18 May 2010

Email: NSWACTgas@aer.gov.au

Mr Mike Buckley
General Manager, Network North Branch
Australian Energy Regulator
23 Marcus Clarke Street
CANBERRA   ACT   2601

JGN access arrangement revision: AER expert reports for final decision

Dear Mike

Jemena Gas Networks (NSW) Ltd (**JGN**) responds to two new expert reports on gamma released by the Australian Energy Regulator (**AER**) in its recent South Australian and Queensland final decisions published on 6 May 2010.

Given the short amount of time since the release of these reports, JGN's response necessarily remains preliminary and does not represent a full response to the issues raised by those reports.

JGN's initial response to the AER draft decision[1] outlined our expectation that JGN will have a reasonable opportunity to respond to all materials relevant to the access arrangement revision process, including any new expert reports that the AER intends to take into account or any change in thinking on issues upon which the AER has not previously consulted JGN[2].

Expert reports on gamma

Subsequent to JGN's initial response and the close of public submissions on the AER's draft decision for JGN on 28 April 2010, the AER released its South Australia and Queensland final decisions.[3] In the reasons given for these decisions the AER relies, in part, on two new expert reports on gamma (collectively, the **gamma reports**):

---

[1] JGN, *Initial response to the draft decision*, 19 March 2010 (**initial response**).

[2] Ibid., p. 15.

[3] Australian Energy Regulator, *Final Decision, South Australia Distribution Determination 2010–11 to 2014–15*, May 2010.
    Australian Energy Regulatory, *Final Decision, Queensland Distribution Determination 2010–11 to 2014–15*, May 2010.

- Professor Michael McKenzie and Associate Professor Graham Partington, 25 March 2010, *Evidence and submissions on gamma*

- Associate Professor John Handley, 19 March 2010, *Report prepared for the AER on the estimation of gamma.*

It does not appear from the final decisions that these reports were made available to ETSA Utilities, Ergon or Energex, or any other interested party, prior to the publication of the AER's final decisions.

Procedural fairness

JGN considers that if the AER intends to introduce similar material in its final decision on JGN's proposal, at a minimum, procedural fairness would require that:

- JGN is notified of the AER's intention to rely on material that has not yet been made available to JGN

- JGN would be provided with a reasonable opportunity to comment on the substance of the material.

The AER has not advised JGN whether the AER intends to have regard to the reports the AER has published in respect of the South Australian and Queensland decisions in making its final decision with respect to JGN. To the extent the AER does intend to have regard to those reports, JGN reserves its position on this issue. JGN's response to those reports should not be taken as JGN conceding that the AER is entitled to seek to rely on those reports in making its final decision on JGN's revised access arrangement revisions.

NERA report on the gamma reports

In the short time since the AER published the gamma reports, JGN has had limited opportunity to critically analyse them.

To assist in this regard, JGN engaged NERA Economic Consulting (**NERA**) to prepare a report critically analysing the gamma reports at a high level.[4] In particular, NERA was engaged to:

- identify new arguments and analysis raised in the gamma reports

- provide an opinion on whether these new arguments and analysis support a gamma estimate of 0.65 that is arrived at on a reasonable basis and is the best estimate available in the circumstances

- outline further analysis that is needed, in light of the gamma reports, to identify a gamma estimate that is arrived at on a reasonable basis and is the best estimate in the circumstances.

In its report, NERA states that[5]:

---

[4] NERA, *New gamma issues raised by AER expert consultants, A report for JGN*, 17 May 2010.
[5] Ibid., p. i.

> NERA has reviewed each of these papers to assess the extent that they support the AER's conclusion that the most reasonable and reliable estimate of gamma is 0.65. Our review highlights that these expert reports do not provide material support for a number of the critical conclusions reached by the AER. Furthermore, our assessment has identified a number of issues with the analyses presented by McKenzie, Partington and Handley. In our opinion, a critical assessment of the current evidence on the value of gamma suggests a value substantially less that that reached by the AER.

In particular, NERA conclude that:[6]

- McKenzie and Partington provide little analysis of the choice by the AER of a payout ratio of one and little analysis of the controversial use of tax studies by the AER to estimate theta

- Handley fails to argue that evidence of practitioners setting gamma to zero does not imply that they ignore franking credits

- evidence that most market participants appear to place negligible value on distributed credits suggests that gamma's value is low

- tax studies[7] do not provide a good estimate of theta and neither gamma report offers any convincing evidence to the contrary

- there are good reasons why the value of an imputation credit distributed may differ substantially from the proportion of credits redeemed

- the results in the SFG dividend drop-off study should be used to estimate theta because it uses the largest number of observations

- neither report provides convincing evidence supporting a payout ratio of one and, in fact, McKenzie and Partington suggest that a payout ratio of one will overestimate the value of gamma

- depending on the period that imputation credits are held, the effective payout ratio can be less than the observed payout ratio of 70 per cent

- there is no evidence to support a conclusion that imputation credits will be retained for a short period of time before being distributed to shareholders

- it is not reasonable to assume that the payout ratio is 100 per cent.

NERA also highlights a number of new issues, but, due to the limited amount of time it had to respond, its analysis of these issues is incomplete.[8] Where the analysis is incomplete we highlight areas where further work is needed.

NERA's report is attached for your consideration and includes these and other conclusions, as well as analysis supporting these conclusions. NERA's report is prepared in accordance with the Federal Court guidelines for expert witnesses, dated 25 September 2009.

---

[6] Ibid., pp. i–iv.

[7] 'Tax studies' are studies of tax information from the ATO (or other tax agencies) that combine this information with assumptions made by their authors.

[8] NERA, *New gamma issues raised by AER expert consultants, A report for JGN*, 17 May 2010, p. i.

If the AER intends to rely on the gamma reports for the JGN final decision (and JGN does not concede that the AER is necessarily entitled to rely on these reports), then, at a minimum, we consider that the AER should fairly consider NERA's report and this letter.

If you wish to discuss this matter further, please contact me on (02) 9455 1512 or by email at sandra.gamble@jemena.com.au.

Yours sincerely

Sandra Gamble
Group Manager Regulatory
Jemena Limited

Attachment: NERA, *New gamma issues raised by AER expert consultants, A report for JGN*, 17 May 2010

17 May 2010

New Gamma Issues Raised by AER Expert Consultants
A report for JGN

NERA
Economic Consulting

Project Team

Simon Wheatley

Brendan Quach

NERA Economic Consulting
Darling Park Tower 3
201 Sussex Street
Sydney NSW 2000
Tel: +61 2 8864 6500
Fax: +61 2 8864 6549
www.nera.com

Contents

Executive Summary

Purpose of the report

Jemena Gas Networks (NSW) Ltd (JGN) has asked NERA Economic Consulting (NERA) to provide an expert opinion on the two new reports recently relied on, in part, by the Australian Energy Regulator (AER) to determine the market value of gamma.[1] Gamma is a parameter used to represent the value that equity investors receive from imputation credits created through the payment of company income tax. The AER engaged three consultants to write the reports. The reports are:

§   Professor Michael McKenzie and Associate Professor Graham Partington, *Evidence and submissions on gamma*, 25 March 2010; and

§   Associate Professor John Handley, *Report prepared for the AER on the estimation of gamma*, 19 March 2010.

These reports were made public on 6 May 2010 with the release of the South Australian and Queensland decisions.[2] NERA has reviewed each of these papers to assess the extent that they support the AER's conclusion that the most reasonable and reliable estimate of gamma is 0.65. Our review highlights that these expert reports do not provide material support for a number of the critical conclusions reached by the AER. Furthermore, our assessment has identified a number of issues with the analyses presented by McKenzie, Partington and Handley. In our opinion, a critical assessment of the current evidence on the value of gamma suggests a value substantially less than that reached by the AER.

Our report also highlights a number of new issues raised in these reports, but, due to the limited amount of time we have had to respond, our analysis of the new issues is incomplete. Where the analysis is incomplete we highlight areas where further work is required.

What is gamma?

Gamma is estimated as the product of two further parameters, namely:[3]

§   the fraction of imputation credits created that are assumed to be distributed to shareholders (the payout ratio or '*F*'); and

---

[1]   We qualify the remark that the AER relies on the advice of its consultants because, as we emphasize in what follows, the AER does not heed the advice of one set of consultants, McKenzie and Partington, who state on page 4 of their report that the AER should use:

  'a broader range of studies to triangulate the evidence considered'

  McKenzie and Partington do not state, for example that the SFG study of the behaviour of stock prices around ex-dividend days is irrelevant but the AER nevertheless places no weight on the study

[2]   AER, *South Australia distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, page 161; and AER, *Queensland distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, pages 226-227.

[3]   Monkhouse, P., *The cost of equity under the Australian dividend imputation tax system*, Accounting and Finance, 1993, pages 1-18.

§   the market value of imputation credits distributed as a proportion of their face value (theta or 'θ').

AER's recent position on gamma

In recent decisions the AER concludes that the most reasonable estimate of gamma is 0.65 based on its assessments that:[4]

§   it remains appropriate to assume a 100 per cent payout ratio; and

§   the value of theta falls between a lower bound of 0.57 based on an estimate for the post–July 2000 period from the Beggs and Skeels (2006) dividend drop–off study and an estimate of 0.74 produced by Handley and Maheswaran (2008) from a study that relies in part on tax statistics.[5]

Opinion on McKenzie and Partington report

McKenzie and Partington were charged by the AER to:

> 'undertake an analysis of the estimation of gamma from dividend drop-off studies and an analysis of the arguments presented by the AER and those raised in the submissions of [various] DNSPs'.

McKenzie and Partington provide little analysis of the choice by the AER of a payout ratio of 100 per cent and little analysis of the controversial use of tax studies by the AER to estimate theta.[6] They therefore do not examine in any detail two of the three estimates that the AER uses to compute an estimate of gamma.

For example, McKenzie and Partington state:[7]

> 'An appropriate value for the payout therefore lies between 70% and 100%.'

They provide no guide, however, as to how close to or far away from 70 per cent the payout ratio should be. Thus *little* can be gleaned from their analysis about how to set the payout ratio.

McKenzie and Partington also state that:[8]

> 'the link between taxation statistics and the market value of imputation credits remains indirect.'

---

[4]   AER, *South Australia distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, page 161; and AER, *Queensland distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, pages 226-227.

[5]   Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

Handley J. and Maheswaran K., A Measure of the Efficacy of the Australian Imputation Tax System, The Economic Record, Vol 84 No 264, March 2008, pages 82-94.

[6]   We define a tax study to be a study that uses tax statistics together with potentially a number of assumptions to estimate theta. Thus the results of a tax study, as we define it, may not rely solely on tax statistics.

[7]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 27.

[8]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 9.

However, they do not state why they believe the link to be indirect or how indirect they believe the link to be and so how *much weight should be placed on* estimates drawn from a tax study. The consequence is that this study does not provide an independent assessment of the use of tax studies to estimate theta even though the use has been subject to significant criticism.

McKenzie and Partington, on the other hand, provide a detailed analysis of the use of ex-dividend day studies – like the study that Beggs and Skeels (2006) conduct – to provide estimates of theta.[9] They raise a number of new and interesting issues on the use of ex-dividend day studies that with additional time could be further investigated.

By way of example, the correlation between dividends and imputation credits across all firms and the tabulated results of Beggs and Skeels and SFG suggest that multicollinearity is not a problem.[10] McKenzie and Partington, on the other hand, argue that the joint confidence intervals that SFG provide suggest that multicollinearity is a problem. Reconciling the two apparently conflicting pieces of evidence will require more work and so more time.

Opinion on Handley report

Handley was similarly asked by the AER to examine issues raised in past AER decisions and submissions to the AER. He argues that the evidence that Truong, Partington and Peat (2008) provide that practitioners typically set gamma to zero need not imply that they are ignoring imputation credits.[11] In our opinion, this argument fails to acknowledge that most market participants appear to place a negligible value on distributed credits, which suggests that gamma's value is low.

On the payout ratio, Handley, like McKenzie and Partington, argues that the ratio computed from Australian Tax Office (ATO) data represents a lower bound on the effective payout ratio, the sum of the values of credits distributed immediately and credits not distributed immediately. However we show that, depending on the period over which credits are retained, the effective payout ratio can be less than the observed payout ratio of 70 per cent.

Finally, Handley argues that the rate at which imputation credits are redeemed can provide an upper bound on theta. We point out that an upper bound for a parameter may differ markedly from the parameter itself. Handley also criticizes an argument that SFG makes.[12] While we find some merit to Handley's critique, we believe that SFG's argument is essentially correct. To demonstrate conclusively that SFG's proposition is correct would require more work and time.

---

[9] Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

[10] Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

Strategic Finance Group, *Further analysis in response to AER draft determination in relation to gamma*, 4 February 2010.

[11] Truong, G., G. Partington and M. Peat, *Cost of capital estimation and capital budgeting practice in Australia*, Australian Journal of Management, 2008, pages 95-122.

[12] SFG, *Responses to the AER Draft Determination in relation to gamma,: Report prepared for ETSA Utilities*, January 2010, pages 19-20.

Conclusions

To conclude, we find the best and most reliable evidence on the value of gamma suggests a value substantially less that that reached by the AER. The AER concludes that the most reasonable and reliable estimate of gamma is 0.65, since:

§ it is appropriate to assume 100 per cent of all imputation credits created would be distributed to shareholders; and

§ the value of theta falls between a lower bound of 0.57 based on an estimate for the post–July 2000 period from the Beggs and Skeels (2006) dividend drop–off study and an estimate of 0.74 produced by Handley and Maheswaran (2008) from a study that relies in part on tax statistics.

