

Jemena Gas Networks (NSW) Ltd - Initial response to the draft decision

Appendix 6.3A

C Skeels (13 Jan 10, ETSA) Response to Australian Energy Regulator Draft Determination

19 March 2010



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RESPONSE TO
AUSTRALIAN ENERGY REGULATOR
DRAFT DETERMINATION

A Report prepared for Gilbert and Tobin by

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* The views expressed in this report are those of the author and do not necessarily reflect those of the University of Melbourne.

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Declaration

This report has been prepared by Associate Professor Christopher Skeels of the Department of Economics at the University of Melbourne, a co-author of the paper Beggs and Skeels (2006), which has figured prominently in the determination by Australian Energy Regulator (hereafter AER) of the value for gamma to be used in the WACC (AER, 2009). A copy of my curriculum vitae is presented in an appendix to this report.

For the purposes of preparing this report I was provided with a copy of the Federal Court guidelines **Expert Witness Guidelines issued by the Federal Court of Australia**. I have reviewed those guidelines and this report has been prepared consistently with the form of expert evidence required by those guidelines. In preparing this report, I have made all the inquiries that I believe are desirable and appropriate and no matters of significance that I regard as relevant have, to my knowledge, been withheld.

I have been engaged by ETSA Utilities to refer to the Draft Determination (AER, 2009b) and address the concerns raised by the AER with matters raised in my review of a dividend drop off study by Strategic Finance Group Consulting (SFG); see Skeels (2009b).

In addition to the Draft Determination I have been provided with copies of SFG Consulting's response to those issues (SFG, 2010) and also the AER's response to an ETSA Utilities information request of 8 December, 2009.

I was provided with a set of formal instructions from Gilbert and Tobin, which are attached as an appendix to this report. The specific questions I was asked were:

- In the Draft Determination the AER has raised a number of concerns with matters raised in your review of the SFG Consulting analysis. Could you please refer to the Draft Determination and address the concerns raised by the AER.

- We note that SFG Consulting will also be responding to specific queries in relation to the data set used in their analysis. We will provide you with a copy of SFG Consulting's response to those issues when it is available. Could you please examine their response to these issues and whether you consider the response to be appropriate.

A handwritten signature in black ink, appearing to read "C. Skeels". The signature is written in a cursive style with a large, sweeping flourish underneath the name.

C. Skeels

January 13, 2010

1. Executive Summary

In this report I provide an assessment of the arguments presented by the Australian Energy Regulator (hereafter AER) in their Draft Determination. This is done in two parts. In the first part I explore the methodology adopted by AER in reaching their original position on the value for gamma to be used in the WACC (AER, 2009). In my opinion there are serious short-comings with this approach in as much as the methodology adopted must necessarily overstate the value of γ given the AER's own definitions and interpretations of the various quantities involved.

My findings in relation the AER's methodology are:

1. Estimates of theta (θ), derived from redemption/utilization rates obtained from tax statistics, including specifically the estimate of θ provided by Handley and Maheswaran (2008), are estimates of the upper bound of possible values for θ .
2. Estimates of θ derived from market values, including specifically the estimate of θ provided by Beggs and Skeels (2006), are not estimates of either upper or lower bounds on θ , rather they are estimates of the actual values of θ .
3. According to the definitions adopted by the AER, and in light of the preceding two points, its method of estimating θ and hence γ is necessarily biased upwards, by construction.

In the second part of this report I explore the arguments provided by the AER in response to issues relating to the SFG report. Although the AER raise a large number of concerns it transpires that these can be distilled to various manifestations of a relatively small set of generic concerns. My discussion focuses on these generic concerns. For the most part I consider that the issues of concern to the AER are of little practical importance in this case. Of greatest potential concern are the data issues raised by the AER. In response to these concerns SFG (2010) provides convincing arguments as to why the AER's concerns are misplaced.

My findings in relation to the AER's concerns with the SFG study are:

1. There is no evidence that multicollinearity represents a serious practical problem in either Beggs and Skeels (2006) or SFG (2009). Consequently, in my opinion, the AER overstates the importance of multicollinearity to the SFG study.
2. Even if multicollinearity is a problem of practical relevance, which in my opinion it is not, it remains the case that ordinary least squares (OLS) remains consistent and the best linear unbiased estimator. That is, within its class of estimators OLS still provides the optimal estimates with the smallest possible estimated standard errors.
3. The AER correctly identified a small error in the use of corporate tax rates by SFG. SFG (2010, p. 4) addresses this issue, the effect of which is demonstrated to be extremely minor. I believe that SFG (2010) are now using corporate tax rates correctly.
4. The AER has identified a small number of observations from the SFG (2009) data set that may be historically inconsistent. To the extent that the AER is aware of any other historically inconsistent observations it should make them known to SFG. In the meantime, SFG (2010) have conducted a sensitivity analysis whereby a sub-sample of their data set is examined intensively, similar to the approach used by auditors of large firms. They find that this intense examination of a sub-sample of their data leads to minimal changes in their results.
5. The modified use of Cook's D statistic by SFG is an appropriate statistical technique for filtering the SFG data set.
6. In my opinion economically unreliable observations that are not influential are unlikely to affect significantly the results obtained and do not constitute cause for concern.
7. The AER's primary concern about the use of Cook's D statistic is that "the Cook's D analysis may fail to identify observations, which in themselves are not

influential, but when combined are jointly influential.” In my opinion, this is a situation of absolutely no practical relevance in context of the data set used by SFG.

8. The AER places considerable weight on a comparison of various regression results that are presented in Table 9.2. I agree with the AER in that some of the issues that they raise merit consideration. However, I feel that the importance of these issues is overstated by the AER. Specifically:
 - a. The AER is concerned about differences in coefficient estimates which may be explained by differences in sample lengths used to estimate the entire equation. (I note that estimation of intercepts is not considered in the AER analysis although they will be important for comparisons such as these.)
 - b. The AER expresses concern about the analysis of SFG (2009) having larger estimated standard errors than does the analysis of Beggs and Skeels (2006), although this observation is largely reversed if one considers SFG’s preferred results, making the AER concern something of a straw-man.
 - c. The AER is concerned about economically implausible estimates in SFG’s preferred model. In my opinion the AER’s interpretation of the SFG results is flawed in that it ignores the fact that economically plausible coefficient values are equally probable on the basis of these results.

As a final observation I note that the determination of the WACC under the CAPM involves the estimation of input parameters. A process of estimation is just that, and there are no perfect results. To inform this process all relevant information should be taken into consideration, bearing in mind that no elements are going to be without limitation.

The AER correctly identified some shortcomings with the original SFG study. However, SFG have responded to the AER’s concerns and, in my opinion, their

revised results merit greater consideration than they have to date received, especially as they are based on the most up to date and relevant data of any of the studies that have been considered. Despite this, the SFG study has been subject to a level of scrutiny well in excess of that placed on other studies that have figured prominently in the AER's decision making process. This scrutiny reinforces the view contained in my previous report (Skeels, 2009b, p. 5) that "the results presented in Appendix I constitute an empirically valid study of the dividend drop-off problem for Australia and that the SFG estimate of theta of 0.23 represents the most accurate estimate currently available". The AER should have regard to the SFG study as it contains relevant information as to how much an investor *values* imputation credits. After all, it is the value of imputation credits which is being assessed in deriving the overall cost of capital estimate.

2. Methodological Concerns

Estimates of theta (θ), derived from redemption/utilization rates obtained from tax statistics, including specifically the estimate of θ provided by Handley and Maheswaran (2008), are estimates of the upper bound of possible values for θ .

