

**A review of SFG's 2011
Dividend Drop-off Study**

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April 19, 2011

Summary

This report has been commissioned by Gilbert and Tobin, acting for ETSA Utilities in merits reviews proceedings currently before the Australian Competition Tribunal. The proceedings relate to distribution determinations made by the Australian Energy Regulator in respect of ETSA Utilities, Ergon Energy and Energex.

One of the issues to be determined by the Tribunal is the correct value of gamma. The Tribunal has determined that the correct value for the distribution rate is 0.7, while for theta they have ordered a state-of-the-art dividend drop-off study to assist them in determining the correct value.

The state-of-the-art dividend drop-off study was done by Professor Stephen Gray of SFG Consulting, following terms of reference agreed by the AER and the applicants. The AER has prepared a report for the Tribunal outlining some concerns about the study, together with a list of departures from the terms of reference.

Gilbert and Tobin have asked us to review the SFG study and the AER report focussing on the extent to which multi-collinearity and heteroscedasticity and other issues raised by the AER in section 4.2 of their report affect the SFG study and its results. They have also asked us to give an opinion on whether the study is “state-of-the-art” and give our view of the reliability and robustness of the SFG study.

In our report, we examine the AER concerns about multi-collinearity, model specification and estimation methods, and econometric analysis used by SFG in the study. Based on our analysis, we conclude that multi-collinearity is not as big an issue as suggested by the AER. We also conclude that heteroscedasticity has been addressed by SFG and the estimation methods used are appropriate. We endorse the methods SFG have used to compute standard errors of the regression coefficients and the use of robust regression methods. We believe that the SFG is a state-of-the-art dividend drop-off study and corresponding weight can be given to the results of the study.

Declaration

We confirm that, in preparing this report, we have made all inquiries that we believe are desirable and appropriate and that no matters of significance that we regard as relevant have, to our knowledge, been withheld. We have been provided with a copy of the Federal Court’s “Guidelines for Expert Witnesses in Proceedings in the Federal Court of Australia” and this report has been prepared in accordance with those Guidelines.

1 The SFG study

SFG was engaged by Energex, Ergon Energy, and ETSA Utilities (the applicants), at the direction of the Australian Competition Tribunal (the Tribunal) to undertake a “state-of-the-art” dividend drop-off study designed to estimate the value of distributed imputation credits, θ (or theta), one of the two components of the value of imputation credits (gamma). The terms of reference to that study were agreed upon by the Australian Energy Regulator (AER) and the applicants in December 2010.

SFG’s dividend drop-off study (SFG, 2011) uses data from the DataAnalysis database from 1 July 2000 to 30 September 2010. Data was also sourced from FinAnalysis, Datastream, SIRCA, and the ASX Website. Various adjustments were made to the data to form a final dataset for analysis.

SFG estimate the parameters of the model

$$\frac{P_{i,t-1} - P_{i,t}^*}{D_i} = \delta + \theta \frac{FC_i}{D_i} + \varepsilon_i$$

where

$P_{i,t-1}$ = cum-dividend stock price for observation i

$P_{i,t}^*$ = market-adjusted ex dividend stock price

D_i = amount of dividend for observation i

FC_i = amount of franking credits associated with observation i

δ = the estimated market value of cash dividends as a proportion of their face value

θ = the estimated market value of distributed franking credits as a proportion of their face value

SFG’s Model 1 corresponds to estimating this model by Ordinary Least Squares (OLS), while Models 2 to 4 correspond to estimating this model using Generalised Least Squares (GLS), with various scaling variables used to cope with heteroscedasticity. Each model was also estimated using various robust regressions, principally MM regression (Yohai, Stahel, and Zamar, 1991).

Based on the dividend drop-off study they conducted, SFG conclude that the appropriate value of theta is 0.35, paired with a value of delta of between 0.85 and 0.90.

2 AER Observations

In Section 4.2 of their report, the AER makes some observations about the AER study in relation to multicollinearity, model specification and estimation methods, and econometric analysis methods used by SFG. In this section we address these observations.

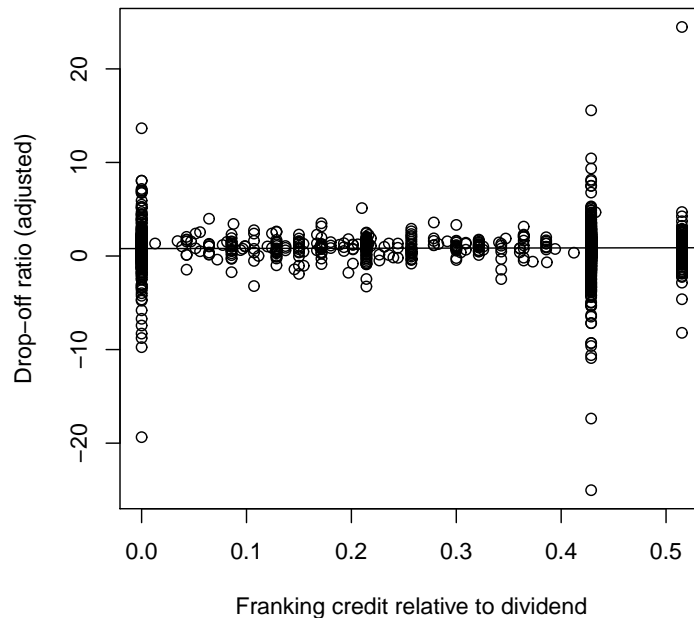


Figure 1: SFG, Figure 4, page 29

Estimation issues-multicollinearity

The AER claim that the SFG study is subject to significant multi-collinearity and use Figure 1 (their Figure 4, page 29) to back up their conclusion. In our view the figure does not demonstrate that. The intercept is largely determined by the average of the results when there are no franking credits, while the gamma estimate is a comparison between a weighted average of the other results, with the bulk being at 0.43, and the average at zero.