The evidence from the ATO is that the payout ratio, whether measured as the effective ratio or the observed ratio, is well below 100 per cent. We compute the cumulative observed payout ratio since credits were first introduced to be below 70 per cent. Furthermore, we find no evidence to support a conclusion that credits will be retained for a short period of time before being distributed to shareholders. Thus we are not persuaded that it is reasonable to assume that the payout ratio is 100 per cent.

While the use of data from the ATO to estimate the payout ratio is not controversial, the use of data from the ATO to measure the value of an imputation credit distributed is controversial. There are good reasons why the value of an imputation credit distributed may differ substantially from the proportion of credits redeemed. The value of an imputation credit distributed may be an order of magnitude smaller than the proportion of credits redeemed. We do not find any information in either report, though, that would enable us to determine the extent of the difference between the two parameters.

Besides using an estimate of the redemption rate from a tax study, the AER also uses an estimate of theta produced from a drop-off study. The AER currently relies exclusively on one estimate produced from a drop-off study that Beggs and Skeels (2006) conduct. They do so despite the fact that SFG conduct drop-off studies that use essentially the same method as Beggs and Skeels, more recent data and a larger number of observations. We note that Skeels has recently endorsed SFG's theta estimate of 0.23 as the most accurate estimate currently available.

McKenzie and Partington suggest that the results of SFG are untrustworthy because of multicollinearity. It is not clear that this is true although determining conclusively that that is the case would require more work and so more time. Even were the assertion to be true, however, it is not clear that a similar problem would not affect the work of Beggs and Skeels. If both studies were to suffer from multicollinearity – and there is evidence that neither suffer from the problem – standard econometric advice is straightforward. One should use the study that employs the largest amount of data. Thus the standard advice would be to use the results provided by SFG because they use the largest number of observations.

Finally, we find that it is probable that market practitioners typically ignore imputation credits in valuations because they believe that gamma is close to zero. We are not persuaded that market practitioners ignore imputation credits while at the same time believing that the market value of credits is substantial.

1.   Introduction

Jemena Gas Networks (NSW) Ltd (JGN) has asked NERA Economic Consulting (NERA) to provide an expert opinion on the two new reports recently relied on by the Australian Energy Regulator (AER) to determine the market value of gamma. Specifically, the AER relied on these reports in reaching decisions on the revenues of the South Australian[13] and two Queensland[14] electricity distribution network service providers (the 'South Australian decision' and 'Queensland decision').

Gamma is a parameter used to represent the value that equity investors receive from imputation credits created through the payment of company income tax. The imputation tax system was introduced in Australia on 1 July 1987 and allows resident investors to deduct from their taxable income any credits distributed to them by way of franked dividends. Since 1 July 2000 investors that have imputation credits in excess of their tax liabilities have received a rebate from the Australian Tax Office (ATO). Gamma represents the proportion of company income tax that does not need to be included in a regulated firm's annual revenue requirement, because of the benefit shareholders receive from the imputation tax system.

Gamma is estimated as the product of two further parameters, namely:[15]

§   the fraction of imputation credits created that are assumed to be distributed to shareholders (the payout ratio or 'F'); and

§   the market value of imputation credits distributed as a proportion of their face value (theta or 'θ').

In both the South Australian and Queensland decisions the AER concluded that the most reasonable estimate of gamma is 0.65 based on its assessments that:[16]

§   it remains appropriate to assume 100 per cent payout ratio; and

§   the value of theta falls between a lower bound of 0.57 based on an estimate for the post–July 2000 period from the Beggs and Skeels (2006) dividend drop–off study and an estimate of 0.74 produced by Handley and Maheswaran (2008) from a study that relies in part on tax statistics.[17]

The AER engaged three consultants to write two reports. The reports are:

---

[13]   AER, *South Australia distribution determination 2010-11 to 2014-15: Final Decision*, May 2010.

[14]   AER, *Queensland distribution determination 2010-11 to 2014-15: Final Decision*, May 2010.

[15]   Monkhouse, P., *The cost of equity under the Australian dividend imputation tax system*, Accounting and Finance, 1993, pages 1-18.

[16]   AER, *South Australia distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, page 161; and AER, *Queensland distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, pages 226-227.

[17]   Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

Handley J. and Maheswaran K., A Measure of the Efficacy of the Australian Imputation Tax System, The Economic Record, Vol 84 No 264, March 2008, pages 82-94.

---

§ Professor Michael McKenzie and Associate Professor Graham Partington, *Evidence and submissions on gamma*, 25 March 2010; and

§ Associate Professor John Handley, *Report prepared for the AER on the estimation of gamma*, 19 March 2010.

These reports were made public on 6 May 2010 with the release of the South Australian and Queensland decisions. The short period in which to respond to these reports has meant that we have been able only to respond in outline form to some of the new issues raised. We indicate below where we would have undertaken further analysis had additional time been available.

The remainder of this report is structured as follows:

§ Section 2 – outlines our response to the report by McKenzie and Partington; and

§ Section 3 – sets out new issues raised by the arguments presented by Handley.

Attached to this report are two appendices. Appendix A reproduces the terms of reference for this report. Appendix B provides the Curriculum Vitae of each of the authors.

1.1. Statement of Credentials

This report has been jointly prepared by **Simon Wheatley** and **Brendan Quach**.

Simon Wheatley is a Special Consultant with NERA, and was until recently a Professor of Finance at the University of Melbourne. Since the beginning of 2008, Simon has applied his finance expertise in investment management and consulting outside the university sector. Simon's expertise is in the areas of testing asset-pricing models, determining the extent to which returns are predictable and individual portfolio choice theory. Prior to joining the University of Melbourne, Simon taught finance at the Universities of British Columbia, Chicago, New South Wales, Rochester and Washington.

Brendan Quach is a Senior Consultant at NERA with ten years experience as an economist, specialising in network economics and competition policy in Australia, New Zealand and Asia Pacific. Since joining NERA in 2001, Brendan has advised a wide range of clients on regulatory finance matters, including approaches to estimating the cost of capital for regulated infrastructure businesses.

In preparing this report, each of the joint authors (herein after referred to as either 'we' or 'our') confirms that we have made all the inquiries we believe are desirable and appropriate and no matters of significance that we regard as relevant have, to our knowledge, been withheld from this report. We have been provided with a copy of the Federal Court guidelines *Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia* dated 25 September 2009. We have reviewed those guidelines and this report has been prepared consistently with the form of expert evidence required by those guidelines.

2.   McKenzie and Partington

In this section we discuss the contents of a report written by McKenzie and Partington entitled *Report to AER: Evidence and submissions on gamma* that was delivered to the AER on 25 March 2010. In the report McKenzie and Partington provide the following information about their terms of reference.[18]

> 'We have been asked to evaluate the determination of gamma (the market value of imputation credits created) as used by the AER for the purposes of economic regulation. Specifically, our instructions were to undertake an analysis of the estimation of gamma from dividend drop-off studies and an analysis of the arguments presented by the AER and those raised in the submissions of the following DNSPs:
>
> • The NSW/ACT gas DNSPs of ActewAGL, Country Energy and Jemena Gas Networks.
>
> • The QLD/SA electricity DNSPs of Energex, Ergon Energy and ETSA Utilities.
>
> • The VIC electricity DNSPs of CitiPower, Jemena Electricity Networks, Powercor, SP AusNet and United Energy.
>
> The focus of this report is on gamma in the context of a given valuation model and capital asset pricing model. In the course of this evaluation we have consulted the following documents:
>
> • SFG, Further analysis in response to AER Draft Determination in relation to gamma: Prepared for ETSA Utilities (4 Feb. 2010)
>
> • SFG, Gamma: Further Evidence to Support Departure from the AER's Statement of Regulatory Intent: Report prepared for ENERGEX and Ergon Energy (7 Dec. 2009)
>
> • SFG, The value of imputation credits as implied by the methodology of Beggs and Skeels (2006): Report prepared for ENA, APIA, and Grid Australia (1 Feb. 2009)
>
> • SFG, The impact of franking credits on the cost of capital of Australian companies: Report prepared for ENA, APIA and Grid Australia (16 Sept. 2008)
>
> • SFG, The impact of franking credits on the cost of capital of Australian companies: Supporting evidence submitted to the Australian Energy Regulator. (12 Nov. 2008) 6
>
> • SFG, Response to AER Draft Determination in relation to gamma: Report prepared for ETSA Utilities (13 Jan. 2010)
>
> • C. Skeels, Response to Australian Energy Regulator Draft Determination (13 Jan. 2010)
>
> • C. Skeels, A Review of the SFG Dividend Drop-Off Study (28 Aug. 2009)
>
> • J. Field, Reliability of data used in dividend drop off study (5 Jan. 2010)

We divide our discussion into three parts. First, we examine McKenzie and Partington's assessment of the relevance of the behaviour of market practitioners for the value that practitioners believe gamma takes. Truong, Partington and Peat (2008) find from a survey they conduct that market practice is typically to ignore imputation credits.[19] McKenzie and Partington suggest that this may not indicate that practitioners believe gamma is zero. If we had additional time we would examine this conjecture by asking the participants of the survey

---

[18]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, pages 6-7.

[19]   Truong, G., G. Partington and M. Peat, *Cost of capital estimation and capital budgeting practice in Australia*, Australian Journal of Management, 2008, pages 95-122.

whether by ignoring imputation credits they believe that gamma has a zero or negligible value.

Second, we examine McKenzie and Partington's assessment of the assumed payout ratio and find that they have are not willing to commit to whether they believe the AER's view that the ratio can be set to one is correct or incorrect.

Third, we examine McKenzie and Partington's assessment of the relevance of the value of theta. The AER uses both tax and ex-dividend day studies to estimate theta. McKenzie and Partington say little about the weight that should be placed on tax studies to estimate theta. They have much more to say about ex-dividend day studies. Not everything that they have to say about ex-dividend day studies, though, is accurate. They argue that multicollinearity is an issue when much of the evidence from the work of SFG and Beggs and Skeels (2006) suggests otherwise.[20] However, we note that responding to all of the issues that they raise about multicollinearity will require further work. Finally, we note that the issue concerning the use of a consistent value for a one-dollar dividend would be irrelevant were the AER to use the most recent and comprehensive results, that SFG produce and Skeels endorses.[21]

2.1. Market practice

SFG point out that it is standard market practice to ignore imputation credits in project analysis and valuations and McKenzie and Partington agree.[22] McKenzie and Partington state:[23]

> 'it probably is the case that ignoring franking credits in valuations is widespread.'

Since rational market practitioners will weigh up the costs and benefits of ignoring imputation credits, evidence that they ignore credits suggests, as SFG point out, that the credits have either no value or, at least, a value substantially less than the value placed on them by the AER.[24]

The costs of ignoring imputation credits are that market practitioners may reject worthwhile projects and undervalue assets. These costs may be substantial. The benefits of ignoring imputation credits are that market practitioners do not have to go to the bother of placing a value on the credits. These benefits are small. So it would seem that if credits were to have any significant value, the costs of ignoring credits would exceed the benefits of ignoring them.

---

[20] Strategic Finance Group, *Further analysis in response to AER draft determination in relation to gamma*, 4 February 2010.

Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

[21] Skeels, C.L., A review of the SFG dividend drop-off study*: A Report prepared for Gilbert + Tobin*, 28 August 2009.

[22] Strategic Finance Group, *Market practice in relation to franking credits and WACC: Response to AER proposed revision of WACC parameters*, 1 February 2009, page 4.

[23] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 27.

[24] Strategic Finance Group, *Market practice in relation to franking credits and WACC: Response to AER proposed revision of WACC parameters*, 1 February 2009, page 13.

The AER assumes that a fraction of the return to equity comes through imputation credits.[25] If the effective tax rate equals the current corporate – ie, 30 per cent – and, as the AER asserts, gamma is 0.65, then 22 per cent of the return to equity must come through imputation credits. It is difficult to believe that were market practitioners to agree with the AER about the value of credits, they would ignore an adjustment to the cost of equity of this magnitude.

McKenzie and Partington, on the other hand, state that:[26]

> 'ignoring franking credits in valuation [does not] necessarily imply that practitioners believe that franking credits have no value.'

They argue that survey evidence that Truong, Partington and Peat (2008) provide shows that few market participants are willing to go so far as to state that they believe that the value of imputation credits is zero.[27] While this may be true, there must be considerable doubt about whether practitioners who set the value of credits to zero do so while simultaneously holding the belief that credits have the value that the AER places on them. Nevertheless, the AER cites the argument that McKenzie and Partington make in their recent final decision issued in Queensland which states that:[28,29]

> 'The AER notes the advice of McKenzie and Partington, which stated that the Truong, Partington and Peat (2008) study illustrated the majority firms that do not account for imputation credits do so because it is too difficult to incorporate a value for gamma. The Truong, Partington and Peat (2008) study finds only 6 out of 89 firms surveyed cited the reason for not incorporating a value for gamma is because they considered that imputation credits have zero market value.'

We note that Truong, Partington and Peat report that 13 companies stated that they accounted for imputation credits in project evaluation while 60 companies stated that they did not account for imputation credits in project evaluation.[30] Thus Truong, Partington and Peat

---

[25]   As Handley shows, the grossed-up cost of equity, r_E, that is, what Officer (1994) labels the after-company-before-personal-tax cost of equity, is related to the cost of equity conventionally computed, r_E^*, in the following way:

$$r_E = \left(\frac{1-T(1-g)}{1-T}\right)r_E^* = r_E^* + \left(\frac{gT}{1-T}\right)r_E^*,$$

where g is gamma and T is the corporate tax rate. It follows that the fraction of the return to equity that must come through imputation credits will be:

$$\left(\frac{gT}{1-T}\right) \div \left(1 + \left(\frac{gT}{1-T}\right)\right) = \left(\frac{gT}{1-T(1-g)}\right).$$

Evaluated at $g = 0.65$ and $T = 0.3$, this fraction will be 0.22.

