The market risk premium

November 2016

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Contents

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Figures

Tables

1   Executive summary

1.1   MRP estimates can be more objective, transparent and reflective of current market expectations

1   Frontier Economics has been retained by Aurizon Network Pty Ltd (Aurizon Network) to provide expert advice in relation to Aurizon Network's regulated rate of return. In this report we consider the market risk premium (MRP) for use in the Capital Asset Pricing Model (CAPM).[1]

2   Our primary conclusions are as follows:

   a.   The QCA's approach to estimating the MRP produces outcomes that are implausible in some market conditions, including the prevailing market conditions.

   b.   The root cause of these implausible outcomes is the fact that the QCA's approach produces an essentially constant MRP allowance. In every decision the MRP estimate has been either 6.0% or 6.5% regardless of whether government bond yields are high or low, whether dividend and earnings yields are high or low, or whether corporate bond spreads are high or low. The QCA's estimate of the MRP is incredibly sticky in comparison to movements in contemporaneous estimates of the MRP.

   c.   The reason that the QCA's approach produces a constant MRP allowance is that the QCA approach assigns no material weight to the estimation techniques that do produce MRP estimates that vary over time. Rather, the QCA approach leads to an outcome that any change in the risk free rate of interest necessarily flows through to the same change in the expected market return.

3   Our view is that the interests of users, regulated entities, investors and regulators is best served by a process that is objective, transparent, and which allows for new information to be incorporated into decision-making. We consider that the QCA can take steps towards estimating the MRP in a manner that meets these three objectives in two ways.

4   First, given the current set of quantitative information already generated by the QCA, the QCA can reach conclusions on the MRP in a fairly straightforward manner by asking three questions.

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[1] Sharpe (1964), Lintner (1965), Mossin (1966).

a. What is the MRP that we would estimate today if we relied entirely upon past returns information and the current government bond yield?

This forms an estimate of the MRP which does not take into account current prices of shares, bonds, expectations for earnings or other contemporaneous information on market risk and return.

In a perfect world we would base the MRP estimate entirely upon information that is relevant today. But information about the expected return in the equity market contains estimation error. We can observe share prices with precision, but make imperfect estimates of dividends, earnings and the value of imputation credits. So placing some reliance on past returns information mitigates the risk of generating a spurious result due to estimation error.

The QCA already produces estimates of the MRP from historical excess returns,[2] historical excess returns adjusted for unexpected inflation,[3] and historical real returns.[4] What we do not know is what the QCA would conclude about the MRP from analysis of past returns.

b. What is the MRP we would estimate today based upon analysis of contemporaneous market information?

The QCA has estimates of the MRP from its dividend discount model analysis,[5] and the QCA analyses other contemporaneous information – volatility measures and corporate debt premiums – in reaching its MRP decision. What we do not know is what the QCA would conclude if it relied only on timely market information to estimate the MRP.

c. Given estimates of the MRP based upon contemporaneous market information, and historical returns, how much confidence do we have in the estimate of the MRP from contemporaneous information? Put another way, how much reliance should we instead place upon the MRP estimate from past returns in order to mitigate the risk of estimation error in the timely MRP estimate?

Addressing this third question makes it clear to everyone in the regulatory process how the QCA arrived at its decision. We can also see what impact different information has on the MRP

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[2] This is referred to by the QCA as the Ibbotson approach.

[3] This is referred to by the QCA as the Siegel approach.

[4] This is referred to by the QCA as the Wright approach.

[5] This is referred to by the QCA as the Cornell approach.

estimate at each point in time. So we have transparency, objectivity and the ability for new information to be reflected in the MRP estimate.

5   Second, we consider that the MRP estimation process would be more objective and transparent, and more responsive to timely market information if the following changes were made.

a. **The QCA's reliance upon historical returns information[6] adjusted for inflation was dropped.**

This adjustment places large, undue weight on an assumption about what investors expected inflation to be in pricing government bonds from 1940 to 1990. This adjustment runs counter to the entire premise for analysing a long series of past returns. The premise is that the past returns series forms a baseline estimate that is less subject to estimation error in individual assumptions than other MRP estimates.

b. **The QCA gives equal reliance to the MRP estimate from historical real returns[7] and historical excess returns.[8]**

The basis for analysis of historical excess returns is that, if investors' perceptions of risk are the same regardless of whether government bond yields are high or low, then investors will demand the same compensation for bearing that risk at high or low government bond yields. However, we know from analysis of dividend yields, earnings yields and the QCA's own dividend discount model analysis that this basis might not be true. The QCA's dividend discount model analysis suggests that expected market returns do not move one-for-one with changes in the government bond yield, and this conclusion is consistent with statements made by other market participants.[9]

The basis for analysis of historical real returns is that a reasonable view of expected real returns in the future is what real returns in the past have been. Government bond yields change for many reasons – sometimes government bond yields fall because investors' perception of risk increases, so investors demand a higher risk premium; sometimes government bond yields fall because central banks intervene in order to lower mortgage rates,

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[6] The Siegel approach in the terminology of the QCA.

[7] The Wright approach in the terminology of the QCA.

[8] The Ibbotson approach in the terminology of the QCA.

[9] The Governor of the Reserve Bank of Australia (RBA), McKinsey, the Economic Regulation Authority of Western Australia (ERA), the Independent Pricing and Regulatory Tribunal in New South Wales (IPART), the United Kingdom (U.K.) energy regulator Ofgem, and the Federal Energy Regulatory Commission (FERC) in the United States (U.S.).

which does not necessarily flow through one-for-one with a lower cost of capital for the equity market; sometimes government bond yields fall because investors' expectations for inflation decline, which could lead to a corresponding decline in the cost of equity, or it could lead to an increased perception of risk because low expectations for inflation coincide with low expectations for growth and employment.

There does not appear to be any justification for giving either of these premises more relative weight than the other.

c. **The QCA's reliance on survey evidence was not treated as an estimate of the MRP which is distinct from the QCA's analysis of historical excess returns.**

One reason for the stickiness in the QCA's MRP estimate is that the QCA treats survey evidence as independent from evidence on the MRP from historical excess returns. However, careful reading of survey papers suggests that survey participants themselves rely heavily on past excess returns in making their responses.

Survey respondents do not appear to be making a careful evaluation of the MRP at the time of the survey given government bond yields, share prices, earnings expectations and perceptions of risk. Answering a question on a survey is not the same as an investor putting capital at risk in buying a stock (which sets the share prices used in contemporaneous estimates of the MRP). The consistent responses of survey participants to the MRP question is around 6% to 7% regardless of other market information and respondents themselves refer to the Ibbotson past returns data as a source. So the responses are analogous to saying "6% or 7% seems about right" and that same response is given year after year.

This is one reason why the QCA's estimate of the MRP is almost invariant to new information about market conditions. The QCA relies upon three MRP estimates that almost never change from one year to the next – historical excess returns, historical excess returns adjusted for inflation, and survey evidence. This makes it almost impossible for timely information about market risk to move the needle on the MRP estimate. This is not conjecture. It is borne out in the QCA's estimates of the MRP which have never moved from 6.0% or 6.5%.

d. **The QCA made adjustments to its dividend discount model analysis to reflect the earnings growth expectations incorporated into current share prices.**

The QCA makes an assumption that, in the long term, the real earnings per share growth of listed companies will be 1% below real GDP growth, which is estimated at 3%. In prior work, we

demonstrated that ever since the inflation targeting regimes of central banks in Australia and the United States were implemented, earnings per share growth has matched or exceeded GDP growth in both markets.[10]

The QCA has rejected this evidence on the basis that (a) the results are contained to one time period rather than all years and (b) earnings per share growth shouldn't be this high because new companies contribute to GDP growth and any one company cannot grow forever faster than the economy.[11]

However, the time period is vitally important. Once central banks began targeting inflation, price-earnings ratios increased substantially. What we are trying to estimate is the cost of capital today at these high price-earnings ratios. But in its dividend discount model analysis, the QCA adopts a growth assumption that is attributable to low stock prices. The result is that the relatively low growth assumption (empirically estimated from research relating to the *prior period*) is matched with relatively high prices (from the *current period*), and so the cost of equity is understated.

With respect to what earnings per share growth should be, we agree that a company cannot actually grow faster than the whole economy forever. Amazon cannot own everything! But a company can grow earnings per share more than the economy for 100 years. Listed companies are higher growth companies than many assets which contribute to GDP, and they engage in substantial share buybacks which allow earnings per share to grow faster than revenue or profits. The present value of dividends over 100 years is almost identical to the present value of dividends forever. So once we allow for growth over the timeframe which matters (100 years) and once we allow for share buybacks which facilitate earnings per share growth, we can have growth in earnings per share which is equal to or greater than GDP growth.

In other words, we can simply write an equation that says …

$$\text{Price} = \frac{\text{Dividend}_1}{(1 + r_e)^1} + \frac{\text{Dividend}_2}{(1 + r_e)^2} + \cdots + \frac{\text{Dividend}_{100}}{(1 + r_e)^{100}}$$

… and the argument no longer applies that growth in earnings per share cannot match GDP growth.

The key point is that there is a result actually present in the data, the earnings per share growth has matched or exceeded GDP growth ever since central banks began targeting inflation, and this

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[10] SFG Consulting (2014), Sub-section 3.3.

[11] UT4 draft decision, pp. 224–225.

period coincides with the relatively high price-earnings ratios we currently observe. If we are going to estimate what discount rate *today* is embedded within share prices, we need to make the best estimate of the growth rate that is also reflected in those share prices *today*. There is no reason to think that, suddenly, earnings per share growth will again fall below GDP growth after two or three decades of keeping pace.

1.2   MRP estimates

6   Given the discussion immediately above, in the table below we summarise what this means for the MRP estimates for Aurizon Network.

7   In the first column we present information from the QCA's conclusions in its April 2016 draft decision for DBCT. We incorporate the QCA's MRP estimates from that decision and make adjustments for changes in the risk free rate.[12]

8   In the second column we present information we would use to estimate the MRP. For analysis of historical excess returns and historical real returns we have used the same estimates as the QCA has relied upon. Debate over the best estimates of the MRP based upon past returns information is not part of this report.

9   We lay out the information with respect to the three distinct questions posed above. Survey estimates are given a separate row in the table, because we did not want to label these estimates as either reflecting past returns information or contemporaneous information. We believe that survey responses largely reflect past excess returns but it is unclear how much the QCA considers the responses to reflect current information or past returns. The QCA considers the survey evidence to be useful, but it is not clear whether it is useful for forming an MRP estimate *on average*, or an MRP estimate that reflects *current conditions*.

10   Question 1 is, "What can we conclude from past returns information?"

   a.   We consider that past returns implies an MRP estimate of 7.63%, given the risk free rate of 2.13%. This is an equally weighted average of the 6.40% average excess returns estimate and the 8.87% figure implied by real returns.

   b.   According to QCA analysis, past returns implies an MRP estimate within the range of 5.40% to 8.87%. We do not know what the QCA's conclusion would be. But we do know that the QCA applies "very low weight" to historical real returns.[13]

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[12] From 2.10% in the DBCT draft decision to 2.13% as the average yield on government bonds reported by the Reserve Bank of Australia (RBA) over the month of June 2016 (2.13%). The RBA reports a yield of 2.12%, We convert this to an annualised yield assuming semi-annual compounding as $(1 + 0.0212 \div 2)^2 - 1 = 2.13\%$.

[13] DBCT Draft Decision, p. 73.

Table 1. Aggregating information to reach a conclusion on the MRP

	QCA	Frontier Economics
Q1. What would the MRP estimate be based upon past returns information?		
MRP implied by historical excess returns[14]	6.40%	6.40%
MRP implied by historical excess returns adjusted for inflation[15]	5.40%	
MRP implied by historical real returns[16]	8.87%	8.87%
Q1. What can we conclude from past returns information?		**7.63%**
Q2. What would the MRP estimate be based upon contemporaneous market information?		
Dividend discount model estimate of the MRP	8.17%	8.09%
Conditioning information (QCA) & Market indicators estimate of the MRP (FE)	No specific estimate[17]	6.85%
Q2. What can we conclude from contemporaneous information?		**7.47%**
What is the survey estimate of the MRP?	6.00%	
Q3. What is the overall estimate of the MRP?	**6.50%**	**7.55%**

11   Question 2 is, "What can we conclude from contemporaneous information?"

    a.   We consider that contemporaneous information implies an MRP estimate of 7.47%. This is an equally weighted average of MRP estimates from the dividend discount model (8.09%)[18] and analysis of four market indicators (earnings yield relative to the risk free

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[14] The QCA refers to this as the Ibbotson approach.

[15] The QCA refers to this as the Siegel approach.

[16] The QCA refers to this as the Wright approach.

[17] The QCA refers to conditioning information in estimating the market risk premium but does not provide an estimate of the MRP based upon this information. The QCA does not state what the MRP would be if conditioning information was included or excluded from the analysis.

[18] Our dividend discount model estimates are described in Sub-section 7.2.1.

rate, term spread, corporate bond spread, and implied volatility; 6.85%).[19]

b. According to the QCA's dividend discount model analysis, the MRP estimate is 8.17%. In its market parameters decision the QCA considers conditional information – implied volatility and corporate bond spreads – but does not reach specific conclusions on the MRP from this discussion.