To see this, note that the regression coefficients are weighted averages of the individual observations, and hence of the average responses corresponding to each set of values of franking credit relative to dividend. There are in fact 69 different values of the franking credit relative to dividend. For Model 1, Figure 2 shows the weights corresponding to each of these values for the intercept, while Figure 3 shows the weights corresponding to each of these values for the theta estimate.

Figure 2 shows that the estimate of the intercept is dominated (a weight of over 80%) by the average when the dividends are unfranked. Figure 3 shows that the estimate of theta is largely twice the difference between the average at an imputation credit of 0.43 and the average of the unfranked

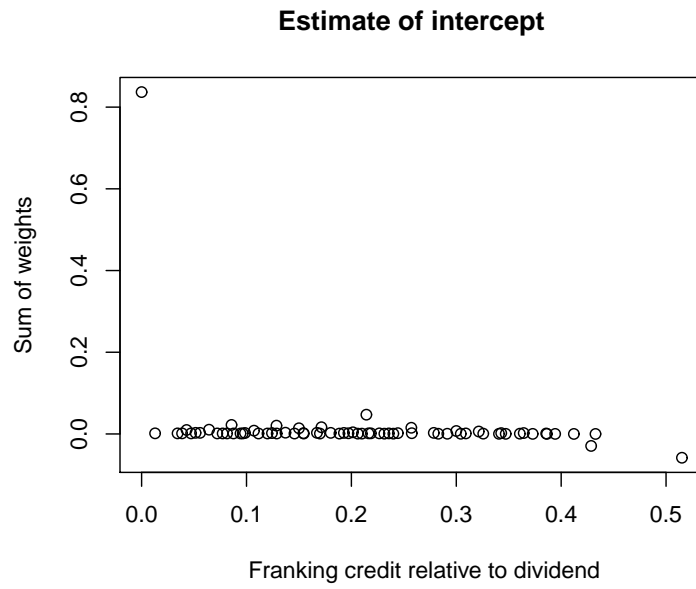


Figure 2: Weights for estimate of intercept, Model 1.

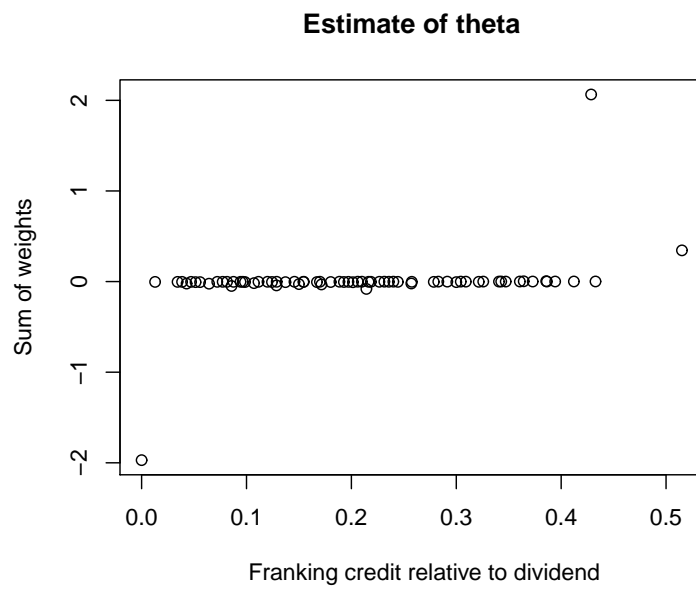


Figure 3: Weights for estimate of theta, Model 1.

dividends. These considerations show that in this context multi-collinearity is not a big issue. The main estimation issue is, given the variability, whether the sample size has been sufficient to allow the average values at these two values of franking credit relative to dividend to be estimated precisely enough. SFG (2011) have appropriately used weighted least squares to address the heteroscedasticity in the data, and MM regression so that the results are robust to long-tailed distribution of the errors.

A direct method of quantifying any effect of multi-collinearity is to calculate the Variance Inflation Factors (VIFs) of the regression coefficients. Following Fox (2008, p.308),

The sampling variance of a least squares slope coefficient B_j is

$$V(B_j) = \frac{1}{1 - R_j^2} \times \frac{\sigma_\varepsilon^2}{(n - 1)S_j^2} \quad (1)$$

where R_j^2 is the squared multiple correlation for the regression of X_j on the other X s, and $S_j^2 = \sum(X_{ij} - \bar{X})^2 / (n - 1)$ is the variance of X_j . The term $1 / (1 - R_j^2)$ is called the variance inflation factor.

Equation (1) shows that the precision of a regression coefficient depends on four quantities:

- The variability of the errors around the regression line.
- The spread of the independent variable.
- The number of observations.
- The VIF.

The calculated VIF for Model 2 is 3.93 and the calculated VIF for Model 4 is 3.35¹. The VIF shows the increased variability due to any multi-collinearity in the data, relative to orthogonal explanatory variables. The usual criterion for concern is a VIF of 10 (see, for example, Bowerman and O'Connell, 1990, p.447), which suggests that multi-collinearity is not a problem. None of the VIFs in the data set are close to this level.

Another way to examine the issue is to examine the condition number of the variance-covariance matrix of the estimated coefficients. As Fox (2008, p.321) says

The relative size of the eigenvalues serves as an indicator of the degree of collinearity present in the data. The square root of the

¹Models 2 and 4 are those preferred by the AER. In any case, calculation of the VIFs is not possible when there is only one explanatory variable besides the intercept, as in Models 1 and 3.

	Model 1	Model 2	Model 3	Model 4
Standard	6.455	5.933	6.095	5.597
White's	7.320	6.811	5.594	5.546
Firm Clustering	7.259	5.261	5.924	5.527

Table 1: Condition Numbers for Models 1 to 4

largest to smallest eigenvalue, $K = \sqrt{L_1/L_k}$, called the *condition number*, is a commonly employed global standardized index of the least squares regression coefficients: A large condition number (say, 10 or more) indicates that relatively small changes in the data tend to produce large changes in the least-squares solution.

