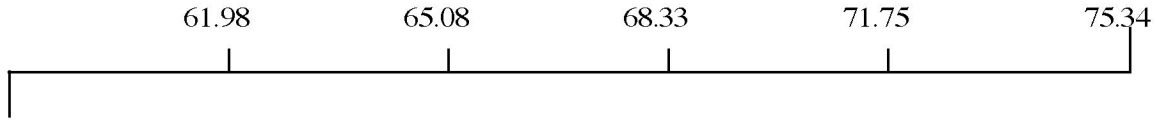
Implied Equity Premiums: January 2008

- We can use the information in stock prices to back out how risk averse the market is and how much of a risk premium it is demanding.

Between 2001 and 2007 dividends and stock buybacks averaged 4.02% of the index each year.

Analysts expect earnings to grow 5% a year for the next 5 years. We will assume that dividends & buybacks will keep pace.. Last year's cashflow (59.03) growing at 5% a year

After year 5, we will assume that earnings on the index will grow at 4.02%, the same rate as the entire economy (= riskfree rate).



January 1, 2008
S&P 500 is at 1468.36
4.02% of 1468.36 = 59.03

- If you pay the current level of the index, you can expect to make a return of 8.39% on stocks (which is obtained by solving for r in the following equation)

$$1468.36 = \frac{61.98}{(1+r)} + \frac{65.08}{(1+r)^2} + \frac{68.33}{(1+r)^3} + \frac{71.75}{(1+r)^4} + \frac{75.34}{(1+r)^5} + \frac{75.35(1.0402)}{(r-.0402)(1+r)^5}$$

- Implied Equity risk premium = Expected return on stocks - Treasury bond rate = 8.39% - 4.02% = 4.37%

Implied Risk Premium Dynamics

- Assume that the index jumps 10% on January 2 and that nothing else changes. What will happen to the implied equity risk premium?

a. Implied equity risk premium will increase

b. Implied equity risk premium will decrease

- Assume that the earnings jump 10% on January 2 and that nothing else changes. What will happen to the implied equity risk premium?

a. Implied equity risk premium will increase

b. Implied equity risk premium will decrease

- Assume that the riskfree rate increases to 5% on January 2 and that nothing else changes. What will happen to the implied equity risk premium?

a. Implied equity risk premium will increase

b. Implied equity risk premium will decrease

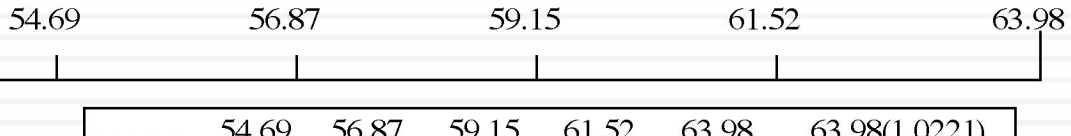
A year that made a difference.. The implied premium in January 2009

Year	Market value of index	Dividends	Buybacks	Cash to equity	Dividend yield	Buyback yield	Total yield
2001	1148.09	15.74	14.34	30.08	1.37%	1.25%	2.62%
2002	879.82	15.96	13.87	29.83	1.81%	1.58%	3.39%
2003	1111.91	17.88	13.70	31.58	1.61%	1.23%	2.84%
2004	1211.92	19.01	21.59	40.60	1.57%	1.78%	3.35%
2005	1248.29	22.34	38.82	61.17	1.79%	3.11%	4.90%
2006	1418.30	25.04	48.12	73.16	1.77%	3.39%	5.16%
2007	1468.36	28.14	67.22	95.36	1.92%	4.58%	6.49%
2008	903.25	28.47	40.25	68.72	3.15%	4.61%	7.77%
Normalized	903.25	28.47	24.11	52.584	3.15%	2.67%	5.82%

In 2008, the actual cash returned to stockholders was 68.72. However, there was a 41% dropoff in buybacks in Q4. We reduced the total buybacks for the year by that amount.

Analysts expect earnings to grow 4% a year for the next 5 years. We will assume that dividends & buybacks will keep pace..
Last year's cashflow (52.58) growing at 4% a year

After year 5, we will assume that earnings on the index will grow at 2.21%, the same rate as the entire economy (= riskfree rate).

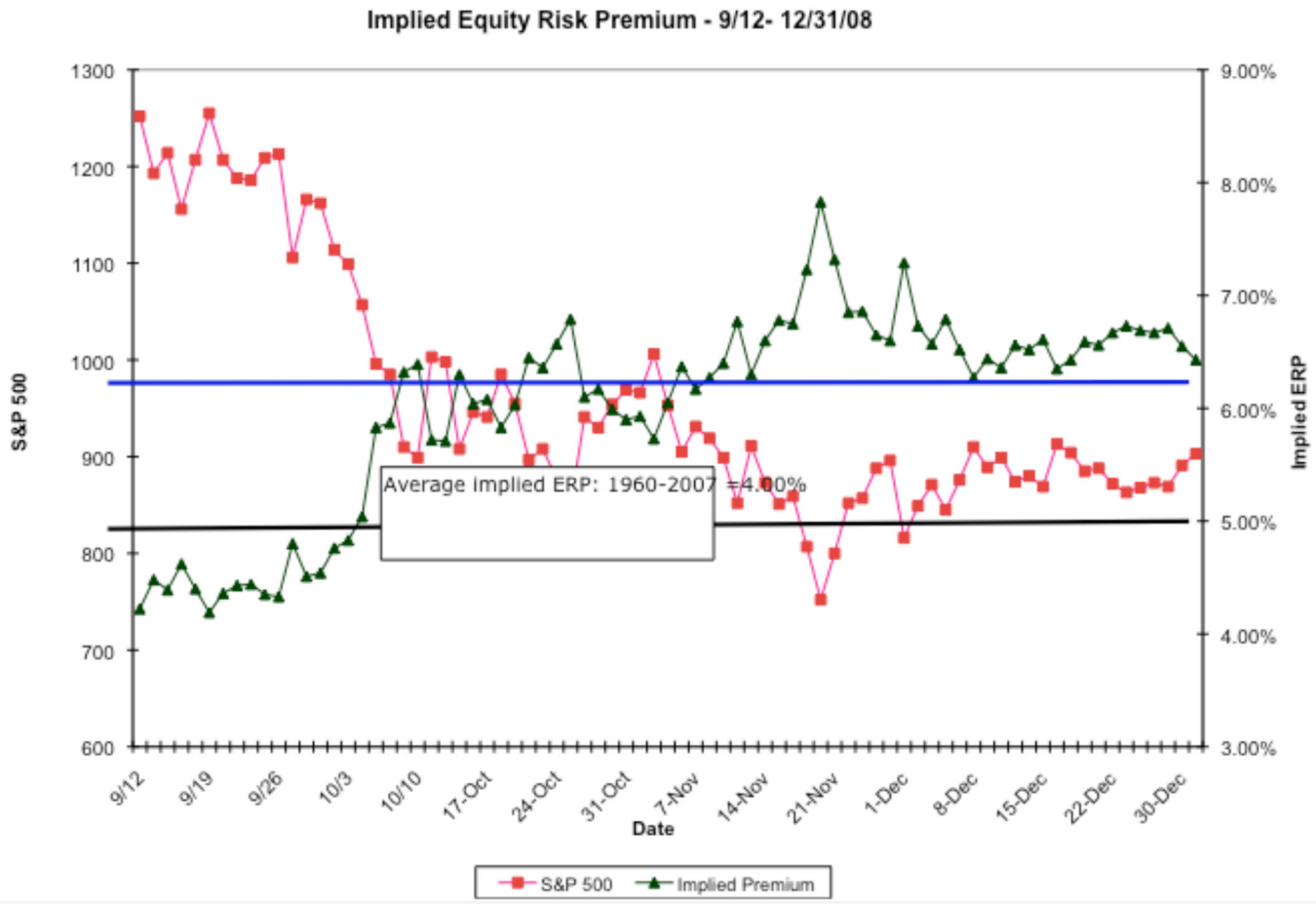


$$903.25 = \frac{54.69}{(1+r)} + \frac{56.87}{(1+r)^2} + \frac{59.15}{(1+r)^3} + \frac{61.52}{(1+r)^4} + \frac{63.98}{(1+r)^5} + \frac{63.98(1.0221)}{(r-.0221)(1+r)^5}$$

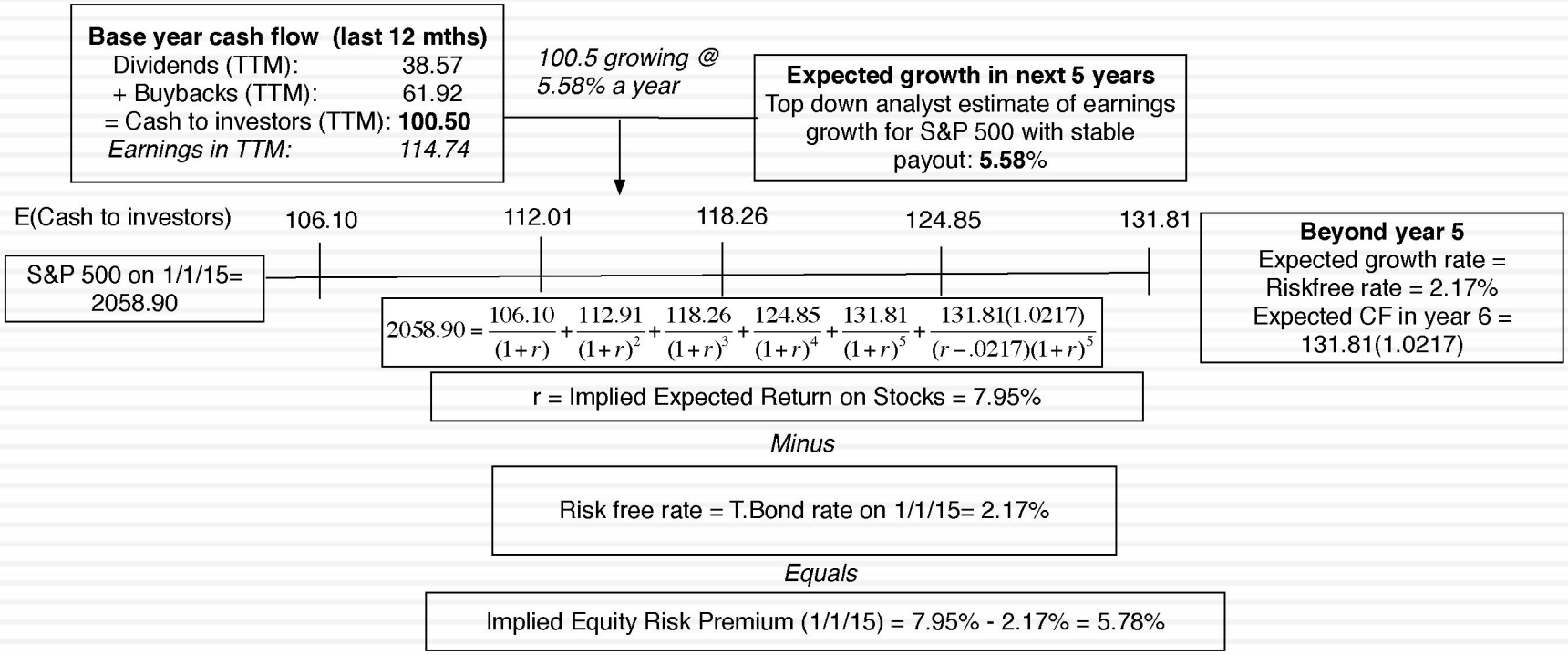
January 1, 2009
S&P 500 is at 903.25
Adjusted Dividends & Buybacks for 2008 = 52.58

Expected Return on Stocks (1/1/09) = 8.64%
Riskfree rate = 2.21%
Equity Risk Premium = 6.43%

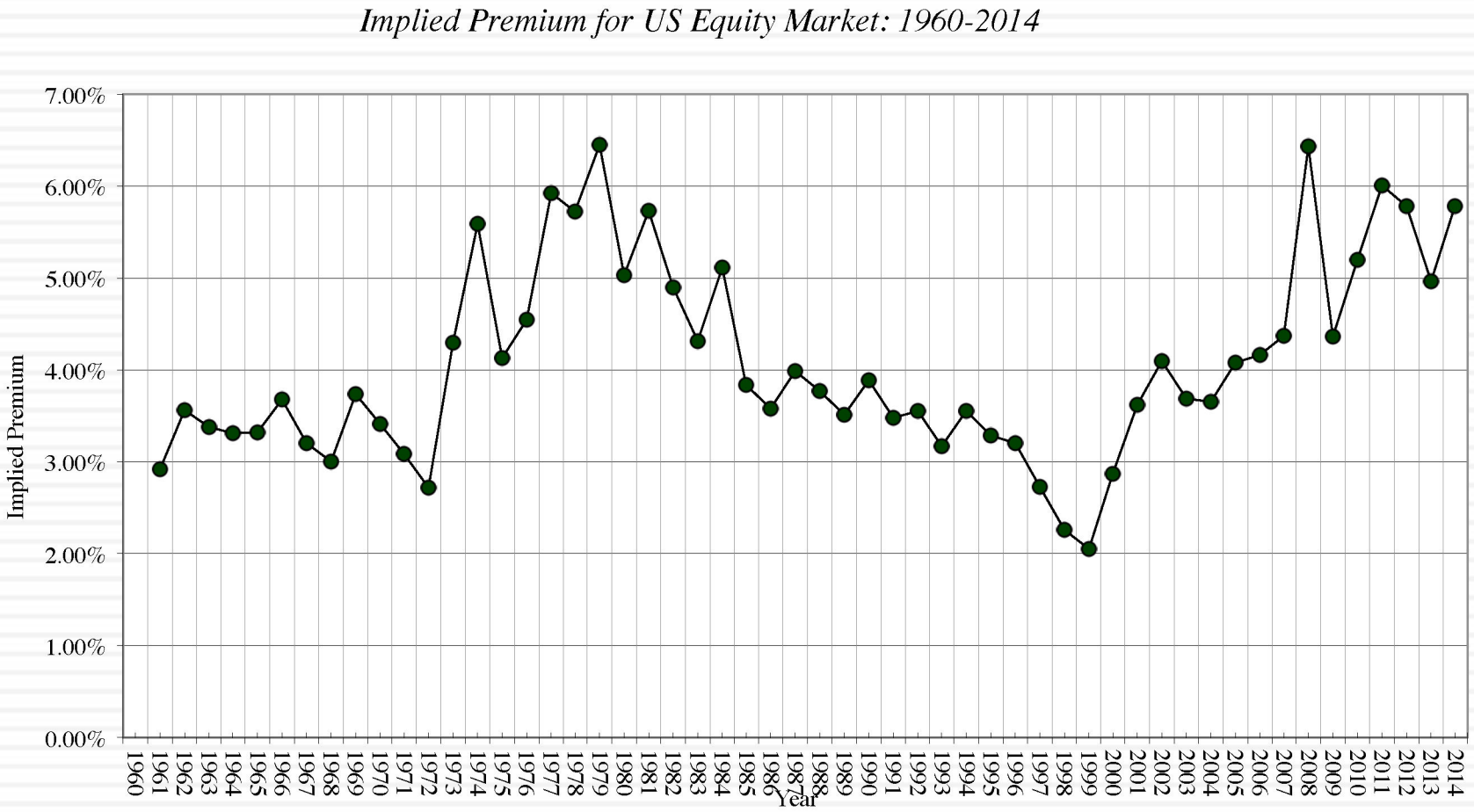
The Anatomy of a Crisis: Implied ERP from September 12, 2008 to January 1, 2009



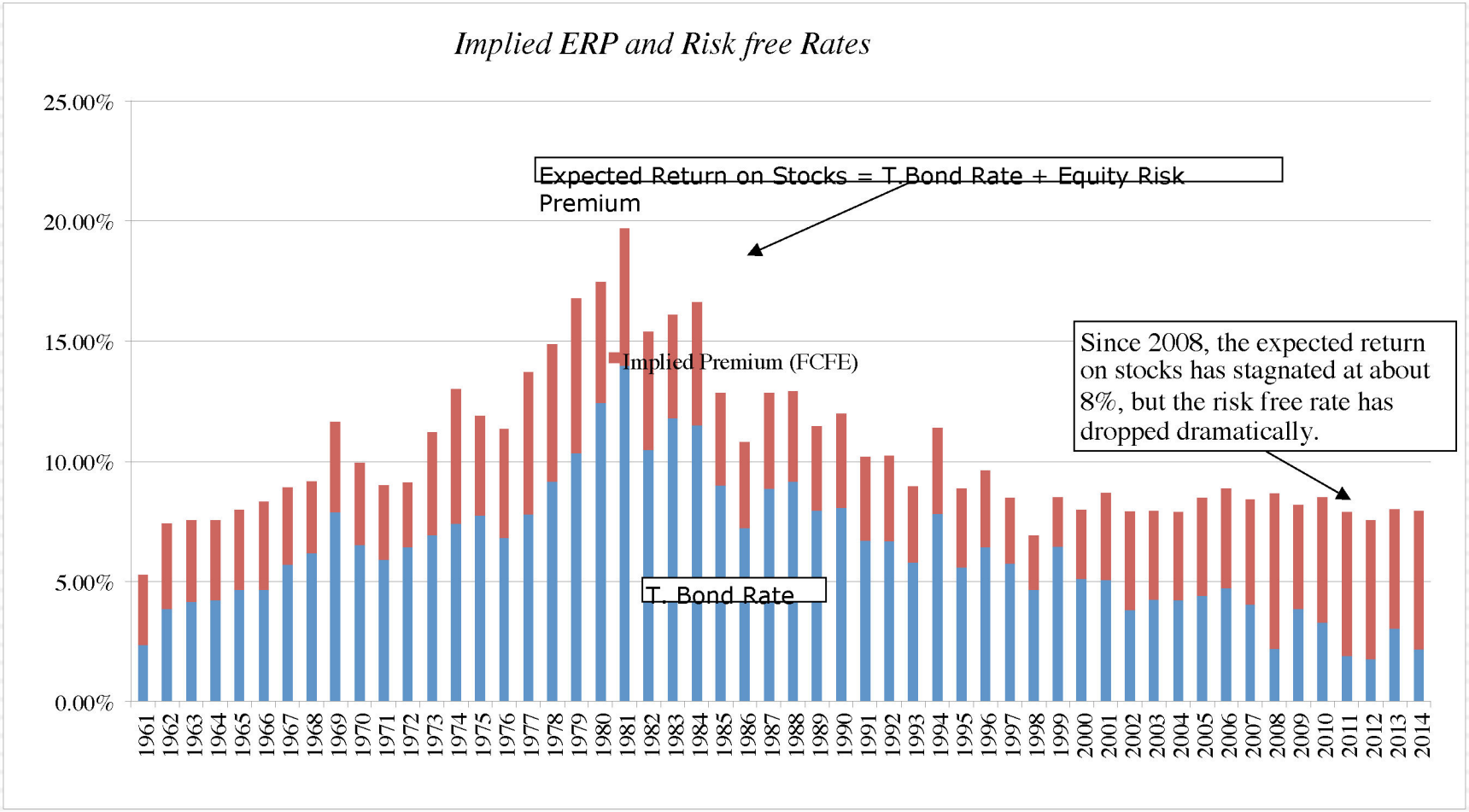
An Updated Equity Risk Premium: January 2015



Implied Premiums in the US: 1960-2014

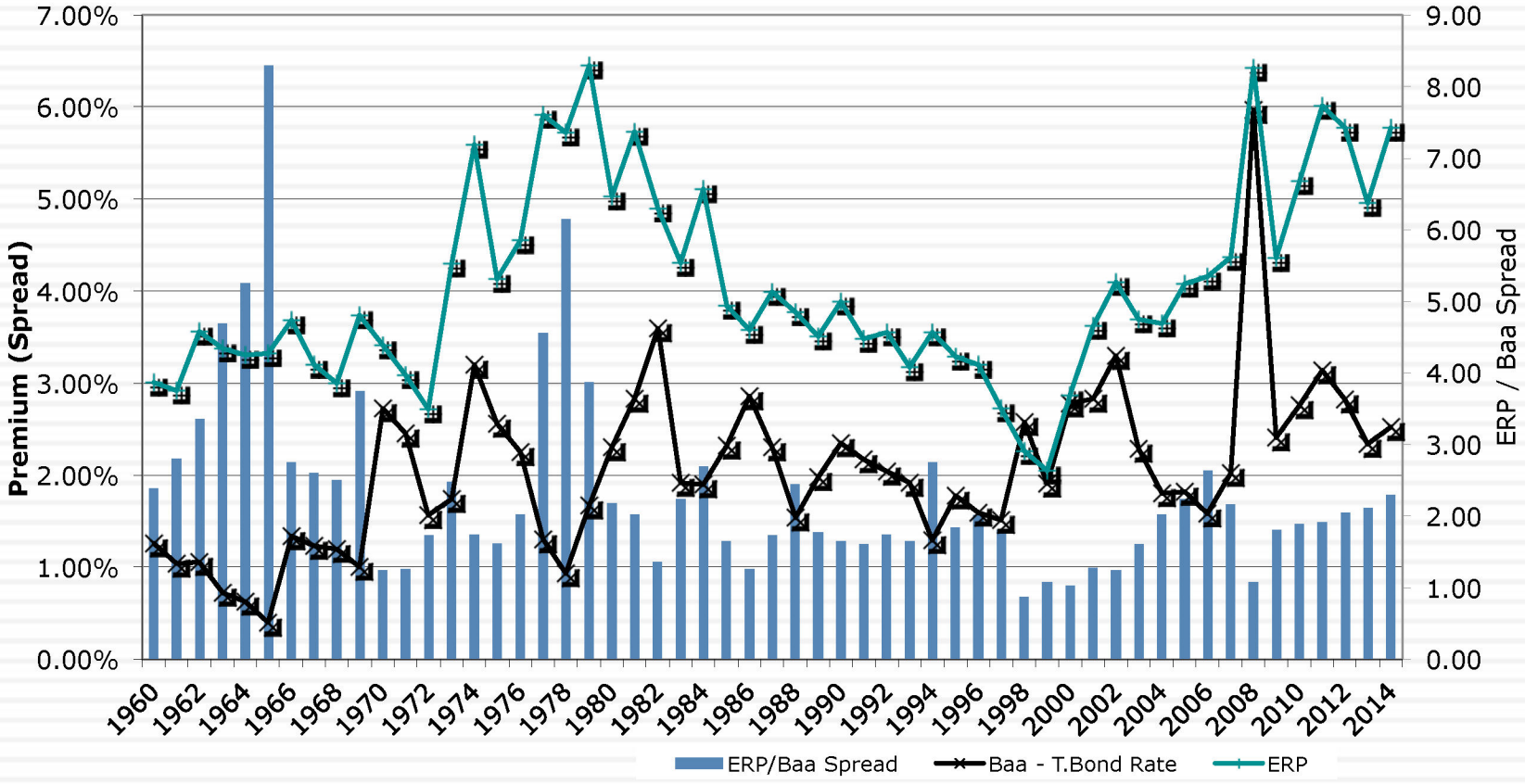


Implied Premium versus Risk Free Rate



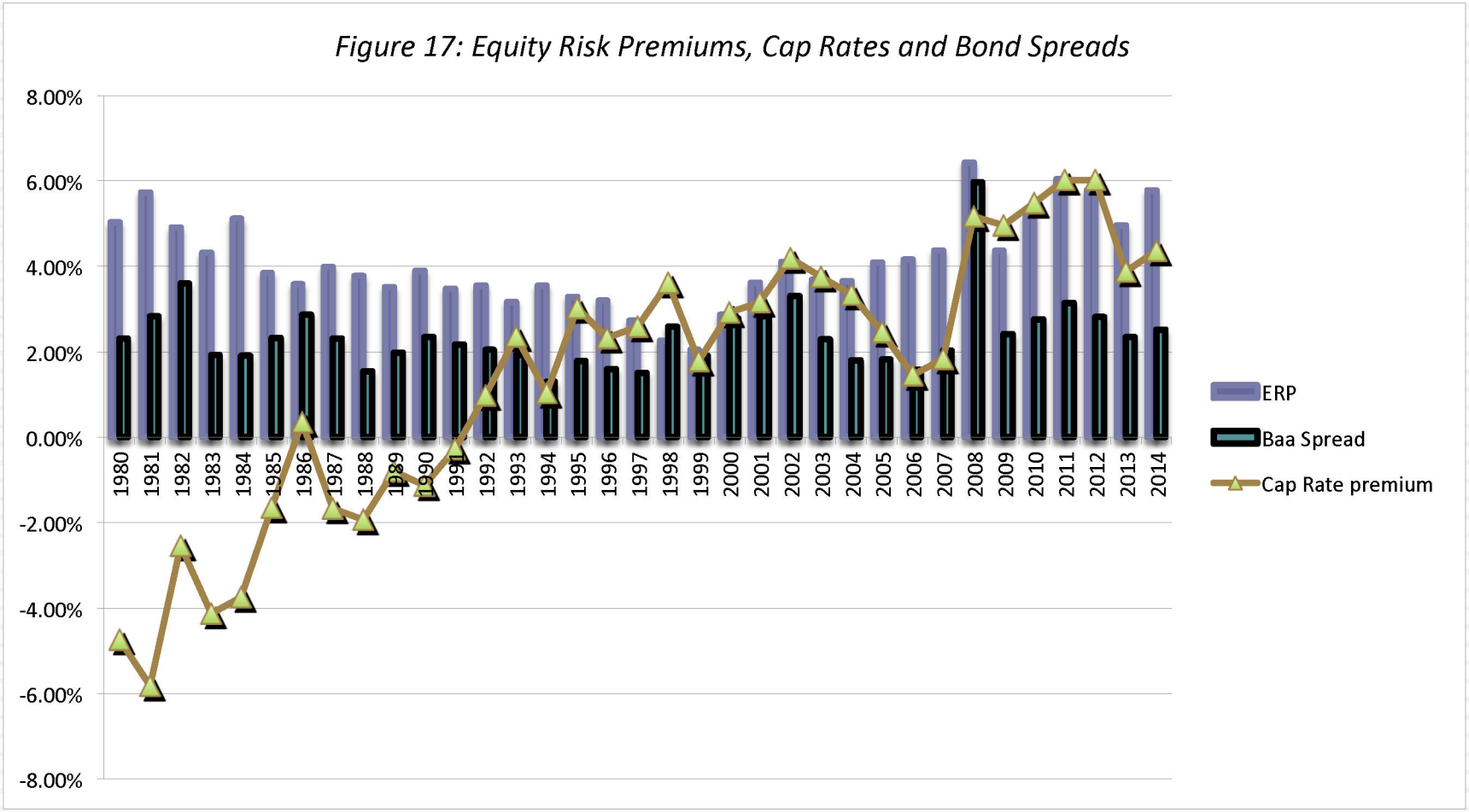
Equity Risk Premiums and Bond Default Spreads

Figure 16: Equity Risk Premiums and Bond Default Spreads



Equity Risk Premiums and Cap Rates (Real Estate)

Figure 17: Equity Risk Premiums, Cap Rates and Bond Spreads



Why implied premiums matter?

- In many investment banks, it is common practice (especially in corporate finance departments) to use historical risk premiums (and arithmetic averages at that) as risk premiums to compute cost of equity. If all analysts in the department used the arithmetic average premium (for stocks over T.Bills) for 1928-2014 of 8% to value stocks in January 2014, given the implied premium of 5.75%, what are they likely to find?

a. The values they obtain will be too low (most stocks will look overvalued)

b. The values they obtain will be too high (most stocks will look under valued)

c. There should be no systematic bias as long as they use the same premium to value all stocks.

Which equity risk premium should you use?

If you assume this	Premium to use
Premiums revert back to historical norms and your time period yields these norms	Historical risk premium
Market is correct in the aggregate or that your valuation should be market neutral	Current implied equity risk premium
Marker makes mistakes even in the aggregate but is correct over time	Average implied equity risk premium over time.

