An appropriate regulatory estimate of gamma

June 2015

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Figures

Executive Summary

1.1   Context

1   Frontier Economics (**Frontier**) has been retained by ActewAGL Distribution, AGN, APA, AusNet Services, Citipower, Ergon, Energex, Jemena Electricity Networks, Powercor, SA Power Networks and United Energy to provide our opinions in relation to the recent decisions of the Australian Energy Regulator (**AER**) insofar as they relate to the gamma parameter.

2   Specifically, we have been asked to review the AER's approach to gamma in the Final Determinations for the ACT/NSW distribution businesses and the Preliminary Determinations for the South Australian and Queensland distribution businesses and provide our views on the AER's decisions with respect to gamma. A copy of the terms of reference for this report is attached at Appendix 1.

3   This report has been authored by Professor Stephen Gray, Professor of Finance at the UQ Business School, University of Queensland and Director of Frontier Economics, a specialist economics and corporate finance consultancy. I have Honours degrees in Commerce and Law from the University of Queensland and a PhD in Financial Economics from Stanford University. I teach graduate level courses with a focus on cost of capital issues, I have published widely in high-level academic journals, and I have more than 15 years' experience advising regulators, government agencies and regulated businesses on cost of capital issues. I have published several papers on the estimation of gamma, including in the *Journal of Financial Economics*, one of the leading international finance journals. A copy of my curriculum vitae is attached as Appendix 2 to this report.

4   My opinions set out in this report are based on the specialist knowledge acquired from my training and experience set out above. I have been provided with a copy of the Federal Court's Practice Note CM 7, entitled "Expert Witnesses in Proceedings in the Federal Court of Australia", which comprises the guidelines for expert witnesses in the Federal Court of Australia (Expert Witness Guidelines). I have read, understood and complied with the Expert Witness Guidelines.

5   I have previously provided two reports in relation to gamma as part of the current round of regulatory determinations:

   a. SFG Consulting, 2014, *An appropriate regulatory estimate of gamma*, 21 May; and

   b. SFG Consulting, 2015, *Estimating gamma for regulatory purposes*, 6 February.

6   Since preparing those reports, I have joined Frontier Economics and provide this report on that basis.

1.2   Summary of conclusions

7   My primary conclusions are as follows:

  a. Gamma should be estimated as the product of:

     i. The distribution rate, *F*; and

     ii. The value of distributed credits, theta.

  b. As set out in Section 3 of this report, I adopt a distribution rate of 70% because:

     i. That estimate is consistent with data for all companies;

     ii. That estimate is consistent with data for all listed companies excluding the top 20; and

     iii. The distribution rate is a firm-specific parameter and the top 20 firms are very large multinationals that are able to distribute imputation credits via profits earned offshore and the benchmark entity operates only within Australia.

  c. Theta should be interpreted as the value of distributed credits – as in the price that an investor would be prepared to pay for a credit in the market for equity funds, or (equivalently) the extent to which credits are capitalised into stock prices.[1] I explain my reasons for this conclusion in Section 2 of this report.

  d. In my view, the best available estimate of theta is 0.35. The source of this estimate is dividend drop-off analysis applied to data from 2000-2013. Other market value estimates of theta tend to be lower, in which case the 0.35 estimate would be conservative. I explain this in Section 5 of this report.

  e. The redemption rate (whether estimated using tax statistics or equity ownership proportions) does not provide an estimate of the relevant value of distributed credits, theta. It can only be used as an upper bound for theta. The majority of the redemption rate estimates that are available are between 0.43 and 0.45. My preferred estimate of theta of 0.35 lies below these upper bound

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[1] That is, the extent to which stock prices have been bid up to reflect the market's assessment of the value of imputation credits.

estimates, satisfying that test. I explain this in Section 0 of this report.

f. The distribution rate is a firm specific parameter because it depends upon dividend payout policies that vary across firms. Theta is a market wide parameter because the value of a credit in the hands of an investor is independent of its source. Consequently, there is no reason to impose a constraint that the same data source must be used to estimate both parameters. Rather, any data that is relevant to the estimation of the distribution rate should be used to estimate that parameter, and any data that is relevant to the estimation of theta should be used for that purpose. The best estimates of each parameter should then be multiplied to produce the best estimate of gamma. In my view, the AER's approach of using different subsets of the available evidence to establish a range of ranges for each parameter and consequently for gamma is neither transparent nor necessary nor correct. I explain this point in Section 0 of this report.

8   My preferred estimate of gamma is 0.25, which is the product of the distribution rate (0.7) and theta (0.35). In my view, this is the best estimate of gamma that is currently available.

2 Value or redemption?

2.1 Key point to be determined

9   The key point of difference to be resolved is the question of whether theta (one of the components of gamma) should be interpreted as:

       a. The value of distributed credits (as in the worth of those credits to investors or the price that they would be prepared to pay for those credits in the market for equity funds or the extent to which credits are capitalised into stock prices); or

       b. The redemption proportion – the proportion of distributed credits that are likely to be redeemed.

10   This dichotomy is relevant throughout the discussion below and for convenience I refer to the two possibilities as the *value* and *redemption* interpretations, respectively.

11   If the *value* interpretation is adopted, we should use estimation methods that measure the value of credits (such as dividend drop-off analysis), and if the *redemption* interpretation is adopted we should use estimation methods that measure the proportion of credits that are redeemed (such as equity ownership and tax statistics).

2.2 The role of gamma in the regulatory setting

12   In the regulatory setting, the regulator first estimates the return that shareholders' require and then reduces that according to the estimate of gamma. For example, suppose the regulator determines that shareholders require a return of $100 and that those shareholders will receive imputation credits that are worth $20 to them. The regulator would then allow the firm to charge prices so that it can pay a return of $80 to the shareholders.[2] That is, the regulator's estimate of gamma determines the quantum of the reduction in the return that the firm is able to provide its shareholders by other means (dividends and capital gains).

13   If, for example, the regulator's assessment of the value of imputation credits is greater than the true value of imputation credits to shareholders, the shareholders will be under-compensated. In this case, the reduction in other forms of return (dividends and capital gains) will exceed the true value of the imputation credits.

14   Thus, when estimating gamma, the appropriate question to consider is this: What is the quantum of dividends and capital gains that shareholders would be

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[2]   This is apparent in Row 35 of the AER's Post-Tax Revenue Model.

prepared to give up in order to receive imputation credits? It is precisely this question that is addressed by market value studies that seek to quantify the relative value (to investors in the market for equity funds) of dividends, capital gains, and imputation credits.

15   The alternative is to reduce the regulatory allowance for returns from dividends and capital gains according to the proportion of investors who may be eligible to redeem credits, rather than according to the value of those credits. This approach will inevitably result in investors being mis-compensated because there is no attempt to consider whether the *value* of what investors are required to give up (dividends and capital gains) is equivalent to the *value* of what they receive in its place (imputation credits).[3]

16   On this issue, the AER's recent final decisions appear to accept the following advice from Handley (2015):

> SFG's description of the regulatory framework is one where the regulator first determines the amount of dividends/capital gains that investors would require in the absence of imputation and then reduces this amount by the value investors receive from imputation credits. I believe a simpler description is that the regulator determines the appropriate after-company-before-personal-tax rate of return. This return by definition consists of three components: capital gains, dividends and imputation credits – there is no "substitution" of dividends/capital gains for imputation credits as SFG suggests.[4]

17   In my view, the regulator does determine the total allowed return on equity, which consists of three components. Then the regulator determines how much of that return it considers will be generated in the form of imputation credits. The regulator then reduces the return that would otherwise be available to equity holders (via the other components of return, which are dividends and capital gains) accordingly. This can be seen in Row 35 of the Analysis sheet in the Post Tax Revenue Model (**PTRM**) – what would otherwise be available to the equity holders is reduced by the assumed value of imputation credits.

18   In my view it is abundantly clear that there are three components to the return on equity – dividends, capital gains, and imputation credits – and that a greater assumed value of imputation credits will result in a reduction in the regulatory allowance that generates dividends and capital gains. This is precisely what occurs in Row 35 of the PTRM – the return that could otherwise be provided to equity holders is reduced by the regulator's assessment of the value of imputation credits. Any suggestion that the regulatory allowance that generates dividends and capital gains is independent of the regulatory assumption about imputation credits is erroneous.

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[3]   The evidence suggests that such an approach will systematically under-compensate investors since the investors who are eligible to redeem credits do not value them at the face amount.

[4]   Handley (2015), p. 31.

2.3   Rule requirements

2.3.1   The requirements of the NER

19   Prior to the latest change the Rules stated that:

> γ is the assumed utilisation of imputation credits.[5]

20   At the time of the latest Rule change, all regulators (including the AER)[6] had always interpreted this provision to require an estimate of the *value* of imputation credits, where "value" was interpreted as "in the market for equity funds" or "market value." Differences of opinion existed about how to best estimate the market value of credits, but there was no dispute about what gamma meant or how it should be defined.[7]

21   In this context, the AEMC amended the Rules to state that:

> γ is the value of imputation credits.[8]

22   This expression is economically equivalent to the longstanding prevailing regulatory practice at the time of the rule change.

23   In any event, the Rules now require regulators to produce an estimate of the *value* of imputation credits.

2.3.2   The AER's interpretation of the Rules

24   In its Guideline, the AER proposed that it would no longer adopt the previous regulatory practice of estimating theta as the market value of distributed credits, but that it would instead define theta to be the redemption rate – the proportion of credits that are likely to be redeemed.[9]

25   In the *Gamma Case*,[10] the Tribunal agreed with my view that the redemption rate cannot be used to estimate theta, but can only be used as an upper bound for theta. The AER states that all parties to that case considered theta to be the market value of distributed credits, in accordance with the longstanding regulatory practice at the time. Thus, the AER suggests that the Tribunal's ruling

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[5]   NER cls. 6.5.3, 6A.6.4 (as at version 52).

[6]   See, for example, the AER's March 2013 Final Decision for SP AusNet, p. 151, published shortly before the AER's draft Rate of Return Guideline.

[7]   See, for example, Australian Competition Tribunal, 2010, Application by Energex Limited (No 2) [2010] ACompT 7, 13 October; Australian Competition Tribunal, 2011, Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9, 12 May.

[8]   NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14).

[9]   See the chronology of the AER's redefinition of theta in the following subsection of this report.

[10]   Application by Energex Limited (No 2) [2010] ACompT 7; Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9.

might be interpreted as requiring that redemption rates cannot be used to estimate the *market value* of distributed credits, leaving open the possibility that they might be used to estimate theta if it was defined in some other way.[11]

26   The AER now proposes to define theta to be the redemption rate. Under this definition, it is tautologically true that the redemption rate could be used to estimate theta. However, that approach would, on its face, appear to be inconsistent with the Rules, which require an estimate of the *value* of imputation credits.

27   To satisfy the *value* definition of gamma that appears in the Rules, the AER's Rate of Return Guideline proposes that the term *value* in the Rules should not be interpreted as taking its common meaning of "worth" or "price," but should instead be interpreted in "a generic sense to refer to the number that a particular parameter takes."[12]

28   In its recent decisions, the AER abandons its "generic sense" interpretation of value.[13] It instead defines the redemption rate to be the "utilisation value" and the "pre-personal-tax and pre-personal-cost value." The AER is clear that both of these terms still mean the redemption rate – the change is a re-definition to include the word "value."[14]

29   The alternative to the AER's interpretations of "value" is an interpretation in the ordinary sense of that word – what is the actual worth of credits to investors in the market for equity funds; what is the price that an investor would actually be prepared to pay for a credit. In my view, this is the correct interpretation of "value" and is consistent with the longstanding prevailing regulatory practice prior to the rule change.

2.4   The evolution of the AER's interpretation of "value"

2.4.1 Draft Guideline

30   In its Draft Rate of Return Guideline, the AER defined theta to be the redemption rate or the "utilisation rate" – the proportion of distributed credits that are redeemed:

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[11] AER Rate of Return Guideline, Explanatory Statement, pp. 166-173.

[12] AER Rate of Return Guideline, Appendix H, p. 138.

[13] See Section 2.4 below.

[14] We expand on our discussion of the evolution of the AER's conceptual redefinition of theta in Section 2.4 below.