Table 2² gives the condition numbers for Models 1 to 4, using the standard variance-covariance matrix, White's "Heteroscedastic-consistent" variance-covariance matrix, and also using the variance-covariance matrix based on firm clustering.³ Note that all of the condition numbers are less than 10.

We agree with the AER that SFG's study addresses the estimation difficulties associated with heteroscedasticity. We disagree about the multicollinearity issue—we think it is overstated.

Model specification and estimation methods

SFG have estimated the model described in the terms of reference using OLS (Model 1), WLS (Models 2, 3, and 4), and MM regression (All four models). Models 2, 3, and 4, can be viewed as Model 1 fitted using WLS; or as different model specifications that can be fitted using OLS. They make the point in paragraph 56:

Even though we refer to the four specifications as "Models" 1 to 4 for convenience, we note that they are actually just different econometric specifications of the one model, . . .

The AER refer to alternative model specifications, not included in the terms of reference, that have been used in dividend drop-off studies and alternative scaling variables to address the heteroscedasticity. Some of these models have included an intercept, which captures systematic deviations from the model. Beggs and Skeels (2006), for example, don't report the intercept but say it is not statistically significant. In our re-analysis of a SFG study (Diamond and Brooks, 2010) we found the intercept was statistically significant

²For all calculations in this section, we have used the R environment for statistical computing (R Core Team, 2011).

³For firm clustering, SFG used the SURVEYREG procedure in SAS. We used the `svyglm` command in the `survey` package in R, which gave the same results as SFG.

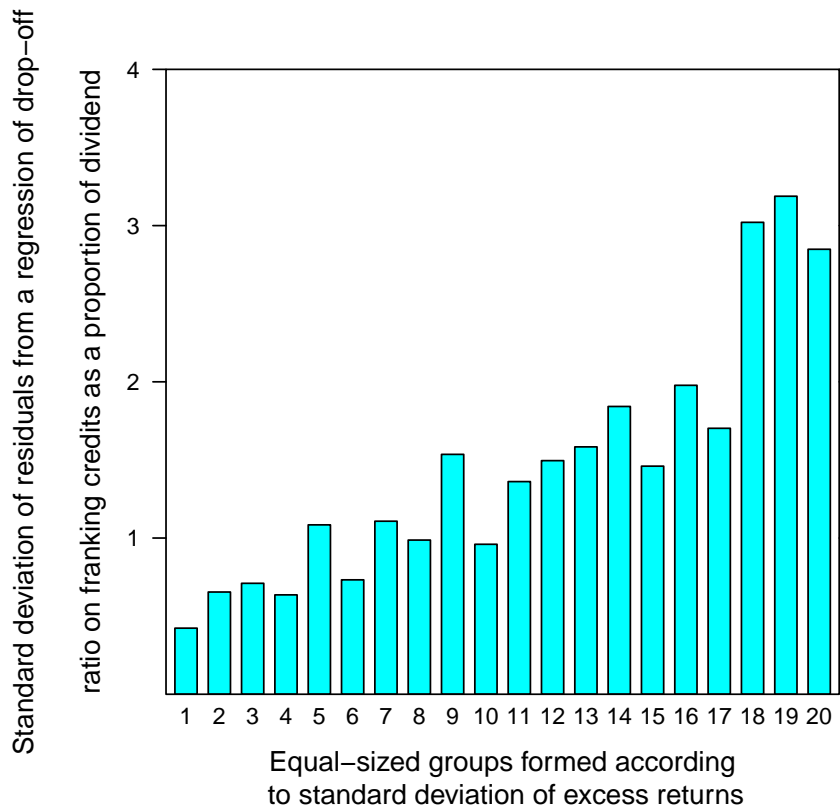


Figure 4: SFG, Figure 4, page 25

and negative but very small. The downward bias suggested by the AER is therefore likely to be small.

Econometric analysis

The AER suggests that more weight to Models 2 and 4 than to Models 1 and 3. Assuming the model is correct all four models should give unbiased estimates of the parameters. The differences in the model results arise because of the different weights applied to the observations. SFG have been careful to use White's correction for heteroscedasticity and this assures that the confidence intervals are not dependent on an erroneous assumption. They have also used standard errors based on firm clustering, which also increases the trust we can have in the calculated standard errors. In addition, SFG have used MM regression, and this is very useful and provides confidence that the results are robust, even in the face of any inherent variability and remaining heteroscedasticity after scaling performed in Models 2, 3, and 4.

SFG motivate Model 3 with their Figure 4, reproduced in Figure 4 of

this report. SFG calculated the volatility for all observations and formed equal sized groups based on these values and then computed the standard deviation of the residuals from Model 1 for each of the groups. The figure shows a clear relationship: the groups with the larger volatility tend to have higher residuals. It is appropriate then to modify Model 1 to form Model 3, where the weighting variable is the inverse of the stock return volatility. This model can be motivated as the AER prefers, that is plotting the residuals or squared residuals versus the variable driving the heteroscedasticity, but there is no advantage of doing so compared to the way done by SFG.

3 Concluding Remarks

We believe that multi-collinearity is not as significant an issue as the AER suggests. We form that opinion based on an analysis of the weights used in computing the regression coefficients, an analysis of the variance inflation factors, and also using the condition numbers of the variance-covariance matrices for the coefficients for each of the estimated models.

In our view the SFG study represents a state-of-the-art dividend drop-off study. The reasons underlying this view are as follows:

1. The econometric methods used in the analysis of the data are appropriate to the features of the dataset, specifically the use of weighted least squares is appropriate given the expected heteroscedasticity in the data. Further, the use of White's heteroscedastic consistent standard errors and standard errors based on firm clustering increases the reliability of the reported results.
2. The use of the robust regression methods is a very useful advance over previous dividend drop-off studies, and increases the trust-worthiness of the results.

