Forward Estimate of the Market Risk Premium: Update

A report prepared for the Victorian gas transmission and distribution businesses: APA Group, Envestra, Multinet Gas and SP AusNet

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Brief

The Australian Energy Regulator has released its final decision for Envestra Ltd, dated June 2011, and a distribution determination for the five year period of 1 July 2011 to 30 June 2016-17[1]. In the final decision, the AER has explained its view that[2]:

- Whereas the appropriate estimate of the MRP was 6.5% in mid-2009, commensurate with conditions in financial markets at that time;
- Conditions in financial markets have since improved so that the long-run average estimate of 6% is now appropriate.

Capital Research has been engaged by: APA Group, Envestra, Multinet and SP AusNet *(the Parties*) to prepare an update of our report on forward estimates of the Market Risk Premium (MRP).

I have been asked by *the Parties* to explicitly conduct my own analysis for the estimates of the MRP embodied in the forecasts of analysts in the Australian capital markets. I have been asked to comment on why I consider this approach the best one for estimating forward views of the MRP. I have also been asked to comment on the possible variations for calculating these estimates and to describe why I chose the method used in this Report.

This update of our previous report has no substantive changes in estimates[3]. It is purely an elaboration and clarification of some issues. Extra estimates have been included to obtain consistency between this and other reports. The same estimation process has been used and no new data has been added.

I have been provided with a copy of "Expert witnesses in proceedings in the Federal Court of Australia" and this report has been prepared in accordance with those guidelines[4]. As required by the guidelines I have made all the inquiries that I believe are desirable and appropriate, and no matters of significance that I regard as relevant have, to my knowledge, been withheld.

[1] AER, Final decision, Envestra Ltd, Access arrangement proposal for the SA gas network 1 July 2011 - 30 June 2016, Australian Energy Regulator, June 2011.

[2] Ibid., pages 59 and 184-202.

[3] Forward Estimate of the Market Risk Premium: Update, A response to the draft distribution determination by the AER for Aurora Energy Pty Ltd, prepared by Capital Research Pty Ltd, February 2012.

[4] Federal Court of Australia, Practice Note CM 7, Expert Witnesses in Proceedings in the Federal Court of Australia, August 2011.

My qualifications and experience in relation to this opinion are as set out in the attached CV[5] which sets out details of my formal qualifications and experience. In relation to the current matter, I note that I have conducted research, lectured, presented public seminars and appeared in court cases in matters involving the cost of capital and imputation tax over a period of approximately 25 years. I have been retained by major companies and the Australian Tax Office in relation to imputation issues. I am involved in ongoing research into cost of capital and valuation issues including on the valuation of the franking credits attached to franked dividends paid by companies resident in Australia. In addition, I am the Head of Investments for an international equity fund (Intrinsic Value Investments, approximately AUD$200 million) that explicitly uses estimates of MRPs for making market allocations around the developed world.

Documents

For my own analysis of these data I have relied extensively on S&P/ASX data acquired via the IRESS data service and the aggregated forecasts of analysts available on a Factset data service. Both of these are commercial data services.

I have been supplied with a report prepared by NERA Economic Consulting: Prevailing Conditions and the Market Risk Premium: A report for APA Group, Envestra, Multinet & SP AusNet, March 2012.

I have also been supplied with a report prepared by CEG: Internal consistency of risk free rate and MRP in the CAPM, a report for Envestra, SP AusNet, Multinet and APA, March 2012.

[5] A copy of my CV forms Appendix 1 to this report.

Statement of Conclusions

- Under current market conditions, historical values of the MRP do not provide the best proxy of the return that investors require for investing in the market portfolio.

- The direct method of estimating the forward MRP is via the dividend and growth assumptions of equity analysts.

- These people make explicit assumptions about the future MRP which can be extracted as an estimate by using a dividend yield model.

- In our report of February 2012, we calculated an average of the *ex ante* dividend discount model results that were obtained in relation to the period from October 2009 to January 2012[6]. This time interval was described as being the post-GFC period. We obtained the result that a typical forward-looking estimate of the MRP, to be applied over a regulatory period from 2012-13 to 2016-17, would lie in the range of 6.6% to 7.6%. The MRP estimate of 6.6% corresponded to a value for net theta of 0.0. Net theta is the product of the franking proportion, and the value of distributed imputation credits. The MRP estimate of 7.6% corresponded to a net theta value of 1.0. By presenting the results as an interval from 6.6% to 7.6%, an allowance was made for a wide band of values of net theta.

- An important point to note, however, is that the MRP estimates were measured relative to a nominal risk-free rate of 5.08% (for details, see Table 6 below). The nominal risk-free rate of 5.08% is an average of the end of month values from October 2009 to January 2012. An implicit assumption underpinning the assessment, therefore, was that a risk-free rate of about 5.08% would prevail over the 2012-13 to 2016-17 regulatory period for Aurora Energy. In practice, however, there is limited evidence available to support that assumption.

- As at the date of writing this report (22nd March 2012), the yields on 10-year Commonwealth Government Securities (CGS) were well below 5.08%. As at 31st December 2011, the yields on 10 year nominal CGS were close to 3.73% (3.76%, annualised). With such diminished values of the risk-free rate, estimates of the MRP from 6.6% to 7.6% are not currently applicable. Accordingly, at the end of December 2011, the dividend discount model suggests that the best forward-looking estimate of the MRP is 9.6%, assuming a value for net theta of 0.2625. The corresponding market return on equity is 13.3%.

- We understand that the next access arrangement period for the Victorian gas distribution and transmission businesses will commence on 1st January 2013 and will continue until 31st December 2017. If the MRP for the 2013 to 2017 regulatory period had been set at the end of December 2011, and locked in for the full five-year period (commencing one-year hence), then the most appropriate value to be chosen for the MRP would have been 9.56% (based on net theta of 0.2625). This MRP estimate would have been predicated on a risk-free rate of 3.73%.

[6] Forward Estimate of the Market Risk Premium: Update, A response to the draft distribution determination by the AER for Aurora Energy Pty Ltd, February 2012.

Comments about the method applied

This Report uses the dividend yield model with growth applied to the forecasts of total Australian dividends in order to estimate the forward MRP being used by those analysts.

- Some of the observations and conclusions are:
  - Market-wide indices are necessary in order to include as many different asset types as possible because the MRP is a price for risk generally, not just a price for equity risk. Some of the indices available in Australia are too narrowly-based in order to get a reliable estimate for the MRP.
  - The direct approach is an alternative to the indirect approaches of estimating implied or future volatility and then having to estimate or assume the correlation between these total risk estimates and the MRP. There is no reason to necessarily assume that the correlation is steady. There is evidence that it is declining over time in the USA but I can find no such evidence in the Australian market. A reasonable starting assumption is that it is stable in Australia and that the indirect approach of implied volatility ought to be viable in with Australian data.
  - When comparing the direct approaches, analysts' forecast of dividend yields and growth are more flexible and explicit than the equivalent variables in the earnings yield model.
  - The earnings yield approach or its equivalent of the price earnings model is most impractical for estimating the impact of franking credits separate from the MRP.
  - The forward dividend estimates over periods of quite different tax regimes can easily accommodate the changes in franking credits: The period 2001-2004 encompasses the "old" imputation tax system and the new "simplified" imputation tax system (STS) which was introduced on 1st July 2002 and had extensive transitional arrangements.
  - The future payout ratios that are used by analysts, as implied by their forecasts of dividends and earnings, differ significantly from the actual realised payout ratios. However, this apparent bias disappears when comparing their implied payout ratios of corporate cash flow after tax to the actual realised payout ratio of corporate cash flow after tax. The implication is that analysts are making adjustments to the accounting earnings of companies before making their forecast estimates. This also makes the earnings yield model unreliable for the purposes of estimating the MRP.

1. Introduction

The Market Risk Premium (MRP) is the extra return investors require for holding risky assets. It plays a central role in valuation as it is a major input into the cost of capital. The required return by investors and the cost of capital are two sides of the same coin – they are the same concept viewed from the perspectives of the suppliers of capital (investors) and the users of capital (typically companies).

Instead of carrying forward the historical MRPs, another approach is to find situations where the ex-ante MRP is priced in the market and then attempt to extract out implied MRPs. The latter approach is more appropriate in the current context. An obvious case is the current price of shares where the price is presumably set by rational investors who have used their expected MRP in deciding the current value. If we knew the model(s) they used for conducting their valuations, or at least had a model that was consistent with their model and had consistent input data, then we could extract the implied MRP from the market. The most common way this is done is to use a simple dividend discount model (DDM) applied to the whole market. As long as we use sensible long term assumptions on market-wide growth, then we can derive a simple model that does indeed give an estimator for the ex-ante MRP.

One model that is in common use by analysts is the Price –Earnings Model (PE model) in which future earnings are multiplied by a factor (the Price Earnings Ratio or PER) in order to derive a capital value for the present. I will demonstrate below that while it superficially looks similar to the DDM it is not practical to use it to estimate the MRP.

We could also approach this problem by looking at individual shares and solving for the implied MRP in the current share price. This involves estimations for various steps such as estimates of company-specific future income and individual stock betas. These betas are notoriously volatile in their estimates. The result from this approach is usually a list of stock-specific MRP estimates that vary widely so they are typically averaged in order to get an overall estimate.

However, there is no reason to believe other than analysts use a consistent estimate of MRP across all their individual stock valuations. So instead of valuing individual stocks it is easier to value the whole market and deduce the implied MRP. This has the advantage of being much more stable in the future cash estimates and does not require estimating a beta – the whole market beta has the value $\beta=1$.

In addition, databases are available commercially[7] that aggregate analysts' estimates up to whole of market estimates. Hence the task is much easier than it first appears.

[7] Two with which I am familiar in my investment activities are Datastream Global Aggregates and Factset Global.

The MRP is not an equity-specific variable. It is meant to capture peoples' estimate for the price of risk. We assume that people have the same attitude to the price of risk no matter what assets they are considering for investments. The main reason we use the broad equity market as our source of the MRP is that most assets are listed in some form or other on the equity markets and these markets are generally very liquid in that they are highly traded.

A broad market index such as the S&P/ASX 300 index in Australia or the S&P 500 index in the USA captures the valuation of a wide range of listed assets. These indices capture the top 300 listed stocks by market capitalisation in Australia and the top 500 listed stocks in the USA. We can reasonably assume that these are of sufficient depth that they are a source for estimating the underlying MRP.

It does however behove analysts for the MRP to use the broadest possible practical index because the underlying assumption is that the index represents a broad range of listed assets. Taking a narrow-based index such as the 20 Leaders index in Australia would give an estimate based mainly on Australian banks and mining companies as these dominate the top 20 stocks in Australia. As the aim is to use a broad-based index in order to represent a broad range of assets such a narrow selection as the 20 Leaders would run counter to that aim.

Other approaches to constructing forward estimates of the MRP are possible. Two with which I am familiar involve estimating the forward total risk (usually via implied volatility of options) and the forward estimate of the dividend yield. These two variables should be correlated with the expected MRP – if higher returns are expected from higher pricing of risk then prices relative to income should be lower so both dividend yields should be higher and price-earnings ratios should be lower.

The aforementioned methods both provide indirect estimates of the MRP because they also rely on the correlation between the input variable (either implied volatility or dividend yield) and the MRP. The additional assumption is that these correlations should be stable. But there is evidence against this: corporate earnings could retain their volatility but become less correlated, so reducing systematic risk among companies and it is systematic or correlated risk which drives portfolio volatility. A market index is just a very large paper portfolio. There is some evidence for this in USA statistics[8]. This is attributed to a structural move in the USA towards service industries that possibly have sales inherently less cross-correlated than industrial company sales. However, I can find no evidence for any such decline of correlation in the Australian market. It would therefore be an appropriate starting

[8] Campbell J.Y., M. Lettau, B.G. Malkiel, and Y. Xu, (2001). *Have Individual Stocks Become More Volatile? An Empirical Exploration of Idiosyncratic Risk*, The Journal of Finance, Volume LVI. The authors found, using US data, that, from 1962 to 1997, the idiosyncratic risk for stocks (company specific stock risk) increased but there was no similar trend in industry or market risk. Rather, idiosyncratic risk became an increasing proportion of total stock risk and correlations between the returns of companies declined.