Officer, R.R., *The cost of capital under an imputation tax system*, Accounting and Finance, 1994, pages 1–17.

[26]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 28.

[27]   Truong, G., G. Partington and M. Peat, *Cost of capital estimation and capital budgeting practice in Australia*, Australian Journal of Management, 2008, pages 95-122.

[28]   AER, *Queensland distribution determination 2010–11 to 2014–15*, May 2010, page 219.

[29]   As McKenzie and Partington point out, 60 (not 89) firms provided 89 responses as to why they did not take into account imputation credits.

[30]   Truong, G., G. Partington and M. Peat, *Cost of capital estimation and capital budgeting practice in Australia*, Australian Journal of Management, 2008, page 115.

found that 82 per cent of respondents (60 out of 73) set the value of credits to zero. Table 2.1 below, which is Table 1 of McKenzie and Partington's report, provides the reasons provided by respondents for setting the value of imputation credits to zero.

Table 2.1
Reasons for not accounting for imputation credits in project evaluation

Reason	Number of responses
It's difficult to set an appropriate tax credit value for all investors	22
Imputation credit should have a very small impact on evaluation result	15
The market already adjusts stock prices, therefore imputation credit is taken into account in cost of capital estimate already	14
It is too complicated	11
Other	11
Imputation credits are irrelevant to overseas shareholders	10
Credits have zero market value	6

Sources: Truong, Partington and Peat (2008).

While only 6 respondents explicitly state that credits have zero market value, it is far from clear from the other responses in Table 2.1 that the remaining respondents would have been willing to place a value of as much as 65 cents on a dollar of credits created. If time had permitted, the matter could have been resolved by contacting the respondents to the survey and asking them what value they would have placed on a dollar of credits created.

2.2. Payout ratio

Handley, Hathaway and Officer (2004), McKenzie and Partington, SFG and we all agree that the evidence from the ATO indicates that on aggregate across all firms approximately 70 per cent of credits created have, historically, been distributed.[31]

Figure 2.1 below provides a plot of the annual payout ratio against time computed using data from 1995/6 through 2006/7 and the cumulative payout ratio computed using data from 1987/8 through 2006/7. The annual ratios are from our 2010 report, while the cumulative ratios are computed using the method of Hathaway and Officer (2004).[32] Both ratios are computed using data from the ATO. The average annual payout ratio computed from these data is 68 per cent while the cumulative payout ratio computed using data from 1987/8 through 2006/7 is 69 per cent.

Figure 2.1
Payout ratio against time

---
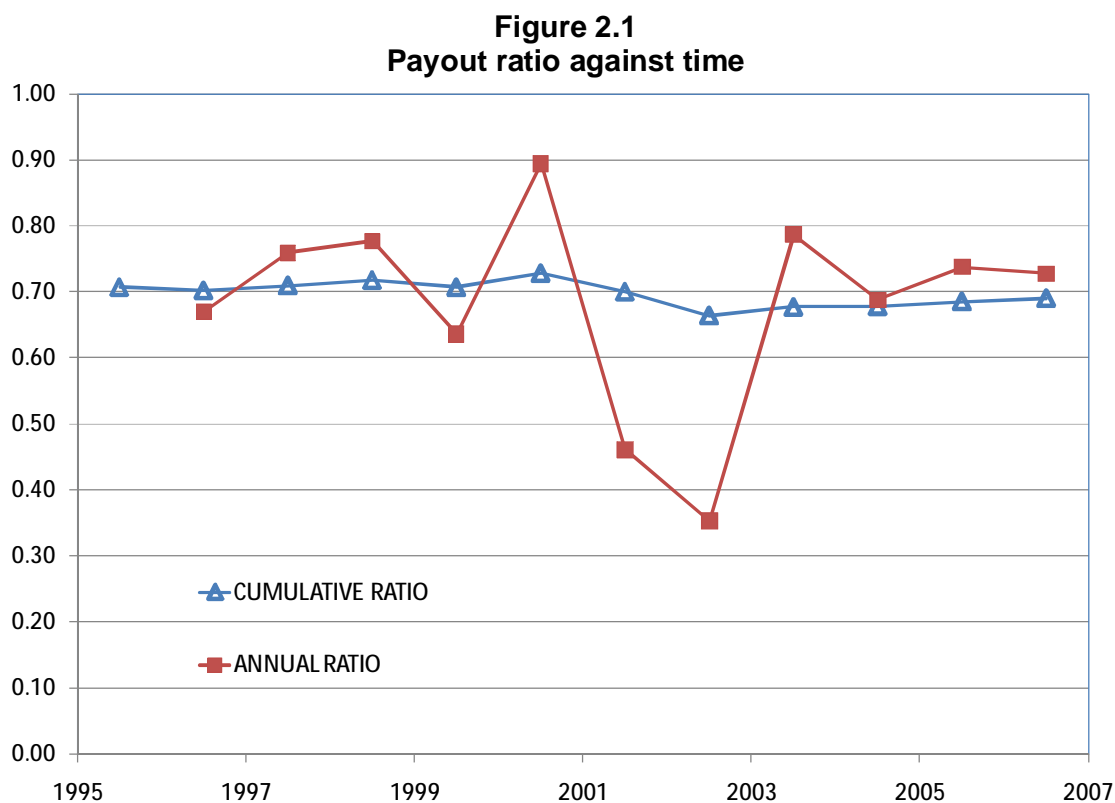
[31] Handley, J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 36.

Hathaway and Officer, *The Value of Imputation Tax Credits*, Working Paper, 2 November 2004, page 11.

McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 26.

NERA, Payout Ratio of Regulated Firms, 5 January 2010, page 7.

Strategic Finance Group, *Response to the AER Draft Determination in relation to gamma, A report prepared for ETSA Utilities*, 13 January 2010, page 20.

[32] NERA, Payout Ratio of Regulated Firms, 5 January 2010, page 6.

While there is no disagreement about the behaviour of these two ratios, there is disagreement as to the inferences that can be drawn from them. Hathaway and Officer, Officer, SFG and we in our report to the AER's WACC review suggest that the evidence is consistent with the idea that firms routinely distribute only 70 per cent of imputation credits and retain the other 30 per cent indefinitely.[33] Credits retained indefinitely are essentially worthless because, unlike retained earnings, retained credits cannot be reinvested.[34]

On the other hand, the AER argues that undistributed credits are not worthless but may be worth almost as much as distributed credits. Thus they argue that it makes sense to assume that the payout ratio is not the 70 per cent one observes but is instead 100 per cent.[35]

McKenzie and Partington do not commit themselves on whether the AER's view is correct. They state:[36]

> 'The AER makes the assumption that there is a 100 percent payout of imputation credits. Taken literally, this is clearly incorrect. However, we view the 100 percent payout assumption as simply a convenient step designed to allow for the value of undistributed franking credits when computing gamma. It is equivalent to saying that undistributed franking credits have the same value as distributed franking credits. In principle, this is likely to overstate the value of the undistributed credits, but it is not clear by how much. Under the assumptions for the distribution of credits that the AER makes, the AER argues that the overstatement is not material.
>
> Whether the AER's distribution assumptions are valid and whether the valuation effect is material is an open question, since the average period that credits remain undistributed is not known and neither is the discount rate that applies to them.'

Thus McKenzie and Partington note that the AER's view is that undistributed credits are not worthless but are instead worth almost as much as a distributed credit. They do not, though, commit themselves on whether the assumption of a 100 per cent payout ratio materially overstates the value of undistributed credits.

For the AER's argument that undistributed credits are not worthless to be correct, at a bare minimum, undistributed credits must eventually be distributed. However, Figure 2.1 shows

---

[33] Hathaway and Officer, *The Value of Imputation Tax Credits*, Working Paper, 2 November 2004, page 11.

NERA, Payout Ratio of Regulated Firms, 5 January 2010, page 7.

Officer, R., *Estimating the Distribution Rate of Imputation Tax Credits: Questions Raised by ETSA's Advisers*, 23 June 2009, page 4.

Strategic Finance Group, *Response to the AER Draft Determination in relation to gamma: A report prepared for ETSA Utilities*, 13 January 2010, page 20.

[34] The value of a dollar to be paid out infinitely far into the future is essentially worthless. To see this, suppose that the interest rate is 10 per cent per annum. Then the value of a dollar to be paid out one year from now will be 91 cents, five years from now will be 62 cents, 25 years from now will be 9 cents and 100 years from now will be one 100th of a cent. It is straightforward to show that the value of a dollar to be paid out indefinitely far into the future will be, to all intents and purposes, zero.

[35] AER, *Queensland distribution determination 2010–11 to 2014–15*, May 2010, page 200.

[36] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 26.

provides no evidence that on aggregate firms distribute retained credits. As McKenzie and Partington note:[37]

> 'the taxation statistics show that the tendency has been for the total of franking account balances to rise through time. This reflects the growth in total credits created as company tax payments grow. In order to distribute the accumulated credits companies will have to grow the distribution rate faster than the creation rate. Only time will tell whether this can be achieved.'

In other words, McKenzie and Partington do not see from the ATO statistics any sign that firms on aggregate are distributing undistributed credits.[38] As seen in Figure 2.1, there is no evidence that the distribution rate is increasing faster than the creation rate, so allowing retained credits to be distributed. In fact the ATO statistics show that the payout ratio has always been less than 100 per cent and has been relatively stable around the long term average of 70 per cent. Thus we support McKenzie and Partington's conclusion that:[39]

> 'In short, assuming a payout ratio of 100 percent is likely to overstate the value of undistributed franking credits.'

It follows from this statement that the AER's policy of assuming that all credits are distributed will also overstate gamma. To ensure that they have covered every eventuality, however, McKenzie and Partington go on to state:[40]

> 'If, however, gamma is to be computed as the product of the payout rate and theta, then it is necessary to use a payout ratio which is greater than the actual payout ratio of about 70% in order to allow for some value in undistributed credits. An appropriate value for the payout therefore lies between 70% and 100%.'

Thus McKenzie and Partington provide no guide as to how close to or far away from 70 per cent the payout ratio should be. Thus *little* can be gleaned from their analysis about how to set the payout ratio. Further, we point out in Section 3.2 that even if all credits are eventually distributed, the proposition that the observed payout ratio of 70 per cent must represent a lower bound on the effective payout ratio need not be correct.

2.3. Theta

The AER computes an estimate of theta by taking a simple average of two estimates of the value of imputation credits distributed. One of these estimates is drawn from a study by

---

[37] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 27.

[38] Besides assuming that all credits will eventually be distributed, McKenzie and Partington note on page 26 of their report that:

'The AER chose not to discount the value of the undistributed credits as a simplifying assumption. We understand that this particular assumption is balanced by other aspects of the determination where not discounting for the time value of money favours the DNSPs.'

We do not believe that accurate estimates of the cost of equity will in general be achieved by underestimating some parameters and overestimating other parameters. This is because determining whether underestimating one parameter is precisely balanced by overestimating another parameter may be a complicated task.

[39] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 27.

[40] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 27.

Handley and Maheswaran (2008) that is in part based on tax statistics and one is drawn from an ex-dividend day study conducted by Beggs and Skeels (2006).[41]

2.3.1. Tax studies

Handley and Maheswaran (2008) report that from 1990 through 2000, 67 per cent of imputation credits distributed are redeemed while from 2001 through 2004, 81 per cent are redeemed.[42,43] The AER uses a simple average of these two rates, 74 per cent, as the best estimate of gamma provided by a tax study.[44]

In our response to the AER's draft decision on its WACC review we strongly criticised the use of redemption rates to measure the market value of distributed imputation credits.[45] We argued that redemption rates will overestimate the value of theta because they do not take into account the impact that foreign investors have on value and because the rates do not take into account the costs to investors of accessing credits. SFG were also highly critical of the use of redemption rates to estimate theta.[46]

Given the controversial nature of the use of tax statistics by the AER, it would have been helpful for McKenzie and Partington to have expressed their opinion on the use of these statistics. However, McKenzie and Partington have *little* to say despite the fact that they state that:[47]

> 'our instructions were to undertake an analysis of the estimation of gamma from dividend drop-off studies *and* an analysis of the arguments presented by the AER and those raised in [a large number of] submissions,'
>
> [emphasis added is ours]

Their only remarks on the use of redemption rates to estimate theta are:[48]

> 'Taxation studies present results that apply across a broad sweep of investors, but they are subject to measurement problems (this has proven to be less of an issue since the introduction of the simplified tax system). Furthermore, the link between taxation statistics and the market

---

[41] Handley J. and Maheswaran K., *A Measure of the Efficacy of the Australian Imputation Tax System*, The Economic Record, Vol 84 No 264, March 2008, pages 82-94.

Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

[42] Handley J. and Maheswaran K., A Measure of the Efficacy of the Australian Imputation Tax System, The Economic Record, Vol 84 No 264, March 2008, page 90.

[43] In arriving at these figures, Handley and Maheswaran make a number of assumptions. For example, they assume that from 2001 through 2004 domestic residents do not leave any imputation credits unused. So the estimates that they produce are not entirely based on tax statistics.

[44] AER, *Queensland distribution determination 2010–11 to 2014–15*, May 2010, page 224.

[45] NERA, *AER's Proposed WACC Statement – Gamma*, 30 January 2009, pages 16-17.

[46] Strategic Finance Group, *Using redemption rates to estimate theta: Response to AER proposed revision of WACC parameters*, 1 February 2009, pages 2-3.

[47] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 6.

[48] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 9.

value of imputation credits remains indirect. Therefore, neither type of study is likely to provide an accurate and definitive estimate of gamma on its own.'