The SFG study has been conducted using a comprehensive database. Further the exact composition of the SFG database is known. This enables a thorough sensitivity analysis of the influence of the inclusion/exclusion of particular observations from the sample to be conducted. Given the difference in theta estimates across studies and the debate about the inclusion or exclusion of particular observations a thorough and comprehensive study must include sufficient detail on particular observations to enable such sensitivity analysis to be conducted.

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19 April 2011

By email

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Dear Dr Diamond

AER merits review - determination of gamma

We refer to the meeting held at our offices and our letter dated 11 April 2011.

As set out in that letter, we act for ETSA Utilities in merits review proceedings currently before the Australian Competition Tribunal (**Tribunal**). These proceedings relate to distribution determinations made by the Australian Energy Regulator (**AER**) in respect of ETSA Utilities, Ergon Energy and Energex (**the Applicants**). This letter is written on behalf of the Applicants.

One of the issues to be determined by the Tribunal in these merits review proceedings is the correct value for gamma. In respect of the distribution rate, the Tribunal has determined that the correct value is 0.7 for the purposes of calculating gamma. In respect of the value of distributed credits (theta), the Tribunal has found a number of errors in the decisions made by the AER and has ordered a state-of-the-art dividend drop-off study, which will assist it in determining the correct value for theta.

The state-of-the-art dividend drop-off study has now been undertaken by Professor Stephen Gray of SFG Consulting pursuant to a terms of reference that was agreed between the AER and the Applicants (**the Study**). The AER has subsequently filed a report with the Tribunal in which it raises a number of criticisms of the Study, including a number of perceived departures from the agreed terms of reference (**the AER Report**).

In this context we seek your review of the Study and the AER Report and your expert opinion on the following matters:

- 1 The extent to which multicollinearity, heteroskedasticity or any other issue raised in section 4.2 of the AER Report affect the Study and its results.
- 2 The overall reliability and robustness of the study (including whether you consider it to be 'state-of-the-art'), having regard to the issues raised in section 4.2 of the AER Report and your opinion on the validity and materiality of these issues.

Your report should be prepared in accordance with the Federal Court Guidelines for Expert Witnesses and acknowledge that you have read the guidelines and have prepared the report in accordance with these guidelines.

ALLIANCES:

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LAWYERS

金杜律师事务所
KING & WOOD
P.A.C. LAWYERS

SYDNEY + MELBOURNE + PERTH

PERTH

CHINA

The Applicants are seeking a final report no later than 19 April 2011.

If you have any questions regarding this letter, please contact us.

Yours sincerely

Gilbert + Tobin

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About the Authors

Dr Neil Diamond Neil is the Director of Consulting in the Department of Econometrics and Business Statistics at Monash University. Neil has worked as a statistician in both industry and academia. He has over 30 years experience as a consultant working in a diverse range of applications with particular emphasis on the design and analysis of observational studies and experiments, quality improvement and time series modelling.

Professor Robert Brooks Rob is a Professor in the Department of Econometrics and Business Statistics and Associate Dean, Undergraduate in the Faculty of Business and Economics, Monash University. Rob's primary area of research interest is in financial econometrics, with a particular focus on beta risk estimation and volatility modelling. Rob has previously worked on industry research projects on measuring the impacts of financial literacy and savings program in low income households, and on ARC Linkage projects around valuing biotechnology companies, and measuring demand and supply conditions for the creative arts in rural and regional Victoria.

Neil and Rob undertook a review of the Beggs and Skeels study (2006) in 2010 and wrote a report entitled "Determining the value of imputation credits: Multicollinearity and Reproducibility Issues" for the Victorian Electricity Distributors.

Neil Diamond CV

April 2011

Full Name: Neil Thomas Diamond
 Academic Qualifications: B.Sc (Hons) (Monash), Ph.D. (Melbourne), A.Stat

Career History

1977-78 Statistician, ICI Explosives Factory, Deer Park
 1979-86 Research Officer, Research Scientist, Senior Research Scientist And Statistics and Computing Team Leader, ICI Central Research Laboratories, Ascot Vale
 1987-1989 Lecturer, Department of Mathematics, Computing and Operations Research, Footscray Institute of Technology
 (1989) Visiting Scientist, Center for Quality and Productivity Improvement, University of Wisconsin-Madison, USA.
 1990-2003 Senior Lecturer, Department of Computer and Mathematical Sciences, Victoria University of Technology
 (1995) Visiting Fellow, Center for Quality and Productivity Improvement, University of Wisconsin-Madison, USA.
 2003-2004 Senior Statistician, Insureware
 2004-2006 Senior Lecturer and Deputy Director of Consulting, Department of Econometrics and Business Statistics, Monash University.
 2007- Senior Lecturer and Director of Consulting, Department of Econometrics and Business Statistics, Monash University.

Teaching Experience

Monash University • Business Statistics (First Year), Marketing Research Analysis (Second Year), Survey Data Analysis (Third Year-Clayton and Caulfield).

- Expert Stats Seminars on Software Packages for Statistics, Questionnaire Design, Analysis of Survey Data, and Multivariate Statistics.
- Introduction to Statistics for Pharmacy-five session course:
 - Data handling, exploration, and graphical summaries
 - An overview of basic statistical methods
 - Regression Analysis and extensions
 - Designing experiments and power analysis
 - An overview of more advanced statistical methods

Victoria University of Technology • Applied Statistics (First Year), Linear Statistical Models, Sampling and Data Analysis (Second Year), Experimental Design (Third Year).

- Statistics for Engineers, Statistics for Nurses, Statistics for Occupational Health.
- Forecasting (Graduate Diploma in Business Science)

Sessional Teaching • Monash University (1996-2003) Design of Experiments for Masters Students of the Australian Pulp and Paper Institute.