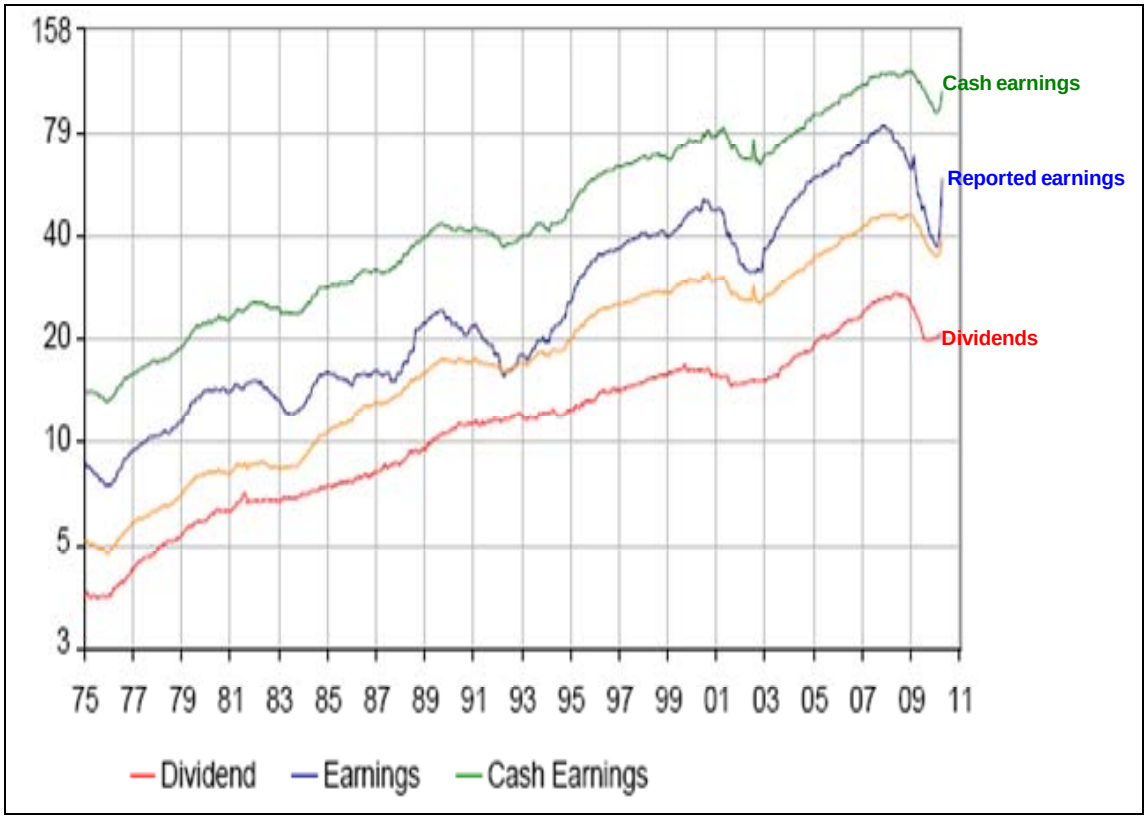
assumption that the correlation in the Australian market is stable and hence that movements in the implied volatility ought to be correlated with movements in the implied MRP.

Owing to the extra problems associated with the indirect approach to estimating the MRP, I maintain the view that a very good approach is the direct one – to investigate the MRP inside the valuations by analysts who are the immediate source of the MRP inputs into a broad-based equity valuation model.

2. Data

The data used herein is aggregate shareholder cash flow after tax, earnings after tax and dividends. Of these, earnings are the most volatile data and the one to be treated with caution. The following is a plot of World corporate cash flow, earnings and dividends ("World" = 22 developed markets in the MSCI World Index over this period – it has since expanded to include more markets). These are actual data and not analysts forecasts. This data is indexed to a base in 1975 and not meant to represent dollar values of aggregate cash flows at any point in time.

Figure 1: World Cash, Earnings and Dividends – Index of actual in USD[9]



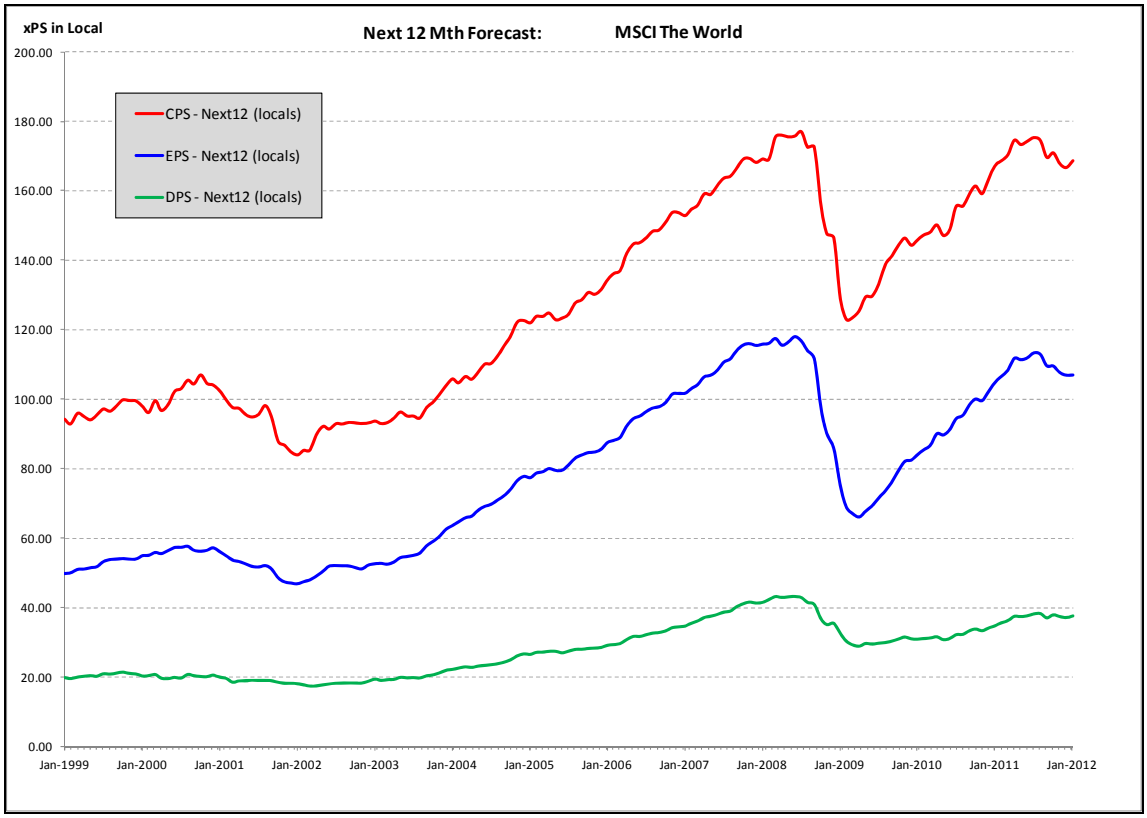
We see immediately that reported earnings are much more volatile than cash earnings. As downturns occur (1982, 1992, 2001, 2008) companies write off values that depress reported earnings and then they write them up again when coming out of the downturn. This makes reported earnings much more volatile than cash earnings. The gap between cash earnings and dividends paid is the cash retained by companies for their internal use. This payout ratio of dividends to cash earnings is quite stable

[9] Ignore the orange line. This is the cash flow series used by Value-Trac from where I sourced the data as a graphic. Valu-Trac advises our fund, Intrinsic Value Investments.

whereas the typical estimate of payout ratio (the ratio of dividends to reported earnings) is quite unstable almost entirely due to reported earnings being quite volatile. The complement of the earnings payout ratio is the retained earnings ratio – the ratio of earnings not paid out as dividends to reported earnings. This retained earnings ratio is also quite volatile. Of course, over time the average cash retained has to be highly correlated with the average earnings retained.

Turning to analysts' forecast data, we see that they do not demonstrate the same pattern in their forecasts of earnings being much more volatile than their estimates of cash flow or dividends. This is important as they usually report estimates for long term growth in only earnings. By long term they typically mean 3-5 years which in the context of volatile earnings data is a relatively short period, itself leading to volatility in the estimates of long term growth. It appears reasonable then to accept their estimates of growth in earnings as a good proxy for growth in cash flow and growth in dividends.

Figure 2: Analysts' forecasts for World for next 12 months

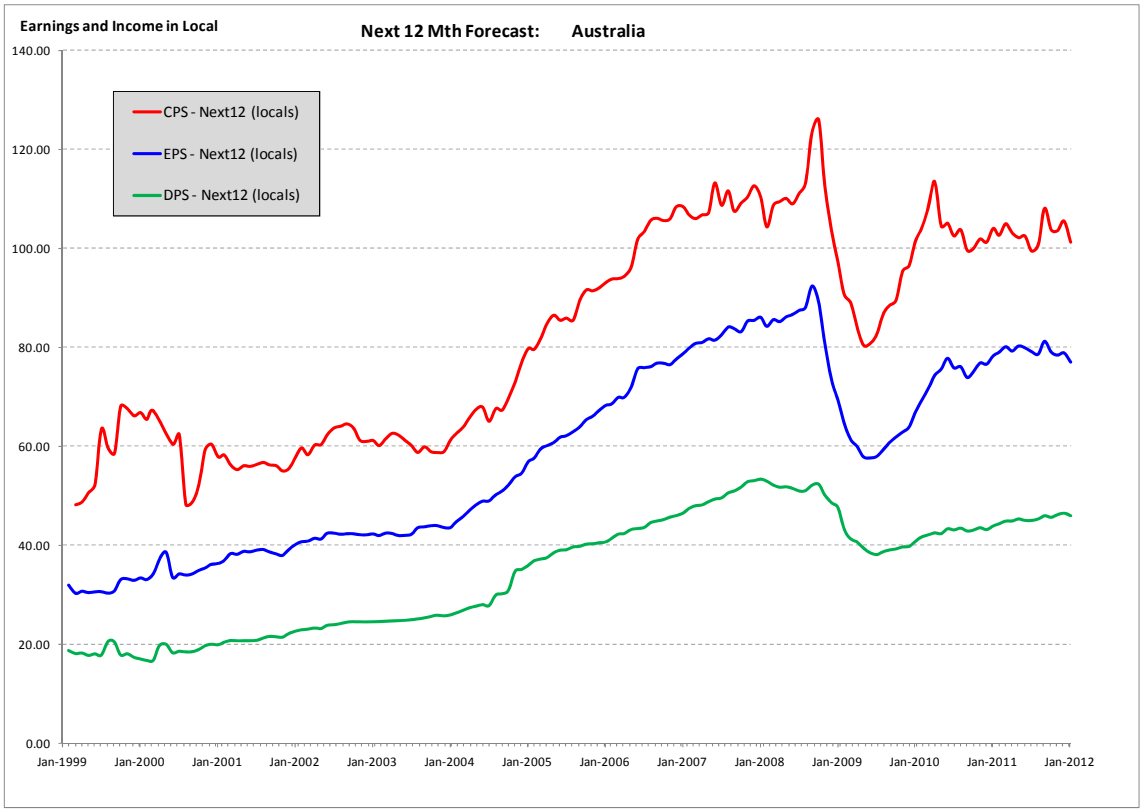


In the above plot, "CPS" means cash flow per share, "EPS" means earnings per share and "DPS" means dividends per share. All forecasts for all countries are expressed in USD and aggregated to a

world amount. For example, in February 1999 the aggregate cash flow per share was US$92.90, the aggregate earnings per share were US$50.13 and the aggregate dividend per share was US$19.57.