In our opinion it is disappointing that two of the AER's three consultants can only write three sentences about the appropriateness of using the redemption rate even though:

§   one half of the AER's estimate of theta is the rate at which credits are redeemed; and

§   the use of the redemption rate as a measure of theta was criticised in a number of submissions to the AER.

Given the importance of the redemption rate and the controversy surrounding its use, it is surprising that McKenzie and Partington did not undertake any analysis (apart from the three sentences above) of the appropriateness of using the rate to estimate a value for theta.

In our opinion, the absence of any analysis of the use of the redemption rate by McKenzie and Partington means that the AER has had no independent advice on the appropriate weight that should be given to the rate in estimating theta and so, also, gamma.

2.3.2. Ex-dividend day studies

The bulk of the report that McKenzie and Partington provide concerns ex-dividend day studies in general rather than the studies of SFG or Beggs and Skeels (2006) in particular.[49] Thus the analysis undertaken by McKenzie and Partington provides little guidance on the merits of the AER using only the Beggs and Skeels study to derive one half of its estimate of theta. However, we note that the AER's dismissal of the SFG study contradicts the advice provided by McKenzie and Partington that, where multiple studies of the same type are available, it is preferable to consider the results across all of the studies.[50] Notwithstanding the above point, some of the comments that McKenzie and Partington make about the work of SFG and Beggs and Skeels are inaccurate.

McKenzie and Partington correctly note that estimates of theta delivered by ex-dividend day studies may reflect the impact of dividend arbitrage traders as well as the impact of long-term traders.[51] Long-term traders may be discouraged from trading around the ex-dividend day by the transaction costs that they face. Estimates that better reflect the impact of long-term traders may be provided by the imputation equivalents of dividend-yield studies but few such studies exist. A dividend-yield study examines the relation between returns, measured over periods not limited to ex-dividend days, and dividend yields, controlling for risk.

A major criticism of ex-dividend day studies made by McKenzie and Partington is that they tend to suffer from multicollinearity.[52] If the sample of firms is limited to those whose dividends are fully franked, multicollinearity will certainly be a problem. The studies that SFG and Beggs and Skeels execute, though, use firms that issue unfranked dividends, firms

---

[49]   Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

[50]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 9.

[51]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 24.

[52]   Multicollinearity occurs when one regressor is an almost linear function of another regressor.

that issue partially franked dividends and firms that issue fully franked dividends.[53] Thus it is far from clear that multicollinearity is a problem for these studies.

McKenzie and Partington, for example state that:[54]

> 'Beggs and Skeels (2006) argue that the presence of observations at different company tax rates and dividends with less than 100% franking could mitigate the colinearity problem. That is to say, if we add in to the sample a mix of tax rate changes and unfranked and partially franked dividends, the singularity problem is overcome to the extent that the equations will estimate. This is true as across the full SFG sample of 5,646 observations, the correlation between the cash dividend and the estimated franking credit is 0.23. Where the 0.03% size filter is employed, the correlation across the 3,201 observations is 0.70.'

A correlation between the two regressors in a multiple regression of only 0.70 would typically not be viewed as likely to give rise to a problem, especially with such a very large sample.

As Skeels (2009) points out, a sign that multicollinearity is a problem is that the standard errors attached to estimates are large. For example, he states that:[55]

> 'In multiple regression models, such as those under discussion, multicollinearity is a problem whereby the individual effects of each of the explanatory variables can be difficult to distinguish from each other even though we observe that, collectively, the explanatory variables do a reasonable job of explaining variability in the dependent variable.'

Large standard errors complicate inference because with large standard errors it can be difficult to reject hypotheses. A glance at the most recent results that SFG provide, that Skeels endorses, suggests that the standard errors attached to the estimates that they produce are relatively small. Using data from 1 July 2000 through 31 December 2006, SFG estimate the value of theta to be 0.24 with a standard error of 0.08.[56] This standard error is sufficiently small that one can reject the hypothesis that theta is zero at conventional levels. One can also reject the hypothesis that theta is 0.65. Thus the standard error attached to the estimate of theta that SFG produce is sufficiently small that meaningful conclusions can be drawn when testing hypotheses. This indicates that multicollinearity is *not* a problem with the most recent SFG empirical work. Skeels, commenting on essentially similar but earlier results produced by SFG, reaches the same conclusion. He states that:[57]

> 'in my opinion multicollinearity is not problematic in the SFG study.'

---

[53]   Strategic Finance Group, *Further analysis in response to AER draft determination in relation to gamma*, 4 February 2010.

   Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

[54]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 44.

[55]   Skeels, C., *A review of the SFG dividend drop-off study*, 28 Aug. 2009, page 18.

[56]   Strategic Finance Group, *Further analysis in response to AER draft determination in relation to gamma*, 4 February 2010.

[57]   Skeels, C., *A review of the SFG dividend drop-off study*, 28 Aug. 2009, page 19.

It is not clear, however, how closely McKenzie and Partington have reviewed the work of SFG and Beggs and Skeels because they state that:

> 'These symptoms of multicol[l]inearity are exactly what we see in the data as the standard errors of the estimated coefficients are quite large and moreover, the estimates for the franking credit are typically statistically insignificant. This is not obvious from reading the SFG and Beggs and Skeels (2006) results however, as in either study the t-statistics are not given and significant coefficients are not highlighted in the usual way.'

Both SFG and Beggs and Skeels report enough information to compute test statistics and assess significance and Beggs and Skeels highlight significant coefficients. In Table 3 of Beggs and Skeels' paper, for example, they report the results of tests of the hypothesis that theta is zero conducted at the one and five per cent levels of significance.[58] We have already pointed out that the standard error attached to SFG's estimate of theta is small and their estimate of theta, while also small, is nevertheless statistically significant. Thus McKenzie and Partington have not taken into account the information available in drawing out their conclusions.

As McKenzie and Partington point out, SFG also provide a joint confidence interval for theta and the value of a one-dollar dividend.[59] We reproduce this figure as Figure 2.2 below. The figure appears to show that the estimates that Beggs and Skeels and that SFG produce using a longer time series are both consistent with the SFG data. However, the figure is puzzling because it appears to suggest that the standard errors attached to the estimates of theta and the value of a one-dollar dividend are larger than both Beggs and Skeels and SFG report.

A sign that multicollinearity is a problem is that two regressors are jointly significant but individually are not significant. The figure together with the tabulated results of Beggs and Skeels and SFG appear to suggest that the two regressors are individually significant but are not jointly significant. In other words, the results appear to suggest that one can easily reject individual hypotheses about theta and the value of a one-dollar dividend but that one cannot easily reject joint hypotheses about the parameters. We find this result puzzling and suggest that further examination of this issue is appropriate.

---

[58]   Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, page 246.

[59]   McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 46.

Strategic Finance Group, *Response to AER Draft Determination in relation to gamma: Report prepared for ETSA Utilities*, 13 January 2010, page 7.

Figure 2.2
Joint confidence interval
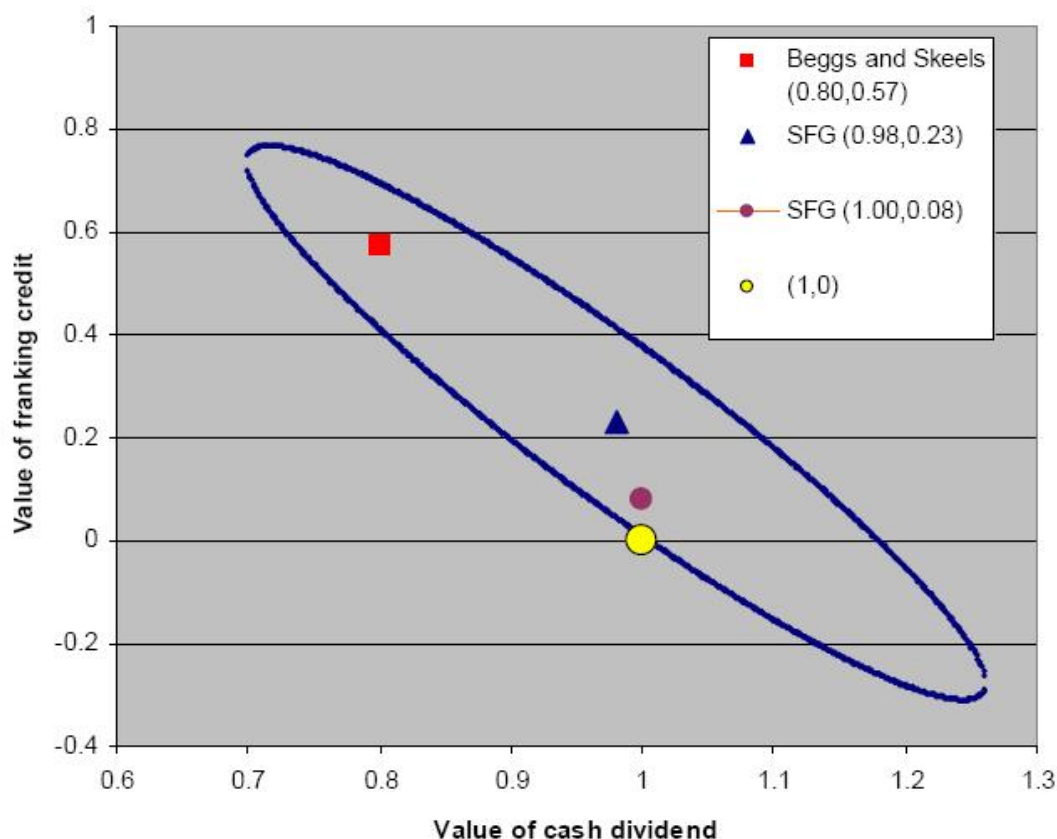
For its part, the AER, has taken the advice that McKenzie and Partington have provided and have stated that:[60]

> 'McKenzie and Partington noted that SFG's estimates are likely to be affected by multicollinearity as well as other data and methodological issues, which suggests that SFG's theta estimate of 0.23 is unreliable.'

As a result, the AER has discarded an estimate of theta provided by SFG that has been computed from the most recent and comprehensive study of the behaviour of Australian stock prices around ex-dividend days. Instead, they have decided to rely on an older study by Beggs and Skeels (2006) that uses less data, but that in every other respect is executed in a manner similar to the study that SFG have provided.[61] This response is unusual in light of the almost uniform advice by econometricians that, to combat the effects of multicollinearity,

---

[60] AER, *Queensland distribution determination 2010-11 to 2014-15: Final Decision*, May 2010, page 223.

[61] Not surprisingly, because Beggs and Skeels use less data, they provide an estimate that has attached to it a marginally larger standard error than the standard error attached to the estimate that SFG provide. The estimate (standard error) that Beggs and Skeels report is 0.57 (0.12) while the estimate (standard error) that SFG report is 0.23 (0.11)

one should use more data. Davidson and McKinnon (1993), for example, state that in dealing with multicollinearity:[62]

> 'There are basically two options: Get more data, or estimate a less demanding model, perhaps the original one after some restriction has been imposed on it.'

2.3.3. Consistency

The AER uses Officer's CAPM to estimate the cost of equity.[63] This model assumes that one dollar of dividends distributed is valued by the market at one dollar but a one-dollar imputation credit can take on any value.

Beggs and Skeels (2006) estimate the value of a one dollar dividend to be 80 cents and the value of one dollar of imputation credits to be 57 cents.[64] Conditional on a one-dollar dividend being worth one dollar, on the other hand, they estimate the value of one dollar of imputation credits to be worth an amount insignificantly different from zero. SFG argues that if the AER is to use a model that assumes that dividends are fully valued, then that restriction should be imposed in ex-dividend day studies.[65]

McKenzie and Partington argue, though, that an estimate of 80 cents for a dollar of dividends is similar to estimates produced by US dividend-yield studies, although they note that in general the estimates from these studies do not differ significantly from one dollar at conventional levels.[66] If one truly believes that the market places a value on a dollar of dividends of only 80 cents then this should be reflected in the cost of equity one computes. In other words, the cost of equity should be first lowered to reflect the benefit from imputation credits and then raised to reflect the cost imposed by taxes levied on dividends. The net result of making the two adjustments, though, will be for each to wash out. Thus one might as well assume that the value of theta is zero.

If the AER were to use the most recent and comprehensive results, that SFG produce and that Skeels endorses, these consistency problems would vanish. This is because SFG cannot reject the hypothesis that a one-dollar dividend is fully valued. SFG estimate that a one-dollar dividend is worth 98 cents.[67] The standard error attached to this estimate is 3 cents. Thus they are unable to reject the hypothesis that a one-dollar dividend is worth one dollar. So there is no need to impose the restriction that dividends are fully valued.

---

[62] Davidson, R. and J. McKinnon, Estimation and inference in econometrics, Oxford University Press, 1993, page 185.

[63] AER, *Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters: Final Decision*, May 2009, page 410.

[64] Beggs, D. J. and Skeels, C.L., *Market arbitrage of cash dividends and franking credits*, Economic Record, 2006, pages 239-252.

[65] Strategic Finance Group, *The consistency of estimates of the value of cash dividends: A report for ENA, APIA and Grid Australia*, 1 February 2009, page 2.

[66] McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, pages 29-31.

[67] Strategic Finance Group, *Further analysis in response to AER draft determination in relation to gamma*, 4 February 2010.

