

Guidelines for Selecting Risk Free Rate and Market Risk Premium

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Introduction

This brief overview provides commentary on selecting a Risk Free Rate and Market Risk Premium ["MRP"] for use in the Capital Asset Pricing Model ("CAPM") when undertaking business valuations.

EMCS recommends use of the current spot rate for 10 year Australian Government Bonds and a current (July 2020) forward view of a MRP of 8% to be used for 5 years then 7% after that.

An essential principle to adhere to when undertaking DCF valuations is the Consistency Principle. This principle provides guidance to ensuring the discount rate and cash flow forecasts are in harmony. It assists in selecting a risk free rate which is relevant for this commentary.

Applying the Consistency Principle assists in ensuring consistency in matters such as:

- the definitions of cash flow used in forecasting and the discount rate (e.g. use Equity Free Cash Flow and Cost of Equity or Operating Free Cash flow and a Weighted Average Cost of Capital);
- treating the tax advantage of debt only once (in either cash flows or in the discount rate, similarly for dividend imputation tax benefits);
- matching the risk of the cash flows to the risk used in the discount rate,
- matching currency with local discount rate; and
- matching nominal (real) cash flow forecasts with a nominal (real) discount rate. Also relevant is considerations of the growth rate used in cash flow forecasts and in the discount rate – particularly for continuing (or terminal) value estimation.

This commentary draws on application of the last item when thinking about inflation and growth and selection of a risk free rate. It then provides commentary about selecting an Market Risk Premium in Australia.

Another important reminder before launching into the commentary is that the Cost of Equity (and indeed any discount rate) should be:

- the current cost of raising capital for the duration of the investment;
- an opportunity cost i.e. the minimum return investors require from an asset with equivalent risk;
- forward looking; and
- reflect a forward view of risk (i.e. of Beta when using the CAPM).

Of the three key inputs to the CAPM, the risk free rate, the MRP and the Beta, only risk free rate is observable as a current, forward looking opportunity cost. The MRP and Beta have to be estimated, usually with the historical record is an input to the estimate.

The estimation of a forward MRP is subject to debate since there is no well accepted view as to how to derive a forward MRP. This may well explain the reliance of many valuers on an historical average. However, there is no reason to expect the MRP to be stable – it will change with the level of risk and investors attitudes to risk.¹

Important Caveat

While these suggested guidelines relate primarily to selecting a risk free rate and MRP, both important inputs to business valuations, cash flow forecasts carefully linked to the strategic position of the business is more important (i.e. how the current industry and the competitive position of the business is expected to evolve over time). This includes careful examination of the evolution of Economic Profit and its drivers.

Risk Free Rate

In Australia, the yield on 10 year Australian Government Bonds ["AGBs"] is generally used as a proxy for the risk free rate. Ten year bonds are used for several reasons, not the least being that the historical MRP is usually measured using with such yields, so consistency requires that 10 year bonds be used as the risk free rate in the CAPM. Otherwise the historical data, to the extent it is relied upon, would need to be re-estimated using the same maturity bonds that are used as the forward looking risk free rate.

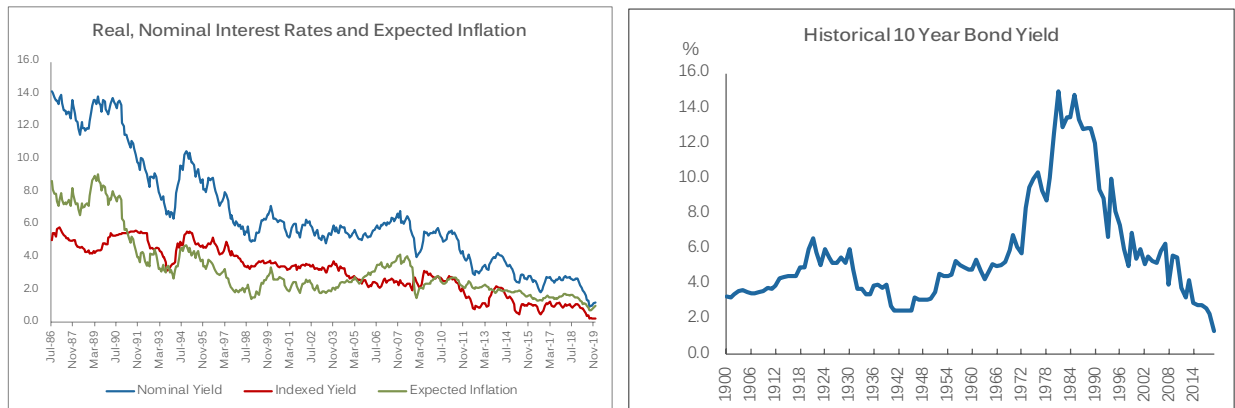
Like most countries the, yield on AGBs have been at historical lows in recent times. The first graph below captures the yield on nominal and indexed 10 year AGB since July 1986. Also shown is the expected inflation implicit in the difference in these two yields. There is a clear downward trend in all three graphs. The nominal yield on 31 December 2019 was 1.2%, the indexed (for inflation) yield was 0.2% suggesting annualised expected inflation of 1% over the next 10 years i.e.:

$$\begin{array}{rccccccc} \text{Risk Free Rate} & = & \text{Real Risk Free Rate} & + & \text{Expected Inflation}^2 \\ 1.2\% & = & 0.2\% & + & 1\% \end{array}$$