Predictor	*Correlation with implied premium next year*	*Correlation with actual risk premium – next 10 years*
Current implied premium	0.712	0.424
Average implied premium: Last 5 years	0.646	0.360
Historical Premium	-0.394	-0.486
Default Spread based premium	0.059	0.174

And the approach can be extended to emerging markets Implied premium for the Sensex (September 2007)

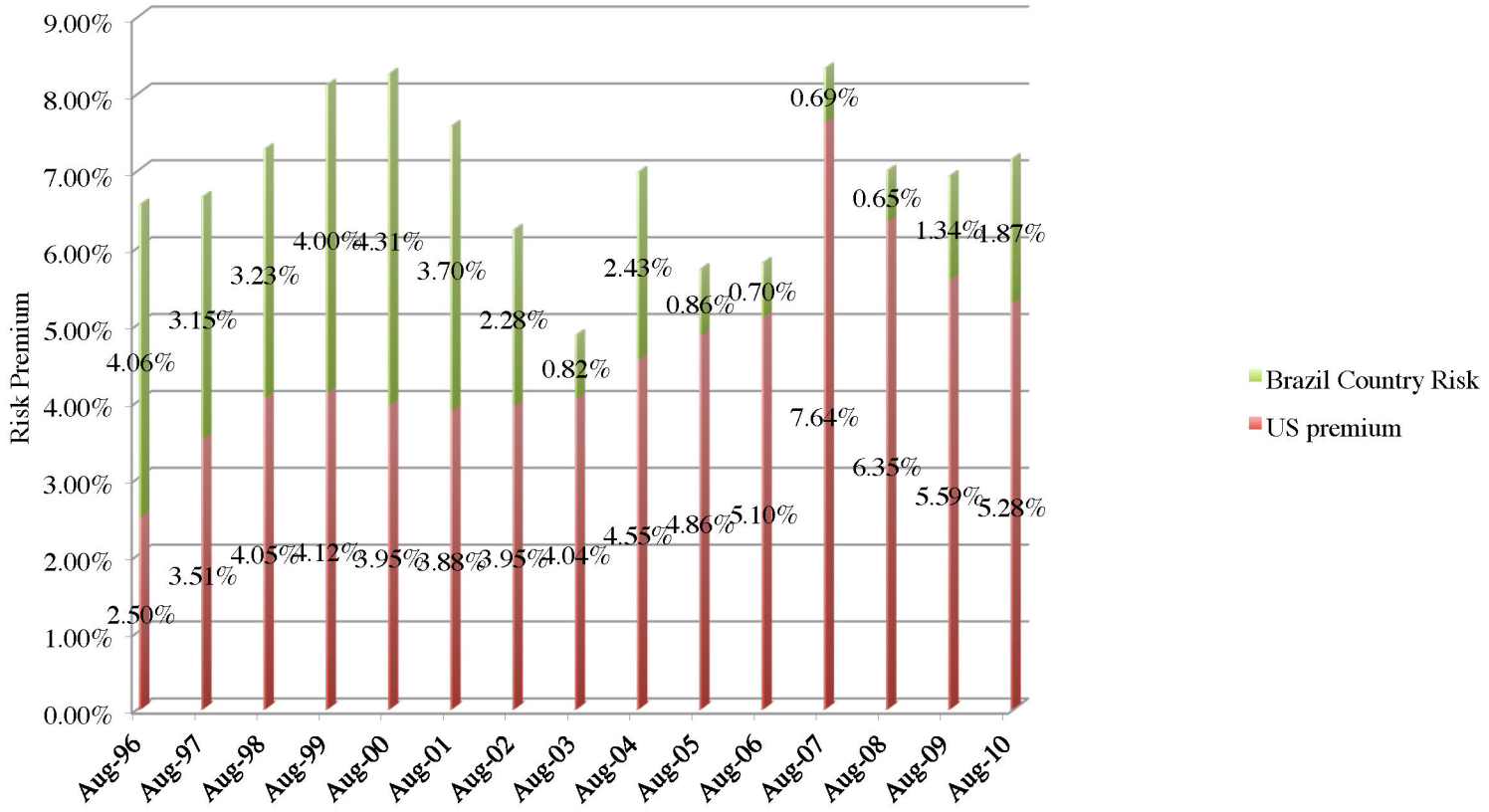
- Inputs for the computation
  - Sensex on 9/5/07 = 15446
  - Dividend yield on index = 3.05%
  - Expected growth rate - next 5 years = 14%
  - Growth rate beyond year 5 = 6.76% (set equal to riskfree rate)
- Solving for the expected return:

$$15446 = \frac{537.06}{(1+r)} + \frac{612.25}{(1+r)^2} + \frac{697.86}{(1+r)^3} + \frac{795.67}{(1+r)^4} + \frac{907.07}{(1+r)^5} + \frac{907.07(1.0676)}{(r-.0676)(1+r)^5}$$

- Expected return on stocks = 11.18%
- Implied equity risk premium for India = 11.18% - 6.76% = 4.42%

Can country risk premiums change? Brazil CRP & Total ERP from 2000 to 2013

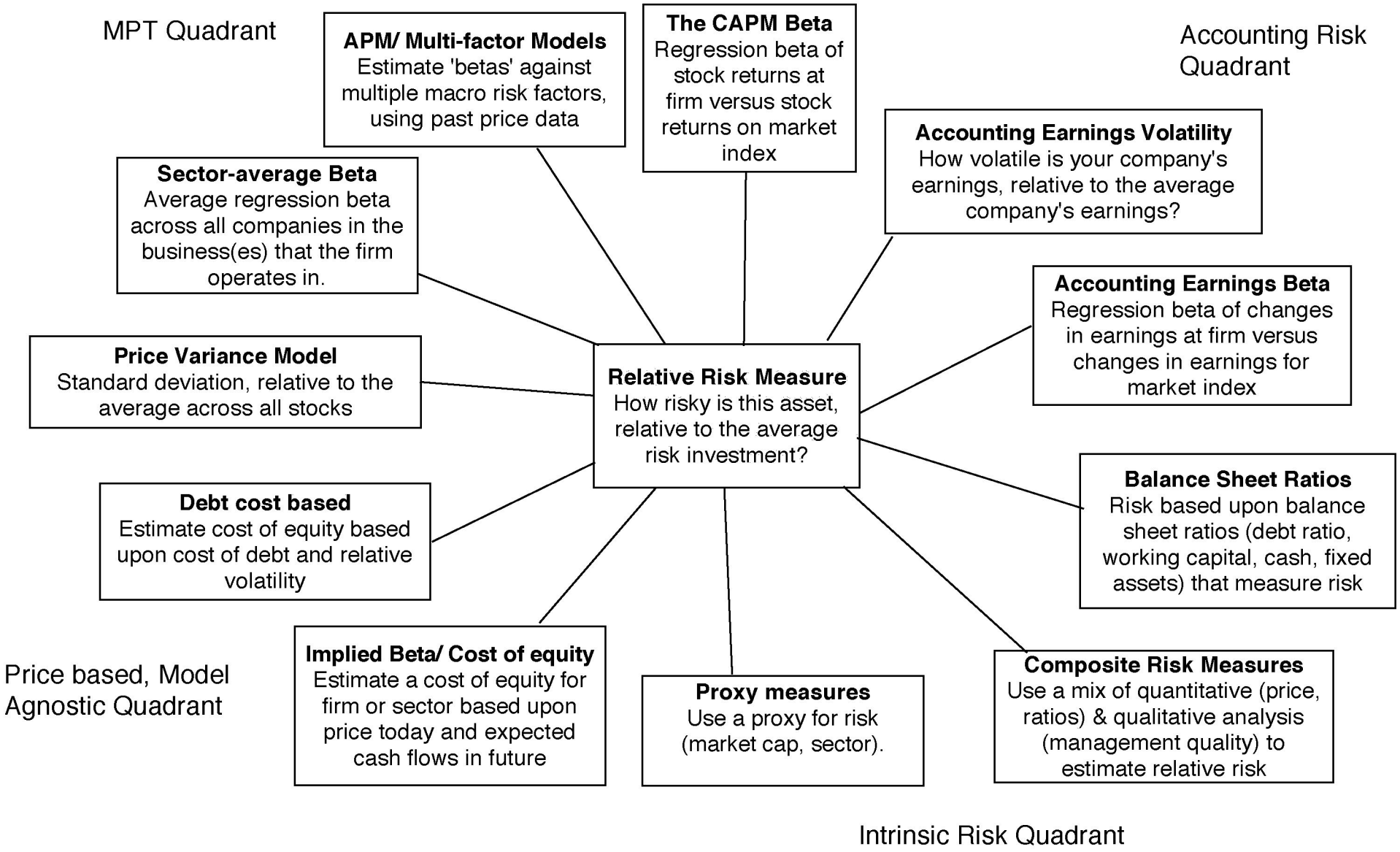
Figure 15: Implied Equity Risk Premium - Brazil



The evolution of Emerging Market Risk

	PBV Developed	PBV Emerging	ROE Developed	ROE Emerging	US T.Bond rate	Growth rate Developed	Growth rate Emerging	Cost of equity (Developed)	Cost of equity (Emerging)	Differential ERP
2004	2.00	1.19	10.81%	11.65%	4.22%	3.72%	5.22%	7.27%	10.62%	3.36%
2005	2.09	1.27	11.12%	11.93%	4.39%	3.89%	5.39%	7.35%	10.54%	3.19%
2006	2.03	1.44	11.32%	12.18%	4.70%	4.20%	5.70%	7.71%	10.20%	2.49%
2007	1.67	1.67	10.87%	12.88%	4.02%	3.52%	5.02%	7.92%	9.73%	1.81%
2008	0.87	0.83	9.42%	11.12%	2.21%	1.71%	3.21%	10.57%	12.74%	2.17%
2009	1.20	1.34	8.48%	11.02%	3.84%	3.34%	4.84%	7.62%	9.45%	1.83%
2010	1.39	1.43	9.14%	11.22%	3.29%	2.79%	4.29%	7.36%	9.14%	1.78%
2011	1.12	1.08	9.21%	10.04%	1.88%	1.38%	2.88%	8.37%	9.51%	1.14%
2012	1.17	1.18	9.10%	9.33%	1.76%	1.26%	2.76%	7.96%	8.33%	0.37%
Jun-13	1.17	1.17	8.79%	9.37%	2.55%	2.05%	3.55%	7.81%	8.52%	0.71%

Measuring Relative Risk



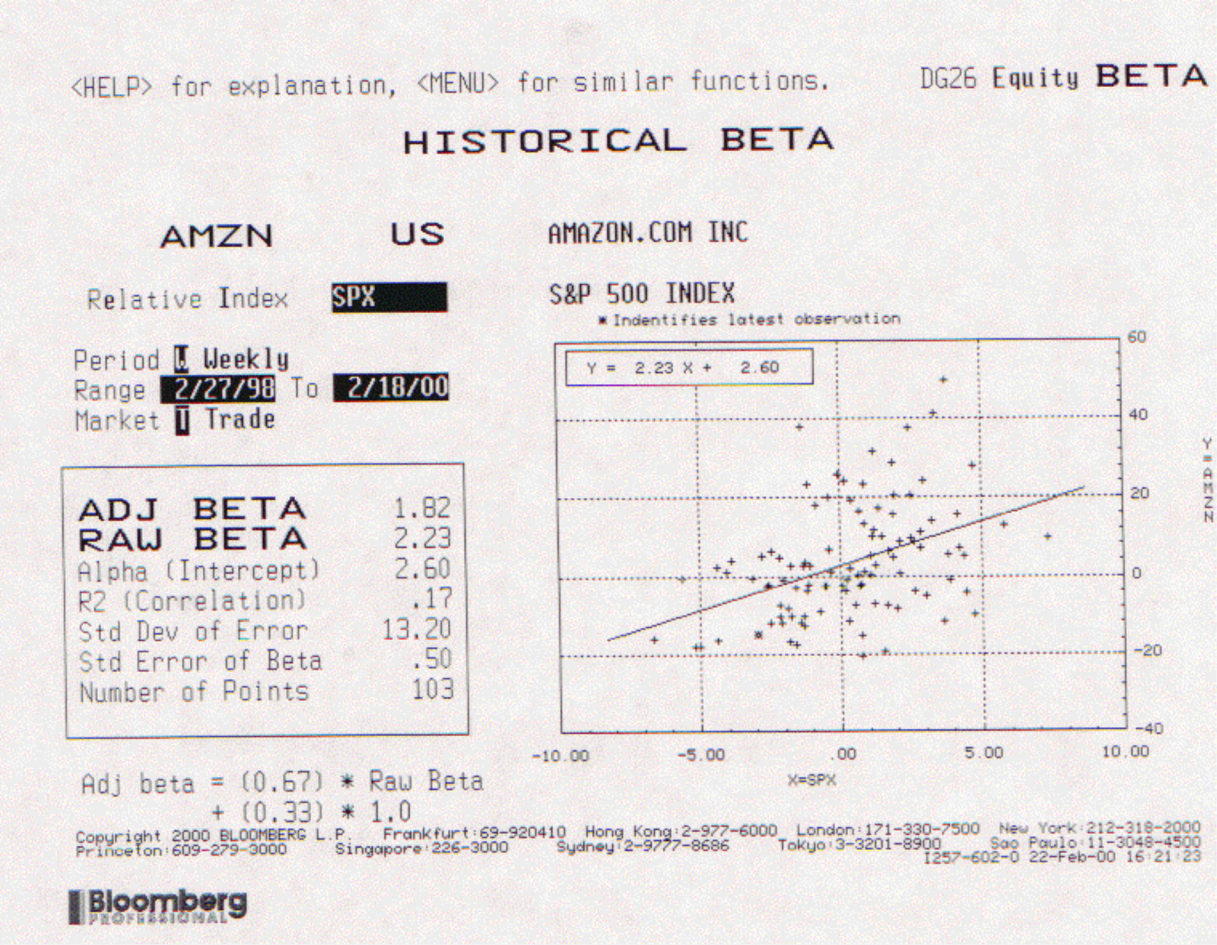
The CAPM Beta

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

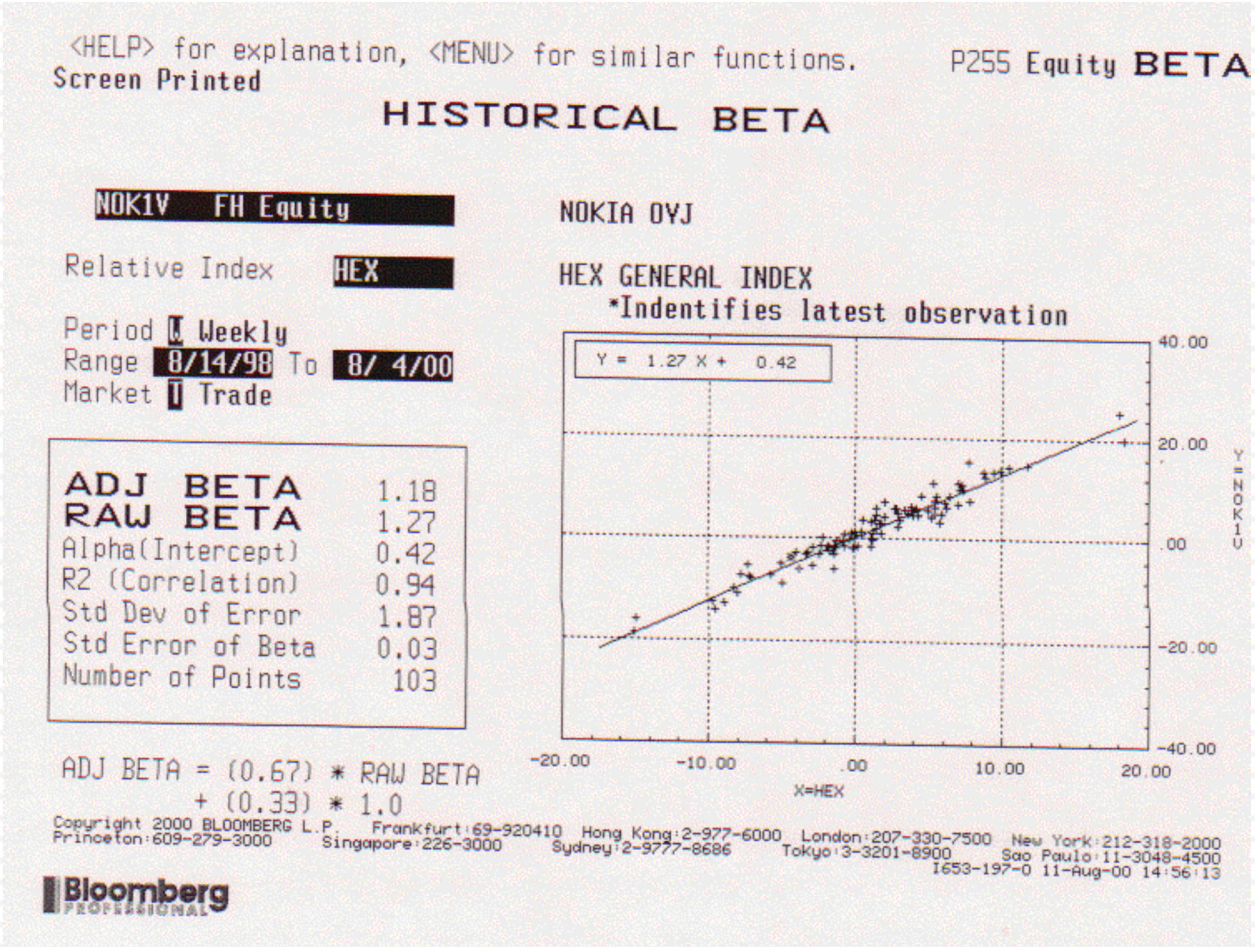
  Rj = a + b Rm

  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 Index Effect



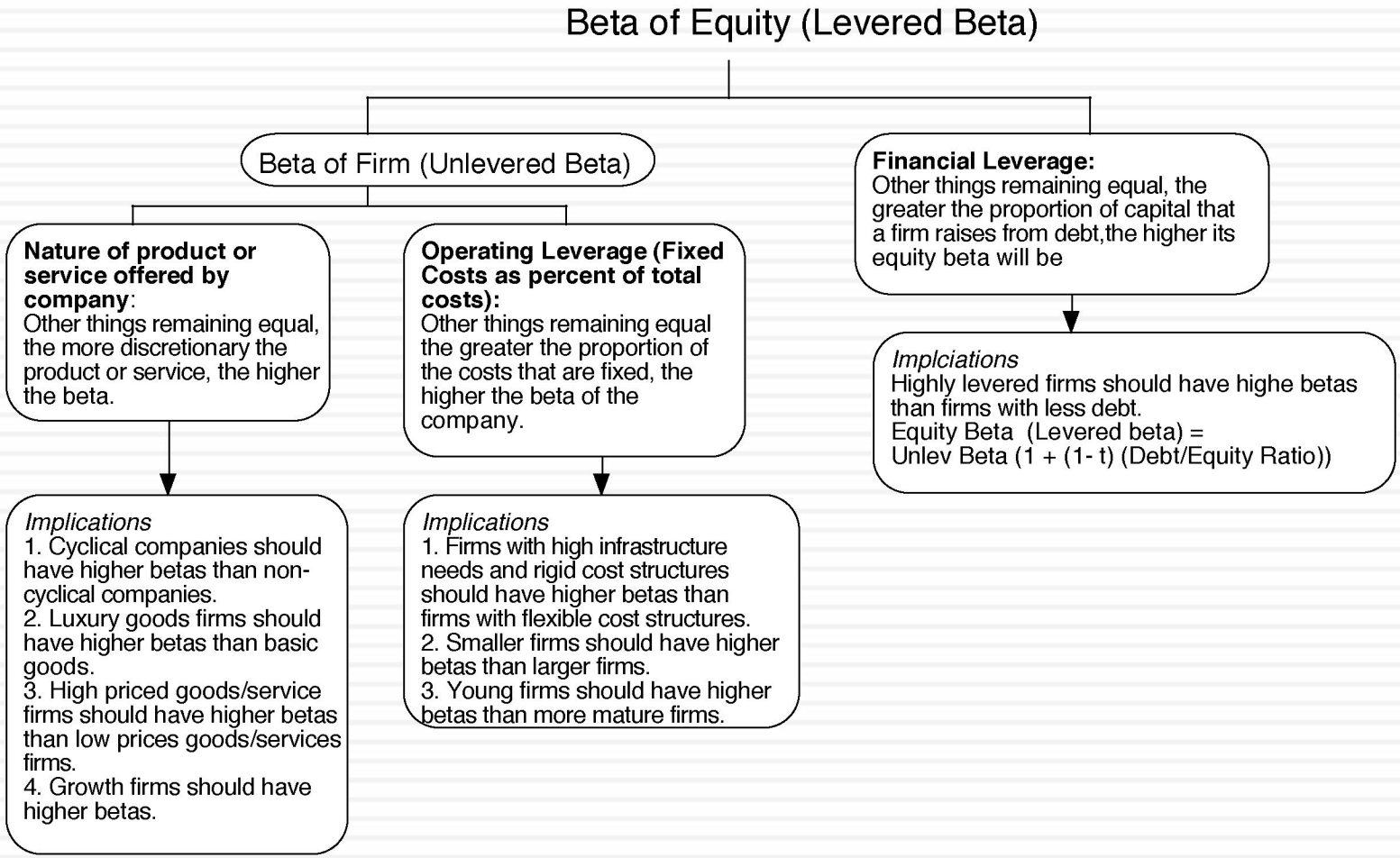
Stock-priced based solutions to the Regression Beta Problem

- Modify the regression beta by
  - changing the index used to estimate the beta
  - adjusting the regression beta estimate, by bringing in information about the fundamentals of the company
- Estimate the beta for the firm using
  - the standard deviation in stock prices instead of a regression against an index
  - Relative risk = Standard deviation in stock prices for investment/ Average standard deviation across all stocks
- Estimate the beta for the firm from the bottom up without employing the regression technique. This will require
  - understanding the business mix of the firm
  - estimating the financial leverage of the firm
- Imputed or implied beta (cost of equity) for the sector.

Alternative measures of relative risk for equity

- Accounting risk measures: To the extent that you don't trust market-priced based measures of risk, you could compute relative risk measures based on
  - Accounting earnings volatility: Compute an accounting beta or relative volatility
  - Balance sheet ratios: You could compute a risk score based upon accounting ratios like debt ratios or cash holdings (akin to default risk scores like the Z score)
- Proxies: In a simpler version of proxy models, you can categorize firms into risk classes based upon size, sectors or other characteristics.
- Qualitative Risk Models: In these models, risk assessments are based at least partially on qualitative factors (quality of management).
- Debt based measures: You can estimate a cost of equity, based upon an observable costs of debt for the company.
  - Cost of equity = Cost of debt * Scaling factor

Determinants of Betas & Relative Risk



CHAPTER 13

DIVIDEND DISCOUNT MODELS

In the strictest sense, the only cash flow you receive from a firm when you buy publicly traded stock is the dividend. The simplest model for valuing equity is the dividend discount model -- the value of a stock is the present value of expected dividends on it. While many analysts have turned away from the dividend discount model and viewed it as outmoded, much of the intuition that drives discounted cash flow valuation is embedded in the model. In fact, there are specific companies where the dividend discount model remains a useful took for estimating value.

This chapter explores the general model as well as specific versions of it tailored for different assumptions about future growth. It also examines issues in using the dividend discount model and the results of studies that have looked at its efficacy.

The General Model

When an investor buys stock, she generally expects to get two types of cashflows - dividends during the period she holds the stock and an expected price at the end of the holding period. Since this expected price is itself determined by future dividends, the value of a stock is the present value of dividends through infinity.

$$\text{Value per share of stock} = \sum_{t=1}^{t=\infty} \frac{E(DPS_t)}{(1+k_e)^t}$$

where,

DPS_t = Expected dividends per share

k_e = Cost of equity

The rationale for the model lies in the present value rule - the value of any asset is the present value of expected future cash flows discounted at a rate appropriate to the riskiness of the cash flows.

There are two basic inputs to the model - expected dividends and the cost on equity. To obtain the expected dividends, we make assumptions about expected future growth rates in earnings and payout ratios. The required rate of return on a stock is determined by its riskiness, measured differently in different models - the market beta in the CAPM, and the factor betas in the arbitrage and multi-factor models. The model is flexible enough to allow for time-varying discount rates, where the time variation is caused by expected changes in interest rates or risk across time.

Versions of the model

Since projections of dollar dividends cannot be made through infinity, several versions of the dividend discount model have been developed based upon different assumptions about future growth. We will begin with the simplest – a model designed to value stock in a stable-growth firm that pays out what it can afford in dividends and then look at how the model can be adapted to value companies in high growth that may be paying little or no dividends.

I. The Gordon Growth Model

The Gordon growth model can be used to value a firm that is in 'steady state' with dividends growing at a rate that can be sustained forever.

The Model

The Gordon growth model relates the value of a stock to its expected dividends in the next time period, the cost of equity and the expected growth rate in dividends.

$$\text{Value of Stock} = \frac{DPS_1}{k_e - g}$$

where,

DPS_1 = Expected Dividends one year from now (next period)

k_e = Required rate of return for equity investors

g = Growth rate in dividends forever

What is a stable growth rate?

While the Gordon growth model is a simple and powerful approach to valuing equity, its use is limited to firms that are growing at a stable rate. There are two insights worth keeping in mind when estimating a 'stable' growth rate. First, since the growth rate in the firm's dividends is expected to last forever, the firm's other measures of performance (including earnings) can also be expected to grow at the same rate. To see why, consider the consequences in the long term of a firm whose earnings grow 6% a year forever, while its dividends grow at 8%. Over time, the dividends will exceed earnings. On the other hand, if a firm's earnings grow at a faster rate than dividends in the long term, the payout ratio, in the long term, will converge towards zero, which is also not a steady state. Thus, though the model's requirement is for the expected growth rate in dividends, analysts should be able to substitute in the expected growth rate in earnings and get precisely the same result, if the firm is truly in steady state.

The second issue relates to what growth rate is reasonable as a 'stable' growth rate. As noted in Chapter 12, this growth rate has to be less than or equal to the growth rate of the economy in which the firm operates. This does not, however, imply that analysts will always

agree about what this rate should be even if they agree that a firm is a stable growth firm for three reasons.

- Given the uncertainty associated with estimates of expected inflation and real growth in the economy, there can be differences in the benchmark growth rate used by different analysts, i.e., analysts with higher expectations of inflation in the long term may project a nominal growth rate in the economy that is higher.
- The growth rate of a company may not be greater than that of the economy but it can be less. Firms can becomes smaller over time relative to the economy.
- There is another instance in which an analyst may be stray from a strict limit imposed on the 'stable growth rate'. If a firm is likely to maintain a few years of 'above-stable' growth rates, an approximate value for the firm can be obtained by adding a premium to the stable growth rate, to reflect the above-average growth in the initial years. Even in this case, the flexibility that the analyst has is limited. The sensitivity of the model to growth implies that the stable growth rate cannot be more than 1% or 2% above the growth rate in the economy. If the deviation becomes larger, the analyst will be better served using a two-stage or a three-stage model to capture the 'super-normal' or 'above-average' growth and restricting the Gordon growth model to when the firm becomes truly stable.

Does a stable growth rate have to be constant over time?

The assumption that the growth rate in dividends has to be constant over time is a difficult assumption to meet, especially given the volatility of earnings. If a firm has an average growth rate that is close to a stable growth rate, the model can be used with little real effect on value. Thus, a cyclical firm that can be expected to have year-to-year swings in growth rates, but has an average growth rate that is 5%, can be valued using the Gordon growth model, without a significant loss of generality. There are two reasons for this result. First, since dividends are smoothed even when earnings are volatile, they are less likely to be affected by year-to-year changes in earnings growth. Second, the mathematical effects of using an average growth rate rather than a constant growth rate are small.

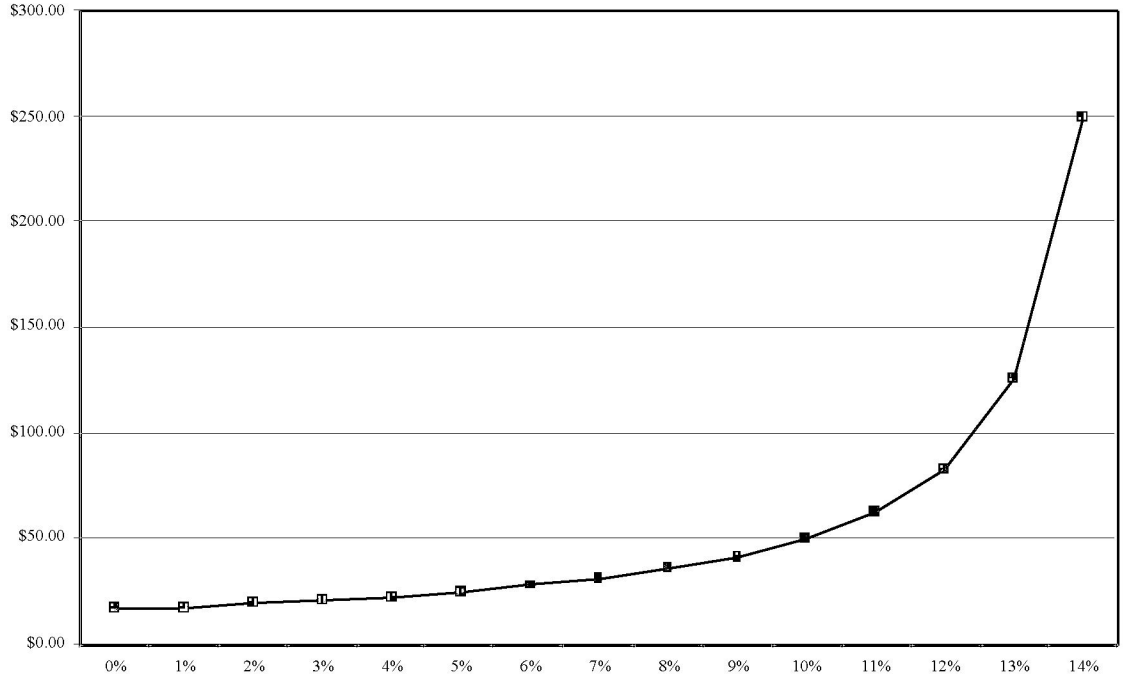
Limitations of the model

The Gordon growth model is a simple and convenient way of valuing stocks but it is extremely sensitive to the inputs for the growth rate. Used incorrectly, it can yield misleading or even absurd results, since, as the growth rate converges on the discount rate, the value goes to infinity. Consider a stock, with an expected dividend per share next period of $2.50, a cost of equity of 15%, and an expected growth rate of 5% forever. The value of this stock is:

$$\text{Value} = \frac{2.50}{0.15 - 0.05} = \$\,25.00$$

Note, however, the sensitivity of this value to estimates of the growth rate in Figure 13.1.

Figure 13.1: Value Per Share and Expected Growth Rate



As the growth rate approaches the cost of equity, the value per share approaches infinity. If the growth rate exceeds the cost of equity, the value per share becomes negative.

This issue is tied to the question of what comprises a stable growth rate. If an analyst follows the constraints discussed in the previous chapter in estimating stable growth rates, this will never happen. In this example, for instance, an analyst who uses a 14% growth rate and obtains a $250 value would have been violating a basic rule on what comprises stable growth.

Works best for:

In summary, the Gordon growth model is best suited for firms growing at a rate comparable to or lower than the nominal growth in the economy and which have well established dividend payout policies that they intend to continue into the future. The dividend payout of the firm has to be consistent with the assumption of stability, since stable

firms generally pay substantial dividends[1]. In particular, this model will under estimate the value of the stock in firms that consistently pay out less than they can afford and accumulate cash in the process.

 *.DDMst.xls*: This spreadsheet allows you to value a stable growth firm, with stable firm characteristics (beta and retun on equity) and dividends that roughly match cash flows.

Illustration 13.1: Value a regulated firm: Consolidated Edison in May 2001

Consolidated Edison is the electric utility that supplies power to homes and businesses in New York and its environs. It is a monopoly whose prices and profits are regulated by the State of New York.

Rationale for using the model

- The firm is in stable growth; based upon size and the area that it serves. Its rates are also regulated. It is unlikely that the regulators will allow profits to grow at extraordinary rates.
- The firm is in a stable business and regulation is likely to restrict expansion into new businesses.
- The firm is in stable leverage.
- The firm pays out dividends that are roughly equal to FCFE.
    - Average Annual FCFE between 1996 and 2000 = $551 million
    - Average Annual Dividends between 1996 and 2000 = $506 million
    - Dividends as % of FCFE = 91.54%

Background Information

Earnings per share in 2000 = $3.13

Dividend Payout Ratio in 1994 = 69.97%

Dividends per share in 2000 = $2.19

Return on equity = 11.63%

Estimates

We first estimate the cost of equity, using a bottom-up levered beta for electric utilities of 0.90, a riskfree rate of 5.40% and a market risk premium of 4%.

Con Ed Beta = 0.90

Cost of Equity = 5.4% + 0.90*4% = 9%

We estimate the expected growth rate from fundamentals.

Expected growth rate = (1- Payout ratio) Return on equity

= (1-0.6997)(0.1163) = 3.49%

[1] The average payout ratio for large stable firms in the United States is about 60%.

Valuation

We now use the Gordon growth model to value the equity per share at Con Ed:

$$\text{Value of Equity} = \frac{\text{Expected dividends next year}}{\text{Cost of equity - Expected growth rate}}$$

$$= \frac{(\$2.19)(1.0349)}{0.09 - 0.0349} = \$41.15$$

Con Ed was trading for $36.59 on the day of this analysis (May 14, 2001). Based upon this valuation, the stock would have been under valued.

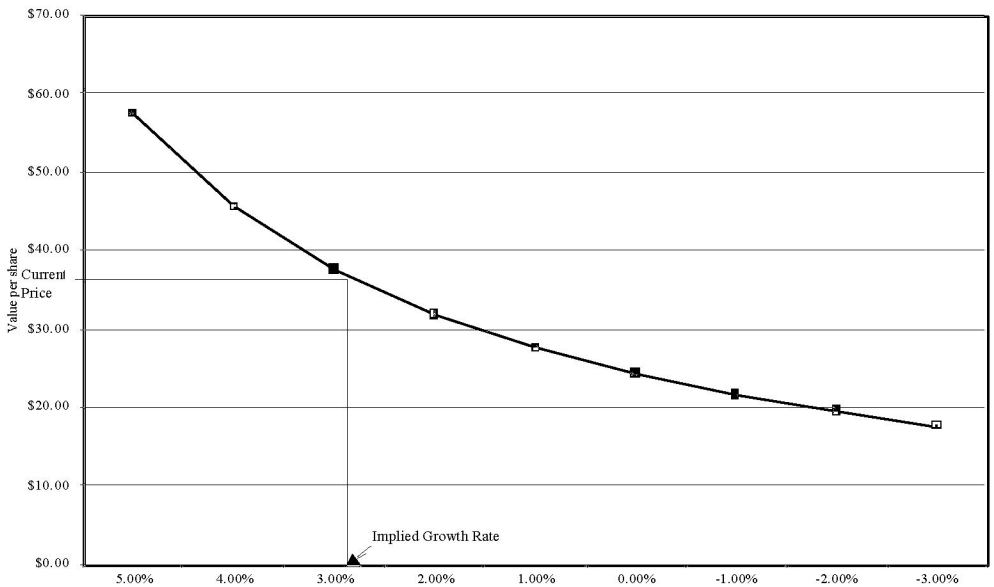
.DDMst.xlss: This spreadsheet allows you to value a stable growth firm, with stable firm characteristics (beta and return on equity) and dividends that roughly match cash flows.