> The utilisation rate is the before-personal-tax reduction in company tax per $1 of imputation credits that the representative investor receives.[15]

31   The AER also defined gamma in terms of the proportion of credits that are likely to be redeemed:

> The proportion (γ) is the proportion of company tax paid that investors redeem.[16]

32   The AER goes on to define gamma as:

> …an estimate of the expected proportion of company tax which is returned to the representative investor through utilisation of imputation credits[17]

and:

> …the representative investor's expected utilisation of franking credits as a proportion of the total company tax paid.[18]

2.4.2 Final Guideline

33   In its Final Guideline, the AER continued to directly define theta to be the redemption rate:

> The utilisation rate, which is the extent to which investors can use the imputation credits they receive to reduce their personal tax.[19]

and as:

> …the complex weighted average (by value and risk aversion) of individual investors' utilisation rates. In turn, these reflect each investor's expected ability to use imputation credits to reduce their tax (or get a refund).[20]

34   The Guideline also states that:

> The utilisation rate is the before-personal-tax reduction in company tax per one dollar of imputation credits that the representative investor receives.[21]

35   This definition is curious in that it refers to some sort of reduction in *company* tax whereas all of the AER's previous definitions refer to the reduction in *personal* tax that is due to the redemption of credits.

36   In the Final Guideline, gamma is also defined in different ways that are difficult to comprehend. For example:

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[15] AER Draft Rate of Return Guideline, Explanatory Statement, p. 126

[16] AER Draft Rate of Return Guideline, Explanatory Statement, p. 234

[17] AER Draft Rate of Return Guideline, Explanatory Statement, p. 118

[18] AER Draft Rate of Return Guideline, Explanatory Statement, p. 122

[19] AER Rate of Return Guideline, Explanatory Statement, p. 159.

[20] AER Rate of Return Guideline, Explanatory Statement, p. 159, Footnote 530.

[21] AER Rate of Return Guideline, Explanatory Statement, p. 165.

γ [gamma] is the proportion of tax collected from the company which gives rise to the tax credit associated with a franked dividend.[22]

37   However, *all* company tax paid in Australia gives rise to an imputation tax credit, by definition, and *all* franked dividends have the same amount of franking credits attached to them.

38   The Guideline then defines theta in terms of the *value* that investors receive from the credits that are distributed to them:

A utilisation rate —which is the value investors receive through imputation credits as a proportion of the credits that the benchmark efficient entity distributes.[23]

39   The Guideline also goes on to define gamma in terms of the *value* of imputation credits:

γ can be interpreted as the value of a dollar of tax credit to the shareholder.[24]

40   Finally, the Guideline defines gamma in terms of the redemption rate and value simultaneously:

We propose that the value of imputation credits within the building block revenue framework is an estimate of the expected proportion of company tax which is returned to investors through utilisation of imputation credits.[25]

41   Here it is important to note that the AER has rejected the longstanding interpretation of gamma as representing the market value of imputation credits.[26] Moreover, the Tribunal has ruled that the redemption rate cannot be used to estimate the market value of imputation credits,[27] and I agree. Thus, the AER does not suggest that the redemption rate can be used to estimate the market value of imputation credits.

42   However, the Rules require the AER to estimate "the value of imputation credits."[28] This leads the AER to adopt a different definition of "value" as follows:

The ENA asserts the use of the word 'value' is intended to denote the concept of 'market value'. We do not agree with this strict interpretation. We do not consider the intended meaning of the word 'value' is made clear in the rules or in the AEMC's determination. Further, we consider the word 'value' in these

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[22]   AER Rate of Return Guideline, Explanatory Statement, p. 158.

[23]   AER Rate of Return Guideline, Appendix H, p. 142.

[24]   AER Rate of Return Guideline, Appendix H, p. 138.

[25]   AER Rate of Return Guideline, Explanatory Statement, p. 158.

[26]   AER Rate of Return Guideline, Explanatory Statement, p. 159.

[27]   Application by Energex Limited (No 2) [2010] ACompT 7; Application by Energex Limited (Gamma) (No 5) [2011] ACompT 9.

[28]   NER cls. 6.5.3, 6A.6.4 (current since version 53); NGR r. 87A(1) (current since version 14).

contexts is being used in a generic sense to refer to the number that a particular parameter takes.[29]

2.4.3 Draft decisions

43 In its November 2014 draft decisions, the AER introduces the concept of "utilisation value:"

> We define the utilisation rate as the utilisation value to investors in the market per dollar of imputation credits distributed,[30]

and:

> [T]heta is the utilisation value to investors in the market per dollar of imputation credits distributed.[31]

44 The source of the term "utilisation value" was advice from Handley, who defines that term is as follows:

> We define this utilisation value as the incremental reduction in personal tax, if any, which arises from the receipt of a franked dividend compared to the receipt of an otherwise equivalent unfranked dividend.[32]

45 That is, the term "utilisation value" is precisely equivalent to the term "redemption rate" or the "proportion of credits that is redeemed." In other words, theta is still simply defined to be the redemption rate, although it is no longer called the "redemption rate," but rather the "utilisation value." The AER makes the same point as follows:

> In this decision, consistent with Handley's advice, we define the utilisation rate as the utilisation value to investors in the market per dollar of imputation credits distributed. However, we consider that the definitions used in the Guideline and in this decision are equivalent.[33]

2.4.4 Final decisions

46 In its April 2015 final decisions, the AER refers to the "before-personal-tax and before-personal-costs value" of imputation credits:

> …we consider that the utilisation rate relates to the before-personal-tax and before-personal-costs utilisation value to investors in the market per dollar of imputation credits distributed[34]

and:

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29 AER Rate of Return Guideline, Appendix H, p. 138.

30 Jemena Gas Networks Draft Decision, Attachment 4, p. 17.

31 Jemena Gas Networks Draft Decision, Attachment 4, p. 35.

32 Handley and Maheswaran (2008), p. 84.

33 Jemena Gas Networks Draft Decision, Attachment 4, p. 36.

34 TransGrid Final Decision, Attachment 4, p. 30.

> …the per dollar value of an imputation credit gamma should be measured prior to any personal tax on the credit and prior to any personal costs associated with the receipt of the credit.[35]

47   The AER notes that this "before-personal-tax and before-personal-costs value" is the same as its definition of "utilisation value" in its draft decisions (which is the same as the redemption rate, as set out above):

> Our definition of the utilisation rate in this final decision and the draft decisions is the utilisation value to investors in the market per dollar of imputation credits distributed.[36]

2.4.5 Summary

48   Throughout the Guideline process, and since, the AER has used a number of different definitions for theta, all of which are equivalent to the redemption rate. That is, the AER approach is to simply define theta to be equal to the redemption rate – even though the name it has used has changed on numerous occasions. In my view, the redemption rate is not a measure of value, no matter what it is called or how it is motivated. Consequently any estimate of gamma that is based on the redemption rate is not an estimate of the value of imputation credits.

2.5   The Handley definitions of value

49   As set out above, the term "utilisation value" is sourced from Handley, who defines it to be the redemption rate. That is the utilisation value is simply another name for the redemption rate.

50   Handley (2015) develops the notion of "pre-personal-tax and pre-personal-cost value" for the AER. This is a measure of what the value of a credit would be to an investor if we set aside all of the reasons why investors would actually value the credit at less than the face amount.

51   Consider a new car that has a list price (face value) of $40,000. Suppose that car has been used as a demonstration vehicle, so has 5,000 km on the odometer, a scratch along one side, and a tear in the upholstery of one seat.[37] The value of the car, before considering mileage, scratches and tears (i.e., the pre-mileage, pre-scratch, pre-tear value) would be the list price of $40,000. However, the actual value of the car in the market for cars (where value is defined in the ordinary sense of that word) would clearly be less than $40,000.

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[35] TransGrid Final Decision, Attachment 4, p. 12.

[36] TransGrid Final Decision, Attachment 4, p. 47.

[37] That is, there are reasons why the market would not value the car at face value – analogous to the reasons why investors would not value imputation credits at the face amount set out in SFG (2014) and SFG (2015).

52   That is, "value" can be interpreted in the ordinary real world sense of that word – the actual worth to investors or the price that investors would be prepared to pay in the market for equity funds – or it can be interpreted in a theoretical way as the value that a credit would have to an investor if we assume away:

   a.   all of the reasons why the market value might be less than the face amount; and

   b.   all of the empirical evidence that the market value *is* less than the face amount.

53   If we adopt the standard interpretation of "value," we would use estimation approaches that seek to determine how much investors would be prepared to pay for credits in the market for equity funds – what is the amount of dividends or capital gains that investors would give up in order to obtain a credit.

54   If we adopt the theoretical interpretation, we would simply assume away any factor that would cause an investor to value credits at less than the face amount. Thus, the "pre-personal-tax and pre-personal-cost value" is also just another name for the redemption rate.

55   There is a strong analogy here to one of the arguments put in the *Gamma Case* before the Tribunal. In that case, there was debate about how the distribution rate should be estimated. The applicants submitted that there was direct real world empirical evidence that established that the actual distribution rate was 70%. By contrast, Dr Handley advised the AER that the real world empirical evidence should be supplanted by theoretical considerations. He proposed that, in theory, the 30% of credits that had not been distributed in *any* year since the start of imputation might all be distributed in *every* year of the forthcoming regulatory period, so that the empirically observed distribution rate of 70% should be supplanted by a theoretically assumed distribution rate of 100%.

56   Handley (2014, pp. 11-14) continues to advise the AER that it should assume that 100% of imputation credits will eventually be distributed, even though the consistent empirical evidence is that year after year after year the distribution rate averages 70%. The AER abandoned the use of a theoretically conceptualised distribution rate immediately prior to the *Gamma Case* and has rejected it ever since.

57   In the case at hand, the redemption rate definition of theta (whatever name it is given) is also a theoretically conceptualised one, as Handley (2015) explains:

   …the use of redemption rates as a means of estimating the value of credits is driven by conceptual considerations and theory…This also forms the basis for using the equity ownership approach.[38]

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[38]   Handley (2015), p. 28.

2.6   A theoretically conceptualised theta

58   Two ways have been proposed for estimating theta. One method involves the empirical estimation of theta from market prices, providing a direct estimate of the value of imputation credits in the market for equity funds. The alternative is to theoretically conceptualise what theta would be under a certain set of theoretical assumptions.

2.6.1 Lally's theoretical conceptualisation

59   One example of the theoretical conceptualisation approach is Lally (2014), whose key assumption is that there is no foreign ownership of Australian equity. This assumption leads Lally to conclude that theta should theoretically be set to 1, and that is his recommendation to the AER.

60   The key assumption on which Lally's conceptualised theta is based is clearly unrealistic and it is inconsistent with the way every other WACC parameter is estimated. For example, the standard practice is to estimate the risk-free rate with reference to traded government bond prices which reflect the participation of foreign investors in that market – we don't theoretically conceptualise what government bond yields would be in the absence of foreign investors.

2.6.2 Handley's theoretical conceptualisation

61   Another example of the theoretical conceptualisation approach is Handley (2014, 2015). He recognises that (a) foreign investors can own Australian equity and (b) Australian investors can own foreign equity. His key assumption is that investors construct their investment portfolio in a way that violates the principles of Markowitz efficiency that underpin the CAPM.[39] Under the CAPM, all investors seek to maximise the utility (i.e., the risk/return trade-off) of their investment portfolio. The very first equation in Sharpe (1964) sets out this basic premise.

62   Indeed, the very basis of the CAPM is that we cannot consider an asset (or a subset of assets) in isolation, we must consider every asset in the context of the entire portfolio held by the investor. Investor's will optimise their portfolio by balancing the risk and return of the whole portfolio. Without this Markowitz portfolio optimisation, investors would not hold the risk-free asset and the market portfolio and, consequently, the CAPM would not exist.

63   The Handley approach is inconsistent with Markowitz portfolio optimisation – it requires that investors will consider their Australian equity investments independently of any other assets they hold. That is, they will compile a portfolio of Australian stocks without any regard to any other assets they may hold. Thus,

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[39]   Harry Markowitz was awarded the Nobel Prize jointly with William Sharpe, the developer of the CAPM, in 1991.

no investor optimises their portfolio or their utility and no investor behaves in a manner that is consistent with the CAPM.