¹. Because there is a range of views on the subject, it is important to note that these guidelines reflect the view of the author. Others may have a different view.

² This relationship is a simplification of the preferred Fisher equation which is $(1 + \text{Nominal Rate}) = (1 + \text{Real Rate})(1 + \text{Expected Inflation})$. When rates are low, there is very little difference between the simple form and the Fisher equation.

The rates had fallen to 0.87%, 0.27% and 0.6% respectively on 30 June 2020. The yields have been more volatile in the second half of the period and are at the lowest point since 1900.



The yield curve as at the end of December 2019 was largely upward sloping but rising to 2.1% for 27 year bonds. This had fallen to 1.7% by 30 June 2020. This suggests that market participants are not expecting an imminent return to substantively higher rates over time based on currently available information. **It also suggests that expectations of inflation and economic growth are low.** As Harvey notes:³

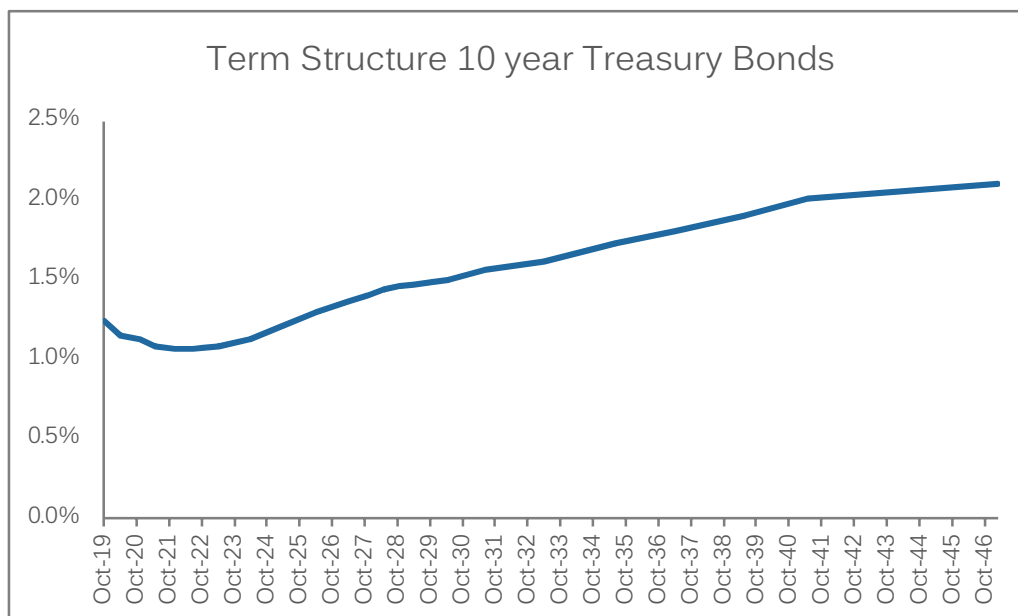
"The intuition is straightforward. If a recession is expected next year, there is an incentive to sacrifice today to buy a one-year bond that pays off in the bad times. The demand for the bond will bid up its price and lower its yield. The theory implies that current real interest rates contain information about expected economic growth."

For Australia, Edirisuriyay finds⁴:

"... on the basis of our results, we conclude that most financial variables are suitable for predicting real economic activity. Among these variables are 10-year Treasury bonds and 90-day bank bills..."

³ Harvey C.H., "Forecasts of Economic Growth from the Bond and Stock Markets", Financial Analysts Journal, Vol 45, No. 5, Sept – Oct 1989.

⁴ Edirisuriyay P., "The Predictive Power of Financial Variables: New Evidence in Australia", Australasian Accounting, Business and Finance Journal. Vol 9, Issue 1, 2015.