3.   Handley

In this section we discuss the contents of a report written by Handley entitled *On the estimation of gamma* that was delivered to the AER on 19 March 2010. In the report Handley provides the following information about his terms of reference.[68]

> 'Pursuant to the National Electricity Rules, the Australian Energy Regulator (AER) is currently in the process of making: (i) distribution determinations for the Queensland and South Australian electricity distribution network service providers1 for 2010 – 2015; and (ii) distribution determinations for the Victorian electricity distribution network service providers for 2011 – 2015. Pursuant to the National Gas Rules, the AER is also currently in the process of making access arrangement decisions for the New South Wales and Australian Capital Territory gas distribution network providers for 2010 – 2015.
>
> A number of issues have arisen in the various regulatory proposals, access arrangement proposals and supporting submissions in relation to the valuation of imputation credits (or equivalently, in relation to the estimation of gamma). These issues form part of the debate between the AER and the various network service providers that has been ongoing since the AER undertook its review of the weighted average cost of capital (WACC) parameters in 2008 and 2009. It is in this regard that the AER has now sought further advice. In response, this report provides comment on the following matters:
>
> • Market Practice
>
> • Conceptual Issues
>
> • Inferring Theta from Market Prices
>
> • Use of Tax Statistics
>
> • Consistency Issues
>
> • Assumed Payout Ratio
>
> • Miscellaneous'

We divide our discussion of Handley's report into three parts. First, we examine Handley's conclusions about what one can infer about the value of theta from the behaviour of market practitioners. As we have previously noted, Truong, Partington and Peat (2008) find from a survey they conduct that market practice is typically to ignore imputation credits.[69] Handley argues that this does not indicate that they believe gamma is zero. He argues that one can value projects without making an explicit assumption about the value that the market places on credits. We show that there is a flaw in this argument and that to correctly value projects, one must make an assumption about the value of credits.

Second, Handley argues, like McKenzie and Partington, that the payout ratio computed from ATO data represents a lower bound on the effective payout ratio, the sum of the values of credits distributed immediately and credits not distributed immediately. We show that this argument may not be correct but that, depending on the period of retention, the effective payout ratio may be less than the observed payout ratio.

---

[68]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 2.

[69]   Truong, G., G. Partington and M. Peat, *Cost of capital estimation and capital budgeting practice in Australia*, Australian Journal of Management, 2008, pages 95-122.

Third, Handley argues that the rate at which imputation credits are redeemed can provide an upper bound on theta. We point out that an upper bound for a parameter may differ markedly from the parameter itself. Handley also criticizes an argument made by SFG.[70] While we find some merit to Handley's critique, we believe that SFG's argument is essentially correct. However, to demonstrate this would require more work and time. Finally, we note again that the issue concerning the use of a consistent value for a one-dollar dividend would be irrelevant were the AER to use the most recent and comprehensive results, which SFG produces and Skeels endorses.[71]

3.1. Market practice

We have already noted that it is standard market practice to ignore imputation credits in project analysis and valuations. SFG interpret this evidence as evidence that market practitioners view the market value of credits as being approximately zero.[72] Handley, on the other hand, disagrees. He states that:[73]

> 'There is another possible explanation for this market practice – (at least some) – Australian firms and independent expert valuation practitioners recognise, under the conventional approach to valuation, there is no explicit recognition of the value of imputation credits in either the cash flows or in the discount rate, and this approach remains valid under the imputation tax system (subject to certain implicit assumptions). In other words, imputation credits are not assumed to have zero value but rather they are simply not explicitly taken into account in either the cash flows or in the discount rate.'

> 'SFG states that if gamma is assumed to have a positive value then an adjustment must be made to the WACC or to the cash flows and therefore, there is no valuation methodology in existence which allows franking credits to have a positive value but which avoids the need to estimate what that value is. I will now show that this view is incorrect by reference to the Officer (1994) framework.'

In what follows, we will show that Handley's view is incorrect. In our submission to the AER's WACC Review, we emphasise that:[74]

> 'As Professor Jonathan Berk of the University of California at Berkeley and Professor Peter DeMarzo of Stanford University make clear in their corporate finance text:

> 'the WACC method does not change in the presence of investor taxes.'

> [The emphasis is theirs]

---

[70] Strategic Finance Group, *Responses to the AER Draft Determination in relation to gamma: Report prepared for ETSA Utilities*, January 2010, pages 19-20.

[71] Strategic Finance Group, *Responses to the AER Draft Determination in relation to gamma: Report prepared for ETSA Utilities*, January 2010, page 18.

Skeels C., *A review of the SFG Dividend Drop-Off Study: A Report prepared for Gilbert + Tobin*, August 2009, page 5.

[72] Strategic Finance Group, Gamma: Further Evidence to Support Departure from the AER's Statement of Regulatory Intent: Report for Energex and Ergon, December 2009, page 43.

[73] Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 4.

[74] NERA, *The Value of Imputation Credits: A report for the ENA, Grid Australia and APIA*, 11 September 2008, pages 3 to 4.

> Personal taxes affect the return the market requires on equity and debt, but do not affect a firm's WACC, conventionally defined, for use in discounting cash flows, also conventionally defined, in any other way. If personal taxes on dividends are high, the market will require that the return to equity that pays dividends be high. If personal taxes on interest are high, the market will require that the return to holding debt be high. If franking credits can be used to reduce personal taxes, the market may accept a lower return to equity that delivers credits. So taxes at the personal level will affect a company's WACC *indirectly*. Taxes at the personal level, though, will not affect a company's WACC *directly*. As Berk and DeMarzo (2007) emphasize, in the conventional WACC formula:
>
> 'the equity and debt cost of capital in the market already reflects the effects of investor taxes.'
>
> [Again, Berk and DeMarzo provide the emphasis]'

Thus Officer's modified WACC framework can be replaced, at least in a perpetual world, by the standard WACC framework that one would use in a classical tax system.[75] The presence of an imputation system does not require one use a different WACC *formula*. If the market places a value on imputation credits, though, the required return on equity will be lower than it would otherwise be and so the WACC will take on a lower *value*. Finding out by how much the cost of equity should fall requires one place a value on imputation credits.

Handley, on the other hand, asserts that:[76]

> 'the value of the firm is equal to the capitalised value of the conventionally measured cash flow (i.e. excluding the value of imputation credits) using a conventionally measured WACC (i.e. excluding the value of imputation credits). Importantly, this is not some "special alternative approach", as SFG would otherwise suggest, but rather is simply the standard conventional approach to valuation, commonly used by practitioners and which involves no explicit recognition of the value of imputation credits in either the cash flows or in the discount rate.'
>
> 'To implement this approach, the conventional measure of the cost of equity ... may be estimated using the Sharpe CAPM in the normal way i.e. using returns based on dividends and capital gains only (and so does not require an estimation of gamma).'

The last sentence is *wrong* because if the market places a value on imputation credits, the Sharpe-Lintner CAPM in its original form will not hold.[77] The original Sharpe-Lintner version of the CAPM assumes that investors face no taxes and receive no credits. Instead, if the usual auxiliary assumptions are true, Officer's version of the CAPM will hold. In Officer's version of the CAPM, investors face the same rate of taxes on capital gains and dividends and receive imputation credits.[78] Officer's CAPM can be used – if the usual auxiliary assumptions are correct – to provide an estimate of the conventional measure of the

---

[75]   Officer, Robert R., *The cost of capital of a company under an imputation tax system*, Accounting and Finance, 1994, page 8.

[76]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 9.

[77]   Sharpe, William F., *Capital asset prices: A theory of market equilibrium under conditions of risk*, Journal of Finance 19, 1964, pages 425-442.

      Lintner, John, *The valuation of risk assets and the selection of risky investments in stock portfolios and capital budgets*, Review of Economics and Statistics 47, 1965, pages 13-37.

[78]   Officer, Robert R., *The cost of capital of a company under an imputation tax system*, Accounting and Finance, 1994, pages 8-10.

cost of equity. Using Officer's CAPM, though, requires one place a value on imputation credits. Thus, as SFG *correctly* assert, evidence that most market participants do not adjust in any way for the value placed on imputation credits strongly suggests that they view the value of credits as being negligible.[79]

3.2. Payout ratio

In its WACC review, the AER recognises that, because of the time value of money, the value of an imputation credit that is not distributed immediately will be less than the value of a credit that is distributed immediately.[80] To investigate the impact of not distributing credits immediately, the AER examines a policy of distributing 71 per cent of imputation credits immediately and distributing the remaining 29 per cent either one or five years later. If firms follow such a policy, the AER argues that the effective payout ratio, the sum of the values of the 71 per cent distributed immediately and the 29 per cent not distributed immediately, will not be materially different from 100 per cent.

The data presented in Figure 2.1 appears to suggest that a policy in which individual firms distribute all credits eventually is inconsistent with the data provided by the ATO. There is no evidence that the payout ratio is rising through time and the payout ratio has always been well below 100 per cent. However, since the amount of credits created each year is rising it is possible for the aggregate payout ratio to be well below 100 per cent and to be approximately constant through time but for firms to simultaneously follow a policy of distributing all credits, albeit not immediately.

In our 2010 report for ETSA we show that the ATO data is not consistent with the proposition that 71 per cent of credits are distributed immediately and the retained credits are distributed after either one or five years.[81] We find, that the data is not consistent with any policy where undistributed credits are retained for no more than one year. On the other hand, the data is consistent with firms following a policy of distributing 17 per cent of credits immediately and the remaining 83 per cent after five years. The effective payout ratio for such a policy computed using the cost of equity that the AER provides in its WACC review is 66 per cent, a number less than the 68 per cent observed payout ratio from the raw ATO data. Again, we define the effective payout ratio to be the sum of the values of the credits distributed immediately and those not distributed immediately.

Handley, like McKenzie and Partington, accepts that the payout ratio that one observes on aggregate across firms is less than 100 per cent. He states that:[82]

> 'The suggested actual payout ratio of 70% based on ATO is also not in dispute.'

---

[79]   Strategic Finance Group, Gamma: Further Evidence to Support Departure from the AER's Statement of Regulatory Intent: Report for Energex and Ergon, December 2009, page 8.

[80]   AER, *Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters: Final Decision*, May 2009, pages 415-416.

[81]   NERA, Payout Ratio of Regulated Firms, 5 January 2010, page 6.

[82]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 36.

However, he argues that undistributed credits should be given a positive value. For example, he states:[83]

> 'the evidence ... does not suggest that a reasonable estimate of the value of a retained credit is 0.'

For this reason, he argues that the effective payout ratio must lie between 70 and 100 per cent. For example, he states that:[84]

> 'This suggests that if one adopts the (estimated) market average payout ratio of around 0.7, then the value of gamma, as a proportion of the value of a distributed imputation credit q, is within the range $0.7q \leq \gamma \leq q$. Where exactly gamma falls within this range depends on the time value loss associated with retention of imputation credits, which in turn depends on the appropriate discount rate and the expected retention period. In my opinion, the estimation of these parameters is subject to much uncertainty.'

We show above, that the proposition that the observed payout ratio from the ATO represents a lower bound on the effective payout ratio is not necessarily correct. One possible interpretation of the ATO data is that 17 percent of credits are immediately distributed and the remaining 83 per cent are retained for five years. If this were true, the effective payout ratio would be 66 percent which is less than the observed payout ratio we observe using the raw ATO data of 68 per cent. Thus the proposition that both McKenzie and Partington and Handley make that the effective payout ratio must lie between 70 and 100 per cent is *unproven*.[85] The effective payout ratio may be less than 70 per cent.

Again, in our submission on behalf of ETSA we examined two alternative payout policies that the AER had proposed. We found that a one-year policy is not consistent with the ATO data. This is important because Handley asserts that:[86]

> 'the valuation of a retained credit (relative to the value of a distributed credit) is more akin to an assumption rather than an estimate since both the appropriate discount rate and the expected retention period can in essence only be assumed.'

The fact that there is no policy whereby undistributed credits can be retained only for one year that is consistent with the ATO data demonstrates that Handley's assertion is *incorrect*. In other words, one can use the ATO data to rule out certain policies – one need not just assume that firms follow a particular retention policy.

For a five-year policy to be consistent with the data the vast majority of credits would have to remain undistributed for five years. The impact of the credits remaining undistributed for five years would be to reduce their value substantially and to render the effective payout ratio little different from the payout ratio computed from the raw ATO data. There are other policies that one might consider and with sufficient time we would have done so. Such a course would have enabled the range over which the effective payout ratio might lie to be

---

[83]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 37.

[84]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 33.

[85]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 38.

       McKenzie, M., and G. Partington, *Report to AER: Evidence and submissions on gamma*, 25 March 2010, page 27.

[86]   Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 37.

narrowed, thereby improving the regulatory outcome relative to relying on a range of between 70 and 100 per cent and assuming a value at the top of this range.

3.3. Theta

3.3.1. Tax studies

In Section 2.3.1 we explain that the value of a dollar of credits distributed will be a complicated average of the redemption rates of all market participants. Handley agrees. He states that:[87]

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

He goes on to say about the average rate at which investors redeem imputation credits that:[88]

> '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, this may be interpreted as a reasonable upper bound estimate of the value of [theta].'

Since the aggregate wealth of foreign investors is an order of magnitude greater than the aggregate wealth of Australian investors, this statement is almost surely true. In other words, we agree that the average rate at which investors redeem imputation credits is an upper bound on the value of theta. An upper bound for a parameter, though, can differ substantially from the parameter itself.

In our response to the draft decision on its WACC review we provided to the AER a fully worked out numerical example of an open economy in which an imputation system operates.[89] In that example the rate at which investors redeemed credits was one but theta was only 0.045, ie, less than one 20th of the value of the upper bound provided by redemption rates. Thus the rate at which imputation credits are redeemed can provide a very misleading guide as to the value of credits distributed.

SFG have used two different arguments to make essentially the same point – that redemption rates can provide a misleading guide as to the value of theta.[90] Given time constraints we have focused on what we consider to be the most important argument, ie:[91]

> 'One of the pillars of the AER's conclusion that redemption rates are relevant to the estimation of theta is the contention that the forcible removal of foreign equity from the Australian market may have no impact on the cost of equity of Australian firms.'