2.6.3 Selecting a theoretical conceptualisation of theta

64   As set out above, the AER has received advice on the theoretical conceptualisation of theta from Lally and Handley. Each has advised the AER that the other's theoretical conceptualisation is flawed and has no proper basis.

65   For example, Lally advises the AER that there is an inconsistency between the use of a CAPM and the use of an assumption that violates the principles of Markowitz efficiency that underpin the CAPM, and that he disagrees with Handley's approach:

> …Handley (2008, section 2.2) appears to believe that there is no inconsistency and believes that all CAPMs start by defining the "market", from which the "relevant" set of investors follows. Thus, if the market is Australian equities, then the relevant set of investors includes foreigners to the extent they invest in Australian equities. I do not agree. CAPMs do not start with a definition of the "market" but a set of assumptions about investor behaviour and institutional features, and the particular assumptions imply which market portfolio and set of investors are relevant.[40]

66   Symmetrically, Handley (2015) advises the AER that the Lally approach is wrong on the basis that there is:

> …an assumption by Lally which contradicts a key joint assumption in the CAPM.[41]

67   My view is that:

    a. It would be inappropriate to adopt a conceptual theta on the basis of an assumption that there is no foreign investment in Australian shares (Lally); and

    b. It would be equally inappropriate to adopt a conceptual theta on the basis of an assumption that investors do not seek to maximise their utility over their investment portfolio (Handley).

68   Theta is the outcome of the complex interaction of trading between different types of foreign and domestic investors. Consequently, the conceptualisation of theta requires the adoption of some strong simplifying assumptions. For example, the complex interaction of trading is simplified by assuming away the existence of foreign investors, or by assuming that investors trade in such a simplistic manner that it pre-dates Markowitz (1959).

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[40]   Lally (2013 AER), pp. 14-15.

[41]   Handley (2015), p. 10.

2.7   Theoretical basis for the redemption rate approach

2.7.1   Overview

69   The theoretical conceptualisation approach that has been adopted by the AER apparently allows it to distinguish between:

> a.   The value of distributed credits in the market; and
>
> b.   The market value of distributed credits.

70   The AER's view is that the former provides an appropriate basis for estimating theta and that the latter does not. Specifically, the AER states that the redemption rate represents "the value to investors in the market" and not "the market value,"[42] and the reverse is presumably true of dividend drop-off analysis and other market value estimation methods.

71   My view is that the AER's justification of its new approach for theta has become increasing muddled and contradictory as it has changed from Guideline to draft decision to final decision – culminating in a confused attempt to rule out "market value" estimates while simultaneously retaining estimates of "the value to investors in the market" on the basis of theoretical reasoning.

72   By contrast, my approach is to simply estimate theta from observed market prices – the same way it has always been done, and the same way that every other WACC parameter is estimated.

2.7.2   The AER's theoretical basis

73   The AER justifies its position on the basis that representative agent equilibrium models provide a conceptual theoretical basis for its approach of defining theta to be the redemption rate. In my earlier report, SFG (2015), I explain in some detail that these models *do not* imply that there is an equivalence between theta and the proportion of credits that investors redeem.[43] SFG (2014) made the same point in some detail.[44]

74   In advice commissioned by the AER, Lally (2013 AER) also makes the same point:

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[42]   TransGrid Final Decision, Attachment 4, p. 46.

[43]   SFG (2015), p. 10.

[44]   SFG (2014), p. 76.

> The AER (2013, page 237) also defines the utilisation rate [theta] as the proportion of distributed credits that investors redeem. **This is not correct**; the redemption rate is merely an estimation method. [45]

75   Lally goes on to note that Handley (2008) had previously made the same error:

> …Handley (2008, section 2.2) appears to believe that there is no inconsistency and believes that all CAPMs start by defining the "market", from which the "relevant" set of investors follows. Thus, if the market is Australian equities, then the relevant set of investors includes foreigners to the extent they invest in Australian equities. **I do not agree**. CAPMs do not start with a definition of the "market" but a set of assumptions about investor behaviour and institutional features, and the particular assumptions imply which market portfolio and set of investors are relevant. [46]

76   In its recent draft and final decisions, the AER does not address the fact that Lally has advised them that they have erred on this point. Rather, the AER's response has been to seek no further advice on gamma from Dr Lally.

77   The AER also does not address the detailed submission on these points in SFG (2014) or SFG (2015). Rather, the AER simply notes that Dr Handley continues to advocate his own unique theoretical approach wherein investors do not optimise their portfolios, and Dr Lally's advice on these points is not mentioned.

78   In summary, Associate Professor Lally and I have both submitted that the theoretical basis on which Handley and the AER rely is flawed. NERA (2015) also make the same point in a different way. For its JGN Final Decision, the AER commissioned an additional report from Handley (2015 JGN). That report reiterates Dr Handley's view that theta should be theoretically conceptualised rather than estimated with reference to market data. In particular, it suggests that the Handley theoretical framework is grounded in Officer (1994), but it is not, as set out in Section 2.9 below. [47]

2.8   A better approach: Empirical estimation

79   The alternative approach is to simply recognise that the outcome of the complex interaction of trading between investors can be observed in the stock price. We can use observed prices from financial markets to estimate parameters as they *are*, rather than conceptualising what they *would be* under a particular set of assumptions. This is the approach that is adopted for all other WACC parameters. For example, government bond prices reflect the complex interaction of trading by investors and we use those prices directly to estimate risk-free rates. We do not conceptualise what the risk-free rate would be if there

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45   Lally (2013 AER), p. 13, emphasis added.

46   Lally (2013 AER), pp. 14-15, emphasis added.

47   Handley (2015 JGN), pp. 3-7.

was no foreign investment, or if investors traded in a particular simplistic manner that is inconsistent with the CAPM. Rather, we accept that there is foreign investment and that investors will adopt whatever strategy they like, and that the observed price will reflect all of those things. Similarly, when estimating beta and MRP we use observed stock prices and conduct empirical analysis – we do not conceptualise what those parameters would be under a particular set of assumptions.

2.9   Imputation credits, stock prices and the Officer framework: The basis for a market value interpretation

80   The mathematical formulas set out in Officer (1994) also support a value interpretation. In its recent draft decisions, the AER considers the key formula from Officer (1994), as set out in Figure 1 below.

Figure 1: AER's documentation of the key result from Officer (1994)

$$E = \frac{X_O - X_D - TAX + \gamma IC}{r_e}$$

where:

- E is the value of equity

- X_O is operating income

- X_D is the debtholders' share of operating income

- TAX is corporate tax paid

- IC is imputation credits generated, and

- r_e is the return on equity.

Source: Jemena Draft Decision, Attachment 4, p. 40.

81   To be clear, in this formula E represents the *market value* of equity, as in the worth to investors. The formula shows that the current market value of equity is equal to:

      a. The present value of operating income; minus

      b. The present value of payments made to debt holders; minus

      c. The present value of tax paid to the government; plus

      d. The present value of imputation credits.

82   In this formula, gamma represents the extent to which imputation credits are capitalised into the market value of equity. I note that this is precisely what is estimated by dividend drop-off analysis and other market value studies. The formula shows that one takes the present face value of imputation credits (IC/r_e) and then multiplies by gamma and the result makes up part of the market value of equity.

83   Another way to see this is to rearrange the formula to isolate gamma as follows:

$$E_{with-IC} = E_{ex-IC} + \gamma \frac{IC}{r_e}$$

where $E_{with-IC}$ represents the market value of equity including imputation credits, E_{ex-IC} represents the market value of equity excluding imputation credits and IC/r_e represents the present face value of imputation credits. It is clear in this formula that gamma does not represent the proportion of imputation credits that might be redeemed, but the extent to which imputation credits increase the market value of equity.

84   Handley (2015) responds to the analysis set out above as follows:

> There is no dispute that the (market) value of credits are capitalised into stock prices – this is clear from equation (2) above. However, SFG fails to see that within Officer's framework it is the before personal tax and before personal costs value of a credit – the redemption value – which is the item being capitalised.

85   This seems to suggest that:

    a. In the real world it is the market value of imputation credits that investors capitalise into the stock price; whereas

    b. In the theoretical setting that forms the basis of Handley's advice, it is the "redemption value" of imputation credits that is capitalised into the price. (The "redemption value" is yet another new term that is presumably equivalent to the redemption rate, "utilisation value," and "pre-personal-tax and pre-personal-cost value".)

86   That is, there is an observed stock price in the real world that has the market value of imputation credits capitalised into it. There may then be an alternative theoretical stock price that has the redemption rate capitalised into it. If one is analysing this theoretical world, the real world stock price would be of little use because it reflects the real world market value of imputation credits rather than the redemption rate. The AER makes a similar point when it states that the market value that is reflected in observed stock prices:

> …is not consistent with our interpretation of the conceptual framework[48]

and:

> …does not align with the conceptual definition of utilisation rate.[49]

87   My point here is a simple one. There appears to be general agreement that real world stock prices will reflect the market value of imputation credits. Thus, stock prices can be used to estimate the market value of imputation credits. It is this market value (based on observations from the market for equity funds) that the regulator should consider when deciding on the extent to which there should be a reduction in the firm's ability to generate dividends and capital gains for its shareholders.

2.10 Is the redemption rate an upper bound or a point estimate?

88   There appears to be broad agreement between us, Handley and the AER that if theta is to be defined as the market value of imputation credits (as in worth to investors in the market), the redemption rate estimates cannot be used to estimate theta. They can, at best, be used to provide an upper bound for theta. By contrast, if theta is to be redefined as the redemption rate, then studies that estimate the redemption rate would (tautologically) provide an appropriate estimate of theta.

89   On several occasions, Handley has referred to the redemption rate as providing an upper bound rather than a point estimate. This is consistent with the view that theta represents the market value of imputation credits and that the redemption rate represents an upper bound that the market cannot exceed. In this regard, Handley (2015) notes that he has previously stated that:

> The extent to which observed stock prices reflect the value of franking credits can only be determined empirically.[50]

90   I agree entirely with that statement. In his previous report, Handley (2008) goes on to describe the tax statistic approach to estimating the redemption rate and he concludes that:

> …this estimate [i.e., the redemption rate] may be interpreted as a reasonable upper bound on the value of gamma.[51]

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[48] AER Rate of Return Guideline, Explanatory Statement, p. 159.

[49] AER Rate of Return Guideline, Explanatory Statement, p. 168.

[50] Handley (2015), p. 14.

[51] Handley (2015), p. 14.

91   That is, Handley suggests that there are two alternative ways of determining theta (and consequently gamma). One approach is to empirically estimate the value of imputation credits from observed stock prices. The other approach is to consider the proportion of credits that are redeemed. He says that the latter approach would not produce a point estimate, but only an upper bound.

92   Handley (2015) now says that the redemption rate provides a point estimate of theta. He explains that:

> An unfortunate side issue relates to my previous use of the term "upper bound". The point of using the term was this: we cannot be sure what is the value of imputation credits reflected in market prices, but we know that it should not exceed its redemption value, since this, by definition, represents the ultimate source of value of a credit. With hindsight, using "upper bound" in this context was unnecessary and confusing.

93   I agree that it is the market value of credits that is reflected in market prices. I also agree that the market price cannot exceed the redemption rate. But I cannot see why this implies that the redemption rate can now be used as a point estimate of theta, or why it would have led anyone to have mistakenly referred to what they believed to be a point estimate as an upper bound instead.

94   Moreover, in his earlier report, Handley (2008) recommends a range for gamma where most of that range is based on dividend drop-off estimates and the upper bound of the range is determined by his redemption rate estimate.[52] That is, the redemption rate estimate was used as an "upper bound" – a figure that a reasonable estimate for theta (from market value studies) could not exceed.

2.11 Further guidance on market value vs. redemption rate

95   The standard treatment of imputation credits in Australian finance textbooks is to interpret gamma in terms of the market value of imputation credits. I am unaware of any published work that interprets gamma in terms of the redemption rate.

