VALUING YOUNG, DISTRESSED, AND COMPLEX BUSINESSES

THE DARK SIDE OF VALUATION

THIRD EDITION

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more haphazard. Second, and more important, the market itself has changed over time, resulting in risk premiums that might not be appropriate for today. The U.S. equity market in 1871 more closely resembled an emerging market, in terms of volatility and risk, than a mature market. Consequently, using the earlier data might yield premiums that have little relevance for today's markets.

Survivor Bias Given how widely the historical risk premium approach is used, it is surprising that the flaws in the approach have not drawn more attention. Consider first the underlying assumption that investors' risk premiums have not changed over time and that the average risk investment (in the market portfolio) has remained stable over the period examined. We would be hard-pressed to find anyone who would be willing to sustain this argument with fervor. The obvious fix for this problem, which is to use a more recent time period, runs directly into a second problem—the large noise associated with historical risk premium estimates. Although these standard errors might be tolerable for very long time periods, they clearly are unacceptably high when shorter periods are used.

Even if a sufficiently long period of history is available, and investors' risk aversion has not changed in a systematic way over that period, a problem remains. Markets such as the U.S., which have long periods of equity market history, represent "survivor markets." In other words, assume that you had invested in the largest equity markets in the world in 1926, of which the U.S. was one.[14] From 1926 to 2000, investments in many of the other equity markets would have earned much smaller premiums than the U.S. equity market, and some of them would have resulted in investors earning little or even negative returns over the period. Thus, the survivor bias will result in historical premiums that are larger than expected for markets like the U.S., even assuming that investors are rational and factor risk into prices.

The Dark Side

If equity risk premiums estimated even over very long time periods have significant standard errors (noise) associated with them, how do analysts deal with the problem? Some ignore the noise and use risk premiums estimated by widely used estimation services as a shield against questions about the numbers they use. Others use the noise in the estimates to serve their purposes, essentially using whatever premium best fits their biases, and arguing that the premium falls within the range of reasonable numbers.

14. Jorion, Philippe and William N. Goetzmann, 1999, "Global Stock Markets in the Twentieth Century," *Journal of Finance*, 54(3), 953–980. They looked at 39 different equity markets and concluded that the U.S. was the best-performing market from 1921 to the end of the century. They estimated a geometric average premium of 3.84% across all the equity markets they looked at, rather than just the U.S.

- **Outsource the premium:** Several services provide estimates of equity risk premiums to analysts, for a price. Perhaps the best-known and oldest service to provide this data was Ibbotson Associates, a Chicago-based service that estimated risk premiums using historical data on stocks and bonds in the U.S. since the 1970s. Although Ibbotson has stopped providing these estimates, Duff and Phelps has taken on the role of updating the data. Because these equity risk premiums are widely used and are backed up by stock return data going back to 1926, analysts who use these premiums are seldom challenged. Without taking a stand on whether Ibbotson equity risk premiums are "good" estimates, it seemingly would be a dereliction of valuation duty to allow one of the most critical numbers in valuation to be a number provided by a service, and thus beyond debate.
- **Biased premium:** Earlier, we noted that the equity risk premium derived from historical data is likely to have a significant standard error associated with it. Put in more pragmatic terms, historical data on stock and bond returns provides us with a range on the equity risk premium, rather than a number. Some analysts use the fact that the equity risk premium falls within a fairly wide range to full advantage. They use the lower end of the range (or lower-risk premiums) if they want to inflate the value of a business and the higher end of the range (or higher-risk premiums) if they want to reduce the value. In either case, they let their biases dictate the risk premium to use in valuation.

The Light Side

If the equity risk premium, even over periods as long as 90 years, is noisy, and it's possible that the "survivor bias" in equity markets is increasing the equity risk premium, we have to look for ways to narrow the error term on the estimates. This section considers two alternatives. In the global approach, we look at equity risk premiums in different markets globally and try to use the data to estimate a market's equity risk premium. In the implied premium approach, we abandon historical risk premiums altogether and use current stock prices to back out equity risk premiums.

Global Premiums How can we mitigate survivor bias? One solution is to look at historical risk premiums across multiple equity markets across very long time periods. In the most comprehensive attempt at this analysis, Dimson, Marsh, and Staunton (2002, 2006) estimated equity returns for 21 markets from 1900 to 2016. Their results are summarized in Table 7.6.[15]

15. Dimson, E., P. Marsh, and M. Staunton, 2002, *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, NJ; Credit Suisse Global Investment Returns Sourcebook, 2017.