---

[87] Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 14.

[88] Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 15.

[89] NERA, *AER's Proposed WACC Statement – Gamma: A Report for the Joint Industry Associations*, January 2009, pages 27-29.

[90] Strategic Finance Group, Gamma: Further Evidence to Support Departure from the AER's Statement of Regulatory Intent: Report for Energex and Ergon, December 2009, page 35.

[91] SFG, *Gamma: Further Evidence to Support departure from the AER's Statement of Regulatory Intent: A report for Energex and Ergon Energy*, 7 December 2009, page 31.

'In our counterfactual example we considered what would happen to the estimate of gamma (and consequently the firm's cost of capital) if a law were passed that forcibly reduced the amount of foreign investment allowed in Australia. We noted that simple average redemption rates must increase in this case (since a greater proportion of franking credits must go to resident investors). If simple average redemption rates were used as the basis for estimation, the estimate of theta would increase, the estimated cost of capital would fall, and the estimated value of the firm would rise. We concluded that such an outcome is illogical.'

Handley's response to this argument is that:[92]

'There are serious problems with the SFG view. First, SFG have not presented the issue within an appropriate framework. Indeed, a proper consideration of the impact of a change in the investor mix (and in particular, a decrease in the proportion of foreign investors) on the cost of capital of Australian firms requires a complete examination of the impact on both asset demand and asset prices within a formal equilibrium framework. In other words, if you change the set of investors then you change the setup for the model and so you will likely change the resulting equilibrium – including not only a possible change in the equilibrium value of imputation credits (gamma) but also a possible change in the equilibrium value of the cash flows (dividends and capital gains) generated by the firms. Such an important question cannot be answered simply by reference to equation (10) from the Officer (1994) framework which, for a given value of gamma shows nothing more than a decomposition of the total grossed-up equity return into the amount due to credits and the amount due to dividends and capital gains. This is the reasoning behind the AER's position – in short, it is a much more complicated issue than SFG otherwise suggests.'

In our opinion, Handley is correct in arguing that the imposition of a partial ban on foreign investment would in all probability change the cost of equity exclusive of imputation credits. It would almost surely raise the cost of equity measured in this way. On the other hand, we also believe that the rate at which credits are redeemed provides a misleading guide as to their value.

It should be straightforward to provide a numerical example where imposing a partial ban on foreign investment will lead to an apparent fall in the cost of equity when measured using redemption rates as a guide to the value of credits. In other words, since the rate at which credits are redeemed can differ so markedly from theta, we believe that it is likely that, given more time, we could construct support for SFG's contention that the forcible removal of foreign investment could lead to a fall in the AER's measure of the cost of equity. A fall in the cost of equity following a forcible removal of foreign investment would, of course, as SFG point out, make little sense.

3.3.2. Consistency

Unlike McKenzie and Partington, Handley argues that the results of US dividend-yield studies show that there is no relation between returns and dividend yields.[93] In other words, Handley interprets the results as providing support for the idea that dividends are fully valued. Thus he interprets the results as providing support for the exclusion of taxes on dividends from Officer's CAPM.

---

[92] Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 20.

[93] Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, page 24.

On the other hand, Handley argues that the results of ex-dividend day studies in Australia and the US indicate that the value of a one-dollar dividend is less than one dollar.[94] He therefore argues that estimates of theta produced by ex-dividend day studies must rely on the value of a one-dollar dividend being set at less than one dollar. However, he also argues that estimates of the value of a one-dollar dividend produced from ex-dividend day studies are not relevant for setting the cost of equity. This is because he views the results of dividend-yield studies as suggesting that dividends are fully valued.

Many ex-dividend day studies conducted on Australian data do find that a one-dollar dividend is valued at less than one dollar. However, the most recent and comprehensive study, that SFG conduct using data from 1 July 2000 through 31 December 2006 and that Skeels endorses, cannot reject the hypothesis that a one-dollar dividend is fully valued.[95] Thus if the AER were to use the most recent and comprehensive set of results, arguments over the value of dividends implied by ex-dividend days and over issues of consistency would be largely irrelevant.

---

[94] Handley J., *Report prepared for the AER on the estimation of gamma*, 19 March 2010, pages 25-26.

[95] Strategic Finance Group, *Responses to the AER Draft Determination in relation to gamma: Report prepared for ETSA Utilities*, January 2010, pages 19-20.

   Skeels C., *A review of the SFG Dividend Drop-Off Study: A Report prepared for Gilbert + Tobin*, August 2009, page 5.

Appendix A. Terms of Reference

A.1. Background

Jemena Gas Networks (**JGN**) is the major gas distribution service provider in New South Wales (NSW). JGN owns 24,000 kilometres of natural gas distribution system, delivering approximately 100 petajoules of natural gas to over one million homes, businesses and large industrial consumers across NSW. Jemena Asset Management (**JAM**) undertakes the majority of JGN's operating, maintenance, and capital works activity.

The relevant provisions relating to the economic regulation of natural gas distribution networks in NSW are set out in the National Gas Law and National Gas Rules, which are available at http://www.aemc.gov.au/Gas/National-Gas-Rules/Current-Rules.html .

JGN is currently engaged with the Australian Energy Regulator (**AER**) in the AER's review of its Access Arrangement (**AA**). JGN submitted its original revisions to the AA in August 2009. JGN then submitted revised AA revisions to the AER on 19 March 2010 which, if approved, will cover the period 2010/11-2014/15 (July to June financial years).

Under the National Gas Rules, total revenue for a relevant service provider is determined for each regulatory year of the access arrangement using a "building blocks" methodology (Rule 76). The building blocks include, amongst others, a return on the projected capital base for the year (Rule 76(a)) and compensation for the estimated cost of corporate income tax for the year (Rule 76(c)).

Rule 87(1) provides that the rate of return on capital is to be commensurate with prevailing conditions in the market for funds and the risks involved in providing reference services. Rule 87(2) provides:

> In determining a rate of return on capital:
>
>   (a)   it will be assumed that the service provider:
>
>   (i)   meets benchmark levels of efficiency; and
>
>   (ii)   uses a financing structure that meets benchmark standards as to gearing and other financial parameters for a going concern and reflects in other respects best practice; and
>
>   (b)   a well accepted approach that incorporates the cost of equity and debt, such as the Weighted Average Cost of Capital, is to be used; and a well accepted financial model, such as the Capital Asset Pricing Model, is to be used.

Rule 72(1)(g) provides that the access arrangement information for a full access arrangement proposal must include the proposed rate of return, the assumptions on which the rate of return is calculated and a demonstration of how it is calculated. Rule 72(1)(h) provides that the access arrangement information must also include the proposed method for dealing with taxation, and a demonstration of how the allowance for taxation is calculated.

Under the National Gas Law (section 28), in making a decision on whether to approve JGN's AA proposal, the AER must have regard to the National Gas Objective (in section 23 of the National Gas Law), which is:

> "to promote efficient investment in, and efficient operation and use of, natural gas services for the long term interests of consumers of natural gas with respect to price, quality, safety, reliability and security of supply of natural gas."

The AER may also take into account the pricing principles in section 24(2) of the National Gas Law, and must do so when considering whether to approve a reference tariff:

> A service provider should be provided with a reasonable opportunity to recover at least the efficient costs the service provider incurs in—
>
> (a) providing reference services; and
>
> (b) complying with a regulatory obligation or requirement or making a regulatory payment.

It may also be relevant to note that Rule 74, which applies to forecasts and estimates, provides:

> (1)   Information in the nature of a forecast or estimate must be supported by a statement of the basis of the forecast or estimate.
>
> (2)   A forecast or estimate:
>
>> (a)   must be arrived at on a reasonable basis; and
>>
>> (b)   must represent the best forecast or estimate possible in the circumstances.

In its revised AA (August 2009), JGN proposed a value of imputation credits (**gamma**) of 0.2. On 10 February 2010 the AER published its draft decision on JGN's AA revision proposal, rejecting JGN's proposal and instead adopting a gamma estimate of 0.65.[96] The AER cited that a gamma of 0.65 was consistent with the recent Queensland and South Australia draft decisions.

JGN submitted a revised proposal in response to the AER's draft decision and an initial response to this decision in a submission to the AER on 19 March 2010. In section 6.3.4 of its initial response, JGN proposes to retain a gamma of 0.2 as the best estimate in the circumstances.

Subsequent to JGN's initial response and the close of public submissions on the AER's draft decision for JGN (28 April 2010), the AER released its South Australia and Queensland final decisions, which both adopt a gamma of 0.65.[97] In the reasons given for these decisions the AER relies, in part, on two new expert reports on gamma (collectively, the **gamma reports**):

- the Mckenzie and Partington report,[98] and

---

[96] Australian Energy Regulator, February 2010, *Draft decision, Jemena, Access Arrangement Proposal for the NSW Gas Networks*, 1 July 2010 – 30 June 2015 (**draft decision**), can be found at http://www.aer.gov.au/content/index.phtml/itemId/730676.

[97] Australian Energy Regulator, May 2010, *Final Decision, South Australia Distribution Determination 2010–11 to 2014–15.*

 Australian Energy Regulatory, May 2010, *Final Decision, Queensland Distribution Determination 2010–11 to 2014–15.*

[98] Michael McKenzie and Graham Partington, 25 March 2010, *Report to AER: Evidence and Submissions on Gamma.*

- the Handley report.[99]

In the short time since the AER has published these two reports, JGN has not had an opportunity to critically analyse them.

Accordingly, JGN is seeking the opinion of a recognised independent expert to review the gamma reports, including with a view to indicating whether those reports support a value for gamma of 0.65.

A.2. Scope of work

The independent expert will provide an opinion report critically analysing the gamma reports. In particular, the report should:

- identify new arguments and analysis raised in the gamma reports

- provide an opinion on whether these new arguments and analysis support a gamma estimate of 0.65 that is arrived at on a reasonable basis and is the best estimate available in the circumstances

- outline further analysis that is needed, in light of the gamma reports, to identify a gamma estimate that is arrived at on a reasonable basis and is the best estimate in the circumstances.

A.3. Information to be considered

JGN will make the following information available to the expert:

- the public version of the AER's draft decision for JGN

- the public version of the AER's final decisions for South Australia and Queensland

- the public version of JGN's initial response to the AER's draft decision for JGN

- the Mckenzie and Partington report, and

- the Handley report.

Should the expert require any further information to prepare the opinion letter, the expert should notify JGN of this and JGN will, where possible, provide this information.

A.4. Other information to be considered

The expert is also expected to draw upon the following additional information:

- the National Gas Law and the National Gas Rules in relation to the economic regulation of gas networks

---

[99] John C. Handley, 19 March 2010, *Report prepared for the Australian Energy Regulator: On the Estimation of Gamma.*

- the National Electricity Law and National Electricity Rules in relation to the economic regulation of electricity networks

- the AER's recent regulatory decisions

- such information that, in expert's opinion, should be taken into account to address the questions outlined above.

A.5. Deliverables

At the completion of its review the expert will provide an independent expert opinion which:

- is of a professional standard capable of being submitted to the AER

- is prepared in accordance with the Federal Court Guidelines for Expert Witnesses set out in Attachment 1 and acknowledges that the expert has read the guidelines and has prepared the report in accordance with these guidelines[100]

- attaches relevant curriculum vitae

- identifies any person and their qualifications, who assists in the preparation of the report or in carrying out any research or test for the purposes of the report

- provides or makes available copies of all citations relied upon in the preparation of the report;

- summarises JGN's instructions and attaches these term of reference, and

- (without limiting the points above) carefully sets out the facts that the expert has assumed in putting together his or her report and the basis for those assumptions.

The expert report will include the findings for each of the two parts defined in the scope of works (Section 2).

---

[100] Available at: http://www.fedcourt.gov.au/how/prac_direction.html.

A.6. Timetable

The independent expert will deliver the final report to JGN by **17 May 2010**. The full list of
deliverables and their due dates are shown in the table below.

Deliverable	Due Date
Draft report	14 May 2010
JGN feedback on adherence to scope and factual accuracy of draft report	14 May 2010
Final report	17 May 2010

At the completion of this phase of work, the expert will provide an opinion report which:

- provides a summary of their opinions;

- sets out their findings for each of the parts defined in the scope of works (Section 2);

- includes detailed reasons for these opinions;

- fully documents the methodology used in detail and discusses the results obtained;

- lists the facts, matters and assumptions on which their opinions are based and the source
  of those facts, matters and assumptions, and lists all reference material and information
  on which they have relied; and

§ list any limitations, incomplete matters or qualifications to the expert's opinion.

Appendix B.   Curriculum Vitae

B.1. Brendan Quach

Senior Consultant

NERA Economic Consulting
Darling Park Tower 3
201 Sussex Street
Sydney NSW 2000
Tel: +61 2 8864 6502
Fax: +61 2 8864 6549
E-mail: brendan.quach@nera.com
Website: www.nera.com

Overview

Brendan Quach has nine years experience as an economist, specialising in network economics, and competition policy in Australia, New Zealand and Asia Pacific. Since joining NERA in 2001, Brendan has advised clients on the application of competition policy in Australia, in such industries as aviation, airports, electricity, rail and natural gas. Brendan specialises in regulatory and financial modelling and the cost of capital for network businesses. Prior to joining NERA, Brendan worked at the Australian Chamber of Commerce and Industry, advising on a number of business issues including tax policy, national wage claims and small business reforms.

Qualifications

1991-1995	**AUSTRALIAN NATIONAL UNIVERSITY** Bachelor of Economics. (High Second Class Honours)
1991-1997	**AUSTRALIAN NATIONAL UNIVERSITY** Bachelor of Laws.

