REVIEW OF SUBMISSIONS TO THE QCA ON THE MRP, RISK-FREE RATE AND GAMMA

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EXECUTIVE SUMMARY

In response to recent submissions on the market risk premium (MRP), the risk-free rate and gamma, the QCA has raised a number of questions with me. My conclusions on these matters are as follows. Firstly, the dividend adjustment proposed by NERA is better supported than that of Brailsford and I therefore recommend adjusting the Brailsford results to reflect this. However, neither adjustment is satisfactory in an absolute sense and both reflect adversely upon the quality of the data used (up until 1958) in estimating the MRP using historical returns data. The problem can be mitigated by placing some weight on such results from other markets.

Secondly, in respect of 2013 surveys of the MRP, the Fernandez et al 2013 survey should be used but the appropriate MRP estimate from it is 5.7% for Australia rather than the 6.8% claimed by SFG. The Fernandez survey also provides results for 19 other markets, and their average is 6.0%. In respect of 2013 results for independent valuation reports, and referred to by SFG, SFG does not report the MRP estimates used by the valuers and instead reports estimated costs of equity. So, SFG's analysis is not useful for the present purposes and I therefore recommend continued reliance on the Ernst and Young 2012 survey of these independent valuation reports, which yields a mean response of 6.3%.

Thirdly, and in respect of the DDM methodology, I favour that methodology presented in Lally (2013a) subject only to the possibility of a mid-year rather than an end-year assumption for dividends. This involves discounting the dividends for year t by t-0.5 years rather than for t years, and the effect of doing so would be to raise the MRP estimate.

Fourthly, I have examined arguments raised by SFG and the QTC, relating to the risk-free rate, the MRP, and gamma. Amongst these arguments that have not already been commented on in the previous three paragraphs, I agree that the data relating to local ownership of Australian equities should be updated, and doing so moderately lowers the proportion of Australian equities owned by Australians from 60% to 54% for listed equities whilst not affecting the figure for all equities (70%).

Finally, I have updated results for the MRP estimation methods favoured by me, including adopting the dividend correction proposed by NERA. Some of these results have materially changed but the median (rounded to the nearest 1%) is still 6.0%.

1. Introduction

In response to recent submissions on the market risk premium (MRP), the risk-free rate and gamma, the QCA has raised the following questions with me, as follows:

(a) Assess NERA's (2013) claims concerning alleged errors in the historical dividend yield for the Australian market in the work of Brailsford et al (2008).

(b) Update the MRP estimate to reflect the Fernandez et al (2013) survey, recent independent valuation reports (as discussed in SFG, 2013d), and other relevant surveys.

(c) Assess competing versions of the discounted dividends model (DDM) for estimating the MRP.

(d) Review the report by SFG (2014a), relating to the MRP, focusing on new arguments.

(e) Review the report by SFG (2014b), relating to gamma, focusing upon new arguments.

(f) Review the report by QTC (2014), relating to the risk-free rate and the MRP, focusing upon new arguments.

This report seeks to examine these questions.

2. Alleged Errors in the Historical Dividend Yield

In forming their Ibbotson-type estimate of the MRP for Australia, using data from 1883, Brailsford et al (2008, section 3.2.1) use dividend yield data from Lamberton (1958) over the period 1883-1957 subject to reducing his dividend yields by 25% to account for Lamberton's exclusion of zero-dividend stocks and use of an equally-weighted rather than a value-weighted average. The 25% reduction was an adjustment used by the Sydney Stock Exchange (SSE) and tested for reasonableness by Brailsford et al (2008, section 3.2.1). Their principal test was to compare the value-weighted dividend yield on all stocks with the dividend yield used by the SSE for February 1966, and this revealed that a downward adjustment of 33% was required to the latter. So, a deduction of 25% would seem to be conservative. NERA (2013, section 2) extends this testing process to the years 1891, 1901, 1911, 1921, 1931, 1941, and 1951 and concludes that the downward adjustment should have typically been less than 25%. Consequently, they conclude that the appropriate adjustment would have led to the average dividend yield being 0.63% higher in the years 1883-1957 than estimated by Brailsford et al (2008). These years represent $75/131^{th}$ of the total available data

(1883-2013). So the overall effect of this adjustment is to raise the average return over the 1883-2013 period by 0.63%(75/131) = 0.36%.

Clearly, NERA's process is superior to that of Brailsford et al (2008) because NERA examine results for seven years rather than only one month and these years are all within the relevant period (1883-1957). However, the seven years examined represent only seven of the 75 years in question. Thus, whilst they represent the best available estimate of the required correction to Lamberton's work, they are inadequate in any absolute sense, i.e., each of the 75 years ought to have been adjusted in this way. Furthermore, methodological errors of this type or others are likely to be present in the older data from many countries. One possible response to this would be to place less weight on the older data. However, there are a vast range of possible weighting schemes and therefore any such choice of weights would be very subjective. A better approach would be to place some weight on Ibbotson-type results from other markets and this is warranted even in the absence of methodological errors due to statistical variability in the data.

In summary, the dividend adjustment proposed by NERA is better supported than that of Brailsford et al (2008). However neither is satisfactory in an absolute sense and both reflect adversely upon the quality of the data used (up until 1958) in estimating the MRP via the use of historical data. The problem can be mitigated by placing some weight on such results from other markets.

3. Recent Survey Data on the MRP

Lally (2013a, Table 1) presents MRP estimates for Australia from Ernst and Young (2012, Appendix C), and for both Australia and the average for 19 other markets using survey data from Fernandez et al (2012, Table 2). These estimates were 6.3%, 5.9% and 5.8% respectively. However, more recent work of this type is available. In particular, Fernandez et al (2013, Table 7) reports a mean response of 6.8% for Australia and a mean of 6.0% for the other 19 markets. In addition SFG (2013d) updates the Ernst and Young (2012) work.

In respect of the SFG (2013d) work, this does not report the MRP estimates used by the valuers and instead reports estimated costs of equity. So, it is not useful for the present purposes. In respect of the Fernandez et al (2013) work there are grounds to be quite

sceptical about the average figure of 6.8% for Australia. It is much larger than the results in the previous two years, of 5.9% and 5.8% (Fernandez et al, 2013, Table 7), it is much larger than the 2013 median for Australia of 5.8% (Fernandez et al, 2013, Table 7), and the cause of this is apparent. Fernandez et al (2013, Table 2) reports the minimum and maximum 2013 responses for Australia of 3.0% and 25% respectively and therefore the greatest outlier is the 25% response. Furthermore the sample size for Australia is 17 (Fernandez et al, 2013, Table 2).[1] So, deletion of this greatest outlier would reduce the average response to 5.7%. Furthermore this outlier may have come from a respondent who sought to manipulate the average result. In view of this, I favour deletion of this outlier (yielding a mean MRP estimate of 5.7%) or recourse to the median result (yielding 5.8%). Consistent with these concerns about this 25% response, I note that it is the largest response across the 20 markets for which data is used here (Australia plus the 19 foreign markets) and it gives rise to a standard deviation amongst the Australian responses that is larger than for any of these other 19 markets (Fernandez, 2013, Table 2).

In addition to these surveys, a wide variety of others are available for Australia, and are referred to by the AER (2013a, Table D.5). I favour surveys that are recent, that are the product of very careful consideration, and that contain results for other markets. No survey satisfies all three requirements but two of them satisfy two of these criteria: the Fernandez (2013) survey satisfies the first and last requirements whilst the Ernst and Young (2012) survey satisfies the first two requirements. I therefore favour use of only these two surveys.

In summary, I favour the use of the Fernandez et al (2013) and Ernst and Young (2012) surveys. Using Australian survey data, they suggest MRP estimates of 5.8% and 6.3% respectively, and averaging over them yields 6.05%. The Fernandez survey also provides results for 19 other markets, and their average is 6.0%.

4. Competing Versions of the DDM

Lally (2013a, Table 1) presents MRP estimates using a version of the DDM. This version is characterised by adjusting dividends for imputation effects, the use of both short-run and long-run expectations of the growth rate in dividends per share (DPS) with a linear

[1] By contrast, the sample size was 73 for 2012 (Fernandez et al, 2012, Table 2).

convergence pattern, estimation of the long-run expected growth rate in DPS from the long-run expected growth rate for GDP subject to a deduction for new share issues and new companies, and reversion in the prevailing risk-free rate within the discount rate towards a long-run value.

Alternative approaches have been suggested. SFG (2013b, paras 94-98) cite a DDM estimate of the MRP from Nelson et al (2012), and then raise it to allow for the value of imputation credits. Relative to the model used by Lally (2013a), there are three shortcomings in SFG's approach. Firstly, SFG's process for adjusting for imputation credits presumes that expected returns to equity holders take the form of only dividends and imputation credits, i.e., there are no expected capital gains. However, the empirical evidence (Brailsford et al, 2008) refutes this assumption and the result is that the modified MRP estimate using SFG's approach would be too high (because the imputation adjustment is applied to the entire cost of equity instead of only the dividend yield). Secondly, SFG's approach unreasonably assumes that the long-run expected growth rate in dividends per share (DPS) is equal to the long-run expected growth rate in GDP, i.e., there is no deduction for the effect of new share issues and new companies. The effect of this would be to overestimate the MRP. Thirdly, SFG's approach unreasonably assumes that the cost of equity is the same for all future years, despite the risk-free rate being unusually low at the present time. The effect of this would be to overestimate the MRP when the risk-free rate is low (as at present).

In addition, and in other recent submissions to the QCA, SFG (2013c, section 2.4; 2013e, section 5) estimates the MRP using another variant of the DDM. Unlike the Nelson et al (2012) paper, the long-run expected growth rate in DPS is the product of the long-run retention rate and the long-run expected rate of return on new equity investment. In addition, the long-run expected growth rate in DPS, the long-run expected rate of return on new equity investment, and the cost of equity are jointly chosen to match the current share price rather than exogenously specifying the expected DPS growth rate and then choosing the cost of equity to match the current share price. Relative to the model used by Lally (2013a), SFG's approach has four principal shortcomings. Firstly, it does not embody the restriction that the long-run expected growth rate in DPS cannot exceed the long-run expected growth rate in GDP, let alone any deduction from the latter to recognize that an increasing share of GDP takes the form of dividends to new firms and new share issues. In respect of the long-run expected GDP growth rate, Lally (2013b, page 14) estimates the real rate at 3%. Coupled

with expected inflation of 2.5% (the middle of the RBA's target band), this implies a nominal rate of about 5.5%. However SFG's estimates of the long-run expected growth rate in DPS are currently 5.8% and have averaged 5.7% since 2002 (SFG, 2013c, Table 6); both numbers are therefore above reasonable estimates of long-run expected growth in GDP, let alone any deduction for new shares and new companies. Remarkably, SFG's failure to impose this upper bound restriction conflicts with another of their reports (SFG, 2013b, paras 94-98) that does impose this restriction. Secondly, SFG unreasonably assumes that the cost of equity is the same for all future years, despite the risk-free rate being unusually low at the present time (relative to the past 20 years). The effect of this would be to overestimate the MRP when the risk-free rate is low (as at present). Thirdly, SFG links their long-run expected growth rate in DPS to the earnings retention rate and the expected rate of return on new equity investment, and the formula that SFG invokes is that of Gordon and Shapiro (1956). However, as shown by Lally (1988), this formula holds only if inflation is zero and a variant is required in the presence of inflation. Fourthly, both the Gordon-Shapiro and Lally formulas assume that all new investment yields payoffs in perpetuity, this is generally not realistic and may induce material error in the MRP estimate. Fifthly, SFG do not impose the restriction that the long-run expected rate of return on equity is equal to the cost of equity, i.e., in the long-run, new investment is NPV = 0 as a result of competition. Since SFG's estimate of the long-run expected rate of return on equity exceeds the cost of equity (SFG, 2013c, Table 6), the effect of failing to impose the restriction is that their estimate of the MRP will be too high. SFG's radical approach to estimating the long-run expected growth rate in DPS is motivated by the (reasonable) desire to link this growth rate to the cost of equity and there is no such linkage in conventional applications of the DDM. However this linkage would be better recognised by exogenously estimating the long-run discount rate and then using the DDM to estimate the short-run MRP (as in Lally, 2013a).