Table 7.6 Historical Risk Premiums Across Equity Markets: 1900 to 2016

Country	Stocks Minus Long-Term Governments					
	Geometric Mean (%)	Arithmetic Mean (%)	Standard Error (%)	Geometric Mean (%)	Arithmetic Mean (%)	Standard Error (%)
Australia	6.0%	7.4%	2.24%	2.57%	4.37%	1.95%
Austria	5.6%	10.4%	1.62%	4.15%	5.67%	1.74%
Belgium	3.0%	5.4%	1.93%	2.07%	3.27%	1.57%
Canada	4.2%	5.6%	2.35%	3.86%	6.03%	2.16%
Denmark	3.3%	5.2%	3.28%	5.28%	8.35%	2.69%
Finland	5.9%	9.4%	1.97%	3.62%	5.18%	1.78%
France	6.2%	8.7%	3.12%	4.30%	7.68%	2.89%
Germany	6.1%	9.9%	2.70%	5.91%	9.98%	3.21%
Ireland	3.6%	5.9%	2.17%	3.86%	5.95%	2.10%
Italy	5.7%	9.5%	2.52%	2.55%	5.26%	2.66%
Japan	6.2%	9.3%	2.15%	5.35%	7.03%	1.88%
Netherlands	4.5%	6.6%	2.08%	2.32%	4.21%	1.96%
New Zealand	4.4%	6.0%	2.15%	5.21%	7.51%	2.17%
Norway	3.2%	5.9%	1.82%	1.80%	3.28%	1.70%
Portugal	4.6%	9.2%	1.93%	4.06%	5.29%	1.61%
South Africa	6.2%	8.2%	1.91%	4.52%	6.49%	1.96%
Spain	3.3%	5.4%	1.88%	4.10%	5.18%	1.48%
Sweden	4.0%	6.0%	1.62%	4.04%	5.15%	1.45%
Switzerland	3.6%	5.3%	1.7%	2.0%	3.5%	1.6%
U.K.	4.4%	6.1%	1.8%	3.6%	4.9%	1.6%
U.S.	5.5%	7.4%	1.8%	4.3%	6.4%	1.9%
Europe	3.3%	5.1%	1.7%	3.1%	4.4%	1.5%
World, minus U.S.	3.5%	5.1%	1.7%	2.8%	3.8%	1.3%
World	4.2%	5.6%	1.6%	3.2%	4.4%	1.4%

Note that the risk premiums, averaged across the 21 markets, are much lower than risk premiums in the U.S. For instance, the geometric average risk premium across the markets is only 3.20%, lower than the 4.30% for the U.S. markets (over this time period). The results are similar for the arithmetic average premium, with the average premium of 4.20% across markets being lower than the 5.5% for the U.S. In effect, the difference in returns captures the survivorship bias, implying that using an historical risk premium based only on U.S. data will result in numbers that are too high for the future.

Implied Premiums When investors price an asset, they are implicitly telling you what they require as an expected return on that asset. Thus, if an asset has expected cash flows of $15 a year in perpetuity, and an investor pays $75 for that asset, he is announcing to the world that his required rate of return on that asset is 20% (15/75). It is easiest to illustrate implied equity premiums with a dividend discount model (DDM). In the DDM, the value of equity is the present value of expected dividends from the investment. In the special case where dividends are assumed to grow at a constant rate forever, we get the classic stable growth (Gordon) model:

$$\text{Value of Equity} = \frac{\text{Expected Dividends Next Period}}{(\text{Required Return on Equity} - \text{Expected Growth Rate})}$$

This is essentially the present value of dividends growing at a constant rate. Three of the four inputs in this model can be obtained or estimated: the current level of the market (value), the expected dividends next period, and the expected growth rate in earnings and dividends in the long term. The only "unknown" is the required return on equity; when we solve for it, we get an implied expected return on stocks. Subtracting the risk-free rate yields an implied equity risk premium.

To illustrate, assume that the current level of the S&P 500 Index is 900, the expected dividend yield on the index is 2%, and the expected growth rate in earnings and dividends in the long term is 7%. Solving for the required return on equity yields the following:

$$900 = (.02 \times 900) / (r - .07)$$

Then we solve for r:

$$r = (18 + 63) / 900 = 9\%$$

If the current risk-free rate is 6%, this yields a premium of 3%.

To expand the model to fit more general specifications, we would make the following changes: Instead of looking at the actual dividends paid as the only cash flow to equity, we would consider *potential dividends instead of actual dividends*. In my earlier work (2002, 2006), the free cash flow to equity (FCFE)—the cash flow left over after taxes, reinvestment needs, and debt repayments—was offered as a measure of potential dividends.[16] Over the last decade, for instance, firms have paid out only about half their FCFE as dividends. If this poses too much of an estimation challenge, a simpler alternative exists. Firms that hold back cash build up large cash balances that they use over time to fund

16. Damodaran, A., 2002, *Investment Valuation*, John Wiley and Sons; Damodaran, A., 2006, *Damodaran on Valuation*, John Wiley and Sons.

stock buybacks. Adding stock buybacks to aggregate dividends paid should give us a better measure of total cash flows to equity. The model can also be expanded to allow for a high growth phase, where earnings and dividends can grow at rates that are very different (usually higher, but not always) from stable growth values. With these changes, the value of equity can be written as follows:

$$\text{Value of Equity} = \sum_{t=1}^{t=N} \frac{E(FCFE_t)}{\left(1+k_e\right)^t} + \frac{E(FCFE_{N+1})}{\left(k_e - g_N\right)\left(1+k_e\right)^N}$$

In this equation, there are N years of high growth, $E(FCFE_t)$ is the expected free cash flow to equity (potential dividend) in year t, k_e is the rate of return expected by equity investors, and g_N is the stable growth rate (after year N). We can solve for the rate of return equity investors need, given the expected potential dividends and prices today. Subtracting the risk-free rate should generate a more realistic equity risk premium.

