Business valuation: theory and practice (continued)

Anthony Wilson

12 November 2012
Valuation - DCF - Discount Rate Calculation

A Weighted Average Cost of Capital (‘‘WACC’’) is used to discount future operational cash flows.

\[
\text{WACC} = \frac{\text{Cost of equity} \times E}{(E + D)} + \frac{\text{Cost of debt} \times D}{(E + D)}
\]

- \( E \) = fair value of equity
- \( D \) = fair value of debt.

The Cost of Equity is calculated according to the Capital Asset Pricing Model (‘‘CAPM’’) as described below;

\[
\text{Cost of equity} = r_F + C + \beta e + \alpha
\]

- \( r_F \) = Risk-free rate of return \( \{4.9\% \text{ (Turkish Eurobond 2030)}\}
- \( C \) = country risk premium \( \{0.9\% \}
- \( \beta \) = relative volatility of the company or sector compared to the market average \( 0.9\% \)
- \( e \) = equity risk premium \( 5.0\% \text{ (Deloitte assumption, similar to Ibbotson)}\)
- \( \alpha \) = specific company risk \( 3.9\% \text{ (Ibbotson risk premia based on size, 2012)}\)
The Cost of Debt is calculated as the after-tax cost of bank borrowings (mid- or long-term senior debt):

\[
\text{Cost of debt} = \text{[Risk-free rate + Spread]} \times (1 - t)
\]

\[
= [4.9\% + 7.6\%] \times (1 - 20\%)
\]

\[
= 10.0\%
\]
The selection of our discount rate: (i) equity risk premium.

Equity Risk Premium

The equity risk premium we have used is from Ibbotson Associates (“Ibbotson”), which is probably the best-known US-based research house. It is calculated by Ibbotson as the difference between equity returns (including dividends) and the yield on US Treasury Bonds.

But there are significant differences in the equity risk premium figures quoted by different sources, and there are different views about the best methodology to use. For example, Aswath Damodaran, a well-known US commentator on risk premiums, has said (in 2006) that “The historical risk premium of 4.84% for the United States is too high a premium to use in valuation. It is much higher than the actual implied equity risk premium in the market.” He used an equity risk premium of 4% in various worked examples in the same presentation.

Accordingly, in this section we consider different approaches that we could have used in the selection of the discount rate. All these approaches accept the basic concepts of the Capital Asset Pricing Model. They differ in how to select an appropriate equity risk premium and how to adjust for country-specific risks.

Equity Risk Premium based on past data for longer or shorter periods:

A time period of 50 years is as long as most individual investors could be interested in. A time period of 100 years or more exceeds any investor’s horizon. As Keynes said, “In the long run we are all dead.”

The use of a long period such as 100 years includes data from years so far back in history that investment conditions then may have been very different from now. On the other hand, use of short periods gives results that can be greatly affected by recent unusual events, such as the dotcom boom in 1999/2000 and the recent global financial crisis.

Damodaran [2008] calculated the US equity premium over various time periods as shown in the table below. He also tried two different forms of averaging: arithmetic mean and geometric mean. Even the choice of averaging method has a significant effect, as shown in the table. He concluded that geometric means are more appropriate.

<table>
<thead>
<tr>
<th></th>
<th>10 years</th>
<th>40 years</th>
<th>80 years</th>
</tr>
</thead>
<tbody>
<tr>
<td>US equity risk premium:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Arithmetic mean</td>
<td>2.7%</td>
<td>4.3%</td>
<td>6.4%</td>
</tr>
<tr>
<td>Geometric mean</td>
<td>1.5%</td>
<td>3.5%</td>
<td>4.8%</td>
</tr>
</tbody>
</table>
The selection of our discount rate: (i) equity risk premium.

Equity Risk Premium based on data from more than one country to eliminate “survivor bias”

An important problem with using equity risk premiums from past US data is that the US economy has been one of the most successful in the world over the past century. If we looked at equity returns from the Russian equity market over the past century, for example, we would have seen far lower equity returns due to defaults and revolution. By focussing on the past performance of the US market, we may reach an over-optimistic view of the premiums that investors worldwide can expect to achieve.