The AER (2013a, Appendix D.2, Appendix E) propose a version of the DDM very similar to that presented in Lally (2013a). Three points of difference exist. Firstly, the AER uses the same discount rate for all future years (a flat term structure) but seems ambivalent on the question, recognising both the reasonableness of alternative approaches and the fact that a flat term structure is standard practice (AER, 2013a, page 115). Secondly, the AER adopts a mid-year rather than an end-year assumption, i.e., dividends for a particular year are assumed to arise at the mid-point of the year rather than the end. This mid-year assumption is more accurate and Lally (2013b, section 8) estimates that the effect of adopting it is to raise the

MRP estimate by about 0.25% (Lally, 2013b, section 8). Thirdly, the AER favours a partial-year correction, i.e., recognising that the short-term expectations for the first year may apply to a period less than one year. Lally (2013b, section 9) shows that the error from failing to do this is only about 0.1%. In view of the minor impact, I do not think this correction is warranted.

In summary, I favour the DDM methodology presented in Lally (2013a) subject only to the possibility of a mid-year rather than an end-year assumption for dividends. This involves discounting the dividends for year t by t-0.5 years rather than for t years, and the effect of doing so would be to raise the MRP estimate.

5. Review of SFG's Views on the MRP

5.1 The Ibbotson Estimate

SFG (2014a, paras 130-142) claim that the Ibbotson estimate for the MRP should be 6.6% if the QCA's preferred estimate for U of 0.625 is adopted. The underlying data are those of Brailsford et al (2012) data subject to an adjustment for dividend yields prior to 1958 as detailed in NERA (2013a, section 2). This adjustment has been discussed in section 2 and the overall effect would be to raise the average market return and hence the MRP estimate by 0.36%.

Exclusive of this adjustment, and also of the effect of imputation credits, the Ibbotson-type MRP estimate using data for 1883-2013 inclusive is 6.13%.[2] In respect of the imputation adjustment, Brailsford et al (2012, Tables 1 and 3) give MRP estimates for 1883-2010 inclusive of 6.1% and 6.4% for U = 0 and U = 1. Given that imputation has operated since 1987, the average annual adjustment for imputation during those 24 years must have been 1.60% (which is consistent with a cash dividend yield of about 5%, 75% of dividends being fully imputed and an average corporate tax rate of 30%), i.e., 1.60%(24/128) = 6.4% - 6.1%. Applying the same figure of 1.60% to the additional three years (2011-2013), the imputation adjustment then applies to 27 out of 131 years, and is then 1.60%(27/131) = 0.33%. Since the QCA favours U = 0.625, this adjustment is instead 0.33%(0.625) = 0.21%. So, exclusive

[2] The data are those in Brailsford et al (2012, Appendix) augmented by data from the Reserve Bank for 2011-2013 inclusive. In particular, the returns data are for the ASX accumulation index (capital gains plus dividends) and drawn from Table F7 whilst the government bond data are the average yields on ten-year bonds over December of the relevant year and drawn from Table F2.

of NERA's proposed adjustment, the MRP estimate is 6.13% + 0.21% = 6.34%. With NERA's adjustment, of 0.36%, it rises to 6.70%. This is marginally higher than SFG's suggested figure of 6.6%, and the difference may be due to SFG not using data up to the end of 2013.

In summary, the Ibbotson estimate for Australia is 6.7%. In addition, and as noted in Lally (2013a, Table 1), Ibbotson-type MRP estimates for 19 other markets should be considered and these average 5.9%.

5.2 The Siegel Estimate

SFG (2014a, para 147) argues that the premise underlying the Siegel adjustment, that actual inflation materially exceeded expected inflation on average over the historical period used for the Ibbotson estimate, has not been established. Support for the premise comes from an examination of average inflation and real government bond yields over the historical period. Siegel (1992) documents this for the US and similar patterns are apparent in other economies. In particular, Australia's experience can be divided into a low inflation era (1883-1939), a high inflation era (1940-1990), and a second low inflation era (1991-2013) with average inflation rates of 0.9%, 6.4% and 2.5% respectively. The corresponding average real yields on ten-year government bonds were 3.5%, 0.7% and 3.5%.[3] So, in the high inflation era, real yields on government bonds were markedly below that from the earlier period (highly suggestive of ten-year inflation forecasts having been too low in this high inflation era) and with little 'compensation' in the subsequent low inflation era (due to ten-year inflation forecasts being too high). NERA (2013b, sections 3.1-3.3) sought to counter that claim by reference to two US surveys of inflation expectations one year ahead, which revealed that there was no systematic tendency to underestimate or overestimate inflation (because the period up to 1980 in which inflation was underestimated was countered by the subsequent overestimation. However, as noted by Lally (2013a, section 2.12), the principal shortcoming in NERA's argument is the use of one-year ahead inflation forecasts rather than ten-year ahead forecasts; only the latter would be relevant and an ability to (on average) accurately forecast inflation one year ahead would not be inconsistent with significant underestimation of inflation in ten-year forecasts. Nothing in SFG's comments addresses this point.

[3] Data are drawn from Brailsford et al (2012, Appendix) for 1883-2010 supplemented with Reserve Bank data for 2011-2013.

SFG (2014a, 149-155) also argues that the 'Wright' approach is not a variant of the 'Siegel' approach. SFG notes that the former adjusts the Ibbotson estimate to the extent future expected inflation differs from past inflation whilst the latter adjusts the Ibbotson estimate to the extent that historical inflation exceeded that which was expected at the time, and therefore they are different. However both approaches were motivated by the inflation surge during the second half of the 20th century and are premised on the belief that this event induced an Ibbotson estimate of the MRP that is too high; on this basis they are similar. Whether they should be called "variants" is not important.

SFG (2014a, page 38) claims that the Siegel estimate for the MRP should be 5.4% with the QCA's preferred estimate for U of 0.625. However, SFG do not seem to be using data till the end of 2013 and the Siegel estimate presented in Lally (2013a, page 30) requires adjustment for the additional year of data (2013). The estimate involves starting with the Ibbotson estimate, adding back the historical average real bond yield and then deducting an estimate of the long-term expected real bond yield. The Ibbotson estimate is 6.7% as discussed in the previous section and the average real bond yield over the same historical period (1883-2013) is 2.4%. In respect of the long-term expected real bond yield, one possible estimate for this is the average real ten-year risk free rate figure of 3.5% over the period from 1883-1939, i.e., the period preceding the high inflation period of 1940-1990. A second possibility is the average real yield on Australian inflation-indexed bonds over the period since their issue (July 1986 to December 2013), and the result is 3.6%.[4] Using the average of these two figures, of 3.6%, the Siegel estimate of the MRP should be 5.5% as follows:

$$\hat{MRP} = .067 + .024 - .036 = .055$$

This estimate is marginally higher than SFG's estimate of 5.4%.

5.3 Discounted Dividends Models

SFG (2014a, paras 160-170) adopts the midpoint of the DDM estimates in Lally (2013a, page 60), of 7.0% to 9.5% conditional upon U = 0.625, i.e., 8.25%. In turn, these estimates are drawn from Lally (2013d, section 8) subject to using the QCA's favoured estimate of U = 0.625 rather than U = 0.35.

[4] Data from the RBA website (http://www.rba.gov.au/statistics/tables/index.html#interest_rates).

These DDM estimates in Lally (2013d) do not span the full set of possible underlying parameter values (being the deduction from the long-run expected growth rate in DPS to account for new share issues and new companies, and the term over which short-term expected DPS growth rates converge on the long-run rate) and merely span a plausible range for these parameters (0.5% to 1.5%, and 10-20 years respectively). So, there is no clear cut point estimate. Thus, an analyst who favoured a deduction of 0.5% and a convergence period of 20 years would favour an MRP estimate of 9.5% whilst an analyst favouring a deduction of 1.5% and a convergence period of 10 years would favour an MRP estimate of 7.0%.

Furthermore these estimates are from December 2012 and are therefore based upon a December 2012 average ten-year government bond yield of 3.23%, a cash dividend yield at that time of 4.80%, and expected growth rates for DPS for the first two years of 7.4% and 7.5% respectively at that time. All of these parameters require updating. The AER (2013a, pp. 115-119) has recently (November 2013) updated its MRP estimates using a DDM. Using Bloomberg data, the cash dividend yield is 4.44% and the expected growth rate in DPS for the first two years is 7.06% per year.[5] In addition, the corresponding government bond yield (November 2013 average) is 4.13%. With $U = 0.625$, the range of 7.0% to 9.5% referred to in the previous paragraph becomes 4.8% to 7.1%, with a midpoint is 5.9%. This is a significant reduction, due to a rise in the government bond yield, a fall in the cash dividend yield and a fall in the short-run expected growth rates for DPS.

In addition, if the mid-year correction described in section 4 is undertaken, the range from 4.8% to 7.1% as described in the previous paragraph becomes 5.4% to 7.9%.

5.4 Surveys

Amongst survey-based estimates of the MRP, SFG (2014a, para 188) favours those in recent (2012-2013) independent valuation reports and argues for figures ranging from 8.63% to 9.24% based upon gamma of 0.50 (ibid, Table 1), with a mid-point of 8.93%. These results are based upon an alleged average MRP estimate in these valuation reports of 6.4%, a possible increment of 0.5% to reflect the fact that these reports use a risk free rate that exceeds the prevailing ten-year government bond yield by 0.5% on average (ibid, para 120), and a further

[5] These figures are not reported in the document and were supplied to me by AER staff.

increment to reflect allowance for imputation credits (ibid, paras 121-127). The figure of 6.4% is attributed to SFG (2013d).