In the Draft Determination the AER suggested that the results obtained from Handley and Maheswaran (2008) be characterised as a point estimate of θ .¹ However, in the eyes of both the AER and of their consultant, Associate Professor John Handley, redemption/utilization rates obtained from tax statistics estimate an upper bound for θ .² In support of this statement I provide the following extracts from AER (2009a), each of which speaks to the use of redemption/utilization rates obtained from tax statistics:

- The AER maintains its view that the methodology provided by the Handley and Maheswaran (2008) study provides a relevant and reliable upper bound estimate of theta in the post-July 2000 period. (pp. 466-467)
- Assoc. Prof. Handley expressed the view that they can be considered to provide an upper bound for theta (p. 451)
- ... this estimate may be interpreted as a reasonable upper bound on the value of gamma. (p. 451)
- In its explanatory statement the AER considered that a utilization / redemption rate as provided by the Handley and Maheswaran (2008) study could provide a reasonable upper bound estimate of theta in the post-2000 period. (pp. 452-453)
- The utilization rate estimate from the Handley and Maheswaran (2008) study is interpreted as an upper bound estimate of theta, which appropriately takes

¹ AER (2009b, p. 275)

² In the AER's analysis the terms γ and θ are used interchangeably, a practice justified by the assumed relationship $\gamma = F \times \theta$ coupled with the AER's assumption that $F = 1$; see AER (2009a, p. 393) and AER (2009a, Section 10.5.2), respectively.

into account the concerns raised regarding time value and risk considerations.
(p. 456)

- Overall, the AER maintains its view from its explanatory statement that the methodology provided by the Handley and Maheswaran (2008) study provides a relevant and reliable estimate of theta in the post July-2000 period. Based on Handley's advice, the AER considers that the results of this study provide a reasonable upper-bound estimate of theta. (p. 456)

It is clear that no interpretation is given by the AER to the use of redemption/utilization rates obtained from tax statistics other than that of providing an estimate of an upper bound on the possible values of θ . Hence, there is no need for me to form an opinion on the AER's interpretation of the use of redemption/utilization rates obtained from tax statistics as they have clearly and repeatedly stated it themselves.

Nonetheless, consistent with the view expressed by Handley, I consider that that use of redemption/utilization rates must be the maximum possible value of θ by definition. This is because redemption/utilization rates represent the actual amount of franking credits claimed by an individual, and individuals will not to pay more for franking credits than they will get back from the ATO.

In my opinion, the face value of the franking credit overstates its value to the investor relative to that of the corresponding cash dividend. This comes about because many months may elapse between the dividend event and the date at which the franking credit is redeemed. Simple time-value-of-money principles make it clear that the real value of franking credits will have reduced by the time they are redeemed, even though they maintain the same face value that they had at the time of the dividend event.

Estimates of θ derived from market values, including specifically the estimate of θ provided by Beggs and Skeels (2006), are not estimates of either upper or lower bounds on θ , rather they are estimates of the actual values of θ .

In AER (2009a) it was made clear that the estimate of gamma obtained from Beggs and Skeels (2006) was being treated by the AER as an estimate of a lower bound on gamma, in much the same way as the estimate from Handley and Maheswaran (2008) was taken as an estimate of an upper bound. The following extract from AER (2009a, p. 477) makes this clear:³

Based on the evidence considered most relevant, reliable, comprehensive and theoretically appropriate, the AER considers that a reasonable estimate of gamma lies in the range 0.57 and 0.74. For clarity it is noted that:

- A payout ratio of 1.0 has been adopted, consistent with a free cash flow approach to valuation and the Officer WACC framework,
- The lower bound estimate of 0.57 is based on the AER's best estimate of theta inferred from market prices, and
- The upper bound estimate of 0.74 is based upon the AER's best estimate of theta from tax statistics.

In Skeels (2009a) I made it clear that it was inappropriate to regard the Beggs and Skeels (2006) estimate of theta as an estimate of a lower bound. Specifically, on page 4 of that report I wrote:

As one of the co-authors, I can state categorically that Beggs and Skeels (2006) were not concerned with the estimation of bounds for θ or γ . Yet, the approach adopted by the AER is to take the estimate provided by Beggs and Skeels (2006) and arbitrarily label it as an estimated lower bound on the true value of γ (and

³ Note that the value of 0.57 used in the following extract as a lower bound on γ is taken from Beggs and Skeels (2006).

hence θ). That the estimate of γ (and hence θ) reported by Beggs and Skeels (2006) is lower than another estimate (say that of Handley and Maheswaran (2008)) is a matter of chance rather than construction.

This point was acknowledged by the AER (2009b, p. 276):

- labelling the Beggs and Skeels study's estimate as a lower bound is inappropriate as it was not intended to carry meaning in the statistical sense

Under standard assumptions, the estimate of θ from Beggs and Skeels (2006) is obtained using an unbiased and consistent estimator. Evidence that the AER (at least implicitly) concurs with this assessment and agrees that such assumptions are reasonable in this context can be found in the following extract from AER (2009a, p. xix):

- Based on the empirical evidence available, the AER considers that the 2006 Beggs and Skeels study provides the most comprehensive, reliable and robust estimate of theta inferred from market prices in the post-2000 period.

According to the definitions adopted by the AER, and in light of the preceding two points, its method of estimating γ is necessarily biased upwards, by construction.

Using the assumptions that $F = 1$ and $\gamma = \theta$, the AER proposes as its best estimator of γ the quantity $\hat{\gamma}_{AER} = (\hat{\gamma}_{BS} + \hat{\gamma}_{HM})/2$, where $\hat{\gamma}_{BS}$ and $\hat{\gamma}_{HM}$ denote the Beggs and Skeels (2006) and the Handley and Maheswaran (2008) estimates of γ , respectively.

If one accepts that $\hat{\gamma}_{BS}$ and $\hat{\gamma}_{HM}$ are estimates of lower and upper bounds on γ then the AER approach is plausible if one also believes that the true value of γ lies at the mid-point of the range of values bounded by the true lower and upper bound. That is, if $\gamma = (\gamma_L + \gamma_U)/2$, where γ_L and γ_U denote the true lower and upper bounds that $\hat{\gamma}_{BS}$ and $\hat{\gamma}_{HM}$ purportedly estimate.

Even if one does not believe that γ lies exactly at the mid-point between γ_L and γ_U then the AER's proposed approach might provide a useful approximation if one believes that the true value of γ is, at least, roughly halfway between γ_L and γ_U . Of course, to the extent that the true value of γ lies at one end or the other of this range, the approximation becomes less useful.

As it is, the proposition that $\hat{\gamma}_{BS}$ is an estimate of a lower bound is simply wrong.⁴ Rather, $\hat{\gamma}_{BS}$ is an estimate of γ itself, it is not an estimate of γ_L . Hence $\hat{\gamma}_{AER}$ is an estimate of the mid-point between γ and γ_U , which is given by $\gamma^* = (\gamma + \gamma_U) / 2$. Except in the completely implausible situation where $\gamma = \gamma_U$ it follows that $\gamma^* > \gamma$. That is, $\hat{\gamma}_{AER}$ is trying to estimate a number that is bigger than γ . Because $\hat{\gamma}_{AER}$ is an unbiased estimator for γ^* , it follows that $\hat{\gamma}_{AER}$ is an upwardly biased estimator for γ .

Note that the conclusion obtained in the previous paragraph is not based on any opinion of mine, it is purely based on stated AER interpretations of the quantities that they work with. Moreover, the bias is an automatic consequence of the procedure adopted by the AER; that is, it is true by construction.

Although contrary to the majority of the AER's statements in relation to this topic, and the views expressed by its own consultant, in the Draft Determination the AER sought to characterize the Handley and Maheswaran (2008) study as a point estimate of γ , rather than an estimated upper bound. However, there can be no question that the AER's methodology involves averaging an upper bound with a point estimate, upwardly biasing the resulting estimate for γ .

⁴ The AER's acknowledgement of this point is documented in item 2 above.

