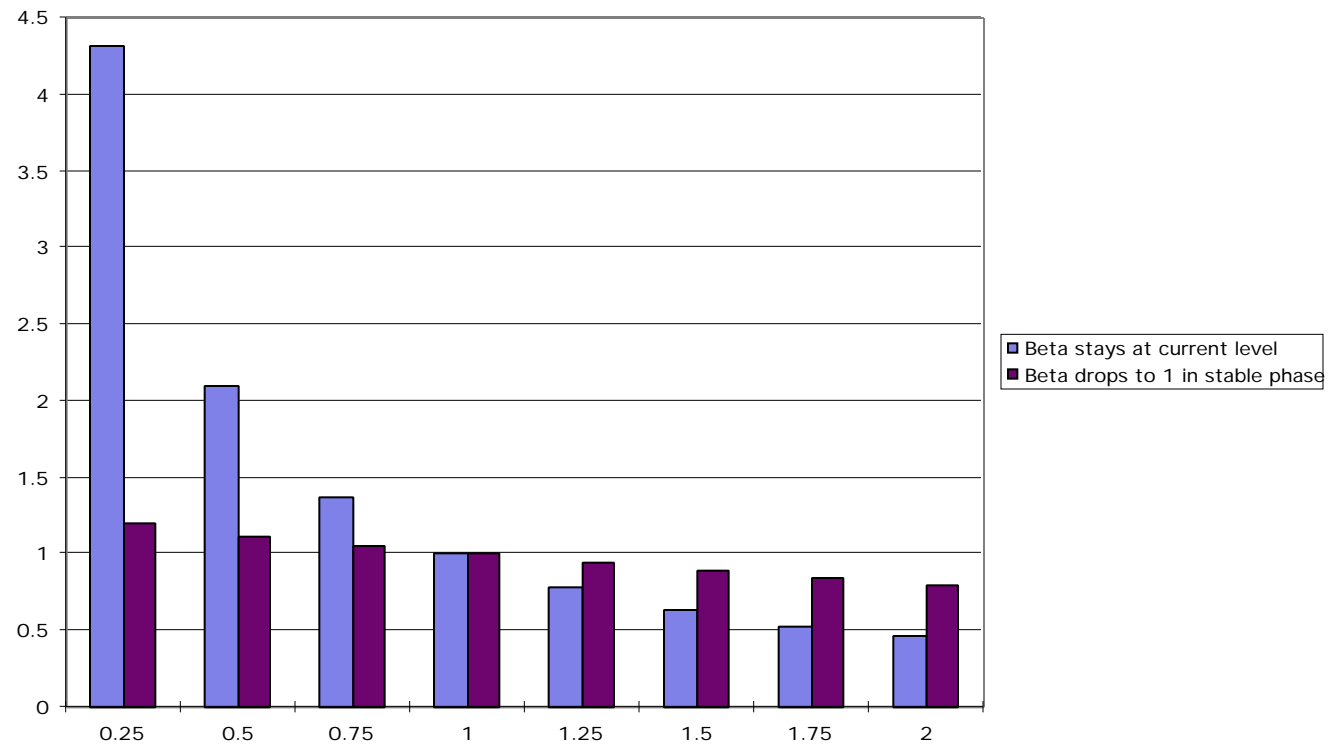
$$PE_{\text{firm}} = \frac{0.3 * (1.10)^* \left(1 - \frac{(1.10)^5}{(1.17)^5} \right)}{(.17 - .10)} + \frac{0.5 * (1.10)^5 * (1.06)}{(.115 - .06) (1.17)^5} = 8.33$$

$$PE_{\text{market}} = \frac{0.3 * (1.10) * \left(1 - \frac{(1.10)^5}{(1.115)^5} \right)}{(.115 - .10)} + \frac{0.5 * (1.10)^5 * (1.06)}{(.115 - .06) (1.115)^5} = 10.45$$