Credit Suisse have addressed this problem by calculating equity risk premiums for 17 countries and for Europe, the World and the World ex-US. Selected results are shown in the table on the right.

It can be seen that:

(i) The Credit Suisse calculation for the US gives a significantly lower result than the Ibbotson calculation or the figures quoted by Damodaran. This may be because the historic periods used are different.

(ii) The result for the World ex-US is slightly lower than for the US, over the longest period 1900-2008.

(iii) The premiums for shorter periods are generally far lower: in fact negative in most countries for the past 25 year period. The World results are significantly worse than the US results for the past 25 and 50 years.

<table>
<thead>
<tr>
<th></th>
<th>25 years 1984-2008</th>
<th>50 years 1959-2008</th>
<th>109 years 1900-2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>US</td>
<td>-1.4%</td>
<td>1.7%</td>
<td>3.8%</td>
</tr>
<tr>
<td>World</td>
<td>-2.3%</td>
<td>0.6%</td>
<td>3.4%</td>
</tr>
<tr>
<td>World ex-US</td>
<td>-2.2%</td>
<td>0.8%</td>
<td>3.5%</td>
</tr>
<tr>
<td>Europe</td>
<td>0%</td>
<td>1.6%</td>
<td>3.6%</td>
</tr>
<tr>
<td>France</td>
<td>0%</td>
<td>0%</td>
<td>3.4%</td>
</tr>
<tr>
<td>Germany</td>
<td>0%</td>
<td>1.0%</td>
<td>4.7%</td>
</tr>
<tr>
<td>Italy</td>
<td>-1.5%</td>
<td>-0.7%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Japan</td>
<td>-5.0%</td>
<td>0%</td>
<td>5.0%</td>
</tr>
<tr>
<td>Netherlands</td>
<td>1.5%</td>
<td>3.1%</td>
<td>3.2%</td>
</tr>
<tr>
<td>Switzerland</td>
<td>3.6%</td>
<td>2.9%</td>
<td>1.5%</td>
</tr>
<tr>
<td>UK</td>
<td>0.5%</td>
<td>3.4%</td>
<td>3.6%</td>
</tr>
</tbody>
</table>
The selection of our discount rate: (i) equity risk premium.

**Equity Risk Premium based on Turkish data:**

Rather than using an equity risk premium which is based on the past performance of the S&P500 index compared to US Treasury bonds, and is thus based entirely on past US experience, we could have calculated an equity risk premium based on the past performance of Turkish equities traded on the Istanbul Stock Exchange compared to a risk free rate. Such an approach would have the obvious attraction of being more directly relevant to the valuation of Turkish companies.

The difficulties with this approach are:

- Although we have data on the ISE stock market indices since the opening of the exchange in 1986, these indices exclude dividends. We do not have data for the total return from investment on the ISE including dividend yield. This data is required to make the calculation.

- The equity risk premium is simply calculated as the difference between the rate of return actually achieved in the past on the stock exchange (as measured by an index such as the ISE-100, plus dividend yield) and a Government bond. Any data series longer than five years includes data from the period of high Turkish inflation (typically around 60-70% per annum until 2002). The high levels of inflation at that time created distortions in the capital markets, including extreme short-termism in many investment decisions, reducing the relevance of the past data.

- Any data series of five years or less encompasses a period of rapid growth in Turkish stock market indices, followed by a collapse, then a sharp recovery again. This growth and collapse may well not be repeatable, and may not have been expected by stock market investors. Therefore any Equity Risk Premium calculated in this way may well differ from the Equity Risk Premium that investors expect for the future.

**Equity Risk Premium compared to short term bills instead of compared to long term bonds:**

Many of the studies referred to in these pages actually calculate two alternative equity risk premiums: the premium over an investment in short-term T-bills and the premium over an investment in long term government bonds (10 - 30 year bonds). Here we have only presented the equity risk premiums compared to long term government bonds. The premiums over short-term T-bills are typically 1% - 2% higher, but this is offset by the fact that yields on short-term T-bills are typically 1% - 2% lower than on long term bonds. Thus the end result of a cost of equity calculation should be similar in both cases, provided that yield curves are normal at the date of valuation.
The selection of our discount rate: (i) equity risk premium.