Turning to the Australian data, the following plot is the aggregate analysts' *forecasts* for the next 12 months for cash flow, earnings and dividends.

Figure 3: Analysts' forecasts for Australia for next 12 months



We consistently use end of month data: we use analysts' forecast as they exist at the end of a month, we use market share prices at the end of a month and Commonwealth Government 10 year bond yields at the end of a month.

3. Model for Implied MRP

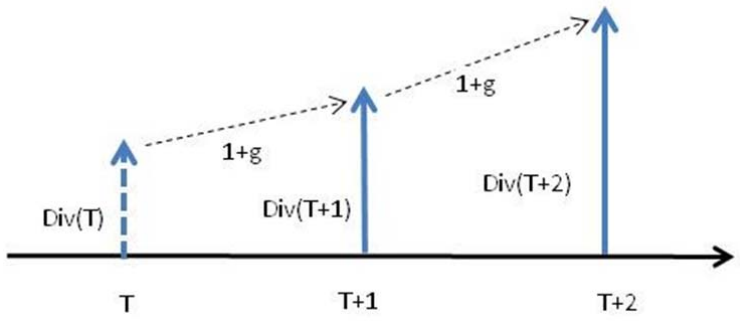
A very simple constant growth dividend discount model is all we need to establish the implied MRP, which we denote by MRP(I). For such a model applied to an individual stock with a risk premium of RP we have

$$Value_t = \frac{Div_{t+1}}{Rfree + RP - g}.$$

In this model, g is the *expected* growth (assumed constant) in the *expected* dividend per share. It is *not* the natural growth in the business per se. That would be the growth in the total earnings of the business, maybe driven by population growth and productivity gains and so correlated with GDP per capita. If a company paid out all of its earnings then there would be no growth in dividends per share. Instead, there would be growth in shares on issue as the company issued more equity in order to acquire capital. This is exactly what would happen if the company offered a dividend reinvestment plan (DRP) and all shareholders elected to accept all dividends via such DRPs.

The following sketch is the logical cash flow for the dividend valuation model. Note that the value at time T+1 is just (1+g) times the value at time T because the future dividends at time T+1 are just (1+g) times the future dividends at time T.

Figure 4: Schematic of valuation cash flows



To back out the implied risk premium (RP) arising from the current market prices, we make the model value meet the market price, i.e. we set $Value_t = P_t$.

The valuation formula used here is one for the ex-dividend cash flow – that is, the value in the above formula is the value of all *future* dividends, not including the current dividend. This means that the return on equity for a period T to T+1 is then given by the growth in price, g, plus the dividend yield,

$$\begin{aligned}\text{Return}_T &= \frac{P_{T+1} + Div_{T+1} - P_T}{P_T} \\ &= \frac{(1+g)P_T + Div_{T+1} - P_T}{P_T} \\ &= g + DivYld_T\end{aligned}$$

In other words, the expected return on equity is the sum of the expected dividend yield and expected capital growth (which in a dividend discount model is the same as expected dividend growth).

$$\begin{aligned}P_t &= \frac{Div_{t+1}}{Rfree + RP - g} \\ 1 &= \frac{Div_{t+1} \big/ P_t}{Rfree + RP - g} \\ 1 &= \frac{DivYield_{t+1}}{Rfree + RP - g}\end{aligned}$$

Solving for the implied risk premium we get

$$RP(I) = DivYield_{t+1} + g - Rfree$$

which is just a re-arrangement of the statement that:

$$\text{Return on Equity} = DivYield_{t+1} + g = RP(I) + Rfree.$$

In equilibrium, expected growth in earnings per share and growth in dividends per share must match the expected return on equity from the expected retained earnings (see the comments above about growth and the payout of earnings). For a constant growth model, everything must always be in equilibrium. Hence we must have growth matching the return on equity for the retained earnings,

$$\text{g} = \text{Re}(\text{retained}\%) = (\text{Rfree} + \text{RP})(\text{retained}\%)$$

where Re is the return on equity (which, in turn, comprises the sum of the risk free rate and the risk premium) and retained% is the proportion of earnings not paid out to shareholders.

When applied to the whole market, the risk premium, RP, becomes the market risk premium (MRP).

Combining the equilibrium growth formula with the RP formula and applying it to the whole market, we have

$$MRP = DivYield_{t+1} + (Rfree + MRP) * (retained\%) - Rfree$$

$$MRP(1 - retained\%) = DivYield_{t+1} + Rfree(retained\% - 1)$$

$$MRP = \frac{DivYield_{t+1}}{(1 - retained\%)} - Rfree$$

$$MRP = EarnYield_{t+1} - Rfree$$

In summary, the implied market risk premium is the whole of market ex-ante earnings yield minus the prevailing market risk free rate.

So there are two models that appear equivalent:

1. The dividend discount model direct for expected dividend yields:

$$MRP(I) = DivYield_{t+1} + g - Rfree.$$

2. The expected earnings yield model

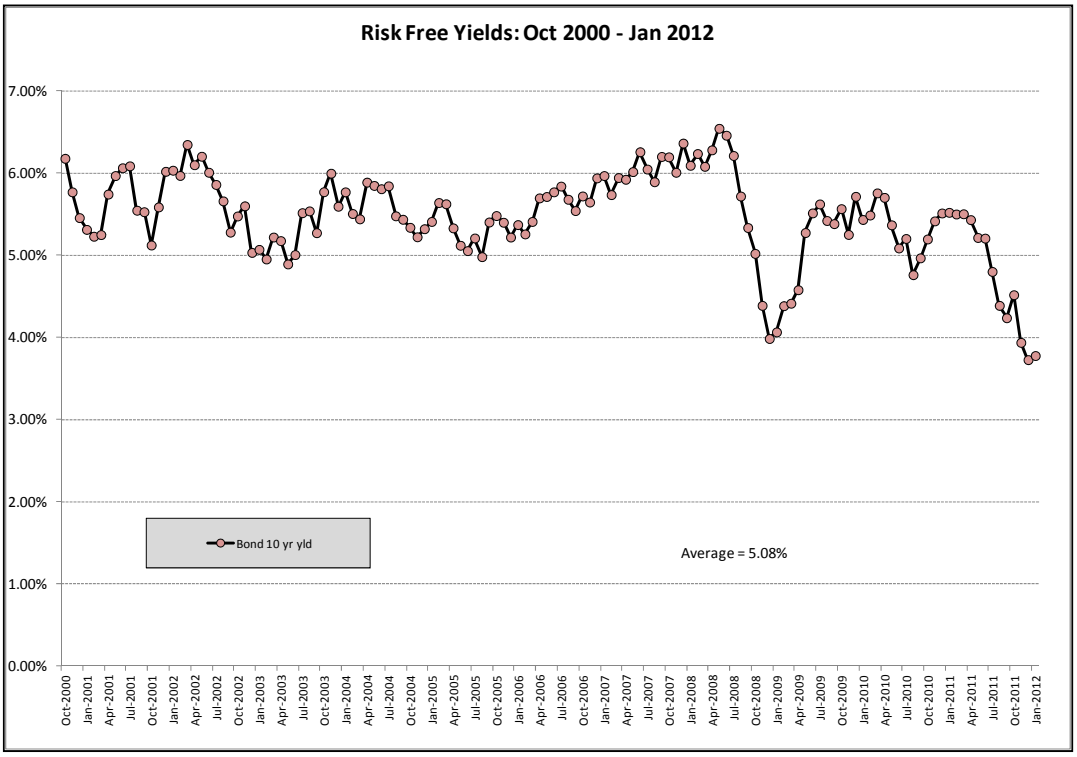
$$MRP(I) = EarnYield_{t+1} - Rfree$$

In both cases, all data are future or expected values applied to the whole market.

The risk free rate is the rate expected in the future. These expectations should be consistent with the expectations framework of the dividend and earnings estimates. The best estimate for that expected risk free rate is the current long term Commonwealth Government bond rate i.e. the opening Commonwealth Government bond rate at the beginning of the period. The following plot is the recent history of the yields on 10-year Commonwealth Government bonds.

For each month, I estimate the implied market risk premium by using the current estimate of the implied dividend yield, the current yield on 10-year government bonds and a stable estimate of the long term growth rate. This results in an estimate of the implied risk premium for each month. This estimation process allows me to examine changes over months in the risk premium. These monthly estimates can, in turn, be averaged to get long term estimates. However, the trade-off as always with averaging is that whilst we obtain a more stable estimate by smoothing any underlying volatility in the monthly estimates, we might also average away any trends in the risk premium over time.

Figure 5: Government bond yields



The simple dividend discount model is one of constant compound growth and so the expected growth rate in the estimates should be a compound average growth rate, (CAGR), and not a simple arithmetic average growth rate. Long term growth estimates are provided in the forecasts of analysts for earnings only. The estimates by analysts for these various growth rates are as follows:

Table 1: Forecasts and Actual EPS, DPS for Australia; Feb 1999 to Jan 2012[10]

	EPS			DPS	
	LTG	Arithmetic	CAGR	Arithmetic	CAGR
Analysts' Forecasts %pa	9.04%	9.00%	7.00%	8.75%	7.16%
Actual history %pa		14.52%	11.43%	10.34%	9.60%

In this table, the LTG estimate is that forecast provided by the analysts. The other averages are my calculations of their time series data for forecasts on EPS and DPS. The analysts are seen to be very

[10] Estimates are not produced for CPS as the database does not report these for banking companies, claiming they are not considered reliable with regard to the activity of a banking company. Banks represent about 25% of the capital of the ASX.

consistent with respect to their estimates of long term growth and the average growth in their forecasts for earnings per share. Each month the analysts separately supply forecast of cash flow, earnings, dividends as well as their forecasts for LTG. My calculation of the actual long term average growth in their monthly forecasts (9.00%) is very close to the average of the LTG estimates (9.04%) that they supply each month as a separate item. Both estimates are about 9.0% per annum meaning that there is no bias between their monthly forecasts and the LTG estimates. These earnings forecasts have a CAGR of 7.0% per annum. The dividend forecasts have a CAGR of 7.16% per annum. Analysts are not asked to supply forecasts of long term growth in dividends, just in earnings. I presume that the logic behind this is that for long term forecasts the growth in dividends ought to match the long term growth in earnings otherwise there would need to be a long term trend in payout ratio. We fully expect there to be episodic changes in payout ratios such as happened in the GFC. Boards of companies became very concerned with cash flow for a while and retained more capital than usual. This heightened period of risk is reflected in a large increase in the market risk premium over the period of the GFC and beyond. Indeed, one of the risks in shares manifested over this period was that shareholders would not receive their anticipated dividends.

I use the estimates from the CAGR of earnings as my estimate for growth rates in the implied dividend yield model. This is the only series for which there is corroboration between my calculations of average growth and the reported LTG, and in the long run dividends cannot grow faster than earnings. As with all time series, the more volatile the series then the greater is the difference between arithmetic average and CAGR.

Growth in dividend per share should match the growth in earnings per share in the long run and these data indicate analysts now have forecasts very similar between growth in DPS and EPS. In contrast, the growth in actual EPS and DPS for the world over the whole period 1975 to 2011 (see Figure 1) was about 6-7% per annum (CAGR). The average forecast for world EPS long term growth over the period Feb 1999 to January 2012 was 11.43% per annum. There are no aggregate analysts' forecast data for the whole period 1975 to 2012.

3.1 Growth in the model for Implied MRP

In its final decision for Envestra, the AER took exception to some of the data used in an earlier report by Capital Research[11]. The AER asserted that we had assumed a growth rate in the model. They asserted that the appropriate estimate is GDP growth plus inflation. They also asserted that the appropriate MRP for the next five years is the long term average one which they estimate as 6% pa.