This analysis has a number of shortcomings. Firstly, as noted in section 3, the SFG (2013d) report does not contain the 6.4% figure and instead only reports the cost of equity estimates of these valuers. Secondly, the 0.5% uplift to the MRP presumes that this risk free rate uplift of 0.5% is a defacto increment to the MRP estimates of the valuers. However, SFG does not present any evidence in support of this and Lally (2013a, section 2.9) suggests that the risk-free rate increment is an attempt by the valuers to recognise that the unobserved rates beyond ten years are likely to be higher than the prevailing ten-year rate. Thirdly, in respect of SFG's claim that the respondents do not incorporate the effects of imputation credits in their MRP estimates (because they do not do so in their cash flows), and therefore that their MRP estimates must be raised, it is interesting that the median MRP estimate amongst this class of respondents that is presented in Ernst and Young (2012, Appendix C) is 6%, which corresponds to the typical MRP estimate amongst Australian regulators (inclusive of imputation credits). So, at least some of these valuers may be presenting MRP estimates that do in fact incorporate the effect of imputation credits.[6] The most that can be said is that failure to adjust these MRP estimates for imputation credits would impart a downward bias to the estimates (because at least some of the valuers do not incorporate allowance for the credits in their MRP estimates).[7] Fourthly, and as noted in Lally (2013a, page 15), SFG's adjustment formula for imputation credits presumes that there are no expected capital gains (i.e., expected returns to equity holders take the form of only dividends and imputation credits), the empirical evidence refutes this assumption and the result is that the modified MRP estimate using this approach would be too high. SFG has never responded to this latter point. Fifthly, the adjustment formula presumes that the MRP estimate (sans imputation) arises from a DDM approach, in which case the imputation adjustment would raise the MRP

[6] It would be inconsistent of them to do this whilst not incorporating the effect in the cash flows, but the offenders may be using this widely-used estimate of 6% for the MRP without realising that it does include an allowance for imputation credits.

[7] As noted in Lally (2013c, section 3.5), analysts who do not explicitly allow for imputation credits in their valuation will still obtain the correct value of an average firm providing their (ex-imputation) MRP estimate is correct, because that ex-imputation MRP estimate will be lower to reflect the existence of the credits (in so far as the market recognises that such credits are valuable). Such analysts may then be desisting from any explicit allowance for the credits on the basis that the resulting valuation is approximately correct rather than because they consider the credits to be worthless. Nevertheless, an ex-imputation MRP estimate obtained from such an analyst must be augmented by the allowance for the credits to yield an MRP estimate for the Officer CAPM.

estimate by about 1%.[8] However, if the MRP estimate arises from an Ibbotson, Siegel or Wright approach, the adjustment is only 0.21% as described in section 5.1.

Since the SFG (2013d) report does not contain MRP estimates provided by these valuers, it is necessary to fall back upon the Ernst and Young (2012) report that does do so, and the average MRP estimate here is 6.3% (ibid, Appendix C).

SFG (2014a, para 187) does not favour use of the Fernandez surveys and provides a number of (very reasonable) points in support of this position. However, as argued in Lally (2013a), some weight should be placed upon results from other markets and the Fernandez surveys are the only ones that allow this to be done. I therefore favour use of this survey as well as the independent valuation reports. As discussed in section 3, the MRP estimates arising from Fernandez et al (2013) are 5.7% for Australia and an average of 6.0% for 19 other markets.

As with the independent valuation reports, the question of whether to add an allowance for imputation credits arises. However, there is even less cause for doing so here because it is not known whether the respondents in this survey adjust cash flows for imputation credits. If they do, one could presume that their MRP estimates also do so and therefore there would be no grounds for an imputation adjustment.

Although a wide variety of survey results are available for Australia, and are referred to by the AER (2013a, Table D.5), I favour results that are recent, that are the product of very careful consideration, and that contain results for other markets. No survey satisfies all three requirements but two of them satisfy two of these criteria: the Fernandez (2013) survey satisfies the first and last requirements whilst the Ernst and Young (2012) survey satisfies the first two requirements. I therefore favour use of only these two surveys. Averaging over the Australian results from these two surveys, of 6.3% and 5.7%, the result is 6.0%. The Fernandez survey also allows averaging over a range of other markets. Using the same 19 foreign markets for which Ibbotson results are invoked above, the average is 6.0% for 2013 (Fernandez et al, 2013, Table 5).

[8] Lally (2013d, section 5) presents the correction formula. If the cash dividend yield is 5%, the imputation adjustment with $U = 0.625$ and 75% of dividend being fully imputed raises the dividend yield to 6%, and this 1% increment to the dividend yield raises the MRP by approximately the same amount. If there were no expected capital gains, the upward effect would be even larger, in accordance with SFG's adjustment formula.

5.5 The Wright Estimate

SFG (2014a, paras 189-192) favours a 'Wright' estimate of the MRP of 7.7% using U = 0.625, based on average real market return of 9.0% inclusive of the NERA (2013) adjustment, expected inflation of 2.5%, and a current ten-year government bond yield of 4%, i.e.,

$$\hat{MRP} = E(R_m) - R_f = [(1.09)(1.025) - 1] - .04 = .077$$

The correct estimate is slightly lower, at 7.5%, involving a historical average real market return (1883-2013 inclusive) of 8.47%, the upward adjustment for imputation credits of 0.21% (see section 5.1), the upward NERA adjustment for the dividend yield of 0.36% (see section 5.1), expected inflation of 2.5% (the midpoint of the RBA's target range), and deduction of the current (December 2013 average) ten-year government bond rate of 4.24%, i.e.,[9]

$$\hat{MRP} = E(R_m) - R_f = [(1 + .0847 + .0021 + .0036)(1.025) - 1] - .0424 = .075$$

Given that both the Wright and Siegel approaches seek to address the late 20th century inflation shock, it is interesting that their results are so different. The explanation for this lies in the fact that the Wright estimate is approximately equal to the Ibbotson estimate subject to adding back the historical average real risk free rate (to produce the historical average real market return) and then deducting the current real risk free rate (equivalent to adding the current inflation expectation and deducting the current nominal risk free rate), whilst the Siegel approach (see section 5.3) instead deducts a long-term average of the expected real risk free rate. Accordingly, the Wright approach differs from the Siegel approach in deducting the current real risk free rate rather than a long-term average of the expected real risk free rate. The latter is estimated at 3.6% (see section 5.2) whilst the current real risk free rate is about 1.7% (4.24% nominal less expected inflation of 2.5%). The difference in these two real risk free rates (approximately 2%) matches the difference between the Wright and Siegel estimates (7.5% and 5.5% respectively). If the current real risk free rate (which is historically low) drifts back towards the long-run expectation, the Wright estimate will converge on the Siegel estimate.

[9] The share market data are described in section 5.1 and the government bond data is drawn from Table F2 on the Reserve Bank's website.

5.6 Overall Results

SFG (2014a, paras 207-208) summarises their views on the preceding five methods, as shown in the last column of Table 1 below, with the derivation of each explained in the preceding sections. SFG notes that the mean of their estimates is 7.4% and the median is 7.7% (which round to 7% and 8% respectively). My estimates, as described in the previous sections, are presented in the first two columns of Table 1. The principal points of difference are in the surveys and the DDM results, and the difference in respect of the DDM results is purely due to SFG using results from December 2012 rather than more recently.

Table 1: Estimates of the MRP

	Australia (Lally)	19 Others (Lally)	SFG
Ibbotson estimate	6.7%	5.9%	6.6%
Siegel estimate: version 1	5.5%	4.0% - 5.0%	5.4%
DDM estimate	5.4% - 7.9%	n/a	8.25%
Surveys	6.0%	6.0%	8.9%
Siegel estimate: version 2 (Wright)	7.5%	n/a	7.7%

I favour use of the median result both because the DDM produces a range rather than a point estimate and because use of the median reduces the impact on the estimate from an extreme outcome arising from one of the methods. Furthermore, as stated in section 5.3, I do not favour using the midpoint of the DDM estimates as a point estimate. However, the range of plausible results from the DDM now runs from below the median to above it, and therefore a point estimate must be selected for the DDM. If the midpoint is used, of 6.65%, then the median result amongst those for Australia is 6.65% corresponding to the DDM. However, as argued in Lally (2013a, section 6.3), I favour significant weighting on the results from a range of other markets due to statistical imprecision in these estimates. Furthermore, as argued in section 5.1 above, the low quality of the pre 1958 data used in the Ibbotson estimates (which flows through to the Siegel and Wright estimates) also argues for placing significant weight on the results from other markets. Substitution of these latter results where available for those in the first column of Table 1 leads to the median of 6.0% (and mean of

6.1%), before rounding. Even if only 50% weight is placed upon the foreign estimates (where they are available), the median is 6.3% before rounding. In view of this, I continue to support an MRP estimate (rounded to the nearest 1%) of 6.0%.

5.7 Further Arguments

SFG (2014a, para 213) argues that protection against an extreme outcome arising from one of the methods is better achieved by deletion of it (unless a plausible explanation for the outcome were available) rather than use of the median result, and this undercuts the merits of using the median rather than the mean. I disagree. Although deletion of outliers is conventional practice in statistics, sample sizes are usually so large that marginal outliers would not materially affect results and therefore disagreements over which outliers to delete are not usually important. By contrast, in the present case in which results from only five approaches are considered, a marginal outlier could materially affect the mean result. For example, suppose it were possible to assign a point estimate to the DDM results and this point estimate were 10%. It would therefore be an outlier in my results using Australian data (see Table 1) but possibly not an extreme one. Using SFG's proposed approach, there would then be contentious debates over whether it was an extreme outcome and, if so, whether a plausible explanation for the result could be offered. Moreover, the effect of including it would be to raise the MRP estimate from 6.4% to 7.1%. Furthermore, if it were included, there would be some higher value at which it would eventually be deleted under SFG's approach and, at this tipping point, the mean result would not only significantly fall but (perversely) do so in response to one individual estimate rising. For example, if the tipping point for a DDM estimate were 11%, an increase in the DDM estimate from just under 11% to just over 11% would reduce the mean MRP estimate from 7.1% to 6.4%. All of these difficulties are avoided by use of the median. Of course, my DDM point estimate is not 10% but one should design a methodology in anticipation of an outcome of this kind from one of the approaches.

SFG (2014a, para 217) also argues that estimates based upon historical data (which they consider to be the Ibbotson and Siegel results) should be averaged before being combined with other estimates. The effect of this would be to reduce the weight on the Ibbotson and Siegel estimates from 20% each to 12.5% each, and therefore to raise the MRP estimate (because these two estimates are collectively low). I do not support this approach. If estimators are considered useful, and sufficiently different from others currently in use to

warrant inclusion, I think that they should be used and given equal weight with all others that are used. Once this principle is abandoned, there is no limit to possible weighting schemes that could be used. For example, the Wright estimate also uses historical data. So, on the same basis, one might average over the Ibbotson, Siegel and Wright estimates, and then combine this average with the remaining estimates.