12   Question 3 is, "What is the overall estimate of the MRP?"

a. We consider that the MRP estimate from past returns is of equal reliability to the MRP estimate from contemporaneous information. If we knew there was no estimation error in the MRP estimate from current information we would disregard past returns entirely. But we do not have certainty over the MRP estimate from current information so we can mitigate estimation error by referring to past returns.

Applying equal weight to the MRP estimates from past returns (7.63%) and contemporaneous information (7.47%) we arrive at an MRP estimate of 7.55%.

b. According to the QCA analysis of past returns, the MRP estimate could lie within the range of 5.40% to 8.87%, but closer to the range of 5.40% to 6.40% given that the QCA assigns very low weight to past real returns.

The QCA's estimate of the MRP from the dividend discount model is 8.17%; and the QCA's estimate of the MRP from survey evidence is 6.00%.

What becomes apparent from the table is that, to arrive at the overall MRP estimate of 6.50% means that very little consideration is given to a contemporaneous estimate of the MRP. The QCA's only two estimates for the MRP ever adopted, of 6.0% and 6.5%, are what we would expect based entirely upon past returns information *and* at government bond yields well above current levels.

13   The key point of our paper is that we consider the QCA's estimate of the MRP to be understated by more than 1% (7.55% versus 6.50%). The reason we consider the MRP estimate to be understated is that we cannot find a way to reconcile the QCA's conclusion with the evidence. We think this reconciliation can be done by simply addressing the three questions posed above.

14   Further, it is possible to produce the estimates for the MRP over at least the last decade in order to show market participants that highly unusual MRP estimates

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[19] The way we estimate the market risk premium from market indicators is described in Sub-section 7.2.2.

will not result from assigning a reasonable amount of influence to contemporaneous market information. This is shown in the figure below. The market risk premium is computed on a monthly basis for a 10.5 year period, using the same approach to considering historical and current information as underpins our estimates in Table 1.[20] As we discuss in Sub-section 4.3 and Section 5, we do not observe unreasonable time series variation in the estimate of expected market returns, nor unreasonable time series variation in the estimate of the MRP.

Figure 1. Market risk premium and expected market return
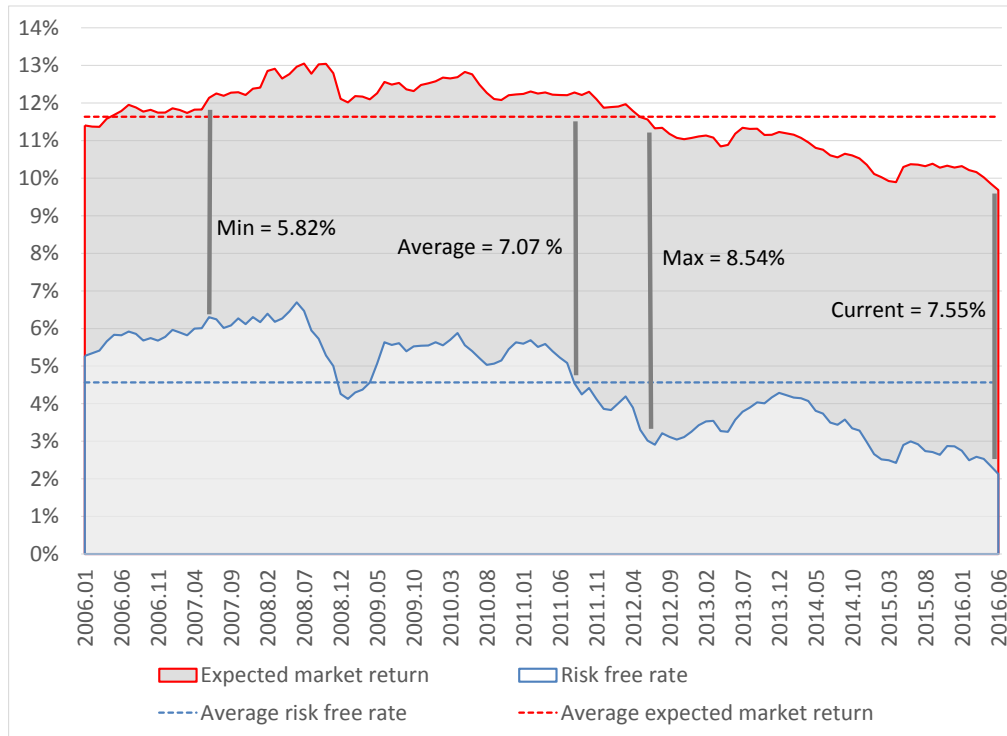
15   The 6.0% to 6.5% MRP estimate range of the QCA does not need to continue to be adopted in order to provide confidence to market participants. This sticky range for the MRP simply means that the allowed return on equity will have almost the same volatility as the risk free rate of interest, and will deviate from the best estimate of the MRP.

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[20] The MRP estimate from historical excess returns is held constant at 6.40%. The average historical real return on the market is held constant at 8.29%, and we assume that inflation is 2.50% for estimating the expected return on the market, consistent with the QCA assumption. The estimate of the expected market return using the dividend discount model is explained in Sub-section 7.2, as is the estimated market risk premium from market indicators.

2   Implications of the QCA's approach to setting the MRP allowance

2.1   The role of the MRP in the regulatory process

16   Within the CAPM, the MRP is a parameter that reflects the additional return, over and above the risk-free return, that investors would require from an investment of average risk.

17   It is well accepted that the MRP varies over time as market conditions change. For example, as market conditions change, investors might reassess the amount of risk that is involved in a particular investment or the return that they require for bearing risk. This is consistent with the fact that regulatory estimates of the debt risk premium have varied materially over the last 10 years – if the return premium for bearing a certain amount of risk varies materially for debt securities, it follows that it must also vary for equity securities.

18   In this regard, the Australian Energy Regulator (AER) states that:

> Evidence suggests the MRP may vary over time. In their advice to the AER, Professor Lally and Professor Mackenzie and Associate Professor Partington have expressed the view that the MRP likely varies over time.[21]

19   The QCA also states that:

> …the market risk premium is forward-looking,[22]

which implies that it changes with market conditions, and specifically that:

> …the market risk premium varies over time.[23]

2.2   The QCA approach to estimating the MRP

20   The QCA has traditionally relied on four methods for estimating the MRP:[24]

    a.   The long-run mean of historical excess returns, which the QCA refers to as the **Ibbotson** method;[25]

    b.   The long-run mean of historical excess returns minus a deduction for the extent to which actual historical inflation was higher than

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[21] AER (2013), Rate of Return Guideline: Explanatory Statement, p. 91.

[22] QCA MRP Discussion Paper, p. 9.

[23] QCA Market Parameters Decision, p. 81.

[24] As set out below, some of the names that the QCA uses for these methods can be misleading. However, for convenience we adopt the QCA's naming convention in relevant places throughout this report.

[25] Ibbotson Associates, now part of Morningstar, is one of a number of sources of historical excess returns data.

the QCA's estimate of what investors expected inflation to be. The QCA refers to this as the **Siegel** method;[26]

c. Recent responses to (mainly academic) surveys about the MRP, which the QCA refers to as the **Survey** method; and

d. The dividend discount method, which produces a forward-looking estimate of the market risk premium implied by current stock prices and forecasted dividends. The QCA refers to this as the **Cornell** method.[27]

21   The QCA has recently also considered the historical real returns method, which it refers to as the **Wright** method.[28]

22   Prior to its Market Parameters Decision, the QCA applied an averaging procedure to the four estimates to obtain a final MRP estimate. However, in its recent decisions, the QCA has indicated that it has applied unspecified weights to the evidence that it has considered:

> …we did not apply an equally-weighted mean (of our four primary methods) and round the result to the nearest half percentage point. As stated in our market parameters decision, we have examined our traditional methods and also considered a broader range of information, some of which does not lend itself readily to an averaging procedure.
>
> Our view is that applying our judgement to assess the strengths and weaknesses of the estimates obtained from several different methods, as well as to assess other relevant information, to arrive at a final estimate for the MRP, was appropriate.[29]

23   However the QCA distils the evidence into a single figure, the outcome of the QCA's approach to estimating the MRP is an almost constant estimate across all market conditions. Specifically, the QCA has set the MRP to 6.0% or 6.5% in every decision since the QCA's inception. The QCA has adopted that same narrow range during the biggest bull market in a generation and also during the worst financial crisis in a generation.

24   The reason for this constant outcome is that three of the QCA's methods produce essentially fixed estimates and the two that do vary over time receive negligible weight. The Ibbotson approach is an average of historical excess returns over 50 to 100 years, and one new observation is generated each year – so that estimate is effectively constant. The Siegel estimate is essentially 1% less than the Ibbotson

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[26] This method was developed for the QCA by its consultant, based on a paper published by Jeremy Siegel in 1988. The "Siegel" method for estimating the MRP has never been used nor advocated by Siegel.

[27] This method is based on Cornell (1999). However, the QCA makes three fundamental adjustments to the method advocated by Cornell, which we discuss in Section 4.

[28] The QCA had regard to the Wright method when setting the MRP in its Market Parameters Decision – see UT4 Final decision, p. 243. The historical real returns method is a common method for estimating the MRP and has been used extensively by UK regulators. Wright is one of many experts to have advocated the use of this approach.

[29] DBCT Draft Decision, p. 75.

estimate, so it too is constant. The surveys that the QCA considers always produce an estimate close to 6% (whether people are surveyed during economic booms or financial crises), so they are effectively constant. It is only the Cornell and Wright estimates that vary across market conditions.

25   Whatever the cause, the observable outcome is that the QCA goes through a detailed analysis for every determination and the outcome is always the same 6.0% to 6.5% figure.

26   Indeed, having stated in its Market Parameters Decision that:

> …the market risk premium varies over time[30]

the QCA now concedes that, under its estimation approach, the MRP is a:

> non-time-variant parameter.[31]

2.3   Implications of the QCA approach to the MRP

27   Since its Market Parameters Decision in December 2013, the yield on 10-year government bonds has fallen from 4.29%[32] to 2.12%. The QCA has maintained the same 6.5% MRP in every one of its decisions since December 2013. Thus, the QCA considers that the required return on equity for the average firm[33] has fallen from 10.8%[34] in December 2013 to 8.6%[35] now. This represents a decline of more than 20% over the last two and a half years, as illustrated in Figure 2 below.

Figure 2: QCA estimate of the required return on equity for an average firm
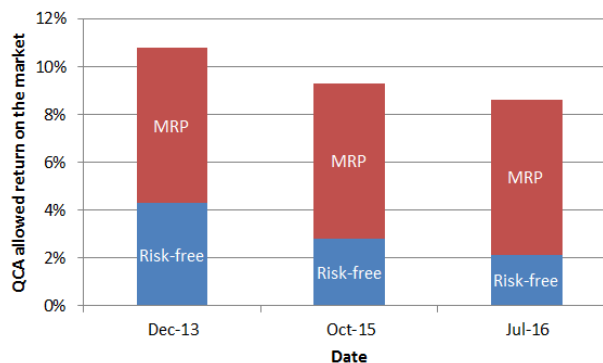
Source: QCA Market Parameters Decision December 2013, QCA DBCT Draft Decision October 2015, RBA current 10-year government bond yield July 2016.

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[30] Market Parameters Decision, p. 81.

[31] QR Final Decision, June 2016, p. 49. The QCA considers the risk free rate and debt margin to be time variant parameters.

[32] Market Parameters Decision, p. 72.

[33] Which, under the CAPM, is equal to the sum of the risk-free rate and the MRP.

[34] 4.29% + 6.5%.

[35] 2.12% + 6.5%.

28   The source of this 20% reduction in the allowed return on equity is the QCA's assumption that investors require a constant risk premium of 6.5% to be added to the contemporaneous government bond yield. Under this assumption, the allowed return on equity rises and falls one-for-one with changes in the government bond yield.

29   In the remainder of this section, we review a range of evidence that supports the proposition that the expected market return does not decline on a one-for-one basis with government bond yields. In the subsequent section, we consider what it is about the QCA's approach that has led it to reduce the allowed return on equity in a way that is inconsistent with the evidence set out below. We then make recommendations about how amendments to the QCA approach might lead to more reasonable estimates of the required return on equity in a range of market conditions.

2.4   The QCA's own estimates of the required return on equity

30   The QCA has stated that it has regard to a number of approaches when selecting an MRP figure to insert into the CAPM formula. Two of these approaches, which the QCA refers to as the "Cornell" and "Wright" approaches[36], produce direct estimates of the required return on the market. The QCA then deducts the contemporaneous government bond yield to obtain an estimate of the MRP.

31   Figure 3 below shows that the QCA's own estimates of the required return on equity from two approaches – historical real returns and the dividend discount model – have not changed between the Market Parameters Decision in December 2013 and the recent DBCT Draft Decision.

32   The QCA's Wright estimate of the required return on the market was 11.7% in 2013[37] and it remains at 11.7% now.[38] This is illustrated in red in the figure below.