The market view of expected inflation and economic growth implicit in current AGB yields suggests cash flow forecasts for DCF valuations should take account of this, especially in the continuing (terminal) value valuations – otherwise there can be a mismatch resulting in flawed valuations i.e. this is a simple application of the Consistency Principle. So, if the current market risk free rate for 10 year bonds is used as the risk free rate in the CAPM, expected economic growth should be at historically low levels and expected inflation should be around 1% p.a. for the average company. A valuer may use different growth rates in the specific forecast period to reflect the particular circumstances of the entity being valued, but less likely in the continuing value estimate. In fact, there is an argument that the growth rate used for cash flows should be less than that for the economy since few companies last forever – the attrition rate is high with an average lifespan of listed companies being circa 20 years.⁵ However, particular circumstances need to be carefully considered if the valuer moves away from the overall market view.

Adjusting the Risk Free Rate using the Consistency Principle

The nominal yield on 10 year AGB's at end June 2019 was 1.3%, the inflation indexed yield was 0.4% suggesting expected inflation of 0.9%. By way of contrast, the KPMG survey reports the average risk free rate used at 30 June 2019 by respondents to the 2109 survey was 2.4% while the long term view of expected inflation for AGB's was 2.36%, implying virtually no real growth from these averages.

Nevertheless, anecdotally, many valuers use the mid-point of the Reserve Bank of Australia's targeted range for inflation as the inflation estimate for cash flows. At 2.5%, this is above the rate implicit in market yields of AGBs. So, if a valuer uses 2.5% for expected inflation in cash flow forecasts (particularly the long term rate) **then it would be appropriate to adjust the risk free rate** to ensure consistency between the numerator and denominator of the DCF equation.

⁵ See for example <https://plus.credit-suisse.com/rpc4/ravDocView?docid=V6y0SB2AF-WEr1ce>

If it is assumed the real rate is that implied by market yields, then the adjustment would provide a risk free rate of 2.9% i.e.

$$\begin{array}{rccccccc} \text{Risk Free Rate} & = & \text{Real Risk Free Rate} & + & \text{Expected Inflation} \\ 2.9\% & = & 0.4\% & + & 2.5\% \end{array}$$

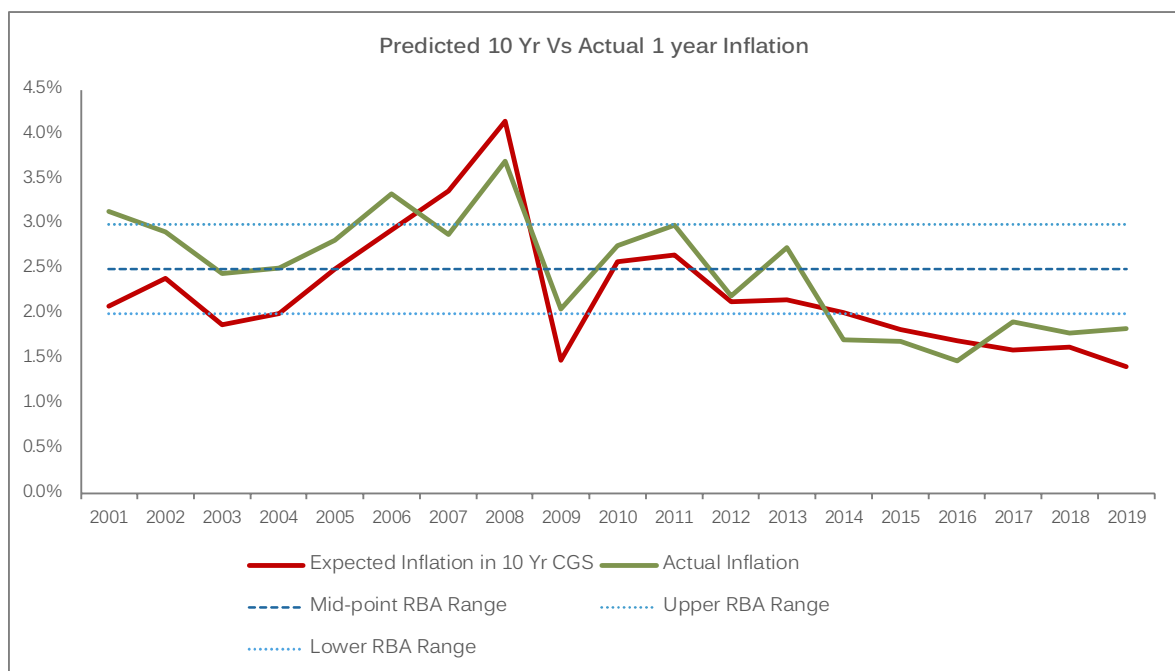
Similarly, if the valuer had a different view of long term real growth (real and inflation) then a consistent risk free rate could be derived in a similar manner by adjusting the real risk free rate.