3. Criticisms of the SFG Study by the AER

In this section I explore the findings contained in AER (2009b) with respect to SFG (2009). The AER has raised a number of concerns about the results; including (AER 2009b, p. 264)

- the methodology employed
- the sampling selection
- the filtering process undertaken
- other identified deficiencies

The AER (2009b, p. 270) also makes the following statements, partially in response to Skeels (2009b):

The AER examined the data and statistical program codes underlying the updated SFG study, and found:

- the updated results were replicable
- the data set used as an input to regression appears not to use historically consistent price and dividend data which may introduce unnecessary noise into the estimation results
- contrary to Skeels' claim, there continues to be an issue with the appropriate use of the corporate tax rates as there remains a three-month lag for the adoption of the 34 and 30 per cent tax rates
- there have been no tests conducted to examine the extent of multi-collinearity, as the AER has previously recognised that dividend drop-off studies are likely to be prone to multi-collinearity given the high correlation between cash dividends and the associated franking credits

- although now some economic reasons are included in the Cook's D analysis, the Cook's D analysis may fail to identify observations, which in themselves are not influential, but when combined are jointly influential
- the AER has concerns about the amount of filtering of the data used in the 2008 SFG study.

As might be seen from these two extracts there are some recurring themes in the AER's analysis of SFG (2009). These themes are summarized in Table 1, which also contains some references to where the various issues are raised in AER (2009b) and an outline of where I discuss these issues in this document.

Table 1. AER Criticisms of the SFG Report

Generic Issues	Pages Issue Raised*	Section Issue Discussed**
Multicollinearity	264, 270-271, 273, 276	3.1
Incorrect Corporate Tax Rates	270, 273	3.2
Use of Historically Inconsistent Data	270, 272-273	3.3
Use of Cook's D Statistic and Outliers	271	3.4
Comparison of Regression Results	Table 9.2 (267-269)	4

* References are to pages of the AER (2009b).

** References are to sections of this document

In my opinion there are broadly two classes of issues raised by the AER. First, there are aspects of technique. This class includes concerns about multicollinearity and the use of Cook's D statistic. The second class of issues focuses more directly on the data used in the analysis. In some sense, this second class is the one of more practical concern because shortcomings in data can influence results without these shortcomings necessarily being readily apparent to the practitioner. In contrast, the technical issues of the first class, although potentially important, tend to be of less practical concern because,

to the extent that they are a problem, they typically readily reveal themselves to the practitioner.

Finally I should point to an elementary error of my own that the AER correctly identified in Skeels (2009a, p. 8). I inadvertently used an estimate of the population variance rather than the appropriate estimated standard error in the calculation of a t-statistic. On the basis of that error the AER⁵ chose to dismiss all of the analysis in that section of my report. Whilst the t-statistic and related confidence intervals identified by the AER are in error, this error does not impinge upon the other calculations in that section and so, in my opinion, it is unreasonable and incorrect for the AER to ignore the remaining analysis.

3.1 Multicollinearity

As can be seen from Table 1, the AER make repeated reference to the potential impact of multicollinearity on the results obtained by SFG. I believe that the AER has dramatically overstated the importance of multicollinearity as an issue. As a practical matter, if multicollinearity is an issue it will be readily evident in the regression results.

There is no evidence that multicollinearity represents a serious practical problem in either Beggs and Skeels (2006) or SFG (2009). Consequently, in my opinion, the AER overstates the importance of multicollinearity to the SFG study.

Multicollinearity is a numerical problem and the extent to which it is a problem can be determined from the results obtained. Moreover, despite concerns about the lack of testing (AER, 2009b, p. 270), this is actually a sentiment shared by the AER (AER, 2009a, pp. 443-444):

... the regression coefficients (except for the intercept term) are insignificant but that the adjusted R-squared is close to one. This result is symptomatic of a multicollinearity problem.

⁵ AER (2009b, p. 275)

The symptoms described here are those observed in the case of near-perfect multicollinearity. Multicollinearity can be thought of as coming in various degrees, with perfect multicollinearity being the worst case scenario and orthogonal regressors the case where there is no multicollinearity. Between these two extremes is a continuum of degrees of correlation amongst the regressors. Perfect multicollinearity can be thought of as a multivariate generalization of division by zero. In the same way as the ratio $1/0$ is not a well-defined real number (the convention is to treat the ratio $1/0$ as being infinitely large) so it is the case that if there is perfect multicollinearity then it is impossible to calculate finite standard errors for OLS estimates. Most modern computer packages will detect such errors and will often refuse to proceed any further. As such perfect multicollinearity is not the sort of problem that might be inadvertently ignored leading to mistaken inference. Instead, it is a situation that modern statistical software is designed to detect and to warn the user about.

Near-perfect multicollinearity, conversely, is problematic in that it will not stop computer packages and so regression results will be presented. Near-perfect multicollinearity is akin to the problem of constructing the ratio $1/\varepsilon$ where ε is a very small number. Such ratios are unstable because quite small changes in ε can lead to substantial changes in the value of the ratio. Similarly OLS estimates can be extremely sensitive to very small changes in the data set and are, consequently, often thought of as being unreliable. However, as observed above by the AER, near-perfect multicollinearity manifests itself in the results in certain obvious ways and so, if one is alert, it should be clear when multicollinearity is problematic; specifically, the classic symptoms for near-perfect multicollinearity are large estimated standard errors (leading to insignificant coefficient estimates) coupled with goodness-of-fit measures suggesting that the model provides a good fit, e.g. adjusted R-squared close to unity.

The case of orthogonal regressors almost never arises in practical situations except for designed experiments. In economic applications there is almost always some degree of correlation amongst the regressors and this poses no practical problem at all, with regression being one of the statistical tools most widely used by practitioners.

Looking for the same indicators of multicollinearity that the AER uses, the question can be asked is there any evidence of multicollinearity in the SFG results. The answer is a clear no. There are times when a single coefficient estimate might be found to be insignificantly different from zero but, when this occurs, other coefficient estimates in the same equations are significant. In my opinion this is simply evidence that the particular coefficient may be insignificantly different from zero. It is certainly not evidence of multicollinearity.

Even if multicollinearity is a problem of practical relevance in this case, which in my opinion it is not, it remains the case that OLS remains consistent and the best linear unbiased estimator. That is, within its class of estimators OLS still provides the optimal estimates with the smallest possible estimated standard errors.

As explained above, near-perfect multicollinearity is the practical problem of most concern, although it is relatively easy to detect in regression output and should not cause practitioners any real difficulty. One thing that should not be forgotten is that, provided the data does not suffer from perfect multicollinearity, which in this case it clearly does not, OLS remains consistent and the best linear unbiased estimator. That is, even though estimated standard errors may be sufficiently large to make coefficient estimates insignificantly different from zero, they are still as small as can be obtained within this class of estimators and so OLS is still the best estimator to use by standard criteria. Dismissing a set of OLS estimates because there is some multicollinearity in the data is, simply, the wrong response. This does not mean that one should never be concerned about multicollinearity. Instead, one should look for the tell-tale signs of problems and, if they signal that multicollinearity is a problem, then one should respond accordingly.⁶

There remains no evidence that multicollinearity is a concern for either Beggs and Skeels (2006) or SFG (2009).

⁶ The appropriate response may differ from case to case.

3.2 Incorrect Corporate Tax Rates

The AER correctly identified a small error in the use of corporate tax rates by SFG. SFG (2010, p. 4) addresses this issue, the effect of which is demonstrated to be extremely minor. I believe that SFG (2010) are now using corporate tax rates correctly.

The AER correctly identified a small error in SFG's treatment of corporate tax rates. This error affected a tiny proportion of the sample observations used in the revised results presented by SFG in the appendix of Skeels (2009b). SFG (2010) correct this error and present revised results. The impact on the results obtained is very small, causing changes in only the 3rd decimal place. I believe that SFG (2010) are now using corporate tax rates correctly.

3.3 Use of Historically Inconsistent Data

The AER has identified a small number of observations from the SFG (2009) data set that may be historically inconsistent. To the extent that the AER is aware of any further such observations it should make them known to SFG. In the meantime, SFG (2010) have conducted a sensitivity analysis whereby a sub-sample of their data set is examined intensively, similar to the approach used by auditors of large firms. They find that this intense examination of a sub-sample of their data leads to minimal changes in their results.