33   From its Cornell approach, which is illustrated in blue in the figure below:

> a.   In its Market Parameters Decision, the QCA adopted a range of 9.8% to 12.3%, with a point estimate of 11.2%;[39] and

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[36] The Wright approach generates an estimate of the expected market return based upon historical average real returns. It is not a timely estimate of the expected market return. We include the Wright approach here, alongside the Cornell approach, to make the point that there is evidence from two estimation techniques used by the QCA that imply no change in the expected market return, despite declines in government bond yields. Yet this does not impact the QCA's decision on MRP which remains at 6.5%.
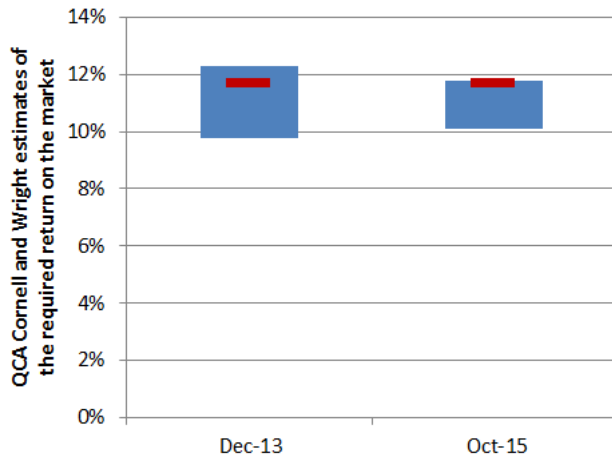
[37] Market Parameters Decision, p. 88.

[38] DBCT Draft Decision, p. 73.

[39] Market Parameters Decision, p. 72.

b. In its DBCT Draft Decision, the QCA adopted a range of 10.1% to 11.8% with a point estimate of 11.0%.[40]

Figure 3: The QCA's Cornell and Wright estimates of the required return on the market

Source: QCA Market Parameters Decision December 2013, QCA DBCT Draft Decision October 2015.
Blue represents the QCA's Cornell range and red represents the QCA's Wright point estimates.

34   The only material change in the QCA's Cornell estimate is a narrowing of the range. The QCA does not explain or comment on the reason for this narrowing, although it is most likely due to the fact that the QCA now considers a smaller set of "convergence" periods.[41]

35   In summary, two of the QCA's own direct estimates show that there has been no material change in the required return on equity since the Market Parameters Decision. Thus, it follows that the decline in government bond yields over this period has been offset by an increase in the MRP as summarised in Table 2 and Figure 4 below.

Table 2. QCA MRP estimates

Decision	Estimation date	Cornell	Wright
Market Parameters Decision	Dec-13	6.90% (5.6% - 8.0%)	7.40%
DBCT Draft Decision	Oct-15	8.20% (7.3% - 9.0%)	8.90%

Source: QCA Market Parameters Decision December 2013, QCA DBCT Draft Decision October 2015.

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[40] DBCT Draft Decision, p. 74.

[41] The convergence period is an assumption about how long it takes for short term dividend growth to trend towards a long term dividend growth assumption.

Figure 4: The QCA's Cornell and Wright estimates of the MRP
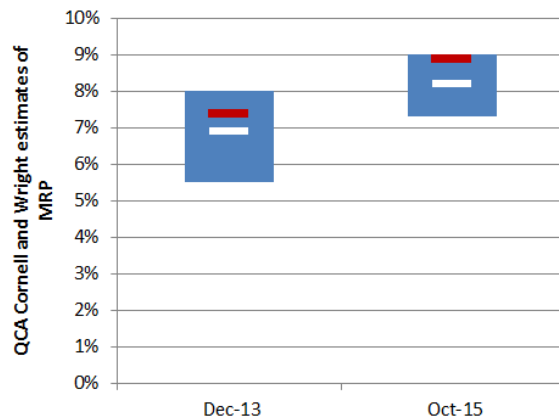
Source: QCA Market Parameters Decision December 2013, QCA DBCT Draft Decision October 2015.

2.5   AER estimates

36   The AER also computes estimates of the required return on the market using a dividend discount approach (which the AER refers to as its "DGM" estimate) and from the Wright approach. The AER published its Guideline estimates in December 2013 and has since published decisions in November 2014, April 2015, and May 2016. The AER's estimates from both approaches ind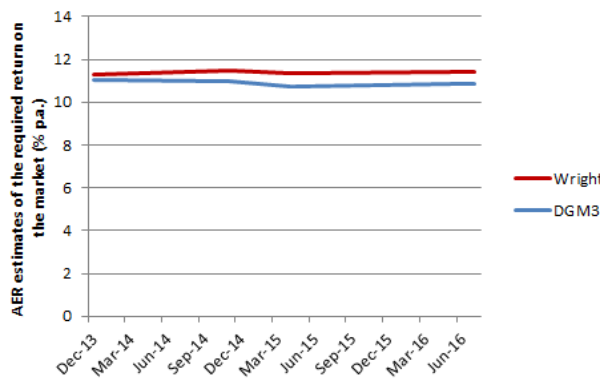icate that there has been no material change in the required return on equity over that period, as illustrated in Figure 5 below.

Figure 5: The AER's DGM and Wright estimates of the required return on the market

Source: Rate of Return Guideline, Explanatory Statement, Appendix; Ausgrid Draft Decision Attachment 3; Ausgrid Final Decision Attachment 3; Citipower Final Decision Attachment 3.
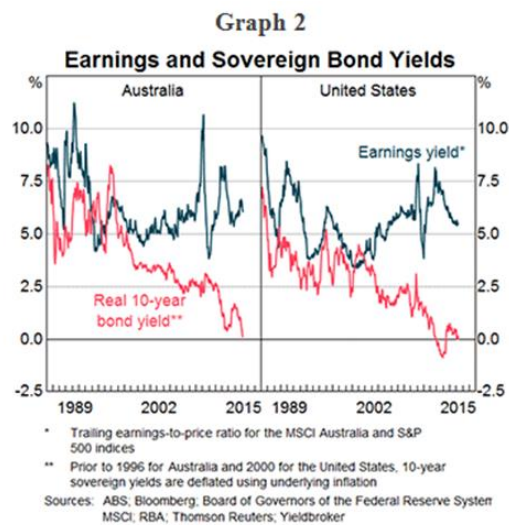
2.6   Views from the market

37   Evidence from respected market participants is consistent with the dividend discount estimates and inconsistent with the QCA estimates, as set out below. Market participants do not agree with the QCA's view that the GFC resulted in a material fall in the required return on equity – one-for-one with changes in the government bond yield.

Reserve Bank of Australia

38   Reserve Bank Governor Glenn Stevens has recently stated that the equity risk premium appears to have risen to offset the recent falls in the risk-free rate such that the required return on equity has not fallen:

> …post-crisis, the earnings yield on listed companies seems to have remained where it has historically been for a long time, even as the return on safe assets has collapsed to be close to zero (Graph 2). **This seems to imply that the equity risk premium observed *ex post* has risen even as the risk-free rate has fallen and by about an offsetting amount**.[42]

Graph 2
Earnings and Sovereign Bond Yields

*   Trailing earnings-to-price ratio for the MSCI Australia and S&P 500 indices
**   Prior to 1996 for Australia and 2000 for the United States, 10-year sovereign yields are deflated using underlying inflation
Sources: ABS; Bloomberg; Board of Governors of the Federal Reserve System; MSCI; RBA; Thomson Reuters; Yieldbroker

39   Governor Stevens went on to note that the returns on equity required by investors have not shifted even though risk-free rates have fallen to exceptionally low levels:

> …it might be explained simply by stickiness in the sorts of 'hurdle rates' that decision makers expect investments to clear. I cannot speak about US corporates, but this would seem to be consistent with the observation that we tend to hear from Australian liaison contacts that **the hurdle rates of return that boards of directors apply to investment propositions have not shifted, despite the exceptionally low returns available on low-risk assets**.[43] [Emphasis added]

40   He goes on to further consider the explanation that:

> …the risk premium being required by those who make decisions about real capital investment has risen by the same amount that the riskless rates affected by central banks have fallen.[44]

McKinsey Inc.

41   Dobbs, Koller and Lund (2014) from McKinsey Inc. examined the impact of the recent world-wide decline in government bonds yields. Like the Reserve Bank and

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[42] Glenn Stevens, Speech to the Australian American Association, New York, 21 April 2015. Emphasis added.

[43] Glenn Stevens, Speech to the Australian American Association, New York, 21 April 2015. Emphasis added.

[44] Glenn Stevens, Speech to the Australian American Association, New York, 21 April 2015.

independent valuation experts, they note that the required return on equity appears to be quite stable even as government bond yields decline materially. They observe that equity investors and corporate managers have maintained stable required returns – they have not reduced required returns one-for-one with recent declines in government bond yields:

> …a "rational expectations" investor who takes a longer-term view should regard today's ultra-low rates as temporary and therefore likely will not reduce the discount rate used to value future cash flows. Moreover, such investors may assign a higher risk premium in today's environment. Our conversations with management teams and corporate boards suggest that they take a similar approach when they consider investment hurdle rates. None of those with whom we spoke have lowered the hurdle rates they use to assess potential investment projects, reflecting their view that low rates will not persist indefinitely.[45]

42   The authors also note that the empirical evidence supports the proposition that the required return on equity has remained stable, even as government bond yields have fallen:

> Empirically, if investors did reduce their discount rate on future corporate-earning streams, we would expect to see P/E[46] ratios rise. Over the last several years of QE,[47] however, P/E ratios have remained within their long-term average range.[48]

43   That is, if the required return on equity had fallen in line with the fall in government bond yields (as the QCA's allowed returns would suggest), we would see an increase in P/E ratios. However, in the prevailing conditions in the Australian market, the exact opposite has occurred – P/E ratios have generally *fallen* with the recent decline in government bond yields, as set out in Figure 6 below. This is consistent with recent increases, rather than decreases, in required returns.

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[45] Dobbs, Koller and Lund (2014), p. 17.

[46] This is a reference to the price-earnings ratio, the ratio of the price per share to earnings per share. It is the inverse of the earnings yield that is the subject of Figure 2 in Stevens (2015).

[47] Quantitative easing is a reference to the expansive monetary policy that has been employed by many central banks since the onset of the GFC.

[48] Dobbs, Koller and Lund (2014), p. 17.

Figure 6: Australian P/E ratios and government bond yields
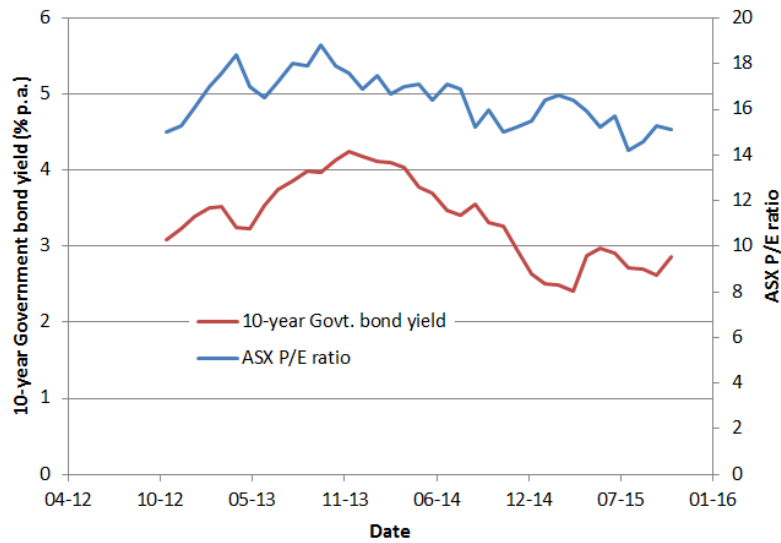
Source: RBA Tables f07 and f02.

44   Dobbs, Koller and Lund (2014) go on to report that the implied real required return on equity[49] has remained stable – within a narrow band even as government bond yields have varied materially. They summarise this evidence in Figure 7 below.

Figure 7: Implied real required return on equity

Source: Dobbs, Koller and Lund (2014), Exhibit 2, p. 17.

45   They conclude that this evidence suggests that equity investors have offset the decline in government bond yields by adopting a higher market risk premium – leaving the required return on equity largely unchanged:

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[49] The estimated real cost of equity is essentially a dividend discount model application, in which the authors estimate the real return which justifies current share prices based upon fundamental information such as growth rates and inflation.

> Since 2000, this implied real cost of equity has been rising steadily, but it has remained well within the historical range since the start of the crisis (Exhibit 2). This implies that even if investors believe the risk-free rate has fallen, they have offset this with a higher equity risk premium.[50]

Economic Regulation Authority

46   In its recent ATCO Gas Final Decision, the Economic Regulation Authority of Western Australia (ERA) increased its MRP estimate from 5.5% to 7.6% to offset the fall in its estimate of the risk-free rate, stating that:

> …the Authority has now concluded that it is not reasonable to constrain the MRP to a fixed range over time. The erratic behaviour of the risk free rate in Australia to date, and more particularly, its pronounced decline in the current economic environment, leads to a situation where the combination of a fixed range for the MRP and prevailing risk free rate may not result in an outcome which is consistent with the achievement of the average market return on equity over the long run.[51]

Independent Pricing and Regulatory Tribunal

47   In New South Wales, the Independent Pricing and Regulatory Tribunal (IPART) applies a default 50% weight to forward-looking estimates of the MRP – primarily a number of DGM specifications.[52] In its most recent update, IPART adopts a contemporaneous MRP of 7.9%.[53]

Ofgem

48   In a report for UK regulator Ofgem, Wright and Smithers (2014) consider how the recent decline in government bond yields might affect the approach to estimating the MRP.