6. Review of QTC's Views on the MRP

The QTC (2014, pp. 9-11) favours a DDM approach to estimating the MRP described in SFG (2013f). This is the same approach described in SFG (2013c, section 2.4; 2013e, section 5) and critiqued in section 4 above.

The QTC (2014, pp. 11-14) favours the 'Wright' method over the 'Siegel' method for dealing with the inflation shock in the late 20th century for a number of reasons. Firstly, the QTC (ibid, page 13) claims that there is no evidence that the MRP is constant over time. However, this assumption underlies both the Ibbotson and Siegel approaches and yet the QTC (inconsistently) favours use of the Ibbotson approach in addition to the Wright approach and SFG's DDM approach (ibid, page 18). Furthermore, the justification for the Siegel over the Wright method is not that the MRP is constant over time but that it displays more stability over time than the expected real market return, and the QTC claims that these two methods have similar stability over time implying equal merit.

Secondly, the QTC (ibid, page 13) argues that the Wright method gives better estimates of the cost of equity when the real risk free rate changes because its estimates of the cost of equity are invariant to changes in the real risk free rate. Clearly, if the real risk free rate changes and the expected real market return does not change, the Wright method will be better than the Siegel method. However, the same argument would favour the Wright method over the Ibbotson method, and yet the QTC (inconsistently) favours use of the Ibbotson method in addition to the Ibbotson method and SFG's DDM approach. Furthermore, in the face of changes to the real risk free rate, it does not seem plausible that the expected real market return will be unchanged; so, the premise underlying the argument is implausible. Furthermore, even if the Wright method were superior to the Siegel method under some circumstances, it might be inferior under other circumstances and therefore both methods might be used.

Thirdly, the QTC (ibid, page 13) argues that the market cost of equity is stable over time, as evidenced by SFG's DDM results, and this supports the Wright method. However, if this argument were valid, it would also support the Wright method over the Ibbotson method (which produces a stable MRP estimate and therefore an unstable cost of equity as the risk free rate changes), and yet the QTC (inconsistently) favours use of the Ibbotson method as well as the Wright approach and SFG's DDM approach. Furthermore, SFG's DDM is only one version of the DDM and it suffers from a number of problems as discussed in section 4 above.

Fourthly, the QTC (ibid, page 14) argues that the Wright approach involves fewer assumptions than the Siegel approach (because the latter requires an estimate of the long-term expected real yield on bonds). However SFG's DDM version requires even more assumptions (as discussed in section 4) and yet the QTC recommends its use. Furthermore, the need for assumptions is only one consideration in choosing an MRP estimate.

In respect of the surveys of independent valuation reports, in which risk free rates in excess of the prevailing ten-year rates were used, the QTC (2013, page 14) has argued that this risk free rate margin should be interpreted as a defacto upward adjustment to the MRP. In response, Lally (2013a, pp. 23-26) notes that these valuers are conducting DCFs for businesses with infinite-life cash flows and therefore would be interested in the prevailing term structure of risk-free rates for terms out to infinity. Furthermore, since observed rates in Australia exist only out to ten years, these valuers would have to speculate upon the rest of the term structure, they would need to invoke an average rate if they used only one rate (as they do), and this single rate would have to be significantly above the ten-year rate if the term structure were significantly upward sloping (as it is because interest rates are unusually low and therefore are expected to rise).[10] Consequently the use of risk free rates in the valuations that were higher than the prevailing ten-year rates should not be interpreted as defacto (upward) adjustments to the MRP. To illustrate the point, Lally (2013a) provides an example

[10] For Australia the July 2013 average rates on five and ten year CGS were 3.09% and 3.75% respectively. To gain some sense of what the (unobservable) Australian term structure beyond ten years might be at the same time, the July 2013 average yields for 10, 20 and 30 year US Treasury Bonds were 2.58%, 3.31% and 3.61% respectively (http://research.stlouisfed.org/fred2/data).

in which he assumes that the expectations hypothesis fully characterises the term structure of interest rates (so as to simplify the example).

The QTC (2014, pp. 14-18) challenges this argument on a number of bases. Firstly, they argue that the term structure beyond ten years can be flat or even downward sloping even if interest rates are expected to rise. Whatever the merits of this claim in general, it does not seem to characterise the present situation. Although Australian government bonds beyond ten years do not exist, they do exist in the US and the July 2013 average rates for 10, 20 and 30 year US government bonds were 2.58%, 3.31% and 3.61% respectively; this term structure is markedly upward sloping and use of the ten-year rate to value infinite life cash flows would therefore significantly overstate the value. So, if a valuer uses only one risk free rate rather than an entire term structure, that single rate would have to be above the ten-year rate. Secondly the QTC claims that Lally (2013a) does not explain his choice of parameters. This claim is not correct; the parameters in the example provided in Lally (2013a) were chosen to closely match the average ten-year risk free rate prevailing at the time of the valuation reports (3.5%) and the average risk free rate used in these valuations (4.4%). Thirdly, the QTC claims that it was inconsistent of Lally (2013a) to construct his example using a theory of the term structure (the expectations hypothesis) that he does not consider to be correct. The QTC seems to have interpreted the words 'not correct' to mean 'false' rather than 'not a complete explanation for the term structure' as intended. All theories are 'false' in the sense of not providing a complete explanation for the phenomenon of interest. Had Lally (2013a) used a more comprehensive theory, the same point could have been illustrated.

Fourthly, the QTC claims that Lally (2013a) failed to consider alternative explanations for the actions of the valuers that are based upon observable market data. This claim is not correct; the explanation posited by Lally is based upon observable market data. In particular, the ten-year Australian government bond rate was relatively low at the relevant time and the contemporaneous term structure of US government bonds beyond ten years was significantly upward sloping. Furthermore, Lally (2013a) does not assert that the only explanation for the behaviour of the valuers is the one presented by him. It was the QTC (2013) that acted presumptuously in asserting that this risk free rate margin should be interpreted entirely as a defacto upward adjustment to the MRP. Lally merely offered an alternative explanation, and it is the QTC that failed to consider alternative explanations in its original statement (QTC, 2013).

Fifthly, the QTC provides quotations from three valuation reports in support of its belief that the risk free rate margins over prevailing rates are solely defacto upward adjustments to the MRP. However, without a summary of the rationales offered by each of the valuers, one might wonder whether these three reports were representative. Furthermore, even if they were a representative sample, only one of these reports (from Lonergan Edwards) provides a clear statement in support of the QTC's claim. One of the other two (Ernst and Young) noted that the ten-year government bond yield is at "historically low levels", that this yield cannot explain current share prices, and therefore they have used a "normalised risk free rate" to "best reflect the longer-term position". This seems to be equivalent to the argument presented in Lally (2013a) rather than contrary to it. Furthermore, in presenting this argument, Ernst and Young clearly distinguish their course of action from that of increasing the MRP and thereby clearly imply that their course of action is not a defacto increase in the MRP. The last of these three valuers (Grant Thornton) refers to volatility in the global economy and therefore chose to use a risk free rate averaged over the previous year. This might be interpreted as a pragmatic response to the fact that valuations are generated over the course of several weeks and are intended to be useful over the following weeks, that the use of a risk free rate at a single (arbitrary) point in time is inconsistent with this, and the inconsistency is most problematic when risk free rates are volatile.

Sixthly, the QTC also refers to a report by Incenta (2013, page 27) in support of their position. However, at that point in the report, specific statements are attributed to only one expert (Mr Edwards) and Mr Edwards is reported as noting that the US 30-year risk free rate is significantly in excess of the ten-year rate and that he would use a longer-term rate than the Australian ten-year rate if it were available. He further notes that he does use a risk free rate in excess of the ten-year rate (ibid, page 45). So, clearly he uses a rate in excess of the ten-year rate in an attempt to replicate the average rate over the entire term structure. Such behaviour corresponds exactly to that suggested in Lally (2013a) rather than that in the QTC (2013). Interestingly, Mr Edwards is presumably a very senior person in the firm Lonergan Edwards and the views expressed by him contradict those expressed by the unidentified individual in the same firm and referred to in the previous paragraph. This somewhat undermines any suggestion that the views of this unidentified individual in Lonergan Edwards were representative of the firm.

Seventhly, the QTC claims that the analysts interviewed by Incenta (2013) use a risk free rate in excess of the prevailing ten-year rate in order to accommodate a 'through the cycle' approach to estimating the cost of equity. This phrase is too ambiguous to treat as supporting the QTC's claim that the increment to the risk free rate is a defacto increment to the MRP estimate. However a review of the specific statements made by these interviewees (Incenta, 2013, Appendix A) reveals that none of them explicitly state that the risk free rate increment is intended as a defacto increment to the MRP. Instead the majority of the interviewees (by 8/14) explain their actions by the fact that the cash flows are long term and therefore should be valued using a long-term risk free rate. Since this term for the cash flows exceeds ten years, the desired risk free rate is one associated with a term longer than ten years and, since the term structure is significantly upward sloping, this rate would exceed the prevailing ten-year rate. This is the explanation offered in Lally (2013a). So, none of these interviewees offer comments consistent with the QTC's claim and a majority offer comments consistent with the explanation offered in Lally (2013a).

Finally, the QTC note that the fall in the CGS yield in 2012 was associated with a rise in the margin for QTC bonds over CGS, they (reasonably) attribute the latter to a liquidity allowance, and they suggest that the risk free rate margin used by valuers (rate used over prevailing en-year rate) was an increased liquidity allowance. Whatever the merits of this explanation, it does not address the fundamental problem: the QTC (2013) attributed the risk free rate margin exclusively to a defacto MRP increment, Lally (2013a) offered an alternative explanation, and the QTC (2014) have not presented any evidence that rules out the alternative offered by Lally (2013a) but do present evidence consistent with the suggestion by Lally (2013a). Unless that alternative explanation is ruled out, it is not valid to add the risk free rate margins in the valuers' reports to their explicit MRP estimates.

Interestingly, despite raising all of the above arguments in support of their earlier claim that the MRP estimates offered by the valuers should be augmented by the risk free rate margin, the QTC no longer supports the use of surveys to estimate the MRP (as evidenced by favouring only estimates of the Ibbotson type, the Wright type and SFG's DDM estimates). This may be an oversight on their part. If it is not an oversight, it is hard to understand why the QTC would devote so much effort into reiterating and attempting to justify their earlier interpretation of the valuers' reports whilst now abandoning recourse to those MRP estimates.