While the RBA target range is widely used for inflation estimates there are, of course other estimates. For example, the IMF forecast a trend from 1.8% to 2.5% from 2020 to 2025 (see 1AUSEA2020001-1.pdf) along with growth in real GDP trending from 2.0% to 2.6%. By contrast, it forecasts the 10 year Government Bond interest rate trending from 0.5% to 2.4% over the same period. There are also economic consulting firms that forecast inflation and other growth rates that may differ from the RBA forecasts.

A key point is that valuation models should provide similar outcomes if they work in real or nominal terms and that there should be care taken such that there is not a mismatch between key assumptions in the cash flows and the discount rate, especially in the terminal value estimates where most of the value (usually) arises.

Expected Inflation

Recent actual inflation has been below the RBA target mid-point. Further, expected inflation implicit in the yield on 10 year AGBs has been a marginally better predictor of actual inflation than the mid-point of the RBA range (square root of mean squared error of 0.46% compared with 0.62% over the period from 2000 and 0.32% compared with 0.67% post GFC).

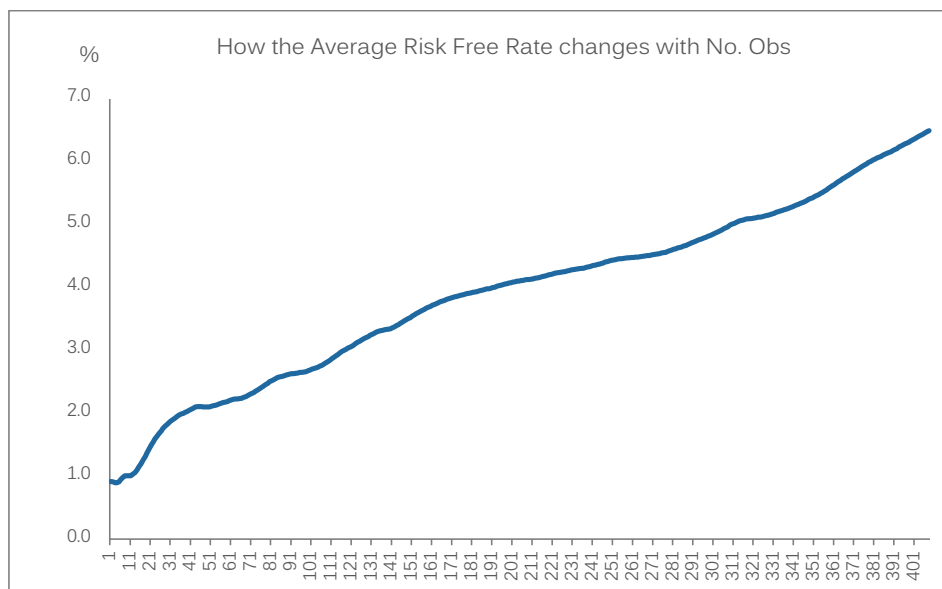


Alternative sources of a risk free rate

Two possible alternative risk free rates might be use of an average rate or the neutral rate of interest. Commentary on each is provided in turn.

If a valuer was of the view that the current yield on AGB's was not a reflection of a long-term rate, then an option may be to use an **average rate**. The valuer would have to be of the view that the market rate is not a true reflection of a competitive rate and their view is a better view. This may be inconsistent with some Accounting Standards e.g. Impairment, which call for use of a market rate.

A challenge when estimating an average rate, is to choose an averaging period. The next chart shows an average rate calculated by starting with the June 30 2020 yield on 10 year AGBs then adding the yield for the prior month and recalculating the average, and so on. The horizontal axis shows the number of months in each average point on the curve.



The average rate is almost continually increasing thereby making it challenging to find a representative average. This is not surprising given the consistent fall in rates from the high point in the 1980's.

By inspection of the long term graph of the yield on AGBs (second graph presented earlier), both the starting point and the period used to assess an average will impact the result. A starting point from 1900 will provide a more stable average until the late 1970's. The average rate over the entire period from 1900 is 5.7%, substantially above the current market rates, including those in the long end of the term structure. An additional challenge with an average rate is to identify expected inflation in the average to use in the cash flow forecasts thereby adhering to the consistency principle (inflation indexed AGBs were introduced in July 1985, so no market based real interest rate data is available prior to that date).

A further challenge with using a average risk free rate is when, it at all, to move away from it to a market rate. If the current market rate is viewed as being too low as a long term rate, then logically there should also be market rates that are viewed as too high. If a non-market rate is perceived to be a better forecast than the market rate, then logic suggests the non-market rate should be used consistently.

It may seem odd at first to be using a long term average as input to estimating a forward looking MRP but not doing so for the risk free rate. The difference is that we do have market rates for forward looking risk free bonds but not for the MRP. If a valuer regards the market rate not as a suitable forward rate, then there is a need to ensure the numerator in the DCF relationship reflects expected inflation in the average rate, and the growth rate use for cash flow forecasts is largely consistent with that implied by the average rate (particularly in the continuing (terminal) value calculation).

