

Report prepared for the
Australian Energy Regulator

**An Estimate of the
Historical Equity Risk Premium
for the Period 1883 to 2011**

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Final
April 2012

1. INTRODUCTION

The Australian Energy Regulator (AER) is responsible for the economic regulation of electricity networks and gas pipelines in Australia (excluding Western Australia) and is currently undertaking a review of arrangements for the following network service providers (NSPs):

- the Victorian Transmission System (VTS), a gas transmission pipeline in Victoria owned by APA Gasnet (Australia) Pty Ltd
- the gas distribution networks in Victoria, owned by Envestra Limited (including Envestra's Victoria and Albury assets), Multinet Gas (DB No.1) Pty Ltd, and SPI Networks (Gas) Pty Ltd (SP Ausnet)
- the Roma to Brisbane Pipeline, a gas transmission pipeline owned by APT Petroleum Pipelines Limited (APTPPL)
- the Tasmanian electricity distribution network owned by Aurora Energy Pty Ltd (Aurora)

As part of the above reviews, the AER determines the allowed revenues/tariffs that can be charged by the above NSPs for electricity and gas distribution and transmission services for various regulatory periods. In setting the allowed revenues/tariffs the AER needs to determine the appropriate return on capital for these periods.

The AER has previously used historical excess return estimates to inform its determination of an appropriate estimate of the expected market risk premium (MRP). Previously provided estimates covered the period from 1883 to 2010.¹ To assist in determining the appropriate value for the MRP, the AER requires an update of the historical excess return estimates to cover data for 2011. In particular, the AER requires estimates of historical excess returns relative to 10-year Commonwealth Government Securities (CGS) for the following time periods: 1883 – 2008, 1937 – 2008, 1958 – 2008, 1980 – 2008, 1988 – 2008, 1883 – 2011, 1937 – 2011, 1958 – 2011, 1980 – 2011

¹ Handley (2011)

and 1988 – 2011. The estimates are to be accompanied by standard errors and 95% confidence intervals.

In addition, separate estimates are required assuming distributed imputation credits are valued at 0 cents, 35 cents, 50 cents, 65 cents and 100 cents in the dollar, as well as an appendix that sets out the annual return for each year on the stock price index, stock accumulation index and bonds and a chart plotting the annual historical excess returns over the 1883-2011 period.

A copy of my resume is set out in Appendix 2.

2. ESTIMATION OF HISTORICAL EXCESS RETURNS OVER THE PERIOD 1883 - 2011

2.1 Data and Approach

In my earlier report,² I set out estimates of historical excess returns (or equivalently, estimates of the historical equity risk premium) over the period 1883 to 2010. In this section, these estimates are updated to include data for 2011. The estimates are based on the original study by Brailsford, Handley and Maheswaran (2008) which covered the period (January) 1883 to (December) 2005 and the recently updated study by Brailsford, Handley and Maheswaran (2012) which covers the period from (January) 1883 to (December) 2010.

Annual stock return and (10 year) bond return data for each calendar year from 1883 to 2010 and imputation credit yield data for each calendar year from 1988 to 2010 is sourced from BHM (2012).³ This is supplemented with one year of additional data for the calendar year 2011, using sources and methodologies consistent with BHM (2008) and BHM (2012). In particular:

² Handley (2011).

³ See BHM (2008) and BHM (2012) for details of data sources and return series construction.

- Stock Returns: daily closing values of the All Ordinaries Accumulation Index during 2011 are obtained from the Australian Stock Exchange (via IRESS). The annual Historical Stock Accumulation Index Series of BHM (2012) is then extended for one year by setting the 2011 value of the series equal to the average value of the All Ordinaries Accumulation Index in December 2011. This leads to an annual series of (discrete) stock returns – attributable to dividends and capital gains/losses – for the 129 calendar years from 1883 to 2011.
- 10 Year Bond Returns: daily yields on 10 year Commonwealth Government treasury bonds during 2011 are obtained from the Reserve Bank of Australia (RBA) website. The annual Historical Bond Return Series of BHM (2012) is then extended for one year by setting the 2011 value of the series equal to the yield at the end of December 2011.
- Imputation Credit Yields: average imputation credit yields on the All Ordinaries Index during 2011 are sourced from the Australian Taxation Office (ATO) website. The annual imputation credit yield series of BHM (2012) is then extended for one year by setting the 2011 value of the series equal to the (weighted) average imputation credit yield for the 12 months ending December 2011.