7. Review of QTC's Views on the Risk Free Rate

The QTC (2014, pp. 3-9) rejects regulatory use of a risk free rate that matches the regulatory cycle (the five-year rate), on a number of bases. The QTC's first argument (ibid, page 3) is that use of the five-year rate presumes that equity holders in regulated firms are in the same position as the holder of a five-year bond and this is not the case because the holders of such bonds receive payment of principal in five years whereas equity holders in regulated businesses do not. This is equivalent to stating, as the QTC did in an earlier submission (QTC, 2013), that the use of a risk free rate that matches the regulatory cycle assumes that the regulated business will be sold at the end of the regulatory cycle. However, as discussed in Lally (2013a, page 21), no such assumption underlies the proposition, either explicitly or implicitly. A proposition that rests upon a number of assumptions can be critiqued on the grounds that the assumptions are very unrealistic but it cannot be critiqued on the basis of assumptions that are never made. Furthermore the usual practice in critiquing an assumption that is believed to underlie a model is to cite the reference to the alleged assumption in the original work or to demonstrate that it has implicitly been made. The QTC (2013, 2014) do neither of these. Instead the QTC (2014, page 3) cites a paper by Lally (2012) in which this issue arises, a further paper by the AER (2013b) that refers to the work in Lally (2012), and a statement in the AER (2013b, page 183) that the use of a risk free rate that matches the regulatory cycle assumes that the regulated business will be sold at the end of the regulatory cycle. However the analysis in Lally (2012) contains no such statement and instead states that the value of the business at the end of the current cycle will match the RAV because "..the output price will be reset to ensure that the value at that time of the subsequent payoffs on the regulatory assets equals the RAV prevailing at that time.." (ibid, page 14). So, faced with a clear statement in Lally (2012) and a contrary statement in the AER (2013b, page 183), the QTC elects to treat the AER as the arbiter in this matter. I cannot be responsible for interpretations of my work by other parties and my own work is entirely consistent on this matter: the use of a risk free rate that matches the regulatory cycle does *not* assume that the regulated business will be sold at the end of the regulatory cycle.

The QTC's second argument (QTC, 2014, pp. 3-5) is that regulated businesses subject to price resets every five years are similar to a very long-term bond with its coupon reset every five years, that such floating-rate bonds are different to five year bonds (because the funds are committed for longer), and therefore that the five-year risk free rate should not be used by a

regulator. Instead, the QTC argues that a regulator should add a margin to the five-year risk-free rate in recognition of this longer-term commitment of funds and the use of the ten-year rate would then be suitable. So, if the five-year rate were currently (say) 5% and the ten year rate were 5.5%, the QTC would consider the margin of 0.5% to be compensation for this longer-term commitment of funds in a regulated business. This argument has the following shortcomings. Firstly, the QTC's argument would apply to long-term floating-rate bonds with the coupon reset every five years, i.e., they would presumably argue that the appropriate rate for coupon resetting should be the ten-year rate rather than the five-year rate. However the appropriate interest rate to use in resetting the rate on a floating-rate bond is a rate corresponding to the reset term (Jarrow and Turnbull, 1996, section 13.2.4); to do otherwise would be to gift an arbitrage opportunity to other investors. Secondly, the QTC's claim that funds are committed for longer than five years is not correct, because the owners of floating rate bonds and shares in regulated businesses can sell their holdings. Thirdly, the consequence of using the ten-year rate for the resetting would be to produce a rate that was sometimes below the five-year rate and therefore contradict QTC's own claim that a (positive) margin over the five-year rate was warranted. Fourthly, a ten-year rate relative to a five-year rate reflects expectations of future interest rates and compensation for risk relating to future changes in interest rates, and these considerations have no relevance to five-year floating rate bonds and therefore none to regulatory situations (because of the resetting that occurs every five years in both cases).

To illustrate the last point in respect of floating-rate bonds, suppose that the current five-year rate is 5%, it is expected to be 10% in five years and investors are risk neutral.[11] In this case, the current ten-year rate will be 7.5% (because the holder of a ten-year bond will not receive the higher rate expected in five years). If the holder of a ten-year bond with coupon resetting every five years received the ten-year rate of 7.5% for the first five years rather than the five-year rate of 5%, as suggested by the QTC, they would be compensated for an adverse situation (the inability to benefit from higher interest rates in five years) that they would not actually be subject to (because the reset will occur in five years). Consequently their compensation would be too high. Instead the holder of the floating rate bond would receive the five-year rate for the first five years and expect to receive the five-year rate of 10% for the last five years. This is fundamental to rate resetting on floating rate bonds.

[11] The assumption of risk neutrality is adopted merely to simplify the example.

The only valid point that could be made here is that shareholders in a regulated business are not in an identical position to holders of long-term bonds with five yearly coupon resetting because regulators may fail to reset prices correctly in five years (whether by error or uncompensated change in the regulatory contract). However the risk that arises here cannot be addressed by using the ten-year risk free rate at the reset points. It should (and is) addressed by estimating the betas for these businesses using returns data from the same type of businesses. If the risks referred to are systematic, they will be reflected in the beta estimate and hence the cost of equity capital allowed by the regulator. To additionally use the ten-year risk free rate with the intention of allowing for these risks would therefore constitute double-counting. In addition to risk (the possibility of an outcome deviating from expectation), there may also be an expectation of loss from uncompensated changes in the regulatory contract. This too cannot be dealt with by using the ten-year risk-free rate, and requires other mechanisms (such as a right of appeal to another body).

The QTC's third argument (QTC, 2014, pp. 5-8) arises from a survey by Incenta (2013) of the valuation practices of 14 investment analysts. Incenta posed four questions to these analysts, of which the first two are as follows:

(a) what risk free rate term is used in valuing a regulated businesses subject to five-year regulatory cycle
(b) is a different rate applied to an unregulated business

Incenta claims that all interviewees used the ten-year rate in valuing a regulated business, and that they would all apply the same rate to an unregulated business but use a different beta (ibid, pp. 27-29). Incenta therefore concluded that regulators should use the ten-year rate so as to achieve consistency with the practice of valuation professionals (ibid, page 43) and this point is repeated by the QTC (2014, page 7).

I do not agree with the conclusion drawn by Incenta for the following reasons. Firstly, since Incenta refers to regulatory debates over the choice of the five or ten year rate, these regulatory rates are the prevailing rates (those at the commencement of the regulatory cycle), and Incenta recommends regulatory use of the ten-year rate, it follows that Incenta is recommending regulatory use of the *prevailing* ten-year rate. However, the rates used by these interviewees averaged 5% (Incenta, 2013, Table 2) whilst the prevailing ten-year rates

averaged 3.2%.[12] Thus, most of the interviewees were not using the prevailing ten-year rate; in fact only one of the interviewees (who used a rate of 3.5%) could have been using the prevailing ten-year rate. Furthermore, one of the interviewees (Mr Edwards of Lonergan Edwards) stated that the term structure was significantly upward sloping and therefore a rate in excess of the prevailing ten-year rate was warranted for valuing the infinite-life cash flows of these businesses (ibid, page 45). Since most of the other interviewees stressed the long-term nature of the cash flows and the need for a matching discount rate (ibid, pp. 45-46), Mr Edwards's explanation may also characterise some or all of these other interviewees. Other interviewees described their risk free rate as being "through the cycle" (ibid, pp. 45-46) and therefore may be using a ten-year rate averaged over some historical period. Thus, despite Incenta recommending the use of the prevailing ten-year rate on the basis that it accords with market practice, their survey of market practice does not support their recommendation.

Secondly, even if the interviewees were using the prevailing ten-year rate for valuation purposes, it would not follow that they favoured use of the same rate by a regulator for setting output prices. If regulators set output prices correctly (so that the present value of future cash flows matched the contemporaneous RAV), regulated businesses were not expected to over or under perform the opex assumptions used by regulators, regulatory policy was not expected to change without appropriate compensation, and these businesses did not have any growth options, the valuation of a regulated businesses at any point in time would simply be the contemporaneous RAV.[13] Thus the value of a regulated business would be its RAV subject to correction for these additional issues. For example, if a regulated business was expected to have lower opex than that reflected in the prices allowed by the regulator, the value of the business would be its RAV plus the present value of this lower opex. Thus, when the analysts refer to using a ten-year risk free rate in the discounting process, they may be referring to the discounting for these additional issues. If so, this discount rate would have no relevance to the appropriate regulatory reset rate because the latter is reflected in the RAV component, i.e., in the WACC allowed by the regulator and applied to the RAV. Alternatively, if analysts are not acting in this way and are present valuing all cash flows

[12] The dates of the interviews are not given but the report is dated June 2013 and I therefore examine the ten-year rates over the preceding year (June 2012-May 2013). The monthly averages range from 2.86% to 3.5% over this period and average 3.2% over the full year (data from the table F2 on the Reserve Bank website: www.rba.gov.au).

[13] To be precise, the value would be the present value of the cash flows over the remainder of the current regulatory cycle plus the present value of the RAV at the end of the cycle.

(including those reflected in the RAV), then the use of the ten-year risk free rate within the discount rate would represent some sort of average over the rate that is relevant to the RAV (the five-year rate) and the rate that is relevant to the additional cash flows, and this average rate does not indicate the appropriate rate for the RAV component.

Thirdly, even if Incenta had asked these analysts the much better question of what was the appropriate risk free rate for a regulator to use in setting output prices and these analysts had clearly stated that this was the (prevailing) ten-year rate, Incenta ought to have enquired into the basis for this response. For example an analyst might have supplied a proof that use of the ten-year rate would satisfy the NPV = 0 principle. However Incenta hasn't asked either of these questions and this undercuts the value of their interviews. The value of interviewing these analysts lies not merely in asking what they do but why. If their practices seem to be wrong, and they cannot supply a plausible explanation for them, it would not be sensible for a regulator to match their behaviour.

Fourthly, a number of the responses from these interviewees undercuts the presumption that their views are authoritative. In particular, two of the interviewees claim to use the ten-year rate because it is "standard market practice" whilst a third one states that it is the "policy of the company" (Incenta, 2013, Appendix A). Such comments suggest that the analyst either has no opinion on the matter or holds a different view to the one presented. In addition, all of the interviewees claim that the appropriate risk-free rate for valuing regulated businesses (with five year cycles) is the same as that for unregulated businesses. Since regulated businesses subject to five-yearly price resets are similar to a very long-term bond with its coupon reset every five years, and even the QTC (2014, pp. 3-5) agrees with this analogy, the belief on the part of all of these analysts that the appropriate risk-free rate for valuing regulated businesses (with five year cycles) is the same as that for unregulated businesses implies a belief that fixed rate bonds should be valued in the same way as floating rate bonds. This implicit failure to appreciate the difference between fixed-rate and floating-rate bonds undercuts the credibility of the interviewees.

8. Review of SFG's Views on Gamma

8.1 The Distribution Rate

SFG (2014b, paras 78-88) rejects the estimate for the distribution rate of 85% presented in Lally (2013c), and prefers the estimate of 70% based upon ATO data, on the following bases.