An alternative source of a risk free rate might be to commence with **a neutral rate of interest (also called a natural rate of interest)**. The RBA describe this as

"the real policy rate required to bring about full employment and stable inflation over the medium term."⁶ And ""The term 'neutral interest rate' sometimes refers to the real short-term interest rate that will bring about full employment at any point in time, given the presence of these transitory business cycle influences. On average, over a normal business cycle, this interest rate will coincide with the medium-run concept . . . , but will exhibit greater volatility because it will also adjust in response to transitory economic developments."

A nominal risk free rate can be established by adding a view of expected inflation to this rate.

Unfortunately, this is not an observable market rate and required a model(s) to derive it. The RBA paper notes that *"we must infer its value from the behaviour of market interest rates and other economic variables"*.

The paper uses two economic models to estimate the rate over time noting that the rate was fairly stable around 3.5% from the early 1990s until 2007. Since then the estimate has declined to around 1% (circa 2017). This is attributed, in the main, to a decline in potential growth and an increase in risk aversion.

While the authors signal that the RBA intends to update and monitor the estimates on a regular basis, these updates do not appear to be made public.

So if a neutral interest rate is used as a proxy for the real risk free rate then the latest RBA estimate appears to be 1%. To this a valuer could add an estimate of inflation which could vary over the forecast period.

⁶ McCririck R. & D. Rees, "The Neutral Interest Rate", RBA Bulletin, September Quarter 2017 p9 Another paper of interest is Valerie Grossman & Enrique Martínez-García & Mark A. Wynne & Ren Zhang, 2019. "Ties That Bind: Estimating the Natural Rate of Interest for Small Open Economies," Globalization Institute Working Papers 359, Federal Reserve Bank of Dallas, revised 31 Mar 2019

As a further point, If a valuer adjusts the real rate by adding a different view of expected inflation (to that in the market rate), there is no need to adjust the MRP as it is a real rate and can be added to the nominal risk free rate that includes inflation.⁷

Adjusting the Historical MRP

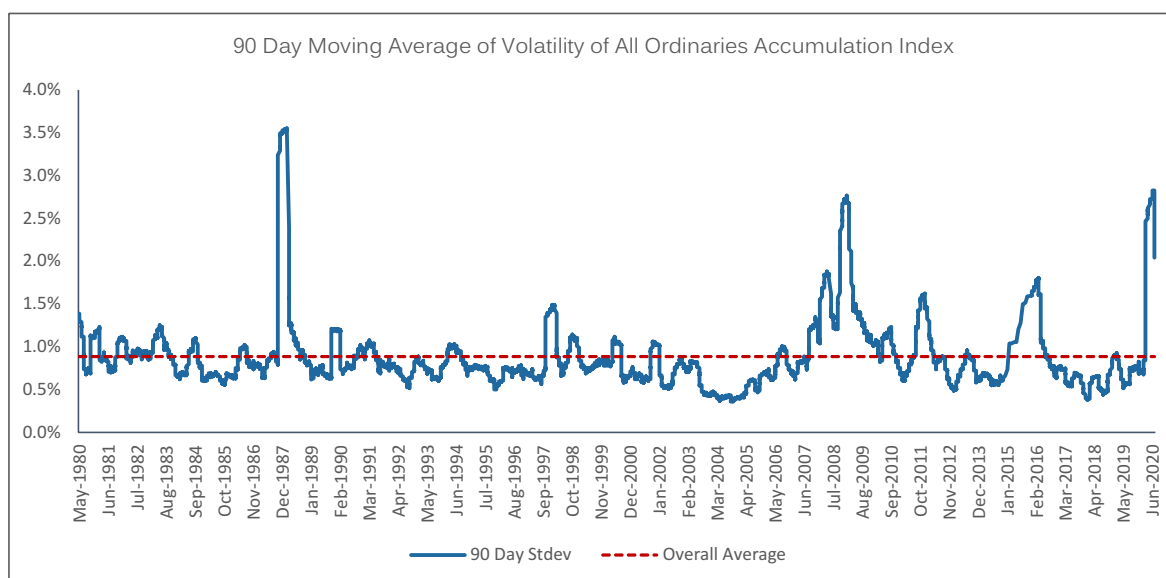
The MRP is the required return for bearing investment risk. It can be viewed as reflecting:

- a view of the level of risk in the market for assets, and
- investors appetite for risk (degree of risk aversion).