Implied Growth Rate

Our value for Con Ed is different from the market price and this is likely to be the case with almost any company that you value. There are three possible explanations for this deviation. One is that you are right and the market is wrong. While this may be the correct explanation, you should probably make sure that the other two explanations do not hold – that the market is right and you are wrong or that the difference is too small to draw any conclusions. [

To examine the magnitude of the difference between the market price and your estimate of value, you can hold the other variables constant and change the growth rate in your valuation until the value converges on the price. Figure 13.2 estimates value as a function of the expected growth rate (assuming a beta of 0.90 and current dividends per share of $2.19).

Figure 13.2: Value per share versus Growth



Solving for the expected growth rate that provides the current price,

$$\$36.59 = \frac{\$2.19(1+g)}{0.09 - g}$$

The growth rate in earnings and dividends would have to be 2.84% a year to justify the stock price of $36.59. This growth rate is called an **implied growth rate**. Since we estimate growth from fundamentals, this allows us to estimate an implied return on equity.

$$\text{Implied return on equity} = \frac{\text{Implied growth rate}}{\text{Retention ratio}} = \frac{0.0284}{0.3003} = 9.47\%$$

Illustration 13.2: Value a real estate investment trust: Vornado REIT

Real estate investment trusts were created in the early 1970s by a law that allowed these entities to invest in real estate and pass the income, tax-free, to their investors. In return for the tax benefit, however, REITs are required to return at least 95% of their earnings as dividends. Thus, they provide an interesting case study in dividend discount model valuation. Vornado Realty Trust owns and has investments in real estate in the New York area including Alexander's, the Hotel Pennsylvania and other ventures.

Rationale for using the model

Since the firm is required to pay out 95% of its earnings as dividends, the growth in earnings per share will be modest,[2] making it a good candidate for the Gordon growth model.

Background Information

In 2000, Vornado paid dividends per share of $2.12 on earnings per share of $2.22. The estimated payout ratio is:

$$\text{Expected payout ratio} = \frac{2.12}{2.22} = 95.50\%$$

The firm had a return on equity of 12.29%.

Estimates

We use the average beta for real estate investment trusts of 0.69, a riskfree rate of 5.4% and a risk premium of 4% to estimate a cost of equity:

Cost of equity = 5.4% + 0.69 (4%) = 8.16%

The expected growth rate is estimated from the dividend payout ratio and the return on equity:

[2] Growth in net income may be much higher, since REITs can still issue new equity for investing in new ventures.

Expected growth rate = (1- 0.955) (0.1229) = 0.55%

Valuation

$$\text{Value per share} = \frac{2.12(1.0055)}{0.0816 - 0.0055} = \$28.03$$

It is particularly important with REITs that we steer away from net income growth, which may be much higher. On May 14, 2001, Vornado Realty was trading at $36.57, which would make it overvalued.

II. Two-stage Dividend Discount Model

The two-stage growth model allows for two stages of growth - an initial phase where the growth rate is not a stable growth rate and a subsequent steady state where the growth rate is stable and is expected to remain so for the long term. While, in most cases, the growth rate during the initial phase is higher than the stable growth rate, the model can be adapted to value companies that are expected to post low or even negative growth rates for a few years and then revert back to stable growth.

The Model

The model is based upon two stages of growth, an extraordinary growth phase that lasts n years and a stable growth phase that lasts forever afterwards.

Extraordinary growth rate: g% each year for n yearsStable growth: g_n forever

|_____|_____>

Value of the Stock = PV of Dividends during extraordinary phase + PV of terminal price

$$P_0 = \sum_{t=1}^{t=n} \frac{DPS_t}{(1+k_{e,hg})^t} + \frac{P_n}{(1+k_{e,hg})^n} \text{ where } P_n = \frac{DPS_{n+1}}{(k_{e,st} - g_n)}$$

where,

DPS_t = Expected dividends per share in year t

k_e = Cost of Equity (hg: High Growth period; st: Stable growth period)

P_n = Price (terminal value) at the end of year n

g = Extraordinary growth rate for the first n years

g_n = Steady state growth rate forever after year n

In the case where the extraordinary growth rate (g) and payout ratio are unchanged for the first n years, this formula can be simplified.

$$P_0 = \frac{DPS_0 * (1+g) * \left(1 - \frac{(1+g)^n}{(1+k_{e,hg})^n}\right)}{k_{e,hg} - g} + \frac{DPS_{n+1}}{(k_{e,st} - g_n)(1+k_{e,hg})^n}$$

where the inputs are as defined above.

Calculating the terminal price

The same constraint that applies to the growth rate for the Gordon Growth Rate model, i.e., that the growth rate in the firm is comparable to the nominal growth rate in the economy, applies for the terminal growth rate (g_n) in this model as well.

In addition, the payout ratio has to be consistent with the estimated growth rate. If the growth rate is expected to drop significantly after the initial growth phase, the payout ratio should be higher in the stable phase than in the growth phase. A stable firm can pay out more of its earnings in dividends than a growing firm. One way of estimating this new payout ratio is to use the fundamental growth model described in Chapter 12.

Expected Growth = Retention ratio * Return on equity

Algebraic manipulation yields the following stable period payout ratio:

$$\text{Stable Payout ratio} = \frac{\text{Stable growth rate}}{\text{Stable period return on equity}}$$

Thus, a firm with a 5% growth rate and a return on equity of 15% will have a stable period payout ratio of 33.33%.

The other characteristics of the firm in the stable period should be consistent with the assumption of stability. For instance, it is reasonable to assume that a high growth firm has a beta of 2.0, but unreasonable to assume that this beta will remain unchanged when the firm becomes stable. In fact, the rule of thumb that we developed in the last chapter – that stable period betas should be between 0.8 and 1.2 – is worth repeating here. Similarly, the return on equity, which can be high during the initial growth phase, should come down to levels commensurate with a stable firm in the stable growth phase. What is a reasonable stable period return on equity? The industry average return on equity and the firm's own stable period cost of equity provide useful information to make this judgment.

Limitations of the model

There are three problems with the two-stage dividend discount model – the first two would apply to any two-stage model and the third is specific to the dividend discount model.

- The first practical problem is in defining the length of the extraordinary growth period. Since the growth rate is expected to decline to a stable level after this period, the value of an investment will increase as this period is made longer. While we did develop criteria

that might be useful in making this judgment in Chapter 12, it is difficult in practice to convert these qualitative considerations into a specific time period.

- The second problem with this model lies in the assumption that the growth rate is high during the initial period and is transformed overnight to a lower stable rate at the end of the period. While these sudden transformations in growth can happen, it is much more realistic to assume that the shift from high growth to stable growth happens gradually over time.
- The focus on dividends in this model can lead to skewed estimates of value for firms that are not paying out what they can afford in dividends. In particular, we will under estimate the value of firms that accumulate cash and pay out too little in dividends.

Works best for:

Since the two-stage dividend discount model is based upon two clearly delineated growth stages, high growth and stable growth, it is best suited for firms which are in high growth and expect to maintain that growth rate for a specific time period, after which the sources of the high growth are expected to disappear. One scenario, for instance, where this may apply is when a company has patent rights to a very profitable product for the next few years and is expected to enjoy super-normal growth during this period. Once the patent expires, it is expected to settle back into stable growth. Another scenario where it may be reasonable to make this assumption about growth is when a firm is in an industry which is enjoying super-normal growth because there are significant barriers to entry (either legal or as a consequence of infra-structure requirements), which can be expected to keep new entrants out for several years.

The assumption that the growth rate drops precipitously from its level in the initial phase to a stable rate also implies that this model is more appropriate for firms with modest growth rates in the initial phase. For instance, it is more reasonable to assume that a firm growing at 12% in the high growth period will see its growth rate drops to 6% afterwards than it is for a firm growing at 40% in the high growth period.

Finally, the model works best for firms that maintain a policy of paying out most of residual cash flows – i.e, cash flows left over after debt payments and reinvestment needs have been met – as dividends.

Illustration 13.3: Valuing a firm with the two-stage dividend discount model: Procter & Gamble

Procter & Gamble (P&G) manufactures and markets consumer products all over the world. Some of its best known brand names include Pampers diapers, Tide detergent, Crest toothpaste and Vicks cough/cold medicines.

A Rationale for using the Model

- *Why two-stage?* While P&G is a firm with strong brand names and an impressive track record on growth, it faces two problems. The first is the saturation of the domestic U.S. market, which represents about half of P&G's revenues. The second is the increased competition from generics across all of its product lines. We will assume that the firm will continue to grow but restrict the growth period to 5 years.
- *Why dividends?* P&G has a reputation for paying high dividends and it has not accumulated large amounts of cash over the last decade.

Background Information

- Earnings per share in 2000 = $3.00
- Dividends per share in 2000 = $1.37
- Payout ratio in 2000 = $\frac{1.37}{3.00} = 45.67\%$
- Return on Equity in 2000 = 29.37%

Estimates

We will first estimate the cost of equity for P&G, based upon a bottom-up beta of 0.85 (estimated using the unlevered beta for consumer product firms and P&G's debt to equity ratio), a riskfree rate of 5.4% and a risk premium of 4%.

Cost of equity = 5.4% + 0.85 (4%) = 8.8%

To estimate the expected growth in earnings per share over the five-year high growth period, we use the retention ratio in the most recent financial year (2000) but lower the return on equity to 25% from the current value.

Expected growth rate = Retention ratio * Return on Equity

$$= (1 - 0.4567)(0.25) = 13.58\%$$

In stable growth, we will estimate that the beta for the stock will rise to 1, leading to a cost of equity of 9.40%.

Cost of equity in stable growth = 5.4% + 1 (4%) = 9.40%

The expected growth rate will be assumed to be equal to the growth rate of the economy (5%) and the return on equity will drop to 15%, which is lower than the current industry average (17.4%) but higher than the cost of equity estimated above. The retention ratio in stable growth during the stable growth period is calculated.

$$\text{Retention ratio in stable growth} = \frac{g}{ROE} = \frac{5\%}{15\%} = 33.33\%$$

The payout ratio in stable growth is therefore 66.67%.

Estimating the value:

The first component of value is the present value of the expected dividends during the high growth period. Based upon the current earnings ($3.00), the expected growth rate (13.58%) and the expected dividend payout ratio (45.67%), the expected dividends can be computed for each year in the high growth period.

Table 13.1: Expected Dividends per share: P&G

Year	*EPS*	*DPS*	*Present Value*
1	$3.41	$1.56	$1.43
2	$3.87	$1.77	$1.49
3	$4.40	$2.01	$1.56
4	$4.99	$2.28	$1.63
5	$5.67	$2.59	$1.70
Sum			$7.81

The present value is computed using the cost of equity of 8.8% for the high growth period.

Cumulative Present Value of Dividends during high growth (@8.8%) = $7.81

The present value of the dividends can also be computed in short hand using the following computation:

$$\text{PV of Dividends} = \frac{\$1.37(1.1358)\left(1 - \frac{(1.1358)^5}{(1.088)^5}\right)}{0.088 - 0.1358} = \$7.81$$

The price (terminal value) at the end of the high growth phase (end of year 5) can be estimated using the constant growth model.

$$\text{Terminal price} = \frac{\text{Expected Dividends per share}_{n+1}}{k_{e,st} - g_n}$$

$\text{Expected Earnings per share}_6 = 3.00 * 1.1358^5 * 1.05 = \$5.96$

$\text{Expected Dividends per share}_6 = EPS_6 * \text{Stable period payout ratio}$

$= \$5.96 * 0.6667 = \$3.97$

$$\text{Terminal price} = \frac{\text{Dividends}_6}{k_{e,st} - g} = \frac{\$3.97}{0.094 - 0.05} = \$90.23$$

The present value of the terminal price –is:

$$\text{PV of Terminal Price} = \frac{\$90.23}{(1.088)^5} = \$59.18$$

The cumulated present value of dividends and the terminal price can then be calculated.

$$P_0 = \frac{\$1.37(1.1358)\left(1 - \frac{(1.1358)^5}{(1.088)^5}\right)}{0.088 - 0.1358} + \frac{\$90.23}{(1.088)^5} = \$7.81 + \$59.18 = \$66.99$$

P&G was trading at $63.90 at the time of this analysis on May 14, 2001.

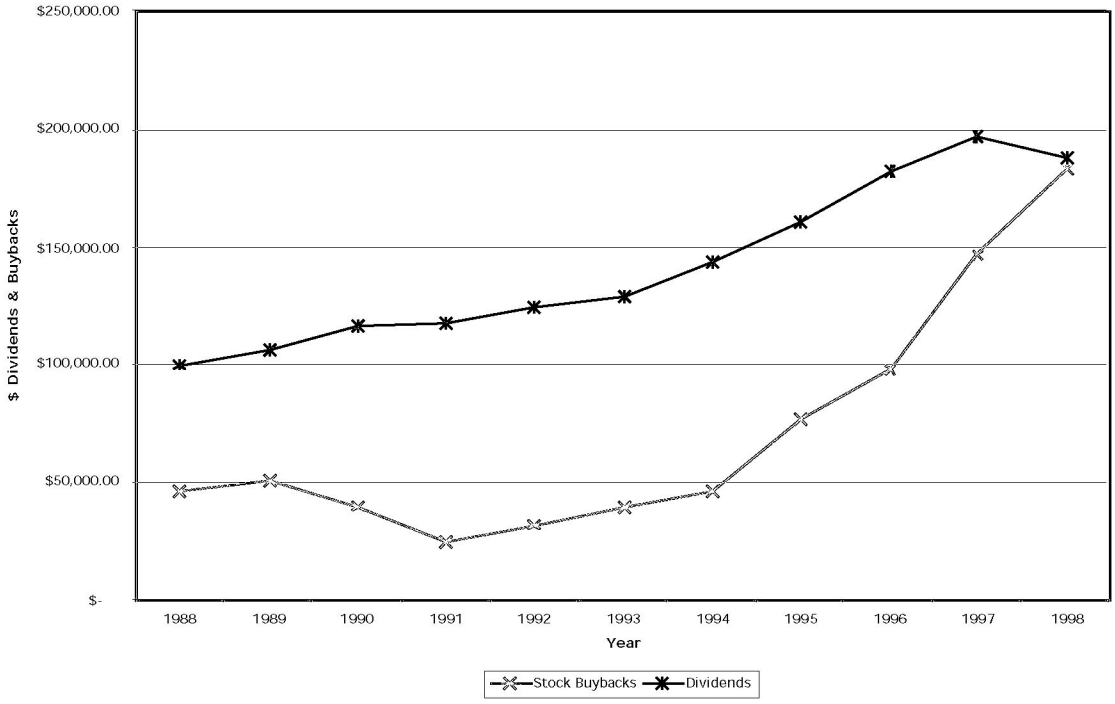
 *.DDM2st.xlss*: This spreadsheet allows you to value a firm with a temporary period of high earnings followed by stable growth.

A Trouble Shooting Guide: What is wrong with this valuation? DDM 2 St	
If this is your 'problem'	*this may be the s*
• If you get a extremely low value from the 2-stage DDM, the likely culprits are	
- the stable period payout ratio is too low for a stable firm (< 40%)	If using fundame
	If entering direct
- the beta in the stable period is too high for a stable firm	Use a beta close
- the use of the two-stage model when the three-stage model is more appropriate	Use a three-stag
• If you get an extremely high value,	
- the growth rate in the stable growth period is too high for stable firm	Use a growth rat

Modifying the model to include stock buybacks

In recent years, firms in the United States have increasingly turned to stock buybacks as a way of returning cash to stockholders. Figure 13.3 presents the cumulative amounts paid out by firms in the form of dividends and stock buybacks from 1960 to 1998.

Figure 13.3: Stock Buybacks and Dividends: Aggregate for US Firms - 1989-98



The trend towards stock buybacks is very strong, especially in the 1990s.

What are the implications for the dividend discount model? Focusing strictly on dividends paid as the only cash returned to stockholders exposes us to the risk that we might be missing significant cash returned to stockholders in the form of stock buybacks. The simplest way to incorporate stock buybacks into a dividend discount model is to add them on to the dividends and compute a modified payout ratio:

$$\text{Modified dividend payout ratio} = \frac{\text{Dividends} + \text{Stock Buybacks}}{\text{Net Income}}$$

While this adjustment is straightforward, the resulting ratio for any one year can be skewed by the fact that stock buybacks, unlike dividends, are not smoothed out. In other words, a firm may buy back $ 3billion in stock in one year and not buy back stock for the next 3 years. Consequently, a much better estimate of the modified payout ratio can be obtained by looking at the average value over a four or five year period. In addition, firms may

sometimes buy back stock as a way of increasing financial leverage. We could adjust for this by netting out new debt issued from the calculation above:

$$\text{Modified dividend payout} = \frac{\text{Dividends} + \text{Stock Buybacks} - \text{Long Term Debt issues}}{\text{Net Income}}$$

Adjusting the payout ratio to include stock buybacks will have ripple effects on the estimated growth and the terminal value. In particular, the modified growth rate in earnings per share can be written as:

Modified growth rate = (1 – Modified payout ratio) * Return on equity

Even the return on equity can be affected by stock buybacks. Since the book value of equity is reduced by the market value of equity bought back, a firm that buys backs stock can reduce its book equity (and increase its return on equity) dramatically. If we use this return on equity as a measure of the marginal return on equity (on new investments), we will overstate the value of a firm. Adding back stock buybacks in recent year to the book equity and re-estimating the return on equity can sometimes yield a more reasonable estimate of the return on equity on investments.

Illustration 13.4: Valuing a firm with modified dividend discount mode: Procter & Gamble

Consider our earlier valuation of Procter and Gamble where we used the current dividends as the basis for our projections. Note that over the last four years, P&G has had significant stock buybacks each period. Table 13.2 summarizes the dividends and buybacks over the period.

Table 13.2: Dividends and Stock Buybacks: P&G

	1997	*1998*	*1999*	*2000*	*Total*
Net Income	3415	3780	3763	3542	14500
Dividends	1329	1462	1626	1796	6213
Buybacks	2152	391	1881	-1021	3403
Dividends+Buybacks	3481	1853	3507	775	9616
Payout ratio	38.92%	38.68%	43.21%	50.71%	42.85%
Modified payout ratio	101.93%	49.02%	93.20%	21.88%	66.32%
Buybacks	1652	1929	2533	1766	
Net LT Debt issued	-500	1538	652	2787	
Buybacks net of debt	2152	391	1881	-1021	

Over the five-year period, P&G had significant buybacks but it also increased its leverage dramatically in the last three years. Summing up the total cash returned to stockholders over

the last 4 years, we arrive at a modified payout ratio of 66.32%. If we substitute this payout ratio into the valuation in Illustration 13.3, the expected growth rate over the next 5 years drops to 8.42%:

Expected growth rate = (1- Modified payout ratio) ROE = (1-0.6632)(0.25) = 8.42%

We will still assume a five year high growth period and that the parameters in stable growth remain unchanged. The value per share can be estimated.

$$P_0 = \frac{\$3.00(0.6632)(1.0842)\left(1 - \frac{(1.0842)^5}{(1.0880)^5}\right)}{0.0880 - 0.0842} + \frac{\$71.50}{(1.0880)^5} = \$56.75$$

Note that the drop in growth rate in earnings during the high growth period reduces earnings in the terminal year, and the terminal value per share drops to $71.50.

This value is lower than that obtained in Illustration 13.3 and it reflects our expectation that P&G does not have as many new profitable new investments (earning a return on equity of 25%).

Valuing an entire market using the dividend discount model

All our examples of the dividend discount model so far have involved individual companies, but there is no reason why we cannot apply the same model to value a sector or even the entire market. The market price of the stock would be replaced by the cumulative market value of all of the stocks in the sector or market. The expected dividends would be the cumulated dividends of all these stocks and could be expanded to include stock buybacks by all firms. The expected growth rate would be the growth rate in cumulated earnings of the index. There would be no need for a beta or betas, since you are looking at the entire market (which should have a beta of 1) and you could add the risk premium (or premiums) to the riskfree rate to estimate a cost of equity. You could use a two-stage model, where this growth rate is greater than the growth rate of the economy, but you should be cautious about setting the growth rate too high or the growth period too long because it will be difficult for cumulated earnings growth of all firms in an economy to run ahead of the growth rate in the economy for extended periods.

Consider a simple example. Assume that you have an index trading at 700 and that the average dividend yield of stocks in the index is 5%. Earnings and dividends can be expected to grow at 4% a year forever and the riskless rate is 5.4%. If you use a market risk premium of 4%, the value of the index can be estimated.

Cost of equity = Riskless rate + Risk premium = 5.4% + 4% = 9.4%

Expected dividends next year = (Dividend yield * Value of the index)(1+ expected growth rate) = (0.05*700) (1.04) = 36.4

$$\text{Value of the index} = \frac{\text{Expected dividends next year}}{\text{Cost of equity - Expected growth rate}} = \frac{36.4}{0.094 - 0.04} = 674$$

At its existing level of 700, the market is slightly over priced.

Illustration 13.5: Valuing the S&P 500 using a dividend discount model: January 1, 2001

On January 1, 2001, the S&P 500 index was trading at 1320. The dividend yield on the index was only 1.43%, but including stock buybacks increases the modified dividend yield to 2.50%. Analysts were estimating that the earnings of the stocks in the index would increase 7.5% a year for the next 5 years. Beyond year 5, the expected growth rate is expected to be 5%, the nominal growth rate in the economy. The treasury bond rate was 5.1% and we will use a market risk premium of 4%, leading to a cost of equity of 9.1%:

Cost of equity = 5.1% + 4% = 9.1%

The expected dividends (and stock buybacks) on the index for the next 5 years can be estimated from the current dividends and expected growth of 7.50%.

Current dividends = 2.50% of 1320 = 33.00

	1	*2*	*3*	*4*	*5*
Expected Dividends =	$35.48	$38.14	$41.00	$44.07	$47.38
Present Value =	$32.52	$32.04	$31.57	$31.11	$30.65

The present value is computed by discounting back the dividends at 9.1%. To estimate the terminal value, we estimate dividends in year 6 on the index:

Expected dividends in year 6 = $47.38 (1.05) = $49.74

$$\text{Terminal value of the index} = \frac{\text{Expected Dividends}_6}{r - g} = \frac{\$49.74}{0.091 - 0.05} = \$1213$$

$$\text{Present value of Terminal value} = \frac{\$1213}{1.091^5} = \$785$$

The value of the index can now be computed:

Value of index = Present value of dividends during high growth + Present value of terminal value = $32.52+32.04+31.57+$31.11+ $30.65+ $785 = $943

Based upon this, we would have concluded that the index was over valued at 1320.

The Value of Growth

Investors pay a price premium when they acquire companies with high growth potential. This premium takes the form of higher price-earnings or price-book value ratios. While no one will contest the proposition that growth is valuable, it is possible to pay too much for growth. In fact, empirical studies that show low price-earnings ratio stocks earning return premiums over high price-earnings ratio stocks in the long term supports the notion that investors overpay for growth. This section uses the two-stage dividend discount model to examine the value of growth and it provides a benchmark that can be used to compare the actual prices paid for growth.

Estimating the value of growth

The value of the equity in any firm can be written in terms of three components:

$$P_0 = \left[\frac{DPS_0 * (1+g) * \left(1 - \frac{(1+g)^n}{(1+k_{e,hg})^n}\right)}{k_{e,hg} - g} + \frac{DPS_{n+1}}{(k_{e,st} - g_n)(1+k_{e,hg})^n} - \frac{DPS_1}{(k_{e,st} - g_n)} \right]$$

Extraordinary Growth

$$+ \left[\frac{DPS_1}{(k_{e,st} - g_n)} - \frac{DPS_0}{k_{e,st}} \right] + \frac{DPS_0}{k_{e,st}}$$

Stable Growth Assets in place

where

DPS_t = Expected dividends per share in year t

k_e = Required rate of return

P_n = Price at the end of year n

g = Growth rate during high growth stage

g_n = Growth rate forever after year n

Value of extraordinary growth = Value of the firm with extraordinary growth in first n years - Value of the firm as a stable growth firm[3]

Value of stable growth = Value of the firm as a stable growth firm - Value of firm with no growth

[3] The payout ratio used to calculate the value of the firm as a stable firm can be either the current payout ratio, if it is reasonable, or the new payout ratio calculated using the fundamental growth formula.

Assets in place = Value of firm with no growth

In making these estimates, though, we have to remain consistent. For instance, to value assets in place, you would have to assume that the entire earnings could be paid out in dividends, while the payout ratio used to value stable growth should be a stable period payout ratio.

Illustration 13.6: The Value of Growth: P&G in May 2001

In illustration 13.3, we valued P&G using a 2-stage dividend discount model at $66.99. We first value the assets in place using current earnings ($3.00) and assume that all earnings are paid out as dividends. We also use the stable growth cost of equity as the discount rates.

$$\text{Value of the assets in place} = \frac{\text{Current EPS}}{k_{e,st}} = \frac{\$3}{0.094} = \$31.91$$

To estimate the value of stable growth, we assume that the expected growth rate will be 5% and that the payout ratio is the stable period payout ratio of 66.67%:

$$\text{Value of stable growth} = \frac{(\text{Current EPS})(\text{Stable Payout Ratio})(1+g_n)}{k_{e,st}-g_n} - \$31.91$$

$$= \frac{(\$3.00)(0.6667)(1.05)}{0.094-0.05} - \$31.91 = \$15.81$$

Value of extraordinary growth = $66.99 - $31.91 - $15.81 = $19.26

The Determinants of the Value of Growth

1. *Growth rate during extraordinary period:* The higher the growth rate in the extraordinary period, the higher the estimated value of growth will be. If the growth rate in the extraordinary growth period had been raised to 20% for the Procter & Gamble valuation, the value of extraordinary growth would have increased from $19.26 to $39.45. Conversely, the value of high growth companies can drop precipitously if the expected growth rate is reduced, either because of disappointing earnings news from the firm or as a consequence of external events.
2. *Length of the extraordinary growth period:* The longer the extraordinary growth period, the greater the value of growth will be. At an intuitive level, this is fairly simple to illustrate. The value of $19.26 obtained for extraordinary growth is predicated on the assumption that high growth will last for five years. If this is revised to last ten years, the value of extraordinary growth will increase to $43.15.
3. *Profitability of projects*: The profitability of projects determines both the growth rate in the initial phase and the terminal value. As projects become more

profitable, they increase both growth rates and growth period, and the resulting value from extraordinary growth will be greater.

4. *Riskiness of the firm/equity* The riskiness of a firm determines the discount rate at which cashflows in the initial phase are discounted. Since the discount rate increases as risk increases, the present value of the extraordinary growth will decrease.

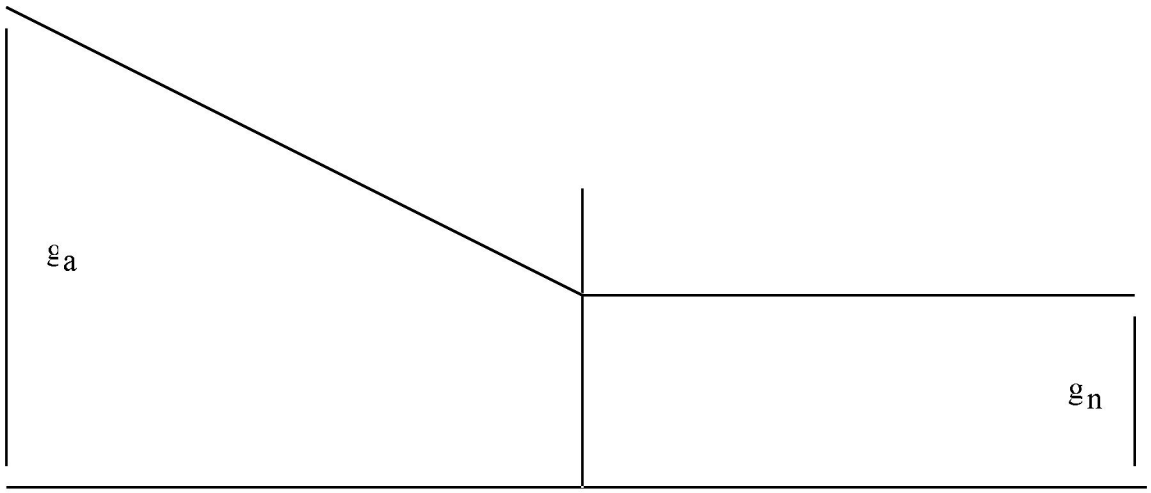
III. The H Model for valuing Growth

The H model is a two-stage model for growth, but unlike the classical two-stage model, the growth rate in the initial growth phase is not constant but declines linearly over time to reach the stable growth rate in steady stage. This model was presented in Fuller and Hsia (1984).

The Model

The model is based upon the assumption that the earnings growth rate starts at a high initial rate (g_a) and declines linearly over the extraordinary growth period (which is assumed to last 2H periods) to a stable growth rate (g_n). It also assumes that the dividend payout and cost of equity are constant over time and are not affected by the shifting growth rates. Figure 13.4 graphs the expected growth over time in the H Model.

Figure 13.4: Expected Growth in the H Model



The value of expected dividends in the H Model can be written as:

$$P_0 = \frac{DPS_0 * (1+g_n)}{(k_e - g_n)} + \frac{DPS_0 * H * (g_a - g_n)}{(k_e - g_n)}$$

Stable growth Extraordinary growth

where,

P_0 = Value of the firm now per share,

DPS_t = DPS in year t

k_e = Cost of equity

g_a = Growth rate initially

g_n = Growth rate at end of 2H years, applies forever afterwards

Limitations

This model avoids the problems associated with the growth rate dropping precipitously from the high growth to the stable growth phase, but it does so at a cost. First, the decline in the growth rate is expected to follow the strict structure laid out in the model -- it drops in linear increments each year based upon the initial growth rate, the stable growth rate and the length of the extraordinary growth period. While small deviations from this assumption do not affect the value significantly, large deviations can cause problems. Second, the assumption that the payout ratio is constant through both phases of growth exposes the analyst to an inconsistency -- as growth rates decline the payout ratio usually increases.

Works best for:

The allowance for a gradual decrease in growth rates over time may make this a useful model for firms which are growing rapidly right now, but where the growth is expected to decline gradually over time as the firms get larger and the differential advantage they have over their competitors declines. The assumption that the payout ratio is constant, however, makes this an inappropriate model to use for any firm that has low or no dividends currently. Thus, the model, by requiring a combination of high growth and high payout, may be quite limited[4] in its applicability.