- RMIT (1991, 1996-2002) Design of Experiments for Masters in Quality Management.
- AGSM (1993-1997): Total Quality Management for Graduate Management Qualification.
- Various other: The University of Melbourne, Enterprise Australia, Swinburne Institute of Technology.

Supervision

Principal Supervisor

Gregory Simmons (1994-1997). M.Sc. completed. “Properties of some minimum run resolution IV designs.”

Tony Sahama (1995-2003). Ph.D. completed. “Some practical issues in the design and analysis of computer experiments.”

Ewa Sztendur (1999-2005). Ph.D. completed. “Precision of the path of steepest ascent in response surface methodology.” [As a result of this thesis, Ewa was awarded the 2006 Victoria University Vice-Chancellor’s Peak Award for Research and Research Training-Research Degree Graduate.]

Co-supervisor

Keith Hart (1996-1997). M.Sc. completed. “Mean reversion in asset prices and asset allocations in funds management.”

Jyoti Behera (1999-2000). M.Eng. completed. “Simulation of container terminals.”

Ray Summit (2001-2004). Ph.D. completed. “Analysis of warranty data for automobile data.”

Rob Moore (2001-2007). Ph.D. completed. “Computer recognition of musical instruments.”

M.Sc. Minor Theses

Milena Shtifelman (1999). Completed. (Monash University Accident Research Centre). “Modelling interactions of factors influencing road trauma trends in Victoria.”

Rohan Weliwita (2002). Completed. “Modelling road accident trauma data.”

Theses Examination

One M.Sc. major thesis (University of Melbourne) and one M.Sc minor thesis (Victoria University).

Industry Projects

Over 30 projects for the following companies and organisations:

Gas and Fuel Corporation	Ford Australia
Mobil Australia	Fibremakers
ICI Australia	Western General Hospital
Data Sciences	Keilor City Council
AMCOR	Composite Buyers
Davids	Email Westinghouse
Craft Coverings	Australian Wheat Board
CSL	Holding Rubber
Viplas Olympic	Melbourne Water
Federal Airports Corporation	

Research and Consulting Experience

- Ten years with ICI Australia as an industrial statistician initially with the Explosives group and eventually with the research group.
- A Ph.D. from the University of Melbourne entitled “Two-factor interactions in non-regular foldover designs.”
- Two six month periods at the Center for Quality and Productivity Improvement at the University of Wisconsin-Madison.
- Extensive consulting and training on behalf of the Centre for Applied Computing and Decision Analysis based at VUT for the following companies:

Data Sciences	Initiating Explosives Systems
Analytical Science Consultants	Saftec
Glaxo Australia	Datacraft Australia
Enterprise Australia	ICI Australia
The LEK partnership	Kaolin Australia
BP Australia	AMCOR
Melbourne Water	Kinhill Group
Australian Pulp and Paper Institute	

- Operated the Statistical Consulting Service at Victoria University of Technology from 1992-2002.
- From 2002-2004 worked as a Senior Statistician with Insureware on the analysis of long-tailed liability data.
- From December 2004 to December 2006 Deputy Director of Consulting of Monash University Statistical Consulting Service based in the Department of Econometrics and Business Statistics.
- From January 2007 Director of Consulting of Monash University Statistical Consulting Service based in the Department of Econometrics and Business Statistics.
- Extensive consulting and training on behalf of the Monash University Statistical Consulting Service for the following companies and organisations:

Australian Tax Office	Department of Human Services
J D McDonald	IMI Research
Port of Melbourne Corporation	Incitec Pivot
Agricola, Wunderlich & Associates	Parks Victoria
Australian College of Consultant Physicians	ANZ
Department of Justice	CRF(Colac Otway)

Journal Articles

1. Diamond, N.T., (1991). "Two visits to Wisconsin," *Quality Australia*, **7**, 30-31.
2. Diamond, N.T., (1991). "The use of a class of foldover designs as search designs," *Austral. J. Statist*, **33**, 159-166.
3. Diamond, N.T., (1995). "Some properties of a foldover design," *Austral. J. Statist*, **37**, 345-352.
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5. Van Matre, J. and Diamond, N.T., (1996). "Team work and design of experiments," *Quality Engineering*, **9**, 343-348.
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3. Sztendur, E.M. and Diamond, N.T.* (2001). "Inequalities for the precision of the path of steepest ascent in response surface methodology," in Cho, Y.J, Kim, J.K., and Dragomir, S.S. (eds.) *Inequality Theory and Applications*, **1**, *The Proceedings of the Sixth International Conference 2000 on Nonlinear Functional Analysis and Applications*, Chinju and Masan, South Korea, 295-301.
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5. Summitt, R.A., Cerone. P., and Diamond, N.T. (2002). "Simulation Reliability Estimation from Early Failure Data, *Proceedings of the Fourth International Conference on Modelling and Simulation*, 368-390.
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7. Sahama, T. And Diamond, N.T. (2008). "Computer Experiment-A case study for modelling and simulation of Manufacturing Systems," 9th Global Conference on Manufacturing and Management.

Reports

A number of confidential reports for ICI Australia from 1977-1987.

Victoria University

VU1. Diamond, N.T (1990). "Professional Experience Program at the Center for Quality and Productivity Improvement," Footscray Institute of Technology.

- VU2. Bisgaard, S. and Diamond, N.T (1991). "A discussion of Taguchi's methods of confirmatory trials," Report No. 60. Center for Quality and Productivity Improvement, University of Wisconsin-Madison.
- VU3. Diamond, N.T (1996). "Outside Studies Program at the Center for Quality and Productivity Improvement," Victoria University of Technology.
- VU4. Diamond, N.T (1996). "Statistical Analysis of EPA compliance of the western treatment plant," prepared for Melbourne Water on behalf of Kinhill Engineers.
- VU5. Diamond, N.T (1996). "Statistical Analysis of EPA compliance of the western treatment plant," prepared for Melbourne Water on behalf of Kinhill Engineers.
- VU6. Diamond, N.T (1998). "Statistical Analysis of BOD and SS compliance rates and license limits at ETP and WTP," prepared for Melbourne Water.
- VU7. Diamond, N.T (1998). "Fate of pollutants at WTP-method for determining safety margins," prepared for Egis consulting group.
- VU8. Bromley, M. and Diamond, N.T (2002). "The manufacture of Laboratory coreboard using various chip furnishes," prepared for Orica adhesives and resins.