If either, or both, of these vary over time, then it is likely that the forward view of the current MRP will change. In contrast, the historical average MRP, including a return on Franking Tax Credits, has been relatively stable at least since 1990 despite some periods of unstable volatility and declining yields of the risk free rate. The range has been from 6.5% to 7.0%.⁸ The most recent update of the historical MRP follows this commentary.

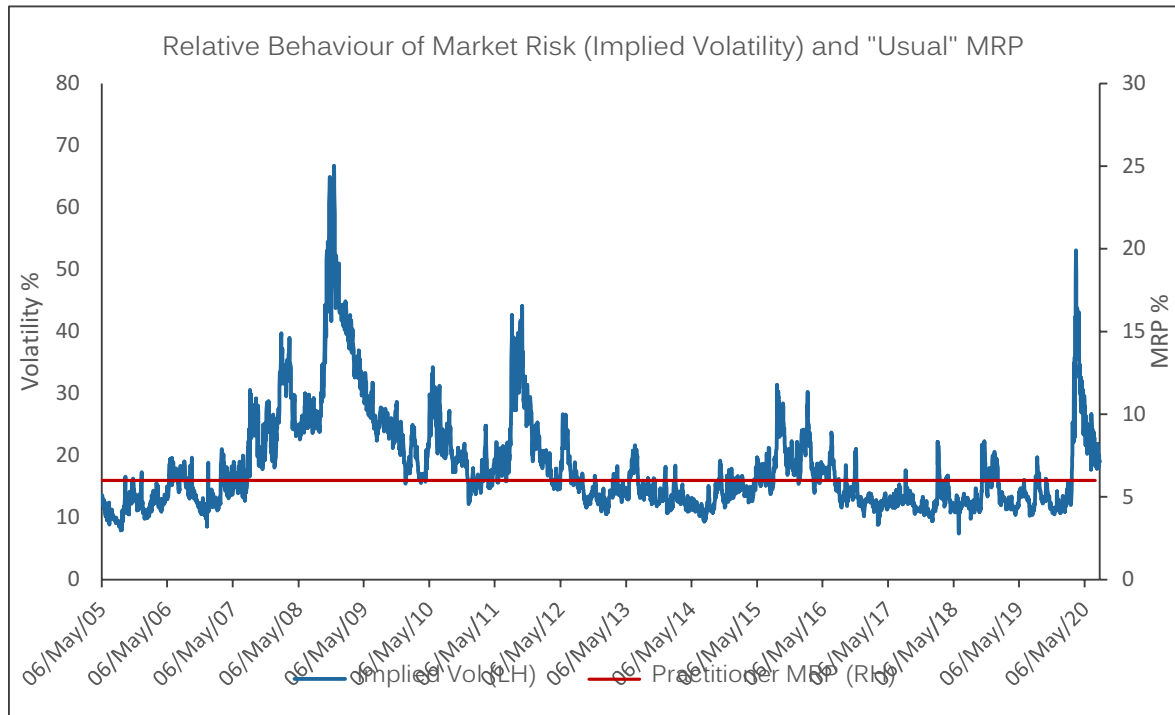
Level of Risk

Volatility in the level of risk is evident from both an historical view and a forward view. As is apparent from the next two charts. The first shows the 90 day moving average of the standard deviation of market returns (historical view), while the second shows the implied volatility derived from options on the stock market index (forward view). They are remarkable similar over a common period.



⁷ If the valuer doesn't accept the yield on AGBs as being a market rate, then there may be a challenge in using an historical MRP which uses market rates for its estimation. Further, another challenging issue is defining the relationship between the risk free rate and the expected return on the market or, put another way, does the expected MRP change with changes in the risk free rate? It may not. If the MRP is a function of the level of risk and attitudes to risk, then the risk free rate may not impact the MRP. A different view on inflation and growth implicit in the risk free rate should also impact the view of the expected market return – so both may change without impacting the difference (MRP).

⁸ The relative stability is a function of the weight of years, one year with a large positive or negative MRP outcome will only have a small impact on the average.