Career Details

2001 -	**NERA ECONOMIC CONSULTING** Economist, Sydney
1998-1999	**AUSTRALIAN CHAMBER OF COMMERCE AND INDUSTRY** Economist, Canberra
1996	**AUSTRALIAN BUREAU OF STATISTICS** Research Officer, Canberra

Project Experience

Industry Analysis

2009	**EnergyAustralia – NSW Electricity Distribution**
	Review of Public Lighting Services

Brendan provided advice to EnergyAustralia during its electricity distribution price review on the provision of public lighting services. Our work provided strategic and regulatory advice to EnergyAustralia and their legal during the appeal of the AER's revenue determination for the 2009-2014 period.

2008-09	**MSAR Office for the Development of the Energy Sector**
	Review of Electricity Cost and Tariff Structures

Review of current and projected costs of electricity provision in Macau, including modelling and analysis of marginal costs and sunk cost attribution to various consumer classes. Our work for the Macau Government has incorporated the development of potential tariff structures (specifically rising block tariff structures) and scenarios, including modelling revenue recovery and cross subsidies.

2008	**Singaporean Ministry for Trade and Industry**
	Electricity Industry Review

NERA was retained by the Singaporean Ministry for Trade and Industry (MTI) to provide a comprehensive review of the Singaporean electricity market. Brendan was involved in the analysis of the costs and benefits arising from the restructuring and reform of the Singaporean electricity industry since the mid 1990's, the estimated costs and benefits of future security of supply and energy diversification approaches. The project required NERA to undertake quantitative dispatch modelling of the Singaporean electricity market.

2008	**Ministerial Council Energy**
	Retailer of Last Resort

Assisted in the development of a joint expert report with Allens Arthur Robinson (AAR) that: reviewed the existing jurisdictional retailer of last resort (RoLR) frameworks; advised the MCE on the development of an appropriate national policy framework for RoLR and developed a suggested base set of proposals for a national RoLR scheme.

2005-06	**Freehills/South Australian Gas Producers, NSW and South Australia**
	Gas supply agreement arbitration

Assisted in the development of an economic expert report in the arbitration of the price to apply following review of a major gas supply

agreement between the South Australian gas producers and a large retailer in NSW and South Australia.

2005-2006   **Australian Energy Market Commission (AEMC), Australia**
Advised the AEMC on its review of the Electricity Rules relating to transmission revenue determination and pricing, which included providing briefing papers to the Commission on specific issues raised by the review.

2005-2006   **Minter Ellison/ South West Queensland Gas Producers, Queensland**
Gas supply agreement arbitration
Advised Minter Ellison and the Producers in an arbitration of the price to apply following review of a major gas supply agreement between the South West Queensland gas producers and a large industrial customer.

2005   **International Utility, Queensland**
Generator sale, due diligence
Part of the due diligence team acting on behalf of a large international utility in the purchase of two coal fired generators in Queensland, Australia. Provided advice on the features of the Australian electricity market and regulatory environment.

2003   **Auckland City Council, New Zealand**
Rationalisation Options Study
Conducting a rationalisation options study to examine alternative business models for Metrowater. Our report assessed different vertical and horizontal integration options for Metrowater.

2003   **Metrowater, New Zealand**
Institutional Restructuring
Prepared advice for the board of the Auckland City Water and wastewater service provider, Metrowater on options for institutional and regulatory reform of the entire Auckland regional water sector.

2002 - 2003   **Rail Infrastructure Corporation, Australia**
Research to RIC on their proposed access undertaking.
Provided research and advice into various components of RICs proposed access undertaking with the ACCC including the cost of capital, asset valuation and pricing principles.

2002   **Argus Telecommunications, Australia**
Critique of CIE's bandwidth pricing principles.
Provided a critique of a CIE report on bandwidth pricing principles for the fibre optic networked run owned by Argus Telecommunications.

2001   **Screenrights, Australia**
                        Advice on valuing retransmission of local TV
                        A review and analysis of different methodologies in valuing
                        retransmission of local television on pay TV services.

Regulatory and Financial Analysis

2009   **Jemena - Gas Distribution**
                        Cost of Equity
                        Co-authored a report on the application of a domestic Fama-French
                        three-factor model to estimate the cost of equity for regulated gas
                        distribution businesses. The report examined whether the Fama-
                        French three-factor model met the dual requirements of the National
                        Gas Code to provide an accurate estimate of the cost of equity and be a
                        well accepted financial model. The using Australian financial data the
                        report also provided a current estimate of the cost of equity for Jemena.

2009   **WA Gas Networks - Gas Distribution**
                        Cost of Equity
                        Co-authored a report that examined a range of financial models that
                        could be used to estimate the cost of equity for a gas distribution
                        business. The report of estimating the cost of equity of a gas
                        distribution business using the Sharpe Lintner CAPM, Black CAPM,
                        Fama-French three-factor model and Fama-French two-factor model.
                        The report examined both the domestic and international data.

2009   **CitiPower and Powercor – Victorian Electricity Distribution**
                        Network Reliability Incentive Mechanism (S-factor)
                        Brendan provided advice to CitiPower and Powercor on the proposed
                        changes to the operation of the reliability incentive mechanism. The
                        advice considered the effects of the proposed changes to the operation
                        of the two distribution network service providers. Specifically, how the
                        'S-factors' would be changed and implications this has to the revenue
                        streams of the two businesses. A comparison was also made with the
                        current ESC arrangements to highlight the changes to the mechanism.

2009   **Jemena and ActewAGL - Gas Distribution**
                        Cost of Equity
                        Co-authored a report on alternative financial models for estimating the
                        cost of equity. The report examined the implication of estimating the
                        cost of equity of a gas distribution business using the Sharpe Lintner
                        CAPM, Black CAPM and Fama-French models. The report examined
                        both the domestic and international data.

2008   **Joint Industry Associations - APIA, ENA and Grid Australia**
                                              Weighted Average Cost of Capital
                                              Assisted in the drafting of the Joint Industry Associations submission
                                              to the Australian Energy Regulator's weighted average cost of capital
                                              review. The submission examined the current market evidence of the
                                              cost of capital for Australian regulated electricity transmission and
                                              distribution businesses.

2008   **Joint Industry Associations - APIA, ENA and Grid Australia**
                                              Weighted Average Cost of Capital
                                              Expert report for the Joint Industry Associations on the value of
                                              imputation credits. The expert report was attached to their submission
                                              to the Australian Energy Regulator's weighted average cost of capital
                                              review. The report examined the current evidence of the market value
                                              of imputation credits (gamma) created by Australian regulated
                                              electricity transmission and distribution businesses.

2007-2008   **Smart Meter Working Group, Ministerial Council on Energy –**
                                              Assessment of the costs and benefits of a national mandated rollout
                                              of smart metering and direct load control
                                              Part of a project team that considered the costs and benefits of a
                                              national mandated rollout of electricity smart meters. Brendan was
                                              primarily responsible for the collection of data and the modelling of
                                              the overall costs and benefits of smart metering functions and
                                              scenarios. The analysis also considering the likely costs and benefits
                                              associated with the likely demand responses from consumers and
                                              impacts on vulnerable customers.

2007   **Victorian Electricity Distribution Business**
                                              Review of Smart Meter model
                                              Reviewed the smart meter model developed by a Victorian distributor
                                              and submitted to the Victorian Essential Service Commission (ESC).
                                              The smart meter model supported the business' regulatory proposal
                                              that quantified the revenue required to meet the mandated roll out of
                                              smart meters in Victoria. The smart meter model the quantified the
                                              expected, meter, installation, communications, IT and project
                                              management costs associated with the introduction of smart meters.
                                              Further, the estimated the expected change in the business' meter
                                              reading and other ongoing costs attributed with the introduction of
                                              smart meter infrastructure.

2007   **Energy Trade Associations - APIA, ENA and Grid Australia**
                                              Weighted Average Cost of Capital
                                              Expert reports submitted to the Victorian Essential Services
                                              Commission evaluating its draft decision to set the equity beta at 0.7,
                                              and its methodology for determining the appropriate real risk free rate

of interest, for the purpose of determining the allowed rate of return for gas distribution businesses.

| 2007- | **Babcock and Brown Infrastructure, Qld** |
| | **Review of Regulatory Modelling** |

Providing advice to Babcock and Brown Infrastructure on the regulatory modelling of revenues and asset values of the Dalrymple Bay Coal Terminal (DBCT). DBCT has undertaken a substantial capital investment to increase the capacity of the port. Brendan's role has been to advise DBCT on variety of issues including the calculation of interest during construction, appropriate finance charges, cost of capital and regulatory revenues which were submitted to the Queensland Competition Authority (QCA).

| 2007- | **ActewAGL, ACT** |
| | **Transition to National Electricity Regulation** |

Providing on-going advice to ActewAGL, the ACT electricity distribution network service provider, on its move to the national energy regulation. The advice covers the revenue and asset modelling, the new incentives for efficient operating and capital expenditure and processes for compliance, monitoring and reporting of its regulatory activities.

| 2007 - 2008 | **Smart Meter Working Group, Ministerial Council on Energy –** |
| | **Assessment of the costs and benefits of a national mandated rollout of smart metering and direct load control** |

Brendan was a member of NERA team that investigated the costs and benefits of a national mandated rollout of electricity smart meters. Brendan's prime responsibility was to undertake the modelling of the costs and benefits of smart metering. NERA's assignment required an assessment of smart metering functions and scenarios, and also considering the likely demand responses from consumers and impacts on vulnerable customers.

| 2005- | **TransGrid, NSW** |
| | **Review of Regulatory Systems** |

Providing strategic advice to TransGrid, the NSW electricity transmission network service provider, on its current regulatory processes. The advice covers TransGrid's internal systems and processes for compliance, monitoring and reporting of its regulatory activities.

2006	**Grid Australia, National**
	Submission to application by Stanwell to change the national
	Electricity Rules (Replacement and Reconfiguration investments)

Developed and drafted a submission to the AEMC on the appropriateness of the draft Rule change that extended the application of the regulatory test to replacement and reconfiguration investments.

2006	**Grid Australia, National**
	Submission to application by MCE to change the national
	Electricity Rules (Regulatory Test)

Developed and drafted a submission to the AEMC on the appropriateness of the draft Rule change which changed the Regulatory Test as it applies to investments made under the market benefits limb.

| 2006 | **Office of the Tasmanian Energy Regulator** |
| | **Implications of the pre-tax or post-tax WACC** |

Provided a report to OTTER on the potential implications of changing from a pre-tax to a post-tax regulatory framework.

| 2006 | **Babcock Brown Infrastructure** |
| | **Regulatory Modelling of Dalrymple Bay Coal Terminal** |

Developed the economic model used to determine revenues at Dalrymple Bay Coal Terminal. This included updating the model for capital expenditure to upgrade capacity at the terminal, account for intra-year cash flows, and the proper formulation of the weighted average cost of capital and inflation.

| 2006 | **Queensland Competition Authority, Queensland** |
| | **Review of Regulatory Revenue Models** |

Advised the QCA on the financial and economic logic of its revenue building block model that projects the required revenue for the Queensland gas distribution businesses and tariffs for the next 5 years.

| 2006 | **Envestra, South Australia** |
| | **Review of RAB Roll Forward Approach** |

Assisted Envestra in responding to the Essential Services Commission of South Australia's consultation paper on Envestra's 2006/07 to 2010/11 gas access proposal. This involved reviewing Envestra's RAB roll forward modelling and the Allen Consulting Group's critique thereof.

| 2006 | **Transpower, New Zealand** |
| | **Review of Regulatory Systems** |

Provided assistance to Transpower, the sole electricity company in New Zealand, in responding to the New Zealand Commerce

Commission's announcement of its intention to declare control of Transpower. This involved developing an expert report commenting on the Commission's methodology for analysing whether Transpower's has earned excess profits in the context of New Zealand's "threshold and control" regime.

2006   **Pacific National**
               Rail industry structure and efficiency
               Assisted with the development of a report which examined options for addressing issues arising in vertically-separated rail industries. This involved examining a number of case study countries including the UK, US and Canada.

2005   **Australian Energy Markets Commission, Australia**
               Transmission pricing regime
               Advisor to the AEMC's review of the transmission revenue and pricing rules as required by the new National Electricity Law.

2005   **Queensland Rail, Australia**
               Weighted Average Cost of Capital
               Provided a report for Queensland Rail on the appropriate weighted average cost of capital for its regulated below rail activities.

2004-2005   **ETSA Utilities**
               Review of Regulatory Modelling
               Advised ETSA Utilities on the financial and economic logic of ESCOSA's regulatory models used to determine the regulatory asset base, the weighted average cost of capital, regulatory revenues and distribution prices.

2003- 2005   **TransGrid, NSW**
               Review of Regulatory Revenues
               Assisted TransGrid in relation to its application to the ACCC for the forthcoming regulatory review which focused on asset valuation and roll forward, cost of capital and financial/regulatory modelling.

2004   **Prime Infrastructure, Australia**
               Weighted Average Cost of Capital
               Provided a report for Prime Infrastructure on the appropriate weighted average cost of capital for its regulated activities (coal shipping terminal).

2004   **PowerGas, Singapore**
               Review of Transmission Tariff Model
               Advised the Singaporean gas transmission network owner on the financial and economic logic of its revenue building block model that

projects PowerGas' revenue requirements and tariffs for the next 5 years.

2003   **ActewAGL, ACT**
                     Review of Regulatory Revenues
                     Provided strategic advice to ActewAGL in developing cost of capital principles, asset valuation and incentive mechanisms as part of their current pricing reviews for their electricity and water businesses.