49   They begin with a consideration of the earlier Smithers & Co report by Wright, Mason and Miles (2003),[54] which proposes that the real required return on equity should be assumed to be constant on the basis of data from long-term historical averages of realised stock returns. Wright and Smithers note that this approach (which the QCA refers to as the "Wright approach") has been employed consistently by UK regulators since then.

50   Wright and Smithers (2014) conclude that:

> … the [U.K.'s Competition Commission] has given at least some weight to a model in which the expected market return is assumed to have been pulled down by falls in the risk-free rate. In Mason et al we argued against this model, pointing to the lack of any historical stability in the risk-free rate, and hence in estimates

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[50] Dobbs, Koller and Lund (2014), pp. 17-18.

[51] ERA, ATCO Gas Final Decision, Paragraph 1173.

[52] IPART, Review of WACC Methodology, December 2013.

[53] IPART, WACC Biannual update, August 2015.

[54] Wright and Smithers (2014) refer to this earlier paper as "Mason et al."

of the market equity premium. We believe that recent events have simply added to the weight of evidence against this approach.

In contrast the Mason et al/Ofgem approach implies a counter-cyclical equity premium, which is consistent with some more recent academic research, and with recent patterns in observable proxies for risk premia such as corporate bond spreads. It also has the advantage of providing stability in the regulatory process.

We conclude that there is no plausible case for any further downward adjustment in the assumed market cost of equity based on recent [downward] movements in risk-free rates.[55] [Emphasis added]

51   They go on to conclude that:

Thus both historical and more recent evidence point to the same conclusion: in contrast to the stock return there is no evidence of stability in the risk-free rate, at any maturity. As a direct implication, there is no evidence of stability of the market equity premium. Without such evidence, **there is no empirical basis for the assumption that falls in risk-free rates should translate to falls in expected market returns.** [56] [Emphasis added]

Federal Energy Regulatory Commission

52   In a recent decision, the U.S. Federal Energy Regulatory Commission (FERC) noted that its previous approach had been to adjust the allowed return on equity (ROE) in lockstep with changes in the relevant government bond yield:

The Commission's practice traditionally has been to adjust the ROE using a 1:1 correspondence between the ROE and the change in U.S. Treasury bond yields—i.e., for every basis point change in the U.S. Treasury bond yield the Commission would adjust the ROE by one basis point.[57]

53   However, FERC concluded that in the prevailing market conditions such an approach "may not produce a rational result,"[58] and that:

Upon consideration of the record evidence in this proceeding, and in light of the economic conditions since the 2008 market collapse more generally, U.S. Treasury bond yields do not provide a reliable and consistent metric for tracking changes in ROE.[59]

54   The primary reason for FERC's conclusion is that:

The capital market conditions since the 2008 market collapse and the record in this proceeding have shown that there is not a direct correlation between changes in U.S. Treasury bond yields and changes in ROE.[60]

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[55] Wright and Smithers (2014), p. 2.

[56] Wright and Smithers (2014), p. 15.

[57] FERC Opinion 531, June 2014, Paragraph 159.

[58] FERC Opinion 531, June 2014, Paragraph 159.

[59] FERC Opinion 531, June 2014, Paragraph 160.

[60] FERC Opinion 531, June 2014, Paragraph 158.

2.7   The key question for decision-makers

55   The key question that is currently being considered by decision-makers and courts is whether they would be comfortable endorsing an approach that:

      a.   Implies that the GFC materially *reduced* the cost of equity capital, which is an implausible proposition; and

      b.   Implies that the cost of equity capital has fallen one-for-one with the decline in government bond yields over recent years when central banks, leading advisory firms, and other regulators conclude that it has not.

2.8   Changes between recent QCA decisions

Allowed return on equity reduced by 20% while equity yields did not

56   It is also important to note that the QCA's approach of maintaining a constant MRP has led it to materially reduce the allowed return on equity since the publication of its Market Parameters Decision in December 2013:

      a.   In its Market Parameters Decision, the QCA adopted a risk-free rate of 4.29% and a MRP of 6.5%, allowing a return on equity of **10.79%**[61] for a firm of average risk; and

      b.   In its DBCT Draft Decision, the QCA has maintained a MRP of 6.5% while reducing the risk-free rate to 2.10%. This provides an allowed return on equity of **8.60%** for a firm of average risk.

57   That is, over a period of approximately 18 months, the QCA's approach to setting the MRP has resulted in a reduction in the allowed return on equity of over 20%. Yet equity yields, the inverse of the price-earnings ratio, have not declined by the same magnitude.

Equity risk premium constant while debt risk premium increased

58   Between the Final Market Parameters Decision and the DBCT Draft Decision:

      a.   The QCA has maintained the equity risk premium at 6.5%; whereas

      b.   The RBA indicates that the debt risk premium on 10-year BBB bonds has increased by 38%, from 2.01% to 2.78%.[62]

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[61] 4.29% + 6.5%.

[62] RBA Table f03 indicates that the debt risk premium on 10-year BBB bonds increased from 2.01% the month before the Final Market Parameters Decision (July 2014) to 2.78% at the end of October (the month used by the QCA parameter estimates in the DBCT Draft Decision).

59   In our view, it is implausible that financial market investors would require a 38% higher premium for risk when buying debt securities, but would require no higher premium for risk at all when buying equity securities.

2.9   Conclusions in relation to the market risk premium

60   In our view, the QCA's approach of adding an effectively constant MRP to the contemporaneous government bond yield should not be relied upon because it produces outcomes that are simply implausible.

61   Our view is that the QCA approach systematically understates the required return on equity in market conditions where government bond yields are at historical lows – as they are at present. We consider that it is implausible, and inconsistent with the evidence, that required returns on equity securities have *reduced* by 20% since the Market Parameters Decision.

3   Why does the QCA approach produce implausible estimates?

62   In Section 2 we made the point that the approach of the QCA produces estimates of the market risk premium that are implausible in some market conditions.

      a.   When stock prices are high compared to earnings and corporate bond spreads are low, the QCA's estimate of the market risk premium does not fall below 6.0% to 6.5%.

      b.   When stock prices are low compared to earnings and corporate bond spreads are high, the QCA's estimate of the market risk premium does not rise above 6.0% to 6.5%.

63   In short, the QCA's estimates of the MRP are sticky. They are almost invariant to any changes in the prices of stocks and corporate bonds. **The result of stickiness in the estimate of the MRP is volatility in the allowed return on equity, which rises and falls one-for-one with changes in government bond yields.**

64   In some circumstances, the required return on equity may well fall when government bond yields fall. For instance, this would occur if investors lower their expectations for inflation, and no other expectations change. In other circumstances the require return on equity may stay constant, or rise, when government bond yields fall. For instance, if investors have an increased perception of risk they will pay higher prices for bonds and lower prices for stocks – government bond yields fall and required returns on equity rise.

65   In estimating the market risk premium, what matters is the reason why the government bond yield has fallen. At any point in time we cannot be certain why government bond yields have changed. So in estimating the MRP we need a process to take account information from the bond and equity markets about current expectations.

66   The problem with the QCA approach is that it implies that the required return on equity **always** falls one-for one with **any** decline in government bond yields. This strict assumption leads to implausible estimates in some market conditions.

67   In this section, we consider what it is about the QCA approach that leads to it always adopting the same estimate of the MRP, even as market conditions change materially over time. To investigate this question, we consider the various estimation methods that the QCA uses to inform its estimates of the MRP. In its recent DBCT Draft Decision, the QCA sets out the information that it has regard to when determining the allowed MRP as follows:

> Our determination of an overall MRP estimate included an examination of the methods of Ibbotson, Siegel, Cornell and Wright as well as other sources such as survey evidence, independent expert reports, and additional information to reflect current conditions (e.g. volatility measures, corporate debt premiums, and

liquidity premiums on government bonds). We also took into account the relationship between the RFR and the MRP.[63]

68   In its Market Parameters Decision and its DBCT Draft Decision the QCA sets out point estimates for the five methods that are listed above, and ranges for three of those methods. The QCA's estimates are summarised in Figure 8 below.

Figure 8: QCA MRP estimates
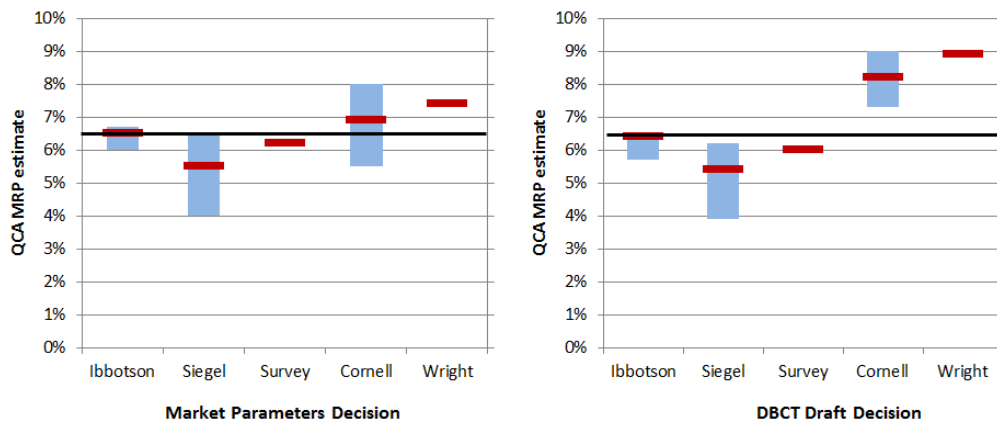
Source: Market Parameters Decision, p. 23; DBCT Draft Decision, pp.73-74.

69   Figure 8 shows that:

> a.   The QCA's Ibbotson, Siegel and Survey estimates are essentially identical in the two decisions; and
>
> b.   The QCA's Cornell and Wright estimates are materially higher in the DBCT Draft Decision.

70   In its DBCT Draft Decision, the QCA concluded that:

> Our assessment of these estimates, together with additional sources of information, confirm that our preferred MRP estimate of 6.5 per cent remains a valid estimate for this draft decision.[64]

71   The QCA has not explained how it has distilled the evidence set out above into a point estimate of 6.5%, other than to note that it has not applied an equally-weighted mean[65] and that:

> Our view is that applying our judgement to assess the strengths and weaknesses of the estimates obtained from several different methods, as well as to assess other relevant information, to arrive at a final estimate for the MRP, was appropriate.[66]

72   That is, it is left for stakeholders to try to reverse engineer precisely how the QCA has processed the evidence that it considers to be relevant into a final estimate of

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[63] DBCT Draft Decision, p. 75.

[64] DBCT Draft Decision, p. 74.

[65] DBCT Draft Decision, p. 75.

[66] DBCT Draft Decision, p. 75.

6.5%. What is clear from Figure 8 is that the QCA's Cornell and Wright approaches must both receive negligible weight. This follows from the fact that the QCA estimates from those two methods increased materially between the two decisions, but the QCA has made no change to its MRP allowance.

73   Thus, by assigning negligible weight to the only two approaches that vary over different market conditions, the QCA approach guarantees a constant MRP allowance. That is, if material weight is assigned only to methods that produce essentially constant estimates over time, it is impossible for there to be any result other than a constant allowed MRP.

74   The adoption of a constant MRP is inconsistent with the QCA's own view that:

> …the market risk premium varies over time and its relationship with the risk-free rate likely changes,[67]

but it is consistent with the QCA's acknowledgement that, under its estimation approach, the MRP is a:

> non-time-variant parameter.[68]

75   In summary:

    a. The QCA's approach to estimating the MRP produces outcomes that are implausible in some market conditions, including the prevailing market conditions; and

    b. The root cause of these implausible outcomes is the fact that the QCA's approach produces an essentially constant MRP allowance; and

    c. The reason that the QCA's approach produces a constant MRP allowance is that it assigns no material weight to the approaches that do produce MRP estimates that vary over time. Rather, the QCA approach leads to an outcome that changes in the risk free rate of interest necessarily flow through to the same change in the expected market return.

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[67] Market Parameters Decision, p. 81.

[68] QR Final Decision, June 2016, p. 49.

4   Recommended changes to the QCA's approach to setting the MRP allowance

4.1   Overview

76   Our view is that the QCA's approach to setting the MRP allowance would be improved by:

  a. Applying relatively less weight to methods that are known to produce essentially the same estimate of the MRP in all market conditions; and

  b. Applying relatively more weight to methods that produce MRP estimates that vary over different market conditions.

77   In the remainder of this section, we provide a brief summary of our recommended approach to each of the QCA's estimation methods. This is followed by discussion of how estimates of the MRP from different estimation techniques can be distilled into a final MRP estimate in a manner that increases objectivity, transparency and consistency.

4.2   Individual estimation methods

4.2.1   Historical excess returns (Ibbotson)

78   We agree that the mean of historical excess returns produces a valid estimate of the long-run average MRP and should be afforded material weight. This approach produces an estimate of the MRP in average market conditions (that is, the average conditions over the historical period that is used).