ETSA Utilities made the following information request on 8 December 2009:

The AER note on p.270 that the data set used as an input by SFG to regression appears not to use historically consistent price and dividend data, which may introduce unnecessary noise into the estimation results. Please outline the basis

for this conclusion including details of the qualitative and quantitative methods applied in any calculations and formulae made or used by the AER

to which the AER responded in the following way:

The AER compared the SFG data (on a selective basis) to data from Bloomberg, and found that the SFG stock price and dividend data are prone to errors:

1. The share price and dividend data are not adjusted to smooth out the effect of bonus issues, right issues, share splits and other events that may change the number of shares on issues. It is desirable to use adjusted series to reflect the same basis of quotation for shares of a company.
2. Company-specific information (including the share split and bonus share issues) is announced around the ex-dividend days, the firm share price changes substantially, reflecting market reaction to both.

For example, KAZ made several announcements around the ex-dividend day (10/04/2001) when it paid out a dividend of 0.0025, including: an announcement that it had signed a three-year IT outsourcing contract; and an announcement that it has successfully implemented a national contract with Elders.

3. Observations on special cash dividend payments are not excluded from the sample or properly controlled in the analysis.
4. Incomplete data as not all dividend-paying events for a firm paying regular interim and final dividends during the sample period are included.

The AER has identified some historically inconsistent data used in the SFG study. SFG (2010, pp. 8-11) has addressed each of the AER's concerns listed above. Specifically:

1. SFG (2010, p.8) address the use of historically inconsistent data. Their fundamental argument is that their data is inconsistent with Bloomberg for the simple reason that Bloomberg make numerous adjusts resulting in price series that are no longer the traded prices for the stocks. As such, the Bloomberg data is inappropriate for price dividend studies that seek to model the change

in actual prices. I believe that the SFG argument is both correct and compelling.

2. SFG (2010, pp. 9-11) respond to the AER's concerns about company-specific information, in the form of announcements around the ex-dividend day, in a number of ways. Most importantly they point out that regression analysis explores average behaviour and that, unless there is some reason to believe that all company-specific information impinges on price movements in the same way, then such announcements should have no significant impact on the average behaviour measured by the regression analysis. I can see no reason why average behaviour should be affected by such announcements because I can see no reason to believe that all company-specific information impinges on price movements in the same way. Consequently, I do not believe that this concern of the AER should be given much weight.
3. The AER is concerned that special dividend payments are not excluded from the analysis. Beggs and Skeels (2006) did remove these dividend events from their analysis, however, SFG (2010, p.8) make a strong argument that such data removal is probably unnecessary because such events are announced in advance and so, come the actual event, there is no reason to believe that the price movements associated with these dividend events should necessarily be different to those of any other dividend events. Again, I find this argument convincing and would need to see evidence to the contrary to believe that it was wrong.
4. The AER expresses concerns about missing dividend events from the sample period. It does not, however, provide any examples for verification. SFG (2010, p.12) provides some comment on this issue but, in the absence of more detail from the AER, it is impossible to be certain of exactly what is missing. I am neither aware of any specific observations missing nor able to deny this possibility. The question I would raise, however, is what is the likely impact of these observations. Unless there is some reason to believe that they are

influential I would conclude that their absence would have no material impact on the parameter estimates obtained. There is nothing in the AER's remarks to suggest that these 'missing' observations are influential.

In response to the AER's concerns SFG have also conducted a sensitivity analysis whereby a sub-sample of their data is examined intensively with potentially unreliable observations discarded. This approach is similar to that which might be taken by the auditor of a large firm. They find that, after re-working their results in light of this intensive examination of a subset of the data, that their results are largely unaffected.

I note that the AER's response has not identified a large number of problematic observations and it has been relatively straight-forward for SFG to re-evaluate their work in light of this information. They have gone further than that and adopted a sampling approach to further investigate their data-set for unreliable observations. This investigation has not yielded any material change in their results. SFG's further sampling work re-enforces the view contained in my previous report (Skeels, 2009b, p. 5) that "the SFG estimate of theta of 0.23 represents the most accurate estimate currently available".

3.4 Use of Cook's D Statistic and Outliers

The modified use of Cook's D statistic by SFG is an appropriate statistical technique for filtering the SFG data set.

Cook's D statistic provides a metric whereby every observation in the sample can be ranked in terms of its influence on the estimates obtained, relative to the influence of the other observations in the sample. The larger the value of Cook's D statistic the more influential is that observation, where influence is defined in terms of the effect on the coefficient estimates of removing that observation from the sample for the purposes of estimation.

The reason for SFG's use of Cook's D statistic was to detect and remove from the sample any unreliable observations that may be having a substantial impact upon the coefficient estimates. The cause of my concern was the simple fact that being influential does not make an observation unreliable. Indeed, observations are influential because of the information they contain and if this information is reliable then you want it to be influential in calculation of the coefficient estimates. Consequently, I was concerned that the use of Cook's D statistic by SFG did not pay sufficient attention to the economic reliability of the data identified.

In an earlier report (Skeels, 2009b) I raised the issue of economic reliability of data with SFG and they subsequently modified their procedure to one where Cook's D statistic was used solely to identify influential observations. These observations were then investigated and individual observations were only discarded in situations where it could be established that there was something unreliable about them, the argument being that the coefficient estimates should not be unduly influenced by unreliable observations.⁷ In my opinion this modified procedure provides a reasonable compromise between the need to ensure that the results obtained were not driven by unreliable observations while, at the same time, avoiding the prohibitive cost associated with individually investigating every observation.⁸ In light of the way its use has been modified by SFG it is my opinion that the modified use of Cook's D statistic by SFG is an appropriate statistical technique for filtering the SFG data set.

In my opinion economically unreliable observations that are not influential are unlikely to significantly affect the results obtained and do not constitute cause for concern.

It should be noted that the modified procedure of SFG does not preclude the possibility of unreliable observations remaining in the sample. In my opinion, unless an unreliable observation is influential, it makes very little difference whether or not it remains in the

⁷ These new results were reported in an appendix to C.L. Skeels (2009), A Review of the SFG Dividend Drop-Off Study: A Report prepared for Gilbert and Tobin.

⁸ I am not aware of any investigation where every single observation has been investigated to determine its reliability.

sample as its presence in the sample has no material impact on the coefficient estimates. This impact on the coefficient estimates is exactly the information conveyed by Cook's D statistic.

The AER's primary concern about the use of Cook's D statistic is that "the Cook's D analysis may fail to identify observations, which in themselves are not influential, but when combined are jointly influential." In my opinion, this is a situation of absolutely no practical relevance in context of the data set used by SFG.

In response to this modification of use of Cook's D statistic, the AER (2009, p.271) comment:

... although now some economic reasons are included in the Cook's D analysis, the Cook's D analysis may fail to identify observations, which in themselves are not influential, but when combined are jointly influential.

In response to an ETSA Utilities information request dated 8 December 2009, the AER state:

Examples of such events include, but are not limited to, ongoing merger speculation (an example of this was Alinta AGL, which went on for a long period of time but did not affect the market), the issuing of new shares, signs of financial stress of a specific business over a period of time (e.g. Envestra, Timbercorp, Babcock and Brown, etc.), and other events which may affect the volatility of a stock's prices over a prolonged period of time but not the entire market.

While I acknowledge that the sorts of things the AER describe in the above passage may well impact upon stock price volatility, volatility by and of itself is of only secondary concern here. In particular, stock price volatility will have absolutely no impact on either the unbiasedness or consistency of the least squares estimator. Where stock price volatility may cause concern is in the precision with which the estimates are obtained, specifically in the magnitudes of the estimated standard errors for the coefficient

estimates; the greater stock price volatility the greater the estimated standard errors. With larger estimated standard errors come wider confidence intervals and small t-statistics *for all coefficient estimates*. While occasional coefficient estimates are found to be insignificantly different from zero, this is not a generic problem afflicting all of the results (the majority of coefficient estimates are found to be significantly different from zero) and so, in my opinion, the observed results suggest that excessive volatility is not a great practical problem.