2003   **Orion Energy, New Zealand**
                     Threshold and Control Regime in the Electricity Sector
                     Provided advice and assistance in preparing submissions by Orion to the Commerce Commission, in relation to the Commission's proposed changes to the regulatory regime for electricity lines businesses. Issues addressed included asset valuation, and the form of regulatory control.

2003   **EnergyAustralia, NSW**
                     Pricing Strategy Under a Price Cap
                     Advised EnergyAustralia on IPART's financial modelling of both regulated revenues and the weighted average price cap.

2002-03   **TransGrid, NSW,**
                     Advice in Relation to the Regulatory Test
                     Modelled the net present value of a range of investment options aimed at addressing a potential reliability issue in the Western Area of New South Wales. This work was undertaken in the context of the application of the ACCC's "regulatory test" which is intended to ensure only *efficient* investment projects are included in the regulatory asset base.

2002   **Rail Infrastructure Corporation (RIC), Australia**
                     Review of the Cost of Capital Model
                     Provided advice to RIC and assisted in drafting RIC's submission to the Australian Competition and Consumer Commission (ACCC) on the appropriate cost of capital. This included building a post-tax revenue model of RIC's revenues in the regulatory period.

2002   **PowerGrid, Singapore**
                     Review of Transmission Tariff Model
                     Advised the Singaporean electricity transmission network owner on the financial and economic logic of its revenue building block model that projects PowerGrid's revenue requirements and tariffs for the next 10 years.

2002	**EnergyAustralia, Australia**
	Review of IPART's Distribution Tariff Model
	Advised EnergyAustralia, a NSW distribution service provider, on the economic logic of the revenue model that projects EnergyAustralia's revenue requirements and tariffs for the 2004-2009 regulatory period.

2002	**Essential Services Commission of South Australia**
	Review Model to Estimating Energy Costs
	Reviewed and critiqued a model for estimating retail electricity costs for retail customers in South Australia for 2002-2003.

2002	**National Competition Council (NCC), Australia**
	Exploitation of Market Power by a Gas Pipeline
	Provided a report to the NCC in which we developed a number of tests for whether current transmission prices were evidence of the exploitation of market power by a gas transmission pipeline. Also provided a separate report that applied each of the tests developed. This analysis was relied on by the NCC in determining whether to recommend the pipeline in question be subject to regulation under the Australian Gas Code.

2002	**Australian Gas and Lighting, Australia**
	Report on South Australian Retail Tariffs
	An independent assessment on the cost components of regulated retail tariffs in South Australia that will be used by AGL in the next review.

2002	**New Zealand Telecom, New Zealand**
	Report on the application of wholesale benchmarks in NZ
	A report on the application of international benchmarks of wholesale discounts to New Zealand Telecom.

2002	**ENEL, Italy**
	Survey of Retailer of Last Resort in NSW
	Provided research into the retailer of last resort provisions in the NSW gas sector of an international review for the Italian incumbent utility.

2002	**ENEL, Italy**
	Survey of Quality of Service provisions in Victoria and South Australia
	Provided research into quality of service regulation for electricity distribution businesses in Victoria and South Australia of an international review for the Italian incumbent utility.

2002	**Integral Energy, Australia**
	Provided Advice on the Cost of Capital for the 2004 – 2008 Distribution Network Review
	Provided analysis and strategic advice to Integral Energy on the possible methodologies that IPART may use to calculate the cost of capital in the next regulatory period.
2001	**IPART, Australia**
	Minimum Standards in Regulation of Gas and Electricity Distribution
	Advised the NSW regulator on the appropriate role of minimum standards in regulatory regimes and how this could be practically implemented in NSW.
2001	**TransGrid, Australia**
	Advice on ACCC's Powerlink WACC decision
	Provided a report critically appraising the ACCC's decision regarding Powerlink's weighted average cost of capital (WACC).

Competition Policy

2005	**Confidential, Australia**
	Merger Analysis
	Provided expert opinion as well as strategic guidance to the merging firms on the competitive implications of that merger.
2004	**Mallesons Stephen Jaques / Sydney Airports Corporation, Australia**
	Appeal to declare under Part IIIA
	Provided strategic and economic advice on aspects of Virgin Blue's appeal for the declaration of airside facilities at Sydney Airport under Part IIIA of the Trade Practices Act. This cumulated in the production of an expert witness statement by Gregory Houston.
2003	**Sydney Airports Corporation, Australia**
	Application to declare under Part IIIA
	Expert report to the National Competition Council in connection with the application by Virgin Blue to declare airside facilities at Sydney Airport under Part IIIA of the Trade Practices Act, and the potential impact on competition in the market for air travel to and from Sydney.
2002 - 2003	**Blake Dawson Waldron/ Qantas Airways, Australia**
	Alleged predatory conduct
	NERA was commissioned to provide advice in relation to potential allegations of anticompetitive behaviour. Developed a paper

examining the economic theory behind predation and the way courts in various jurisdictions determine whether a firm has breached competition law.

2002	**Phillips Fox and AWB Limited**

Declaration of the Victorian Intra-State Rail Network

Advised law firm Phillips Fox (and AWB Limited) in its preparation for an appeal (in the Australian Competition Tribunal) of the Minister's decision not to declare the Victorian intra-state rail network, pursuant to Part IIIA of the Trade Practices Act. This included assisting in the preparation of testimony relating to pricing arrangements for third party access to the rail network and their likely impact on competition in related markets, including the bulk freight transportation services market.

2002   **Singapore Power International (SPI)**

Impact of acquisition of a Victorian distributor on competition

Provided analysis to a company interested in acquiring CitiPower (a Victorian electricity distribution/retail business). Including an assessment of the extent to which the acquisition of CitiPower would lead to a 'substantial lessening of competition' in a relevant energy markets, given the company's existing Australian electricity sector assets. The NERA report was submitted to the ACCC as part of the pre-bid acquisition clearance process.

Other

1999-2000   **Australian Chamber of Commerce and Industry, Australia**

Alienation of Personal Service Income

Involved in analysing the effects of the proposed business tax reform package had on a number of industries which advocated a number of recommendations to the Federal Government. The package also included the provisions to change the definition of personal service income.

1998-2000   **Australian Chamber of Commerce and Industry, Australia**

Various economic policy issues

Provided analysis on economic trends and Government policies to business groups. This covered issues such as industrial relations reform, taxation changes, business initiatives, and fiscal and monetary settings. Also compiled ACCI surveys on business conditions and expectations.

1996	**Australian Bureau of Statistics, Australia**
	Productivity Measures in the Public Health Sector
	Involved in a team that reported on the current methods used to measure output in the public health sector and analysed alternative methods used internationally. This was in response to the ABS investigating the inclusion of productivity changes in the public health sector.

Publicly Available NERA Reports

September 2002	**Hypothetical New Entrant Test in the Context of Assessing the Moomba to Sydney Pipeline Prices**
	A report for the Australian Competition and Consumer Commission which applied the hypothetical new entrant (HNE) test to the Moomba to Sydney Pipeline. The report also compared HNE prices with those actually charged for use of the MSP.
March 2002	**Minimum Service Standards**
	Report for IPART which assessed the need for minimum performance standards for energy sector licensees and advised on the appropriate process and practical implementation issues associated with introducing any such standards.

B.2. Simon Wheatley

Special Consultant

NERA Economic Consulting
33 Exhibition Street
Melbourne VIC 3000
Tel: +61 3 9623 6800
Fax: +61 3 9623 0800
E-mail: simon.wheatley@nera.com
Website: www.nera.com

Overview

Simon is a Special Consultant with NERA, and was until recently a Professor of Finance at the University of Melbourne. Since the beginning of 2008, Simon has applied his finance expertise in investment management and consulting outside the university sector. Simon's expertise is in the areas of testing asset-pricing models, determining the extent to which returns are predictable and individual portfolio choice theory. Prior to joining the University of Melbourne, Simon taught finance at the Universities of British Columbia, Chicago, New South Wales, Rochester and Washington.

Employment

§ Special Consultant, NERA Economic Consulting, 2009-present

§ Quantitative Analyst, Victorian Funds Management Corporation, 2008-2009

§ Adjunct, Melbourne Business School, 2008

§ Professor, Department of Finance, University of Melbourne, 2001-2008

§ Associate Professor, Department of Finance, University of Melbourne, 1999-2001

§ Associate Professor, Australian Graduate School of Management, 1994-1999

§ Visiting Assistant Professor, Graduate School of Business, University of Chicago, 1993-1994

§ Visiting Assistant Professor, Faculty of Commerce, University of British Columbia, 1986

§ Assistant Professor, Graduate School of Business, University of Washington, 1984-1993

§ Visiting Fellow, Australian Graduate School of Management, 1981

§ Aviation Insurance Adjuster, American International Group, London, 1977-1978

Education

§   Ph.D., University of Rochester, USA, 1986; Major area: Finance; Minor area: Applied statistics; Thesis topic: Some tests of international equity market integration; Dissertation committee: Charles I. Plosser (chairman), Peter Garber, Clifford W. Smith, Rene M. Stulz

§   M.A., Economics, Simon Fraser University, Canada, 1979

§   M.A., Economics, Aberdeen University, Scotland, 1977

Publications

Do measures of investor sentiment predict returns? (with Robert Neal), 1998, *Journal of Financial and Quantitative Analysis* 33, 523-547.

Adverse selection and bid-ask spreads: Evidence from closed-end funds (with Robert Neal), 1998, *Journal of Financial Markets* 1, 121-149.

Shifts in the interest-rate response to money announcements: What can we say about when they occur? (with V. Vance Roley), 1996, *Journal of Business and Economic Statistics* 14, 135-138.

International investment restrictions and closed-end country fund prices, (with Catherine Bonser-Neal, Greggory Brauer, and Robert Neal), 1990, *Journal of Finance* 45, 523-547 (reprinted in International Capital Markets Volume III, 2003, G. Andrew Karolyi and Rene M. Stulz, editors, Edward Elgar Publishing, Cheltenham, Glos).

A critique of latent variable tests of asset pricing models, 1989, *Journal of Financial Economics* 21, 177-212.

Some tests of international equity market integration, 1988, *Journal of Financial Economics* 21, 177-212 (reprinted in International Capital Markets Volume I, 2003, G. Andrew Karolyi and Rene M. Stulz, editors, Edward Elgar Publishing, Cheltenham, Glos).

Some tests of the consumption-based asset pricing model, 1988, *Journal of Monetary Economics* 22, 193-215.

Working papers

An evaluation of some alternative models for pricing Australian stocks (with Paul Lajbcygier), 2009.

Imputation credits and equity returns (with Paul Lajbcygier), 2009.

Intertemporal substitution, small-sample bias, and the behaviour of U.S. household consumption (with Kogulakrishnan Maheswaran and Robert Porter), 2007.

Keeping up with the Joneses, human capital, and the home-equity bias (with En Te Chen), 2003.

Evaluating asset pricing models, 1998.

Time-non-separable preferences or artifact of temporal aggregation? (with Robert Porter), 2002.

Testing asset pricing models with infrequently measured factors, 1989.

Work in progress

Risks for the long run: A potential resolution of asset pricing puzzles?

Debt policy, growth, and the value of the tax shield (with Robert Neal)

Refereeing experience

Referee for Accounting and Finance, the Australian Journal of Management, Economic Letters, Financial Analysts Journal, Financial Management, Journal of Accounting and Economics, Journal of Business, Journal of Empirical Finance, Journal of Finance, Journal of Financial and Quantitative Analysis, Journal of Financial Economics, Journal of Futures Markets, Journal of International Economics, Journal of International Money and Finance, Journal of Money, Credit, and Banking, Journal of Monetary Economics, Management Science, National Science Foundation, Pacific-Basin Finance Journal, and the Review of Financial Studies.

Program Committee for the Western Finance Association in 1989 and 2000.

Teaching experience

International Finance, Melbourne Business School, 2008

Corporate Finance, International Finance, Investments, University of Melbourne, 1999-2008

Corporate Finance, International Finance, Investments, Australian Graduate School of Management, 1994-1999

Investments, University of Chicago, 1993-1994

Investments, University of British Columbia, 1986

International Finance, Investments, University of Washington, 1984-1993

Investments, Macroeconomics, Statistics, University of Rochester, 1982

Accounting, 1981, Australian Graduate School of Management, 1981

Teaching awards

MBA Professor of the Quarter, Summer 1991, University of Washington

Honours

Elected a member of Beta Gamma Sigma, June 1986.

Fellowships

Earhart Foundation Award, 1982-1983

University of Rochester Fellowship, 1979-1984

Simon Fraser University Fellowship, 1979

Inner London Education Authority Award, 1973-1977

Ph. D. dissertations supervised

En Te Chen, University of Melbourne (2006), To Invest or not to Invest? Theory and Evidence on Stock Holdings over the Life-Cycle. Current position: Lecturer, Queensland University of Technology, Queensland

Kogulakrishnan Maheswaran, University of Melbourne (2005), Some international evidence on the impact of liquidity constraints on consumption smoothing. Current position: Manager, Quantitative Research, KBC Financial Products, New York

Piruna Polsiri, University of Melbourne (2004), The effects of concentrated ownership on firm restructurings: evidence from Thailand. Current position: Director of DBA/MBA Programs, Dhurakij Pundit University, Thailand

Valter Lazarri, University of Washington (1993), Two essays in finance. Current position: Director of MBA Program, Bocconi University, Milan

NERA
Economic Consulting

NERA Economic Consulting
Darling Park Tower 3
201 Sussex Street
Sydney NSW 2000
Tel: +61 2 8864 6500
Fax: +61 2 8864 6549
www.nera.com

NERA Australia Pty Ltd, ABN 34 092 959 665