96   For example, in their corporate finance textbook, Associate Professor Partington and his co-authors state (correctly in my view) that:

> γ=the market value of franking credits as a percentage of face value.[53]

97   They also note (correctly in my view) that the evidence suggests that investors value imputation credits materially below the face amount:

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52   Handley (2008), p. 22.

53   Brealey, Myers, Partington and Robinson (2000), p. 168.

> The results have been mixed, but they suggest that the market value of franking credits is positive, but significantly less than the credit's face value.[54]

and:

> …the market value of the franking credit is likely to differ from its face value. We do not know exactly what the market value is, but the evidence suggests that franking credits are valued at a significant discount to their face value.[55]

98   Partington et. al also provide an explanation (with which I agree) as to why imputation may have had an immaterial effect on the corporate cost of equity capital:

> The impact of imputation may not have been that big. There are several reasons for this. As suggested by Bob Officer, in a small open economy like Australia, equilibrium rates of return are likely to be determined by capital flows from international investors. If so, domestic tax changes are likely to have a reduced effect, or no effect at all, on equilibrium rates of return.[56]

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[54]   Brealey, Myers, Partington and Robinson (2000), p. 169.

[55]   Brealey, Myers, Partington and Robinson (2000), p. 168.

[56]   Brealey, Myers, Partington and Robinson (2000), p. 168.

3 The distribution rate

3.1 A firm-specific parameter

99   In its recent final decisions, the AER notes that:

> …the distribution rate is a firm specific parameter.[57]

100   The AER also notes that there is broad agreement that when estimating the distribution rate, we are seeking an estimate of the proportion of credits that would be distributed by the benchmark efficient entity:

> There appears to be agreement between the service providers, SFG and us that the distribution rate is the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors.[58]

101   There is also agreement on this point from Lally (2013 AER):

> …within the Officer (1994) model, the distribution rate is a firm specific parameter rather than a market average parameter.[59]

3.2 The relevant characteristics of the benchmark efficient entity

102   In its 2009 WACC Review the AER stated that the benchmark efficient entity should not be interpreted as a large listed firm:

> …the AER does not agree that a benchmark efficient NSP be defined as a large, stock market listed NSP and is a settled concept.[60]

103   Consistent with this view, the AER's 2013 Rate of Return Guideline defines the benchmark efficient entity without reference to size or listing status:

> The AER's proposed conceptual definition of the benchmark efficient entity is a pure play, regulated energy network business operating within Australia. [61]

104   Thus, the AER's view is that the benchmark efficient entity should not be defined as a large listed company, but generically as a "network business."

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57   TransGrid Final Decision, Attachment 4, p. 20.

58   TransGrid Final Decision, Attachment 4, p. 65.

59   Lally (2013 AER), p. 41.

60   AER 2009 WACC Review, pp. 80, 105.

61   AER Rate of Return Guideline, p. 7.

3.3   The AER's estimation approach

105   The AER has decided that the distribution rate should not be estimated with reference to comparator firms (as it does for other firm-specific parameters such as beta and gearing) because that may provide an incentive for regulated firms to manipulate their dividend payout policies to obtain a higher regulatory estimate of gamma.[62] As unlikely as this seems, the current question is *which* broader data set should be used to estimate the distribution rate. The AER considers two possibilities: all tax-paying companies, and all public companies.

106   SFG (2015) demonstrate that the two data sets that the AER considers produce effectively identical estimates, but for the 20 largest listed companies, which have materially higher payout ratios. Specifically, the AER accepts that:

> a. Listed firms in aggregate distribute 80% of the credits that they create;[63] and
>
> b. The 20 largest listed firms, which account for 62% of all listed equity, distribute 84% of the credits that they create.[64]

107   SFG (2015) show that implies that the public firms that are not among the top 20 have an average distribution rate of 73% since:

$$73\% \times 0.38 + 84\% \times 0.62 = 80\%.$$

108   NERA (2015) use Australian Tax Office data to estimate distribution rates for various types of companies from 2000-2012. Their results are summarised in Table 1 below.

Table 1: Distribution rate 2000-2012 by company type

Firm type	Distribution rate
Top 20 ASX listed	0.840
Public, but not top 20 ASX listed	0.693
All public	0.755
Private	0.505
All companies	0.676

Source: NERA (2015), Table 3.4, p. 23.

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62   AER Rate of Return Guideline, Explanatory Statement, p. 164.

63   TransGrid Final Decision, Attachment 4, p. 67.

64   TransGrid Final Decision, Attachment 4, p. 67.

109   Thus, the distribution rate for listed firms is approximately 70%, for all but the 20 largest listed firms and it is lower for unlisted firms. Consequently, the question is whether "the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors"[65] is best estimated with reference to the 20 largest listed firms, or with reference to other firms.

110   Handley (2015 JGN) confirms that the distribution rate is a firm specific parameter and confirms the NERA estimates set out above.

3.4   The role of the top 20 listed firms

111   In my view, when estimating the distribution rate there are two reasons to be concerned about the weight that is afforded to the top 20 listed firms:

> a. The AER has specifically stated that the benchmark efficient entity should not be assumed to be a large listed company, as set out above; and

> b. The top 20 listed firms differ from the benchmark entity in that their foreign sourced profits enable a higher distribution rate.

112   On the second point, SFG (2015) note that the 20 largest listed firms are very large multinationals. For example, BHP has equity that is valued at more than 30 times the equity in the regulated asset base of even a large service provider.[66] Even the 20th listed company is orders of magnitude larger than the service providers that are regulated by the AER.[67]

113   SFG (2015) also note that the 20 largest listed firms have a material amount of foreign sourced profits which enable them to distribute a higher proportion of imputation credits. Specifically, multinational firms are able to attach imputation credits to dividends that they distribute out of foreign sourced profits (since *any* dividend can have credits attached to it). Foreign profits enable any firm to distribute more imputation credits than it would otherwise have been able to.

114   This differentiates the top 20 listed firms from the benchmark entity, which is purely domestic by definition.[68]

115   In its recent final decisions, the AER acknowledges the SFG (2015) submission on this point and then devotes the following single sentence to its dismissal:

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65 TransGrid Final Decision, Attachment 4, p. 65.

66 A service provider with a $10 billion RAB would be considered to be large. Such a service provider would have $4 billion of equity. BHP has a market capitalisation of over $122 billion.

67 For example, Amcor has a market capitalisation of approximately $16 billion.

68 The AER defines the benchmark efficient entity to be "operating within Australia." AER Rate of Return Guideline, p. 7.

> Handley considered SFG's analysis to be 'incomplete and oversimplified to support such a strong conclusion'.[69]

116   The sum total of Handley's consideration of this important issue is reproduced below:

> SFG argues that the estimate of the distribution rate based on data for public companies only is overstated to the extent that foreign sourced income enables large public companies to distribute a higher proportion of imputation credits. The analysis used by SFG is however incomplete and oversimplified to support such a strong conclusion. There are many factors which determine the financing and dividend policies of multinational firms relative to domestic firms. One cannot simply assume (as SFG has done) that both types of firms would seek to pay the same dollar amount of dividends out of the same dollar amount of profits irrespective of its source.[70]

117   This analysis seems to miss the point entirely. The point is that *any* firm with foreign profits will be able to distribute more imputation credits than they would otherwise have been able to. The 20 largest multinational companies obviously have material foreign income and they would obviously be able to distribute fewer imputation credits without that foreign income.[71]

118   The fact that firms consider many things before they settle on a dividend policy is self-evidently true, but irrelevant to the point at hand. The point is that the 20 large multinationals have foreign profits that inflate their ability to distribute imputation credits, and that the benchmark firm has no such ability. If these multinationals differ from the benchmark domestic entity in other ways as well (e.g., because of their size or other considerations they make in setting their dividend policy) then there would be even more reason to exclude them.

3.5   Summary and conclusions

119   In summary, I note that:

    a.   The distribution rate for all companies is approximately 70%;

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[69]   TransGrid Final Decision, Attachment 4, p. 66.

[70]   Handley (2015), p. 21.

[71]   Consider the following simple example. A domestic firm earns a profit of $100 and pays $30 of corporate tax, creating $30 of imputation credits. The only way that firm would be able to distribute all of those imputation credits is if it pays a dividend of 100% of after-tax profits ($70), which firms typically do not do. If that firm paid a $50 dividend (close to the 70% dividend payout rate of the average firm) it could only attach $21.5 of credits [$50×0.3/(1-0.3)]. That is, if a domestic firm distributes 70% of its after-tax profits as a dividend, it can only distribute 70% of the imputation credits it creates.

Now suppose that firm generates 20% of its profits offshore. In this case, the domestic profit is $80 and domestic tax (and imputation credits created) will be $24. If the firm again pays a $50 dividend (again, approximately 70% of after-tax profits) it can again distribute $21.5 of credits, which is a credit distribution rate of 90% [21.5/24]. That is, for *any* given level of dividends, the more offshore profits a firm has, the greater the proportion of its franking credits that it will be able to distribute.

b. The distribution rate for all listed companies, other than the top 20, is also approximately 70%; and

c. The top 20 listed companies differ from the benchmark efficient entity in their ability to distribute imputation credits via profits that have been sourced offshore.

120   Consequently, my view is that the best estimate of "the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors"[72] is 70%.

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[72] TransGrid Final Decision, Attachment 4, p. 65.

4   Current estimates of the redemption rate

4.1   Overview

121   Whether the redemption rate is to be used as a point estimate of theta or as an upper bound for theta, the regulator will require an estimate of it. Two methods have been proposed for estimating the redemption rate: tax statistics and the equity ownership approach.

4.2   Tax statistics estimates

122   The tax statistics approach involves the analysis of ATO data in relation to the quantum of credits redeemed relative to the quantum of credits distributed. Two estimates are currently available:

> a.   The AER has accepted an estimate of 0.43 from Hathaway (2013)[73]; and
>
> b.   NERA (2105) report an estimate of 0.45.[74]

4.3   Equity ownership

123   The equity ownership approach involves estimating the proportion of Australian shares that are owned by resident investors and then assuming that 100% of the credits distributed to residents will be redeemed.

124   In its Guideline and draft decisions the AER estimated the redemption rate by assuming that credits distributed to government entities would not be redeemed – the same as credits distributed to foreign investors. However, in its recent final decisions, the AER makes an adjustment to its equity ownership estimates by assuming that credits distributed to government entities were never distributed at all.[75]   The AER justifies this by redefining the redemption rate *from* the proportion of distributed credits that are likely to be redeemed *to* the proportion of credits that are likely to be redeemed among those that are not distributed to government entities.

125   The AER states that it has adopted this approach:

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[73]   TransGrid Final Decision, Attachment 4, p. 18.

[74]   NERA (2015), p. v.

[75]   TransGrid Final Decision, Attachment 4, p. 72.

> …because the value of imputation credits forms part of our determination of the rate of return required by private investors in the benchmark efficient entity.[76]

126   This suggests that the redemption rate is being estimated for the benchmark efficient entity, whereas elsewhere in its final decisions the AER (correctly) states that the redemption rate should be estimated as a market-wide parameter.[77]

127   If the redemption rate is to be estimated as a market-wide parameter, then all of the credits in the market should be considered – not some subset of credits that the AER asserts would be relevant to the benchmark firm. Alternatively, if the redemption rate is to be estimated as a firm-specific parameter, the starting point would surely be to examine the actual shareholder bases of the comparator firms that the AER uses to estimate other WACC parameters. The current approach of the AER is not consistent with either a market-wide or a firm-specific approach.

128   My view is that, to the extent that the distribution rate is relevant, it should be estimated on a market-wide basis. Consequently, I consider the market-wide estimates that were set out in the AER's November 2014 draft decisions, rather than the adjusted estimates set out in its recent final decisions.

129   For the reasons set out in SFG (2015, pp. 29-31), my view is that more recent estimates are more relevant than historical estimates and that the most recent estimates of the redemption rate are 0.44 using listed equity and 0.58 using all equity. By contrast, in its recent final decisions, the AER applies the same weight to data points that are more than 15 years out of date as it applies to the current data.

4.4   Summary of estimates

130   The estimates of the redemption rate that are currently available are:

   a.   From tax statistics: 0.43 (Hathaway, 2013) and 0.45 (NERA, 2015); and

   b.   From equity ownership: 0.44 (listed equity) and 0.58 (all equity).