[11] See AER, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016: Final Decision, Australian Energy Regulator, June 2011; and

Hathaway (2011a), Forward Estimates of Market Risk Premium, Neville Hathaway, Capital Research, April 2011.

The common Price-Earnings Ratio (PER) model is a perpetuity model and as such it employs parameters over the theoretical entire future. In the extreme long run, the growth parameter in the model must be the same as GDP plus inflation. This is not true in the immediate and mid-term. It has not been true for approximately the last 40 years. The growth in listed corporate earnings do not simply reflect the economy-wide GDP earnings (when GDP is measured using the income approach.) The whole economy includes many enterprises that would never be listed on the public markets, including many private and government-owned enterprises.

One major purpose of the stock market is to selectively allocate capital to those who make best use of the capital. To assume that the average stock looks like the average economy-wide enterprise is to assert that the capital markets fail, on average, at this selection process.

It could go both ways: entrepreneurial capital may not become listed but instead remain in private hands. If this factor dominated then listed corporate earnings could grow at a rate *less* than GDP. Equally, if marginal growth enterprises such as rural economies dominated the GDP metric but were not listed on the equity market then the equity market earnings could easily grow at a rate faster than GDP.

The GDP data must be an average of all enterprises, listed and unlisted. If one asserts that the listed companies must grow at the same rate as GDP then this is the same as asserting that the unlisted must also grow at this rate. Hence the principal activity of capital markets in allocating capital is a failure. We can see no reason to put forth this dire proposition.

In addition, the national income measure of GDP, as it is identified in the Australian National Accounts[12], incorporates other components which have no relationship with either the earnings of listed corporations or the gross operating surplus of other private and public enterprises. These components include:

- Gross mixed income
- Taxes less subsidies on production and imports; and
- Net primary income from non-residents.

The incorporation of these variables in Gross National Income reduces the likelihood that earnings growth will ever be the same as GDP growth.

A pricing model is only a vehicle for using parameters to arrive at a valuation conclusion by applying parameters that the market considers are appropriate today. No-one would sensibly assume that for

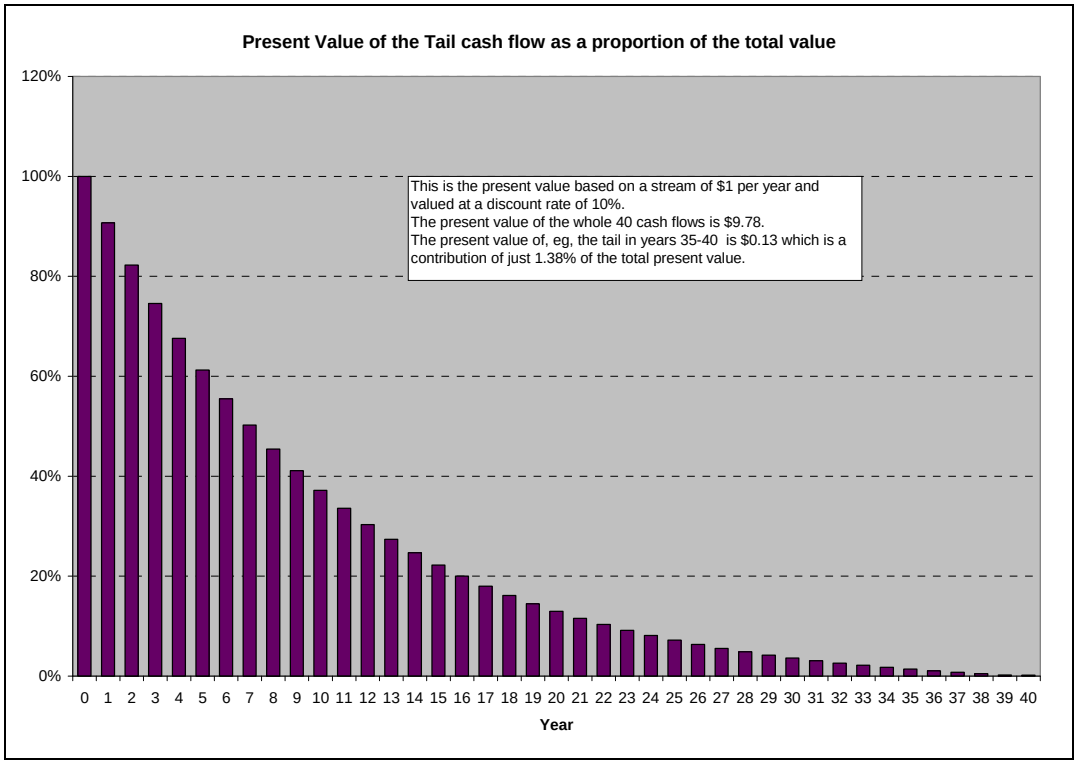
[12] Australian System of National Accounts, Concepts, Sources and Methods: ABS 2000

the next few years the earnings and dividends will grow in all developed markets at the rate of GDP in every country.

Analysts in the market are reasonably practical people so the continued use of such a simple PER model suggests an underlying robustness with its continued use. This is borne out by the following simple logic: What is to be gained in practice by making the model more complicated by using future growth rates that converge (or glide) to the long run GDP rates? The answer is very little. Consider the following logic.

First plot the present value of a 40 year stream of $1 per year and exhibit the contribution of the tail to the total present value. I use a net 10% as a discount rate. The result is in Figure 6. Near-future cash is worth much more than distant cash. Indeed, all the cash flows after year 16 (ie the tail of years 17-40) contribute less than 20% to the total value. The tail consisting of the last year's cash flow contributes just 0.2% to the total value.

Figure 6: Present value of the tail in a cash flow



It is obvious that extending this model to a perpetuity framework with different growth in the tail will add very little in terms of significant value. A perpetuity of $1 per year is valued at $10.00 (calculated as $1.00/10%) so the infinite stream of cash flows starting in year 41 and going on ad infinitum adds

just $0.22 to the total value (the finite 40 year stream is valued at $9.78) which is just 2.2% of the total perpetual value of $10.00. This is economically insignificant though it may be academically correct.

The relevance to the PER model is that after many years, the present value of a perpetual tail valued at, say, 5% growth versus one valued at 7% growth is of only marginal difference. The practical difference is that the perpetual tail will increase in value by about 20% in the future. However, in today's values, each dollar of value in the tail is only worth about 2.2% of the total, and so increasing this by 20% still makes it worth less than 2.5% of the total. This marginal increase must surely be within the bounds of error in a valuation where judgment is needed for estimating the uncertain input parameters in a real-world situation. Hence practitioners do not feel any need at all to use abstract arguments that future cash flow will eventually grow at a rate consistent with GDP because that elaboration in the model is of no practical significance.

The average growth rate in earnings, dividends and cash for the last 37 years for the 22 developed markets (as chosen by Morgan Stanley for their 22 market Morgan Stanley Capital Index) is approximately 6.5% per annum – see Figure 1. This estimate is dominated by the USA, Japan and UK (approximately 70% of the total) and the markets in these countries have been relatively poor performers, particularly for the last 15 years. If some are below average then some must be above average. An Australian nominal growth rate of 7.0% pa is hardly unrealistic when average markets have delivered 6.5% pa.

4. Including Franking Credits

The question of how to include franking credits becomes a question of consistency. The "price" data being used in the analysis is taken from market prices. The design concept of the analysis is to extract out the implied market risk premium from the market data. Hence, the appropriate theta to use in the analysis is that value which market participants collectively use in determining their price level for all equities. The relationship can be expressed as the following in which theta has a value $0 \leq \theta \leq 1$.

$$P_t(\theta) = \frac{Div_{t+1}(\theta)}{Rfree + MRP - g}$$

Theta, θ, is a concept developed for a franked dividend of a single share. Any dividend of an individual share can only be fully franked or unfranked. There is no legal concept of a part-franked dividend. People usually employ the words "part-franked dividend" to describe the net effect of a bundle of some fully franked and some unfranked dividends. Theta is the measure of the market value of the franking credit of a fully franked dividend.

However, when considering the market as one big share, the whole of market franking credit will be a partly franked dividend, made up of the blend of fully and unfranked dividends. The theta value then must be a multiplication of the level of the franking of the aggregate dividend and the market value of a fully franked dividend. This is the *net* theta, which then allows for the extent of franking credits to the generic market dividend.

For example, a dividend cash yield of 4% that is 68% franked and these franking credits are valued at 50 cents in the dollar then values the 4% yield as a grossed up 4.58% cash plus credit (under a 30% company tax rate.) The logic is as follows:

4% cash fully franked	=	4%/(0.70)	=	5.71% grossed up dividend
fully franked credit	=	5.71% - 4%	=	1.71%
68% franked credit	=	(0.68)x1.71%		1.17%
market value of partial credit	=	(0.50)x1.17%	=	0.58%
	=	(0.50)x(0.68)x1.71%	=	0.58%
	=	(0.34)x1.71%	=	0.58%
value of the cash plus credit	=	4% + 0.58%	=	4.58%

The *net* theta (0.34) is then the product of the franking proportion (0.68) and the actual theta per credit of a fully franked dividend (0.50).

From our database of 16,200 dividend events from 1978 to 2010, I calculate that for the period July 2002 to June 2010 [13] the simple average franking level for all dividend events was 65.3% franked. If I calculate this as a market capitalisation weighted average, the result is an average franking level of 68.1%.

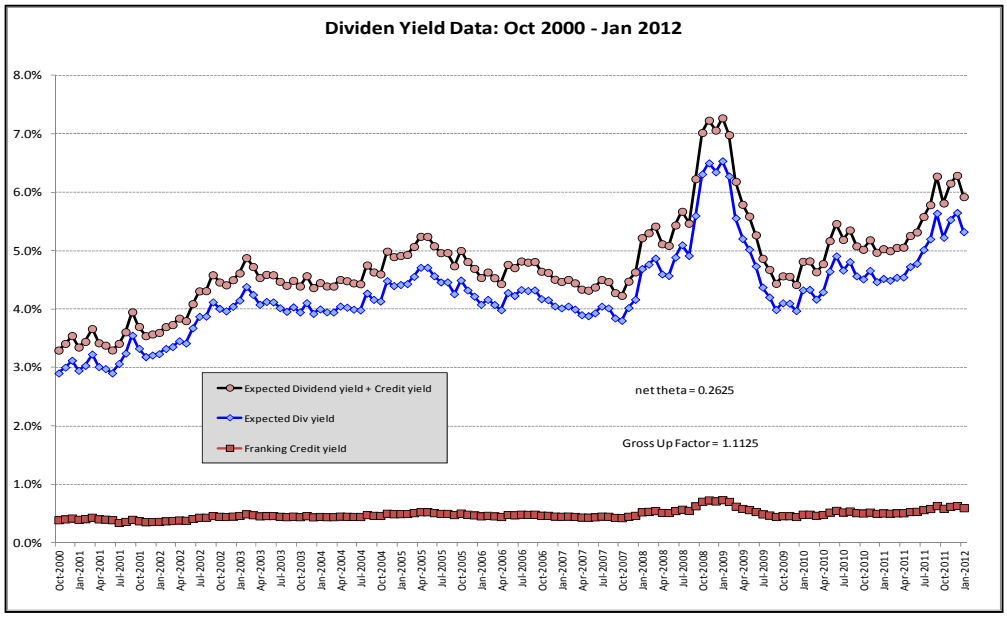
This estimate for stock exchange traded events is substantially below the estimate from taxation statistics in which the average franking level of all reported dividends is 90% (calculated from the latest reported ATO data for 2009). This is not surprising as the ATO data include many private companies which pay a higher proportion of fully value franked dividends.