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- M1. Hyndman, R.J, Diamond, N.T. and de Silva, A. (2004). "A review of the methodology for identifying potential risky agents," prepared for the Australian Tax Office.
- M2. Diamond, N.T. and Hyndman, R.J. (2005). "Sample Size for Maternal and Child Health Service Evaluation," prepared for the Department of Human Services.
- M3. Diamond, N.T. (2005). "Analysis of Customer Satisfaction Survey 2005," prepared for JD Macdonald.
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- M18. Diamond, N.T. (2006). "Analysis of Statistical Issues regarding Cornish v Municipal Electoral Tribunal," prepared for Agricola, Wunderlich & Associates.
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- M31. Diamond, N.T. (2008). "Analysis of Clients presenting to Problem Gambling Counselling and Problem Gambling Financial Counselling Services-2006/07", prepared for the Department of Justice.
- M32. Diamond, N.T. (2008). "The effect of changes to Electronic Gaming Machine numbers on gambling expenditure", prepared for the Department of Justice.
- M33. Diamond, N.T. (2009). "Adjustment of Mark Distributions", prepared for the Faculty of Law.
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R Packages

R1. Diamond, N.T. (2010), VizCompX

Professional Service

- President, Victorian Branch, Statistical Society of Australia, 2001-2002.
 - Terms as Council Member, Vice-President, and Past President.
- Referee: *Australian and New Zealand Journal of Statistics*, *Biometrika*

Short CV

Professor Robert Brooks
Associate Dean (Undergraduate)
Faculty of Business and Economics
Monash University

Qualifications: B.Ec. (Hons.), PhD (Monash)

Employment History

Current

Associate Dean (Undergraduate), Faculty of Business and Economics, Monash University, February 2009 to present

Course Director, Bachelor of Business and Commerce, Faculty of Business and Economics, Monash University, February 2008 to present

Professor, Department of Econometrics and Business Statistics, Monash University, February 2005 to present

Previous

Associate Dean (Research Quality), Faculty of Business and Economics, Monash University, May 2006 to January 2008

Head of Faculty (Berwick and Peninsula campuses), Faculty of Business and Economics, Monash University, July 2006 to January 2008

Acting Deputy Dean (Research), Faculty of Business and Economics, Monash University, January 2006 to May 2006

Deputy Head, Department of Econometrics and Business Statistics, Monash University, June 2005 to December 2005

Acting PVC (Design and Social Context), RMIT, July 2004 to August 2004

Dean (Research & Innovation), RMIT Business, March 2004 to June 2004, January 2005

Associate Dean, RMIT Business, August 2003 to December 2003

Acting PVC (Business), RMIT, April 2003 to August 2003, September 2004 to December 2004

Associate Dean (Research), RMIT Business, August 2000 to April 2003 and January 2004 to March 2004

Professor of Financial Econometrics, RMIT Business, January 1999 to January 2005

Head, Research Development Unit, RMIT Business, August 1998 to August 2000

Director, Postgraduate Programs, Economics and Finance, RMIT, August 1998 to August 2000

Associate Professor, Economics and Finance, RMIT, June 1997 to December 1998

Senior Lecturer, Economics and Finance, RMIT, January 1995 to June 1997

Lecturer, Economics and Finance, RMIT, December 1991 to December 1994

Tutor, Economics, Monash University, July 1989 to November 1991

Research Assistant, Economics, Monash University, November 1987 to June 1989

PUBLICATIONS (as at September 2008):

Books

Brooks, R. and Fausten, D. (1998), *Macroeconomics In the Open Economy*, Longman.

Brooks, R., Morley, C., Kam, B., Stewart, M., Diggle, J. and Gangemi, M. (2003), *Benefits of Road Investment to Assist Tourism*, Austroads Publication AP-R225/03, Austroads Incorporated.

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Conference Papers

Brooks, R. (2003), Time Varying Betas on China's A and B Share Indices, paper presented to the 15th Annual ACESA Conference, Melbourne 2003.

Brooks, R. (2004), Benchmarking University Research Performance Using RRTMR Data, paper presented to the 2004 Quality in Postgraduate Research Conference, Adelaide.

Dimovski, W. and Brooks, R. (2006), Stakeholder and Gender Characteristics of Mining and Energy IPO Boards of Directors, Enhancing Corporate Accountability Prospects and Challenges Conference Proceedings.

Leeprechanon, N., Moorthy, S., Brooks, R. and David, A.K. (2000), A Review of Major Factors in Restructuring Power Markets in Developing Countries, 5th International Conference on Advances in Power System Control, Operation and Management.