Illustration 13.7: Valuing with the H model: Alcatel

Alcatel is a French telecommunications firm, paid dividends per share of 0.72 Ffr on earnings per share of 1.25 Ffr in 2000. The firm's earnings per share had grown at 12% over the prior 5 years but the growth rate is expected to decline linearly over the next 10 years to 5%, while the payout ratio remains unchanged. The beta for the stock is 0.8, the riskfree rate is 5.1% and the market risk premium is 4%.

[4] Proponents of the model would argue that using a steady state payout ratio for firms which pay little or no dividends is likely to cause only small errors in the valuation.

Cost of equity = 5.1% + 0.8*4% = 8.30%

The stock can be valued using the H model:

$$\text{Value of stable growth} = \frac{(0.72)(1.05)}{0.083 - 0.05} = \$22.91$$

$$\text{Value of extraordinary growth} = \frac{(0.72)(10/2)(0.12 - 0.05)}{0.083 - 0.05} = 7.64$$

Value of stock = 22.91 + 7.64 = 30.55

The stock was trading at 33.40 Ffr in May 2001.

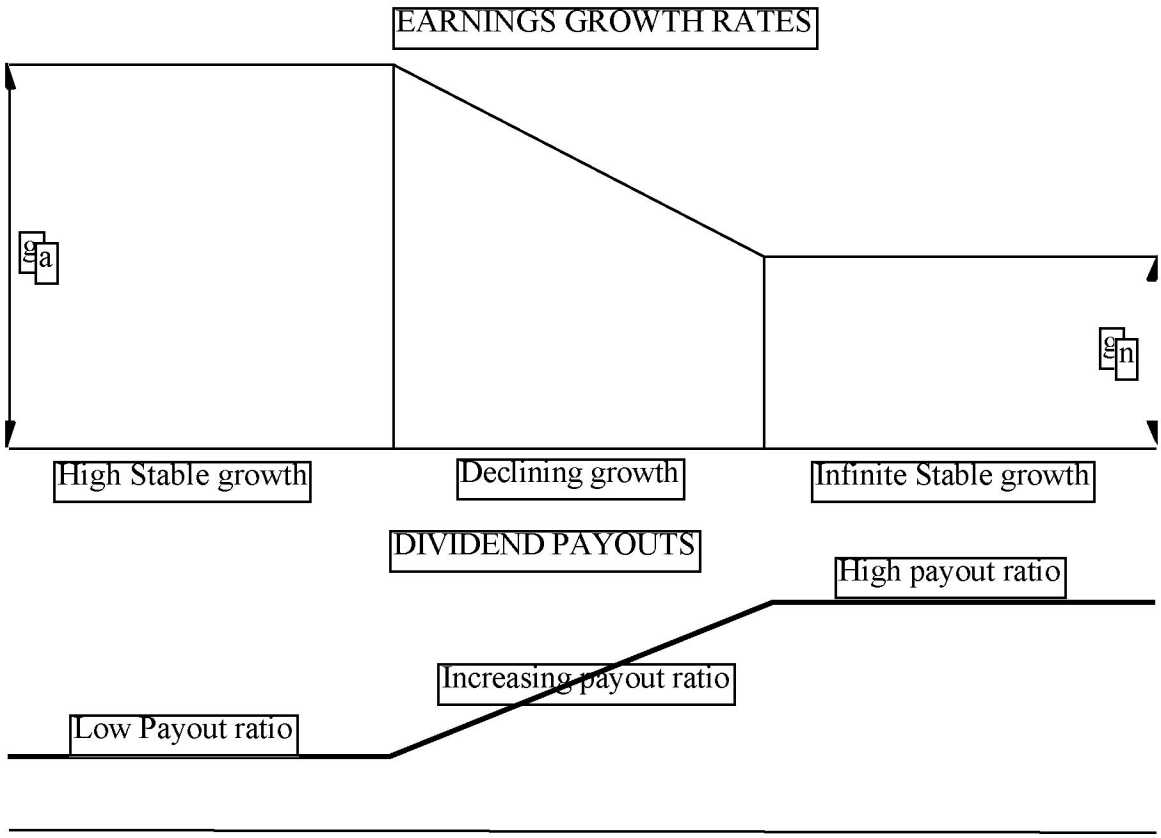
IV. Three-stage Dividend Discount Model

The three-stage dividend discount model combines the features of the two-stage model and the H-model. It allows for an initial period of high growth, a transitional period where growth declines and a final stable growth phase. It is the most general of the models because it does not impose any restrictions on the payout ratio.

The Model

This model assumes an initial period of stable high growth, a second period of declining growth and a third period of stable low growth that lasts forever. Figure 13.5 graphs the expected growth over the three time periods.

Figure 13.5: Expected Growth in the Three-Stage DDM



The value of the stock is then the present value of expected dividends during the high growth and the transitional periods and of the terminal price at the start of the final stable growth phase.

$$P_0 = \sum_{t=1}^{t=n1} \frac{EPS_0 * (1+g_a)^t * \Pi_a}{(1+k_{e,hg})^t} + \sum_{t=n1+1}^{t=n2} \frac{DPS_t}{(1+k_{e,t})^t} + \frac{EPS_{n2} * (1+g_n) * \Pi_n}{(k_{e,st} - g_n)(1+r)^n}$$

High growth phase Transition Stable growth phase

where,

EPS_t = Earnings per share in year t

DPS_t = Dividends per share in year t

g_a = Growth rate in high growth phase (lasts n1 periods)

g_n = Growth rate in stable phase

Π_a = Payout ratio in high growth phase

Π_n = Payout ratio in stable growth phase

k_e = Cost of equity in high growth (hg), transition (t) and stable growth (st)

Assumptions

This model removes many of the constraints imposed by other versions of the dividend discount model. In return, however, it requires a much larger number of inputs - year-specific payout ratios, growth rates and betas. For firms where there is substantial noise in the estimation process, the errors in these inputs can overwhelm any benefits that accrue from the additional flexibility in the model.

Works best for:

This model's flexibility makes it a useful model for any firm, which in addition to changing growth over time is expected to change on other dimensions as well - in particular, payout policies and risk. It is best suited for firms which are growing at an extraordinary rate now and are expected to maintain this rate for an initial period, after which the differential advantage of the firm is expected to deplete leading to gradual declines in the growth rate to a stable growth rate. Practically speaking, this may be the more appropriate model to use for a firm whose earnings are growing at very high rates[5], are expected to continue growing at those rates for an initial period, but are expected to start declining gradually towards a stable rate as the firm become larger and loses its competitive advantages.

Illustration 13.8: Valuing with the Three-stage DDM model: Coca Cola

Coca Cola, the owner of the most valuable brand name in the world according to Interbrand, was able to increase its market value ten-fold in the 1980s and 1990s. While growth has leveled off in the last few years, the firm is still expanding both into other products and other markets.

A Rationale for using the Three-Stage Dividend Discount Model

- *Why three-stage?* Coca Cola is still in high growth, but its size and dominant market share will cause growth to slide in the second phase of the high growth period. The high growth period is expected to last 5 years and the transition period is expected to last an additional 5 years.
- *Why dividends?* The firm has had a track record of paying out large dividends to its stockholders, and these dividends tend to mirror free cash flows to equity.
- The financial leverage is stable.

Background Information

- Current Earnings / Dividends
    - Earnings per share in 2000 = $1.56

[5] The definition of a 'very high' growth rate is largely subjective. As a rule of thumb, growth rates over 25% would qualify as very high when the stable growth rate is 6-8%.

- Dividends per share in 2000 = $0.69
- Payout ratio in 2000 = 44.23%
- Return on Equity = 23.37%

Estimate

a. Cost of Equity

We will begin by estimating the cost of equity during the high growth phase, expected. We use a bottom-up levered beta of 0.80 and a riskfree rate of 5.4%. We use a risk premium of 5.6%, significantly higher than the mature market premium of 4%, which we have used in the valuation so far, to reflect Coca Cola's exposure in Latin America, Eastern Europe and Asia. The cost of equity can then be estimated for the high growth period.

Cost of equity$_{\text{high growth}}$ = 5.4% + 0.8 (5.6%) = 9.88%

In stable growth, we assume that the beta will remain 0.80, but reduce the risk premium to 5% to reflect the expected maturing of many emerging markets.

Cost of equity$_{\text{stable growth}}$ = 5.4% + 0.8 (5.0%) = 9.40%

During the transition period, the cost of equity will linearly decline from 9.88% in year 5 to 9.40% in year 10.

b. Expected Growth and Payout Ratios

The expected growth rate during the high growth phase is estimated using the current return on equity of 23.37% and payout ratio of 44.23%.

Expected growth rate = Retention ratio * Return on equity = (1-0.4423)(0.2337) = 13.03%

During the transition phase, the expected growth rate declines linearly from 13.03% to a stable growth rate of 5.5%. To estimate the payout ratio in stable growth, we assume a return on equity of 20% for the firm:

$$\text{Stable period payout ratio} = 1 - \frac{g}{ROE} = 1 - \frac{5.5\%}{20\%} = 72.5\%$$

During the transition phase, the payout ratio adjusts upwards from 44.23% to 72.5% in linear increments.

Estimating the Value

These inputs are used to estimate expected earnings per share, dividends per share and costs of equity for the high growth, transition and stable periods. The present values are also shown in the last column table 13.3.

Table 13.3: Expected EPS, DPS and Present Value: Coca Cola

Year	*Expected Growth*	*EPS*	*Payout ratio*	*DPS*	*Cost of Equity*	*Present Value*

High Growth Stage						
1	13.03%	$1.76	44.23%	$0.78	9.88%	$0.71
2	13.03%	$1.99	44.23%	$0.88	9.88%	$0.73
3	13.03%	$2.25	44.23%	$1.00	9.88%	$0.75
4	13.03%	$2.55	44.23%	$1.13	9.88%	$0.77
5	13.03%	$2.88	44.23%	$1.27	9.88%	$0.79
Transition Stage						
6	11.52%	$3.21	49.88%	$1.60	9.78%	$0.91
7	10.02%	$3.53	55.54%	$1.96	9.69%	$1.02
8	8.51%	$3.83	61.19%	$2.34	9.59%	$1.11
9	7.01%	$4.10	66.85%	$2.74	9.50%	$1.18
10	5.50%	$4.33	72.50%	$3.14	9.40%	$1.24

(Note: Since the costs of equity change each year, the present value has to be calculated using the cumulated cost of equity. Thus, in year 7, the present value of dividends is:

$$\text{PV of year 7 dividend} = \frac{\$1.96}{(1.0988)^5 (1.0978)(1.0969)} = \$1.02$$

The terminal price at the end of year 10 can be calculated based upon the earnings per share in year 11, the stable growth rate of 5%, a cost of equity of 9.40% and the payout ratio of 72.5% -

$$\text{Terminal price} = \frac{\$4.33(1.055)(0.725)}{0.094 - 0.055} = \$84.83$$

The components of value are as follows:

Present Value of dividends in high growth phase:$ 3.76

Present Value of dividends in transition phase:$ 5.46

Present Value of terminal price at end of transition:$ 33.50

Value of Coca Cola Stock :$ 42.72

Coca Cola was trading at $46.29 in May 21, 2001.

.DDM3st.xlss: This spreadsheet allows you to value a firm with a period of high growth followed by a transition period where growth declines to a stable growth rate.

What is wrong with this model? (3 stage DDM)	
If this is your problem	*this may*
• If you are getting too low a value from this model,	
- the stable period payout ratio is too low for a stable firm (< 40%)	If using fundame
	If entering direct
- the beta in the stable period is too high for a stable firm	Use a beta close
• If you get an extremely high value,	
- the growth rate in the stable growth period is too high for stable firm	Use a growth rat
- the period of growth (high + transition) is too high	Use shorter high

Issues in using the Dividend Discount Model

The dividend discount model's primary attraction is its simplicity and its intuitive logic. There are many analysts, however, who view its results with suspicion because of limitations that they perceive it to possess. The model, they claim, is not really useful in valuation, except for a limited number of stable, high-dividend paying stocks. This section examines some of the areas where the dividend discount model is perceived to fall short.

(a) Valuing non-dividend paying or low dividend paying stocks

The conventional wisdom is that the dividend discount model cannot be used to value a stock that pays low or no dividends. It is wrong. If the dividend payout ratio is adjusted to reflect changes in the expected growth rate, a reasonable value can be obtained even for non-dividend paying firms. Thus, a high-growth firm, paying no dividends currently, can still be valued based upon dividends that it is expected to pay out when the growth rate declines. If the payout ratio is not adjusted to reflect changes in the growth rate, however, the dividend discount model will underestimate the value of non-dividend paying or low-dividend paying stocks.

(b) Is the model too conservative in estimating value?

A standard critique of the dividend discount model is that it provides too conservative an estimate of value. This criticism is predicated on the notion that the value is determined by more than the present value of expected dividends. For instance, it is argued that the dividend discount model does not reflect the value of 'unutilized assets'. There is no reason, however, that these unutilized assets cannot be valued separately and added on to the value from the dividend discount model. Some of the assets that are supposedly ignored by the dividend discount model, such as the value of brand names, can be dealt with simply within the context of the model.

A more legitimate criticism of the model is that it does not incorporate other ways of returning cash to stockholders (such as stock buybacks). If you use the modified version of the dividend discount model, this criticism can also be countered.

(c) The contrarian nature of the model

The dividend discount model is also considered by many to be a contrarian model. As the market rises, fewer and fewer stocks, they argue, will be found to be undervalued using the dividend discount model. This is not necessarily true. If the market increase is due to an improvement in economic fundamentals, such as higher expected growth in the economy and/or lower interest rates, there is no reason, a priori, to believe that the values

from the dividend discount model will not increase by an equivalent amount. If the market increase is not due to fundamentals, the dividend discount model values will not follow suit, but that is more a sign of strength than weakness. The model is signaling that the market is overvalued relative to dividends and cashflows and the cautious investor will pay heed.

Tests of the Dividend Discount Model

The ultimate test of a model lies in how well it works at identifying undervalued and overvalued stocks. The dividend discount model has been tested and the results indicate that it does, in the long term, provide for excess returns. It is unclear, however, whether this is because the model is good at finding undervalued stocks or because it proxies for well-know empirical irregularities in returns relating to price-earnings ratios and dividend yields.

A Simple Test of the Dividend Discount model

A simple study of the dividend discount model was conducted by Sorensen and Williamson, where they valued 150 stocks from the S&P 400 in December 1980, using the dividend discount model. They used the difference between the market price at that time and the model value to form five portfolios based upon the degree of under or over valuation. They made fairly broad assumptions in using the dividend discount model.

(a) The average of the earnings per share between 1976 and 1980 was used as the current earnings per share.

(b) The cost of equity was estimated using the CAPM.

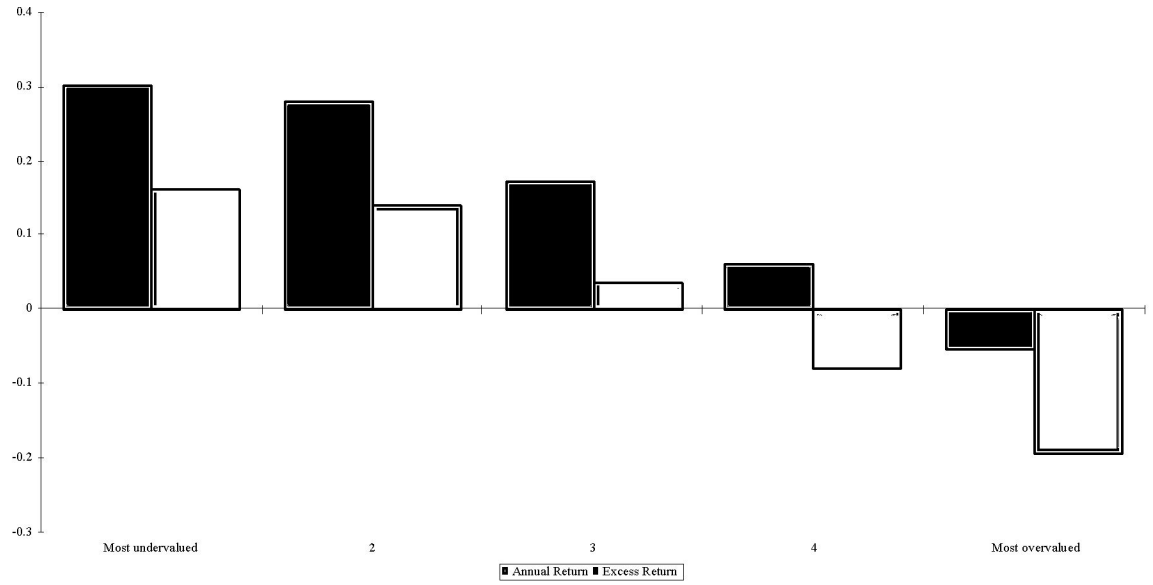
(c) The extraordinary growth period was assumed to be five years for all stocks and the I/B/E/S consensus forecast of earnings growth was used as the growth rate for this period.

(d) The stable growth rate, after the extraordinary growth period, was assumed to be 8% for all stocks.

(e) The payout ratio was assumed to be 45% for all stocks.

The returns on these five portfolios were estimated for the following two years (January 1981-January 1983) and excess returns were estimated relative to the S&P 500 Index using the betas estimated at the first stage and the CAPM. Figure 13.6 illustrates the excess returns earned by the portfolio that was undervalued by the dividend discount model relative to both the market and the overvalued portfolio.

Figure 13.6 Performance of the Dividend Discount Model: 1981-83



The undervalued portfolio had a positive excess return of 16% per annum between 1981 and 1983, while the overvalued portfolio had a negative excess return of 15% per annum during the same time period. Other studies which focus only on the dividend discount model come to similar conclusions. In the long term, undervalued (overvalued) stocks from the dividend discount model outperform (under perform) the market index on a risk adjusted basis.

Caveats on the use of the dividend discount model

The dividend discount model provides impressive results in the long term. There are, however, three considerations in generalizing the findings from these studies.

The dividend discount model does not beat the market every year

The dividend discount model outperforms the market over five-year time periods, but there have been individual years where the model has significantly under performed the market. Haugen reports on the results of a fund that used the dividend discount model to analyze 250 large capitalization firms and to classify them into five quintiles from the first quarter of 1979 to the last quarter of 1991. The betas of these quintiles were roughly equal. The valuation was done by six analysts who estimated an extraordinary growth rate for the initial high growth phase, the length of the high growth phase and a transitional phase for each of the firms. The returns on the five portfolios as well as the returns on all 250 stocks and the S&P 500 from 1979 to 1991 are reported in Table 13.4.

Table 13.4: Returns on Quintiles: Dividend Discount Model

	Quintile						
	Under Valued	2	3	4	Over Valued	250 Stocks	S&P 500
1979	35.07%	25.92%	18.49%	17.55%	20.06%	23.21%	18.57%
1980	41.21%	29.19%	27.41%	38.43%	26.44%	31.86%	32.55%
1981	12.12%	10.89%	1.25%	-5.59%	-8.51%	28.41%	24.55%
1982	19.12%	12.81%	26.72%	28.41%	35.54%	24.53%	21.61%
1983	34.18%	21.27%	25.00%	24.55%	14.35%	24.10%	22.54%
1984	15.26%	5.50%	6.03%	-4.20%	-7.84%	3.24%	6.12%
1985	38.91%	32.22%	35.83%	29.29%	23.43%	33.80%	31.59%
1986	14.33%	11.87%	19.49%	12.00%	20.82%	15.78%	18.47%
1987	0.42%	4.34%	8.15%	4.64%	-2.41%	2.71%	5.23%
1988	39.61%	31.31%	17.78%	8.18%	6.76%	20.62%	16.48%
1989	26.36%	23.54%	30.76%	32.60%	35.07%	29.33%	31.49%
1990	-17.32%	-8.12%	-5.81%	2.09%	-2.65%	-6.18%	-3.17%
1991	47.68%	26.34%	33.38%	34.91%	31.64%	34.34%	30.57%
1979-91	*1253%*	*657%*	*772%*	*605%*	*434%*	*722%*	*654%*

The undervalued portfolio earned significantly higher returns than the overvalued portfolio and the S&P 500 for the 1979-91 period, but it under performed the market in five of the twelve years and the overvalued portfolio in four of the twelve years.

Is the model just a proxy for low PE ratios and dividend yields?

The dividend discount model weights expected earnings and dividends in near periods more than earnings and dividends in far periods., It is biased towards finding low price-earnings ratio stocks with high dividend yields to be undervalued and high price-earnings ratio stocks with low or no dividend yields to be overvalued. Studies of market efficiency indicate that low PE ratio stocks have outperformed (in terms of excess returns) high PE ratio stocks over extended time periods. Similar conclusions have been drawn about high-dividend yield stocks relative to low-dividend yield stocks. Thus, the valuation findings of the model are consistent with empirical irregularities observed in the market.

It is unclear how much the model adds in value to investment strategies that use PE ratios or dividend yields to screen stocks. Jacobs and Levy (1988b) indicate that the marginal gain is relatively small.

Attribute *Average Excess Return per Quarter: 1982-87*

Dividend Discount Model	0.06% per quarter
Low P/E Ratio	0.92% per quarter
Book/Price Ratio	0.01% per quarter
Cashflow/Price	0.18% per quarter
Sales/Price	0.96% per quarter
Dividend Yield	-0.51% per quarter

This suggests that using low PE ratios to pick stocks adds 0.92% to your quarterly returns, whereas using the dividend discount model adds only a further 0.06% to quarterly returns. If, in fact, the gain from using the dividend discount model is that small, screening stocks on the basis of observables (such as PE ratio or cashflow measures) may provide a much larger benefit in terms of excess returns.

The tax disadvantages from high dividend stocks

Portfolios created with the dividend discount model are generally characterized by high dividend yield, which can create a tax disadvantage if dividends are taxed at a rate greater than capital gains or if there is a substantial tax timing[6] liability associated with dividends. Since the excess returns uncovered in the studies presented above are pre-tax to the investor, the introduction of personal taxes may significantly reduce or even eliminate these excess returns.

In summary, the dividend discount model's impressive results in studies looking at past data have to be considered with caution. For a tax-exempt investment, with a long time horizon, the dividend discount model is a good tool, though it may not be the only one, to pick stocks. For a taxable investor, the benefits are murkier, since the tax consequences of the strategy have to be considered. For investors with shorter time horizons, the dividend discount model may not deliver on its promised excess returns, because of the year-to-year volatility in its performance.

Conclusion

When you buy stock in a publicly traded firm, the only cash flow you receive directly from this investment are expected dividends. The dividend discount model builds on this simple propositions and argues that the value of a stock then has to be the present value of expected dividends over time. Dividend discount models can range from simple growing perpetuity models such as the Gordon Growth model, where a stock's value is a function of

[6] Investors do not have a choice of when they receive dividends, whereas they have a choice on the timing of capital gains.

its expected dividends next year, the cost of equity and the stable growth rate, to complex three stage models, where payout ratios and growth rates change over time.

While the dividend discount model is often criticized as being of limited value, it has proven to be surprisingly adaptable and useful in a wide range of circumstances. It may be a conservative model that finds fewer and fewer undervalued firms as market prices rise relative to fundamentals (earnings, dividends, etc.) but that can also be viewed as a strength. Tests of the model also seem to indicate its usefulness in gauging value, though much of its effectiveness may be derived from its finding low PE ratio, high dividend yield stocks to be undervalued.

Problems

1. Respond true or false to the following statements relating to the dividend discount model:

A. The dividend discount model cannot be used to value a high growth company that pays no dividends.

B. The dividend discount model will undervalue stocks, because it is too conservative.

C. The dividend discount model will find more undervalued stocks, when the overall stock market is depressed.

D. Stocks that are undervalued using the dividend discount model have generally made significant positive excess returns over long time periods (five years or more).

E. Stocks which pay high dividends and have low price-earnings ratios are more likely to come out as undervalued using the dividend discount model.

2. Ameritech Corporation paid dividends per share of $3.56 in 1992 and dividends are expected to grow 5.5% a year forever. The stock has a beta of 0.90 and the treasury bond rate is 6.25%.

a. What is the value per share, using the Gordon Growth Model?

b. The stock was trading for $80 per share. What would the growth rate in dividends have to be to justify this price?

3. Church & Dwight, a large producer of sodium bicarbonate, reported earnings per share of $1.50 in 1993 and paid dividends per share of $0.42. In 1993, the firm also reported the following:

Net Income = $30 million
Interest Expense = $0.8 million
Book Value of Debt = $7.6 million
Book Value of Equity = $160 million

The firm faced a corporate tax rate of 38.5%. (The market value debt to equity ratio is 5%.) The treasury bond rate is 7%.

The firm expected to maintain these financial fundamentals from 1994 to 1998, after which it was expected to become a stable firm with an earnings growth rate of 6%. The firm's financial characteristics were expected to approach industry averages after 1998. The industry averages were as follows:

Return on Capital = 12.5%
Debt/Equity Ratio = 25%
Interest Rate on Debt = 7%

Church and Dwight had a beta of 0.85 in 1993 and the unlevered beta was not expected to change over time.

a. What is the expected growth rate in earnings, based upon fundamentals, for the high-growth period (1994 to 1998)?

b. What is the expected payout ratio after 1998?

c. What is the expected beta after 1998?

d. What is the expected price at the end of 1998?

e. What is the value of the stock, using the two-stage dividend discount model?

f. How much of this value can be attributed to extraordinary growth? to stable growth?

4. Oneida Inc, the world's largest producer of stainless steel and silverplated flatware, reported earnings per share of $0.80 in 1993 and paid dividends per share of $0.48 in that year. The firm was expected to report earnings growth of 25% in 1994, after which the growth rate was expected to decline linearly over the following six years to 7% in 1999. The stock was expected to have a beta of 0.85. (The treasury bond rate was 6.25%)

a. Estimate the value of stable growth, using the H Model.

b. Estimate the value of extraordinary growth, using the H Model.

c. What are the assumptions about dividend payout in the H Model?

5. Medtronic Inc., the world's largest manufacturer of implantable biomedical devices, reported earnings per share in 1993 of $3.95 and paid dividends per share of $0.68. Its earnings were expected to grow 16% from 1994 to 1998, but the growth rate was expected to decline each year after that to a stable growth rate of 6% in 2003. The payout ratio was expected to remain unchanged from 1994 to 1998, after which it would increase each year to reach 60% in steady state. The stock was expected to have a beta of 1.25 from 1994 to 1998, after which the beta would decline each year to reach 1.00 by the time the firm becomes stable. (The treasury bond rate was 6.25%)

a. Assuming that the growth rate declines linearly (and the payout ratio increases linearly) from 1999 to 2003, estimate the dividends per share each year from 1994 to 2003.

b. Estimate the expected price at the end of 2003.

c. Estimate the value per share, using the three-stage dividend discount model.

Musings on Markets

My not-so-profound thoughts about valuation, corporate finance and the news of the day!

Saturday, April 11, 2015

The Small Cap Premium: Where is the beef?

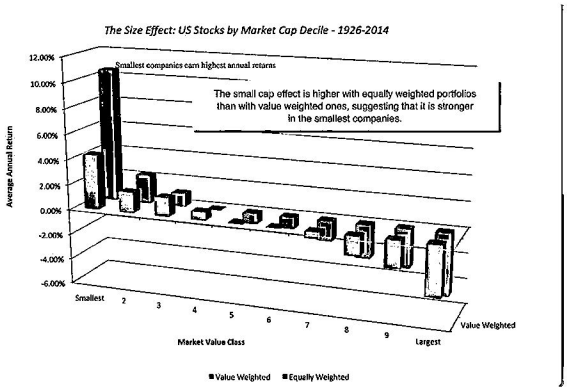
For decades, analysts and investor have bought into the idea of a small cap premium, i.e., that stocks with low market capitalizations can be expected to earn higher returns than stocks with higher market capitalizations. For investors, this has led to the pursuit of small cap stocks and funds for their portfolios, and for analysts, it has translated into the addition of "small cap" premiums of between 3-5% to traditional model-based expected returns, for companies that they classify as small cap. While I understand the origins of the practice, I question the adjustment for three reasons:

1. On closer scrutiny, the historical data, which has been used as the basis of the argument, is yielding more ambiguous results and leading us to question the original judgment that there is a small cap premium.
2. The forward-looking risk premiums, where we look at the market pricing of stocks to get a measure of what investors are demanding as expected returns, are yielding no premiums for small cap stocks.
3. If the justification is intuitive, i.e., that smaller firms are riskier than larger firms, much of that additional risk is either diversifiable, better adjusted for in the expected cash flows (instead of the discount rate) or double counted.

The small cap premium is a testimonial to the power of inertia in corporate finance and valuation, where once a practice becomes established, it becomes difficult to challenge, even if the original reasons for it have long since disappeared.

The Basis

The first studies that uncovered the phenomenon of the small cap premium came out in the 1970s. They broke companies down into deciles, based on market capitalization, and found that companies in the lowest decile earned higher returns, after adjusting for conventional risk measures, than companies in the highest decile. I updated those studies through the end of 2014, and the small cap premium seems intact (at least at first sight). In summary, looking at returns from 1926 to 2014, the smallest cap stocks (in the lowest decile) earned 4.33% more than the market, after adjusting for risk.



Source: Ken French's online data

This is the strongest (and perhaps) only evidence for a small cap premium and it is reproduced in data services that try to estimate historical risk premiums (Ibbotson, Duff and Phelps etc.). This historical premium has become the foundation for both valuation and investment practice. In valuation, analysts have referenced this table to estimate a small cap premium (4-5%) that they then add to the required return from conventional risk and return models to estimate discount rates. For instance, in the conventional capital asset pricing model, it plays out as follows:

Expected Return = Risk free rate + Beta * Equity Risk Premium + Small Cap Premium

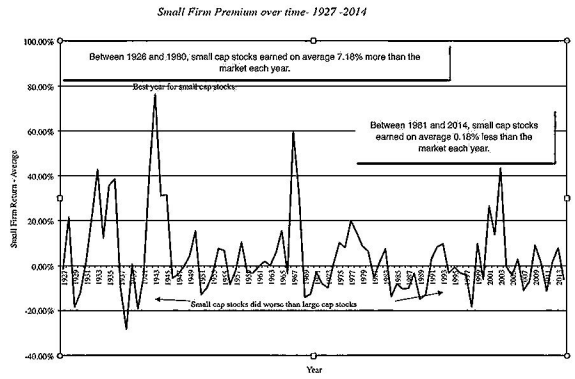
That discount rate is used to estimate the value of future cash flows, and not surprisingly, the use of a small cap premium lowers the value of smaller companies.

In investing, it has been used as a weapon both for and against active investing. Those who favor active investing have pointed to the small cap premium as a justification for their activity, and during the periods of history when small cap companies outperformed the market, it did make them look like heroes but it quickly gave rise to a counterforce, where performance measurement services (like Morningstar) started incorporating portfolio tilts, comparing small cap funds against small cap indices. Since almost all of the "excess returns" disappeared on this comparison, it was only a matter of time before index funds entered the arena, creating small-cap index funds for investors who wanted to claim the premium, without paying large management fees.

The Problem with the Historical Premium

In the decades since the original small cap premium study, the data on stocks has become richer and deeper, allowing us to take a closer look at the phenomenon. There are some serious questions that can be raised about whether the premium exists and if so, what exactly it is measuring:

1. Trend lines and Time Periods: Small cap stocks have earned higher returns than large cap stocks between 1928 and 2014 but the premium has been volatile over history, disappearing for decades and reappearing again. While the premium was strong prior to 1980, it seems to have dissipated since 1981. One reason may be that the small cap premium studies drew attention and investor money to small cap stocks, and in the process led to a repricing of these stocks. Another is that the small cap premium is a side effect of larger macroeconomic variables (inflation, real growth etc.) and that the behavior of those variables has changed since 1980.