The AER appears to have used a redemption rate estimate of 0.6 in its recent decisions.[78] In my view, that estimate is inconsistent with the weight of evidence set out above.

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[76]   TransGrid Final Decision, Attachment 4, p. 72.

[77]   TransGrid Final Decision, Attachment 4, p. 21.

[78]   See, for example, the references to theta being set to 0.6 in the TransGrid Final Decision, Attachment 3, pp. 301, 303, 304, 305, 307, 316, 318, 331, 435. The AER states (p. 307) that its estimates "are based on an imputation credit utilisation rate (theta) of 0.6. This is consistent with other parts of this decision (see attachment 4 – value of imputation credits).

5 Market value estimates of theta

5.1 My preferred estimate

131   In my previous report to the AER,[79] I submitted that:

> In all of the alternative market value studies over the last five years, the authors have concluded that the evidence supports an estimate of theta between 0 and 0.35.[80] We note that, relative to these alternative market value studies, dividend drop-off analysis has a longer history, has been subjected to a higher level of scrutiny (especially the SFG 2011 study), and the strengths and weaknesses of the approach, and the econometric issues, are better understood. Consequently, we maintain a theta estimate of 0.35 – from dividend drop-off analysis – in this report noting that this is a conservative estimate in that the other relevant evidence produces lower estimates.[81]

132   I remain of the view that 0.35 is a conservative estimate of the market value of distributed imputation credits for the reasons set out in this report and my earlier report. I note that SFG (2014, pp. 27-28) summarises the Tribunal's scrutiny of the SFG dividend drop-off study and its adoption of the SFG estimate.

133   In the remainder of this section of the report, I briefly summarise the divergence of views between us and the AER on three key issues relating to market value studies.

5.2 The reintroduction of pre-2000 estimates and estimates that had been previously rejected due to concerns about quality

134   In its recent draft decisions, the AER noted that in its Guideline it concluded that market value studies supported an estimate between 0 and 0.5 (mid-point of 0.25). The AER explained that:

> This range was determined with regard to a range of studies, with higher regard given to those studies that:
>
> • used longer data periods
>
> • used data since 2000, when the change in tax law entitled eligible investors to a refund of credits that exceeded their tax liability
>
> • encompassed the breadth of the market instead of just selected firms, and

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[79] SFG (2014).

[80] See, for example, the list of studies set out in AER Rate of Return Guideline, Explanatory Statement, Appendix H, Table H.8, pp. 173-174.

[81] SFG (2014), p. 38.

• appeared to use more reasonable and robust econometric treatments.[82]

135   However, in its recent draft and final decisions, the AER has re-introduced studies that were rejected in the Guideline because:

    a.   They used a small sample of data; or

    b.   They related to a different tax regime; or

    c.   They examined a small sample of firms (for one study, a single firm!); or

    d.   The econometric treatments were not reasonable and robust.

136   The re-introduction of these studies has led the AER to revise its range of estimates of the market value of distributed credits from 0-0.5 (mid-point of 0.25) to 0-1. That is, the top half of the range that has been proposed in the recent decisions is due entirely to evidence that the AER had already considered and rejected (for the reasons set out above) in its Guideline.

137   In its recent draft decisions, the AER explains that the reason for the departure from the Guideline to reintroduce these previously rejected studies is:

> …with regard mainly to the view of McKenzie and Partington that there is no obvious manner by which the results of implied market value studies should be filtered, we no longer propose to do so.

138   The AER confirms this is its recent final decisions:

> McKenzie and Partington considered it reasonable to have regard to a range of studies[83]

139   SFG (2015) notes that:

> The reference above is to the McKenzie and Partington (2013 QCA) report commissioned by the Queensland Resources Council. The sum total of the analysis of this issue by McKenzie and Partington is as follows:
>
> *The question is how to combine the information in these estimates. You might weight the studies by timeliness, or by perceived quality, or by precision, or by the extent to which they are independent of each other. With no obvious answer to these questions, we have chosen to give them equal weight.*[84]
>
> Based on this new "evidence" the AER has departed from its Guideline. In my view, this departure has no basis relative to the more reasonable and considered approach that was adopted in the Guideline. My view is that the Guideline estimate of 0 to 0.5, with a mid-point of 0.25 is a more reasonable characterisation of the range of relevant market value evidence.

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82   Jemena Draft Decision, Attachment 4, p. 23.

83   TransGrid Final Decision, Attachment 4, p. 28.

84   McKenzie and Partington (2014 QRC), p. 34.

140   The AER's recent final decisions do not respond to the submission that its re-introduction of the pre-2000 and low-quality studies that it had rejected in its Guideline is an error.

141   Moreover, the recent final decisions assume that all market value studies are of uniform relevance and quality. There is no differentiation between studies that use up-to-date data and those that are 20 years old. There is no differentiation between studies that have thousands of data points and which have been thoroughly scrutinized and adopted by the Tribunal and those that are based on a handful of data points for a single company. In my view, it is unreasonable and erroneous to give no consideration to the relative quality of different studies simply because McKenzie and Partington (2013 QCA) did not attempt to perform that task.

5.3   Empirical estimation issues

142   In its recent final decisions, the AER sets out what it considers to be a number of limitations relating to dividend drop-off analysis.[85] This list of limitations was first raised by the AER during the Guideline process and again in its November 2014 draft decisions. My previous report, SFG (2015, pp. 38-39), provides responses to these issues and provides references to where responses were provided on two previous occasions: as part of the Guideline process and prior to the 2014 draft decisions.

143   Also, my previous report, SFG (2014, pp. 27-28), summarises the Tribunal's scrutiny of the SFG drop-off study and its adoption of the SFG estimate.

144   In its recent final decisions,[86] the AER summarises some empirical estimation issues in relation to the SFG dividend drop-off analyses. As set out above, these points have been responded to twice before, but I briefly summarise them here:

   a. **Possibly implausible estimates.** The AER has previously stated that it is possible for dividend drop-off analyses to produce implausible estimates. Of course it is possible that any empirical analysis might produce an implausible estimate, particularly if it is a low-quality study. The AER now accepts that the fact the SFG study produces a stable, precise and plausible estimate means that this criticism is irrelevant.[87]

   b. **Dividend drop-off estimates reflect market values.** The AER correctly notes that dividend drop-off studies capture the market

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85   TransGrid Final Decision, Attachment 4, p. 27.

86   TransGrid Final Decision, Attachment 4, Section A.14.5, pp. 84-87.

87   TransGrid Final Decision, Attachment 4, p. 84.

value of distributed credits, rather than theoretically assuming that investors value credits at the full face amount. This is true, and for the reasons set out throughout this report, entirely appropriate.[88]

c. **Dividend drop-off estimates might be affected by trading around the ex-dividend date.** In my previous responses cited above, I note that the trading volumes around ex-dividend dates tend to be higher than average. I also cite work by Associate Professor Partington and his coauthors that shows that this increase in trading volume is driven by an increase in demand from buyers before the ex-date. If this volume has any effect, it is to increase the cum-dividend price and consequently the measured drop-off, which would in turn increase the estimate of theta. That is, to the extent that this additional trading volume is an issue, it will serve to *inflate* the estimate of theta. Whereas the Partington et al evidence suggests that dividend drop-off studies may overestimate theta, the AER has never presented any evidence to suggest that trading around the ex-date might lead to an underestimate of theta.[89]

d. **Dividend drop-off analysis uses a large data set.** The AER correctly notes that the SFG studies use a large data set with thousands of observations. In my view, this is a strong positive as large data sets are more able to provide robust and precise estimates, and can be used to demonstrate the stability of the estimate over time. Moreover, the methodology applied is regression analysis, which is the same as the AER uses to estimate beta.[90]

e. **The combined value must be allocated between dividend and imputation credits.** The AER notes that dividend drop-off analysis provides separate estimates of the value of cash dividends and the value of imputation credits. The former is estimated with reference to unfranked dividends and the latter is estimated with reference to franked dividends.[91]

f. **Academic concerns about dividend drop-off analysis.** The AER sets out a number of academic "concerns" with dividend drop-off analysis. The examples provided by the AER fall into

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[88] TransGrid Final Decision, Attachment 4, p. 84.

[89] TransGrid Final Decision, Attachment 4, pp. 85-87.

[90] TransGrid Final Decision, Attachment 4, p. 87.

[91] TransGrid Final Decision, Attachment 4, p. 87.

two groups: Those expressed by consultants for energy users and the AER, and those that suggest that dividend drop-off analysis might *overestimate* theta. The AER does not reference any of the dozens of dividend drop-off analyses that have been published over many years in the world's leading finance journals.[92]

5.4   Adjustments to dividend drop-off estimates of theta

5.4.1   Overview

145   In its November 2014 draft decisions, the AER proposes that the SFG dividend drop-off estimate of 0.35 should be adjusted upwards to 0.4 by dividing by the coefficient on cash dividends.[93] SFG (2015, pp. 39-40) explains why that would be inappropriate and why the proposed adjustment would drive an illogical and perverse outcome. However, in its recent final decisions, the AER maintains that the same adjustment should be applied.[94] Handley (2015) advises that the SFG estimate is an appropriate estimate of the market value of imputation credits and that:

> …an inconsistency would arise if no adjustment was made since the estimate of theta from the SFG dividend drop-off study would then not represent the value of credits before personal taxes and before personal costs.[95]

146   In my view, a market value estimate of theta is entirely appropriate, so no adjustment is required to convert it into an estimate of the "value of credits before personal taxes and before personal costs," and that consideration of this issue can finish here.

5.4.2   Further analysis

147   If further consideration of this issue is required, it can be best considered in the following way. Suppose the dividend drop-off regression produced a coefficient of 1 on cash dividends and a coefficient of 0.35 on imputation credits. This would suggest that 100% of the face amount of dividends and 35% of the face amount of imputation credits is capitalised into the stock price. In this case, the AER's proposed adjustment would be to divide the 0.35 estimate by 1, leaving it at 0.35.

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[92]   TransGrid Final Decision, Attachment 4, pp. 89-92.

[93]   Jemena Draft Decision, Attachment 4, p. 23.

[94]   TransGrid Final Decision, Attachment 4, p. 28.

[95]   Handley (2015), p. 30.

148   Now consider a case that is identical, except that the coefficient on cash dividends is 0.9. This implies that dividends are worth only 90% of their face amount and imputation credits are still worth 35% of their face amount. In this case, the allowed return would need to be higher to leave investors equally well off. This would enable the firm to pay dividends with a higher face amount, which would be necessary if investors value dividends at less than their face amount. Regulators in some jurisdictions (e.g., New Zealand) allow higher returns in relation to dividends being valued at less than the face amount, but the AER does not.

149   Rather than allowing a *higher* return, the AER proposed adjustment would result in a *lower* allowed return. The AER would propose that the 0.35 estimate should be divided by 0.9 to produce an adjusted estimate of 0.39. This higher theta would then result in shareholders receiving a *lower* return than they otherwise would. That is, rather than compensating investors for the lower value of dividends, the effect of the AER's proposed adjustment would be to compound the problem by *reducing* the amount of dividends that the firm is able to distribute. Thus, such an adjustment produces a perverse outcome.

150   Perhaps an even more important point is the fact that throughout all of the above example, the evidence shows that 35% of the face amount of imputation credits is capitalised into the stock price. In my view this is the appropriate estimate of theta.

6 Compiling the evidence into an estimate of gamma

151 My approach is consistent with the standard practice of estimating gamma as the product of:

    a. The distribution rate, *F*; and

    b. The value of distributed credits, theta.

152 The distribution rate is a firm specific parameter because it depends upon dividend payout policies, which vary across firms according to their characteristics and circumstances. Theta is a market wide parameter because the value of a credit in the hands of an investor is independent of its source – in the hands of any particular investor, all imputation credits are identical.

153 Consequently, there is no reason to impose a constraint that the same data source must be used to estimate both parameters. Rather, any data that is relevant to the estimation of the distribution rate (i.e., "the proportion of imputation credits generated by the benchmark efficient entity that is distributed to investors"[96]) should be used to estimate that parameter, and any data that is relevant to the estimation of theta should be used for that purpose. The best estimates of each parameter should then be multiplied to produce the best estimate of gamma.