Equity Risk Premium based on US data but forward-looking: from surveys

The equity risk premium is a forward-looking concept: what extra rate of return investors now want to compensate them for the extra risks of equities compared to bonds in future during the period they will be holding the investment.

Therefore it is unsatisfactory in principle to measure the equity risk premium by review of the past returns that investors earned. Conditions may have been different in the past, and the actual outturn may have differed from what investors expected.

One method of estimating a forward-looking equity risk premium without reliance on past data is to look at the results of surveys about investor expectations.

- Graham and Harvey have been conducting annual surveys of CFO’s or companies for roughly the last decade with the intent of estimating what these CFOs think is a reasonable equity risk premium (for the next ten years over the ten-year bond rate). In the 2008 survey, they report an average equity risk premium of 3.80% across survey respondents and a median premium of 4.2%. The average across all 8 years of surveys (about 9,000 surveys) was 3.46%.

- A Merrill Lynch survey of more than 300 institutional investors globally in July 2008 indicated an average equity risk premium of 3.8%.

However surveys of investors have limited credibility because investors do not appear to have good predictive power. “Studies that have looked at the efficacy of survey premiums indicate that if they have any predictive power, it is in the wrong direction. . . . In other words, investors becoming more optimistic (and demanding a larger premium) is more likely to be a precursor to poor (rather than good) market returns.” [Damodaran Sept. 2008].

Paul Marsh of the London Business School, one of the authors of the Credit Suisse Global Investment Returns Yearbook, was reported in March 2009 as saying that “Our research indicates that the [equity] risk premium is likely to be 3% to 3.5% in the future”, although we do not know the method(s) used in their research.
The selection of our discount rate: (i) equity risk premium.

**Equity Risk Premium based on US data but forward-looking: from earnings growth expectations**

Apart from surveys of investor intentions, another forward-looking source of information is expectations for earnings and dividend growth. If we know the present price of an equity share, and we know investors’ expectations about growth of earnings (and hence the future dividends expected), then we can deduce what rate of return the investor is expecting on their investment using a discounted cash flow approach or Gordon growth model approach. Subtracting the risk-free rate from this rate of return gives the equity risk premium the investor is expecting. This calculation has been performed by Damodaran for the US market as a whole, with adjustments for share buybacks. His estimate of the equity risk premium, calculated in this way as at September 2008, was 4.54%.

For this method to give a reliable result, it is essential that the expectations for future earnings growth are realistic. The published expectations are usually prepared by analysts, who are not themselves usually significant investors. Investors may think differently. In particular, there have been claims that analysts’ view about future earnings growth may often be too optimistic. If so, the equity risk premium calculated as above could be too high.
The selection of our discount rate: (ii) country risk premium.

Country risk premium

We have used a country risk premium which is the difference between the yield (as of the valuation date) on a Turkish government bond of approximately 10 year maturity and the yield on a US Treasury bond of similar maturity. Alternative approaches available include:

- **Using country risk ratings.** Studies have been performed which are designed to show the relation between country risk rating and investor risk premium: the lower the country risk rating, the higher the country risk premium. But the main purpose of these studies is to be able to find a country risk premium for countries that do not have US Dollar denominated bonds, because for those countries a direct comparison with the yield on a US government bond cannot be made. Therefore, there seems no need to use this approach for valuing a Turkish company, since Turkey has issued US Dollar denominated bonds which can be compared directly with the US government bonds.

- **Using Credit Default Swap spreads** (p40). This method should not give results very different from the comparison of government bond yields described above. Since the data on government bond yields is more readily available, we have preferred it.

Usually, the country risk premium which is found from any of the above approaches is simply added on to the risk-free rate. “Analysts who use default spreads as measures of country risk typically add them on to both the cost of equity and debt of every country traded in that country. For instance, the cost of equity for a Brazilian company, estimated in US dollars, will be 2.15% higher than the cost of equity of an otherwise similar US company, using the September 2008 measure of the default spread on the dollar denominated bonds. In some cases, analysts add the default spread to the US risk premium and multiply it by the beta. This increases the cost of equity for high beta companies and lowers it for low beta firms.” [Damodaran September 2008].