Firstly, contrary to claims by Lally, SFG suggests that the ATO data is free of problems. These problems are actually referred to by NERA (2013c, pp. 5-6) who suggest that the distribution rate estimated from ATO data (using the "tax measure") may be overestimated due to undistributed imputation credits of bankrupt companies being deleted (and therefore effectively treated as distributed) and may be either over or under estimated due to some firms failing to report their franking account balances. Furthermore, there may be a host of other problems (not yet recognised by NERA) that might bias the estimate. Furthermore, NERA (ibid, Table 2.2) estimates the distribution rate through two methods that ought to yield the same result, but produce significantly different results (70% and 53%). This further undercuts the credibility of the ATO data.

Secondly SFG claims that, even if there are problems in the ATO data, these problems might also be present in the financial statement data used by Lally. However, financial statement data has three features that virtually guarantees protection against the problems in the ATO data: the financial statement data is audited, the researcher is able to personally identify the source data (the figures of interest for particular firms) rather than having to rely upon the aggregation exercise carried out by the ATO (and is therefore protected against double-counting and other aggregation problems), and the financial statement data is internally consistent, i.e., there are no unexplained discrepancies in the financial statement data whereas there are major inconsistencies in the ATO data (which casts doubt on all of it). In respect of the specific shortcomings in the ATO data identified by NERA (2013c), and described in the previous paragraph, neither would apply to the financial statement data. In particular, if a firm examined by a researcher did go bankrupt during the period examined, its undistributed credits would be properly treated as undistributed. In addition, since the researcher personally extracts the franking balance data from the financial statements, this approach is not exposed to reporting failures by firms.

Thirdly, SFG claims that the sample used by Lally (of ten companies) is too small. However, since the parameter being estimated is the market-wide distribution rate, the significant feature of the sample is not the number of companies but the proportion of company taxes paid to the ATO that come from these firms. This proportion should be strongly related to the aggregate market weight of these companies, and this aggregate market weight is 50%. Clearly this is less satisfactory than the 100% sample implicit in the ATO data and therefore there is a trade-off between the data problems in the ATO data and the smaller sample size

used by Lally. However, to characterise Lally's sample as ten companies without also noting that it represented 50% of the ASX200 market weight is misleading.

Fourthly, SFG claims that the sample used by Lally would be more likely to have high distribution rates because the companies examined by Lally are large, and therefore more likely to have foreign-sourced profits, which reduces their tax payments to the ATO and therefore raises their distribution rates. This claim is readily testable by increasing the sample size, and I have therefore doubled the sample size to cover the largest 20 firms by market capitalisation (as at 20 February 2014), raising the share of ASX200 market capitalisation from 50% to 62%.[14] The results are shown in the Appendix. The aggregate distribution rate has fallen only marginally, to 84%. Furthermore, treating the first and last half of the observations as drawings from potentially separate populations, the averages of the individual firm distribution rates are almost identical for these two halves, at 87% and 86% respectively. In addition, the most significant characteristic of the companies with the unusual (low) distribution rates is not size but that they are involved in natural resource extraction. All of this reinforces the conclusion that the estimate from the ATO data is too low, and that the appropriate rate for the market is about 85%.

Fifthly, SFG notes a number of estimates of the distribution rate arising from the use of ATO data and reported in Lally (2013c), ranging from 0.69 to 0.71, and considers this narrow range to reflect favourably on the ATO data. However, if the ATO data contains deficiencies which induce bias in the estimate, it will contaminate all such estimates and therefore the similarity in these figures is not an indication that the ATO data is error-free.

Sixthly, SFG claims that Lally's estimate of 85% is not indicative of the benchmark regulated firm. This statement is true; the figure is intended to be an estimate of the market average and so too is the generally employed estimate of 70% based upon ATO data. Thus, SFG's observation does not favour the ATO-based estimate over Lally's estimate. Furthermore, the general practice of Australian regulators is to apply the same distribution rate to all firms and the 85% estimate is consistent with this general practice.

[14] Fortescue Metals would have been included but its Financial Statements lacked the required information on dividends prior to 2011 and it was therefore replaced by the 16th ranked company (Suncorp). In addition, data on MacQuarie Group extends back only to 2008.

8.2 The Utilisation Rate

Lally (2013c, section 3.7) argues that combining the Officer model (which assumes segmented markets for risky assets) with an estimate of the utilisation rate (U) based on market prices (and therefore reflecting the presence of foreign investors) constitutes a de facto form of cherry-picking of parameter values and models that maximises the price or revenue cap for regulated businesses, and he presents an analysis of estimated costs of equity under the assumption of both complete segmentation and complete integration of markets for risky assets. In response, SFG (2014b, section 6) raises a number of contrary points.

Firstly, and primarily, SFG (ibid, para 122) argues that Lally's analysis assumes that the Australian risk free rate would be the same regardless of whether markets were segmented or integrated, and presents empirical evidence that this assumption is not valid (SFG, ibid, Figure 1). Crucial to SFG's concern is their belief that a CAPM that assumes segmentation assumes that all foreign investment (including that in government bonds) is precluded (SFG, ibid, para 109). However, Lally's analysis does not assume that a CAPM based on a segmentation scenario (the Officer model) precludes foreign investment in the risk-free asset. Instead the Officer CAPM only assumes that the market for *risky* assets is completely segmented. No assumption is made in this model about the market for the risk-free asset, except that this asset exists and is available to all local investors, because the risk-free rate is an exogenously determined parameter (in all versions of the CAPM). So the Australian risk free rate could reflect demand from only local investors, or demand from investors anywhere, or even be set by government fiat. Thus, SFG's evidence that the Australian risk-free rate would differ according to whether foreign investment in Australian government bonds was precluded or not is irrelevant to applications of the Officer CAPM.

An alternative, but equivalent, way of viewing this matter is to note that the cost of equity is the sum of a risk free rate and a risk premium. The risk free rate is affected by many factors, including whether the market for *risk-free* assets is segmented or integrated. Similarly, the risk premium is affected by many factors, including whether the market for *risky* assets is segmented or integrated. CAPMs are theories about the risk premium, and the Solnik and Officer models offer alternative explanations for the risk premiums. The analysis carried out by Lally focuses upon these two models and therefore how the risk premiums would change with increasing integration of markets for *risky* assets. Consequently Lally (2013c, section 3.7) could have conducted his entire analysis using risk premiums on assets rather than costs

of equity and therefore a risk free rate would never have appeared in the calculations; the result would have been the same: combining the Officer model (which assumes segmented markets for risky assets) with an estimate of U based on market prices (and therefore reflecting the presence of foreign investors) produces implausibly high estimates of the risk premium because this approach constitutes a de facto form of cherry-picking of parameter values and models that maximises the risk premium on assets and therefore maximises the price or revenue cap for regulated businesses. The possibility or even fact that the Australian risk free rate would be higher than currently observed if foreign investors were excluded from this market does not ameliorate the problem of overestimating the risk premium under the current situation.

Even if segmentation in the market for risky assets did imply segmentation in the market for risk-free assets, the possibility or even fact that the Australian risk free rate would be higher than currently observed if segmentation applied to it (i.e., foreign investors were excluded from this market) would still not ameliorate the problem that the risk premium under the current situation seems to have been overestimated (by coupling the Officer model with an estimate of U that reflects a high level of integration). To illustrate this point, consider the example in Lally (2013c, pp. 33-34), in which the Australian risk-free rate is currently 3%, the risk premium (net of the effect of firm-level imputation credits) has been estimated at 5.4% using $U = 0.35$, and the bounds on this net risk premium have been estimated at between 3.8% (under complete integration) and 4.7% (under complete segmentation). Using this data, the estimated the cost of equity using $U = 0.35$ is 8.4% and Lally's bounds on this were 6.8% (under complete integration) and 7.7% (under complete segmentation), using the same risk-free rate of 3% in all cases. If segmentation of the markets for risky assets implied the same for risk-free assets, and the risk free rate would have been higher than 3% (say 4%) in such a case, then the cost of equity under complete segmentation of the markets for both risky and risk-free assets would be 8.7% (4.7% + 4%), and therefore the estimate of 8.4% would lie within the bounds for complete segmentation and integration (of all markets). However, even if the risk free rate were 4% under the scenario considered, it would not ameliorate the fact that the risk premium of 5.5% under the current scenario is too high, i.e., it lies outside the band of possible values. If A is the sum of B plus C, and B is observable, and C is not, and C has been estimated at 5.4%, and the plausible bounds on C are 3.8% to 4.7%, then C has been overestimated and the possibility that B would be higher than its currently observed value under some possible scenarios does not ameliorate the overestimation of C.

Secondly, SFG (ibid, para 120) argues that the analysis conducted by Lally (2013c, section 3.7) is subject to uncertainty about parameter values and a proper allowance for this would produce a range that was so wide as to be of no value. However, SFG provides no analysis in support of this claim. Furthermore Lally does consider a range of possible values for the parameters that are not observable, as shown in Lally (2013c, Table 3, Table 4). If SFG considers that these ranges are unwarranted, the responsibility to present that case lies with them and they have not done it.

Thirdly, SFG (ibid, para 121) argues that Lally (2013c, section 3.7) fails to consider the possibility of "model error in converting real-world estimates to their theoretical world values". Presumably this is a reference to Lally's use of the Solnik model for estimating the cost of equity capital under complete integration of markets for risky assets. However, as noted in Lally (2013c, page 30), this model was selected because (dividend imputation aside) it closely resembles the Officer model. If SFG feels that a better choice of model under complete integration of markets for risky assets is available, the responsibility to present it and to justify the choice lies with them. No alternative has been presented by them.

Fourthly, SFG (ibid, para 121, para 131) also claims that Lally (2013c, section 3.7) fails to consider the possibility of estimation errors in his parameters. However, Lally (ibid, Table 3, Table 4) considers a range of possible values for unobservable parameters, and even SFG (ibid, footnote 86) acknowledges this.

In addition to these purely technical issues, SFG never addresses the fundamental issue: that the cost of equity capital is estimated by SFG using a model (Officer) that assumes complete segmentation of markets for risky assets whilst estimating U in a way that will reflect the presence of foreign investors, and this inconsistency may give rise to a perverse result. The same comment could be made about estimates of U based on the "equity ownership" approach, and were made by Lally (2013c, pp. 14-15). Remarkably, in critiquing the equity ownership approach, SFG (2014b, para 140) approvingly cites this comment from Lally. So, in respect of the equity ownership approach, SFG does accept that combining the Officer model with an estimate of U that reflects the presence of foreign investors can have perverse results. The same problem afflicts SFG's method for estimating U.