For the purposes at hand, the estimate from listed equities is more appropriate so I consider an estimate for franking of 68% to be the preferable one. Varying the values of net theta gives a range of possible answers for the implied MRP although net theta is by no means the dominant determinant of the estimate of the implied MRP. The variation in the implied MRP caused by varying the value of net theta is well within the total variation of the range of estimates.

The following is a plot of implied dividend yields and grossed up dividend yields using a net theta of 0.2625 (constructed using a franking fraction of 0.75, and a valuation fraction of 0.35). The aforementioned parameter values have been used by NERA (2012b), and also appear to have been endorsed by the AER.

[13] This is the Simplified Tax System (STS) period – there was a very large burst in unfranked dividends paid prior to the introduction of the STS and after the announcement of the abolition of the inter-corporate dividend rebate scheme. Including this earlier period would depress the average franking level estimate.

Figure 7: Expected Dividend Yield estimates



5. Comparing the models

There are two substantive and related problems with the earnings yield model that render it practically useless for estimating the implied market risk premium:

1. The estimates of future dividend payout ratios from future earnings are apparently biased,
2. There is no way to directly include franking credits within future earnings without referring back to future dividends which requires the flawed future payout ratio estimate.

The tie between the two models based on dividends and earnings is the payout variable, as seen in the two connecting relationships between the dividend and the earnings models:

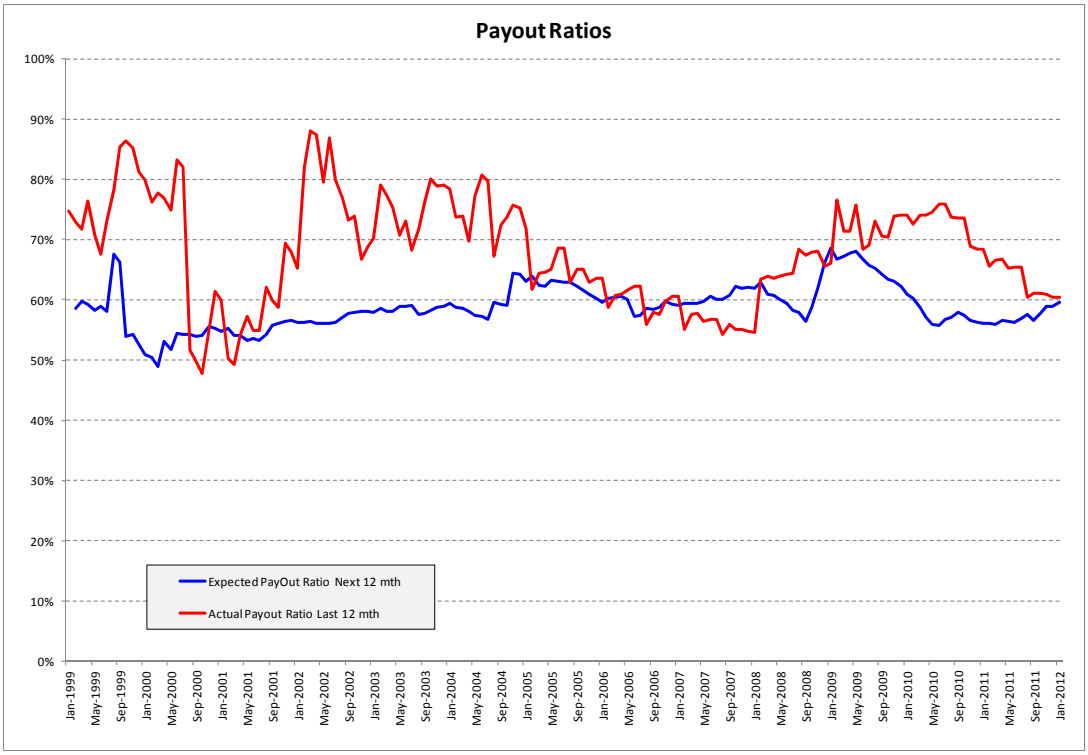
DPS = Payout * EPS

Growth = Re*(1-Payout)

These relationships were used to move from the dividend model to the earnings model.

The assumed payout ratio then becomes important in connecting the two models. The implied and actual estimates of payout ratios are as follows:

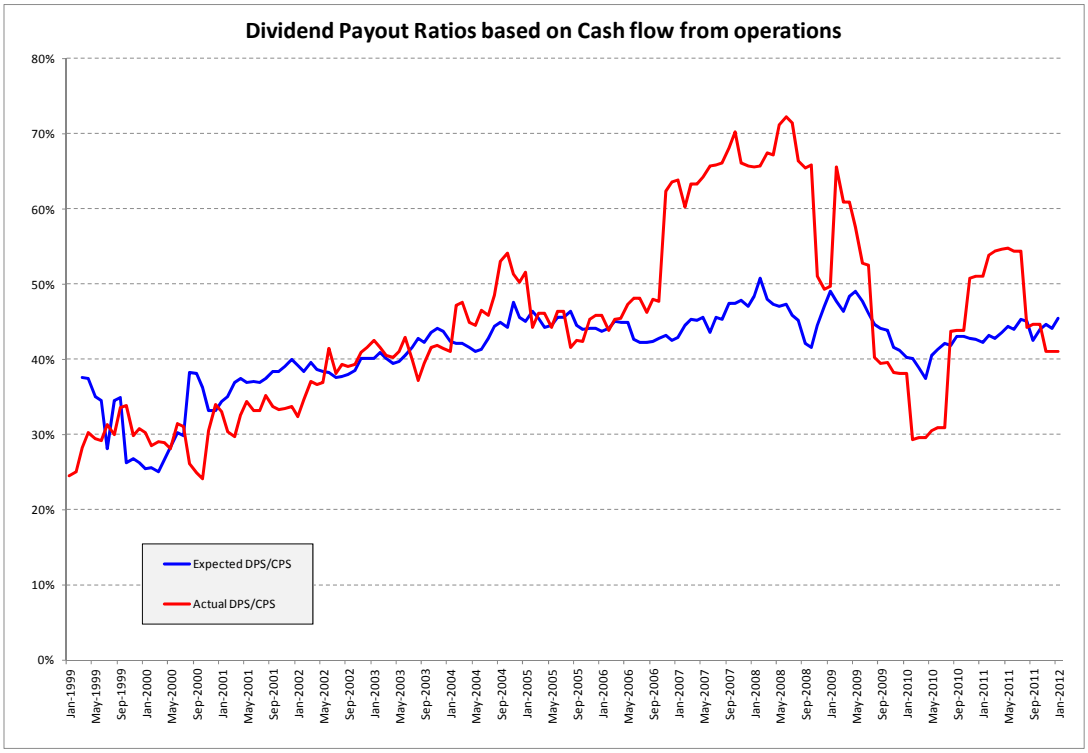
Figure 8: Payout ratios; Expected and Actual



Analysts appear both conservative and more stable in their estimates of payout ratios than the actual experience. On average, the earnings payout ratio of dividends was actually 69%, whereas the analysts expected an average payout ratio of 60%. We would not expect to see such a bias built into analysts' forecasts. The answer lies in recasting "payout" away from cash dividends paid out of accounting earnings and expressing it as cash dividends paid out of cash income from operations. One has to have the cash income in order to pay it out as a cash dividend – especially in perpetuity models such as the simple ones under review. We can all think of recent examples where this simple rule was violated with the inevitable eventual demise of the offending business.

The dividend payout ratios based on Cash Flow from Operations per share (CPS) are much more aligned as we see in the following:

Figure 9: Cash-based dividend payout ratios



The apparent bias has disappeared as they make forecasts very much in line with the actual cash payout ratio. The discrepancy is only seen in accounting based data so we can assume analysts are making a collective net adjustment to accounting data when estimating dividends that will be paid out of cash earnings.

This lends credence to using the dividend model in preference to the earnings model. One is based on hard data (cash dividends) and the other is based on accounting data (earnings). The dividend model uses a directly observable estimate of growth in DPS whereas the earnings model uses a problematic variable – earnings payout ratio.

The second issue of including franking credits within the earnings model is a basic one that is difficult to overcome without essentially re-invoking the dividend model. Presumably when dividend imputation was introduced into Australia it caused a rise in the value of stocks without any apparent increase in after tax earnings. This must have resulted in a (possibly one-off) increase in the PE ratio for Australian stocks. The introduction of imputation by itself should not have caused any change in corporate earnings. Imputation is after all a reduction in the total tax paid by the ultimate owner of the business, the shareholders. Its introduction reduced the imposition of double taxation - first company tax and then personal tax. Shareholders' total tax was reduced as they received a credit for company

tax. Hence the only way to see this effect in the PE model is (was) by a change in the PE ratio. But PE ratios are themselves quite volatile so it is difficult to estimate the impact of imputation tax within the background noise of the volatility of the PE ratio. It is even more difficult to detect subtle changes in the imputation impact due to any changes in the regime, such as the STS of 2001-2002.

We have to estimate the impacts of franking credits in the PE ratio or else we will make the error of ascribing changes in the PE ratio to changes in risk when they are instead due to changes in cash flow to shareholders. For example, if the PE ratio rose noticeably with the introduction of imputation tax in 1987, then we would have been in error if we concluded a reduction in risk increased the value of shares (the PE ratio rose) when no such conclusion should have been drawn.

In summary, the DDM approach allows all of the changes in the imputation system to be explicitly included in the franking credits paid along with the cash dividends. In contrast, the earnings yield model (or equivalently, the PE model) can only implicitly recognise credits via changes in the PE ratios which are very difficult to detect. In a forward-looking PE model, we are left trying to detect changes in the future PE ratios of analysts that arise from their franking credit assumptions and this task may be all but impossible.

6. Resulting Implied MRP estimates

Using a CAGR of 7% for the expected growth in dividends and the set of analysts' forecasts for dividend yields, the following are the results of model 1; the expected dividend yield model.

