3a. And the differences are sometimes revealing... Price to Book Ratios across globe – January 2013



4. Simplistic rules almost always break down...6 times EBITDA was not cheap in 2010...



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But it may be in 2016, unless you are in Japan, Australia or Canada

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Analytical Tests

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- 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.
- How do changes in these fundamentals change the multiple?
 - The relationship between a fundamental (like growth) and a multiple (such as PE) is almost never linear.
 - Proposition 3: It is impossible to properly compare firms on a multiple, if we do not know how fundamentals and the multiple move.

A Simple Analytical device

23	Start with a basic intrinsic value model.	Divide both sides of value equation by the denominator of the multiple that you are trying to deconstruct.	You should end up with an intrinsic version of your multiple, which relates the multiple to fundamentals that vary across firms.		
If Equity Multiple	Start with a dividend or FCFE model, preferably siimple.	For example, if you are trying to deconstruct the Price to Book ratio, divide both sides by book value of equity.	Intrinsic version of PE		
If enterprise value multiple	Start with a firm or operating asset model:.	For example, if you are trying to deconstruct the EV to Sales ratio, dividen both sides oby total sales.	Intrinsic version of EV/ Sale ratio.		

I. PE Ratios

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- To understand the fundamentals, start with a basic equity discounted cash flow model.
 - With the dividend discount model,

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

Dividing both sides by the current earnings per share,

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

$$\blacksquare \text{ If this had been a FCFE Model,}$$

$$P_0 = \frac{FCFE_1}{r-g_n}$$

$$\frac{P_0}{EPS_0} = PE = \frac{(FCFE/Earnings)^*(1+g_n)}{r-g_n}$$

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:

$$P_{0} = \frac{EPS_{0}*Payout Ratio*(1+g)*\left(1 - \frac{(1+g)^{n}}{(1+r)^{n}}\right)}{r-g} + \frac{EPS_{0}*Payout Ratio_{n}*(1+g)^{n}*(1+g_{n})}{(r-g_{n})(1+r)^{n}}$$

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:

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

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%

 $\frac{P_0}{EPS_0} = \frac{.20^*(1.25)^* \left(1 - \frac{(1.25)^5}{(1.115)^5}\right)}{.115 - .25} + \frac{.50^*(1.25)^{5*}(1.08)}{(.115 - .08)(1.115)^5} = 28.75$

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a. PE and Growth: Firm grows at x% for 5 years, 8% thereafter

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PE Ratios and Expected Growth: Interest Rate Scenarios

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b. PE and Risk: A Follow up Example

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Example 1: Comparing PE ratios across Emerging Markets- March 2014 (pre- Ukraine)



Example 2: An Old Example with Emerging Markets: June 2000

Country	PE Ratio	Interest	GDP Real	Country
5		Rates	Growth	Risk
Argentina	14	18.00%	2.50%	45
Brazil	21	14.00%	4.80%	35
Chile	25	9.50%	5.50%	15
Hong Kong	20	8.00%	6.00%	15
India	17	11.48%	4.20%	25
Indonesia	15	21.00%	4.00%	50
Malaysia	14	5.67%	3.00%	40
Mexico	19	11.50%	5.50%	30
Pakistan	14	19.00%	3.00%	45
Peru	15	18.00%	4.90%	50
Phillipines	15	17.00%	3.80%	45
Singapore	24	6.50%	5.20%	5
South Korea	21	10.00%	4.80%	25
Thailand	21	12.75%	5.50%	25
Turkey	12	25.00%	2.00%	35
Venezuela	20	15.00%	3.50%	45

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Regression Results

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 The regression of PE ratios on these variables provides the following –

PE = 16.16 - 7.94 Interest Rates

+ 154.40 Growth in GDP

- 0.1116 Country Risk

R Squared = 73%

Predicted PE Ratios

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ູ	4

Country	PE Ratio	Interest Rates	GDP Real Growth	Country Risk	Predicted PE
Argentina	14	18.00%	2.50%	45	13.57
Brazil	21	14.00%	4.80%	35	18.55
Chile	25	9.50%	5.50%	15	22.22
Hong Kong	20	8.00%	6.00%	15	23.11
India	17	11.48%	4.20%	25	18.94
Indonesia	15	21.00%	4.00%	50	15.09
Malaysia	14	5.67%	3.00%	40	15.87
Mexico	19	11.50%	5.50%	30	20.39
Pakistan	14	19.00%	3.00%	45	14.26
Peru	15	18.00%	4.90%	50	16.71
Phillipines	15	17.00%	3.80%	45	15.65
Singapore	24	6.50%	5.20%	5	23.11
South Korea	21	10.00%	4.80%	25	19.98
Thailand	21	12.75%	5.50%	25	20.85
Turkey	12	25.00%	2.00%	35	13.35
Venezuela	20	15.00%	3.50%	45	15.35

Example 3: PE ratios for the S&P 500 over

time

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PE Ratios for the S&P 500: 1969-2015



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