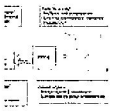
Source: Ken French's online data

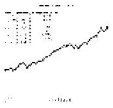
2. Microcap, not small cap premium: Even over the long time period that provides the strongest support for existence of a small cap premium, one study finds that removing stocks with less than $5 million in market cap causes the small firm effect to vanish. In effect, what you have is microcap premium, isolated in the smallest of stocks, not just small stocks.
3. Standard Error: Historical equity returns are noisy and any estimates of risk premium from that data will reflect the noise in the form of large standard errors on estimates. I have made this point about the overall historical equity risk premium but it becomes magnified when you dice and slice historical data into sub-classes. The table below lists standard errors in excess returns by decile class and reinforce the notion that the small cap premium is fragile, barely making the threshold for statistical significance over the entire period.

Decile	Average	Standard Error	Maximum	Minimum
Smallest	4.33%	1.96%	76.28%	-28.42%
2	1.63%	1.14%	41.25%	-17.96%
3	1.47%	0.77%	41.98%	-13.54%
4	0.64%	0.55%	15.56%	-7.33%
5	0.05%	0.53%	11.63%	-16.05%
6	-0.01%	0.51%	15.21%	-14.01%
7	-0.51%	0.55%	7.48%	-19.50%
8	-1.50%	0.81%	11.20%	-29.42%
9	-2.13%	1.02%	21.96%	-36.09%
Largest	-3.98%	1.56%	31.29%	-65.57%

Source: Ken French's online data

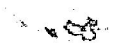
4. The January Effect: One of the most puzzling aspects of the small cap premium is that almost all of it is earned in one month of the year, January, and removing that month makes it disappear. So what? If your argument for the small cap premium is that small cap stocks are riskier, you now have the onus of explaining why that risk shows up only in the first month of every year.

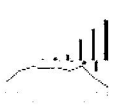

This is the third, and I hope the last, of my viral market updates, reflecting how much change a week can deliver, and last week delivered...


A Viral Market Meltdown: Fear or Fundamentals?
It has become almost a rite of passage for investors, at least since 2008, that they will be tested by a market crisis precipitated someti...


A Do-it-yourself (DIY) Valuation of Tesla: Of Investment Regrets and Disagreements!
I was hoping to move on from Tesla to my data update posts, but my last post on Tesla drew some attention, in good and bad ways, partly be...


An Ode to Luck: Revisiting my Tesla Valuation
When investing, I am often my own biggest adversary, handicapped by the preconceptions and priors that I bring into analysis and decision ...


A Viral Market Meltdown Part II: Clues in the Debris!
Update on 3.9/20: In a sign of how volatile times are, over the weekend, oil prices plummeted to close to $30, the treasury bond rate to l...


Walmart's India (Flipkart) Gambit: Growth Rebirth or Costly Facelift?
On May 9, 2018, Walmart confirmed officially what had been rumored for weeks, and announced that it would pay $16 billion to ac...

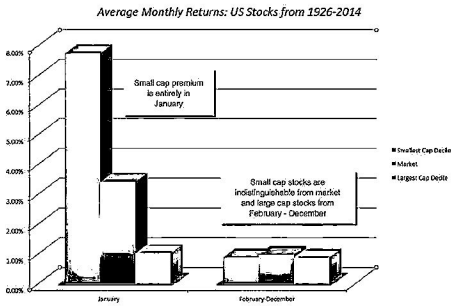
Total Pageviews

17,035,185

Blog Archive

- ▶ 2020 (16)
- ▶ 2019 (27)
- ▶ 2018 (35)
- ▶ 2017 (28)
- ▶ 2016 (48)
- ▼ 2015 (50)
  - ▶ December (5)
  - ▶ November (4)
  - ▶ October (6)
  - ▶ September (3)
  - ▶ August (7)
  - ▶ July (4)
  - ▶ June (2)
  - ▶ May (2)
  - ▼ April (4)
    - Is your CEO worth his (her) pay? The Pricing and V...
    - The Search for Investment Serenity: The Look Back ...
    - The Small Cap Premium: Where is the beef?
    - Dealing with Low Interest rates: Investing and Cor...
  - ▶ March (2)

► February (5)
► January (6)
► 2014 (44)
► 2013 (36)
► 2012 (49)
► 2011 (55)
► 2010 (45)
► 2009 (60)
► 2008 (42)



Source: Ken French's online data

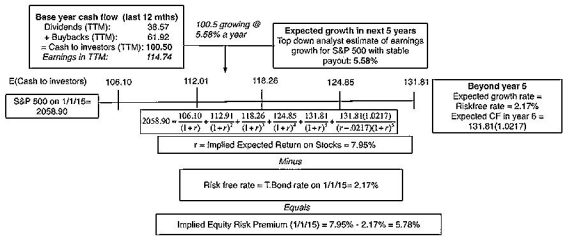
5. Weaker globally: The small cap premium seems to be smaller in non-US markets than in US markets and is non-existent in some. In contrast, the value effect (where low price to book stocks outperform the market) is strong globally.
6. Proxy for other factors: A host of papers argue that the bulk or all of the small size effect can be attributed to a liquidity effect and that putting in a proxy for illiquidity makes the size effect disappear or diminishes it.
7. Works only with market cap: Finally, you can take issue with the use of a market-priced based measure of size in a study of returns. Others have tried other non-price size measures such as income or revenues but there seems to be no size effect in those variables.

A recent working paper by Asness, Frazini, Israel, Moskowitz and Pedersen tries to resurrect the size effect, but accomplishes it only by removing the subset of small companies that they classify as "low quality" or "junk". While the results are interesting and can be used by active small-cap fund managers as a justification for their activity, they are in no way a basis for adding a small cap premium to every small company, and asking analysts to add it on only for small, high quality companies is problematic. In summary, if the only justification that you can offer for the addition of a small cap premium to your discount rate is the historical risk premium, you are on thin ice.

Market-Implied Small Cap Premium

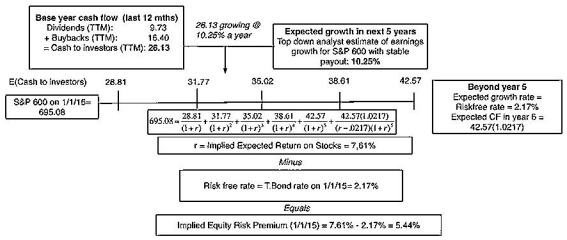
If the historical data ceases to support the use of a historical risk premium, can we then draw on intuition and argue that since small companies tend to be riskier (or we perceive them to be), investors must require higher return when they invest in them? You can, but the onus is then on you to back up that intuition. In fact, you can check to see whether investors are demanding a forward looking "small cap" premium, by looking at how they price small as opposed to large companies, and backing out what investors are demanding as expected returns. Put simply, if small cap stocks are viewed by investors as riskier and that risk is being priced in, you should expect to see, other things remaining equal, higher expected returns on small cap stocks than large cap stocks.

As some of you are aware, I compute a forward-looking equity premium for the S&P 500 at the start of each year, backing out the number from the current level of the index and expected cash flows. On January 1, 2015, this is what I found:



In effect, to the extent that my base year cash flows are reasonable and my expected growth rate reflects market expectations, the expected return on large cap stocks on January 1, 2015 was 7.95% in the US (yielding an overall equity risk premium of 5.78% on that day).

To get a measure of the forward-looking small cap premium, I computed the expected return implied in the S&P 600 Small Cap Index, using the same approach that I used for S&P 500. In spite of using a higher expected earnings growth for small cap stocks, the expected return that I estimate is only 7.61%:



In effect, the market is attaching a smaller expected return for small cap stocks than large ones, stories and intuition notwithstanding.

I am not surprised that the market does not seem to buy into the small cap premiums that academics and practitioners are so attached to. After all, if the proponents of small cap premiums are right, bundling together small companies into a larger company should instantly generate a bonus, since you are replacing the much higher required returns of smaller companies with the lower expected return of a larger one. In fact, small companies should disappear from the market.

The Illiquidity Fig Leaf

Looking at the data, the only argument left, as I see it, for the use of the small cap premium is as a premium for illiquidity, and even on that basis, it fails at one of these four levels:

1. *If illiquidity is your bogey man in valuation, why use market capitalization as a stand-in for it?* Market capitalization and illiquidity don't always go hand in hand, since there are small, liquid companies and large, illiquid ones in the market. Four decades ago, your excuse would have been that the data on illiquidity was either inaccessible or unavailable and that market capitalization was the best proxy you could find for illiquidity. That is no longer the case and there are studies that categorize companies based on measures of illiquidity (bid ask spread, trading volume) and find an "liquidity premium" for illiquid companies.
2. *If illiquidity is what you are adjusting for in the small cap premium, why is it a constant across companies, buyers and time?* Even if your defense is that the small cap premium is an imperfect (but reasonable) measure of the illiquidity premium, it is unreasonable to expect it to be the same for every company. Thus, even if you are valuing just privately owned businesses (where illiquidity is a clear and present danger), that illiquidity should be greater in some businesses than in others and the illiquidity (or small cap) premium should be larger for the former than the latter. Furthermore, the premium you add to the discount rate should be higher in some periods (during market crises and liquidity crunches) than others and for some buyers (cash poor, impatient) than others (patient, cash rich).
3. *Even if you can argue that illiquidity is your rationale for the small cap premium and that it is the same across companies, why is it not changing over the time horizon of your valuation (and especially in your terminal value)?* In any valuation, you assume through your company's cash flows and growth rates that your company will change over time and it is inconsistent (with your own narrative) to lock in an illiquidity premium into your discount rate that does not change as your company does. Thus, if you are using a 30% expected growth rate on your company, your "small" company is getting bigger (at least according to your estimates) and presumably more liquid over time. Should your illiquidity premium therefore not follow your own reasoning and decrease over time?
4. *If your argument is that size is a good proxy for illiquidity, that all small companies are equally illiquid and that that illiquidity does not change as you make them bigger, why are you reducing your end value by an illiquidity discount?* This question is directed at private company appraisers who routinely use small cap premiums to increase discount rates and also reduce the end (DCF) value by 25% or more, because of illiquidity. You can show me data to back up your discount (I have seen restricted stock and IPO studies) but none of them can justify the double counting of illiquidity in valuation.

Why are we slow to give up on the "small cap" premium?

It is true that the small cap premium is established practice at many appraisal firms, investment banks and companies. Given the shaky base on which it is built and how much that base has been chipped away in the last two decades, you would think that analysts would reconsider their use of small cap premiums, but there are three powerful forces that keep it in play.

1. Intuition: Analysts and investors not only start of with the presumption that the discount rates for small companies should be higher than large companies, but also have a "number' in mind. When risk and return models deliver a much lower number, the urge to add to it to make it "more reasonable" is almost unstoppable. Consequently, an analyst who arrives at an 8% cost of equity for a small company feels much more comfortable after adding a 5% small cap premium. It is entirely possible that you are an idiot savant with the uncanny capacity to assess the right discount rate for companies, but if that is the case, why go through this charade of using risk and return models and adding premiums to get to your "intuited" discount rate? For most of us, gut feeling and instinct are not good guides to estimating discount rates and here is why. Not all risk is meant for the discount rate, with some risk (like management skills) being diversifiable (and thus lessened in

portfolios) and other risks (like risk of failure or regulatory approval) better reflected in probabilities an expected cash flow. A discount rate cannot and is not meant to be a receptacle for all your hopes and fears, a number that you can tweak until your get to your comfort zone.

2. Inertia (institutional and individual): The strongest force in corporate finance practice is inertia, where much of what companies, investors and analysts do reflects past practice. The same is true in the use of the small cap premium, where a generation of analysts has been brought up to believe (by valuation handbooks and teaching) that it is the right adjustment to make and now do it by rote. That inertia is reinforced in the legal arena (where many valuations end up, either as part of business or tax disputes) by the legal system's respect for precedence and general practice. You may view this as harsh, but I believe that you will have an easier time defending the use of a bad, widely used practice of long standing in court than you would arguing for an innovative better practice.
3. Bias: My experiences with many analysts who use small cap premiums suggest to me that one motive is to get a "lower" value". Why would they want a lower value? First, in accounting and tax valuation, the client that you are doing the valuation for might be made better off with a lower value than a higher one. Consequently, you will do everything you can to pump up the discount rate with the small cap premium being only one of the many premiums that you use to "build up" your cost of capital. Second, there seems to be a (misplaced) belief that it is better to arrive at too low a value than one that is too high. If you buy into this "conservative" valuation approach, you will view adding a small cap premium as costless, since even it does not exist, all you have done is arrived at "too low" a value. At the risk of bringing up the memories of statistics classes past, there is always a cost. While "over estimating" discount rates reduces type 1 errors (that you will buy an over valued stock), it comes at the expense of type 2 errors (that you will hold off on buying an under valued stock).

A Requiem for the Small Cap Premium?

I have never used a small cap premium, when valuing a company and I don't plan to start now. Needless to say, I am often asked to justify my non-use of a premium and here are my reasons. First, I am not convinced by either the historical data or by current market behavior that a small cap premium exists. Second, I do believe that small cap companies are more exposed to some risks than large cap companies but there are other more effective devices to bring these risks into valuation. If it is that they are capital constrained (i.e., that it is more difficult for small companies to raise new capital), I will limit their reinvestment and expected growth (thus lowering value). If it is that they have a greater chance of failure, I will estimate a probability of failure and reflect that in my expected value (as I do in my standard DCF model). If it is illiquidity that is your concern, it is worth recognizing that one size will not fit all and that the effect on value will vary across investors and across time and will be better captured in a discount on value.

To illustrate how distorted this debate has become, note that those who routinely add small cap premiums to their discount rates are not put to the same test of justifying its use. So, at the risk of opening analysts up to uncomfortable questions, here are some questions that you should pose to anyone who is using a small cap premium (and that includes yourself):

1. *What is your justification for using a small cap premium?* If the defense is pointing to history (or a data table in a service), it is paper thin, since that historical premium defense seems to have more holes in it than Swiss cheese. If it is intuitive, i.e., that small companies are riskier and markets must see them as such, I don't see the basis for the intuition, since the implied costs of equity for small companies are no higher than those of large companies. If the argument is that everyone does it, I am sorry but just because something is established practice does not make it right.
2. *What are the additional risks that you see in small companies that you don't see in large ones?* I am sure that you can come up with a laundry list that is a mile long, but most of the risks on the list either don't belong in the discount rate (either because they are diversifiable or because they are discrete risks) or can be captured through probability estimates. If it is illiquidity that you are concerned about, see the section on illiquidity above for my response.

If you are investors, here are the lessons I draw from looking at the data. If you are following a strategy of buying small cap stocks, expecting to be rewarded with a premium for just doing that, you will be disappointed. Even the most favorable papers on the small cap premium suggest that you have to add refinements, with some suggesting that these refinements should screen out the least liquid, riskiest small cap stocks and others arguing for value characteristics (stable earnings, high returns on equity & capital, solid growth). I do think that there is a glimmer of hope in the recent research that the payoff to looking for under valued stocks may be greater with small companies, partly because they are more likely to be overlooked, but it will take more work on your part and it won't be easy!

Data sets

1. Professor Ken French's data library (on small cap stocks)

Spreadsheets

1. Implied equity risk premium (S&P 500)
2. Implied equity risk premium (S&P Small Cap 600)

Posted by Aswath Damodaran at 1:57 PM
Labels: Cost of equity, Discount Rates, Small Cap Premium, Valuation Practice

21 comments:

Max said...

It's worse when you look at the performance of the most widely used small cap index, the Russell 2000. The R2K has underperformed small caps in general. (Why? Perhaps because membership in a major index grants a stock improved liquidity).

April 11, 2015 at 4:38 PM

Unknown said...

When we talk about January effect, we're in effect talking about a 12 month reversal phenomenon. In other words(dogs of the Dow theory), the losers of the preceding year outperform the winners of the preceding year and quite understandably so, the micro cap firms whose market cap had plummeted in the preceding 12 months would be expected to outperform the broad market. Further small cap premium would be expected to be significantly positive in bull markets and significantly negative in bear markets, in other words small cap effect is a function of investor sentiment (risk -on vs. risk off sentiment). So splitting the sample period (1926-2014) into three periods of bull markets, bear markets and range bound markets would give us some more insights on the small cap premium. Further there is the migration effect i.e. small caps going onto become mid caps due to stock price surge and mid caps becoming small caps due to stock prices plummeting in the preceding years. In other words when we look at decile 10 of the capitalization strata, the character of the firms in the decile 10 is vastly different every year. Further empirical evidence suggests small cap premium is concentrated in few sectors/industries which emerge out of nowhere and become sunrise industries. In other words analyzing small cap effect is vastly complicated and there are too many forces at work!

April 11, 2015 at 10:12 PM

Aswath Damodaran said...

Yogesh,
It it takes this much convoluted back tracking for you to try to explain with small cap stocks, there is no small cap effect. It is not complicated. It is just not there.

April 11, 2015 at 10:16 PM

UniverseofRisks said...

In your calculation of the small cap ERP,shouldn't the terminal growth rate be much higher than the risk free rate. By using the same rate as the S&P 500 you're actually calculating the return on equity of companies that begin as small cap but are treated as large caps after year 5. Wouldn't you want your inputs for calculations beyond year 5 to reflect a constant rate of growth for small caps, which to me is much higher than the risk free rate?

April 12, 2015 at 8:41 AM

Aswath Damodaran said...

UniverseofRisks,
You have a good point, though the growth rate you use can only be marginally higher than the growth rate of the economy, since it is a perpetual number. By the take same token, I should probably use a slightly lower than the economy growth rate for larger companies.

April 12, 2015 at 9:43 AM

Unknown said...

Playing with the IFA index calculator it seems like small almost always outperforms large:

https://www.ifa.com/calculator/?i=sv&g=100000&s=1/1/2000&e=1/31/2014&infl=true&af=true&aorw=false&perc=true

Also see:

http://www.marketwatch.com/story/the-one-asset-class-every-investor-needs-2014-06-25

BR Martin

April 13, 2015 at 9:15 AM

Anonymous said...

What if there were an instance where the implied small cap premium were higher than the large cap? Would it be more precise to use the small implied premium?

April 13, 2015 at 4:54 PM

MD said...

In line with comments from UniverseofRisk, I think the growth assumption, and particularly the assumed growth differential between large and small caps, can easily change your conclusion. Duplicating your math, I can justify a premium of about 1.25% if I assume 10% growth in small caps for 10 years (vice 5), and then capitalize at the risk free rate. This may not justify the 4-5% premium that is ubiquitously applied, but it does highlight that both growth and risk expectations must be considered.

April 15, 2015 at 2:59 PM

David Velasco said...

Having valued hundreds of small and very small businesses over the years I have never been comfortable imposing substantial small cap premiums when developing my discount rates used in DCF analysis. However, valuators do face real differences when valuing "small" companies (i.e., less than $5 million in annual sales), such as: 1) Investment diversification is rarely achieved where the typical owner owns 100% of the equity; and 2) that ownership comprises a very significant portion of that individual's personal wealth. Given the reality of typically poor diversification in small business valuation, is any premium warranted for the owner's inability to diversify systematic risk?

April 15, 2015 at 5:50 PM

RoE said...

I once had a discussion with you at a CFA Valuation Conference about when cash flow riskiness should be reflected in the cash flow estimate, rather than discount rate, and you talk about that again here. Could you please explain (or point to references)under what circumstances you adjust cash flows and not discount rates? I think its a very important topic. (Maybe a separate blog session on it??)

April 15, 2015 at 8:29 PM

Unknown said...

In a significant level of valuation work, a "micro-cap" premium is being applied as those companies are much smaller than a small cap company. In those cases, is it at least marginally reasonable and justifiable to use a micro-cap premium?

April 16, 2015 at 11:42 AM

Aswath Damodaran said...

MD and UniverseofRisks,
It is entirely possible that giving a longer growth period for small cap stocks or a slightly higher growth rate in stable growth can yield a small cap premium, but the fact that you have work that hard to get any significance is revealing.
David,
The lack of diversification is an entirely different issue and I am not sure why a small cap premium (that comes from publicly traded companies) would yield an answer. I have argued that lack of diversification effectively scales up your exposure to conventional market risk. (I concocted the total beta measure to capture it).
Michael,
I think that the bulk of the premium, if it exists in microcap companies is a reflection of either survival risk or illiquidity and my points about double counting still stand.

April 16, 2015 at 1:39 PM

Rohit said...

Thanks for a great piece, Professor.

"While 'over estimating' discount rates reduces type 1 errors (that you will buy an over valued stock), it comes at the expense of type 2 errors (that you will hold off on buying an under valued stock)."

As a long-only investor, wouldn't it not be okay to commit a few type II errors as a price for incorporating 'margin of safety'?

April 16, 2015 at 5:00 PM

Aswath Damodaran said...

Rohit,
Sure. As long as you don't end up with a lot of cash in your portfolio because you have set your expected return too high (or applied too large a margin of safety in your portfolio). In this market, finding an under valued stock is tough enough.

April 16, 2015 at 6:59 PM

UniverseofRisks said...

My only concern is; intuitively when you're computing the Implied ERP for small cap stocks, you are looking at a cash-flows of a dynamic set of companies. Ones that are small and fast growing now,which will be replaced by newer and younger companies in the future. I think the stable period growth spread over the risk free rate should be significant in this context because you're dealing with a dynamic set of companies that are always young and fast growing

April 17, 2015 at 7:39 AM

SDHakala said...

What you are saying is what I found in the 1990s and have consistently asked others about. In a chapter to an update to a valuation text in 1998, Hakala (me) and Bajaj found no forward-looking small stock premium, found small stock premiums largely disappeared after 1980, and found that the small stock premium was highly correlated with the bid-ask spread (transactions cost) which has gone done steadily over time. Additionally, if you look at actual buy and hold small cap fund returns (like Vanguard's NAESX from 1960 onward) or DFSCX since inception, small caps have only slightly outperformed large caps on a geometric return basis by 1.0% since 1960s and microcaps have only slightly outperformed large caps since 1982 by 1.0%. The NAESX has actually underperformed S&P 500 funds since the end of 1986 on a geometric return basis. Thus, much of the findings appear to be data mining and biases (arithmetric annual returns in Ibbotson and Duff & Phelps; monthly average returns in Fama-French work) and to have largely declined to not being statistically significant post 1980.

April 17, 2015 at 1:15 PM

SDHakala said...

There are a number of problems that have never really been addressed with the return data and methods commonly used to estimate small cap premiums (particularly Duff& Phelps and Fama-French data):
First, the use of arithmetric average returns over relatively short holding periods will mathematically always overstate the correct size premium for a three to five year DCF and for the terminal value discount rate. There have been numerous studies on this in the academic literature that have largely been discounted or ignored (from Blume's work in the 1970s to more recent work by others such as Jacquier's work with Kane and Marcus).
Second, the Compustat (and to a much less extent CRSP) data has two biases associated with construction of the combined data: a backfilling bias (as the databases were constructed and filled in over time from the 1970s to current with subsequently successful companies "backfilled" and added to the historical data overtime) and a restatement bias (historic data was restated after mergers or subsequent restatements). There was work done for Compustat on this issue by Northfield around 2000-2001 that found substantially inflated return averages (as much as 6% overstatement of returns in 1980s) using backfilled and restated data as compared with the originally "as reported" data. Compustat now sells a separate set of "corrected, as first reported" financial data that acknowledges this issue. But even the academic studies often do not use this corrected data (because it does not come automatically matched up with the CRSP data, requires a separate purchase, and the data only goes back to 1983). Requiring companies with two or five years of historical trading or financial data is a common "academic" "solution" to the backfilling bias but does not appear to entirely solve the backfilling problem and does not address the significance and importance of restatements in the data (Companies with negative restatements will drop out of the D&P study and companies with positive restatements for mergers and such will suddenly show up in the data, for example.) Despite the academic work going back and forth on this issue, no one has actually studied the true effects of the bias beyond guesses that I know of.
Third, microcap stocks are more likely to experience positive jumps in returns due to being acquired/restructured that are not representative of expected returns. These "outliers" have been shown to significantly explain some of the "anomalies" in some of the academic research. At least one could argue this part of the equation has some validity but it is a non-priced excess return on a current basis for most microcaps.

April 17, 2015 at 1:57 PM

Anonymous said...

In estimating implied ERP for small cap you have used dividend discount model (for stable firms), is this model right in the first place for small companies which are typically 1) growing and 2) not stable?

However, I agree with you that small cap premium is actually not warranted since we have to estimate cash flows based on the characteristics of a particular small firm, and discount rate should not capture it.

April 19, 2015 at 8:32 AM

hernando rivas said...

I understand your blog and I agree with your arguments. But is very subjective to adjust the DCF for possible bankruptcy or other adjustments.
Why are better or less subjective those adjustment than use a small cap premium?
Do you have any longer documents about those topic?
My mail is hrivas82@gmail.com

February 16, 2017 at 5:12 PM

Bo said...

If there is no small cap premium, do you see a mid cap premium? Over the long-haul they seem to have had higher returns and are potentially lower risk being larger and more established than their smaller cap counterparts.

April 18, 2017 at 2:48 PM

Sanjay said...

Dear Professor Damodaran,

Thank you for addressing this topic and in advance for consideration of my question. In practice, I have noted that a number of the stocks I am reviewing in the UK that are listed below the FTSE100 have lower equity betas (and asset betas) than direct comparables. How do we adjust for trading volume, at least in the short term, to reflect the lack of liquidity in the specific stocks. Whilst I agree that there is limited logic for a small cap premium, WACCs do appear lower for smaller cap stocks, even when adjusting for the higher marginal after tax cost of debt.

April 25, 2018 at 7:23 AM

Post a Comment

Links to this post

Create a Link

Newer Post Home Older Post

Subscribe to: Post Comments (Atom)

Musings on Markets

My not-so-profound thoughts about valuation, corporate finance and the news of the day!

Saturday, April 11, 2015

The Small Cap Premium: Where is the beef?

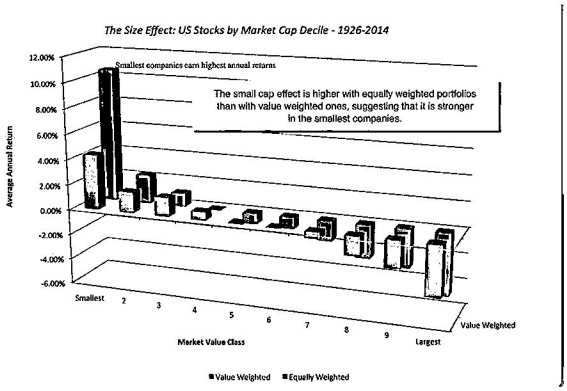
For decades, analysts and investor have bought into the idea of a small cap premium, i.e., that stocks with low market capitalizations can be expected to earn higher returns than stocks with higher market capitalizations. For investors, this has led to the pursuit of small cap stocks and funds for their portfolios, and for analysts, it has translated into the addition of "small cap" premiums of between 3-5% to traditional model-based expected returns, for companies that they classify as small cap. While I understand the origins of the practice, I question the adjustment for three reasons:

1. On closer scrutiny, the historical data, which has been used as the basis of the argument, is yielding more ambiguous results and leading us to question the original judgment that there is a small cap premium.
2. The forward-looking risk premiums, where we look at the market pricing of stocks to get a measure of what investors are demanding as expected returns, are yielding no premiums for small cap stocks.
3. If the justification is intuitive, i.e., that smaller firms are riskier than larger firms, much of that additional risk is either diversifiable, better adjusted for in the expected cash flows (instead of the discount rate) or double counted.

The small cap premium is a testimonial to the power of inertia in corporate finance and valuation, where once a practice becomes established, it becomes difficult to challenge, even if the original reasons for it have long since disappeared.

The Basis

The first studies that uncovered the phenomenon of the small cap premium came out in the 1970s. They broke companies down into deciles, based on market capitalization, and found that companies in the lowest decile earned higher returns, after adjusting for conventional risk measures, than companies in the highest decile. I updated those studies through the end of 2014, and the small cap premium seems intact (at least at first sight). In summary, looking at returns from 1926 to 2014, the smallest cap stocks (in the lowest decile) earned 4.33% more than the market, after adjusting for risk.



Source: Ken French's online data

This is the strongest (and perhaps) only evidence for a small cap premium and it is reproduced in data services that try to estimate historical risk premiums (Ibbotson, Duff and Phelps etc.). This historical premium has become the foundation for both valuation and investment practice. In valuation, analysts have referenced this table to estimate a small cap premium (4-5%) that they then add to the required return from conventional risk and return models to estimate discount rates. For instance, in the conventional capital asset pricing model, it plays out as follows:

Expected Return = Risk free rate + Beta * Equity Risk Premium + Small Cap Premium

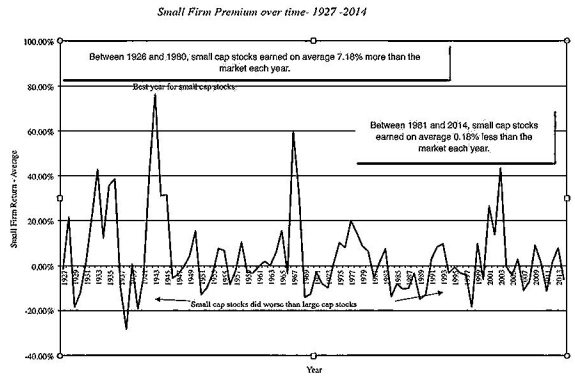
That discount rate is used to estimate the value of future cash flows, and not surprisingly, the use of a small cap premium lowers the value of smaller companies.

In investing, it has been used as a weapon both for and against active investing. Those who favor active investing have pointed to the small cap premium as a justification for their activity, and during the periods of history when small cap companies outperformed the market, it did make them look like heroes but it quickly gave rise to a counterforce, where performance measurement services (like Morningstar) started incorporating portfolio tilts, comparing small cap funds against small cap indices. Since almost all of the "excess returns" disappeared on this comparison, it was only a matter of time before index funds entered the arena, creating small-cap index funds for investors who wanted to claim the premium, without paying large management fees.

The Problem with the Historical Premium

In the decades since the original small cap premium study, the data on stocks has become richer and deeper, allowing us to take a closer look at the phenomenon. There are some serious questions that can be raised about whether the premium exists and if so, what exactly it is measuring:

1. Trend lines and Time Periods: Small cap stocks have earned higher returns than large cap stocks between 1928 and 2014 but the premium has been volatile over history, disappearing for decades and reappearing again. While the premium was strong prior to 1980, it seems to have dissipated since 1981. One reason may be that the small cap premium studies drew attention and investor money to small cap stocks, and in the process led to a repricing of these stocks. Another is that the small cap premium is a side effect of larger macroeconomic variables (inflation, real growth etc.) and that the behavior of those variables has changed since 1980.



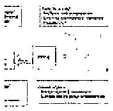
Source: Ken French's online data

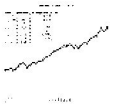
2. Microcap, not small cap premium: Even over the long time period that provides the strongest support for existence of a small cap premium, one study finds that removing stocks with less than $5 million in market cap causes the small firm effect to vanish. In effect, what you have is microcap premium, isolated in the smallest of stocks, not just small stocks.
3. Standard Error: Historical equity returns are noisy and any estimates of risk premium from that data will reflect the noise in the form of large standard errors on estimates. I have made this point about the overall historical equity risk premium but it becomes magnified when you dice and slice historical data into sub-classes. The table below lists standard errors in excess returns by decile class and reinforce the notion that the small cap premium is fragile, barely making the threshold for statistical significance over the entire period.