154 In my view, the AER's approach of using different subsets of the available evidence (e.g., all equity vs. listed equity) to establish a range of ranges for each parameter, and consequently for gamma, is neither transparent, nor necessary, nor correct.

155 Specifically, the AER considers that if listed equity is used to estimate theta, then only listed equity must be used to estimate the distribution rate – and that other data that is relevant to the estimation of the distribution rate must be set aside.[97] In my view, this would be a mistake. The distribution rate and theta are separate parameters. It is not the case that the estimate of one depends on, or builds on, the estimate of the other. In my view, all of the relevant estimation methods that are relevant to the estimation of a parameter should be used to inform the estimate of that parameter.

156 Handley (2015 JGN) agrees that the distribution rate is a firm-specific parameter and that theta is a market-wide parameter, but he disagrees with the proposition that all of the relevant estimation methods that are relevant to the estimation of a parameter should be used to inform the estimate of that parameter. Rather, he concludes that "it is obvious that both components should be based on

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[96] TransGrid Final Decision, Attachment 4, p. 65.

[97] See for example, TransGrid Final Decision, Attachment 4, p. 63-64.

consistent data sets that relate to the same market." To show why this conclusion is far from obvious, consider the case where there are sufficient comparator firms to properly estimate a firm-specific distribution rate. The Handley approach would then have us estimate theta with reference to only the data for those comparator firms, even though theta is a market-wide parameter and would be properly informed by data from all firms.[98]

157   After considering all of the relevant evidence, I adopt a distribution rate of 70% for the reasons set out in Section 3 of this report:

   a.   That estimate is consistent with data for all companies;

   b.   That estimate is consistent with data for all listed companies excluding the top 20; and

   c.   The distribution rate is a firm-specific parameter and the top 20 firms are very large multinationals that are able to distribute imputation credits via profits earned offshore and the benchmark entity operates only within Australia.

158   For the reasons set out in Section 2 of this report, I consider that theta should be interpreted as the value of distributed credits – as in the price that an investor would be prepared to pay for a credit in the market for equity funds, or (equivalently) the extent to which credits are capitalised into stock prices.[99] In my view, the best available estimate of theta is 0.35. The source of this estimate is dividend drop-off analysis applied to data from 2000-2013. Other market value estimates of theta tend to be lower, in which case the 0.35 estimate would be conservative.

159   My view is that redemption rates should be interpreted as an upper bound for theta. The estimates of the redemption rate that are currently available are:

   a.   From tax statistics: 0.43 (Hathaway, 2013) and 0.45 (NERA, 2015); and

   b.   From equity ownership: 0.44 (listed equity) and 0.58 (all equity).

My preferred estimate of theta of 0.35 lies below these upper bound estimates, satisfying that test.

160   My preferred estimate of gamma is 0.25, which is the product of the distribution rate (0.7) and theta (0.35). In my view this is the best estimate of gamma that is currently available.

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[98] Handley (2015 JGN), p. 8.

[99]   That is, the extent to which stock prices have been bid up to reflect the market's assessment of the value of imputation credits.

7   Miscellaneous issues

7.1   Adjustments for the 45-day rule

161   The equity ownership approach assumes that all credits that are distributed to resident investors will be redeemed. However, the 45-day rule will prevent some of these credits from being redeemed, in which case the equity ownership estimate will overstate the redemption rate.

162   Handley (2015) advises the AER that he is not aware of any data on the extent to which imputation credits have been denied pursuant to the 45-day holding rule.[100] He goes on to state that:

> It is reasonable to expect that the impact of the 45 day rule would automatically be built into estimates of theta coming from implied market value studies and tax statistics studies. In addition, I see no merit in adjusting estimates of theta from equity ownership studies since this amounts to looking for a level of precision which is not warranted by what is already imprecise data. [101]

163   I agree that the market value studies and tax statistics studies will automatically reflect any impact of the 45-day rule and that the equity ownership studies will not. However, the fact that the equity ownership data is imprecise does not imply that the effect of the 45-day rule (which can only decrease the equity ownership estimate) should be ignored. One cannot assume that the effect of the 45-day rule is negligible in the absence of any data about it.

164   Handley and Maheswaran (2008) report that 6-11% of credits distributed to resident investors were not redeemed during the years when they estimated the redemption by residents,[102] and one of the reasons for this is the 45-day rule.

165   In summary, the equity ownership approach should be considered to be an upper bound for the redemption rate.

7.2   Adjusting theta to correct for mis-estimation of taxes

166   In its recent final decisions, the AER states that:

> We agree with the CCP's suggestion that it would be reasonable to consider the tax building block as a whole when determining the value of imputation credits. Under this approach, a tendency toward a higher value of imputation

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[100] Handley (2015), p. 29.

[101] Handley (2015), p. 29.

[102] For some years of their study, they simply assumed that all credits distributed to residents would be redeemed.

credits (and therefore greater reduction in the tax building block) might be reasonable if the benchmark tax allowance is above the efficient cost of tax. However, in the Guideline and this final decision our determination of the value of imputation credits is guided by the relevant theoretical framework and associated evidence.[103]

167   I agree that theta should not be adjusted to account for the possibility of a differential between the benchmark tax allowance and the efficient cost of tax. If such an adjustment was to be made, the AER would first have to quantify the extent to which its tax allowance was above the efficient cost of tax, and would then have to demonstrate that the proposed adjustment to theta properly corrected that differential. However, rather than mis-estimating theta to correct for a mis-estimation of the tax allowance, a better approach would be to properly estimate both.

7.3   Support from experts

168   In its recent final decisions, the AER does not state that its experts have endorsed their approach or their estimate, but that its experts have indicated that the range of evidence that the AER considers is relevant:

> It is within the range of values indicated by the evidence, and the relevance of the evidence is supported by the expert opinion of Handley, Lally, and McKenzie and Partington.[104]

7.3.1   Lally

169   The AER goes on to note that Lally recommended that the AER should not use the equity ownership approach, but instead should assume away the existence of all foreign investors and set theta to 1,[105] but states that:

> The equity ownership approach was Lally's second preference[106]

170   In my previous report, SFG (2014), I explain that Lally (2013 AER) ranks alternative approaches for estimating theta in terms of how close they are to his favoured "ignoring foreigners" estimate of 1. The equity ownership estimate ranks second because its outcome happens to be closest to Lally's favoured estimate of 1. But far from being an endorsement, Lally concludes that the equity ownership approach produces estimates that are implausible,[107] as do all approaches other than his "ignoring foreigners" approach.

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103   TransGrid Final Decision, Attachment 4, p. 15, emphasis added.

104   TransGrid Final Decision, Attachment 4, p. 16.

105   TransGrid Final Decision, Attachment 4, p. 16.

106   TransGrid Final Decision, Attachment 4, p. 16.

107   Lally (2013a), p. 4.

171   Lally (2013 AER) goes on to state that the only redeeming feature of the Guideline's equity ownership approach is that, even though it is an estimate of the wrong thing, it is at least a statistically precise one.[108]   However even that is disputed in that there is debate about whether observations that are 20 years out of date should be included and whether adjustments should be made in relation to credits distributed to government entities.

172   SFG (2014, pp. 74-78) documents other criticisms that Lally (2013 AER) makes of the equity ownership approach, including that:

    a.   The equity ownership is inconsistent with the theoretical basis that the AER uses to support it;

    b.   The equity ownership approach is circular in that it simply defines theta in terms of one of the estimation methods; and

    c.   The equity ownership approach has the "perverse" implication that the cost of capital for Australian firms could be reduced by restricting foreign ownership.

173   The AER's final decisions do not address these submissions – they continue to imply that the equity ownership approach is supported by Dr Lally.[109]

7.3.2 McKenzie and Partington

174   In my previous report to the AER, SFG (2014) I set out reasons for concluding that McKenzie and Partington (2013) do not support the AER's conceptual interpretation.[110]   Although they state that the AER "makes a reasonable case," they note that the redemption rate interpretation of theta is contrary to the accepted practice of adopting a value interpretation of theta, and they go on to follow the accepted practice. In particular, they consider 15 market value studies, four of which involve Dr Partington himself.

175   McKenzie and Partington (2013) conclude by comparing:

    a.   Their own market value estimate of gamma (which they describe as "an average across our studies"[111]); with

    b.   The AER's "utilisation" estimate (which they describe as "Alternatively using the AER (2013) estimate"[112]).[113]

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[108]   Lally (2013a), pp. 3-4.

[109]   TransGrid Final Decision, Attachment 4, p. 16.

[110]   SFG (2014 Gamma), pp. 64-65.

[111]   McKenzie and Partington (2013), p. 34.

[112]   McKenzie and Partington (2013), p. 34.

176   In summary, the advice from McKenzie and Partington does not recommend that when estimating theta redemption rates should be used to the exclusion of market value estimates, or even in preference to market value estimates.

177   Moreover, in their corporate finance textbook, Associate Professor Partington and his co-authors state (correctly in my view) that:

> γ=the market value of franking credits as a percentage of face value.[114]

178   They also note (correctly in my view) that the evidence suggests that investors value imputation credits materially below the face amount:

> The results have been mixed, but they suggest that the market value of franking credits is positive, but significantly less than the credit's face value.[115]

7.3.3 Handley

179   Handley (2008) advised the AER that they should consider gamma in the context of a "representative investor"[116] equilibrium wherein:

> …theory tells us that in equilibrium γ represents a complex weighted average of the values of franking credits across all investors in the market.[117]

180   He also advised the AER that the redemption rate:

> …may be interpreted as a reasonable upper bound on the value of gamma.[118]

181   Handley (2010) advised the AER that:

> …Theory tells us that in equilibrium, γ represents a complex weighted average of the values of franking credits across all investors in the market,[119]

and that consideration of gamma should be on an "after-company-before-personal tax" basis.[120]

182   In relation to redemption rates, he advises that:

> Notwithstanding this represents a simple average of utilisation rates across investors rather than a (complex) weighted average and assuming the set of investors is indicative of the set of investors in the domestic market portfolio,

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[113] Since both estimates turn out to be above 0.5 their conclusion is that the QCA should not reduce its current estimate of 0.5.

[114] Brealey, Myers, Partington and Robinson (2000), p. 168.

[115] Brealey, Myers, Partington and Robinson (2000), p. 169.

[116] Handley (2008), p. 6.

[117] Handley (2008), p. 8.

[118] Handley (2008), p. 8.

[119] Handley (2010), p. 14.

[120] Handley (2010), pp. 18, 21.

> this may be interpreted as a reasonable upper bound estimate of the value of gamma,[121]

and that:

> The term "upper bound" is used here as a (theoretical) maximum value rather than in a statistical/confidence interval sense.[122]

183 That is, on two previous occasions, Dr Handley has considered the same representative investor equilibrium, the same complex weighted-average over investors, and the same pre-personal tax framework that the AER now uses to motivate its use of the redemption rate as a point estimate of theta. Dr Handley has previously advised the AER that, within this conceptual framework, the redemption rate represents an upper bound (in a theoretical maximum value sense) for theta.

184 In its Guideline, and since, the AER concludes that the same conceptual framework can be used to support the use of the redemption rate as a point estimate of theta. Dr Handley now supports the AER's use of the redemption rate as a point estimate of theta.

7.4 Views from recent academic work

185 Ainsworth, Partington and Warren (2015) "examine the implications of the imputation system for…cost of capital," among other things. They begin by drawing the important distinction between what they call "value in use" and "value in exchange." Specifically, they make the point that just because some investors may receive a benefit at the time they redeem an imputation credit, it does not necessarily follow that credits must have a material effect on traded stock prices or the cost of capital. This is because share prices (and consequently the cost of capital) will be the equilibrium outcome of the complex interaction of trading among all investors, and certain types of investors may be more influential in determining the equilibrium price:

> Also relevant is the basic economic distinction between 'value in use' and 'value in exchange'. There is no doubt that imputation credits have considerable value in use to Australian resident investors, who can use them to reduce taxes. Whether they have value in exchange – in other words, whether they are priced – is a separate matter.[123]

186 Ainsworth, Partington and Warren (2015) also set out the basic economic principle that the fact that an investor receives and redeems an imputation credit does not mean that the investor must value that credit at the full face amount:

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[121] Handley (2010), pp. 18, 21.