Given its long history and wide following, the S&P 500 is a logical index to use to try out the implied equity risk premium measure. In this section, we will begin by estimating the implied equity risk premium on January 1, 2017. On December 31, 2016, the S&P 500 Index closed at 2238.83 and dividends and buybacks in the twelve months leading into 2017 amounted to 108.67. In addition, the consensus estimate of growth in earnings for companies in the index was 5.54% for the next five years and we will assume that total cash returned in the form of dividends and buybacks will keep pace.[17] Because this growth rate cannot be sustained forever, we employ a two-stage valuation model. We allow growth to continue at 5.54% for five years, and then we lower the growth rate to 2.45% (the risk-free rate) after that.[18] Table 7.7 summarizes the expected dividends and buybacks for the next five years of high growth and for the first year of stable growth thereafter.

Table 7.7 Estimated Cash Flows on the S&P 500 Index: January 1, 2017

Year	Dividends + Buybacks on Index
1	114.69
2	121.04
3	127.75
4	134.82
5	142.28
6	145.77

17. We used the average of the analyst estimates for individual firms (bottom-up). Alternatively, we could have used the top-down estimate for the S&P 500 earnings.

18. The Treasury bond rate is the sum of expected inflation and the expected real rate. If we assume that real growth is equal to the real rate, the long-term stable growth rate should be equal to the Treasury bond rate.

If we assume that these are reasonable estimates of the expected dividends and that the index is correctly priced, the value can be written as follows:

$$2238.83 = \frac{114.69}{(1+r)} + \frac{121.04}{(1+r)^2} + \frac{127.75}{(1+r)^3} + \frac{134.82}{(1+r)^4} + \frac{142.28}{(1+r)^5} + \frac{145.77}{(r-.0245)(1+r)^5}$$

Note that the last term in the equation is the terminal value of the index, based on the stable growth rate of 2.45%, discounted back to the present. Solving for required return in this equation yields a value of 8.14%. Subtracting the ten-year Treasury bond rate (the risk-free rate) yields an implied equity premium of 5.69%. The process is summarized in Figure 7.2.

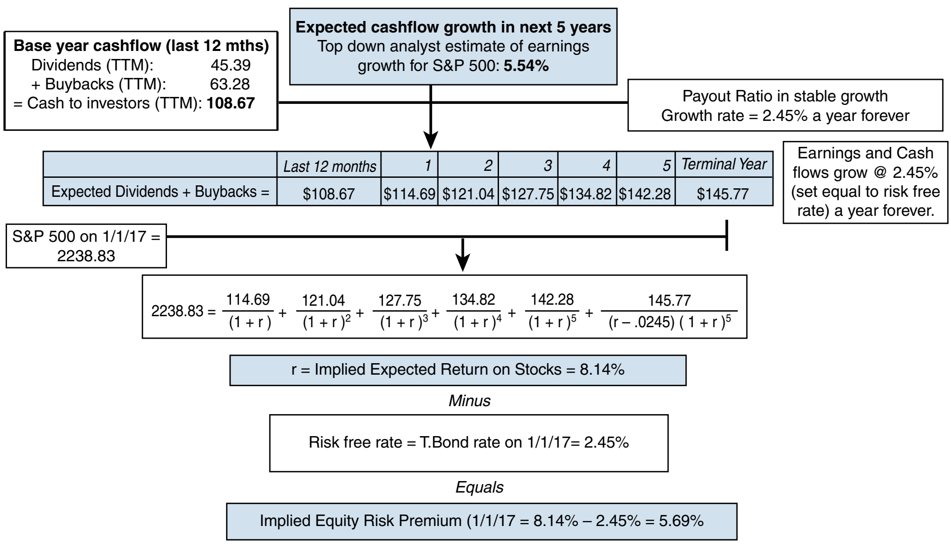

Figure 7.2 Implied Equity Risk Premium for S&P 500—January 1, 2017

It is true that this approach to estimating equity risk premiums also comes with a standard error, because your inputs on growth can be wrong, but the standard errors will be much smaller than using a historical risk premium. For instance, using different estimates of cash flows and growth in the January 2017 estimate would have yielded values between 4.50% and 6.16%, a much tighter range than the one estimated for historical risk premiums.

Risk Premiums Are Changing

In an earlier section, we noted the determinants of equity risk premiums and default spreads, including real economic uncertainty and investor risk aversion. Because the fundamentals that determine equity risk premiums and default spreads can change over