What would be of concern were if the sorts of events described above by the AER bias the estimates of γ obtained from a dividend drop-off study. In order for that to happen observations must be unreliable in some consistent way. Specifically, if the dividend drop-off is either consistently exaggerated or consistently attenuated then such observations may induce bias in the coefficient estimates. However, volatility (or variability) in the price data should not impact on the dividend drop-offs in a consistent way, sometimes the drop-offs will be exaggerated and sometimes attenuated but, on average, this should not have a substantial bias-inducing impact on the coefficient estimates. The fact that the leading example provided by the AER in the preceding extract is one that ‘did not affect the market’ raises the question of why the AER are concerned about this at all. Indeed, in my opinion, there is nothing in the sorts of examples provided above suggesting that such an impact is a serious cause for concern for any individual stock.

In summary, it is extremely difficult to envisage situations where ‘the Cook’s D analysis may fail to identify observations, which in themselves are not influential, but when combined are jointly influential.’ In my opinion, the AER does not have cause to be concerned about the fact that Cook’s D statistic is designed for the detection of individual influential observations rather than sets of influential observations.

3.5 Summary

I make the following conclusions in respect of the AER's concerns with the SFG study:

- The relevance of multicollinearity in the SFG study is overstated by the AER.
- The AER correctly identified an error in the treatment of corporate tax rates. This error has been corrected in the revised results presented in SFG (2010).
- SFG (2010) have addressed the AER's concerns about historically consistent data and further explored the sensitivity of their results to potentially unreliable observations and found that their results are extremely stable.
- The modified use of Cook's D statistic by SFG is an appropriate statistical technique for filtering the SFG data set.

The AER correctly identified some shortcomings with the original SFG study and have subsequently raised some on-going concerns to the revisions provided by SFG in the appendix of Skeels (2009b). However, SFG (2010) have responded to the AER's concerns and, in my opinion, their revised results merit greater consideration than they have to date received, especially as they are based on the most up to date and relevant data of any of the studies that have been considered.

4. Table 9.2

The AER have expressed concerns about the differences in results contained in Table 9.2 (AER, 2009b, p.269). These concerns relate to a variety of different aspects of the contents of Table 9.2.

1. One issue for the AER is the difference between the various SFG results and those of Beggs and Skeels (2006). One explanation for this is clearly that the samples used in estimating the different results are clearly not identical. One difference in the data sets that appears to have been over-looked is the fact that the Beggs and Skeels data set extends back to July 1985 whereas that for SFG only extends back as far as July 1997. It is possible that these differences in sample lengths manifest themselves in the slope coefficients via the (unreported) intercepts contained in each equation. That is, the difference in results ascribed to different samples may be manifestations of differences in the lengths of the overall samples which are used in the estimation of intercepts.
2. A second AER concern arising from Table 9.2 is that the estimated standard errors for the SFG results with coefficient estimates closest to those of Beggs and Skeels (2006) are much larger than the estimated standard errors of Beggs and Skeels. This is true but is something of a straw-man because if one compares the Beggs and Skeels standard errors with those for SFG's preferred results then this is no longer the case. Specifically, the standard errors reported in the SFG results with influential (and economically unreliable) observations removed from the sample are typically smaller than those of Beggs and Skeels and are similar in magnitude otherwise.
3. The AER discounts SFG's preferred results on the grounds the coefficient of cash dividends is slightly greater than unity and so is then dismissed as economically implausible because it implies that a dollar of cash dividends is valued at more than a dollar.

Estimates are accompanied by estimated standard errors so that we have an idea of the precision with which the estimates have been formed. This is exactly why people are interested in confidence intervals.

If the point estimate is economically implausible but the confidence interval includes economically plausible values, as the preferred SFG results do, then the correct interpretation of the estimates is that they suggest that the true parameter is near to the boundary of economically plausible values. They do not suggest that the true parameter value is an economically implausible value. This point is illustrated in SFG (2010, Figure 1), where it is clear that coefficient estimates can be probabilistically equivalent to a range of different values. To attach an implausible interpretation to something when a plausible interpretation is equally probable does not constitute a fair assessment of the statistical evidence.

For the reasons presented here, the factors identified by the AER in 1-3 above are not sufficient reasons to dismiss the results contained in the SFG report.

5. Final Remarks

In determining a value for γ the AER is faced with a difficult task. This task is complicated by the fact that all of the various approaches and results before it, including those it prefers, are flawed; there are no ‘perfect’ results available. Use of the CAPM involves a process of estimation. To inform this estimation all relevant information should be taken into consideration, bearing in mind that no elements are going to be without some element of limitation.

In this document I have, first, presented some methodological concerns with the approach adopted by the AER in its determination of θ . In my opinion, this approach will necessarily over-estimate the true value of θ . I note that this conclusion does not depend on any professional judgment of my own, rather it is the logical consequence of the AER’s own interpretations of the quantities used in its procedure.

A second component of this document examines concerns raised by the AER in respect of SFG (2009). The AER correctly identified some shortcomings with the original SFG study. SFG have responded to the AER’s concerns in Skeels (2009b) and have further examined the AER’s most recently stated concerns in SFG (2010), where they find that their results are stable even when more extensive cleaning of their data set is carried out.

I consider that SFG (2009) is important for the simple reason that it contains information from that data set which extends closest to the current date and there is no reason to suggest that the most recent period is in some way aberrant or unrepresentative. That is, it contains the most up to date and relevant information available. Despite this, the SFG report has been subject to a level of scrutiny well in excess of that placed on other studies that have figured prominently in the AER’s decision making process. As indicated in my report, I think that a number of the AER’s concerns are overstated and relate to issues that are of little practical importance. For these reasons I do not believe that the AER’s concerns constitute grounds to dismiss the results of SFG (2009). The AER should have regard to the SFG study as it contains relevant information as to how much an investor

values imputation credits. After all, it is the value of imputation credits which is being assessed in deriving the overall cost of capital estimate.

6. References

- Australian Energy Regulator (2009a), *Electricity transmission and distribution network service providers: Review of the weighted average cost of capital (WACC) parameters*
- Australian Energy Regulator (2009b), *Draft Determination*.
- Beggs, D. J., and C. L. Skeels (2006), Market Arbitrage of Cash Dividends and Franking Credits. *The Economic Record*, 82 (258), 239-252.
- Cannavan, D., F. Finn, and S. Gray (2004), The Value of Dividend Imputation Tax Credits in Australia. *Journal of Financial Economics*, 73, 167-197.
- Handley, J. C., and K. Maheswaran (2008), A Measure of the Efficacy of the Australian Imputation Tax System. *The Economic Record*, 84 (264), 82-94.
- Skeels, C. L. (2009a), *Estimation of γ* , Report prepared for ETSA Utilities.
- Skeels, C. L. (2009b), *A Review of the SFG Dividend Drop-Off Study: A Report prepared for Gilbert and Tobin*.
- Strategic Finance Group (2009), *The value of imputation credits as implied by the methodology of Beggs and Skeels (2006)*. Report prepared for ENA, APIA and Grid Australia.
- Strategic Finance Group (2010), *Response to AER Draft Determination in relation to gamma*. Report prepared for ETSA Utilities.

Appendix 1: Brief of C Skeels

BRIEF of C Skeels

RESPONSE TO DRAFT DETERMINATION

Background

The Australian Energy Regulator (**AER**) is currently considering ETSA's Regulatory Proposal for 2010-2015, and has published its Draft Determination on 25 November 2009. As part of this process, the AER must determine an appropriate return on capital, which is a function of (inter alia) the valuation of dividend imputation credits.

In support of ETSA Utilities Original Proposal you prepared a number of expert reports examining a dividend drop off study by SFG Consulting.

Questions

In the Draft Determination the AER has raised a number of concerns with matters raised in your review of the SFG Consulting analysis. Could you please refer to the Draft Determination and address the concerns raised by the AER.

We note that SFG Consulting will also be responding to specific queries in relation to the data set used in their analysis. We will provide you with a copy of SFG Consulting's response to those issues when it is available. Could you please examine their response to these issues and whether you consider the response to be appropriate.

Guidelines in preparing your report

Attached are Expert Witness Guidelines issued by the Federal Court of Australia. Although this brief is not in the context of litigation, ETSA Utilities seeks a rigorously prepared independent view for use in the context of regulatory decision making and you are requested to follow the Guidelines to the extent reasonably possible in the context.