79   The MRP allowance should not be based exclusively on this approach because the current market conditions may differ from the long-run average market conditions – for example, if government bond yields were currently lower than at any time during the historical period over which the mean was computed.

4.2.2   Excess returns adjusted for unanticipated inflation (Siegel)

80   We have previously submitted[69] that there is no sound basis for the use of the QCA's "Siegel" method. There is a conceptual flaw in assigning so much relevance to this revision to historical excess returns, as we explain below by answering four questions.

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[69] SFG (2015).

First, why do we refer to historical returns at all in estimating the market risk premium today?

81   We have information on stock prices, earnings expectations, corporate bond yields and other contemporaneous information we can use to estimate the market risk premium. But regulators, investors, regulated entities and users recognise that there is estimation error in contemporaneous estimates of the market risk premium.

82   This means there is the risk that, if we rely solely on timely information about expected market returns, that we make a material error in the estimate of the MRP. Reference to past returns mitigates the risk that this material error occurs.

Second, what can we interpret from past returns information?

83   Past returns information allows us to make an estimate of the market return, and market risk premium, which would occur on average. If we knew nothing about what the market's expectations were today (for instance, if we didn't have information on stock prices, earnings expectations or corporate bond yields) reference to historical returns allows us to make an estimate of the expected market return and MRP.

84   There is an important assumption that underpins this reference to historical returns. The assumption is that the sample of returns information is unbiased. This means there is an equal chance that returns in the past were better than investors expected, or worse than investors expected. In the short term this assumption is unlikely to hold. In a single year equity market returns might be +60% or −40% which is not what investors would have expected. But as the time series is extended there is an increased chance that the average from past returns represents investors' expectations.

85   Now consider the use of the adjustment to average returns which the QCA refers to as the Siegel approach. By incorporating this adjustment, the QCA forms the view that the average outcome from historical returns is not an unbiased estimate of investor expectations. Rather, the QCA makes the assumption that equity investors earned returns which were above what the investors expected. The basis for this view is that inflation in one period of time was above what investors expected, reducing real government bond yields and adding a boost to the realised return premium that investors earned, compared to what was expected.

86   The reason we question the logic of the QCA approach is that it places disproportionate weight on **one** particular explanation for the 6.5% average excess return. There are countless reasons why average excess returns could have been above or below investor expectations in a particular time period.

       a.   In the 17 months from October 2007 to February 2009 the Australian equity market recorded returns of −48%. It was not until

2013 that market recovered to its level observed prior to the GFC.[70] So we have a six year period of zero aggregate returns on the Australian equity market. This is below what investors would have expected.

b. There is another six per period ending in September 1987 when the Australian market earned total returns of +332%, equivalent to 28% per year. The market then lost 40% in the crash of October 1987 and took another three years and seven months to return to its pre-crash levels.[71]

87   The key point is that a large number of shocks affect market returns and government bond yields but there is a single idea that is relied upon by the QCA to adjust the historical returns series to what it considers to be an unbiased level – the concept of unexpected inflation. In addressing this issue in its decisions, the QCA provides commentary to support its view that (a) inflation was higher than expected, and (b) this led to real government bond yields being lower than expected. The QCA is not suggesting that real market returns were unusually high, but rather that real government bond yields were unusually low (low, that is, compared to expectations).

88   In short, in giving so much weight to the Siegel adjustment, what the QCA is saying is:

a. We are very confident that government bond yields for a long period of time were below what investors expected, and so we need to decrease the average excess returns to get an unbiased estimate of the long run average MRP; but

b. With respect to all other factors that affected government bond yields and equity market returns, we have no reason to think that these factors led to average excess returns being too high or too low.

Third, can we have so much confidence in the theoretical argument that underpins the Siegel approach that it should materially affect the MRP estimate?

89   This confidence in giving such weight to the Siegel adjustment is not justified for the following reasons.

a. No one actually knows what inflation expectations were. So implementation of the Siegel approach requires strong assumptions to be made about what was a reasonable expectation for real government bond yields. The QCA makes an estimate of

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[70] Figures reported in this paragraph are based on the All Ordinaries Total Return Index and do not include benefits of imputation associated with dividends.

[71] Figures reported in this paragraph are based on the Datastream Australia Total Market Index.

the average real government bond yield using data from 1986 onwards[72] and says this is the best estimate of what investors over all years would have expected.

This is the crux of the matter – the QCA considers that a short time period with a fundamentally different central bank regime can be used to estimate what expected real government bond yields were over all years. We do not know what investors expected government bond yields to be over all years, and this one assumption ends up carrying considerable weight in the QCA's overall MRP estimate.

b. The main prediction underpinning the Siegel approach (that is, that real government bond yields would rise relative to 1990 levels) has turned out to be completely wrong.

We are at the end of a ten year period in which real government bond yields have averaged 2.0%, and a 20 year period in which real government bond yields have averaged 2.7%, which are well below the QCA's 3.8% estimate of investor expectations for real government bond yields.

c. Siegel himself proposes several possible explanations for the low real government bond yields observed since the 1920s. However, the QCA's Siegel approach focuses exclusively on only one of those explanations — unanticipated inflation. In doing so, the QCA overstates the role of unanticipated inflation in explaining the low real yields noticed by Siegel.

d. The "correction" that the QCA applies to the Ibbotson estimate, when applying its Siegel approach, is likely to be overstated as it fails to account for likely illiquidity premia within the yields on inflation-protected bonds.

e. The Siegel estimator is simply another version of the Ibbotson estimator, so the inclusion of both as separate methods is to essentially double the weight given to historical average excess returns.

Fourth, how can we interpret historical returns evidence?

90   In our view there is no basis for assigning any weight to the Siegel adjustment for unanticipated inflation. The adjustment relies entirely on one important assumption – that the average real government bond yield observed since 1986 is the best estimate of what the expected real government bond yield was over all historical periods. This one assumption reduces the MRP implied by past excess returns by a whole percentage point, from 6.5% to 5.5%. This is a very strong

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[72] Market Parameters Decision, p. 81. The figure used by the QCA is 3.8% using data from 1986 to 2012.

assumption to apply to a different regime in terms of economic development, fiscal policy and central bank objectives.

91   Yet this assumption fundamentally alters the basis for referring to past returns at all – that we are attempting to mitigate estimation error – because of the risk that our interpretation of any one piece of evidence leads to a spurious result.

4.2.3 Surveys

Pablo Fernandez

92   The QCA considers two forms of survey evidence. The first of these is a series of surveys conducted by Spanish academic Pablo Fernandez. This survey consistently produces an MRP estimate in the order of 6% – in raging bull markets and during the depths of the GFC, it is always close to 6%.

93   The QCA notes that (as for every method) this estimate of the MRP must be grossed-up to include the QCA's estimate of the value of imputation credits. In its Market Parameters Decision, the QCA erroneously calculated the grossing-up to amount to 0.18%, but corrected this to 0.83% in its UT4 Draft Decision.[73] This led the QCA to conclude that the with-imputation estimate of the MRP (that is, an estimate that is comparable to the QCA's with-imputation estimates from other methods) is 6.8%.[74]

94   We have previously submitted[75] that the Fernandez survey results should be afforded no weight for reasons including:

  a. There is no information about the qualifications of respondents.

  b. There is no information about the non-response rate.

  c. The survey does not ask respondents what they are using the MRP for. It is unlikely that any of the respondents would be using the MRP to make real-world investment decisions. As Lally has noted "The respondents to these surveys are academics, analysts, and managers rather than investors per se."[76]

  d. There is no information about the values that participants use for other WACC parameters (for example, whether they are using higher values of the risk-free rate in lieu of a higher value for MRP).

  e. The vast majority of survey respondents indicate that their estimate is based on either the Ibbotson estimate, a textbook or historical data. Thus, the vast majority of survey responses are based on backward-looking historical information and are not forward-

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[73] UT4 Draft Decision, p. 232.

[74] UT4 Draft Decision, p. 232.

[75] SFG Consulting (2014).

[76] Lally (2013), p. 23.

looking estimates of MRP. This is consistent with the fact that the survey responses for Australia effectively reproduce the long-run historical estimate. This implies that the survey estimate should not be treated as being independent of the historical estimate and it should not be treated as a forward-looking estimate.

95   We remain of the view that the Fernandez surveys do not contribute any valuable information and should be afforded no weight. However, we recognise that the QCA has considered our arguments and has concluded that the Fernandez surveys are "timely, clear and properly reflective of the views of the market."[77]

Independent expert valuation reports

96   In its UT4 Draft Decision, the QCA agreed with our suggestion to consider MRP estimates in independent expert valuation reports that are prepared in conjunction with major corporate transactions.[78] At the QCA's request, we provided the QCA with a set of 29 reports. It is agreed between us and the QCA that, across those reports, the mean is 6.4% and the median is 6.0%, excluding imputation credits.[79]

97   In our previous submission, we noted that "On average, these reports use a risk-free rate that is 0.5% higher than the spot government bond yield at the time of the report."[80] Thus, it would be clearly inappropriate to consider that these reports would support an approach that pairs the quoted MRP estimate with the contemporaneous government bond yield.

98   We have also submitted that, for this data set, the mean is a more appropriate and reflective estimate than the median.[81] As well as being the median estimate, 6% is also the *minimum* estimate. None of the reports that were evaluated by the QCA adopts an estimate below 6%, but 41% of them adopt an estimate above 6%, as set out in Table 3 below.

Table 3. Independent expert report estimates of ex-imputation MRP

Estimate	Frequency
6%	59%
7%	14%
6-7%	3%
6-8%	24%

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[77] UT4 Draft Decision, p. 231.

[78] UT4 Draft Decision, p. 232.

[79] UT4 Draft Decision, p. 232.

[80] SFG (2014), paragraph 120.

[81] SFG (2014), paragraph 100.

Source: Independent expert reports

99   The QCA dismisses this point in the following sentence:

> …we consider that the more appropriate statistic is the median, to eliminate the influence of outliers in this small sample.[82]

100   However, there are no outliers in this data set in the sense that every single mid-point estimate is within the narrow range of 6-7%.

101   For the reasons set out above, our view is that characterising this evidence as supporting an (ex-imputation) MRP of 6% is misleading, but we recognise that this is the conclusion that the QCA has reached.

102   The QCA then grosses-up this estimate to incorporate its assumed value of imputation credits, resulting in a with-imputation estimate of 6.8%.[83]

103   However, in its DBCT Draft Decision, the QCA states that:

> Survey evidence supports an estimate of 5.1 per cent (excluding imputation credits), and 6.0 per cent (including imputation credits).

104   No explanation has been provided for why the QCA has materially reduced its survey estimate of the MRP. In our view, the MRP estimate would not take account of survey evidence. But if survey evidence was to be incorporated into the QCA analysis we consider that the evidence provided by a survey of independent expert reports is more credible than survey estimates compiled from a poll of academics and market practitioners.

105   The respondents to the poll do not need to justify their response, and it is unclear whether their responses pay particular attention to market conditions at the point in time. In contrast, the valuations provided by independent expert reports generally reflect market prices, so the joint expectations embedded in cash flow projections and discount rates will be a better approximation of market expectations than a poll.

4.2.4 Dividend discount model (Cornell)

106   We agree with the QCA that a dividend discount model should be used to inform the estimate of the MRP. The QCA uses what it calls the "Cornell" method, which draws its name from Cornell (1999). However, the QCA's dividend discount model differs materially from that actually proposed by Cornell in three ways:[84]

> a. Rather than simply solving for a single required return on equity in the standard way, the QCA assumes that equity holders require a low return for ten years and then there is a step change to a higher

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[82] DBCT Draft decision, p. 232.

[83] UT4 Draft Decision, p. 232.

[84] The QCA recognises these differences in its DBCT Draft Decision, Footnote 201, p. 70.

required return on equity thereafter. The MRP estimate is then based on the low return for the first ten years.

b. Rather than setting the long-run growth rate equal to the GDP growth rate, the QCA makes deductions on the basis that corporate dividends and earnings do not grow as fast as GDP – even though we have previously demonstrated that corporate dividends and earnings have grown faster than GDP over the last three decades. The MRP estimate is then based on the reduced growth rate.

c. Rather than deducting the same risk-free rate that is used elsewhere in the CAPM formula, the QCA deducts a higher risk-free rate when estimating the MRP.[85]

107   All of these adjustments result in the MRP estimate being lower than under a standard implementation of the method advocated by Cornell (1999). In short, the QCA assumes that sometime later we will observe a high cost of capital (compared to the cost of capital today) and low growth (compared to growth rates observed today) which pushes down the estimate of today's cost of capital.

108   We have previously made submissions on these points to the QCA and note that the QCA has rejected those submissions and maintained its approach of making the three adjustments set out above. Importantly, we have previously demonstrated that:

a. The assumption that the expected market return after 10 years will revert to its long term average leads to incredibly large variation over time in the expected market return and market risk premium estimates.[86] The QCA could replicate this analysis by showing what its market risk premium estimates would have been over the past 10 years.

b. The QCA's assumption about earnings growth (real growth 1% less than GDP growth) is not consistent with the actual earnings growth observed for listed firms in the current regime of low inflation and high price/earnings ratios.[87]

c. In more than one submission we have made the point that it is illogical to have different estimates of the expected market return depending upon whether the regulatory period is 1 year, 4 years or 10 years. At any point in time the government bond yield will differ by maturity of debt. But the QCA applies the same MRP estimate. So if the regulatory period is 1 year, 4 years or 10 years the QCA will have a different prediction of the market return.