Decile	Average	Standard Error	Maximum	Minimum
Smallest	4.33%	1.96%	76.28%	-28.42%
2	1.63%	1.14%	41.25%	-17.96%
3	1.47%	0.77%	41.98%	-13.54%
4	0.64%	0.55%	15.56%	-7.33%
5	0.05%	0.53%	11.63%	-16.05%
6	-0.01%	0.51%	15.21%	-14.01%
7	-0.51%	0.55%	7.48%	-19.50%
8	-1.50%	0.81%	11.20%	-29.42%
9	-2.13%	1.02%	21.96%	-36.09%
Largest	-3.98%	1.56%	31.29%	-65.57%

Source: Ken French's online data

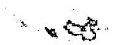
4. The January Effect: One of the most puzzling aspects of the small cap premium is that almost all of it is earned in one month of the year, January, and removing that month makes it disappear. So what? If your argument for the small cap premium is that small cap stocks are riskier, you now have the onus of explaining why that risk shows up only in the first month of every year.

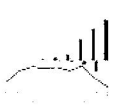

This is the third, and I hope the last, of my viral market updates, reflecting how much change a week can deliver, and last week delivered...


A Viral Market Meltdown: Fear or Fundamentals?
It has become almost a rite of passage for investors, at least since 2008, that they will be tested by a market crisis precipitated someti...


A Do-it-yourself (DIY) Valuation of Tesla: Of Investment Regrets and Disagreements!
I was hoping to move on from Tesla to my data update posts, but my last post on Tesla drew some attention, in good and bad ways, partly be...


An Ode to Luck: Revisiting my Tesla Valuation
When investing, I am often my own biggest adversary, handicapped by the preconceptions and priors that I bring into analysis and decision ...


A Viral Market Meltdown Part II: Clues in the Debris!
Update on 3.9/20: In a sign of how volatile times are, over the weekend, oil prices plummeted to close to $30, the treasury bond rate to l...


Walmart's India (Flipkart) Gambit: Growth Rebirth or Costly Facelift?
On May 9, 2018, Walmart confirmed officially what had been rumored for weeks, and announced that it would pay $16 billion to ac...

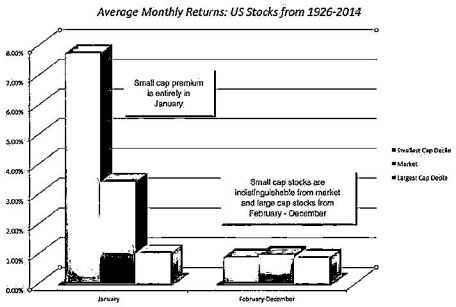
Total Pageviews

17,035,185

Blog Archive

- ▶ 2020 (16)
- ▶ 2019 (27)
- ▶ 2018 (35)
- ▶ 2017 (28)
- ▶ 2016 (48)
- ▼ 2015 (50)
  - ▶ December (5)
  - ▶ November (4)
  - ▶ October (6)
  - ▶ September (3)
  - ▶ August (7)
  - ▶ July (4)
  - ▶ June (2)
  - ▶ May (2)
  - ▼ April (4)
    - Is your CEO worth his (her) pay? The Pricing and V...
    - The Search for Investment Serenity: The Look Back ...
    - The Small Cap Premium: Where is the beef?
    - Dealing with Low Interest rates: Investing and Cor...
  - ▶ March (2)

► February (5)
► January (6)
► 2014 (44)
► 2013 (36)
► 2012 (49)
► 2011 (55)
► 2010 (45)
► 2009 (60)
► 2008 (42)



Source: Ken French's online data

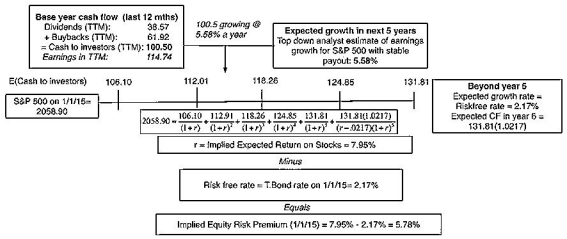
5. Weaker globally: The small cap premium seems to be smaller in non-US markets than in US markets and is non-existent in some. In contrast, the value effect (where low price to book stocks outperform the market) is strong globally.
6. Proxy for other factors: A host of papers argue that the bulk or all of the small size effect can be attributed to a liquidity effect and that putting in a proxy for illiquidity makes the size effect disappear or diminishes it.
7. Works only with market cap: Finally, you can take issue with the use of a market-priced based measure of size in a study of returns. Others have tried other non-price size measures such as income or revenues but there seems to be no size effect in those variables.

A recent working paper by Asness, Frazini, Israel, Moskowitz and Pedersen tries to resurrect the size effect, but accomplishes it only by removing the subset of small companies that they classify as "low quality" or "junk". While the results are interesting and can be used by active small-cap fund managers as a justification for their activity, they are in no way a basis for adding a small cap premium to every small company, and asking analysts to add it on only for small, high quality companies is problematic. In summary, if the only justification that you can offer for the addition of a small cap premium to your discount rate is the historical risk premium, you are on thin ice.

Market-Implied Small Cap Premium

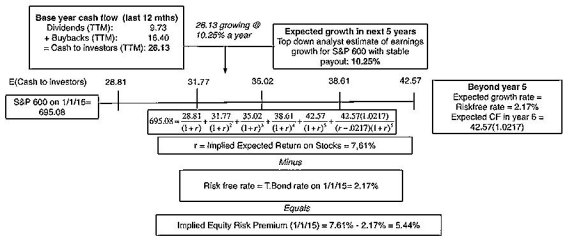
If the historical data ceases to support the use of a historical risk premium, can we then draw on intuition and argue that since small companies tend to be riskier (or we perceive them to be), investors must require higher return when they invest in them? You can, but the onus is then on you to back up that intuition. In fact, you can check to see whether investors are demanding a forward looking "small cap" premium, by looking at how they price small as opposed to large companies, and backing out what investors are demanding as expected returns. Put simply, if small cap stocks are viewed by investors as riskier and that risk is being priced in, you should expect to see, other things remaining equal, higher expected returns on small cap stocks than large cap stocks.

As some of you are aware, I compute a forward-looking equity premium for the S&P 500 at the start of each year, backing out the number from the current level of the index and expected cash flows. On January 1, 2015, this is what I found:



In effect, to the extent that my base year cash flows are reasonable and my expected growth rate reflects market expectations, the expected return on large cap stocks on January 1, 2015 was 7.95% in the US (yielding an overall equity risk premium of 5.78% on that day).

To get a measure of the forward-looking small cap premium, I computed the expected return implied in the S&P 600 Small Cap Index, using the same approach that I used for S&P 500. In spite of using a higher expected earnings growth for small cap stocks, the expected return that I estimate is only 7.61%:



In effect, the market is attaching a smaller expected return for small cap stocks than large ones, stories and intuition notwithstanding.

I am not surprised that the market does not seem to buy into the small cap premiums that academics and practitioners are so attached to. After all, if the proponents of small cap premiums are right, bundling together small companies into a larger company should instantly generate a bonus, since you are replacing the much higher required returns of smaller companies with the lower expected return of a larger one. In fact, small companies should disappear from the market.

The Illiquidity Fig Leaf

Looking at the data, the only argument left, as I see it, for the use of the small cap premium is as a premium for illiquidity, and even on that basis, it fails at one of these four levels:

1. *If illiquidity is your bogey man in valuation, why use market capitalization as a stand-in for it?* Market capitalization and illiquidity don't always go hand in hand, since there are small, liquid companies and large, illiquid ones in the market. Four decades ago, your excuse would have been that the data on illiquidity was either inaccessible or unavailable and that market capitalization was the best proxy you could find for illiquidity. That is no longer the case and there are studies that categorize companies based on measures of illiquidity (bid ask spread, trading volume) and find an "liquidity premium" for illiquid companies.
2. *If illiquidity is what you are adjusting for in the small cap premium, why is it a constant across companies, buyers and time?* Even if your defense is that the small cap premium is an imperfect (but reasonable) measure of the illiquidity premium, it is unreasonable to expect it to be the same for every company. Thus, even if you are valuing just privately owned businesses (where illiquidity is a clear and present danger), that illiquidity should be greater in some businesses than in others and the illiquidity (or small cap) premium should be larger for the former than the latter. Furthermore, the premium you add to the discount rate should be higher in some periods (during market crises and liquidity crunches) than others and for some buyers (cash poor, impatient) than others (patient, cash rich).
3. *Even if you can argue that illiquidity is your rationale for the small cap premium and that it is the same across companies, why is it not changing over the time horizon of your valuation (and especially in your terminal value)?* In any valuation, you assume through your company's cash flows and growth rates that your company will change over time and it is inconsistent (with your own narrative) to lock in an illiquidity premium into your discount rate that does not change as your company does. Thus, if you are using a 30% expected growth rate on your company, your "small" company is getting bigger (at least according to your estimates) and presumably more liquid over time. Should your illiquidity premium therefore not follow your own reasoning and decrease over time?
4. *If your argument is that size is a good proxy for illiquidity, that all small companies are equally illiquid and that that illiquidity does not change as you make them bigger, why are you reducing your end value by an illiquidity discount?* This question is directed at private company appraisers who routinely use small cap premiums to increase discount rates and also reduce the end (DCF) value by 25% or more, because of illiquidity. You can show me data to back up your discount (I have seen restricted stock and IPO studies) but none of them can justify the double counting of illiquidity in valuation.

Why are we slow to give up on the "small cap" premium?

It is true that the small cap premium is established practice at many appraisal firms, investment banks and companies. Given the shaky base on which it is built and how much that base has been chipped away in the last two decades, you would think that analysts would reconsider their use of small cap premiums, but there are three powerful forces that keep it in play.

1. Intuition: Analysts and investors not only start of with the presumption that the discount rates for small companies should be higher than large companies, but also have a "number' in mind. When risk and return models deliver a much lower number, the urge to add to it to make it "more reasonable" is almost unstoppable. Consequently, an analyst who arrives at an 8% cost of equity for a small company feels much more comfortable after adding a 5% small cap premium. It is entirely possible that you are an idiot savant with the uncanny capacity to assess the right discount rate for companies, but if that is the case, why go through this charade of using risk and return models and adding premiums to get to your "intuited" discount rate? For most of us, gut feeling and instinct are not good guides to estimating discount rates and here is why. Not all risk is meant for the discount rate, with some risk (like management skills) being diversifiable (and thus lessened in

portfolios) and other risks (like risk of failure or regulatory approval) better reflected in probabilities an expected cash flow. A discount rate cannot and is not meant to be a receptacle for all your hopes and fears, a number that you can tweak until your get to your comfort zone.

2. Inertia (institutional and individual): The strongest force in corporate finance practice is inertia, where much of what companies, investors and analysts do reflects past practice. The same is true in the use of the small cap premium, where a generation of analysts has been brought up to believe (by valuation handbooks and teaching) that it is the right adjustment to make and now do it by rote. That inertia is reinforced in the legal arena (where many valuations end up, either as part of business or tax disputes) by the legal system's respect for precedence and general practice. You may view this as harsh, but I believe that you will have an easier time defending the use of a bad, widely used practice of long standing in court than you would arguing for an innovative better practice.
3. Bias: My experiences with many analysts who use small cap premiums suggest to me that one motive is to get a "lower" value". Why would they want a lower value? First, in accounting and tax valuation, the client that you are doing the valuation for might be made better off with a lower value than a higher one. Consequently, you will do everything you can to pump up the discount rate with the small cap premium being only one of the many premiums that you use to "build up" your cost of capital. Second, there seems to be a (misplaced) belief that it is better to arrive at too low a value than one that is too high. If you buy into this "conservative" valuation approach, you will view adding a small cap premium as costless, since even it does not exist, all you have done is arrived at "too low" a value. At the risk of bringing up the memories of statistics classes past, there is always a cost. While "over estimating" discount rates reduces type 1 errors (that you will buy an over valued stock), it comes at the expense of type 2 errors (that you will hold off on buying an under valued stock).

A Requiem for the Small Cap Premium?

I have never used a small cap premium, when valuing a company and I don't plan to start now. Needless to say, I am often asked to justify my non-use of a premium and here are my reasons. First, I am not convinced by either the historical data or by current market behavior that a small cap premium exists. Second, I do believe that small cap companies are more exposed to some risks than large cap companies but there are other more effective devices to bring these risks into valuation. If it is that they are capital constrained (i.e., that it is more difficult for small companies to raise new capital), I will limit their reinvestment and expected growth (thus lowering value). If it is that they have a greater chance of failure, I will estimate a probability of failure and reflect that in my expected value (as I do in my standard DCF model). If it is illiquidity that is your concern, it is worth recognizing that one size will not fit all and that the effect on value will vary across investors and across time and will be better captured in a discount on value.

To illustrate how distorted this debate has become, note that those who routinely add small cap premiums to their discount rates are not put to the same test of justifying its use. So, at the risk of opening analysts up to uncomfortable questions, here are some questions that you should pose to anyone who is using a small cap premium (and that includes yourself):

1. *What is your justification for using a small cap premium?* If the defense is pointing to history (or a data table in a service), it is paper thin, since that historical premium defense seems to have more holes in it than Swiss cheese. If it is intuitive, i.e., that small companies are riskier and markets must see them as such, I don't see the basis for the intuition, since the implied costs of equity for small companies are no higher than those of large companies. If the argument is that everyone does it, I am sorry but just because something is established practice does not make it right.
2. *What are the additional risks that you see in small companies that you don't see in large ones?* I am sure that you can come up with a laundry list that is a mile long, but most of the risks on the list either don't belong in the discount rate (either because they are diversifiable or because they are discrete risks) or can be captured through probability estimates. If it is illiquidity that you are concerned about, see the section on illiquidity above for my response.

If you are investors, here are the lessons I draw from looking at the data. If you are following a strategy of buying small cap stocks, expecting to be rewarded with a premium for just doing that, you will be disappointed. Even the most favorable papers on the small cap premium suggest that you have to add refinements, with some suggesting that these refinements should screen out the least liquid, riskiest small cap stocks and others arguing for value characteristics (stable earnings, high returns on equity & capital, solid growth). I do think that there is a glimmer of hope in the recent research that the payoff to looking for under valued stocks may be greater with small companies, partly because they are more likely to be overlooked, but it will take more work on your part and it won't be easy!

Data sets

1. Professor Ken French's data library (on small cap stocks)

Spreadsheets

1. Implied equity risk premium (S&P 500)
2. Implied equity risk premium (S&P Small Cap 600)

Posted by Aswath Damodaran at 1:57 PM
Labels: Cost of equity, Discount Rates, Small Cap Premium, Valuation Practice

21 comments:

Max said...

It's worse when you look at the performance of the most widely used small cap index, the Russell 2000. The R2K has underperformed small caps in general. (Why? Perhaps because membership in a major index grants a stock improved liquidity).

April 11, 2015 at 4:38 PM

Unknown said...

When we talk about January effect, we're in effect talking about a 12 month reversal phenomenon. In other words(dogs of the Dow theory), the losers of the preceding year outperform the winners of the preceding year and quite understandably so, the micro cap firms whose market cap had plummeted in the preceding 12 months would be expected to outperform the broad market. Further small cap premium would be expected to be significantly positive in bull markets and significantly negative in bear markets, in other words small cap effect is a function of investor sentiment (risk -on vs. risk off sentiment). So splitting the sample period (1926-2014) into three periods of bull markets, bear markets and range bound markets would give us some more insights on the small cap premium. Further there is the migration effect i.e. small caps going onto become mid caps due to stock price surge and mid caps becoming small caps due to stock prices plummeting in the preceding years. In other words when we look at decile 10 of the capitalization strata, the character of the firms in the decile 10 is vastly different every year. Further empirical evidence suggests small cap premium is concentrated in few sectors/industries which emerge out of nowhere and become sunrise industries. In other words analyzing small cap effect is vastly complicated and there are too many forces at work!

April 11, 2015 at 10:12 PM

Aswath Damodaran said...

Yogesh,
It it takes this much convoluted back tracking for you to try to explain with small cap stocks, there is no small cap effect. It is not complicated. It is just not there.

April 11, 2015 at 10:16 PM

UniverseofRisks said...

In your calculation of the small cap ERP,shouldn't the terminal growth rate be much higher than the risk free rate. By using the same rate as the S&P 500 you're actually calculating the return on equity of companies that begin as small cap but are treated as large caps after year 5. Wouldn't you want your inputs for calculations beyond year 5 to reflect a constant rate of growth for small caps, which to me is much higher than the risk free rate?

April 12, 2015 at 8:41 AM

Aswath Damodaran said...

UniverseofRisks,
You have a good point, though the growth rate you use can only be marginally higher than the growth rate of the economy, since it is a perpetual number. By the take same token, I should probably use a slightly lower than the economy growth rate for larger companies.

April 12, 2015 at 9:43 AM

Unknown said...

Playing with the IFA index calculator it seems like small almost always outperforms large:

https://www.ifa.com/calculator/?i=sv&g=100000&s=1/1/2000&e=1/31/2014&infl=true&af=true&aorw=false&perc=true

Also see:

http://www.marketwatch.com/story/the-one-asset-class-every-investor-needs-2014-06-25

BR Martin

April 13, 2015 at 9:15 AM

Anonymous said...

What if there were an instance where the implied small cap premium were higher than the large cap? Would it be more precise to use the small implied premium?

April 13, 2015 at 4:54 PM

MD said...

In line with comments from UniverseofRisk, I think the growth assumption, and particularly the assumed growth differential between large and small caps, can easily change your conclusion. Duplicating your math, I can justify a premium of about 1.25% if I assume 10% growth in small caps for 10 years (vice 5), and then capitalize at the risk free rate. This may not justify the 4-5% premium that is ubiquitously applied, but it does highlight that both growth and risk expectations must be considered.

April 15, 2015 at 2:59 PM

David Velasco said...

Having valued hundreds of small and very small businesses over the years I have never been comfortable imposing substantial small cap premiums when developing my discount rates used in DCF analysis. However, valuators do face real differences when valuing "small" companies (i.e., less than $5 million in annual sales), such as: 1) Investment diversification is rarely achieved where the typical owner owns 100% of the equity; and 2) that ownership comprises a very significant portion of that individual's personal wealth. Given the reality of typically poor diversification in small business valuation, is any premium warranted for the owner's inability to diversify systematic risk?

April 15, 2015 at 5:50 PM

RoE said...

I once had a discussion with you at a CFA Valuation Conference about when cash flow riskiness should be reflected in the cash flow estimate, rather than discount rate, and you talk about that again here. Could you please explain (or point to references)under what circumstances you adjust cash flows and not discount rates? I think its a very important topic. (Maybe a separate blog session on it??)

April 15, 2015 at 8:29 PM

Unknown said...

In a significant level of valuation work, a "micro-cap" premium is being applied as those companies are much smaller than a small cap company. In those cases, is it at least marginally reasonable and justifiable to use a micro-cap premium?

April 16, 2015 at 11:42 AM

Aswath Damodaran said...

MD and UniverseofRisks,
It is entirely possible that giving a longer growth period for small cap stocks or a slightly higher growth rate in stable growth can yield a small cap premium, but the fact that you have work that hard to get any significance is revealing.
David,
The lack of diversification is an entirely different issue and I am not sure why a small cap premium (that comes from publicly traded companies) would yield an answer. I have argued that lack of diversification effectively scales up your exposure to conventional market risk. (I concocted the total beta measure to capture it).
Michael,
I think that the bulk of the premium, if it exists in microcap companies is a reflection of either survival risk or illiquidity and my points about double counting still stand.

April 16, 2015 at 1:39 PM

Rohit said...

Thanks for a great piece, Professor.

"While 'over estimating' discount rates reduces type 1 errors (that you will buy an over valued stock), it comes at the expense of type 2 errors (that you will hold off on buying an under valued stock)."

As a long-only investor, wouldn't it not be okay to commit a few type II errors as a price for incorporating 'margin of safety'?

April 16, 2015 at 5:00 PM

Aswath Damodaran said...

Rohit,
Sure. As long as you don't end up with a lot of cash in your portfolio because you have set your expected return too high (or applied too large a margin of safety in your portfolio). In this market, finding an under valued stock is tough enough.

April 16, 2015 at 6:59 PM

UniverseofRisks said...

My only concern is; intuitively when you're computing the Implied ERP for small cap stocks, you are looking at a cash-flows of a dynamic set of companies. Ones that are small and fast growing now,which will be replaced by newer and younger companies in the future. I think the stable period growth spread over the risk free rate should be significant in this context because you're dealing with a dynamic set of companies that are always young and fast growing

April 17, 2015 at 7:39 AM

SDHakala said...

What you are saying is what I found in the 1990s and have consistently asked others about. In a chapter to an update to a valuation text in 1998, Hakala (me) and Bajaj found no forward-looking small stock premium, found small stock premiums largely disappeared after 1980, and found that the small stock premium was highly correlated with the bid-ask spread (transactions cost) which has gone done steadily over time. Additionally, if you look at actual buy and hold small cap fund returns (like Vanguard's NAESX from 1960 onward) or DFSCX since inception, small caps have only slightly outperformed large caps on a geometric return basis by 1.0% since 1960s and microcaps have only slightly outperformed large caps since 1982 by 1.0%. The NAESX has actually underperformed S&P 500 funds since the end of 1986 on a geometric return basis. Thus, much of the findings appear to be data mining and biases (arithmetric annual returns in Ibbotson and Duff & Phelps; monthly average returns in Fama-French work) and to have largely declined to not being statistically significant post 1980.

April 17, 2015 at 1:15 PM

SDHakala said...

There are a number of problems that have never really been addressed with the return data and methods commonly used to estimate small cap premiums (particularly Duff& Phelps and Fama-French data):
First, the use of arithmetric average returns over relatively short holding periods will mathematically always overstate the correct size premium for a three to five year DCF and for the terminal value discount rate. There have been numerous studies on this in the academic literature that have largely been discounted or ignored (from Blume's work in the 1970s to more recent work by others such as Jacquier's work with Kane and Marcus).
Second, the Compustat (and to a much less extent CRSP) data has two biases associated with construction of the combined data: a backfilling bias (as the databases were constructed and filled in over time from the 1970s to current with subsequently successful companies "backfilled" and added to the historical data overtime) and a restatement bias (historic data was restated after mergers or subsequent restatements). There was work done for Compustat on this issue by Northfield around 2000-2001 that found substantially inflated return averages (as much as 6% overstatement of returns in 1980s) using backfilled and restated data as compared with the originally "as reported" data. Compustat now sells a separate set of "corrected, as first reported" financial data that acknowledges this issue. But even the academic studies often do not use this corrected data (because it does not come automatically matched up with the CRSP data, requires a separate purchase, and the data only goes back to 1983). Requiring companies with two or five years of historical trading or financial data is a common "academic" "solution" to the backfilling bias but does not appear to entirely solve the backfilling problem and does not address the significance and importance of restatements in the data (Companies with negative restatements will drop out of the D&P study and companies with positive restatements for mergers and such will suddenly show up in the data, for example.) Despite the academic work going back and forth on this issue, no one has actually studied the true effects of the bias beyond guesses that I know of.
Third, microcap stocks are more likely to experience positive jumps in returns due to being acquired/restructured that are not representative of expected returns. These "outliers" have been shown to significantly explain some of the "anomalies" in some of the academic research. At least one could argue this part of the equation has some validity but it is a non-priced excess return on a current basis for most microcaps.

April 17, 2015 at 1:57 PM

Anonymous said...

In estimating implied ERP for small cap you have used dividend discount model (for stable firms), is this model right in the first place for small companies which are typically 1) growing and 2) not stable?

However, I agree with you that small cap premium is actually not warranted since we have to estimate cash flows based on the characteristics of a particular small firm, and discount rate should not capture it.

April 19, 2015 at 8:32 AM

hernando rivas said...

I understand your blog and I agree with your arguments. But is very subjective to adjust the DCF for possible bankruptcy or other adjustments.
Why are better or less subjective those adjustment than use a small cap premium?
Do you have any longer documents about those topic?
My mail is hrivas82@gmail.com

February 16, 2017 at 5:12 PM

Bo said...

If there is no small cap premium, do you see a mid cap premium? Over the long-haul they seem to have had higher returns and are potentially lower risk being larger and more established than their smaller cap counterparts.

April 18, 2017 at 2:48 PM

Sanjay said...

Dear Professor Damodaran,

Thank you for addressing this topic and in advance for consideration of my question. In practice, I have noted that a number of the stocks I am reviewing in the UK that are listed below the FTSE100 have lower equity betas (and asset betas) than direct comparables. How do we adjust for trading volume, at least in the short term, to reflect the lack of liquidity in the specific stocks. Whilst I agree that there is limited logic for a small cap premium, WACCs do appear lower for smaller cap stocks, even when adjusting for the higher marginal after tax cost of debt.

April 25, 2018 at 7:23 AM

Post a Comment

Links to this post

Create a Link

Newer Post Home Older Post

Subscribe to: Post Comments (Atom)

Musings on Markets

My not-so-profound thoughts about valuation, corporate finance and the news of the day!

Saturday, August 5, 2023

The Price of Risk: With Equity Risk Premiums, Caveat Emptor!

If you have been reading my posts, you know that I have an obsession with equity risk premiums, which I believe lie at the center of almost every substantive debate in markets and investing. As part of that obsession, since September 2008, I have estimated an equity risk premium for the S&P 500 at the start of each month, and not only used that premium, when valuing companies during that month, but shared my estimate on my webpage and on social media. In my last post, on country risk premiums, I used the equity risk premium of 5.00% that I estimated for the US at the start of July 2023, for the S&P 500. That said, I don't blame you, if are confused not only about how I estimate this premium, but what it measures. In fact, an article in MarketWatch earlier this year referred to the equity risk premium as an esoteric concept, a phrasing that suggested that it had little relevance to the average investor. Adding to the confusion are the proliferation of very different numbers that you may have seen attached to the current equity risk premium, each usually quoting an expert in the field, but providing little context. Just in the last few weeks, I have seen a Wall Street Journal article put the equity risk premium at 1.1%, a Reuters report put it at 2.2%, and a bearish (and widely followed) money manager estimate the equity risk premium to be negative. How, you may ask, can equity risk premiums be that divergent, and does that imply that anything goes? In this post, I will not try to argue that my estimate is better than others, since that would be hubris, but instead focus on explaining why these ERP differences exist, and let you make your own judgment on which one you should use in your investing decisions.

ERP: Definition and Determinants

The place to start this discussion is with an explanation of what an equity risk premium is, the determinants of that number and why it matters for investors. I will try to steer away from models and economic jargon in this section, simply because they do little to advance understanding and much to muddy the waters.

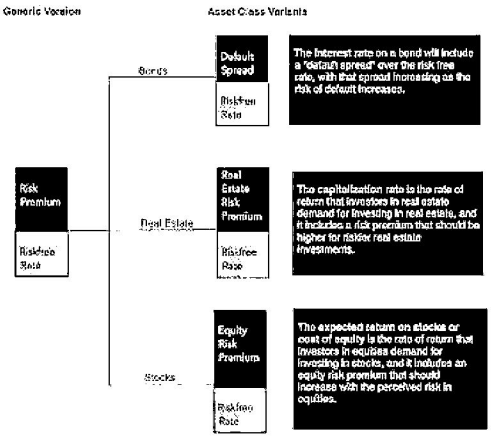
What is it?

Investors are risk averse, at least in the aggregate, and while that risk aversion can wax and wane, they need at least the expectation of a higher return to be induced to invest in riskier investments. In short, the expected return on a risky investment can be constructed as the sum of the returns you can expect on a guaranteed investment, i.e., a riskfree rate, and a risk premium, which will scale up as risk increases.

$$\text{Expected Return} = \text{Risk free Rate} + \text{Risk Premium}$$

Note that this proposition holds even if you believe that there is nothing out there that is truly risk free, which is the case when you worry about governments defaulting, though it does imply that you have cleaning up to do to get to a riskfree rate. Note also that expectations do not always pan out, and the actual returns on a risky investment can be much lower than the risk free rate, and sometimes sharply negative.

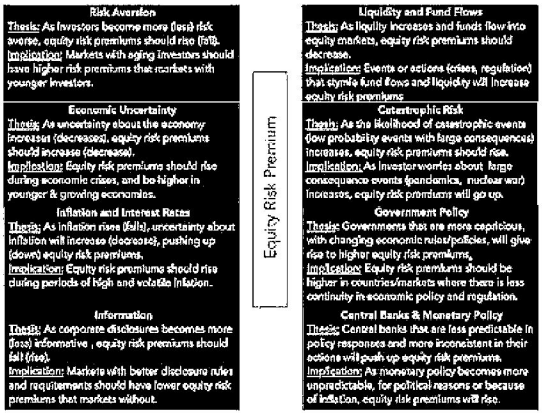
The risk premium that you demand has different names in different markets. In the corporate bond market, it is a *default spread*, an augmentation to the interest rate that you demand on a bond with more default risk. In the real estate market, it is embedded in a *capitalization rate*, an expected return used by real estate investors to convert the income on a real estate property into a value for that property. In the equity market, it is the *equity risk premium*, the price of risk for investing in equities as a class.



As you can see, every asset class has a risk premium, and while those risk premiums are set by investors within each asset class, these premiums tend to move together much of the time.

Determinants

Since the equity risk premium is a price for risk, set by demand and supply, it stands to reason that it is driven not only by economic fundamentals, but also by market mood. Equities represent the residual claim on the businesses in an economy, and it should come as no surprise that the fundamentals that determine it span the spectrum:



My equity risk premium paper

Even a cursory examination of these fundamentals should lead you to conclude that not only will equity risk premiums *vary across markets*, providing an underpinning for the divergence in country risk premiums in my last post, but should also *vary across time*, since the fundamentals themselves change over time.

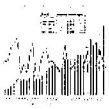
Market prices are also driven by *mood and momentum*, and not surprisingly, equity risk premiums can change, as these moods shift. In particular, equity risk premiums can become too low (too high) if investors are excessively upbeat (depressed) about the future, and thus become the ultimate receptacles for market hope and fear. In fact, *one symptom of a market bubble is an equity risk premium that becomes so low that it is disconnected from fundamentals*, setting up for an inevitable collision with reality and a market correction.

Why it matters

If you are a trader, an investor or a market-timer, and you are wondering why you should care about this discussion, it is worth recognizing that the equity risk premium is a central component of what you do, even if you have never explicitly estimated or used it.

1. Market Timing: When you time markets, you are making a judgment on how an entire asset class (equities, bonds, real estate) is priced, and reallocating your money accordingly. In particular, if you believe that stocks are over priced, you will either have less of your portfolio invested in equities or, if you are aggressive, sell short on equities. Any statement about market pricing can be rephrased as a statement about equity risk premiums; if you believe that the equity risk premium, as priced in by the market, has become too low (relative to what you believe is justified, given history and fundamentals), you are arguing that stocks are over priced (and due for a correction). Conversely, if you

equity risk premiums, which I believe lie at the center of alm...

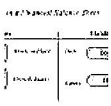


AI's Winners, Losers and Wannabes: An NVIDIA Valuation, with the AI Boost!
I will start this post with a couple of confessions. The first is that my portfolio has held up well this year, in a market that has been to...