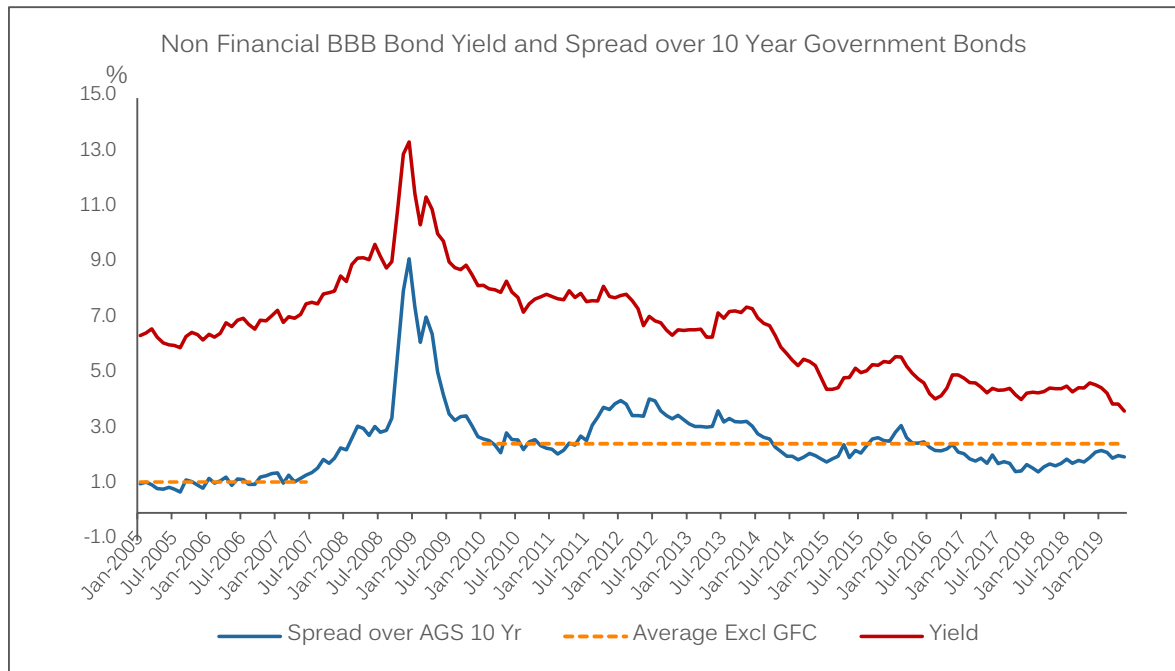
Neither chart show unusually high volatility at the end of December 2019 suggesting little need to adjust the MRP upwards on these grounds at that time.⁹ However the COVID episode has changes that. Clearly the June 2010 time period, the GFC and a period in 2015 could call for a higher MRP while a lower MRP would be reasonable in in less volatile periods like those pre GFC.

Attitude to Risk

There is evidence that investors have become more risk averse since the GFC, resulting a higher required MRP. The chart below shows the required return on BBB rated bonds pre and post the GFC. It is evident that the premium over the AGB yield has increased. Since corporate bonds are also financial assets with systematic risk then it can be expected that equity premium would move (at a minimum) in keeping with the bond premium. The apparent increase in bond yields is circa 140 basis points. On this basis the current view of a forward MRP might be circa 140 bp above the historical average i.e. circa $6.8\% + 1.4\% = 8.2\%$. An average of the two provides 7.5%.¹⁰

⁹ Bishop S, M Fitzsimmons & R Officer, (2011) "Adjusting the Market Risk Premium to Reflect the Global Financial Crisis", JASSA, Issue 1, pp 8 -14 demonstrate a method for making an adjustment if risk levels move away from the average.