- Relative PE Ratio = $8.33/10.45 = 0.80$

Relative PE and Relative Risk

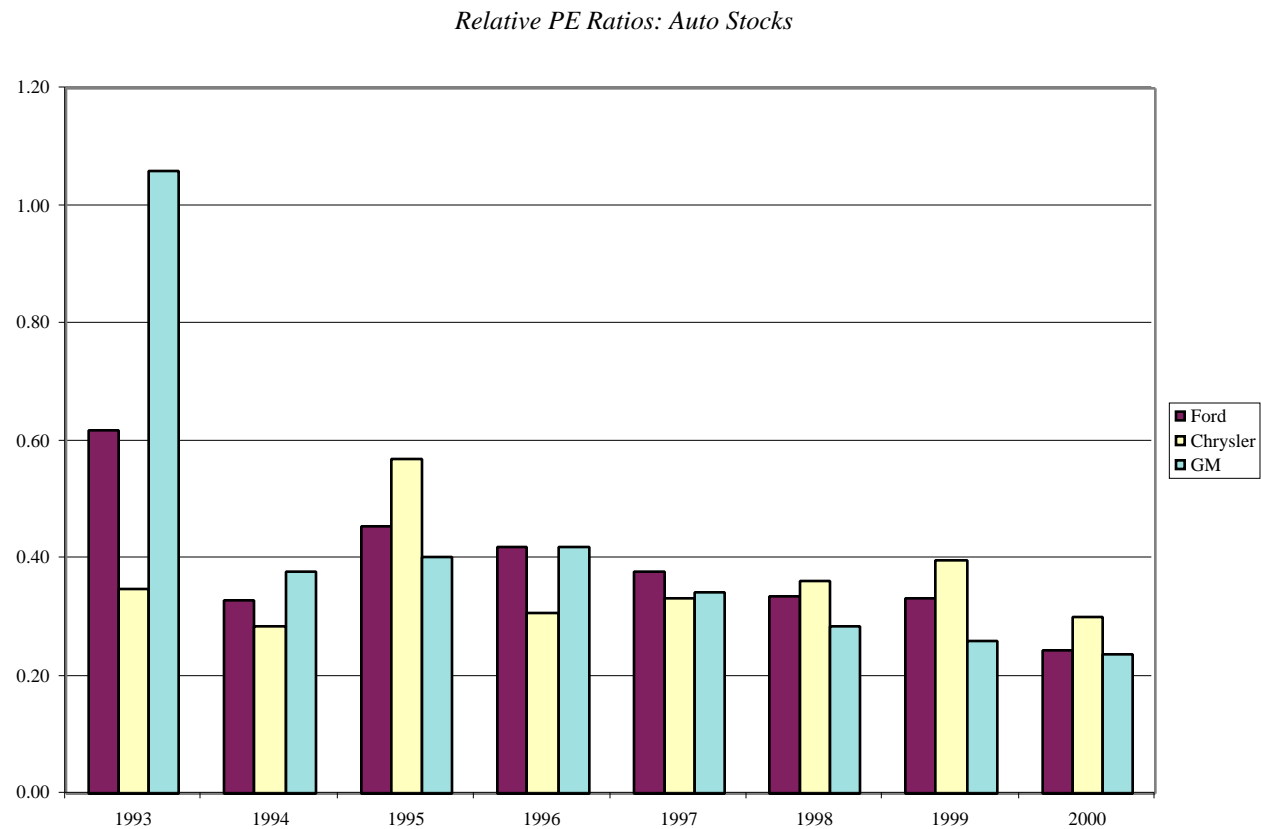
Relative PE and Relative Risk: Stable Beta Scenarios



Relative PE: Summary of Determinants

- The relative PE ratio of a firm is determined by two variables. In particular, it will
 - increase as the firm's growth rate relative to the market increases. The rate of change in the relative PE will itself be a function of the market growth rate, with much greater changes when the market growth rate is higher. In other words, a firm or sector with a growth rate twice that of the market will have a much higher relative PE when the market growth rate is 10% than when it is 5%.
 - decrease as the firm's risk relative to the market increases. The extent of the decrease depends upon how long the firm is expected to stay at this level of relative risk. If the different is permanent, the effect is much greater.
- Relative PE ratios seem to be unaffected by the level of rates, which might give them a decided advantage over PE ratios.

Relative PE Ratios: The Auto Sector



Using Relative PE ratios

- On a relative PE basis, all of the automobile stocks look cheap because they are trading at their lowest relative PE ratios in five years. Why might the relative PE ratio be lower today than it was 5 years ago?

Relative PEs: Why do they change?

- Historically, GM has traded at the highest relative PE ratio of the three auto companies, and Chrysler has traded at the lowest. In the last two or three years, this historical relationship has been upended with Ford and Chrysler now trading at the higher ratios than GM. Analyst projections for earnings growth at the three companies are about the same. How would you explain the shift?

Relative PE Ratios: Market Analysis

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.478 ^a	.229	.227	41.4196

a. Predictors: (Constant), Beta, RELPYT, RELGR

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.674	.060		11.242	.000
	RELGR	.835	.038	.527	22.115	.000
	RELPYT	4.431E-02	.011	.098	4.150	.000
	Beta	-.175	.047	-.089	-3.737	.000

a. Dependent Variable: RELPE

b. Weighted Least Squares Regression - Weighted by Market Cap