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[85] See Appendix 7.1 for more information.

[86] SFG (2014), Figure 2.

[87] SFG (2014), Figures 3 and 4.

4.2.5 Historical real returns (Wright)

109   In our view, the Ibbotson and Wright methods should be considered jointly as they are two different methods for obtaining an MRP estimate from the historical data. These two methods sit at either end of a theoretical spectrum.

   a. The Ibbotson method assumes that the best estimate of the MRP is the average excess return and the required return on equity rises and falls one-for-one with changes in government bond yields; and

   b. The Wright approach assumes that best estimate of the real required return on equity is the average real return on equity, which means that the MRP changes over time due to variation in government bond yields and inflation expectations.

110   Since the truth likely falls somewhere between these two theoretical endpoints, our view is that both should be afforded material weight.

111   In this respect, our view is entirely consistent with Lally's advice to the QCA:

> I consider that the set of methodologies considered by the QCA should be augmented by one involving estimating the expected real market cost of equity from the historical average actual real return and then…converting the estimate of the expected real market cost of capital to its nominal counterpart.[88]

112   Lally (2013) concludes that the evidence on which end of the spectrum should be preferred is "not decisive"[89] and consequently recommends that both approaches should be given weight. Lally (2013) also notes that the Wright approach is used extensively by UK regulators.[90]

113   Moreover, Siegel (1999) also concludes that real stock returns have "displayed remarkable long-term stability" which is entirely consistent with the use of the Wright approach:

> The real return on stocks, as I have emphasised [1998] has displayed a remarkable long-term stability…The relative stability of long-term real equity returns is in marked contrast to the unstable real returns on fixed income assets.[91]

114   However, in its DBCT Draft Decision, the QCA states that:

> …very low weight [is] afforded to this method."[92]

115   The reasons proposed for the effective rejection of the Wright evidence are:

   a. If the QCA were to take into account evidence from different methods applied to foreign markets, that may produce a lower

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[88] Lally (2013), p. 3.

[89] Lally (2013), p. 6.

[90] Lally (2013), p. 13.

[91] Siegel (1999), p. 12.

[92] DBCT Draft Decision, p. 73.

> estimate that offsets the effect of the currently higher Wright estimate;[93] and
>
> b. Although the Wright and Siegel methods produce materially different estimates, they are designed to address the same issue and each may be superior under certain conditions.[94]

116   The first of these reasons is clearly irrelevant – logically, the fact that a different method applied to a different market might produce a different result has no bearing at all on whether or not the Wright method applied to the Australian data is relevant evidence that the QCA should consider.

117   The second of the QCA's proposed reasons is drawn from Lally (2015). Lally argues that the Wright and Siegel approaches are designed to address the same issue. This is not correct.

> a. The basis for the Siegel approach is that there is one particular influence on the historical data – unanticipated inflation – that leads to a bias in the implied market risk premium. This means that, if the Siegel adjustment is adopted, we will have the same adjustment regardless of whether today's government bond yield is high, low or average.
>
> b. The Wright approach does not say that the average excess return has a downward bias regardless of today's risk free rate. It says that, at low risk free rates the MRP implied by excess returns is too low because we do not expect a one-for-one movement in the required returns on the equity market and government bond yields.
>
> c. In short, at average government bond yields, the MRP implied by the Siegel approach will necessarily be below the average excess returns. But the MRP implied by the Wright approach will be approximately equal to average excess returns.

118   Regardless of whether the two approaches address the same or different issues, Lally still recommends that the Wright approach should be included as one of the methods that the QCA considers – and we agree with that assessment.

119   In summary, our conclusion is that there is no basis for the QCA's effective rejection of the Wright evidence – it has provided no cogent reason for rejecting the Wright evidence and it has done so against the advice of its consultant.

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[93] DBCT Draft Decision, p. 72.

[94] DBCT Draft Decision, pp. 72-73.

4.3   Reaching conclusions based upon the evidence

4.3.1   Three simple questions add substantial clarity

120   The discussion presented in Sub-sections 4.2 to 4.2.5 addressed specific issues associated with five estimation approached used by the QCA to estimate the MRP. In this sub-section we address the issue of interpretation of evidence, once decisions are made upon what estimation methods are relevant and what the MRP estimate is from each estimation method. In other words, there are two distinct issues involved – estimation of the MRP from difference techniques (which produces five MRP estimates in the QCA process) and how those MRP estimates are distilled into a conclusion.

121   The analysis of past QCA decisions presented in Sections 2 and 3 suggests that the QCA's reliance upon different estimation methods is not consistent over time. We can see this because even though the MRP implied by the dividend discount model and past real returns has increased as government bond yields fell, the conclusion on MRP remained 6.5%.

122   Our view is that the interests of users, regulated entities, investors and regulators is best served by a process that is objective, transparent, and which allows for new information to be incorporated into decision-making. The process could move in this direction if the QCA addressed three questions.

    a.   **What is the MRP that we would estimate today if we relied entirely upon past returns information and the current government bond yield?**

    This forms an estimate of the MRP which does not take into account current prices of shares, bonds, expectations for earnings or other contemporaneous information on market risk and return.

    In a perfect world we would base the MRP estimate entirely upon information that is relevant today. But information about the expected return in the equity market contains estimation error. We can observe share prices with precision, but make imperfect estimates of dividends, earnings and the value of imputation credits. So placing some reliance on past returns information mitigates the risk of generating a spurious result due to estimation error.

    According to the QCA MRP estimates, this would encompass MRP estimates from (i) historical excess returns; (ii) historical excess returns adjusted for unexpected inflation, and (iii) historical real returns.

    b.   **What is the MRP we would estimate today based upon analysis of contemporaneous market information?**

    The QCA has estimates of the MRP from its dividend discount model analysis, and analyses other contemporaneous information

– volatility measures and corporate debt premiums – in reaching its MRP decision.

c. Given estimates of the MRP based upon contemporaneous market information, and historical returns information, how much confidence do we have in the estimate of the MRP from contemporaneous information? Put another way, how much reliance should we instead place upon the MRP estimate from past returns in order to mitigate the risk of estimation error in the timely MRP estimate?

Addressing this third question makes it clear to everyone in the regulatory process how the QCA arrived at its decision. We can also see what impact different information has on the MRP estimate at each point in time. So we have transparency, objectivity and the ability for new information to be reflected in the MRP estimate (additional returns information slowly affects the MRP estimate based upon past data, and contemporaneous information changes quickly).

123   In Table 4 we illustrate how we would address these three questions, alongside QCA estimates of the MRP from its estimation techniques.[95] Our dividend discount model estimates and our MRP estimates from market indicators are explained in the following section. In the current sub-section we focus on interpretation of the evidence, rather than each specific estimation technique.

124   In the upper section of the table, we present information relating to past stock returns.

a. According to the three approaches the QCA uses to estimate the MRP from past stock returns, the MRP would lie within the range of **5.40% to 8.87%**.

b. We would drop the adjustment for unanticipated inflation, and then give equal consideration to the MRP estimate from past excess returns (6.40%) and past real returns (8.87%) to arrive at an MRP estimate of **7.63%**.

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[95] The risk free rate estimate of 2.13% is the average yield to maturity on 10 year government bonds over the month of June. The inflation assumption has been set to 2.50%, consistent with the QCA assumption. However, our dividend discount model estimate of the market risk premium is based upon the lower inflation assumption of 1.36% implied by 10 year nominal government bonds and 10 year inflation adjusted bonds.

Table 4. Aggregating information to reach a conclusion on the MRP

	QCA	Frontier Economics
Q1. What would the MRP estimate be based upon past returns information?		
MRP implied by historical excess returns	6.40%	6.40%
MRP implied by historical excess returns adjusted for inflation	5.40%	
MRP implied by historical real returns	8.87%	8.87%
Q1. What can we conclude from past returns information?		**7.63%**
Q2. What would the MRP estimate be based upon contemporaneous market information?		
Dividend discount model estimate of the MRP	8.17%	8.09%
Conditioning information (QCA) & Market indicators estimate of the MRP (FE)	No specific estimate	6.85%
Q2. What can we conclude from contemporaneous information?		**7.47%**
What is the survey estimate of the MRP?	6.00%	
Q3. What is the overall estimate of the MRP?	**6.50%**	**7.55%**

125   In the middle section of the table, we present information relating to contemporaneous estimates of the MRP.

a. According to information in the DBCT draft decision, the dividend discount model estimate of the MRP would be **8.17%**.[96] The QCA also considers equity market volatility and corporate bond spreads but does not make an MRP estimate based upon this conditioning information.

b. We have a dividend discount model estimate of the MRP of 8.09%, and an estimate of the MRP from market indicators of 6.85%, and would apply equal consideration to each of these MRP estimates. So we would estimate that contemporaneous information implied an MRP estimate of 7.47%.

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[96] The dividend discount model estimate of the MRP from the DBCT draft decision was 8.20%, and the risk free rate estimate we use is 0.03% higher (2.13% versus 2.10).

126   In the table, the survey evidence figure of 6.00% appears on a separate line. This occurs because it is unclear whether the QCA views the survey result:

    a.   as a contemporaneous estimate of the MRP, or

    b.   whether the QCA considers the survey response to be, at least in part, an estimate of the MRP that would apply in normal market conditions, or

    c.   Whether the QCA considers the survey estimate to be a conclusion that takes into account past information and current information – to be specific, the survey response could be an estimate of what someone would use in making a decision, rather than what the respondent thinks is implied by current share prices and government bond yields.

127   The final question to be addressed is how much confidence we have in contemporaneous estimates of the MRP, such that we need to place some reliance on past returns information. We would give equal consideration to the MRP estimate from current market conditions (**7.47%**) and the MRP estimate from past returns information (**7.63%**). This leads to a conclusion on the MRP of **7.55%**.

128   We know that QCA's conclusion on the MRP (6.50%). What we do not know is what the conclusion would be in the future when the MRP estimates from different approaches change.

129   Whenever there is discussion in a regulatory setting on the MRP, there is debate about how much consideration should be given to different pieces of evidence. This debate mostly relates to whether conclusions should be reached by applying specific weights (as we have done) or whether judgement should be applied in a holistic sense (as the QCA has done). The latter approach is justified on the basis that selection of any particular weight is arbitrary – "Why 50% versus 50%? Why not 60/40, or 70/30?"

130   The point we make in the current paper is different. Our point is that there are three distinct questions which would inform the MRP estimate, because not all estimation techniques relate to the same thing – Some estimation techniques address the question of what the MRP estimate would be, on average, and some estimation techniques address the question of what the MRP estimate is today, given prices we currently observe for stocks and government bonds. Addressing these questions is important because, from analysis of past QCA decisions, it appears that the holistic approach to considering information effectively changes the weight placed upon different pieces of evidence with no particular reason.

4.3.2 MRP estimates over time

131   It is useful to consider what the estimates of the MRP would have been over time, based upon the approach we summarise in Sub-section 4.3.1. In Figure 9 we present the expected market return and 10 year government bond yield over the 10.5 years from January 2006 to June 2016.

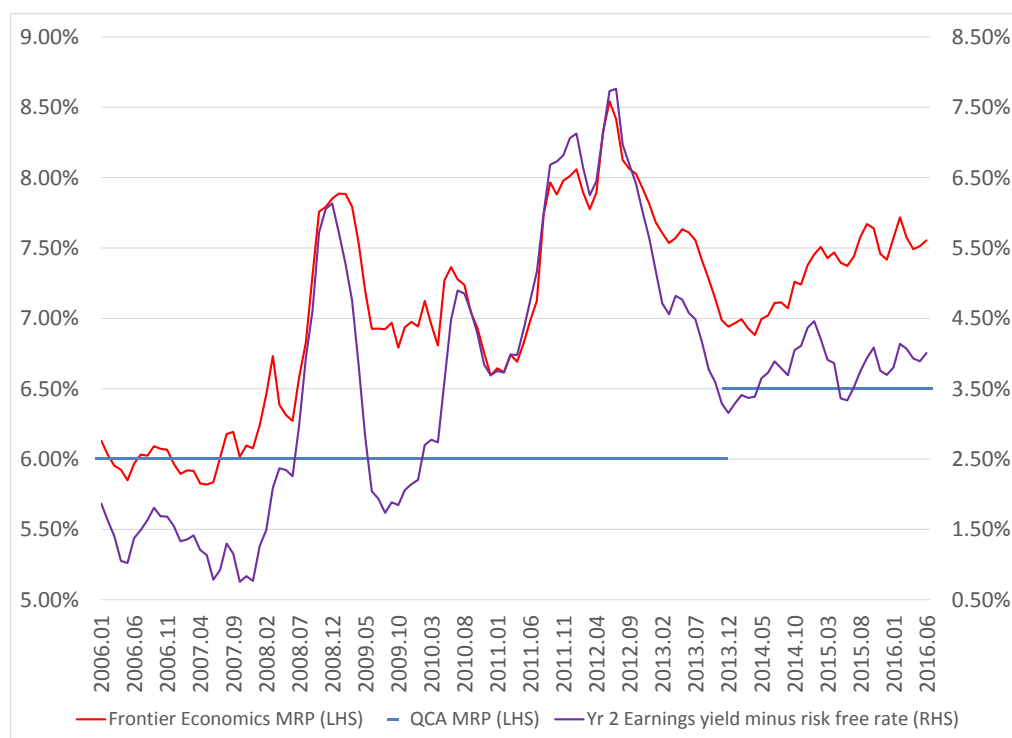Figure 9. Market risk premium and expected market return