In particular, please:

- (a) identify your relevant area of expertise and provide a curriculum vitae setting out the details of that expertise;
- (b) only address matters that are within your expertise;
- (c) where you have used factual or data inputs please identify those inputs and the sources;
- (d) if you make assumptions, please identify them as such and confirm that they are in your opinion reasonable assumptions to make;
- (e) if you undertake empirical work, please identify and explain the methods used by you in a manner that is accessible to a person not expert in your field;
- (f) confirm that you have made all the inquiries that you believe are desirable and appropriate and that no matters of significance that you regard as relevant have, to your knowledge, been withheld from your report; and
- (g) please do not provide legal advocacy or argument and please do not use an argumentative tone.

Attachment A: Expert Witness Guidelines issued by the Federal Court of Australia

1 General Duty to the Court¹

- 1.1 An expert witness has an overriding duty to assist the Court on matters relevant to the expert's area of expertise.
- 1.2 An expert witness is not an advocate for a party even when giving testimony that is necessarily evaluative rather than inferential.²
- 1.3 An expert witness's paramount duty is to the Court and not to the person retaining the expert.

2 The Form of the Expert Evidence³

- 2.1 An expert's written report must give details of the expert's qualifications and of the literature or other material used in making the report.
- 2.2 All assumptions of fact made by the expert should be clearly and fully stated.
- 2.3 The report should identify and state the qualifications of each person who carried out any tests or experiments upon which the expert relied in compiling the report.
- 2.4 Where several opinions are provided in the report, the expert should summarise them.
- 2.5 The expert should give the reasons for each opinion.
- 2.6 At the end of the report the expert should declare that "[the expert] has made all the inquiries that [the expert] believes are desirable and appropriate and that no matters of significance that [the expert] regards as relevant have, to [the expert's] knowledge, been withheld from the Court."
- 2.7 There should be included in or attached to the report: (i) a statement of the questions or issues that the expert was asked to address; (ii) the factual premises upon which the report proceeds; and (iii) the documents and other materials that the expert has been instructed to consider.
- 2.8 If, after exchange of reports or at any other stage, an expert witness changes a material opinion, having read another expert's report or for any other reason, the change should be communicated in a timely manner (through legal representatives) to each party to whom the expert witness's report has been provided and, when appropriate, to the Court.⁴
- 2.9 If an expert's opinion is not fully researched because the expert considers that insufficient data are available, or for any other reason, this must be stated with an indication that the opinion is no more than a provisional one. Where an expert witness who has prepared a report believes that it may be incomplete or inaccurate without some qualification, that qualification must be stated in the report (see footnote 5).
- 2.10 The expert should make it clear when a particular question or issue falls outside the relevant field of expertise.

¹ See rule 35.3 Civil Procedure Rules (UK); see also Lord Woolf "Medics, Lawyers and the Courts" [1997] 16 C.J.Q. 302 at 313

² See [Sampi v State of Western Australia \[2005\] FCA 777](#) at [792]-[793], and [ACCC v Liquorland and Woolworths \[2006\] FCA 826](#) at [836]-[842]

³ See rule 35.10 Civil Procedure Rules (UK) and Practice Direction 35 – Experts and Assessors (UK); *HG v the Queen* (1999) 197 CLR 414 per Gleeson CJ at [39]-[43]; [Ocean Marine Mutual Insurance Association \(Europe\) OV v Jetopay Pty Ltd \[2000\] FCA 1463](#) (FC) at [17]-[23]

⁴ The "*Ikarian Reefer*" [1993] 20 FSR 563 at 565

- 2.11 Where an expert's report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter,⁵ these must be provided to the opposite party at the same time as the exchange of reports.

3 Experts' Conference

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

⁵ The "*Ikarian Reefer*" [1993] 20 FSR 563 at 565-566. See also Ormrod "*Scientific Evidence in Court*" [1968] Crim LR 240

Appendix 2: Curriculum Vitae of C. Skeels

CURRICULUM VITAE

Christopher Lachlan SKEELS

PERSONAL DETAILS

Academic Qualifications

- 1989 PhD (Economics), Monash University.
Thesis Title: Estimation in misspecified systems of equations:
Some exact results.
- 1982 Bachelor of Economics, Honours IIA, Monash University.
(Economics/Economic Statistics),

Appointments

Present Appointment

Associate Professor (Tenured), Department of Economics, University of Melbourne. (January 2009 – present)

Previous Appointments

- Senior Lecturer (Tenured), Department of Economics, University of Melbourne. (January 2002 – December 2008)
- Senior Lecturer (Tenured), School of Economics, Australian National University. (January 2001 – December 2001)
- Senior Lecturer (Tenured), Department of Statistics and Econometrics, Australian National University. (July 1997 – December 2000)
- Visiting Associate Professor, Department of Economics, Duke University. (August – September, 2000)
- Visiting Lecturer, Department of Economics, University of Warwick. (January – December, 1995)
- Lecturer (Tenured), Department of Statistics, Australian National University. (August 1992 – July 1997)
- Visiting Assistant Professor, Management Science Division, Faculty of Commerce and Business Administration, University of British Columbia. (November 1991 – August 1992).
- Fixed-Term Lecturer, Department of Statistics, Australian National University. (January 1988 – October 1991)
- Fixed-Term Lecturer, Department of Statistics, Australian National University. (May 1987 – December 1987)
- Research Officer, Department of Market Research and Economic Forecasting, Gas and Fuel Corporation of Victoria. (September 1986 – May 1987)
- Sessional Tutor, Department of Econometrics and Operations Research, Monash University. (March 1983 – September 1986)
- Clerk Class 1, Forecasting — Trunk Network Products, Telecom Australia. (November 1982 – February 1983)
- Clerk Class 1, Forecasting Section, Telecom Australia. (November 1981 – February 1982)

Membership of Professional Associations

Member of Econometric Society

Member of Economic Society of Australia (Victorian Branch)

TEACHING

Administration

Program Director

Graduate Diploma in Economics	2007 – present
Postgraduate Diploma in Economics	2007 – present
Master of Commerce (Economics)	2007 – present
Master of Economics	2009 – present
PhD Program in Economics	2009 – present

Subjects Taught

Unless otherwise marked the listed subjects were taught at the Australian National University. Subjects taught at any of the University of Melbourne, the University of Warwick (UK), the University of British Columbia (Canada), or Duke University (US), are labelled UoM, Warwick, UBC, or Duke, respectively.

Undergraduate Subjects

First Year Subjects

Quantitative Methods I	2002 – 2004	UoM
Quantitative Methods for Business and Economics I	1997 – 2001	
Economic Statistics	1988 – 1994, 1996	

Second Year Subjects

Financial Mathematics	2000 – 2001	
Marketing Research Methods	1998 – 1999	
Econometric Modelling	1997 – 1999, 2001	
Techniques for Mathematical Economics and Econometrics	1995	Warwick
Applied Econometrics	1993	
Commerce 291	1992	UBC
Introductory Econometrics	1988 – 1989	
Introductory Econometric Techniques	1987, 1996	

Third Year Subjects

Basic Econometrics	2005 – present	UoM
Econometrics II	1995	Warwick
Econometric Techniques	1990 – 1991	

Fourth Year Subjects

Microeconomics	2003 – 2008	UoM
Econometric Theory and Method	1988, 1993 – 1994	

Postgraduate Subjects

Masters Research Report	2007 – present	UoM
Basic Econometrics	2005 – present	UoM
Advanced Microeconometrics	2003 – 2008	UoM
Econometrics I	2000	Duke
Multivariate Analysis	1997	
Special Topics in Econometrics	1994	
Economic Models and Introductory Econometrics	1987	

Honours and Masters Supervision

I have supervised projects that form part of the unit ‘Case Studies in Applied Econometrics’, a mandatory component of postgraduate training economics at ANU. At the University of Warwick, I also supervised projects associated with the unit ‘Quantitative Methods I’, which is a compulsory unit in their Master of Economics Program. Finally, I have regularly supervised both Honours and Masters projects at both ANU and at the University of Melbourne.