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Journal Refereeing and Thesis Examination

Editorial Board (current)

Accounting & Finance

Editorial Board (previous)

Accounting Research Journal

International Journal of Knowledge, Culture and Change Management

Journal Refereeing

Accounting Research Journal, Accounting & Finance, Agricultural Economics, Agricultural Water Management, Annals of Operations Research, Applied Economics, Applied Financial Economics, Asia Pacific Journal of Economics & Business, Australian Economic Papers, Australian Journal of Agricultural & Resource Economics, Australian Journal of Management, Australian Universities Review, Corporate Governance, Corporate Governance: An International Review, Economic Papers, Economic Record, Economics E-Journal, Emerging Markets Finance and Trade, Emerging Markets Review, European Journal of Finance, European Journal of Operational Research, Financial Markets and Portfolio Management, Financial Review, Global Finance Journal, International Journal of e-Collaboration, International Journal of Emerging Markets, International Review of Economics and Finance, International Review of Finance, International Review of Financial Analysis, Journal of Agricultural and Resource Economics, Journal of Applied Statistics, Journal of Banking & Finance, Journal of Business, Journal of Business Venturing, Journal of Econometrics, Journal of Economic Studies, Journal of Economic Surveys, Journal of Economics and Business, Journal of Empirical Finance, Journal of Futures Markets, Journal of International Financial Markets Institutions & Money, Journal of International Money & Finance, Journal of Quantitative Economics, Managerial Finance, Manchester School, Monash Business Review, Multinational Finance Journal, Pakistan Journal of Statistics, Quantitative Finance, Quarterly Review of Economics and Finance, Review of Pacific Basin Financial Markets and Policies, Review of Quantitative Finance and Accounting, Science of the Total Environment, Studies in Economics and Econometrics.

Thesis Examination

PhD

Australian National University, Edith Cowan University, Griffith University, LaTrobe University, Monash University, Nanyang Technological University, Queensland University of Technology, University of Melbourne, University of Queensland, University of Southern Queensland, University of the Sunshine Coast, University of Sydney, University of Western Australia, Victoria University

1. Supervision of postgraduate research students.

PhD students

Main Supervisor – Completed: (13)

Berman, G. A Charity Case – Efficiency and Accountability of Nonprofit Welfare Organisations in Australia, Economics and Finance, RMIT, 2001.

Bissoondoyal-Bheenick, E., Sovereign and Australian Credit Ratings: Determinants and Valuation Effects, Economics and Finance, RMIT, 2004.

Chan, D. The Role of Information In Stock Pricing In The Hong Kong Stock Market, Economics and Finance, RMIT, 1998.

Diggle, J. When Cash Is King – The Optimal Management of an Asset Allocation to Cash, Economics and Finance, RMIT, 2002.

Gionea, J. Trends/Prospects In The Global Grain Sector: The Opportunities For Australia's Grain Industry, Economics and Finance, RMIT, 2003.

Guo, H. The Chinese initial public offering market: underpricing, duration to listing and hot issue cycles, Econometrics and Business Statistics, Monash University, 2009.

Iqbal, J. Asset Pricing on the Karachi Stock Exchange, Econometrics and Business Statistics, Monash University, 2008.

Lambrick, S. An Assessment and Test of the Arbitrage Pricing Theory in Australia: 1974 to 2000, Econometrics and Business Statistics, Monash University, 2009.

Lim, K. An empirical analysis of the weak-form efficiency of stock markets, Econometrics and Business Statistics, Monash University, 2009.

Lin, D. Investment Decision Making Under Uncertainty: A Residual Character Approach, Economics and Finance, RMIT, 1998.

Loh, J. A Framework for the Valuation of Biotechnology Companies, Econometrics and Business Statistics, Monash University, 2007.

McKenzie, M. Australian Exchange Rate Volatility: Modelling, Forecasting And Assessing The Impact On Trade Flows, Economics and Finance, RMIT, 1997

Sokulsky, D. An Empirical Investigation into the Price Effects Associates with Constituent Changes to Australian Equity Indices, Economics and Finance, RMIT, 2002.

Associate Supervisor – Completed: (18)

Anderson, J. Trading Rules and Money Management, Economics and Finance, RMIT, 2002.

Coate, B. Australian Indigenous and Non-indigenous Art at Auction, Economics and Finance, RMIT, 2009.

Davidson, S. South African Corporate Structures In An Agency Theory Framework, Economics and Finance, RMIT, 1999.

Di Iorio, A. An Analysis of the Exchange Rate Exposure of the Australian Equities Market, Economics and Finance, RMIT, 2002.

Gangemi, M. Modelling Regional Economic Development, Economics and Finance, RMIT, 2008.

Glasson, S. Censoring Regression Techniques for Credit Scoring, Statistics, RMIT, 2007.

Hart, K. Modelling The Asset Allocation Process And The Effectiveness Of Models Through Time, Communications And Informatics, VUT, 2000.

Jens, P. Valuations and Business Models for Biotechnology Companies, Economics and Finance, RMIT, 2007.

Jugurnath, B. An Analysis of an Integrated Tax System in APEC, Economics and Finance, RMIT, 2005.

Lai, E. The Role of Return Skewness In Financial Modelling: Some International Evidence, Economics and Finance, RMIT, 2000.

Leeprechanon, N. A Pricing Optimisation Model For Transmission Services Open Access In The Competitive Electricity Supply Industry In Thailand, Electrical Engineering, RMIT, 2003.

Luo, L. Business and Economic Forecasting in Australia, Econometrics and Business Statistics, Monash University, 2008.

Maldonado, D. Knowledge Development Between Industries and Universities, Management, RMIT, 2005.

Masters, T. Demand and Supply for the Creative Arts in Rural and Regional Victoria, Economics and Finance, RMIT, 2007.

Parkatt, G. The Role Of Equity Factors In Explaining The Cross-sectional Variation In Stock Returns In The Thai Capital Market, Economics and Finance, RMIT, 2002.

Ragunathan, V. Integration Of And Correlations Between National Stock Market Indices, Economics and Finance, RMIT, 1999.

Wang, Y. Development of China's Capital Markets, Economics and Finance, RMIT, 2006.

Yip, A. A Case Based Reasoning Approach to Business Failure Prediction, Business Information Technology, RMIT, 2005.

Main Supervisor – In Progress: (2)

Irawan, B. Development of bond market in East Asia as a policy response to financial crisis, Econometrics and Business Statistics, Monash University.

Treloar, K. Challenges in Early Stage Commercialisation and Entrepreneurship in Australia, Econometrics and Business Statistics, Monash University.