Lally (2013c, section 3.2) provides estimates of the proportion of Australian equities held by Australians, of about 60% for listed equity (Black and Kirkwood, 2010, page 2) and about 70% for all equity (Australian Bureau of Statistics, 2007), and favours the latter figure. In response SFG (2014b, pp. 30-33) raises three points. Firstly, SFG argues that more recent estimates should be used. I agree. In respect of listed equity, the ASX (2013, page 2) estimates the proportion held by Australians at 54% and (like Black and Kirkwood, 2010) uses ABS data. In respect of all equity, updated ABS data yields approximately the same 70% figure in Australian Bureau of Statistics (2007).[15] Secondly, SFG argues that there are grounds for concern about the quality of the data on unlisted equities. This seems correct and suggests that such data be viewed cautiously. Thirdly, SFG argues that data on unlisted equity includes government bodies and these should be excluded because they are irrelevant to the proportion of imputation credits likely to be redeemed by recipients. Whatever the merits of this argument, the practical effect of it is limited because government-owned businesses are a small part of the unlisted equity (about 15%). So, even if this point were considered valid, the resulting upward bias to the unlisted sector would be small (reducing the local ownership proportion from 70% to 67%). The more important point here is whether unlisted equity should be included, in principle. Arguably, the fact that only listed equity is used to estimate the MRP and beta suggests that the same limitation be applied to the present issue. However, the limitation is only imposed for the MRP and beta because data from unlisted firms is entirely inadequate for estimating returns. Furthermore, MRP estimates are generally based on a subset of listed equity (such as the ASX200), the subsets used may vary and are sometimes never specified (in surveys), and betas are typically estimated from foreign returns data. All of these results could reasonably be viewed as proxies for the results that would arise from using Australian data on all equities. In addition, treating the CAPM as a model that applies to only listed equities would rule out using it to estimate the cost of equity for an unlisted company (and some regulated businesses are unlisted). Thus, in principle, I favour inclusion of unlisted equity for estimating the proportion of Australian equities held locally. SFG's concerns about the quality of this data seem warranted, but it seems entirely plausible that the local ownership proportion of unlisted equity is higher than for listed equity and therefore that the inclusion of unlisted equity would raise the local

[15] In respect of the Australian National Accounts (5232.0), Table 32 ("Listed Equity") gives the value of listed equity as at Sept 2013 as $1,470b and the aggregate of foreign ownership stakes as $641b. In addition, Table 33 ("Unlisted Equity") gives the value of unlisted equity as at Sept 2013 as $1,303b (being the value of unlisted Australian equity plus Australian holdings of foreign equity of $2,134b less Australian holdings of foreign equity of $831b) and the aggregate of foreign ownership stakes as $209b. So, the foreign ownership share is ($641b + $209b)/($1,471b + $1,303b) = 0.31.

ownership proportion above the 54% for listed equity. So, a conservative estimate for the local ownership proportion is 54% and a more likely figure is about 70%. So, if U is estimated from the equity ownership approach, a conservative estimate for the local ownership proportion is 54% and a more likely figure is about 70%.

Lally (2012b, section 2.3) argues that the coefficient on imputation credits (θ) in the regressions used to estimate U from ex-dividend data is not U but the product of U and the coefficient on dividends (δ), and δ reflects differential personal taxation of gross dividends and capital gains. Since estimates of δ are typically less than one, because gross dividends are typically taxed more onerously than capital gains, treating the estimate of θ as an estimate of U leads to an overestimate. SFG (2014b, pp. 34-35) refer to this issue and attributes claims to Lally (2012) that are never made by him (ibid, para 169). However SFG do not address the central question: does the coefficient θ partly reflect the fact that gross dividends are taxed more onerously than capital gains and should the estimate for θ be stripped of this component in order to estimate U.

Lally (2012b, pp. 16-17) notes the lack of a constant in SFG's preferred regression model for estimating U. He adds that the case for doing so is neither presented by SFG nor clear cut, some earlier studies yield a statistically significant constant, and its omission could materially alter the estimate for the utilisation rate. In response, SFG (2014b, pp. 37-38) raises two points. Firstly, they claim that their preferred model (model 4 as shown in SFG, ibid, para 185) is derived from model 1 ("basic model") and this precludes insertion of a constant. However, SFG's description of model 1 as the "basic model" is unwarranted. The most fundamental model in this area is that the price change around ex-day (ΔP) is linearly related to the dividend (DIV) and the franking credits (FC), to which a noise term is added, and a constant (a) might be added:

$$\Delta P = a + \delta DIV + \theta IC + e$$

From this basic model, one could scale by a variety of possible variables, as shown in SFG (ibid, para 185). If the scalars are cum-div price and standard deviation of returns, the result is SFG's preferred model 4, with or without a constant as desired. Thus there is no obstruction to insertion of a constant in SFG's preferred model 4.

Secondly, SFG (ibid, para 188) claims that there is no compelling reason for the price change to be non-zero as the cash dividend goes to zero, and this supports exclusion of the constant. In support of this, SFG quotes Lally (2012b, page 16). A reasonable interpretation of the quote is that Lally opposes the use of a constant. However this is not the case. Immediately following the quote, Lally (2012b) states that "However, the empirical evidence of anomalous behaviour on the ex-days of splits and stock dividends, and also on the days shortly before and after the ex-days of cash dividends (as discussed above), suggests that the constant be included." Thus, Lally considered both viewpoints and concluded that the "appropriate course of action is not clear cut". Since it is not clear cut, and some researchers in this area do use models with constants, SFG ought to have examined the effect of inserting a constant. If the effect of doing so is to materially change the estimate of U, the credibility of this approach would be further undercut.

Lally (2012b, pp. 17-18) notes that the dividend drop-off methodology used by SFG also suggests that gross dividends are taxed more onerously than capital gains, that this is inconsistent with the Officer CAPM also favoured by SFG, and that SFG favour resolving the inconsistency by continuing to use the Officer CAPM. This involves disregarding the empirical evidence on the validity of the Officer CAPM whilst simultaneously accepting empirical evidence on U from the same type of study. In response, SFG (2014b, paras 191-193) argues that use of the Officer CAPM would require that the valuation differential between dividends and capital gains be ignored, in order to be consistent. This is true but it does not address the fundamental issues: should the Officer CAPM be used and, if it is, why should some parameter estimates from a regression model be used and others ignored because they conflict with the Officer CAPM.

Lally (2012b, pp. 19-20) notes that SFG deletes from its dividend drop-off study those companies with a market cap below 0.03% of the market index, that this rule has no incremental value because observations are also (sensibly) eliminated if trades are not present on both the cum and ex-dividend dates, that the choice of 0.03% is highly arbitrary, that the rule tends to exclude observations that are least likely to be contaminated by tax arbitrage (the best ones), and the rule may have significantly affected SFG's results. In response SFG (2014b, page 39) attributes the rule to Beggs and Skeels (2006, footnote 16), who justify it on the grounds that small companies "tend to be rarely traded". However, such a concern is already dealt with by excluding observations when trades are not present on both the cum and

ex-dividend dates. SFG fail to explain why the 0.03% rule is needed in addition to the requirement for prices on the relevant dates, and they do not respond to the other concerns raised by Lally (2012b, pp. 19-20).

SFG (2014b, paras 204-211) argues that only results from studies based upon data from July 2000 should be invoked and implies (wrongly) that I take a different view (in Lally, 2012, 2013). This is incorrect. I share SFG's view that studies based upon data from July 2000 dominate those based upon earlier data. In addition SFG (ibid, para 204) states that all of the papers reviewed in Lally (2012) use pre-2000 data. In fact, Lally (2012b, section 2.1 and page 11) refers to results from SFG (2011) for the period 2000-2010 and those from Beggs and Skeels (2006) for 2001-2004, and reference to the other studies was to allow comparison of their methodology with that of SFG (2011). Furthermore, Lally (2012b, page 24) states that the SFG (2011) study dominates all studies using data from pre July 2000 because of the tax regime change at that point. SFG (ibid, para 204) also states that the Lally (2013c) review consists essentially of the same set of papers that were examined in Lally (2004). However, of the eight studies referred to by Lally (2013, section 3.4), only two of them were referred to in Lally (2004) because the other six did not then exist. SFG's misrepresentation of my earlier reports here seems to be part of a systematic pattern of such behaviour, and other examples have been noted above.

SFG (2014b, para 211) claims that reports by Lally (2012b, 2013c) do not consider a number of recent studies using post-2000 data, and identifies these (later in the paper, at paras 212-243) as Beggs and Skeels (2006), SFG (2011), SFG (2013g), SFG (2013h), Vo et al (2013), NERA (2013d), and Feuerherdt et al (2010).[16] This claim is not correct; Lally (2012b) refers to the first two of these papers and Lally (2013c) to all but the last (because it does not offer an estimate of *U*). This is one further example of SFG systematically misrepresenting my earlier reports. In addition SFG does not refer here to a paper by Cummings and Frino (2008), which is referred to in Lally (2013c) and which provides higher estimates of *U* than the papers referenced by SFG. Had they referred to this paper, SFG (2014b, para 244) could not have claimed that empirical studies produce estimates of *U* of 0-0.35, and would instead have had to acknowledge that it was 0-0.64 (as per Lally, 2013c, Table 2).

[16] SFG refer to a paper by the ERA that I reference as Vo et al (2013) and uses the citation SFG (2013) at two different points to refer to two different papers (which I have separately referenced).

SFG (2014b, pp. 45-46) claims that the study by Vo et al (2013) produces similar results to their own work when the market adjustment is made. This claim is correct, and I also support the use of the market adjustment for the reasons presented by SFG. However, SFG neglect to mention that Vo et al (2013) obtain quite different results to SFG when outliers are omitted and alternative values for the 'tuning coefficient' in robust regression are used (these results are noted in Lally, 2013c, pp. 21-22). Thus, far from supporting the SFG work, the work of Vo et al (2013) suggests that results are highly sensitive to outliers and the value for the 'tuning coefficient'.

Lally (2013c, page 24) reviewed surveys of whether practitioners allowed for imputation credits, and notes that there has been a trend in the last decade towards explicit adjustments for imputation credits. In support of this, he cites surveys by KPMG (2005), in which no respondents made an explicit adjustment for imputation credits, Truong et al (2008), in which 13/64 respondents made such adjustments, and KPMG (2013, pp. 26-28), in which 53% of respondents explicitly adjusted for imputation credits in valuing businesses other than infrastructure (rising to 94% for infrastructure investments). In response SFG (2014b, paras 249-250) raises two points. Firstly, they claim that the trend alleged by Lally was based on the KPMG (2013) survey. This is not correct. The trend also reflects the results in Truong et al (2008). Secondly, SFG claims that the largest group in the survey was infrastructure funds and the cash flows of any regulated infrastructure asset would inevitably be adjusted for imputation credits according to the regulator's estimate of gamma. Again, SFG's claim is not correct. Only 6/23 of the survey respondents were infrastructure funds (KPMG, 2013, page 2).