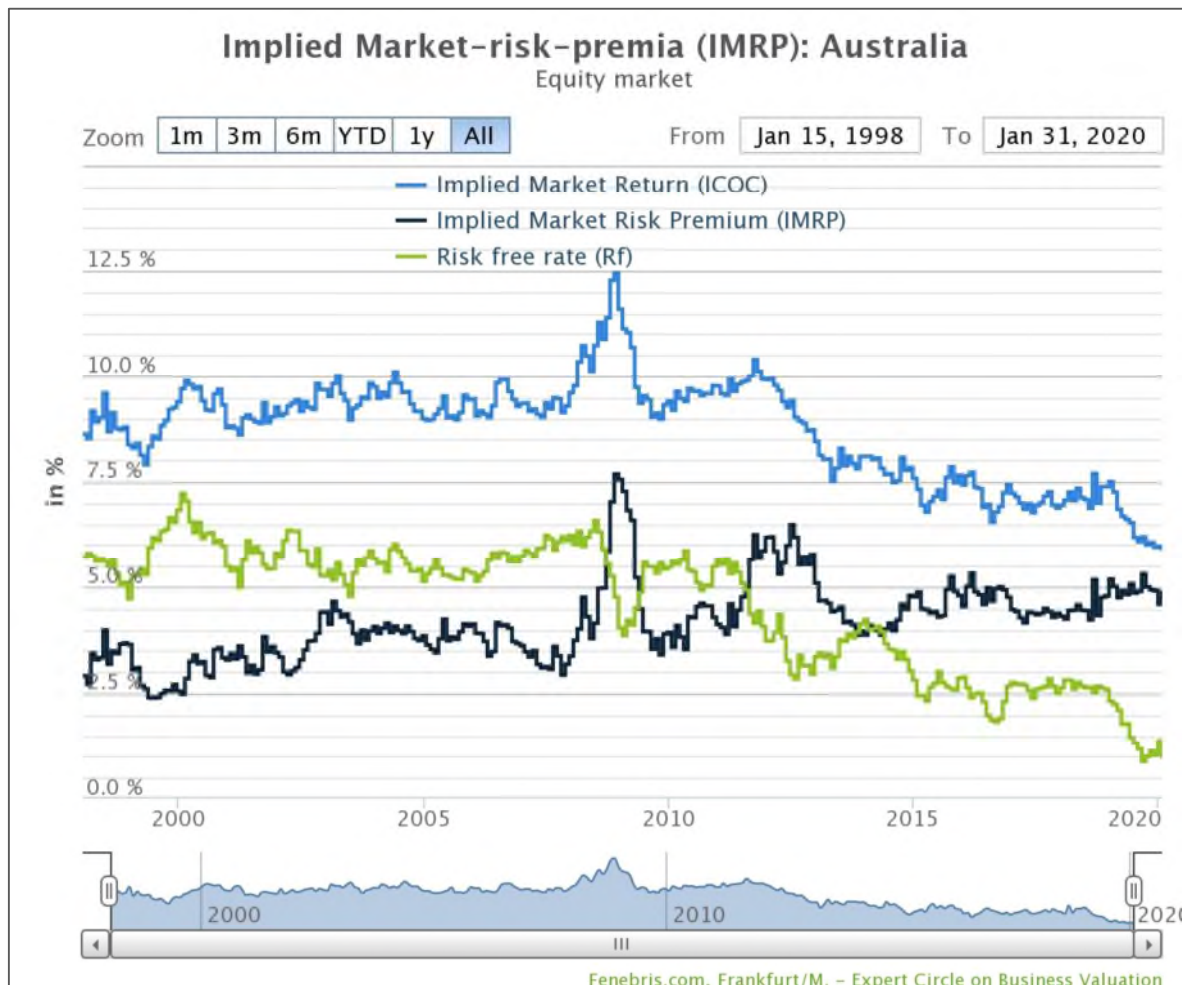
¹⁰ IPART form a view of an appropriate MRP using a similar logic of an average of historical and current. Their estimate of the current rate is based on several forward looking driver models. See IPART, (2013) "Review of WACC Methodology: Research – Final Report", December and also frequent updates available on its website.



Implied MRP as a forward view

Some researchers use a version of the dividend discount model to estimate a forward view of the market return then deduct the current risk free rate to estimate a forward MRP. An example of such estimates over time is provided in the chart below.¹¹ The estimated forward MRP as at December 2019 was 4.6% - much lower than the historical average but trending upwards as is apparent in the graph. It is also apparent that the post GFC estimates are averaging above the pre GFC estimates. Since the range is wide, from 2.5% to 7.6%. The lower end is challenging to accept for equities, but the trends make sense and appear to reflect substantive changes in volatility of the market.

¹¹ See <http://www.market-risk-premia.com/au.html>



Final Thoughts

The historical average MRP is a useful input to forming a view about the current forward view. The reason for relying on the historical MRP is that the expectations of investors will be framed from their experiences, which are of course historical. Therefore, the average historical MRP could be expected to have had the greatest influence on investors' expectations about the future. Hence there is usually reliance on some average of historical MRPs in order to settle on an estimate of the investor's expected or required MRP.

However, there is no reason for the estimate to be stable. In periods of stability (low volatility) the forward view will be below this historical average and above it in periods of high volatility.

At the end of 2019, volatility was not far different from historical volatility but there is evidence at that time of investors requiring a higher premium per unit of risk i.e. that the MRP post GFC is higher than pre GFC. So somewhere in the range 6 - 7% appears reasonable, with a preference for 7% as a long term view.

The forward estimate of the forward looking market risk premium used by EMCS is usually 7%. However, with the current VIX above a long term average due to the Covid pandemic, a forward estimate of 8% is more appropriate. This assumes a recovery to more normal

conditions in 3 years and is computed as an equivalent rate to apply for 5 years after which the more stable rate of 7% is considered appropriate.

This is informed by:

- research and analysis of the historical equity risk premium conducted by Bishop & Officer, Bishop, Carlton and Tan¹² and by Bishop (**the latter published in Duff & Phelps “Valuation Handbook: International Industry Cost of Capital”**);
- recent behaviour of debt risk premiums;
- the behaviour of implied volatility of options on the ASX 200 index; and
- research conducted and published by IPART into forward looking models of the MRP.

Feel free to contact me if you wish to discuss this analysis.

¹² Bishop, Carlton & Tan, “Market Risk Premium: Australian Evidence”, Research paper for the CAANZ Business Valuation Specialists Conference, 13-14 August, 2018