[122] Handley (2010), pp. 18, 21.

[123] Ainsworth, Partington and Warren (2015), p. 9.

> The fact that a domestic investor holds a stock and can fully utilise any imputation credits does not provide incontrovertible evidence that they attribute full value to imputation in exchange. It is entirely possible that a domestic investor could be holding a domestic stock due to expectations of receiving high pre-tax returns or other reasons, and not pricing in the imputation credits in the process. <u>Just because an investor receives imputation credits does not necessarily mean they fully price them, and hence require a commensurately lower pre-imputation return from the company as a consequence.</u>[124]

187   I note that the AER's current approach to gamma is based entirely on the proposition that every domestic investor who receives imputation credits *does* fully price every one of them and hence require a commensurately lower pre-imputation return from the company as a consequence.

188   Ainsworth, Partington and Warren (2015) go on to suggest that the relevant consideration is an empirical one – whether stock prices in financial markets are bid up to reflect some value for imputation credits:

> This fundamental issue can be posed as follows. Consider two companies with identical assets, with the exception that one also has a positive balance in its franking account and can distribute imputation credits, while the other has a zero balance. The question is: "Do the two companies sell for the same price?"[125]

189   Ainsworth, Partington and Warren (2015) note that the evidence generally suggests that the two companies above *do* sell for the same price.[126]

190   The fact that share prices might be independent of the amount of imputation credits the firm has available is consistent with the observation that, in practice, firms have little regard to imputation when estimating the cost of capital that they would use when evaluating potential new projects. In this regard, Ainsworth, Partington and Warren (2015) conclude that:

> Removing imputation would probably have no major impact on the manner in which most companies estimate cost of capital and evaluate investments. Imputation is typically *not* built into the cost of capital for most companies.[127]

191   Ainsworth, Partington and Warren (2015) give special consideration to the regulatory approach to lowering allowed returns to reflect the assumed effect of imputation credits on the corporate cost of capital. They note that this approach is very different from the commercial practice of making no adjustments at all to corporate valuation or cost of capital estimates in relation to imputation:

> <u>The treatment of imputation credits for regulatory purposes stands in stark contrast to the approach elsewhere.</u> Regulators make explicit allowance for

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[124] Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

[125] Ainsworth, Partington and Warren (2015), p. 9.

[126] Ainsworth, Partington and Warren (2015), p. 17.

[127] Ainsworth, Partington and Warren (2015), p. 27.

imputation in their regulatory decisions (e.g. see AER, 2015). The regulators employ the model of Officer (1994), where imputation is taken into account and other tax effects incurred by investors are ignored. The application involves reducing the cost of corporate tax by the 'value of imputation credits', which lowers the pre-tax return that utilities are allowed to earn on regulatory capital. This has the effect of limiting the prices that utilities are permitted to charge.[128]

192   They go on to summarise the AER's recent approach as follows:

The regulators estimate the value of imputation credits as the product of the distribution rate (i.e. the portion of income that is assumed to be distributed to shareholders), and the utilisation rate. The latter parameter reflects an estimate of the value of imputation credits in the hands of investors. In a recent decision, the Australian Energy Regulator (AER) applied a value of 0.4 to imputation credits (AER, 2015). While this value was formed with reference to a range of estimates and measures, it roughly equates to the product of a 70% distribution rate and a 60% utilisation rate. That is, regulatory practice assumes that distributed imputation credits are worth about $0.60 in the dollar.

A notable feature of the regulatory approach is the hierarchy that is applied in considering various estimates of the utilisation rate. The AER firstly relies on the proportion of Australian equities holdings held by domestic investors, which it indicates to be in the range of 0.56 to 0.68 for all equity, and 0.38 to 0.55 for listed companies. They secondly consider the reported utilisation of imputation credits according to taxation statistics, suggesting a range for the utilisation rate for all equity of 0.4 to 0.6, with reference to analysis by Hathaway (2013). They place least reliance on what they call 'implied market value studies'. Thus least weight is placed on the body of research aiming to extract the value of imputation credits from market prices and returns, as described in Section 4.1. Their reasons are that the equity holding and tax data provide more direct and simple evidence, meanwhile downplaying market-based studies based on their methodological limitations and variable estimates.[129]

193   Ainsworth, Partington and Warren (2015) then call into question the basis of the AER's approach, in the context of their discussion about the standard economic concept of market equilibrium:

The discussion in Section 3.2 around how market equilibrium is determined is directly relevant to this issue. It raises some questions over the philosophy underpinning the regulatory approach.[130]

194   They further spell out the problems with the AER's approach. They note that investors will consider many factors when determining what assets they will purchase and what price they would be prepared to pay for them. This prevents problems for the AER's "aggregation" approach, which simply counts up the number of credits that are distributed to domestic investors and *assumes* that

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[128] Ainsworth, Partington and Warren (2015), p. 27, emphasis added.

[129] Ainsworth, Partington and Warren (2015), p. 27.

[130] Ainsworth, Partington and Warren (2015), Footnote 21, p. 27, emphasis added.

those investors value all credits at the full face amount *and* that this is reflected in the equilibrium share price and cost of capital:

> In practice, an investor's demand for assets may reflect a whole range of considerations, including their expectations, the broader portfolio context, their liabilities, constraints, other costs, etc. <u>This issue is particularly problematic for applying the aggregation approach through reference to observed holdings.</u>[131]

195   In my view, Ainsworth, Partington and Warren (2015) reinforce many of the points made in Section 2 above. The AER's approach of simply counting up the number of credits that are distributed to domestic has no proper basis to it and is inconsistent with standard economic concepts of equilibrium and with standard commercial practice.

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[131] Ainsworth, Partington and Warren (2015), p. 14, emphasis added.

8   Declaration

197   I confirm that I have made all the inquiries that I believe are desirable and appropriate and no matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court.

_____
Professor Stephen Gray

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10 Appendix 1: Instructions

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TERMS OF REFERENCE

Engagement

I refer to the previous reports you have provided concerning the estimation of gamma for the purpose of energy network regulation by the AER.

Can you please review the AER's approach to gamma in the Final Determinations for the NSW distribution businesses and the Preliminary Determinations for the South Australian and Queensland distribution businesses and provide your views on the AER's decisions with respect to gamma.

You are engaged by Jones Day on behalf of Jemena Electricity Networks, APA, AGN, Ausnet Services, CitiPower, Energex, Ergon, Powercor, SA Power Networks and United Energy.

Compliance with the Code of Conduct for Expert Witnesses

Attached as **Annexure 1** is a copy of the Federal Court's Practice Note CM 7, entitled "Expert Witnesses in Proceedings in the Federal Court of Australia", which comprises the guidelines for expert witnesses in the Federal Court of Australia (Expert Witness Guidelines).

Please read and familiarise yourself with the Expert Witness Guidelines, and comply with them at all times over the course of your engagement.

In particular, your report prepared should contain a statement at the beginning of the report to the effect that the author of the report has read, understood and complied with the Expert Witness Guidelines.

Your report must also:

1. contain particulars of the training, study or experience by which the expert has acquired specialised knowledge;

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2.   identify the questions that the expert has been asked to address;

3.   set out separately each of the factual findings or assumptions on which the expert's opinion is based;

4.   set out each of the expert's opinions separately from the factual findings or assumptions;

5.   set out the reasons for each of the expert's opinions; and

6.   otherwise comply with the Expert Witness Guidelines.

The expert is also required to state that each of the expert's opinions is wholly or substantially based on the expert's specialised knowledge.

The declaration contained within the report should be that "[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the report".

Please also attach a copy of these terms of reference to the report.

Kind regards

Nicolas Taylor

Partner

Annexure 1

FEDERAL COURT OF AUSTRALIA
Practice Note CM 7
EXPERT WITNESSES IN PROCEEDINGS IN THE
FEDERAL COURT OF AUSTRALIA

Practice Note CM 7 issued on 1 August 2011 is revoked with effect from midnight on 3 June 2013 and the following Practice Note is substituted.

Commencement

1.   This Practice Note commences on 4 June 2013.

Introduction

2.   Rule 23.12 of the Federal Court Rules 2011 requires a party to give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the Evidence Act 1995 (Cth)).

3.   The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence[1], and to assist experts to understand in general terms what the Court expects of them.   Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1.   General Duty to the Court[2]

1.1   An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.

1.2   An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.

1.3   An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2.   The Form of the Expert's Report[3]

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[1]   As to the distinction between expert opinion evidence and expert assistance see Evans Deakin Pty Ltd v Sebel Furniture Ltd [2003] FCA 171 per Allsop J at [676].

[2]   The "*Ikarian Reefer*" (1993) 20 FSR 563 at 565-566.

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2.1   An expert's written report must comply with Rule 23.13 and therefore must

    (a)   be signed by the expert who prepared the report; and

    (b)   contain an acknowledgement at the beginning of the report that the expert has read, understood and complied with the Practice Note; and

    (c)   contain particulars of the training, study or experience by which the expert has acquired specialised knowledge; and

    (d)   identify the questions that the expert was asked to address; and

    (e)   set out separately each of the factual findings or assumptions on which the expert's opinion is based; and

    (f)   set out separately from the factual findings or assumptions each of the expert's opinions; and

    (g)   set out the reasons for each of the expert's opinions; and

    (ga)   contain an acknowledgment that the expert's opinions are based wholly or substantially on the specialised knowledge mentioned in paragraph (c) above[4]; and

    (h)   comply with the Practice Note.

2.2   At the end of the report the expert should declare that "[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the Court."

2.3   There should be included in or attached to the report the documents and other materials that the expert has been instructed to consider.

2.4   If, after exchange of reports or at any other stage, an expert witness changes the expert's opinion, having read another expert's report or for any other reason, the change should be communicated as soon as practicable (through the party's lawyers) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court[5].

2.5   If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one.   Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report.

2.6   The expert should make it clear if a particular question or issue falls outside the relevant field of expertise.

2.7   Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports[6].

3.   Experts' Conference

(continued…)

[3]   Rule 23.13.

[4]   See also *Dasreef Pty Limited v Nawaf Hawchar* [2011] HCA 21.

[5]   The "Ikarian Reefer" [1993] 20 FSR 563 at 565

[6]   The "Ikarian Reefer" [1993] 20 FSR 563 at 565-566. See also Ormrod "Scientific Evidence in Court" [1968] Crim LR 240

3.1   If experts retained by the parties meet at the direction of the Court, it would be improper for an expert to be given, or to accept, instructions not to reach agreement.   If, at a meeting directed by the Court, the experts cannot reach agreement about matters of expert opinion, they should specify their reasons for being unable to do so.

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J L B ALLSOP

Chief Justice

4 June 2013

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11   Curriculum vitae of Professor Stephen Gray

Stephen F. Gray

Professor of Finance
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AUSTRALIA
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Email: s.gray@business.uq.edu.au

Director
Frontier Economics
Email: Stephen.Gray@frontier-economics.com.au

Academic Qualifications

1995   Ph.D. (Finance), Graduate School of Business, Stanford University.
           Dissertation Title: Essays in Empirical Finance
           Committee Chairman: Ken Singleton
1989   LL.B. (Hons), Bachelor of Laws with Honours, University of Queensland.
1986   B.Com. (Hons), Bachelor of Commerce with Honours, University of Queensland.

Employment History

2000-Present   Professor of Finance, UQ Business School, University of Queensland.
1997-2000   Associate Professor of Finance, Department of Commerce, University of Queensland and Research Associate Professor of Finance, Fuqua School of Business, Duke University.
1994-1997   Assistant Professor of Finance, Fuqua School of Business, Duke University.
1990-1993   Research Assistant, Graduate School of Business, Stanford University.
1988-1990   Assistant Professor of Finance, Department of Commerce, University of Queensland.
1987   Specialist Tutor in Finance, Queensland University of Technology.
1986   Teaching Assistant in Finance, Department of Commerce, University of Queensland.