Figure 10: Implied MRP from Constant Dividend Growth model: net theta=0

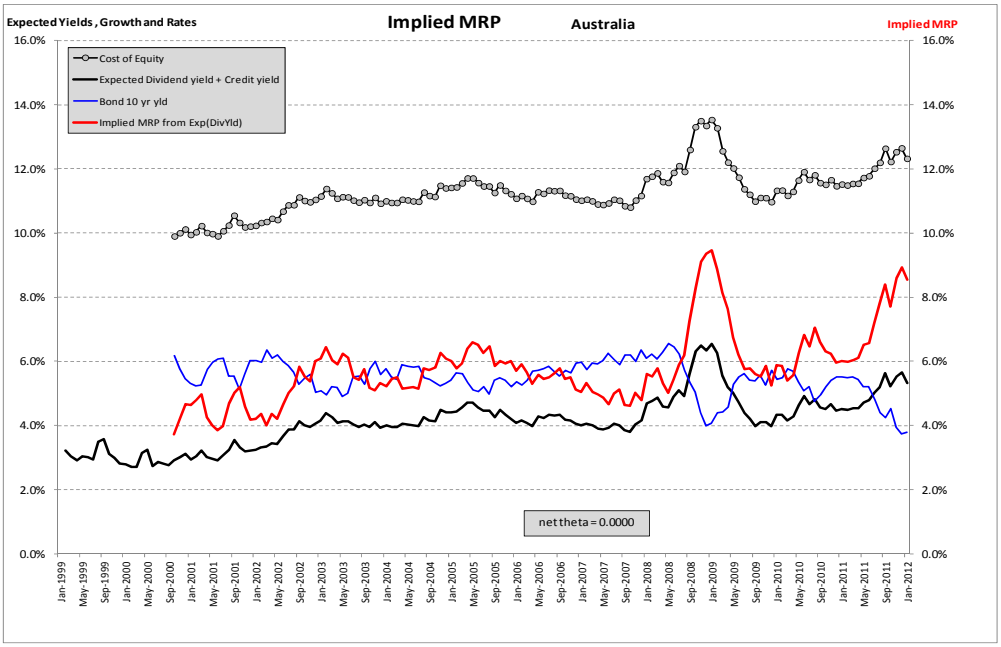


Figure 11: Implied MRP from Constant Dividend Growth model: net theta=0.2625

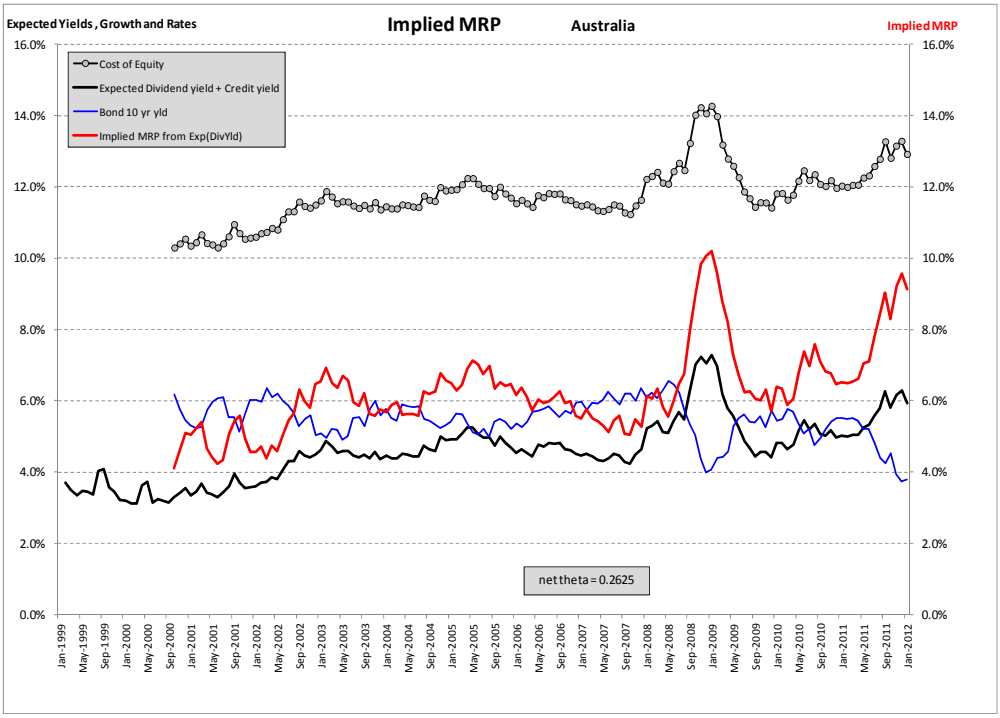


Figure 12: Implied MRP from Constant Dividend Growth model: net theta=0.5

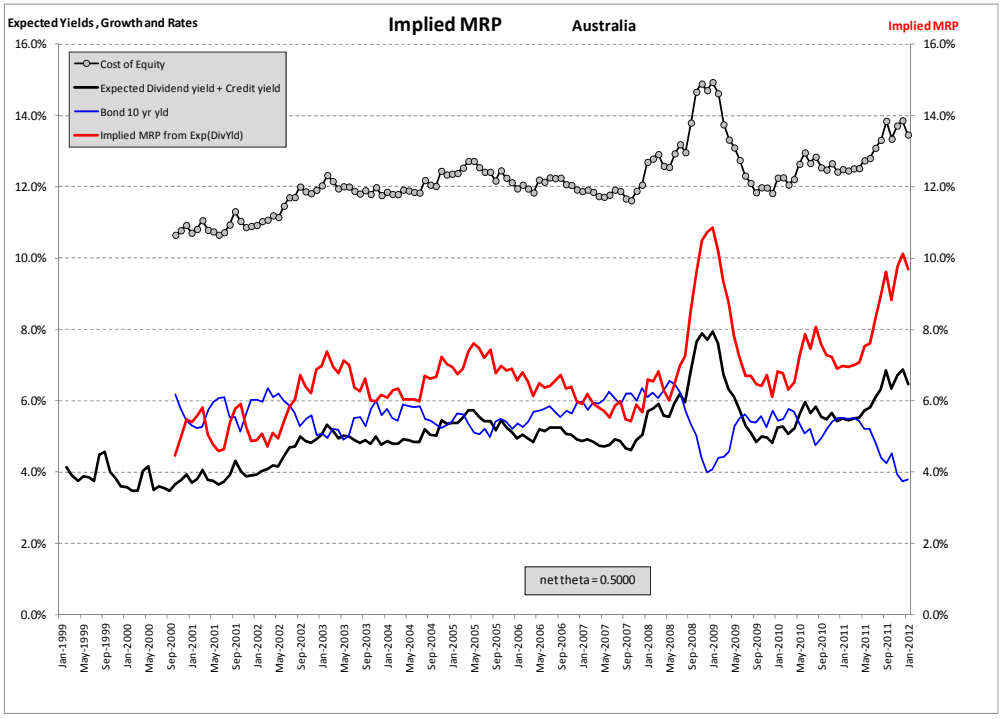
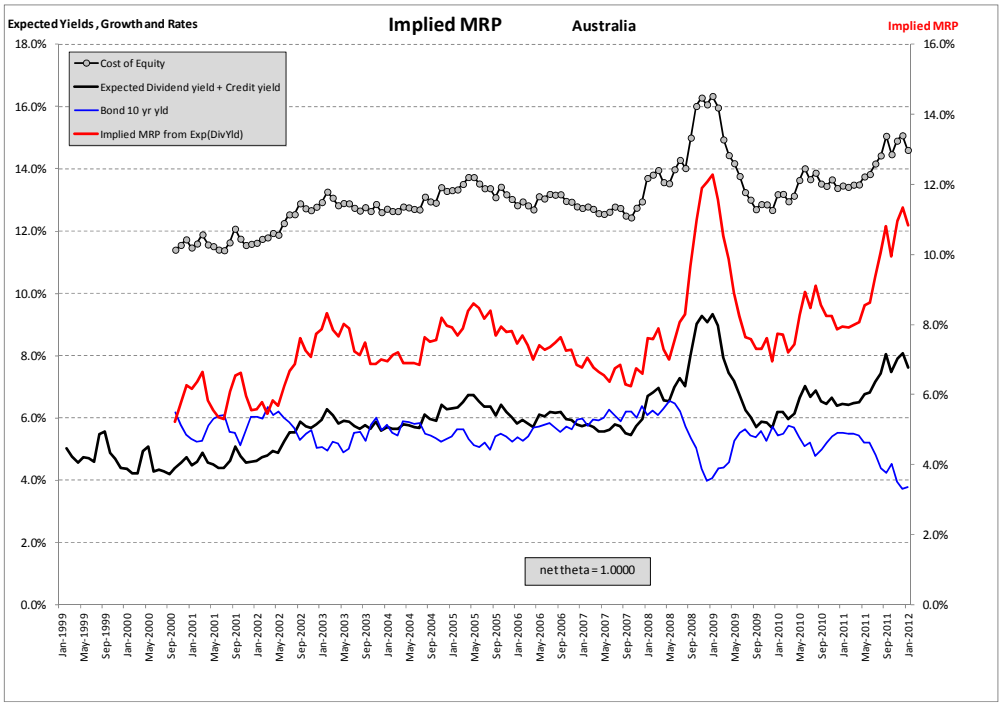


Figure 13: Implied MRP from Constant Dividend Growth model: net theta=1



For a value of net theta = 0.5, prior to the GFC period (pre-June 2008) the implied MRP averaged 6.2%. During the GFC (June 2008 – Sep 2009) it averaged 8.4% and since then it has dropped to an average of 7.6% (Oct 2009 – January 2012). The whole period average (Feb 1999 – January 2012) is 6.7%. These estimates are in the range typically encountered in Australia. The following table includes all the estimates for the values of net theta = 0, net theta = 0.5 and net theta = 1.0.

Table 2: Average Implied MRP results

		Net Theta			
	Risk free rate (average)	***0.0***	***0.2625***	***0.5***	***1.0***
Pre GFC	5.66%	5.3%	5.8%	6.2%	7.0%
During GFC	5.11%	7.2%	7.8%	8.4%	9.5%
Post GFC	5.08%	6.6%	7.2%	7.6%	8.6%
Whole period	5.48%	5.8%	6.3%	6.7%	7.7%

I consider that the most realistic values for the MRP are to be found in the range of net theta=0 to net theta=0.5. The net theta = 1 range is most unrealistic. To be valid it requires that every dividend in the market is fully franked and that every such dividend is 100% valued at its face value. This is clearly unrealistic for the obvious reason that not all dividends are so fully franked.

In practice, franking credits of fully franked dividends are valued at somewhere in the range of 0.35 to 0.50 of face value, and the aggregate franking level is about 68%. Hence, the typical net theta is expected to be in the range of 0.24 to 0.34 which is within the outcomes of the data shown in the columns in Table 2 for the net theta = 0 and the net theta = 0.5. I understand that the Australian Competition Tribunal has determined that the market value of one dollar of distributed imputation credits is 35 cents[14].

These results differ a little from those of NERA, which has adopted a similar approach, principally because I use the analysts' forecast data for the Price Earnings Ratio model, and not the dividend discount model[15]. They are closely related though if one uses a constant pay out rate assumption. I use aggregate forecasts of earnings per share for the next 12 months. Analysts do not make forecasts of constant dividend payout ratios – see Figures 8 and 9 above for confirmation of this.

[14] Australian Competition Tribunal, Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9, May 2011.

[15] Prevailing Conditions and the Market Risk Premium. A report for APA Group, Envestra, Multinet and SP AusNet, prepared by NERA Economic Consulting, 28th March 2012.

In addition, I average the monthly implied risk premiums. These are calculated using monthly forecasts by analysts and end of month ten year bond yields. NERA, on the other hand, uses an average measure of the risk-free rate based on a number of days. Specifically they use a 20 day average of interpolated nominal 10 year Commonwealth Government bond yields. The days which they use are 21st November 2011 to 16th December 2011. The resulting average is 3.99% per annum. The averaging period of 20 business days was chosen following the AER's convention of nominating a time interval over which to measure the cost of debt. I understand that the businesses have measured their cost of debt over the 20-day reference period.

Indices of series of cash flows and series of share prices must be consistent in that they must both be consistently scaled to aggregate market values. For example the ASX All Ordinaries index is currently near the range of about 4,200 whereas the similar All Ordinaries Accumulation Index (with dividends reinvested) is currently around the level of 32,000. These substantial base value differences were originally chosen so that there should not be any confusion about which index is being quoted. Associated cash flow series using either the All Ordinaries Price index or the Accumulation index would also have to be scaled consistently. I use the Factset database of forecast cash flows per share (dividends, earnings and cash) along with the Morgan Stanley Australian share price index. These are consistent sets of indices.

7. AER Estimates based on DGM

In its final decision for Envestra (South Australia), the AER has also included a table of MRP estimates based on a dividend growth model[16] - see Table A5 page 194. I have examined their results and I conclude that there must be errors in these calculations. I use their input data and their parameter estimates. Of the three scenarios, I can reproduce approximately only one set of estimates. First I reproduce their table of results.

Table 3: AER Table A.5 MRP estimates with different growth assumptions

Growth rate	Theta value	Dividend yield	Estimated MRP
0%	0.35	4 – 5 %	–0.9 – 0.4 %
3.5%	0.35	4 – 5 %	2.3 – 3.4 %
6.0%	0.35	4 – 5 %	4.5 – 5.6 %

Recall from above that the expected return on equity is the sum of the grossed up expected dividend yield and expected growth. The expected market risk premium is then the the expected return on equity minus the estimated risk free rate.

The grossing up factor from net dividends to gross dividends depends on the company tax rate, the fraction of the dividend that is franked and the value of a distributed franking credit. The AER uses a value for company tax of 30%, and a value of $0.35 per $1.00 of distributed credits. They are silent on the actual level of franking for a generic dividend so I use the estimate of 75% franked[17]. In their final decision for Envestra the AER use 5.68% as the risk free rate - see page 59 of the final decision.