This premium is a good measure of the risk of a Turkish government default, but these country risk premiums measure the extra risk faced by bondholders, and there is a question whether they adequately capture all the extra risk that an equity shareholder faces in a country such as Turkey. An equity investor in a country such as Turkey may face different risks which are not necessarily well represented by the government default risk.

For this reason, Damodaran has explored calculations of larger country risk premiums, found by looking at measures of the volatility of different countries’ stock markets (“relative equity market standard deviations”). Since the basic theory is that investors deserve and require an equity risk premium for investing in shares because the returns from shares are more volatile than on bonds, we could apply higher equity risk premiums in countries where the stock market volatility is higher than in the US. For example, if the ISE is twice as volatile as the NYSE, we could use an equity risk premium twice as high.
The selection of our discount rate: (ii) country risk premium, and (iii) small cap premium

Country risk premium (continued)

Alternatively, we could use the country risk premium found in the traditional way from comparing Turkish government bond yields with US Treasury bond yields, and mutiply it by a factor for relative stock exchange volatility: for example, if the ISE is twice as volatile as the NYSE, we multiply the country risk premium by two.

Damodaran favours the second approach, but we have not seen any evidence that the country risk premiums calculated in this purely theoretical way are in line with the actual views and decisions of investors. Even Damodaran admits that the results in some cases "look wrong": he notes that the country risk premiums calculated for Namibia, Nigeria and Egypt all look very low (about 1% - 1.5%) whereas these "seem" risky markets. He believes this is because some risky markets actually show low volatility, because there is insufficient liquidity and so not much trading in these markets.

Small cap premium

In our cost of equity calculation, we add a premium in cases where the company is small compared to major US publicly-traded corporations. Almost all Turkish companies are small when measured against the largest US companies.

The factors we use are calculated by Ibbotson. There is an argument that such standardised factors might be misleading and that it would be better to look at the specific risks that might apply to each small company being valued and tailor the risk premium to those risks. We are concerned that any such judgements would be very subjective and could be thought to be open to manipulation, so we prefer to continue with the Ibbotson factors which are, at least, objective.
Conclusion:

Equities performed so badly that there was not any equity risk premium in the US or UK when measured over the 40 years 1969 – 2009. This led to increased questioning of whether the Capital Asset Pricing Model has any real validity, and whether it is sensible for individuals to invest in equities.

“There’s no such thing as a risk that you get paid for taking. The whole point about risk is that you don’t know if you’re going to be paid for it or not. What’s important about the current period is that now it’s true even for a very long period that people haven’t been paid for taking equity risks.” [Robert Jaeger, BNY Mellon Asset Management, March 2009].

However, in the absence of any other widely used model, we have used the Capital Asset Pricing Model to find a discount rate in the DCF method. Our equity risk premium is from Ibbotson. The Credit Suisse study and comments from Damodaran suggest it may be too high, as it certainly has been lower or even zero when measured over recent decades or in other countries outside the US. Our country risk premium is simply the difference between Turkish and US government bond yields. Damodaran considers that it may be too low, and that an upward adjustment should be made for emerging market equity volatility.

Overall our conclusion is that any discount rate must be treated with caution as it can never be “correctly” calculated.

Sources:


Credit Suisse Global Investment Returns Yearbook 2009


Deloitte refers to one or more of Deloitte Touche Tohmatsu, a Swiss Verein, its member firms, and their respective subsidiaries and affiliates. Deloitte Touche Tohmatsu is an organization of member firms around the world devoted to excellence in providing professional services and advice, focused on client service through a global strategy executed locally in nearly 140 countries. With access to the deep intellectual capital of approximately 150,000 people worldwide, Deloitte delivers services in four professional areas—audit, tax, consulting, and financial advisory services—and serves more than 80 percent of the world’s largest companies, as well as large national enterprises, public institutions, locally important clients, and successful, fast-growing global companies. Services are not provided by the Deloitte Touche Tohmatsu Verein, and, for regulatory and other reasons, certain member firms do not provide services in all four professional areas.

As a Swiss Verein (association), neither Deloitte Touche Tohmatsu nor any of its member firms has any liability for each other's acts or omissions. Each of the member firms is a separate and independent legal entity operating under the names “Deloitte,” “Deloitte & Touche,” “Deloitte Touche Tohmatsu,” or other related names.