Academic Awards

2006   Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
2002   Journal of Financial Economics, All-Star Paper Award, for Modeling the Conditional Distribution of Interest Rates as a Regime-Switching Process, JFE, 1996, 42, 27-62.
2002   Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
2000   University of Queensland Award for Excellence in Teaching (a University-wide award).
1999   Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.
1999   KPMG Teaching Prize, Department of Commerce, University of Queensland.
1998   Faculty Teaching Prize (Business, Economics, and Law), University of Queensland.
1991   Jaedicke Fellow in Finance, Doctoral Program, Graduate School of Business, Stanford University.
1989   Touche Ross Teaching Prize, Department of Commerce, University of Queensland.
1986   University Medal in Commerce, University of Queensland.

Large Grants (over $100, 000)

- Australian Research Council Linkage Grant, 2008—2010, Managing Asymmetry Risk ($320,000), with T. Brailsford, J.Alcock, and Tactical Global Management.
- Intelligent Grid Cluster, Distributed Energy – CSIRO Energy Transformed Flagship Collaboration Cluster Grant, 2008-2010 ($552,000)
- Australian Research Council Research Infrastructure Block Grant, 2007—2008, Australian Financial Information Database ($279,754).

- Australian Research Council Discovery Grant, 2006—2008, Capital Management in a Stochastic Earnings Environment ($270,000).
- Australian Research Council Discovery Grant, 2005—2007, Australian Cost of Equity.
- Australian Research Council Discovery Grant, 2002—2004, Quantification Issues in Corporate Valuation, the Cost of Capital, and Optimal Capital Structure.
- Australian Research Council Strategic Partnership Grant, 1997—2000, Electricity Contracts and Securities in a Deregulated Market: Valuation and Risk Management for Market Participants.

Current Research Interests

Benchmark returns and the cost of capital. Corporate Finance. Capital structure. Real and strategic options and corporate valuation. Financial and credit risk management. Empirical finance and asset pricing.

Publications

Gray, S. and J. Nowland, 2015, "The Diversity of Expertise on Corporate Boards in Australia," *Accounting and Finance*, forthcoming.

Darat, A., S. Gray, J. C. Park and S. Wu, (2014), "Corporate governance and bankruptcy risk" *Journal of Accounting, Auditing and Finance,* forthcoming.

Gray, S., I. Harymawan and J. Nowland, (2014), "Political and government connections on corporate boards in Australia: Good for business?" *Australian Journal of Management,* forthcoming.

Brailsford, T., S. Gray and S. Treepongkaruna, (2013), "Explaining the bid-ask spread in the foreign exchange market: A test of alternate models," *Australian Journal of Management*, forthcoming.

Faff, R., S. Gray and M. Poulsen, (2013), "Financial inflexibility and the value premium," *International Review of Finance*, forthcoming.

T. Fitzgerald, S. Gray, J. Hall and R. Jeyaraj, (2013), "Unconstrained estimates of the equity risk premium" *Review of Accounting Studies,* 18, 560-639.

Gray, S. and J. Nowland, (2013), "Is prior director experience valuable?" *Accounting and Finance,* 53, 643-666.

Chen, E. T., S. Gray and J. Nowland, (2012), "Family representatives in family firms" *Corporate Governance: An International Review*, 21(3), 242-263.

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Chan, K-F., R. Brooks, S. Treepongkaruna and S. Gray, (2011), "Asset market linkages: Evidence from financial, commodity and real estate assets," *Journal of Banking and Finance*, 35, 6, 1415-1426.

Parmenter, B, A. Breckenridge, and S. Gray, (2010), 'Economic Analysis of the Government's Recent Mining Tax Proposals', *Economic Papers*: *A Journal of Economics and Policy*, 29(3), September, 279-91.

Gray, S., C. Gaunt and Y. Wu, (2010), "A comparison of alternative bankruptcy prediction models," *Journal of Contemporary Accounting and Economics*, 6, 1, 34-45.

Feuerherdt, C., S. Gray and J. Hall, (2010), "The Value of Imputation Tax Credits on Australian Hybrid Securities," *International Review of Finance*, 10, 3, 365-401.

Gray, S., J. Hall, D. Klease and A. McCrystal, (2009), "Bias, stability and predictive ability in the measurement of systematic risk," *Accounting Research Journal*, 22, 3, 220-236.

Treepongkaruna, S. and S. Gray, (2009), "Information volatility links in the foreign exchange market," *Accounting and Finance*, 49, 2, 385-405.

Costello, D., S. Gray, and A. McCrystal, (2008), "The diversification benefits of Australian equities," *JASSA*, 2008, 4, 31-35.

Gray, S. and J. Hall, (2008), "The Relationship Between Franking Credits and the Market Risk Premium: A Reply," *Accounting and Finance*, 48, 1, 133-142.

Gray, S., A. Mirkovic and V. Ragunathan, (2006), "The Determinants of Credit Ratings: Australian Evidence," *Australian Journal of Management*, 31(2), 333-354.

Choy, E., S. Gray and V. Ragunathan, (2006), "The Effect of Credit Rating Changes on Australian Stock Returns," *Accounting and Finance*, 46(5), 755-769.

Gray, S. and J. Hall, (2006), "The Relationship Between Franking Credits and the Market Risk Premium," *Accounting and Finance*, 46(3), 405-428.

Gray, S. and S. Treepongkaruna, (2006), "Are there non-linearities in short-term interest rates?" *Accounting and Finance*, 46(1), 149-167.

Gray, P., S. Gray and T. Roche, (2005), "A Note on the Efficiency in Football Betting Markets: The Economic Significance of Trading Strategies," *Accounting and Finance*, 45(2) 269-281.

Duffie, D., S. Gray and P. Hoang, (2004), "Volatility in Energy Prices. In V. Kaminski," (Ed.), *Managing Energy Price Risk: The New Challenges and Solutions* (3rd ed.). London: Risk Books.

Cannavan, D., F. Finn and S. Gray, (2004), "The Value of Dividend Imputation Tax Credits in Australia," *Journal of Financial Economics*, 73, 167-197.

Gray, S. and S. Treepongkaruna, (2003), "Valuing Interest Rate Derivatives Using a Monte-Carlo Approach," *Accounting and Finance*, 43(2), 231-259.

Gray, S., T. Smith and R. Whaley, (2003), "Stock Splits: Implications for Investor Trading Costs," *Journal of Empirical Finance*, 10, 271-303.

Gray, S. and S. Treepongkaruna, (2003), "On the Robustness of Short-term Interest Rate Models," *Accounting and Finance*, 43(1), 87-121.

Gray, S. and S. Treepongkaruna, (2002), "How to Value Interest Rate Derivatives in a No-Arbitrage Setting," *Accounting Research Journal* (15), 1.

Gray, P. and S. Gray, (2001), "A Framework for Valuing Derivative Securities," *Financial Markets Institutions & Instruments*, 10(5), 253-276.

Gray, P. and S. Gray, (2001), "Option Pricing: A Synthesis of Alternate Approaches," *Accounting Research Journal*, 14(1), 75-83.

Dahlquist, M. and S. Gray, (2000), "Regime-Switching and Interest Rates in the European Monetary System," *Journal of International Economics*, 50(2), 399-419.

Bollen, N., S. Gray and R. Whaley, (2000), "Regime-Switching in Foreign Exchange Rates: Evidence from Currency Options," *Journal of Econometrics*, 94, 239-276.

Duffie, D., S. Gray and P. Hoang, (1999), "Volatility in Energy Prices. In R. Jameson," (Ed.), *Managing Energy Price Risk* (2nd ed.). London: Risk Publications.

Gray, S. and R. Whaley, (1999), "Reset Put Options: Valuation, Risk Characteristics, and an Example," *Australian Journal of Management*, 24(1), 1-21.

Bekaert, G. and S. Gray, (1998), "Target Zones and Exchange Rates: An Empirical Investigation," *Journal of International Economics*, 45(1), 1-35.

Gray, S. and R. Whaley, (1997), "Valuing S&P 500 Bear Market Warrants with a Periodic Reset," *Journal of Derivatives*, 5(1), 99-106.

Gray, S. and P. Gray, (1997), "Testing Market Efficiency: Evidence from the NFL Sports Betting Market," *The Journal of Finance*, 52(4), 1725-1737.

Gray, S. (1996), "Modeling the Conditional Distribution of Interest Rates as a Regime- Switching Process," *Journal of Financial Economics*, 42, 27-62.

Gray, S. (1996), "Regime-Switching in Australian Interest Rates," *Accounting and Finance*, 36(1), 65-88.

Brailsford, T., S. Easton, P.Gray and S. Gray, (1995), "The Efficiency of Australian Football Betting Markets," *Australian Journal of Management*, 20(2), 167-196.

Duffie, D. and S. Gray, (1995), "Volatility in Energy Prices," In R. Jameson (Ed.), *Managing Energy Price Risk,* London: Risk Publications.

Gray, S. and A. Lynch, (1990), "An Alternative Explanation of the January Anomaly," *Accounting Research Journal*, 3(1), 19-27.

Gray, S. (1989), "Put Call Parity: An Extension of Boundary Conditions," *Australian Journal of Management*, 14(2), 151-170.

Gray, S. (1988), "The Straddle and the Efficiency of the Australian Exchange Traded Options Market," *Accounting Research Journal*, 1(2), 15-27.

Teaching

Fuqua School of Business, Duke University, Student Evaluations (0-7 scale):

- Financial Management (MBA Core): Average 6.5 over 7 years.
- Advanced Derivatives: Average 6.6 over 4 years.
- Empirical Issues in Asset Pricing: Ph.D. Class

1999, 2006   Outstanding Professor Award, Global Executive MBA, Fuqua School of Business, Duke University.

UQ Business School, University of Queensland, Student Evaluations (0-7 scale):

- Finance (MBA Core): Average 6.6 over 10 years.
- Corporate Finance Honours: Average 6.9 over 10 years.

2002   Australian University Teaching Award – Business (a national award for all university instructors in all disciplines).
2000   University of Queensland Award for Excellence in Teaching.
1999   Department of Commerce KPMG Teaching Prize, University of Queensland.
1998   Faculty Teaching Prize, Faculty of Business Economics and Law, University of Queensland.
1998   Commendation for Excellence in Teaching, University-wide Teaching Awards, University of Queensland.
1989   Touche Ross Teaching Prize, Department of Commerce, University of Queensland.

Board Positions

2012 - Present: Director, Children's Hospital Foundation, Queensland.
2002 - Present: Director, Financial Management Association of Australia Ltd.
2003 - 2012: Director, Moreton Bay Boys College Ltd. (Chairman from 2007).
2002 - 2007: External Risk Advisor to Board of Enertrade (Queensland Power Trading Corporation Ltd.)

Consulting

SFG Consulting: 1997-2014.
Frontier Economics: 2014-Present.

Twenty years' experience in consulting to companies, government-owned corporations, government and regulatory agencies. Examples include:

- *Regulatory cost of capital*: Preparation of submissions in regulatory determinations. Clients include all Australian energy transmission and distribution businesses, FOXTEL, Telstra, BBI, ACCC, IPART, ERA.

- *Corporate cost of capital reviews*: Review of cost of capital estimates for project evaluation and impairment testing purposes. Clients include QANTAS, Stanwell Corporation, Ecowise.

- *Executive stock option valuation*: Clients include Collins Foods Group, Ground Probe, Crater Gold Mining, Beach Petroleum.

- *New Project Evaluation*: Assisting companies and GOCs to evaluate proposed new projects. Particular focus is on quantifying risk and uncertainty and presenting possible outcomes in a probabilistic framework. Clients include Queensland Treasury Corporation, Queensland Accommodation Group, Stanwell, EnerTrade.

- *Financial modelling and forecasting*: Clients include ATO (forecasting delinquent payments), ASX (forecasting trading volumes), Compass Resources (integrated mine valuation model).

Retained as a valuation expert in many litigation cases; produced many expert witness reports;
appeared in Court for cross examination many times including:

- *Macquarie Generation*: Witness for AGL in competition case.
- *Telstra v. ACCC*: Witness for Telstra in rate of return regulation case.
- *C7 Case*: Witness for PBL, Newscorp, Telstra re valuation of Seven's failed cable TV network.
- *Alcan v. NT Commissioner of Revenue*: Witness for Alcan re valuation of combined bauxite mine and alumina refinery for stamp duty purposes.