Country Risk: A July 2023 Update!
I have looked at country risk, in all its dimensions, towards the middle of each year, for the last decade, for many reasons. One is curiosi...

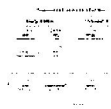
Good (Bad) Banks and Good (Bad) Investments: At the right price...
In my last post, I looked at banking as a business, and used a simple banking framework to advance the notion that the key ingredient tying...

Breach of Trust: Decoding the Banking Crisis
In March 2023, the fall of Silicon Valley Bank shocked investors not only because it was unforeseen, but also because of the speed with whic...



Data Update 6 for 2023: A Wake up call for the Indebted?
We have an uneasy relationship with debt, both in our personal and business lives. While it is a financial decision, it is one that is freig...

Data Update 7 for 2023: Dividends, Buybacks and Cash Flows
This is the last of my data update posts for 2023, and in this one, I will focus on dividends and buybacks, perhaps the most most misunderst...



Control, Complexity and Politics: Deconstructing the Adani Affair!
The India Rising story hit some turbulence last week, as one of its biggest corporate success stories, the Adani Group, was hit with a repor...

Data Update 4 for 2023: Country Risk - Measures and Implications
I describe myself as a dabbler, and it does get in the way of my best laid plans. A few weeks ago, I posted my first data update pulling to...

Blog Archive

▼ 2023 (16)
- ▼ August (1)
  - The Price of Risk: With Equity Risk Premiums, Cave...
- ► July (2)
- ► June (1)
- ► May (2)
- ► March (1)
- ► February (5)
- ► January (4)

► 2022 (20)
► 2021 (23)
► 2020 (30)
► 2019 (27)
► 2018 (35)
► 2017 (28)
► 2016 (48)
► 2015 (50)
► 2014 (44)
► 2013 (36)
► 2012 (49)
► 2011 (55)
► 2010 (45)
► 2009 (60)
► 2008 (42)

believe that the equity risk premium has become too high, relative again to what you think is a reasonable value, you are contending that stocks are cheap, in the aggregate.

2. Stock Picker: When you invest in an individual stock, you are doing so because you believe that stock is trading at a price that is lower than your estimate of its value. However, to make this judgment, you have to assess value in the first place, and while we can debate growth potential and profitability, the equity risk premium becomes an input into the process, determining what you should earn as an expected return on a stock. Put simply, if you are using an equity risk premium in your company valuation that is much lower (higher) than the market-set equity risk premium, you are biasing yourself to find the company to be under (over) valued. A market-neutral valuation of a company, i.e., a valuation of the company given where the market is today, requires you to at least to try to estimate a premium that is close to what the market is pricing into equities.
3. Corporate Finance: The role of the equity risk premium in determining the expected return on a stock makes it a key input in corporate finance, as well, because that expected return becomes the company's cost of equity. That cost of equity is then embedded in a cost of capital, and as equity risk premiums rise, all companies will see their costs of capital rise. In a post from the start of this year, I noted how the surge in equity risk premiums in 2022, combined with rising treasury bond rates, caused the cost of capital to increase dramatically during the course of the year.

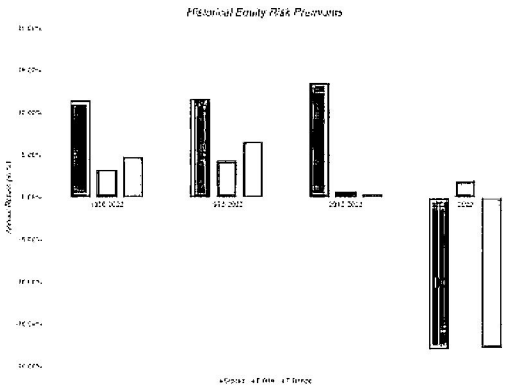
Put simply, the equity risk premiums that we estimate for markets have consequences for investors and businesses, and in the next section, I will look at ways of estimating it.

Measurement

If the equity risk premium is a market-set number for the price of risk in equity markets, how do we go about estimating it? Unlike the bond market, where interest rates on bonds can be used to back out default spreads, equity investors are not explicit about what they are demanding as expected returns when they buy stocks. As a consequence, a range of approaches have been used to estimate the equity risk premium, and in this section, I will look at the pluses and minuses of each approach.

1. Historical Risk Premium

While we cannot explicitly observe what investors are demanding as equity risk premiums, we can observe what they have earned historically, investing in stocks instead of something risk free (or close). In the US, that data is available for long periods, with the most widely used datasets going back to the 1920s, and that data has been sliced and diced to the point of diminishing returns. At the start of every year, I update the data to bring in the most recent year's returns on stocks, treasury bonds and treasury bills, and the start of 2023 included one of the most jarring updates in my memory:



	Arithmetic Average		Geometric Average	
	Stocks - T. Bills	Stocks - T. Bonds	Stocks - T. Bills	Stocks - T. Bonds
1928-2022	8.19%	6.64%	6.36%	5.05%
Std Error	2.05%	2.15%		
1973-2022	7.33%	5.14%	5.90%	4.12%
Std Error	2.50%	2.75%		
2013-2022	12.81%	13.08%	11.66%	12.32%
Std Error	5.31%	4.81%		
2022	-20.03%	-0.18%	-20.03%	-0.18%
Std Error	NA	NA		

Spreadsheet with historical data

It was an unusual year, not just because stocks were down significantly, but also because the ten-year treasury bond, a much touted safe investment, lost 18% of its value. Relative to treasury bills, stocks delivered a negative risk premium in 2022 (-20%), but it would be nonsensical to extrapolate from a single year of data. In fact, even if you stretch the time periods out to ten, fifty or close to hundred years, you will notice that your estimates of expected returns come with significant error (as can be seen in the standard errors).

In much of valuation, especially in the appraisal community, historical risk premiums remain the prevalent standard for measuring equity risk premiums, and there are a few reasons.

- Perhaps, the fact that you can compute averages precisely gets translated into the delusion that these averages are facts, when, in fact, they are not just estimates, but very noisy ones. For instance, even if you use the entire 94-year time period (from 1928-2022), your estimate for the equity risk premium for stocks over ten-year treasury bonds is that it falls somewhere between 2.34% to 10.94%, with 95% confidence (6.64% ± 2* 2.15%).
- It is also true that the menu of choices that you have for historical equity risk premiums, from a low of 4.12% to a high of 13.08%, depending on then time period you look at, and what you use as a riskfree rate, gives analysts a chance to let their biases play out. After all, if your job is to come up with a low value, all you have to do is latch on to a high number in this table, claim that it is a historical risk premium and deliver on your promise.

When using historical equity risk premiums, you are assuming *mean reversion*, i.e., that returns revert to historic norms over time, though, as you can see, those norms can be different, using different time periods. You are also assuming that the *economic and market structure has not changed significantly over the estimation period*, i.e., that the fundamentals that determine the risk premium have remained stable. For much of the twentieth century, historical equity risk premiums worked well as risk premium predictors in the United States, precisely because these assumptions held up. With China's rise, increased globalization and the crisis of 2008 as precipitating factors, I would argue that the case for using historical risk premiums has become much weaker.

2. Historical Returns-Based Forecasts

The second approach to using historical returns to estimate equity risk premiums starts with the same data as the first approach, but rather than just use the averages to make the estimates, it looks for time series patterns in historical returns that can be used to forecast expected returns. Put simply, this approach brings into the estimate the correlation across time in returns:

Correlations of Stock Returns over time: 1928 to 2022

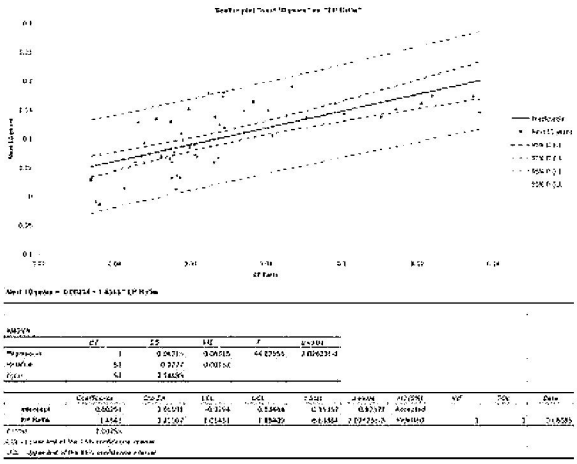
This year's return correlated with...	Correlations
Next year's return	-0.0157
t	-0.1504
p-value (2-tailed)	0.8836
N	94
Compounded Annual Returns in next 5 years	-0.1503
t	-1.4955
p-value (2-tailed)	0.1573
N	90
Compounded Annual Returns in next 10 years	0.0243
t	0.2199
p-value (2-tailed)	0.8267
N	85

If stock returns are uncorrelated over time, i.e., this year's annual return tells you nothing about what will happen in the next year, the next 5 years or the next 10 years, you should expect to see zero correlation. A positive correlation would indicate that good year(s) follow good years (momentum), whereas a negative correlation would indicate teh opposite (reversal)

Bottom line: Across the entire time period, there is little evidence of correlation in market returns over time.

If the correlations across time in stock returns were zero, this approach would yield results similar to just using the averages (historical risk premiums), but it they are not, it will lead to different predictions. Looking at historical returns, the correlations start off close to zero for one-year returns but they do become slightly more negative as you lengthen your time periods; the correlation in returns over 5-year time periods is -0.15, but it is not statistically significant. However, with 10-year time horizon, even that mild correlation disappears. In short, while it may be possible to coax a predictive model using only historical stock returns, that model is unlikely to yield much in actionable predictions. There are sub-periods where the correlation is higher, but I remain skeptical of any ERP prediction model built around just the time series of stock returns.

In an extension of this approach, you could bring in a measure of the cheapness of stocks (PE ratios or earnings yields are the most common ones) into the historical return data and exploit the relationship (if any) between the two. If there is a relationship, positive or negative, between PE ratios and subsequent returns, a regression of returns against PE (or EP) ratios can be used to generate predictions of expected annual returns in the next year, next 5 years or the next decade. The figure below is the scatter plot of earnings to price ratios against stock returns in the subsequent ten years, using data from 1960 to 2022:



A regression using this data yields some of the lowest estimates of the ERP, especially for longer time horizons, because of the elevated levels of PE ratios today. In fact, at the current EP ratio of about 4%, and using the historical statistical link with long-term returns, the estimated expected annual return on stocks, over the next 10 years and based on this regression is:

- Expected Return on Stocks, conditional on EP = .00254 + 1.4543 (.04) = .0607 or 6.07%
- ERP based on EP-based Expected Return = 6.07% - 3.97% = 2.10%

It is worth remembering that the expected return predictions come with error, and the more appropriate use of this regression is to get a range for the expected annual return, which yields predictions ranging from 4% to 8%. Extending the regression back to 1928 increases the R-squared and results in some regressions that yield predicted stock returns that are lower than the treasury-bond rate, i.e., a negative equity risk premium, given the EP ratio today.

Note that the results from this regression just reinforce rules of thumb for market timing, based upon PE ratios, where investors are directed to sell (buy) stocks if PE ratios move above (below) a "fair value" band. Since those rules of thumb have yielded questionable results, it pays to be skeptical about these regressions as well, and there are three limitations that those who use it have to keep in mind.

- First, with the longer time-period predictions, where the predictive power is strongest, the same data is counted multiple times in the regression. Thus, with 5-year returns, you match the EP ratio at the end of 1960 with returns from 1961 to 1965, and then the EP ratio at the end of 1961 with returns from 1962 to 1966, and so on. While this does not imply that you cannot run these regression, it does indicate that the statistical significance (R squared and t statistics) are overstated for the longer time horizons. In addition, the longer your time horizon, the more data you lose. With a 10-year time horizon, for instance, the last year that you can use for predictions is 2012, with the EP ratio in that year matched up to the returns from 2013-2022.
- Second, as is the case with the first approach (historical risk premiums), you are assuming that the structural model is stable and that there will be mean reversion. In fact, within this time period (1928 - 2022), the predictive power is far greater between 1928 and 1960 than it is betweeen 196 and 2022.
- Third, while these models tout high R-squared, the number that matters is the standard error of the predictions. Predicting that your annual return will be 6.07% for the next decade with a standard error of 2% yields a range that leaves you, as an investor, in suspended animation, since you face daunting questions about follow through: Does a low expected return on stocks over the next decade mean that you should pull all of your money out of equities? If yes, where should you invest that cash? And when would you get back into equities again?

Proponents of this approach are among the most bearish investors in the market today, but it is worth noting that this approach would have yielded "low return" predictions and kept you out of stocks for much of the last decade.

3. The Fed Model: Earnings Yield and ERP

The problem with historical returns approaches is that they are backward-looking, when equity risk premiums should be about what investors expect to earn in the future. To the extent that value is driven by expected future cash flows, you can back out an equity risk premium from current stock prices, if you are willing to make assumptions about earnings growth and cash flows in the future. In the simplest version of this approach, you start with a stable-growth dividend discount model, where the value of equity can be written as the present value of dividends, growing at a constant rate forever:

$$\text{Value of Equity} = \frac{\text{Expected Dividends next year}}{(\text{Cost of Equity} - g)} = \frac{\text{Expected Earnings (Payout Ratio)}}{(\text{Cost of Equity} - g)}$$

If you assume that earnings will stagnate at current levels, i.e., no earnings growth, and that companies pay out their entire earnings as dividends (payout ratio = 100%), the cost of equity can be approximated by the earnings to price ratio:

$$\text{Value of Equity} = \frac{\text{Expected Earnings}}{\text{Cost of Equity}}$$

$$\text{Cost of Equity} = \frac{\text{Expected Earnings}}{\text{Value of Equity}} = EP\ Ratio$$

Alternatively, you can assume that there is earnings growth and that companies earn returns on equity equal to their costs of equity, you arrive at the same result:

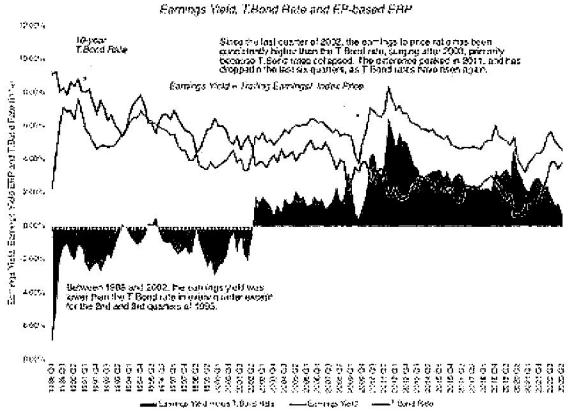
$$\text{Value of Equity} = \frac{\text{Expected Earnings}\ (1-\frac{g}{ROE})}{(\text{Cost of Equity} - g)} = \frac{\text{Expected Earnings}\ (1-\frac{g}{\text{Cost of Equity}})}{(\text{Cost of Equity} - g)}$$

$$\frac{(\text{Cost of Equity} - g)}{(1-\frac{g}{\text{Cost of Equity}})} = \frac{\text{Expected Earnings}}{\text{Value of Equity}}$$

$$\text{Cost of Equity} = \frac{\text{Expected Earnings}}{\text{Value of Equity}} = EP\ Ratio$$

In short, *the earnings to price ratio becomes a rough proxy for what you can expect to earn as a return on stocks, if you are willing to assume no earnings growth or that firms generate no excess returns*.

This is the basis for the widely used Fed model, where the earnings yield is compared to the treasury bond rate, and the equity risk premium is the difference between the two. In the figure below, you can see the equity risk premiums over time that emerge from this comparison, on a quarterly basis, from 1988 to 2023:



Download quarterly data

As you can see, this approach yields some "strange" numbers, with negative equity risk premiums for much of the 1990s, one of the best decades for investing in stocks over the last century. It is true that the equity risk premiums have been much more positive in this century, but that is largely because the treasury bond rate dropped to historic lows, after 2008. As interest rates have risen over the last year and a half, with stock prices surging over the same period, the equity risk premium based on this approach has dropped, standing at 0.41% at the start of August 2023. Since this is the approach used in the Wall Street Journal article, it explains the ERP being at a two-decade low, but I do find it odd that there is no mention that this approach yielded negative premiums in the 1980s and 1990s. In a variant, the Wall Street Journal article also looks at the difference between the earnings yield and the inflation-protected treasury rate, which yields a higher value for the ERP, of about 3%, but suffers from many of the same issues as the standard approach.

My problem with the earnings yield approach to estimating equity risk premiums is that the *assumptions that you need to make to justify its use are are at war with the data*. First, while earnings growth for US stocks has been negative in some years, it has been positive every decade for the last century, and there are no analysts (that I am aware of) expecting it be zero (in nominal terms) in the future. Second, assuming that the return on equity is equal to the cost of equity may be easy on paper, but the actual return on equity for companies in the S&P 500 was 19.73% in 2022, 17.04% over the last decade and has been higher than the cost of equity even in the worst year in this century (9.35% in 2008). *If you allow for growth in earnings and excess returns, it is clear that earnings yield will yield too low a value for the ERP, because of these*

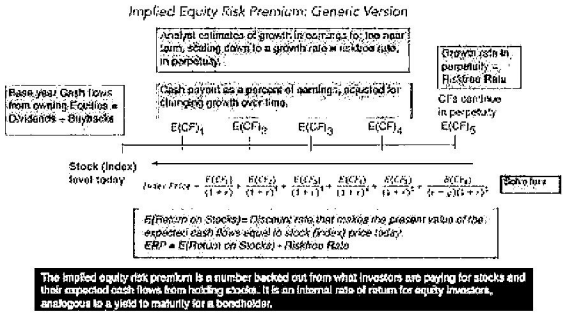
omissions, and will yield negative values in many periods, making it useless as an ERP estimator for valuation.

4. Implied ERP

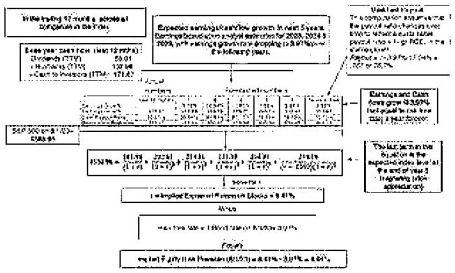
I start with the same general model for value that the earnings yield approach does, which is the dividend discount model but change three components

1. Augmented Dividends: It is undeniable that companies around the world, but especially in the US, have shifted from returning cash in the form of dividends to stock buybacks. Since two-thirds of the cash returned in 2022 was in the form of buybacks, ignoring them will lead to understating expected returns and equity risk premiums. Consequently, I add buybacks to dividends to arrive at an augmented measure of cash returned and use that as the base for my forecasts.
2. Allow for near-term growth in Earnings: Since the objective is to estimate what investors are demanding as an expected return, given their expectations of growth, I use analyst estimates of growth in earnings for the index. To get these growth rates, I focus on analysts who estimate aggregated earnings growth the index, rather than aggregating the growth rates estimated by analysts for individual companies, where you risk double counting buybacks (since analyst estimates are often in earnings per share) and bias (since company analysts tend to over estimated growth).
3. Excess Returns and Cashflows: I start my forecasts by assuming that companies will return the same percentage of earnings in cash flows, was they did in the most recent year, but I allow for the option of adjusting that cash return percentage over time, as a function of growth and return on equity (Sustainable cash payout = Growth rate/ Return on Equity).

The resulting model in its generic form is below:



In August 2023, this model would have yielded an equity risk premium of 4.44% for the S&P 500, using trailing cash flows from the last twelve months as a starting point, estimating aggregate earnings for the companies from analyst estimates, for the next three years, and then scaling that growth down to the risk free rate, as a proxy for nominal growth in the economy, after year 5:



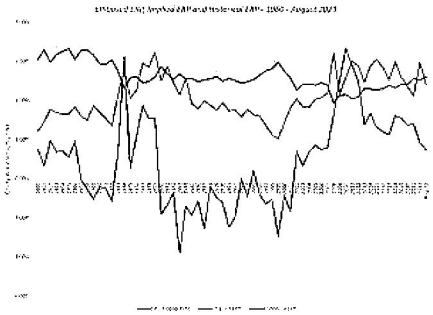
Download implied ERP spreadsheet

To reconcile my estimate of the equity risk premium with the earnings yield approach, you can set the earnings growth rate to zero and the cash payout to 100%, in this model, and you will find that the equity risk premium you get converges on the 0.41% that you get with the earnings yield approach. Adding growth and excess returns to the equation is what brings it up to 4.44%, and I believe that the data is on my side, in this debate. To the critique that my approach requires estimates of earnings growth and excess returns that may be wrong, I agree, but I am willing to wager that whatever mistakes I make on either input will be smaller than the input mistakes made by assuming no growth and no excess returns, as is the case with the earnings yield approach.

Picking an Approach

I prefer the implied equity risk premium approach that I just described, as the best estimate of ERP, but that may just reflect my comfort with it, developed over time. Ultimately, the test of which approach is the best one for estimating equity risk premium is not theoretical, but pragmatic, since your estimate of the equity risk premium is used to obtain predictions of returns in subsequent periods. In the figure below, I highlight three estimates of equity risk premiums -

the historical risk premium through the start of that year and the EP-based ERP (EP Ratio minus the T.Bond Rate) and the implied equity risk premiums, at the start of the year:



Correlations across ERP Measures

ERP Measure	EP - T.Bond Rate	Implied ERP	Historical ERP
EP - T.Bond Rate	1.0000		
t			
Implied ERP	0.6085	1.0000	
t	6.0385		
Historical ERP	-0.4686	-0.6483	1.0000
t	-4.1764	-6.7039	

The historical risk premium is stable, but that stability is a reflection of a having a long tail of historical data that keeps it from changing, even after the worst of years. The implied and EP-based ERP approaches move in the same direction much of the time (as evidenced in the positive correlation between the two estimates), but the latter yields negative values for the equity risk premium in a large number of periods.

Ultimately, the test of whether an equity risk premium measure works lies in how well it predicts future returns on stocks, and in the table below, I try to capture that in a correlation matrix, where I look at the correlation of each ERP measure with returns in the next year, in the next 5 years and in the next 10 years:

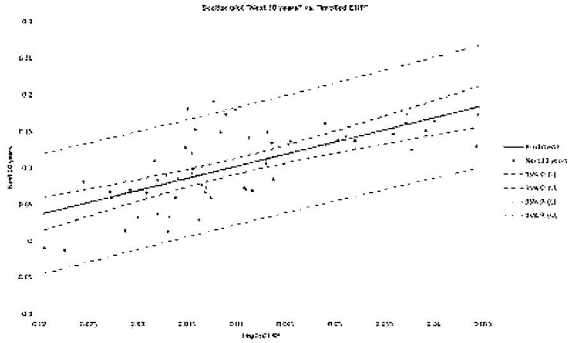
	ERP Measures		
Stock Returns	*EP - T.Bond Rate*	*Implied ERP*	*Historical ERP*
Return in next year	0.1124	0.1746	-0.2172
R Std Err	0.0165	0.0162	0.0159
t	0.8759	1.3737	-1.7239
p-value (2-tailed)	0.3846	0.1746	0.0899
N	62	62	62
Annual Returns - Next 5 years	0.1093	0.4673	-0.4458
R Std Err	0.0176	0.0140	0.0143
t	0.8229	3.9554	-3.7264
p-value (2-tailed)	0.4140	0.0002	0.0005
N	58	58	58
Annual Returns - Next 10 years	0.1736	0.6713	-0.5509
R Std Err	0.0190	0.0108	0.0137
t	1.2590	6.4678	-4.7143
p-value (2-tailed)	0.2138	0.0000	0.0000
N	53	53	53

Correlations in bold are significant at the 5% level (2-tailed).

Download data

None of the approaches yield correlations that are statistically significant, for stock returns in the next year, but the implied ERP and historical ERP are strongly correlated with returns over longer time periods, with a key difference; the former moves with stock returns in the next ten years, while the latter moves inversely.

While that correlation lies at the heart of why I use implied ERP in my valuations as my estimate of the price of risk in equity markets, I am averse to using it as a basis for market timing, for the same reasons that I cautioned you on using the EP ratio regression: the predictions are noisy and there is no clear pathway to converting them into investment actions. To see why, I have summarized the results of a regression of stock returns over the next decade against the implied ERP at the start of the period, using data from 1960 to 2022:



	Coefficients	Std Err	LCI	UCI	t Stat	p-value	H0 (5%)	KP	TOL	Beta
Intercept	-0.00237	0.02117	-0.07257	0.06513	-0.11194	0.91754	Accepted			
Implied ERP	3.51351	0.54258	2.28156	4.74614	6.47573	3.77E-08	Rejected	1	1	0.67128

T (5%) 2.00758

LCL - Lower limit of the 95% confidence interval

UCL - Upper limit of the 95% confidence interval

Download data

You can see, from the scatter plot, that implied ERPs move with stock returns over the subsequent decades, but that movement is accompanied by significant noise, and that noise translates into a wide range around the predicted returns for stocks. If you are a market timer, you are probably disappointed, but this type of noise and prediction errors is what you should expect to see with almost any fundamental, including EP ratios.

Conclusion

I hope that this post has helped to convince you that the equity risk premium is central to investing, and that even if you have never used the term, your investing actions have been driven by its gyrations. I also hope that it has given you perspective on why you see the differences in equity risk premium numbers from different sources. With that said, here are some thoughts for the road that can help you in future encounters with the ERP:

1. There is a true, albeit unobservable, ERP: The fact that the the true equity risk premium is unobservable does not mean that it does not exist. In other words, the notion that you can get away using any equity risk premium you want, as long as you have a justification and are consistent, is absurd. So, whatever qualms you may have about the estimation approaches that I have described in this post, please keep working on your own variant to get a better estimate of the ERP, since giving up is no an option.
2. Not all estimation approaches are created equal: While there are many approaches to estimating the equity risk premium, and they yield very different numbers, some of these approaches have more heft, because they offer better predictive power. Picking an approach, such as the historical risk premium, because its stability over time gives you a sense of control, or because everyone else uses it, makes little sense to me.
3. Your end game matters: As I noted at the start of this post, the equity risk premium can be used in a multitude of investment settings, and you have to decide, for yourself, how you will use the ERP, and then pick an approach that works for you. I am not a market timer and estimate an equity risk premium primarily because I need it as an input in valuation and corporate finance. That requires an approach that yields positive values (ruling out the EP-based ERP) and moves with with stock returns in subsequent periods (eliminating historical ERP).
4. Market timers face a more acid test: If you are using equity risk premiums or even earnings yield for market timing, recognize that having a high R-squared or correlation in past returns will not easily translate into market-timing profits, for two reasons. First, the past is not always prologue, and market and economic structures can shift, undercutting a key basis for using historical data to make predictions. Second, even if the correlations and regressions hold, you may still find it hard to profit from them, since you (and your clients, if you are a portfolio manager) may be bankrupt, before your predictions play out. Statistical noise (the standard errors on your regression predictions) can create havoc in your portfolios, even if it eventually gets averaged out.

YouTube Video

The Price of Risk: With Equity Risk Premiums, Caveat Emptor!

Data Links

1. Historical returns on Stocks, Bonds and Real Estate: 1928 - 2022
2. Earnings to Price Ratios and Dividend Yields, by Quarter: 1988 Q4- 2023 Q2
3. Implied ERP from 1960 to 2022: Annual Data
4. ERP and Stock Returns: 1960 to 2022

Spreadsheet

1. Implied ERP Spreadsheet for August 2023

Papers

1. Equity Risk Premiums (ERP): Determinants, Estimation and Implications- The 2023 Edition

Posted by Aswath Damodaran at 1:40 PM
Labels: Equity Risk Premiums, Mean Reversion, Price of Risk

No comments:

Post a Comment

Home Older Post

Subscribe to: Post Comments (Atom)

The following files are not convertible:

Article 75.xlsx

Please see the ZIP file for this Filing on the PUC Interchange in order to access these files.

Contact centralrecords@puc.texas.gov if you have any questions.

Seeking Alpha$^{\alpha}$

Today's Market | Market Outlook | Podcasts

January 2019 Data Update 1: A Reminder That Equities Are Risky, In Case You Forgot

Jan. 3, 2019 5:45 AM ET6 comments | 12 Likes

by: Aswath Damodaran

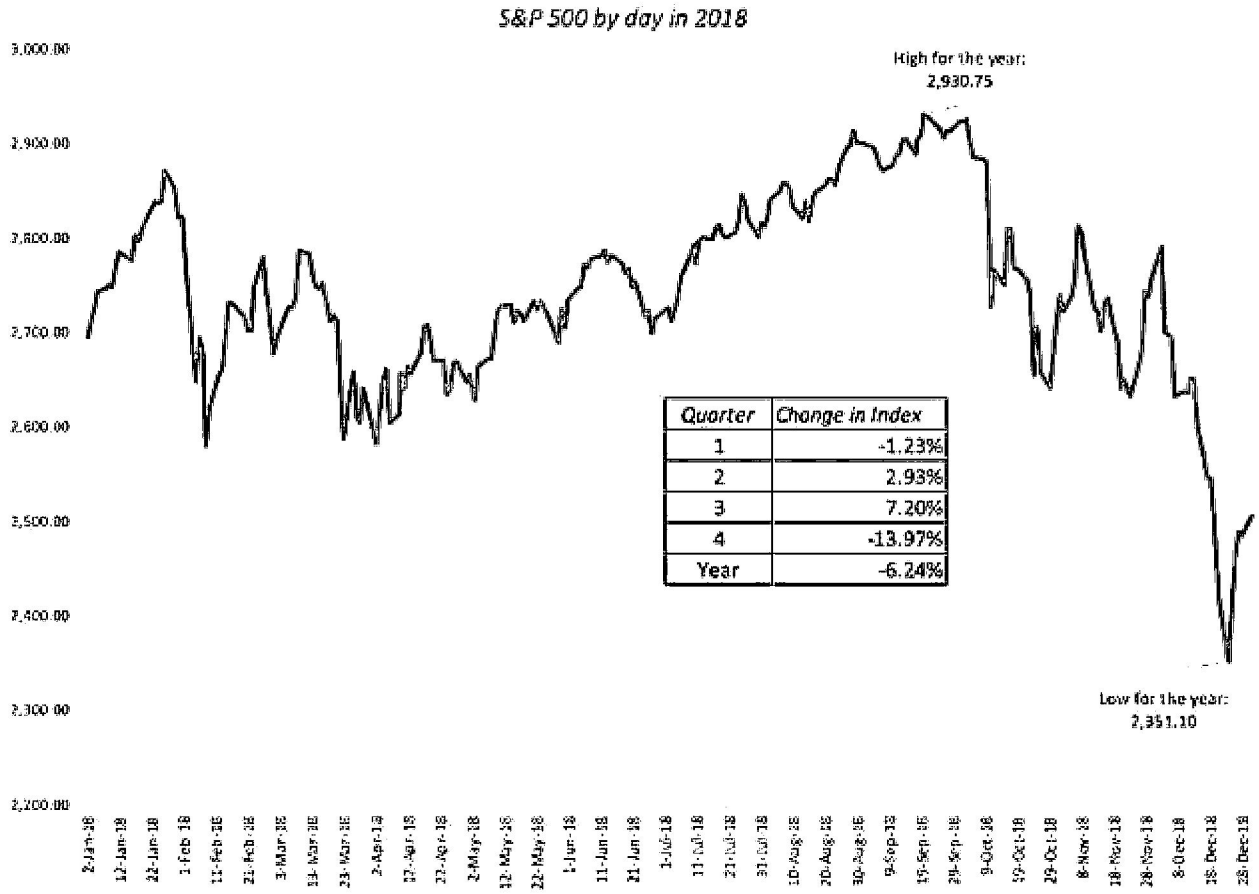
Summary

- It is healthy, albeit painful, to be reminded that the risk in stocks is real and that there is a reason why investors earn a premium for investing in equities, as opposed to safer investments.
- At its current level of 5.96%, the equity risk premium is in the top decile of historical numbers, exceeded only by the equity risk premiums in three other years, 1979, 2009 and 2011.
- Viewed purely on that basis, the equity market is more undervalued than overvalued right now.