With these estimates the grossed up-dividend yield factor is 1.1125. This is calculated from the fully franked grossed up amount using the company tax rate, t_c, namely $1 + [t_c/(1-t_c)]$, reduced by the franking level, f, and the value of the credit, θ, namely $1 + f.\theta[t_c/(1-t_c)]$.

The results of this calculation are shown in the following table. A relevant observation is that the grossed up dividend yields used by the AER are low in comparison with observed values as at December 2011. The grossed up dividend yield used by Capital Research, as at the end of December, 2011, was 6.29%.

[16] AER, Final decision, Envestra Ltd., Access arrangement proposal for the SA gas network 1 Jul 2011- 30 June 2016, Australian Energy Regulator, June 2011.

[17] Brailsford, T., J. Handley and K. Maheswaran, Re-examination of the historical equity risk premium in Australia, Accounting and Finance 48, 2008, page 85.

Table 4: AER Table A5 corrected: MRP estimates with different growth assumptions

Growth rate	Grossed up Dividend Yield	Exp Ret on Equity	Rfree (nom)	Exp MRP
0%	4.4% - 5.5%	4.4% - 5.5%	5.68%	-1.2% - -0.1%
3.5%	4.4% - 5.5%	7.9% - 9.0%	5.68%	2.3% - 3.4%
6.0%	4.4% - 5.5%	10.4% - 11.5%	5.68%	4.8% - 5.9%

Note that only the growth rate of 3.5% gives the correct answer. The zero growth rate and the 6% growth rate give different answers. They cannot all be consistent.

In its recent draft decision for Aurora Energy the AER has revised its risk free rate down to 4.28% per annum – see Table 6.1, page 27[18]. This is quite reasonable as the market yields have come down as we saw previously. However, one must be consistent. Revising some parameters and not others means that a discordant set of estimates is combined into one overall cost of capital. The downward revision to the AER's risk free rate causes an upward revision to the AER's estimated market risk premium.

If we use this revised estimate for the risk free rate in the AER calculations, then the new AER results become:

Table 5: AER Table A5 revised and corrected: MRP estimates with different growth assumptions

Growth rate	Grossed up Dividend Yield	Exp Ret on Equity	Rfree (nom)	Exp MRP
0%	4.4% - 5.5%	4.4% - 5.5%	4.28%	0.2% - 1.3%
3.5%	4.4% - 5.5%	7.9% - 9.0%	4.28%	3.7% - 4.8%
6.0%	4.4% - 5.5%	10.4% - 11.5%	4.28%	6.2% - 7.3%

The results for the implied market risk premium in Table 5 are the corrected values of the AER's MRP estimates. The mistakes made by the AER have been remedied. However, the values in Table 5 should not be construed as being an appropriate set of estimates for the MRP not least because the estimates of the grossed-up dividend yield that are shown under-state the true position at present.

I am at a loss then to understand why the AER persists in maintaining a market risk premium of 6% whilst they have revised down the risk free rate. They are using a bottom up approach of combining a static risk premium with a volatile risk free rate. These are inconsistent. We have all seen the risk free rates drop and remain low around the world as the risk in markets and economies grew in recent years and remains high. It beggars belief that the appetite for risk by investors is presumed to be static as implied by the AER's constant market risk premium. After all, this risk premium is the price of risk

[18] AER, Draft Distribution Determination Aurora Energy Pty Ltd 2012–13 to 2016–17. Australian Energy Regulator, November 2011

demanded by investors and if economies are in such poor shape that they need very low risk free rates to push them along, then surely the corresponding price of risk has risen commensurately.

8. Comparison of NERA and our results

Whilst ostensibly using the same approach to estimating the market risk premium, our results differ slightly from those of CEG and NERA. I have attempted to explain the differences in the following Table 6. This ascribes the essential differences in various estimates to the input assumptions.

Table 6: Comparison of dividend growth model results, Capital Research and NERA

Author	Forecast, grossed-up dividend yield (%)	Projection for growth in DPS (%)	Risk-free rate (%)	*Ex ante* MRP (%)	Basis of estimate
NERA (using Bloomberg consensus forecasts for DPS), as at 31st Dec. 2011	6.03	5.65	3.99	7.69	Calculate the internal rate of return that discounts the dividends that a portfolio is expected to pay back to the current price
NERA (using consensus forecasts for DPS from I/B/E/S), as at 31st Dec. 2011	6.06	5.65	3.99	7.72	As above
CEG, estimate as at 31st Dec. 2011 (dividend yields from the RBA which are then grossed up).	5.68	6.60	3.77	8.52	Based on the application of a method from AMP Capital Investors, using a net theta of 0.2625 (see below).
Capital Research, current estimate as at 31st Dec. 2011	6.29	7.00	3.73	9.56	Price earnings ratio model (PER), using a net theta of 0.2625.
Capital Research, arithmetic mean of monthly values, October 2009 to January 2012	5.23	7.00	5.08	7.15	Price earnings ratio model (PER), using a net theta of 0.2625.
Capital Research, arithmetic mean of monthly values, October 2009 to January 2012	4.70	7.00	5.08	6.62	Price earnings ratio model (PER), using a net theta of 0.0.
Capital Research, arithmetic mean of monthly values, October 2009 to January 2012	5.71	7.00	5.08	7.63	Price earnings ratio model (PER), using a net theta of 0.5.

Author	Forecast, grossed-up dividend yield (%)	Projection for growth in DPS (%)	Risk-free rate (%)	*Ex ante* MRP (%)	Basis of estimate
Bloomberg, estimate as at 10th January 2012	n/a	n/a	n/a	10.52	Bloomberg internally generated estimate

Source: Capital Research, CEG and NERA. *Prevailing conditions and the Market Risk Premium*, a report for APA Group, Envestra, Multinet and SP AusNet, prepared by NERA Economic Consulting, 28th March 2012. Internal consistency of risk-free rate and MRP in the CAPM, a report for Envestra, SP AusNet, Multinet and APA Group, prepared by Competition Economists Group, March 2012.

In Table 6 above, "DPS" means Dividends per share and I/B/E/S is the Institutional Brokers' Estimate System. The dividend yield has been grossed up by multiplying by net theta, which is calculated as the product of the franking proportion and the value of distributed imputation credits. The estimate of the gross up factor is 1.1125 based on the net theta of 0.2625.

NERA did not apply a price-earnings ratio model of the type that was used by Capital Research. Hence the characterisation, shown in Table 6, of the estimates presented by NERA is a distillation of their results for expositional purposes. CEG applied a very similar dividend growth model to that which we use and they followed the AMP approach for estimating long term dividend growth.

The AER did not explicitly state what level of franking they assumed. They did make a statement that the payout ratio was 70% but this is a different issue. A company can have a dividend payout ratio of 70% of its earnings and all those dividends are fully franked so the franking rate is 100%. Similarly, a company can have a payout ratio of 70% and half of those dividends are fully franked and the other half are unfranked. We summarise this situation by stating that the franking level of all dividends is 50% - but one cannot pay a partly franked dividend. Each dividend must be either fully franked or unfranked. Because we are evaluating the whole Australian market in which some dividends are franked and some unfranked then we have to model it as a partly franked aggregate dividend.

In NERA's estimates, the franking proportion is assumed to be 75% (as per Brailsford, Handley, and Maheswaran, 2011), whilst the value of distributed imputation credits is set at 0.35, based on an amount determined by the Australian Competition Tribunal. The net theta value in NERA is therefore 0.2625. This appears to be consistent with the AER data in that these estimates accurately reproduce the AER implied MRP for one case calculated by the AER for their DGM.

We present results for the implied MRP over net theta values of 0.0, 0.2625, 0.5 and 1.0. The net theta estimate of 0.2625 has been added to this updated report.

Bloomberg estimates an MRP by calculating a measure for the market return based on the capital weighted average of the internal rate of return for all major index members. The internal rate of return for each index member is calculated using a dividend discount model (DDM) developed by Bloomberg.

In comparing these results in Table 6, some estimates are derived as averages over time and some are point estimates. As we cautioned above, averages are a good way of eliminating noise or volatility in estimates provided there is no trend or drift in the mean of the estimate. In the latter case, averaging will disguise the underlying trend. As seen above in the time plots of the implied MRP (see Figures 10-13) there have indeed been trends in the implied MRP. These trends correspond very well with the reported heightened risk of world markets, both during the GFC event in 2008-2009 and again during the heightened global risks in 2011. Australia is a small and open economy. World risks and associated prices of risks are never going to be quarantined from infecting Australian investors. To pretend that the price of risk within Australia has remained totally insulated from the world beggars belief. To assume that a constant rate of the MRP is 6% year in and year out is the same as assuming that the world risk and appetite for that risk does not impact upon Australia. I find that an incredible assumption.

To understand this issue, begin with the high level concept of:

Required return on risky investment = Return for time + Return for risk.

There is nothing contentious here. All investments involve waiting for a payoff. We get compensated for the wait ("Return for time") by being paid an interest rate. With no risk of loss of capital we get a risk-free interest rate. At the wholesale level, a good proxy for this is the return on Commonwealth Government bonds (not all governments are such a good proxy; e.g. Greek government).

The price of time and the price of risk interact with each other. In times of high risk, investors bail out of high risk assets (e.g. equities) and buy into low risk assets (high quality government bonds). The act of doing this means that investors sell equities and buy bonds. The repercussions are that that the price of equities falls and the price of bonds rises (all else being the same, ie per dollar of income from each asset). We expect the price of risky and risk-free assets each to rise and fall as the income from each rises and falls so the argument is best posed in the form that, controlling for the income from each asset, the price of risk within each asset falls (rises) as investors sells (buys) the asset.

As investors sold equities and purchased quality bonds, we saw, (and are still seeing as at March 2012), that the price of quality bonds increased. For a given income from bonds, this would imply a

fall in yields which is exactly what we have seen – see Figure 5. Hence we fully expect to see a commensurate rise in the yield on risk assets (a price fall per dollar of income) which is what we have observed – see Figures 10-13.

The counter-intuitive idea of adding a fixed MRP to the prevailing risk free yield (regardless of whether the assumed fixed MRP is 6% or 3% or 9%) is the same as asserting that the movements in the required return on risky assets are perfectly correlated with the required return on riskless assets. This is in contradiction with the observed and logical behaviour of investors that as they move from risky assets to less risky assets, then the required return on riskless assets falls and the required return on risky assets rises.

It is reasonable to state that the very long term risk premium for equities over riskless bonds is approximately 6% per annum. That is quite a sensible estimate.

But it is very illogical to add that risk premium to a current low-risk return on riskless assets and then claim that the sum is the required return on risky assets.

That amounts to combining a short term time-dependent high price on riskless bonds (or equivalently a low yield on riskless bonds) with a time-invariant (typically a long term average) risky premium for risky assets such as equities.

Such a construction is illogical.

9. Summary

There is no reason to assume that analysts would use a different MRP estimate depending on what they were valuing – individual shares or the whole Australian market. Accordingly, a well-accepted model that can be applied to the whole market is the preferred estimator. It eliminates the need to estimate extraneous company-specific variables such as stock betas and stock-specific volatility estimates. In addition, aggregate forecasts at the whole of market level are available for basic variables such as dividends per share, earnings per share, cash flow per share as well as long term growth estimates, though these are only supplied for EPS. Reasonable assumptions can be applied to the data in order to develop an acceptable implied MRP estimate based on forward looking data – equity analysts' forecasts of the future cash flows.

The estimates based on these analysts' forecasts are consistent with other estimates used in Australia.

The objections of the AER to some of the parameters we used in our earlier Report are not appropriate[19]. They are misplaced in that the AER adopts the view that the parameters ought to be what they would put in such a model. This is not the point. The design concept was extracting the estimated implied MRP from equity analysts' forecasts, consistently using their estimates. The aim was not to build a better model. It is inappropriate to change any inputs into their model as the aim was to extract their estimate of risk.