Panel A: Risk free rate and expected market return
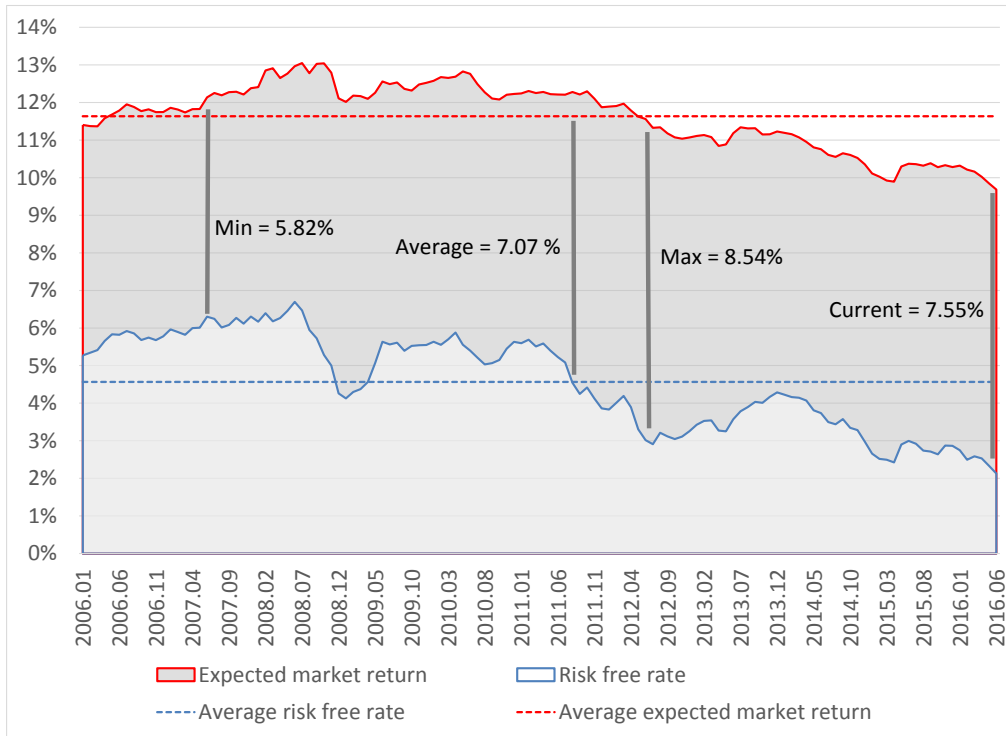
Panel B: Market risk premium estimates and corporate bond spreads
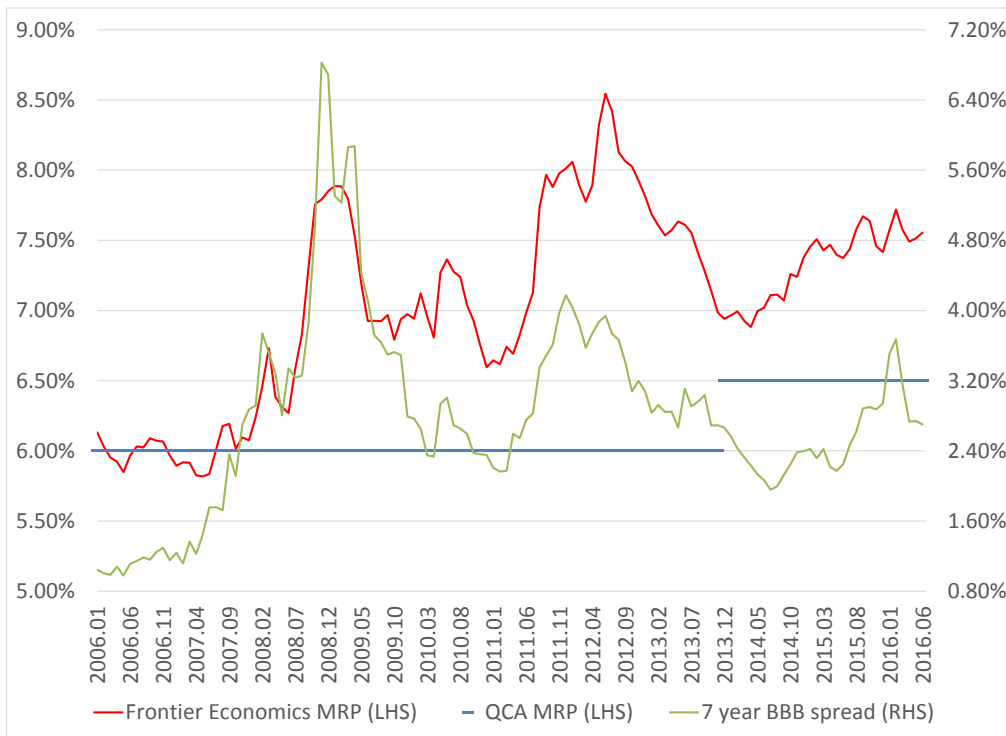
Panel C: Market risk premium estimates and earnings yield spreads

132   On average, the estimated market risk premium is 7.07%. This is higher than average excess return of 6.40% but this occurs because government bond yields are lower during the recent decade than in the entire series used to estimate the average excess return.

133   Prior to the GFC, the estimated market risk premium is low, and has a minimum estimate of 5.82%. Subsequent to the GFC, government bond yields have declined. So have expected market returns, but gap between government bond yields and the expected market return widened. It reached a maximum of 8.54% and for the most recent month is 7.55%.

134   In Panel B we present the estimate of the market risk premium over time, in comparison to the QCA estimate of the market risk premium. On average, the difference between the two MRP estimates is 0.95%, and at present is 1.05% (7.55% versus 6.50%).

135   It is worth highlighting that this difference in MRP estimates occurs primarily because the QCA approach appears to place very high reliance on average excess returns. So when there are current indications that the cost of equity is high compared to government bond yields we consider the QCA approach leads to the cost of equity being under-estimated.

136   Panel B shows the spread between the yield on seven year BBB rated government bonds and the 10 year government bond yield.[97] The corporate bond spread shows

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[97] The yields are compiled by the RBA and we have converted the yields to effective annual rates. There is a break in the series for 10 year BBB rated government bond yields so for illustrative purposes we use the 7 year BBB rated bonds.

substantial variation over time, and moves in the same general direction as our estimates of the market risk premium.[98] In contrast the QCA estimate of the market risk premium is invariant to movements in the corporate bond spread.

137   We reach the same conclusion if we refer to Panel C, in which we show the two year ahead earnings yield relative to the risk free rate.[99] The spread between the two year earnings yield and the 10 year government bond yield is currently 4.01%, compared to its minimum of 0.75% over the 10.5 year period. The earnings yield relative to the risk free rate has trended upwards over time and has generally moved in the same direction as the corporate bond spread. Yet movements in this signal of the market risk premium have not influenced the QCA's estimate of the market risk premium.

4.3.3 Summary

138   The key point of this sub-section is that it is possible to make estimates of the market risk premium on a systematic basis over time, taking account of all relevant information. In Panel A of Figure 9 we show that the implied market return estimates that result from the systematic approach we follow do not throw out obvious anomalies. The range for the expected market return is 9.68% (the current figure – the lowest in the series, when government bond yields are also at their lowest) to 13.05% (which occurred in July 2008).

139   The volatility of expected market returns from month to month does not suggest that market participants will be unreasonably concerned about stability in cost of capital estimates. The largest single change in the estimated market return over a month is 0.68% (compared to 0.74% for changes in government bond yields and 1.58% for changes in seven year BBB bond yields).

140   Most importantly, allowed returns are likely to be made more objective, transparent and reflective of current market conditions if three questions are addressed.

> a. What is the MRP that we would estimate today if we relied entirely upon past returns information and the current government bond yield?
>
> b. What is the MRP we would estimate today based upon analysis of contemporaneous market information?

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[98] In our market indicators approach, the corporate bond spread is one of four indicators used to estimate the market risk premium. So the corporate bond spread effectively contributes 6.25% to our overall estimate of the market risk premium (that is, we place half the weight on a contemporaneous estimate of the market risk premium, of which half the weight is given to our market indicators approach, and the corporate bond spread is one of four indicators, so we have $0.50 \times 0.50 \times 0.25 = 6.25\%$). The corporate bond spread contributes 12.50% to our contemporaneous estimate of the market risk premium. This means that the movement of the corporate bond spread is not solely driving the movement in our estimate of the market risk premium.

[99] For stocks in the ASX100, compute a market capitalisation weighted average of the consensus earnings per share forecast two years ahead, relative to share price. This indicator carries the same weight in our analysis as the corporate bond spread.

    c.   Given estimates of the MRP based upon contemporaneous market information, and historical returns information, how much confidence do we have in the estimate of the MRP from contemporaneous information? Put another way, how much reliance should we instead place upon the MRP estimate from past returns in order to mitigate the risk of estimation error in the timely MRP estimate?

5   Conclusion

141   Our view is that the best estimate of the MRP in June 2016 is 7.55%. This specific estimate of the MRP is based upon four estimation approaches, two of which allow us to make an estimate of the MRP from historical data, and two of which allow us to make a contemporaneous estimate of the MRP.

142   In this report we have addressed an important issue regarding decision-making in the regulatory setting. It is important that estimates of the cost of capital reflect current market conditions. It is also important that regulators adopt processes to mitigate the risk that errors in data, or unusual trading, have an unreasonable influence on outcomes. These are two competing objectives.

143   We currently have a process for estimating the MRP that does not appear to allow current market information to impact upon the conclusion. Despite signals that the MRP has increased in the period since the QCA's market parameters decision, there has been no movement in the MRP estimate of 6.5%.

144   We consider that the MRP estimation process can be enhanced if there were separate conclusions reached on:

    a.   The MRP estimate based upon analysis of past returns;

    b.   The MRP estimate based upon current information; and

    c.   How much confidence the regulator has in the MRP estimate from current information, which leads the regulator to give some consideration to what has been observed in the past.

145   In Figure 10 we show our estimates of the expected market return over time, along with the 10 year government bond yield, the QCA's estimate of the market return,[100] and our estimates of the expected market return based upon past returns information and current information.

146   The QCA estimate of the expected market return tracks downwards as the risk free rate declines. Crucially, there are periods in which the QCA's estimate of the expected market return falls *well below* estimates of the market return based upon both current market information and past returns.

147   This suggests we currently have a process that does not capture timely changes in market conditions. Adopting a process that does capture timely changes in market

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[100] We add 6.0% to the risk free rate prior to December 2013 and 6.5% thereafter.

conditions, but still allows reference to past returns to mitigate estimation error, can be achieved by addressing the three questions we pose above.

Figure 10. Aggregating estimates of the market risk premium
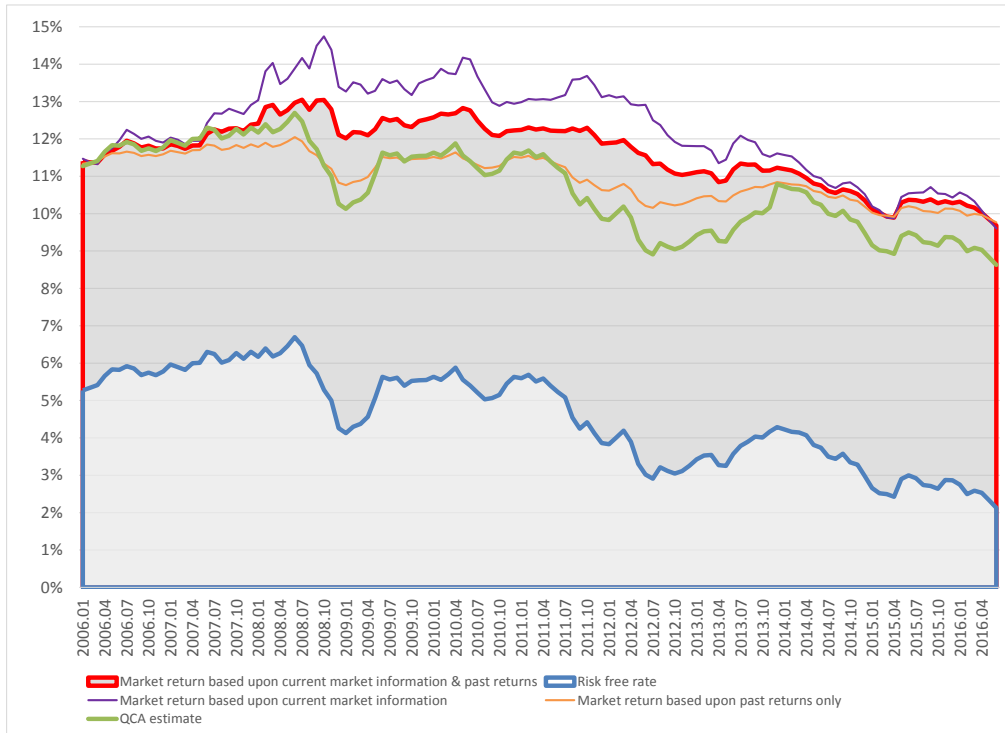
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7   Appendices

7.1   Violation of the GasNet consistency principle

148   The risk-free rate is required in two places in the CAPM equation, as set out below:

$$r_e = r_f + \beta\left(r_m - r_f\right).$$

149   The QCA's recent decisions:

>   a.   Set the first instance of the risk-free rate equal to the yield on government bonds with maturity equal to the length of the regulatory period (4-5 years); and

>   b.   Set the second instance of the risk-free rate equal to the yield on government bonds with maturity of ten years.