In bull markets, investors, both professional and amateur, often pay lip service to the notion of risk, but blithely ignore its relevance in both asset allocation and stock selection, convinced that every dip in stock prices is a buying opportunity and soothed by bromides that stocks always win in the long term. It is therefore healthy, albeit painful, to be reminded that the risk in stocks is real and that there is a reason why investors earn a premium for investing in equities, as opposed to safer investments, and that is the message that markets around the world delivered in the last quarter of 2018.

A Look Back at 2018

The stock market started 2018 on a roll, having posted nine consecutive up years, making the crisis of 2008 seem like a distant memory. True to form, stocks rose in January, led by the FAANG (Facebook (NASDAQ:FB), Amazon (NASDAQ:AMZN), Apple (NASDAQ:AAPL), Netflix (NASDAQ:NFLX) and Google (NASDAQ:GOOG)) stocks and momentum investors celebrated. The first wake-up call of the year came in February, first as the market responded negatively to macroeconomic reports of higher inflation, and then as Facebook and Google stumbled from self-inflicted wounds.



Quarter	Change in Index
1	-1.23%
2	2.93%
3	7.20%
4	-13.97%
Year	-6.24%

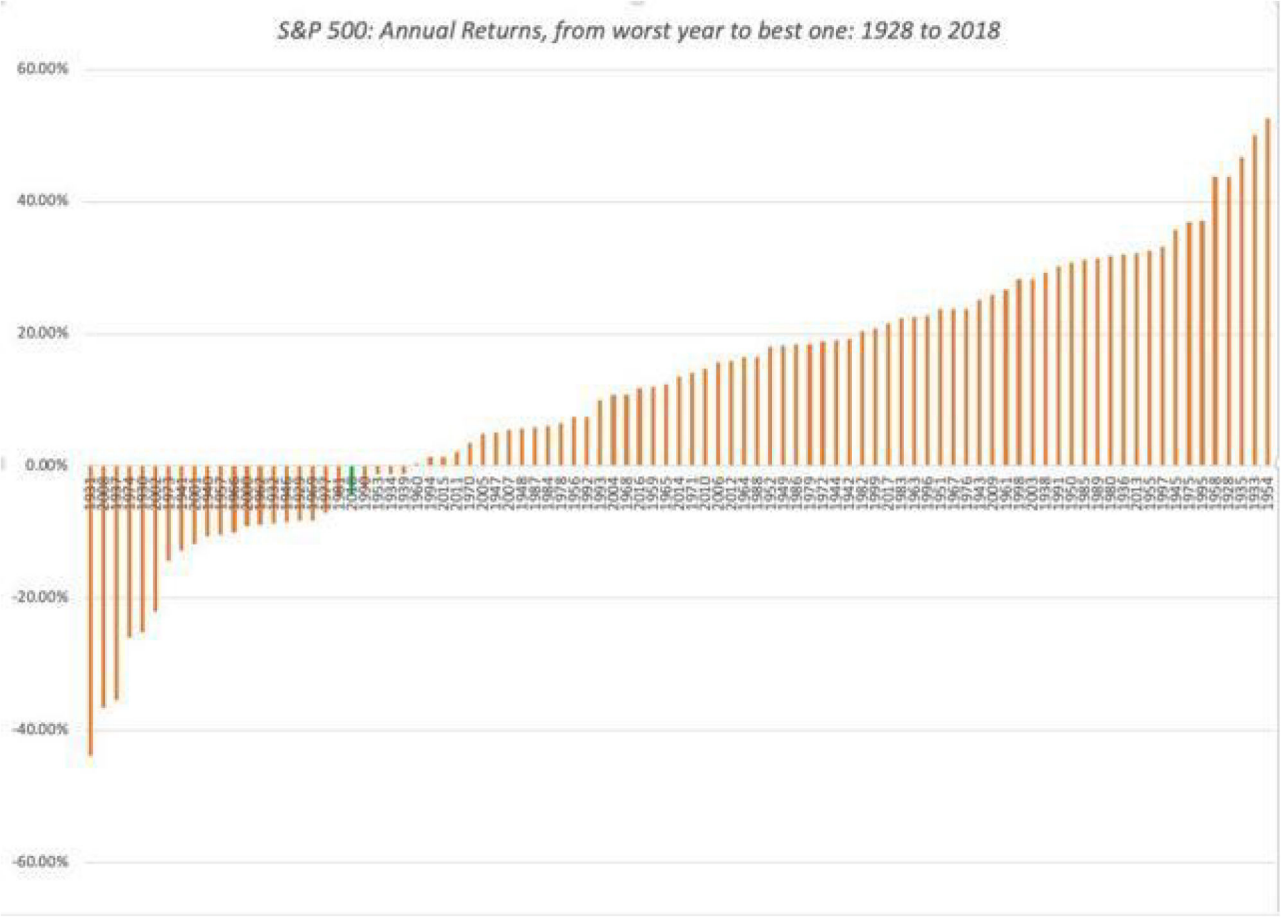
The market shook off its tech blues by the end of March and continued to rise through the summer, with the S&P 500 peaking for the year at 2931 on September 20, 2018. For the many investors who were already counting their winnings for the year, the last quarter of 2018 was a shock, as volatility returned to the market with a vengeance. In October, the S&P 500 dropped by 6.94%, though it felt far worse because of the day-to-day and intraday price swings. In November, the S&P 500 was flat, but volatility continued unabated. In December, US equities finally succumbed to selling pressures, as a sharp selloff pushed stocks close to the "bear market" threshold, before recovering a little towards the end of the year.

Over the course of the year, every major US equity index took a hit, but the variation across the indices was modest.

	12/31/17	12/31/18	% Change
Dow 30	24719	23327	-5.63%
S&P 500	2673.61	2506.85	-6.24%
S&P 600 (Small cap)	936.26	844.94	-9.75%
NASDAQ	7137	6635	-7.03%

The ranking of returns, with the S&P 600 and the NASDAQ doing worse than the Dow or

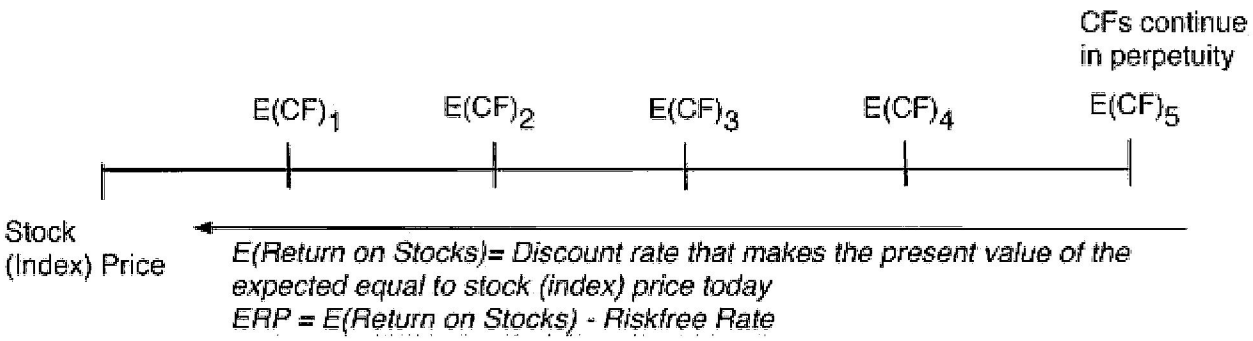
the S&P 500 is what you would expect in any down market. With dividends incorporated, the return on the S&P 500 was -4.23%, the first down market in a decade but only a modestly bad year by historical standards:



I know that this is small consolation if you lost money last year, but looking at annual returns on stocks in the last 90 years, there have been twenty years with more negative returns. In short, it was a bad year for stocks, but it felt far worse for three reasons. First, after nine good years for the market, investors were lulled into a false sense of complacency about the capacity of stocks to keep delivering positive returns. Second, the negative returns were all in the last quarter of the year, making the hit seem larger (from the highs of September 2018) and more immediate. Third, the intraday and day-to-day volatility exacerbated the fear factor, and those investors who reacted by trading faced far larger losses.

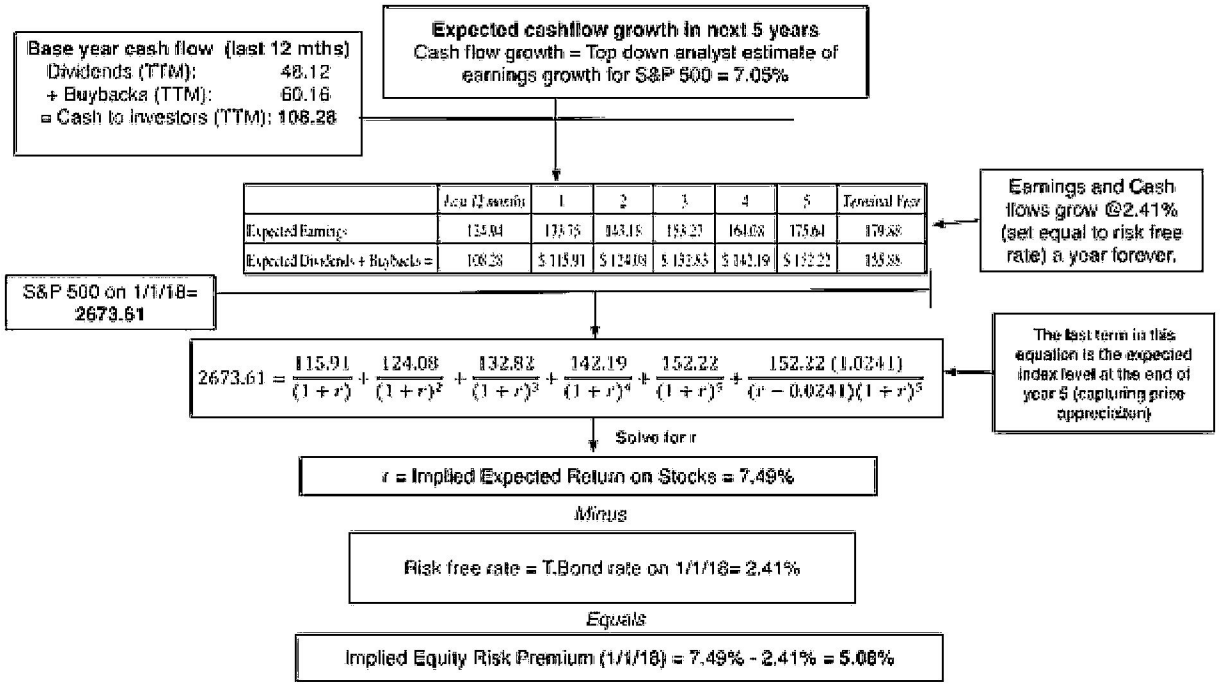
The Equity Risk Premium

If you have been a reader of this blog, you know that my favorite device for disentangling the mysteries of the market is the implied equity risk premium, an estimate of the price that investors are demanding for the risk of investing in equities. I back this number out from the current market prices and expected future cash flows, an IRR for equities that is analogous to the yield to maturity on a bond:



As with any measure of the market, it requires estimates for the future (expected cash flows and growth rates), but it is not only forward looking and dynamic (changing as the market moves), but also surprisingly robust and comprehensive in its coverage of fundamentals.

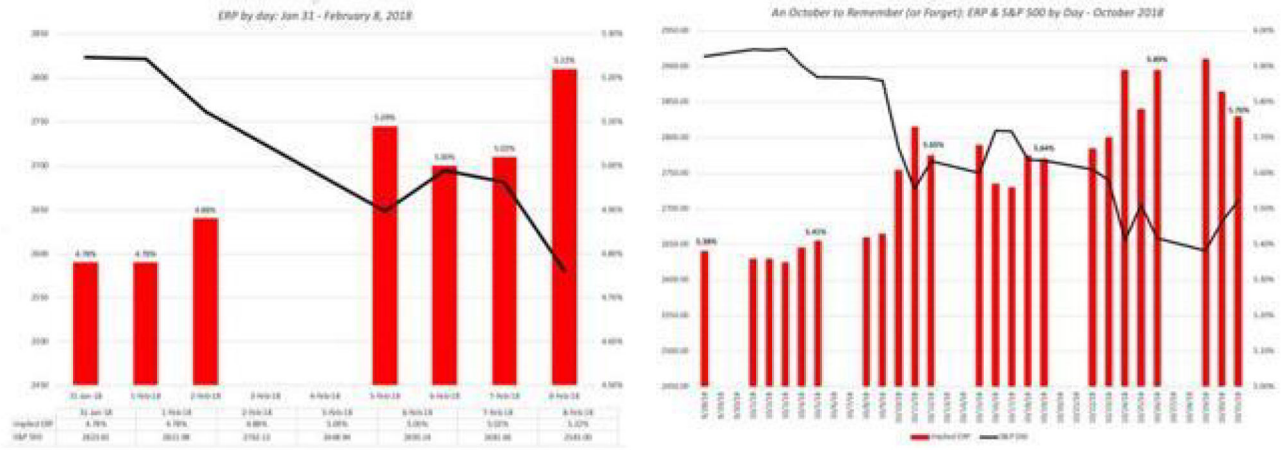
At the start of 2018, I estimated the equity risk premium, using the index at that point in time (2673.61), the 10-year treasury bond rate on that day (2.41%) and the growth rate that analysts were projecting for earnings for the index (7.09%).



	Actual 12 months	1	2	3	4	5	Terminal Year
Expected Earnings	135.94	133.75	143.18	153.27	164.08	175.64	179.68
Expected Dividends + Buybacks =	108.28	$ 115.91	$ 124.08	$ 132.83	$ 142.19	$ 152.22	155.88

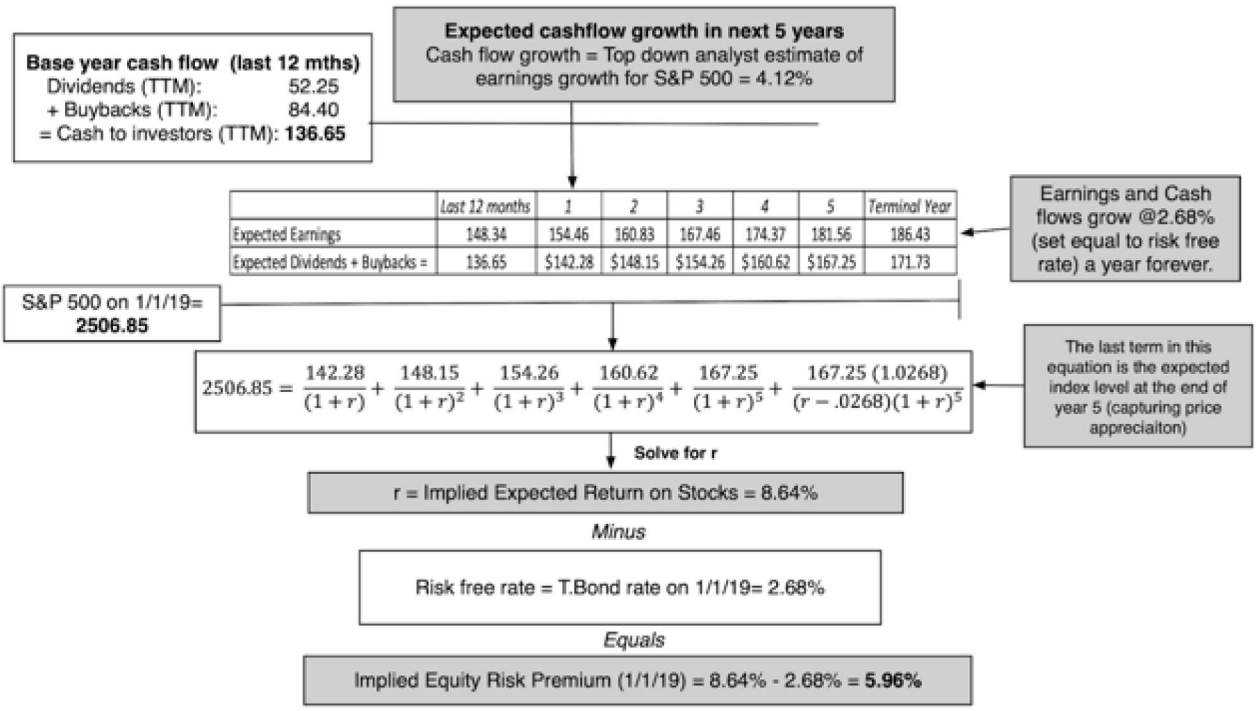
The equity risk premium on January 1, 2018 was 5.09%. As we moved through the year, I computed the equity risk premium at the start of each month, adjusting cash flows on a quarterly basis (which is about as frequently as S&P does it) and using the index level and ten-year T.Bond rate at the start of each month.

While the conventional wisdom about equity risk premiums is that they do not change much on a day to day basis in developed markets, that has not been true since 2008. In 2018, there were two periods, the first week of February and the month of October, where volatility peaked on an intraday basis, and I computed the ERP by day, during the first week of February, and all through October:



During October, for instance, the equity risk premium moved from 5.38% at the start of the month to 5.76% by the end of the month, with wide swings during the course of the month.

After a brutal December, where stocks dropped more than 9% partly on the recognition that global economic growth may slacken faster than expected, I recomputed the equity risk premium at the start of 2019:



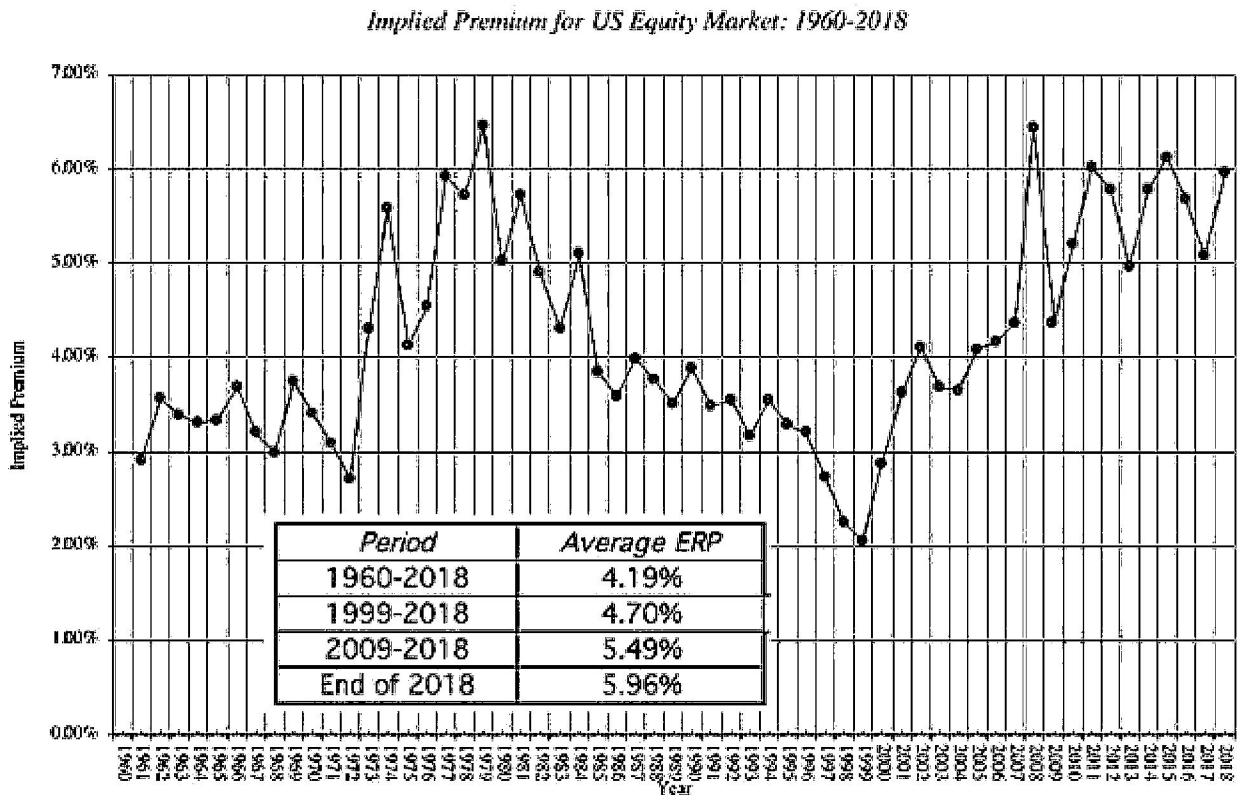
The equity risk premium has increased to **5.96%**, but a closer look at the differences between the inputs at the start and end of the year indicates how investor perspectives have shifted over the course of the year:

Input	*Start of 2018*	*Start of 2019*	*Reasons*
S&P 500	2673.61	2506.85	Fourth quarter meltdown in stocks
Base year cash flows	108.28	136.65	Continued increase in buybacks, triggered partly by new tax law release of trapped cash.
Expected growth in earnings	7.09%	4.12%	Pessimism about future global growth and possibility of US recession.
T. Bond Rate	2.41%	2.68%	Fear of the Fed?
Expected return on stocks (ERP)	7.49% (5.08%)	8.64% (5.96%)	Lower growth fears + Political and Economic Crisis worries?

Going into 2019, investors are clearly less upbeat than they were in 2018 about future growth and more worried about future crises, but companies are continuing to return cash at a pace that exceeds expectations.

What now?

I know that you are looking for a bottom line here on whether the numbers are aligned for a good or a bad year for stocks, and I will disappoint you upfront by admitting that I am a terrible market timer. As an intrinsic value investor, the only market-related question that I ask is whether I find the current price of risk (the implied ERP) to be an acceptable one; if it is too low for my tastes, I would shift away from stocks, and if it is too high, shift more into them. To gain perspective, I graphed the implied ERP from 1960 through 2018 below:



At its current level of 5.96%, the equity risk premium is in the top decile of historical numbers, exceeded only by the equity risk premiums in three other years, 1979, 2009 and 2011. Viewed purely on that basis, the equity market is more undervalued than overvalued right now.

I am fully aware of the dangers that lurk and how they could quickly change my assessment and they can show up in one or more of the inputs:

1. Recession and lower growth: While there was almost no talk about a possible recession either globally or in the US, at the start of 2018, some analysts, albeit a minority, are raising the possibility that the economy would slow down enough to push it into recession at the start of 2019. While the lower earnings growth used in the 2019 computation already incorporates some of this worry, a recession would make even the lower number optimistic. In the table below, I have estimated the effect on the equity risk premium of lower growth, and note that even with a compounded growth rate of -3% a year for the next five years, the ERP stays above the historical average of 4.19%.

Expected growth next 5 years	ERP
-3.00%	4.31%
-1.00%	4.74%
0%	4.96%
1.00%	5.19%
3.00%	5.68%

2. Higher interest rates: The fear of the Fed has roiled markets for much of the last decade, and while it has played out as higher short term interest rates for the last two years, the ten-year bond rate, after a surge over 3% in 2018, is now back to 2.68%. There is the possibility that higher inflation and economic growth rate can push this number higher, but it is difficult to see how this would happen if recession fears pan out. In fact, as I noted in this post from earlier in the year, higher interest rates, if the trigger is higher real growth (and not higher inflation), could be a positive for stocks, not a negative.
3. Pullback on cash flows: US companies have been returning huge amounts of cash in the form of stock buybacks and dividends. In 2018, for instance, dividends and buybacks amounted to 92% of aggregate earnings, higher than the 84.60% paid out, on average, between 2009 and 2018 but still lower than the numbers in excess of 100% posted in 2015 and 2016. Assuming that the payout will adjust over time to 85.07%, reflecting expected long term growth, lowers the ERP to 5.55%, still well above historical levels.
4. Political and Economic Crises: The trade war and the Brexit mess will play out this year and each has the potential to scare markets enough to justify the higher ERP that we are observing. In addition, it goes without saying that there will be at least a crisis or two that are not on the radar right now that will hit markets, an unwanted side effect of globalization.

Looking at how the equity risk premium will be affected by each of these variables, I think that the market has priced in already for shocks on at least two of these variables, in the form of lower growth and political/economic crises, and can withstand fairly significant bad news on the other two.

Bottom Line

I have long argued that it is better to be transparently wrong than opaquely right, when making investment forecasts. In keeping with my own advice, I believe that stocks are more likely to go up in 2019, than down, given the information that I have now. That said, if I am wrong, it will be because I have underestimated how much economic growth will slow

in the coming year and the magnitude of economic crises. Odds are that I will see the telltale signs too late to protect myself fully against any resulting market corrections, but that is not my game anyway.

Data Update 1 for 2019: Stocks are risky (in case we had fo...

Datasets

1. Historical Returns on Stocks, Bonds and Bills - 1928 to 2018
2. Historical Implied Equity Risk Premiums for US - 1960 to 2018

Spreadsheets

1. Implied ERP for January 1, 2019

Disclosure: The summary bullets for this article were chosen by Seeking Alpha editors.

https://www.wsj.com/articles/rare-bond-market-inversion-signals-short-lived-boost-to-inflation-11614249002

MARKETS

Rare Bond-Market Inversion Signals Short-Lived Boost to Inflation

Markets appear to price in a spike of inflation in the medium term that ebbs later on

The Federal Reserve building in Washington.

PHOTO: SAMUEL CORUM/BLOOMBERG NEWS

By *Paul J. Davies*

Feb. 25, 2021 5:30 am ET

Listen to this article
4 minutes

Markets are signaling that inflation is coming and investors are getting ready. Treasury yields are rising and stock-market investors are starting to shift from high-growth tech companies toward companies like airlines that will benefit from an economic rebound.

But one corner of the Treasury market suggests that a coming bump in U.S. inflation will run out of steam swiftly. This has implications for fans of gold or cryptocurrencies who fret about runaway inflation.

Investors' inflation expectations can be seen in Treasury markets by looking at the difference between the yields on ordinary Treasurys and the yields on inflation protected

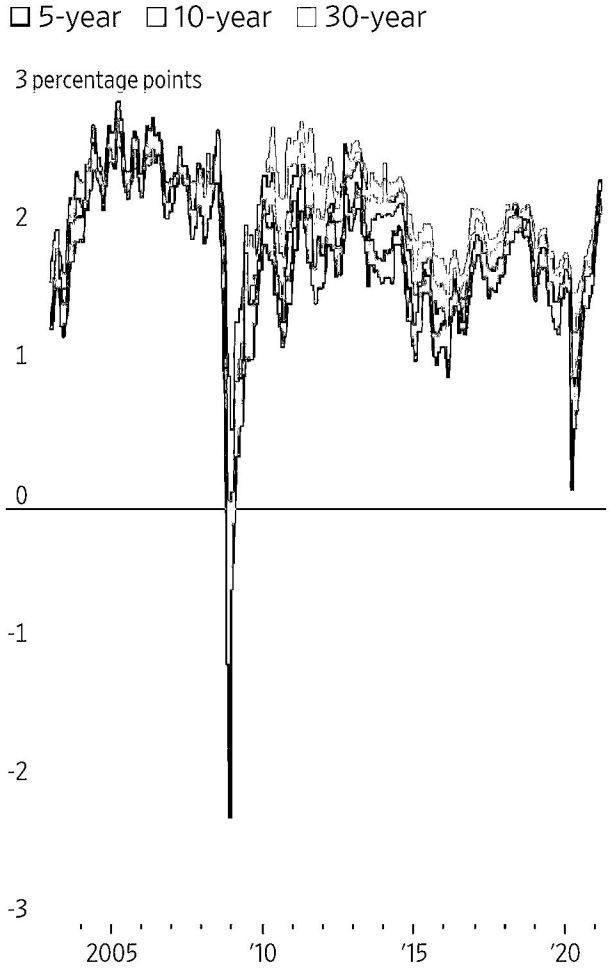
Treasurys, known as TIPS. This difference is called the break-even rate.

The difference between five-year Treasury and TIPS yields shows break-even inflation expectations have risen to nearly 2.4% in recent days—the highest level since May 2011, implying inflation is set to pick up.

But there is more going on below the surface. Shorter-term break-even rates are higher than longer-term ones, an extremely rare situation—known as an inversion of the break-even curve. This forecasts a spike in inflation that then falls away.

For instance, longer-term inflation expectations are lower: 10-year break-even rates are 2.15% and 30-year rates are 2.1%.

Inflation expectations shown in the gap between Treasury yields and real yields*



*Real yields are from inflation-protected Treasurys, or TIPS
Source: FactSet

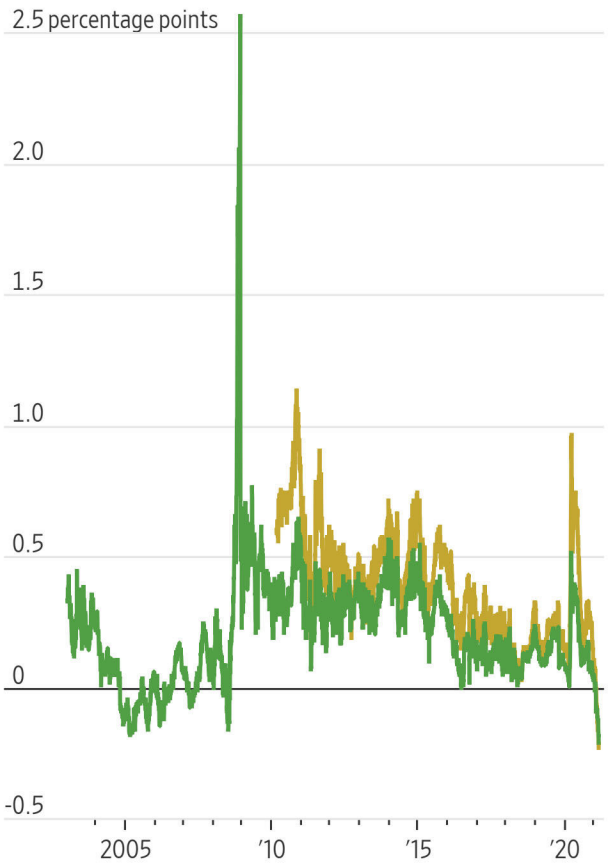
The five-year rate hasn't been above the 10-year since July 2008, according to FactSet, and the gap between the two has never been as great as it was on Wednesday.

Interpretations for the anomaly vary. One possibility is that the $1.9 trillion coronavirus-relief package Washington will vote on this week will bring only short-term benefits—and only a short-lived bump to inflation. More than three-quarters of the funds likely to be approved will be spent on stimulus checks and other income support, according to Goldman Sachs estimates.

Another view is that the inversion in break-even rates might signal expectations that the Federal Reserve—contrary to promises—will react swiftly to cap inflation and keep it close to its 2% target.

"It may signal that we are getting closer to the first test of the Fed's commitment to average inflation targeting...and not tightening policy until they see the whites in the eyes of inflation," said David Riley, chief investment strategist at BlueBay Asset Management.

Gap between inflation expectations at different Treasury maturities



Note: A negative reading means inflation will be lower further into the future
Source: FactSet