The dividend growth model is preferred over the earnings yield model for estimating the forward MRP implied in analysts' forecasts of future corporate earnings aggregated to the whole market.

The objective evidence is that systemic risk has risen in recent years. It would be extremely heroic to suggest that the average systemic risk for the next five years is at the long term average. The only way in which this can happen, starting from a current position of heightened risk is that the coming five years contain years that have below average long term risk. This is not credible in the current environment.

In our report of February 2012, we calculated an average of the *ex ante* dividend discount model results that were obtained in relation to the period from October 2009 to January 2012[20]. This time interval was described as being the post-GFC period. We obtained the result that a typical forward-looking estimate of the MRP, to be applied over a regulatory period from 2012-13 to 2016-17, would lie in the range of 6.6% to 7.6%. An important point to note, however, is that the MRP estimates were measured relative to a nominal risk-free rate of 5.08% (for details, see Table 6 above). The nominal

[19] AER, Envestra Ltd, Access arrangement proposal for the SA gas network, 1 July 2011 – 30 June 2016: Final Decision, Australian Energy Regulator, June 2011; page 52.

[20] Forward Estimate of the Market Risk Premium: Update, A response to the draft distribution determination by the AER for Aurora Energy Pty Ltd, February 2012.

risk-free rate of 5.08% is an average of the end of month values from October 2009 to January 2012. An implicit assumption underpinning the assessment, therefore, was that a risk-free rate of about 5.08% would prevail over the 2012-13 to 2016-17 regulatory period for Aurora Energy. In practice, however, there is limited evidence available to support that assumption.

As at the date of writing this report (22nd March 2012), the yields on 10-year Commonwealth Government Securities (CGS) were well below 5.08%. As at 31st December 2011, the yields on 10 year nominal CGS were close to 3.73% (3.76% annualised). With such diminished values of the risk-free rate, estimates of the MRP from 6.6% to 7.6% are not currently applicable. Accordingly, at the end of December 2011, the dividend discount model suggests that the best forward-looking estimate of the MRP is 9.6%, assuming a value for net theta of 0.2625. The corresponding cost of equity (or return on equity for the market, with beta equal to one) is 13.3%.

Neville Hathaway
Capital Research
March 2012

Appendix 1: Resume of Neville Hathaway

Experience

INVESTMENT COMMITTEE, LEGALSUPER
2009 –

I am an adviser to the investment committee of Legalsuper, which is an industry superannuation fund, managing approximately $1.4 billion of members' funds, derived mainly from the legal industry, including legal services. The role includes all the facets of allocating assets and choosing managers.

HEAD OF INVESTMENTS, INTRINSIC VALUE INVESTMENTS LTD
2005 –

I am head of the investment team at IVI, being a boutique international funds management company with approximately $330 million under management. My role includes liaising with all the major research houses and investment platforms. Also conduct all the trading of the listed securities (OPALS) and the FX hedging for the fund.

PRINCIPAL, CAPITAL RESEARCH
2003 –
Capital Research is a specialist consulting firm in corporate finance and investments. The business was started in 2003 by Neville Hathaway and builds on the extensive experience and skills of the principals in the areas of investments valuation, and acting as expert witnesses.

Consultant, STRUCTURED INVESTMENT GROUP (SIG), INVESCO (AUSTRALIA)
2002 – 2003

Developed a new investment product (an enhanced index product) for INVESCO Australia. This involved all aspects of original design, logical rationale for why it should work, specification of the product, collection of data and product testing.

HEAD, STRUCTURED INVESTMENT GROUP (SIG), INVESCO (AUSTRALIA) previously COUNTY INVESTMENT MANAGEMENT,
2001 – 2002

At that time, SIG managed about A$3.5 billion of INVESCO Australia's A$11 billion of FUM. Investments were made in three main areas; Passive Overlays (A$2.7 bill), Protection (A$400 mill) and Indexation (A$400 mill) plus some others. The business was principally focussed on risk management. My responsibilities included client and consultant relationship management, compliance oversight, interaction with rating agencies and development of the business, both for the domestic and the Asian markets.

The business was transferred from Sydney to Melbourne in May 2001 with a substantial restructure of the team at the same time as I was appointed the new Head. My immediate role was to interact with clients and asset consultants to ensure them of continuing commitment to the business. We were successful in retaining nearly all of the FUM over the transition period.

HEAD, INVESTMENT SOLUTIONS GROUP, COUNTY INVESTMENT MANAGEMENT,
1998- 2001

Responsible for product development, process improvement and client consulting. Major achievements of my team included designing a new investment process for the Active Australian Equities team (Top 100) and a new indexation process for the Fixed Interest team.

Assembled the management data and business cash flows for the sale of County to INVESCO.

ASSOCIATE PROFESSOR OF FINANCE, MELBOURNE BUSINESS SCHOOL,
1991 – 1997

Taught in the MBA and executive programs. Taught subjects in funds management, corporate valuation and corporate finance. Delivered a number of courses to the Australian financial community: regular ones included Cost of Capital and Dividend Imputation, Small Firm Funds, Derivative Securities, others on a one-off basis, such as "Small Firm Effect" for Securities Institute of Australia. Upon leaving MBS for County in 1997, The University of Melbourne granted me a further rolling appointment as a Fellow (Assoc. Professor).

Other appointments included :
Associate Professor Of Finance, University Of California, Berkeley, USA 1988,
Senior Lecturer, Melbourne Business School, 1984-1991.
Lecturing and adviser to Securities Institute of Australia (FINSIA) masters programme.

CONSULTANCIES:
Through the professional relationships I have built up, we have received numerous requests for assistance. Some examples include:

Expert witness for the National Australia Bank vs Australian Tax Office.
Expert witness for the Buchanan Borehole Collieries vs NSW DPI in the Land and Environment Court, NSW.
Due diligence for the potential acquisition of a Melbourne-based fund manager and responsible entity.
Advised on EquipSuper Fund performance including full attribution analysis.
Review of ACT Super re its business structure and operations.

Expert witness (Norman O'Brien QC) re Administrative Appeal Tribunal of an insider trading case.
Expert witness for the Idemitsu-Pacific Coal case in Queensland Supreme Court. Valued damages due to break up of a joint venture (exploration and development rights).
Expert witness for an appeal to the ATO re the sale of Weight Watchers.
Advised boutique Melbourne Australian equity fund re its investment process.
Developed an imputation-based investment strategy for local investment fund.
Strategic business plan for the Anglican Superfund of Australia.
Advised on the value of a trust of aged care facilities prior to its listing on the ASX.
Valued the management rights for managing this trust.
Valued the Valley Power gas-peaker electricity plant in the La Trobe Valley for attempted purchase.
Valuation advice for purchasing Loy Yang B power station for a prospective buyer.
Valued embedded derivatives for Zinifex Ltd re its electricity supply contract.
Advised SAPEX Ltd on valuation of executive options.
Advised Affiance Group Ltd for the value of its employee options for ATO purposes.
Valued the executive options for Lion Selection Group for its prospectus issue.
Advised St George Bank in matter vs ATO as expert witness.
Advised Rio Tinto for its dispute with the ATO re its franking credits.
Expert witness for NSW Coal Compensation Board for several cases involving valuation compensation claims.
Advised Grand Hotel Group with its asset sale and counterparty compensation.
Advised AAPT re Telstra's ACCC submission on ULLC.
Advised Freehills (representing Channel Seven) re FOXTEL's special access undertaking as expert witness
Advised Prime Infrastructure for the Dalrymple Bay Coal Loader return determination by the Queensland Competition Authority.
Advised BHP re its valuation of plant closure.
Advised Hong Kong Electric Company for its regulated business required return.
Advised Lend Lease Corporation for its dispute with the ATO re its structured transaction of its Westpac share holdings.
Valuation of Optus Vision.
Valuation of Australia Post.
Cost of capital for each of the NSW GBEs (for NSW Treasury).
Advised ATO on changes to imputation tax laws.
Gas transmission access pricing; for AGL Ltd, re Sydney gas market.
Value of Commonwealth Bank imputation credits for sale of stock by the Federal Government.
Value of a large commodity project in South America (for RIO/CRA Ltd).
Valuation of some gold companies for Grant Samuel (Normandy Mining et al merger).
Valuation of the capital of ANZ Bank Ltd.
Advice on domestic versus foreign capital costs for BHP Ltd.
Valuation of a resource project for RIO/CRA Ltd.
Advised on negotiations for the Colonial/State Bank of New South Wales merger.
Valued a $multi-billion, multi-stage project for Comalco.
Costed the capital for the bid for the Victorian electricity distributor, United Energy Ltd for Westpac - bid by the French company EdF, subsequently by

AGL Ltd.
The cost of capital (company-wide and divisional) for WMC Ltd.
Costed the capital for the sale of the State Bank of NSW - for CS First Boston.
Cost of capital for various listed companies: including WMC, CRA, FBG.
Advised the NSW Pricing Tribunal on price-setting for Government Business Enterprises.
Valued a company for the ATO with respect to potential litigation.
Valued the employee share option scheme for McIntosh Securities Ltd.
Analyse and made recommendations for a new ASX derivative product - Share Price Ratios. This appeared as an ASX publication: Hathaway Report on Share Ratios.
Report on Asset Allocation for Potter Warburg Private Clients Services.
Valuation of and recommendations about the 530+ million derivative securities involved in the Elders/Harlin restructure into Fosters Brewing Group.
Corporate valuations for potential takeover offers.

PREVIOUS APPOINTMENTS:

FAY, RICHWHITE: 1993 - 1994: ASSOCIATE DIRECTOR

Responsibilities: Undertook commissioned research and consulting upon request as both a team member and as a sole agent. Guided and assisted the investment banking staff of the Bank in developing and conducting their analyses for clients.
Developed a new risk management process for the Australian Loan Council in order to handle the States' involvement in infrastructure projects. The implementation involved extensive liaising with Treasury staff, both Federal and State.

Developed and advised on the introduction of Economic Rates of Return for Federal Government Business Enterprises (GBE's - eg Federal Airports Corporation). Liaised with the heads of the Federal GBE Policy Advisory Committee concerning the changes induced by placing economic rates of return targets on GBEs.
Analysed and costed the State of Victoria's commitment to the Portland and Point Henry aluminium smelters. My Report was used in both the Nicol's Committee of Inquiry and the Victorian Audit Commission Report.

Member, University of Melbourne Investment Committee.
This Committee acted as a fund manager for the many millions of dollars of endowment funds that the University of Melbourne has under investment (approx $500 million when I departed upon my resignation from MBS). It oversaw all aspects of these funds and made all investment decisions. There were five university appointees and five outside appointees to this committee, as well as support staff. The management of this fund is now out-sourced (to VFMC). The fund has now grown to over $1 billion.

Member, ASX Committee on Australia's Competitive Position in World Resource Stocks.
This group of people was assembled in order to design a large project to examine all aspects of how Australia's market position for resource stocks can be protected and enhanced within the world. It was envisaged that this project would be a very long one, taking many years and made up of a wide number of projects all with the strategic aim of furthering the market position of the ASX and Australia.

Member, Advisory Panel to Companies & Securities Commission Advisory Committee.
This committee reported to the Attorney General in regards to the regulation of derivative securities within Australia.

Member, Advisory Panel to Finsia.
This committee is responsible for the design and content of the Masters Program course M01, Applied Quantitative Methods in Finance. I also delivered the course as the principal leader.

Education

Ph.D	University of Melbourne,	1980.	(Maths/economics)
M.Sc	University of Melbourne,	1978.	(Applied Mathematics)
B.Sc (Hons)	La Trobe University,	1974.	(Mathematics)

(Took a two year break, 1974-1975, worked in London /travelled world.)