Associate Supervisor – In Progress: (3)

Jutasompakorn, P. Forecasting the Financial Crisis, Accounting and Finance, Monash University.

Muth, R. International Real Estate Investments in a Mixed-Asset Portfolio, Accounting and Finance, Monash University

Vaz, J. The Behaviour of Interest Rates and Financial Institution Returns, Accounting and Finance, Monash University.

DBA Students

Main Supervisor – Completed: (1)

Dimovski, B. Characteristics Of Initial Public Offerings In Australia 1994 to 1999: Recent Evidence of Initial Day Underpricing and Longer Term Underperformance, Management, RMIT, 2002.

Associate Supervisor – Under Examination: (1)

Lekkumporn, P An exploration of personal values as antecedent of gift-giving behavior, Marketing, Monash University.

Master of Philosophy (Research) Students

Associate Supervisor – Completed: (1)

Nurjannah, Asset Pricing in the Indonesian Stock Market, Econometrics and Business Statistics, Monash University, 2009.

Associate Supervisor – In Progress: (1)

Ting, S. Essays in Financial Econometrics, Econometrics and Business Statistics, Monash University.

Master of Business (Research) Students

Main Supervisor – Completed: (1)

Gangemi, M. Country And Industry Beta Risk: Stability, Mean Reversion And The Role Of Macroeconomic Variables, Economics and Finance, RMIT, 1999

Associate Supervisor – Completed: (1)

Piriyapant, G. An Analysis Of The Thai Mutual Fund Industry, Economics and Finance, RMIT, 1999.



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17th September 2010

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By email: Neil.Diamond@buseco.monash.edu.au

Dr Neil Diamond
Room 674, Building 11E
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Monash University
CLAYTON VICTORIA 3800
Australia

Dear Dr Diamond,

Supplementary expert report on the value of imputation credits

The Australian Energy Regulator (**AER**) is currently conducting its five-yearly review of pricing proposals submitted by the five Victorian electricity distribution businesses, United Energy, Citipower, Powercor, Jemena and SP Ausnet. As part of the review process, the AER must determine an appropriate return on capital, which is a function of the valuation of dividend imputation credits, also referred to as gamma. The AER has taken account of a number of dividend drop-off studies in its consideration of the value of gamma, including:

- A 2006 study by Beggs and Skeels;¹ and
- Empirical analyses undertaken by SFG Consulting in January and February 2010²

We ask that you provide incisive analysis and commentary in relation to the following propositions:

1. "As a statistical construct, the joint confidence region calculated and plotted by SFG cannot be used to reject the parameter estimates derived by Beggs and Skeels (2006)".
 - Does the joint confidence region in effect "accommodate" the parameter estimates obtained by Beggs and Skeels (2006)?

¹ Beggs, D. J. and Skeels, C.L., (2006), 'Market arbitrage of cash dividends and franking credits', *Economic Record*, 82 (258), 239 – 252.

² SFG, *Response to the AER Draft Determination in relation to gamma*. Report prepared for ETSA Utilities, 13th January 2010. SFG, *Further analysis in response to the AER Draft Determination in relation to gamma*. Prepared for ETSA Utilities, 4 February 2010

2. "The SFG parameter estimates change from one discrete time period to the next because of multicollinearity. The parameter estimates are unstable and imprecise."
3. McKenzie and Partington (2010, pp.46) have made the following statement:
 - "We believe that multicollinearity is a serious problem for dividend drop off studies and the results of SFG and Beggs and Skeels (2006) cannot be reliably interpreted in the presence of multicollinearity. Further, until serious consideration is given to this issue, reliable decomposition of the partial effect of cash dividends and franking credits will remain elusive."

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, the Victorian electricity distribution businesses are seeking 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:

Identify your relevant area of expertise and provide a curriculum vitae setting out the details of that expertise:

- 1.1.1. only address matters that are within your expertise;
- 1.1.2. where you have used factual or data inputs please identify those inputs and the sources;
- 1.1.3. if you make assumptions, please identify them as such and confirm that they are in your opinion reasonable assumptions to make;
- 1.1.4. 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;
- 1.1.5. 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
- 1.1.6. please do not provide legal advocacy or argument and please do not use an argumentative tone.

Yours sincerely,



Jeremy Rothfield
Regulatory Economist

FEDERAL COURT OF AUSTRALIA

Practice Note CM 7

EXPERT WITNESSES IN PROCEEDINGS IN THE FEDERAL COURT OF AUSTRALIA

1. Practitioners should give a copy of the following guidelines to any witness they propose to retain for the purpose of preparing a report or giving evidence in a proceeding as to an opinion held by the witness that is wholly or substantially based on the specialised knowledge of the witness (see **Part 3.3 - Opinion** of the *Evidence Act 1995* (Cth)).
2. The guidelines are not intended to address all aspects of an expert witness's duties, but are intended to facilitate the admission of opinion evidence¹, and to assist experts to understand in general terms what the Court expects of them. Additionally, it is hoped that the guidelines will assist individual expert witnesses to avoid the criticism that is sometimes made (whether rightly or wrongly) that expert witnesses lack objectivity, or have coloured their evidence in favour of the party calling them.

Guidelines

1. General Duty to the Court²

- 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 inferential³.
- 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 Evidence⁴

- 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.

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

² See rule 35.3 Civil Procedure Rules (UK); see also Lord Woolf "Medics, Lawyers and the Courts" [1997] 16 CJQ 302 at 313.

³ 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]

⁴ 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]

- 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 Court⁵.
- 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.
- 2.11 Where an expert’s report refers to photographs, plans, calculations, analyses, measurements, survey reports or other extrinsic matter, these must be provided to the opposite party at the same time as the exchange of reports⁶.

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.

M E J BLACK
Chief Justice
25 September 2009

⁵ The “*Ikarian Reefer*” [1993] 20 FSR 563 at 565

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