PhD Supervision

Wang Sheng Lee	Graduated 2007
Simon Barry	Graduated 1996 (Thesis awarded PAP Moran Prize)
Marios Obwana	Graduated 1995
Anne Hawke	Graduated 1992

In all cases my role has been as a member of the supervisory committee.

Postgraduate Thesis Examination

PhD Theses

Gatechew Asgedom Tessema (University of New England), 1995.
 Giovanni Amisano (University of Warwick), 1995.
 Sivagowry Srianthakumar (Monash University), 2001.

MEc Theses

David J. Hoile (University of Warwick), 1995.
 Emanuela Marrocu (University of Warwick), 1995.
 Asoka Handagama (University of Warwick), 1995.

MSc Theses

Magdalena G Tolentino (Australian National University), 1997.

Other

Panel member for *Supervision Skills Workshop: Humanities*, Melbourne School of Graduate Research, The University of Melbourne. Session entitled ‘Best Practice in Graduate Research Supervision: A Panel Discussion’.

RESEARCH

Awards

- 1997 Econometric Theory *Multa Scripsit* Award.
1983–86 Australian Government Commonwealth Postgraduate Research Award.

Grants

2007	ARC Discovery Project		
	Topic: Up in Smoke: An Econometric	\$100,000	(2007)
	Analysis of Labour Market, Health and	\$90,000	(2008)
	Educational Consequences of Cannabis Use	\$100,000	(2009)
	(with J Williams, JC van Ours, R Pacula, funds allocated equally)		
2007	ARC Discovery Project		
	Topic: Econometric Estimation and	\$100,000	(2007)
	Inference in Weakly Identified Models	\$80,000	(2008)
	(with Poskitt, DS, G Forchini, funds allocated equally)	\$100,000	(2009)
2006	Faculty Research Grant Scheme		
	Topic: Approximations to the Sampling		
	Behaviour of the IV Estimator in Dynamic		
	Simultaneous Equations Models	\$10,000	
2004	Faculty Research Grant Scheme		
	Topic: Approximations to the Sampling		
	Distribution of the IV Estimator	\$13,000	
2003	Faculty Research Grant Scheme		
	Topic: Finite Sample Behaviour of a Class of		
	Instrument Relevance Statistics	\$10,000	
2002	Faculty Research Grant Scheme		
	Topic: Weak Instruments	\$10,000	
1999/2000	Faculty of Economics and Commerce		
	Summer Research Grant	\$1,600	
1998/99	Faculty of Economics and Commerce		
	Summer Research Grant	\$1,800	
1998	Small Australian Research Council Grant	\$9,000	
	(joint with DS Poskitt, funds allocated equally)		

Publications

Articles that are not refereed journal articles but are marked with a ‡ were refereed before acceptance for publication. My top 5 publications are marked by an asterisk (*).

Chapters in Books

- ‡ Griffiths, WE, Skeels, CL & Chotikapanich, D, 2002. Sample Size Requirements for Estimation in SUR Models. Chapter 27 (pp. 571–586) in *Handbook of Applied Econometrics and Statistical Inference*, A Ullah, A Wan and A Chatturvedi (eds.), Marcel Dekker: New York.

- ‡* Hillier, GH & Skeels, CL, 1993. Some further exact results for structural equation estimators. Chapter 9 (pp. 117–139) in *Models, Methods and Applications of Econometrics: Essays in Honour of A. R. Bergstrom*, PCB Phillips (ed.), Basil Blackwell.

Refereed Journal Articles

- Poskitt, DS & Skeels, CL, 2009. Assessing the magnitude of the concentration parameter in a simultaneous equations model. *Econometrics Journal* 12 (1), 26–44.
- Poskitt, DS & Skeels, CL, 2008. Conceptual frameworks and experimental design in simultaneous equations. *Economics Letters* 100(1), 138–142.
- * Poskitt, DS & Skeels, CL, 2007. Approximating the distribution of the two-stage least squares estimator when the concentration parameter is small. *Journal of Econometrics* 139(1), 217–236.
- Williams, J & Skeels, CL, 2006. The impact of cannabis use on health. *De Economist* 154 (4), 517–546.
- Beggs, DJ & Skeels, CL, 2006. Market arbitrage of cash dividends and franking credits. *The Economic Record* 82(258), 239–252.
- Skeels, CL & Vella, F, 1999. A Monte Carlo investigation of the sampling behaviour of conditional moment tests in Tobit and Probit models. *Journal of Econometrics* 92, 275–294.
- Skeels, CL & Vella, F, 1997. Monte Carlo evidence on the robustness of conditional moment tests in Tobit and Probit models. *Econometric Reviews* 16, 69–92.
- Skeels, CL & Smith, MD, 1996. Some consequences of model misspecification for t testing in a structural equation. *Journal of Statistical Planning and Inference* 50, 251–271.
- Hillier, GH & Skeels, CL, 1996. The ET Interview: Professor AT James. *Econometric Theory* 12, 155–185.
- Skeels, CL & Taylor, LW, 1995. On a simultaneous equations pre-test estimator. *Journal of Econometrics* 68, 269–286.
- * Skeels, CL, 1995b. Instrumental variables estimation in misspecified single equations. *Econometric Theory* 11, 498–529.
- * Skeels, CL, 1995a. Some exact results for estimators of the coefficients on the exogenous variables in a single equation. *Econometric Theory* 11, 484–497.
- Skeels, CL & Vella, F, 1994. The effect of estimator behaviour on conditional moment tests in Probit and Tobit models. *Pakistan Journal of Statistics* 10, 487–516. (Invited paper)
- * Koenker, R, Machado, JAF, Skeels, CL & Welsh, AH, 1994. Momentary lapses: Moment expansions and the robustness of minimum distance estimation. *Econometric Theory* 10, 172–197.
- Koenker, R, Machado, JAF, Skeels, CL & Welsh, AH, 1993. Amemiya’s form of the weighted least squares estimator. *Australian Journal of Statistics* 35, 155–174.
- Skeels, CL, 1990. A conditional canonical approach to simulation studies of I.V. estimators in simultaneous equations models. *Journal of Quantitative Economics* 6, 311–329.

Book Reviews

- Skeels, CL, 2007. Review of ‘Analysis of Microdata’, by Rainer Winkelmann and Stefan Boes, *Economic Record* 83(260), 113–114.
- Skeels, CL, 2006. ‘Simplicity, Inference and Modelling: Keeping it Sophisticatedly Simple’, Zellner, Keuzenkamp and McAleer, eds., *Economic Record* 82(257), 226–227.
- Skeels, CL, 1989. ‘Matrix differential calculus with applications in statistics and econometrics’ by J. Magnus and H. Neudecker, *Economic Record* 65, 313–314.

Papers Submitted for Publication

Gørgens, T, Skeels, CL & Würtz, AH. Efficient Estimation of Non-Linear Dynamic Panel Data Models with Application to Smooth Transition Models.

Papers In Preparation

Poskitt, DS & Skeels, CL. An Investigation of Power Properties of Hypothesis Tests With Weak Instruments.

Skeels, CL & Van Ours, J. On Measurement Error in Self-Reported Tobacco and Alcohol Use Data.

Lee, W-S & Skeels, CL. A Note on the Implementation of the Wooldridge Estimator of the Dynamic Probit Model in Applied Work.

Conference Papers

Items marked with a † were subsequently published.

Gørgens, T, Skeels, CL & Würtz, AH. Efficient Estimation of Non-Linear Dynamic Panel Data Models with Application to Smooth Transition Models. North American Summer Meeting of the Econometric Society, Pittsburgh, June 2008, available at <http://editorial-express.com/conference/NASM2008/program/NASM2008.html>, and the Australasian Meeting of the Econometric Society, Wellington, July 2008.