9. Conclusions

My conclusions are as follows. Firstly, the dividend adjustment proposed by NERA (2013a) is better supported than that of Brailsford et al (2008) and I therefore recommend adjusting the Brailsford results to reflect this. However neither adjustment is satisfactory in an absolute sense and both reflect adversely upon the quality of the data used (up until 1958) in estimating the MRP using historical returns data. The problem can be mitigated by placing some weight on such results from other markets.

Secondly, in respect of 2013 surveys of the MRP, the Fernandez et al (2013) survey should be used but the appropriate MRP estimate from it is 5.7% for Australia rather than the 6.8% claimed by SFG. The Fernandez survey also provides results for 19 other markets, and their average is 6.0%. In respect of 2013 results for independent valuation reports, and referred to by SFG (2013d), SFG does not report the MRP estimates used by the valuers and instead reports estimated costs of equity. So, SFG's analysis is not useful for the present purposes and I therefore recommend continued reliance on the Ernst and Young (2012) survey of these independent valuation reports, which yields a mean response of 6.3%.

Thirdly, and in respect of the DDM methodology, I favour that methodology presented in Lally (2013a) subject only to the possibility of a mid-year rather than an end-year assumption for dividends. This involves discounting the dividends for year t by t-0.5 years rather than for t years, and the effect of doing so would be to raise the MRP estimate.

Fourthly, I have examined arguments raised by SFG and the QTC, relating to the risk-free rate, the MRP, and gamma. Amongst these arguments that have not already been commented on in the previous three paragraphs, I agree that the data referred to by Lally (2013c) and relating to local ownership of Australian equities should be updated, and doing so moderately lowers the proportion of Australian equities owned by Australians from 60% to 54% for listed equities whilst not affecting the figure for all equities (70%).

Finally, I have updated results for the MRP estimation methods favoured by me, including adopting the dividend correction proposed by NERA. Some of these results have materially changed but the median (rounded to the nearest 1%) is still 6.0%.

APPENDIX

Table 2: Distribution Rates for Companies and the Market

Company	B_{2000}	B_{2013}	*DIV*	*DIST*	*TAX*	*DIST RATE*
CBA (Parent)	450	742	35,496	15,212	15,504	0.98
BHP (Group)	0	11,308	46,794	20,054	31,362	0.64
Westpac (Parent)	257	1247	34,964	14,984	15,974	0.94
ANZ (Group)	0	265	29,750	12,750	13,015	0.98
NAB (Group)	0	1035	31,291	13,410	14,445	0.93
Telstra (Group)	74	0	45,255	19,395	19,321	1.00
Woolworths (Group)	417	1943	11,621	4,980	6,506	0.77
Wesfarmers (Group)	0	243	12,602	5,400	5,643	0.96
CSL (Group)	0	0	377	161	161	1.00
Woodside (Group)	173	3,260	8,034	3,443	6,530	0.53
Rio Tinto (Group)	2,215	7,434	4,388	1,880	5,219	0.36
Westfield (Group)	25	55	950	407	437	0.93
MacQuarie (Group)	133	297	1,915	821	985	0.83
Origin Energy (Group)	0	0	3,229	1,384	1,384	1.00
Suncorp (Group)	136	551	6,899	2,957	3,372	0.88
QBE Ins (Group)	-8	83	1,533	657	748	0.88
Brambles (Group)	188	78	2,946	1,263	1,153	1.10
Santos (Group)	360	993	3,082	1,321	1,954	0.68
AMP (Group)	80	191	4,248	1,821	1,932	0.94
Amcor (Group)	0	0	1,480	634	634	1.00
Total				122,934	146,279	0.84

REFERENCES

AER, 2013a, *Better Regulation Explanatory Statement Rate of Return Guideline Appendices* (www.aer.gov.au).

___ 2013b, *Draft Rate of Return Guideline – Explanatory Statement* (www.aer.gov.au).

ASX, 2013, *Annual Australian Cash Equity Market* (http://www.asx.com.au/documents/resources/australian_cash_equity_market.pdf).

Australian Bureau of Statistics, 2007, *Feature Article*: *Foreign Ownership of Equity* (http://www.abs.gov.au/ausstats/abs@.nsf/featurearticlesbyCatalogue/C223BB70FF545363CA2573AA000F3524?OpenDocument

Beggs, D., and Skeels, C., 2006, 'Market Arbitrage of Cash Dividends and Franking Credits', *Australian Economic Papers*, vol 82, pp. 239-252.

Black, S., and Kirkwood, J., 2010, 'Ownership of Australian Equities and Corporate Bonds', *RBA Bulletin - September* (http://www.rba.gov.au/publications/bulletin/2010/sep/4.html).

Brailsford, T., Handley, J., and K. Maheswaren, 2008. 'Re-examination of the Historical Equity Risk Premium in Australia', *Accounting and Finance*, 48, pp. 73-97.

_____ 2012. 'The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data, *Accounting and Finance*, 52, pp. 237-247.

Cummings, J., and Frino, A., 2008, 'Tax Effects on the Pricing of Australian Stock Index Futures', *Australian Journal of Management*, vol. 33, pp. 391-406.

Ernst and Young, 2012, *Market Evidence on the Cost of Equity*: *Victorian Gas Access Arrangement Review 2013-2017* (www.aer.gov.au).

Feuerhardt, C., Gray, S., and Hall, J., 2010, 'The Value of Imputation Tax Credits on Australian Hybrid Securities', *International Review of Finance*, vol. 10, pp. 365-401.

Gordon, M. and Shapiro, E. 1956, 'Capital Equipment Analysis: The Required Rate of Profit', *Management Science*, vol. 3, pp. 102-10.

Fernandez, P., Aguirreamalloa, J., and Corres, L., 2012, 'Market Risk Premium used in 82 Countries in 2012: A Survey with 7192 Answers', working paper, University of Navarra (http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2084213).

Fernandez, P., Aguirreamalloa, J., and Linares, P., 2013, 'Market Risk Premium and Risk Free Rate used for 51 Countries in 2013: A Survey with 6237 Answers', working paper, IESE Business School (www.netcoag.com/archivos/pablo_fernandez_mrp2013.pdf**).**

Incenta Economic Consulting, 2013, *Term of the Risk Free Rate for the Cost of Equity*, report prepared for the Energy Networks Association (www.aer.gov.au).

Jarrow, R., and Turnbull, S., 1996, *Derivative Securities*, South-Western College Publishing, Cincinnati.

KPMG, 2005, *Cost of Capital*: *Market Practice in Relation to Imputation Credits*, report prepared for the Victorian Electricity Distribution Businesses (www.aemc.gov.au).

_____ 2013, *Valuation Practices Survey 2013* (www.kpmg.com.au).

Lally, M., 1988, 'The Gordon-Shapiro Dividend Growth Formula and Inflation', *Accounting and Finance*, Vol. 28, pp. 45-51.

_____ 2004, *The Cost of Capital for Regulated Businesses*, report prepared for the QCA (www.qca.org.au).

_____ 2012a, *The Risk Free Rate and the Market Risk Premium*, report prepared for the QCA (www.qca.org.au).

_____ 2012b, *The Estimated Utilisation Rate for Imputation Credits*, report prepared for the QCA (www.qca.org.au).

_____ 2013a, *Response to Submissions on the Risk-Free Rate and the MRP*, report prepared for the QCA (www.qca.org.au).

_____ 2013b, *Review of the AER's Proposed Dividend Growth Model*, report prepared for the AER (www.aer.gov.au).

_____ 2013c, *Estimating Gamma*, report prepared for the QCA (www.qca.org.au).

_____ 2013d, *The Dividend Growth Model*, report prepared for the AER (www.aer.gov.au).

Lamberton, D., 1958, *Share Price Indices in Australia*, Law Book Company of Australasia, Sydney, NSW.

Nelson, N., Ferrarone, C., and McGuire, J., 2012, *Implied Equity Risk Premium*, UBS Global Investment Strategy, October.

NERA, 2013a, *The Market, Size and Value Premiums*, report prepared for the ENA (www.aer.gov.au).

_____ 2013b, *The Cost of Equity for a Regulated Energy Utility*: *A Response to the QCA Discussion Paper on the Risk-Free Rate and the MRP*, report prepared for United Energy and Multinet Gas (www.qca.org.au).

_____ 2013c, *The Payout Ratio*, report prepared for the ENA (www.aer.gov.au).

_____ 2013d, *Imputation Credits and Equity Prices and Returns*, report prepared for the ENA (www.aer.gov.au).

QCA, 2012, *The Risk-free Rate and the Market Risk Premium* (www.qca.org.au).

QTC, 2013, *The Risk-Free Rate and the Market Risk Premium*: *Submission to the Queensland Competition Authority* (www.qca.org.au).

____ 2014, *The Risk-Free Rate and the Market Risk Premium*, submission to the QCA (www.qca.org.au).

SFG, 2011, *Dividend Drop-Off Estimate of Theta*, report prepared for Energex Ltd, Ergon Energy Ltd and ETSA Utilities (www.aer.gov.au).

____ 2013b, *Response to the QCA Discussion Paper on the Risk-Free Rate and the Market Risk Premium*, report prepared for Aurizon Ltd (www.qca.org.au).

____ 2013c, *Techniques for Estimating the Cost of Equity* (www.qca.org.au).

____ 2013d, *Evidence on the Required Return on Equity from Independent Expert Reports* (www.qca.org.au).

____ 2013e, *Reconciliation of Dividend Discount Model Estimates with those Complied by the AER* (www.aer.gov.au).

____ 2013f, *Cost of Equity Estimates Implied by Analyst Forecasts and the Dividend Discount Model*, report prepared for the Victorian distribution businesses (www.aer.gov.au).

____ 2013g, *Updated Dividend Drop-Off Estimate of Theta*, report prepared for the ENA (www.aer.gov.au).

____ 2013h, *Using Market Data to Estimate the Equilibrium Value of Distributed Imputation Tax Credits*, report prepared for the ENA (www.aer.gov.au).

____ 2014a, *An Appropriate Regulatory Estimate of the Market Risk Premium*, report prepared for Aurizon Ltd (www.qca.org.au).

____ 2014b, *An Appropriate Regulatory Estimate of Gamma*, report prepared for Aurizon Ltd (www.qca.org.au).

Schmalensee, R., 1989, 'An Expository Note on Depreciation and Profitability Under Rate of Return Regulation', *Journal of Regulatory Economics*, vol. 1, pp. 293-298.

Siegel, J. 1992, 'The Equity Premium: Stock and Bond Returns since 1802', *Financial Analysts Journal*, Jan-Feb, pp. 28-38.

Truong, G., Partington, G., and Peat, M., 2005, 'Cost of Capital Estimation and Capital-Budgeting Practice in Australia', *Australian Journal of Management*, vol. 33, pp. 95-121.

Vo, D., Gellard, B., and Mero, S., 2013, *Estimating the Market Value of Franking Credits*: *Empirical Evidence from Australia* (www.erawa.com.au).