150   This results in a systematic downward bias in the allowed return on equity. For example, the RBA reports that the average difference between the yields on 10-year and 5-year government bonds during June 2016 was 0.4%. Thus, the QCA's *allowed* return on equity is 0.4% below its own estimate of the *required* return on equity. Having settled on an estimate of the required return on equity, the QCA then deducts the 10-year risk-free rate and adds back the 5-year risk-free rate, leaving the allowed return 0.4% below its own estimate of the return that investors require.

151   We have previously noted[101] that the QCA's approach in using different risk-free rates in two places in the same CAPM equation is inconsistent with the consistency principle laid out by the Australian Competition Tribunal in its *GasNet* decision.

152   In its GasNet decision, the Tribunal stated that:

>   The position of the ACCC was that it was required to make an evaluative judgment for the purposes of s 8.30 as to what the appropriate Rate of Return should be. Its position was that although consistency was desirable, best estimates have to be used when perfect information is not available, and that at various stages of the CAPM, approximations and estimates are required. The ACCC contends that such a use of estimates and approximations does not invalidate the use of the CAPM. While it is no doubt true that the CAPM permits some flexibility in the choice of the inputs required by the model, it nevertheless requires that one remain true to the mathematical logic underlying the CAPM formula. In the present case, **that requires a consistent use of the value of r_f in both parts of the CAPM equation where it occurs** so that the choice was either a five year bond rate or a ten year bond rate in both situations.[102]

153   The Tribunal went on to conclude that:

>   The ACCC erred in concluding that it was open to it to apply the CAPM in other than the conventional way to produce an outcome which it believed better

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[101] SFG (2014 Market risk premium).

[102] ACT (2003), paragraph 46, emphasis added.

> achieved the objectives of s 8.1. In truth and reality, **the use of different values for a risk free rate in the working out of a Rate of Return by the CAPM formula is neither true to the formula nor a conventional use of the CAPM**. It is the use of another model based on the CAPM with adjustments made on a pragmatic basis to achieve an outcome which reflects an attempt to modify the model to one which operates by reference to the regulatory period of five years. The CAPM is not a model which is intended to operate in this way. **The timescales are dictated by the relevant underlying facts in each case and for present purposes those include the life of the assets and the term of the investment**. [103]

154   We also note that, in explaining its reasons for adopting a 10-year term for the risk-free rate, the AER recently had regard to the *GasNet* decision:

> The Australian Competition Tribunal (the Tribunal) decided in its 2003 GasNet decision that 10 years is the appropriate term of the risk free rate in the CAPM. The Tribunal came to this view on the basis of two reasons:
>
> - as the MRP was estimated using a 10 year risk free rate, consistency demands that a 10 year risk free rate be used in the CAPM, and
>
> - it is a convention of economists and regulators to use a relatively long-term risk free rate where the life of the assets is relatively long.[104]

155   The QCA has made two points in response:

> a. Its preferred approach is to set the first occurrence of the risk-free rate on the basis of the length of the regulatory period;[105] and
>
> b. Even if it were required to use consistent estimates of the risk-free rate, it would not change its estimate of the allowed return on equity.[106]

156   The first point is not a reason for maintaining inconsistent estimates of the risk-free rate. If the five-year rate is to be used in one part of the CAPM equation, the five-year should simply be used in the other.

157   The second point is that even if the QCA was required to change one of its estimates of the risk-free rate to make it consistent with the other (currently, a change of 0.4%), that would have no impact on its allowed return on equity. In our view, if a formula requires A-B and B changes materially, the output must also change.

158   In summary, our view is that the same risk-free rate should be used in the two places in which it appears in the CAPM formula.

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[103] ACT (2003), paragraph 46, emphasis added.

[104] AER Draft Rate of Return Guideline Explanatory Statement, p. 182.

[105] QCA Market Parameters Decision, p. 49.

[106] QCA Market Parameters Decision, p. 49.

7.2 Contemporaneous estimates of the market risk premium

7.2.1 Dividend discount model

159   We make estimates of the expected market return using the dividend discount model under the following assumptions.

Dataset

160   The dataset we use is stocks in the ASX100. For each stock, on a monthly basis, we compile consensus earnings per share forecasts for periods of one and two years ahead. We also compute share prices on a monthly basis so for each stock we have an estimate of the year one and year two earnings yield. The earnings yield is earnings per share relative to price. We then compute a market capitalisation weighted average earnings yield over years one and two to generate the earnings yield for the whole market. Finally, we take a two month rolling average of earnings yields in order to offset the risk of an unusual result for one particular month.

   a.   For June 2016, the estimated year 1 and year 2 earnings yields are 5.6% and 6.1%, respectively This corresponds to forward price-earnings ratios of 17.7 and 16.3.

   b.   On average over the 10.5 years from January 2006 to June 2016, the estimated year 1 and year 2 earnings yields are 7.5% and 8.2%, respectively. This corresponds to forward price-earnings ratios of 13.3 and 12.1.

161   To estimate dividends we compile the dividend payout ratio we have observed over the prior five years in the market and hold this dividend payout ratio constant to compile the projected dividend stream.

   a.   For June 2016 the estimated dividend payout ratio is 70%.

   b.   On average over the 10.5 years from January 2006 to June 2016 the estimated dividend payout ratio is 64%.

Growth

162   The real long term growth assumption is the average of two individual real long term growth assumptions:

   a.   3.0% as a proxy for real GDP growth; and

   b.   Real growth which varies over time according to the product of an estimated real return on equity and an estimated reinvestment rate (that is, growth = return on equity × reinvestment rate).

      To estimate the real return on equity we compile 20 years of real earnings per share growth and 20 years of reinvestment rates. The ratio of real earnings per share growth and the reinvestment rate

> gives us an estimate of real returns on equity that have been earned in the last two decades.

> We can illustrate this computation with respect to the most recent month of June 2016. For the past 20 years, sample stocks have experienced real earnings per share growth of 3.4% per year, and over the same time period reinvested 34% of earnings.[107] This means that the real return on equity on past investments is computed as 0.034 ÷ 0.34 = 10.0%.

> For the most recent five year period, sample firms have reinvested 30% of earnings. If this rate of reinvestment continues and the firms earn real returns of 10.0% on those reinvestments the future real growth is 0.30 × 0.100 = 3.0%.[108]

163   The reason we use the 3.0% real GDP growth assumption, along with the real growth estimate from analysis of earnings and dividends, is because of the potential for estimation error. There is always the possibility that the past 20 years were particularly good or bad years for investment. We would not expect the good or bad period to persist indefinitely. But there could be a sustained downturn. However, we do want our growth rate assumption to reflect, to some degree, what we observe in the actual data for listed firms. It is worth repeating that the QCA's assumption that expected long-term growth is GDP minus 1% is not consistent with recent decades of the actual growth in earnings per share for listed companies. It is based upon (a) empirical evidence from a period of much lower price-earnings ratios; and (b) an assumption that recent growth rates will soon peter out.

164   In sum, we have the following real long term growth assumptions.

>   a.   For June 2016 the real long term growth estimate is 3.0%; and

>   b.   On average over the 10.5 years from January 2006 to June 2016 the real long term growth rate estimate is 3.8%.

Inflation

165   We make our inflation estimates with reference to the yields on 10 year government bonds and 10 year inflation-adjusted bonds. Given current yields, this leads to lower nominal growth assumptions that implied by the QCA's inflation estimate of 2.5%. This is one reason why our market risk premium estimates based upon the dividend discount model are, in fact, lower than those of the QCA.

>   a.   For June 2016 we estimate inflation at 1.4% per year.

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[107] The time period is actually one year behind for the reinvestment rate because we assume reinvestment last year leads to earnings growth next year.

[108] It is coincidental that in June 2016 that the estimate of real earnings per share growth from past returns on investment is equal to 3.0%, the same as the proxy for real GDP growth. Retaining all decimal places our real earnings per share growth rate implied by past returns in investment is 3.02%.

b. On average over the 10.5 years from January 2006 to June 2016 the estimated inflation rate is 2.5%.

Trend towards long term growth

166   We trend year two earnings growth towards long term earnings growth over a nine year period such that earnings growth reaches its long term expectation in forecast year 11. In other words, in the 10th forecast year the market is expected to reach its normal level of reinvestment and returns on investment, such that its earnings growth is normal in year 11.

Imputation

167   We adjust dividends for imputation using the QCA assumptions that a distributed imputation credit is worth 0.56 and the corporate tax rate is 30%. So imputation adjusted dividends are computed according to the following equation.

$$\text{Imputation adjusted dividend} = \text{Cash dividend} \times \left[1 + \frac{0.30}{1 - 0.30} \times 0.56 \right]$$

Equation

168   We solve the equation below for r_m to estimate the cost of equity in the market, in which D_n is dividend yield in forecast year n adjusted for imputation and g is the nominal long term growth rate.

$$1 = \frac{D_1}{(1 + r_m)^1} + \frac{D_2}{(1 + r_m)^2} + \frac{D_{10}}{(1 + r_m)^{10}} + \frac{D_{10} \times (1 + g)}{(r_m - g) \times (1 + r_m)^{10}}$$

7.2.2 Market indicators

169   Our second technique for estimating the MRP based upon timely market information is to consider four market indicators:

a. Earnings yield based upon year one forecast earnings relative to the risk free rate;

b. Corporate bond spreads, based upon RBA estimates for 10 year BBB bonds;

c. Volatility on the ASX200 implied by the prices of call and put options; and

d. The term spread, which we proxy as the difference between the yield on 10 year government bonds and 2 year government bonds.

170   The rationale for analysing market indicators is essentially the same rationale adopted by the QCA in its reference to corporate bond spreads and market implied volatility. They are market indicators that, directionally, point to the market risk premium being above or below average.

171   However, it is not enough to simply observe market indicators in a qualitative manner because it makes it almost impossible to decide what overall impact the indicator has on the MRP. This is what occurs in the QCA decisions we reviewed. There was discussion of market indicators, but it was unclear what movement in any indicator has on the overall decision.

172   To make an estimate of the MRP we adopt the following decision rule.

    a.   For each indicator determine where the indicator lies, as a percentile, compared to all the history available to us. As examples, in June 2016:

        i.   The earnings yield relative to the risk free rate was 4.03%, which was the 91st percentile based upon data from February 1987 to June 2016;

        ii.   The corporate bond spread was 2.76% which was the 50th percentile based upon data from January 2005 to June 2016;

        iii.   Implied volatility was 19.25% which was the 52nd percentile based upon data from January 2008 to June 2016; and

        iv.   The term spread was 0.50%, which was the 37th percentile based upon data from January 1995 to June 2016.

    b.   Compute the average percentile across the four indicators. As an example, the average percentile in June 2016 was the 58th percentile.

    c.   Estimate the market risk premium with a mid-point equal to an estimate of the historical average excess return (6.40%) and within a range of ±3.00%. As an example at the 58th percentile, the estimated market risk premium is computed as:

MRP = 3.40% + 0.58 × 6.00% = 3.40% + 3.45% = 6.85%.

173   An obvious question is, "Why the range of ±3%?" We need an estimate as to how much the market risk premium could vary from normal, given current market conditions.

    a.   We have dividend discount model estimates of the market risk premium over 10.5 years which range from 5.2% to 12.4%, a width of 7.2%.

    b.   We also have BBB corporate bond spreads over 11.5 years from January 2005 to June 2016 which range from 0.9% to 9.3%, a width of 8.4%.

    c.   Based upon this information, estimating a width of 6.0% for the MRP estimate based upon market indicators appears reasonable in our view.

174   It should also be pointed out that the actual MRP estimates over time are much narrower than a width of 6.0%. This occurs because we never observe all four

indicators being at the maximum or the minimum over the sample period. The lowest MRP estimate from the market indicators approach is 5.9% and the highest MRP estimate is 9.2%, a width of 3.3%.

7.2.3 Combining two contemporaneous estimates of the market risk premium

175   We have two techniques for estimating the market risk premium, based upon timely information, because we want to use all relevant information and to mitigate estimation error. This means that we do not observe extreme outcomes which would be affected by errors in the underlying data, or unusual trades that occur in a particular month.

   a.   For June 2016, our estimate of the market risk premium based upon timely information is 7.47% (the average of 8.09% based upon the dividend discount model and 6.85% based upon market indicators.

   b.   Across the whole sample period the average estimate of the market risk premium based upon timely information is 7.72% (the average of 8.52% based upon the dividend discount model and 6.92% based upon market indicators).