Poskitt, DS & Skeels, CL. Small concentration asymptotics and instrumental variables inference. Australasian Meeting of the Econometric Society, Alice Springs, July 2006, available at <http://esam06.anu.edu.au>, and the World Congress of the Econometric Society, London, August 2005, available at <http://www.eswc2005.com>. (Submitted to *Journal of Econometrics*.)

† Beggs, DJ & Skeels, CL. Market arbitrage of cash dividends and franking credits. Proceedings of the Australian Conference of Economists, 2005. Available at <http://gemini.econ.umd.edu/conference/ACE2005/program/ACE2005.html>

† Poskitt, DS & Skeels, CL. Approximating the distribution of the Instrumental Variables estimator when the concentration parameter is small. EC² Conference, London, December 2003. (Subsequently published as Poskitt and Skeels, 2007.)

Poskitt, DS and Skeels, CL. A note on a method-of-moments approximation to the distribution of the Instrumental Variables estimator with many weak instruments. Australasian Meeting of the Econometric Society, Sydney, July 2003. (Superseded by paper presented at EC² Conference, London, December 2003.)

Poskitt, DS and Skeels, CL. Assessing Instrumental Variable Relevance: An Alternative Measure and Some Exact Finite Sample Theory. Australasian Meeting of the Econometric Society, Brisbane, July 2002. (Submitted to *Econometrics Journal*.)

Skeels, CL. Of Silk Purses and Sow's Ears: Inference in the Presence of Weak Instruments. Australasian Meeting of the Econometric Society, Auckland, July 2001.

† Skeels, CL & Taylor, LW. Simultaneous equations pre-test estimator. European Meeting of the Econometric Society, Uppsala, August 1993.

† Skeels, CL & Vella, F. A Monte Carlo investigation of the robustness of conditional moment tests in Tobit and Probit models. Australasian Meeting of the Econometric Society, Sydney, July 1993. (Subsequently published as Skeels and Vella, 1997.)

† Skeels, CL & Vella, F. A Monte Carlo investigation of the performance of conditional moment tests in Tobit and Probit models. Australasian Meeting of the Econometric Society, Sydney, July 1991 and Winter Meeting of the Econometric Society, New Orleans, January 1992. (Subsequently published as Skeels and Vella, 1999.)

- † Skeels, CL. The exact distribution of exogenous variable coefficient estimators revisited. Australasian Meeting of the Econometric Society, Canberra, August 1988 and European Meeting of the Econometric Society, Munich, September 1989. (Subsequently published as Skeels, 1995a.)
- † Skeels, CL. IV estimation in misspecified systems. Australasian Meeting of the Econometric Society, Christchurch, August 1987. (Subsequently published as Skeels, 1995b.)
- † Skeels, CL. The marginal density of IV estimators in a general structural equation: A simulation study. Australasian Meeting of the Econometric Society, Melbourne, August 1986. (Subsequently published as Skeels, 1990.)
- King, ML & Skeels, CL. Joint testing for serial correlation and heteroscedasticity in the linear regression model. Australasian Meeting of the Econometric Society, Sydney, August 1984.

Session Chair at Conferences

Australasian Meeting of the Econometric Society: 1991, 1993, 1994, 1996, 1997, 1999,
2002, 2003, 2004, 2008

European Meeting of the Econometric Society: 1993

Invited Discussant at Conferences

PhD Conference in Economics and Business, University of Western Australia, November 2005.

School of Economics Workshop, The University of Adelaide, February 2007.

Labour Econometrics Workshop, The Australian National University, April 2008.

Seminar Presentations

I have made seminar presentations at the following universities:

Australia: Adelaide, ANU, Melbourne, Monash, New South Wales, QUT and Sydney

Canada: Alberta, British Columbia and Queen's

Denmark: Aarhus

England: Bristol, Exeter, Manchester, Nottingham, Oxford, Southampton,
UCL, Warwick and York

Germany: Dortmund

Netherlands: Amsterdam (Tinbergen Institute)

U.S.A.: Illinois, Indiana at Bloomington, Lehigh, SUNY at Albany, and
the Triangle Econometrics Workshop (Comprising Duke University,
UNC - Chapel Hill and NC State - Raleigh)

KNOWLEDGE TRANSFER & LEADERSHIP AND SERVICE

Office-Holding

Member of the Australasian Standing Committee of the Econometric Society (1997 – 2000)

Member of the Committee of the ACT Division of the Marketing Research Society of Australia (1999 – 2001)

Member of the National Higher Education Committee of the Australian Market & Social Research Society (formerly the Marketing Research Society of Australia) (1999 – 2005)

Conference/Seminar Organisation

Departmental Seminar Co-ordinator, Department of Economics, University of Melbourne (Semester 2, 2005)

Co-Chair Program and Local Organising Committees for the 1998 Australasian Meeting of the Econometric Society (ESAM98).

Convener A.N.U. Econometrics Group One-Day Workshop Series (December 1988 – 1993)

Convener A.N.U. Econometrics Seminar Series (December 1988 – 1993)

Provision of Expert Advice

To Corrs Westgarth Chambers on behalf of the ACCC, via the School of Enterprise, University of Melbourne (December 2007 – April 2008)

To ETSA Utilities, via Melbourne Consulting and Custom Programs, University of Melbourne (June 2009 – present)

Refereeing

External Assessor for Appointment Committee

Assessor for the Department of Economics at the Johns Hopkins University

Grant Applications

Australian Research Council, Social Sciences and Humanities Research Council of Canada

Journals & Periodicals

Agenda, Australia and New Zealand Journal of Statistics, Australian Journal of Agricultural and Resource Economics, Australian Journal of Labour Economics, Communications in Statistics: Theory and Methods, Econometrica, Econometric Reviews, Econometric Theory, Econometrics Journal, Economic Record, Economics Letters, Handbook of Applied Econometrics and Statistics, Journal of Applied Econometrics, Journal of Business and Economic Statistics, Journal of Econometrics, Journal of Multivariate Analysis, Journal of Quantitative Economics, Journal of Statistical Planning and Inference, Ormond Papers, Pacific Basin Finance Journal, Pakistan Journal of Statistics, Social Science and Medicine, Statistical Letters, The Manchester School

Manuscript Proposals

Nelson Thomson Learning, Prentice Hall, Routledge, Wiley-Blackwell

ADMINISTRATIVE ACTIVITIES

Some of my more important administrative activities are listed below.

The University of Melbourne (2002 – present)

Deputy Head of Department (December 2009 - present)
Department Graduate Review Committee (2009-present)
Department Sub-Committee on Graduate Offerings (2008)
Department Sub-Committee on Melbourne Model '+2' degrees (2007 – 2008)
Faculty of Economics and Commerce Information Technology Committee (2006 – present)
Member of Executive Committee, Centre for Microeconometrics (2004 – present)
Faculty of Economics and Commerce Library Users' Committee (2003 – 2004)

The Australian National University (1987 – 2001)

Member of Undergraduate Studies Committee (1998 – 2001)
Member of Dean's Working Party on the Teaching of Marketing (1997 – 2001)
Member of Faculty Rules Committee (1997)
Member of Board of Studies, Graduate Program in Commerce (1997 – 1998)
Student Enrolment Adviser (1996 – 2001)
Member of Faculty Enrolments Committee (1994, 1997)
Member of Departmental Strategic Planning Committee (1994)
Member of Electoral Committee for Associate Lecturer in Econometrics (1994)
Member of Departmental Liaison Committee for Chair in Econometrics (1993)
Member of Departmental Liaison Committee for Lecturer/Senior Lecturer in Statistics (1993)
Graduate Academic Progress Committee, Faculty of Economics and Commerce (1990)
Liaison with Chifley Library for book purchasing related to econometrics (1989 – 1994)
Acting Sub-Dean (January – February 1988 – 1990, 1993 – 1994)
Member of Faculty Library Committee (1988 – 1994)

Courses Completed

Workplace Discrimination and Harassment – Legal Compliance Course	2007
Program Director's Induction Course	2007
Environmental Health and Safety:	
Roles and Responsibilities for Supervisors	2006, 2009
Ergonomics and Manual Handling	2009
Staff Selection Training Course (completed at the ANU)	1998