2.2 Results

Table 1 sets out various statistics of the historical equity risk premium in Australia over a number of sample periods from January 1883 to December 2011. The differing start dates of 1883, 1937, 1958 and 1980 correspond to periods of increasing data quality but decreasing sample size. The start date of 1988 reflects the introduction of the dividend imputation tax system in Australia. AM is the arithmetic mean, SE is the standard error, Low and High define the 95% confidence interval for the “true” but unobservable value of the mean, p-value is the (2-tail) significance level of AM and GM is the geometric mean. The equity premium is defined as the (simple) difference between the stock return and the relevant proxy for the risk free rate – in this case the yield on 10 year Commonwealth Government bonds. Calculations are based on nominal, discrete returns and the stock return takes into account cash dividends and capital gains/losses only.

Relative to 10 year bonds, the equity risk premium has averaged 6.0% p.a. over 1883–2011, which is statistically significant at the 5% level.

BHM (2008) and BHM (2012) document concerns about data quality the further back into the past one looks and in particular suggest there are sufficient question marks over the quality of data prior to 1958 to warrant any estimates based thereon to be treated with caution. Relative to 10 year bonds, the equity risk premium has averaged 5.8% p.a. over 1958–2010, which is a period of relatively good data quality. It is noted that the statistical significance of this estimate (with a p-value of 0.07) is slightly lower than the standard 5% level using a two-tailed test.

TABLE 1							
Historical Equity Risk Premium 1883 - 2011							
Assumed Value of Imputation Credits				0.00			
Relative to 10 year Bonds							
Period	Years	AM	SE	95% Confidence Interval		p-value	GM
				Low	High		
1883 - 2008	126	0.059	0.015	0.030	0.089	0.00	0.046
1937 - 2008	72	0.054	0.023	0.007	0.100	0.02	0.034
1958 - 2008	51	0.057	0.032	-0.007	0.121	0.08	0.031
1980 - 2008	29	0.050	0.043	-0.038	0.137	0.26	0.023
1988 - 2008	21	0.038	0.040	-0.046	0.122	0.36	0.019
1883 - 2011	129	0.060	0.015	0.031	0.089	0.00	0.046
1937 - 2011	75	0.055	0.023	0.009	0.100	0.02	0.035
1958 - 2011	54	0.058	0.031	-0.004	0.120	0.07	0.033
1980 - 2011	32	0.052	0.040	-0.030	0.134	0.20	0.026
1988 - 2011	24	0.043	0.038	-0.036	0.122	0.28	0.024
<i>Note: Refer to report for data sources and variable definitions</i>							
<i>Estimates in Bold are significant at the 5% level using a 2-tailed test.</i>							

Tables 2 to 5 sets out similar statistics of the historical equity risk premium in Australia assuming distributed imputation credits are valued at 35 cents, 50 cents, 65 cents and 100 cents in the dollar respectively.⁴

⁴ In this case, the stock return takes into account cash dividends, the value of imputation credits attached to those dividends and capital gains/losses. Any value attributable by the market to retained imputation credits would be reflected in the observed capital gain.

TABLE 2							
Historical Equity Risk Premium 1883 - 2011							
Assumed Value of Imputation Credits				0.35			
Relative to 10 year Bonds							
Period	Years	AM	SE	95% Confidence Interval		p-value	GM
				Low	High		
1883 - 2008	126	0.060	0.015	0.031	0.090	0.00	0.047
1937 - 2008	72	0.055	0.023	0.009	0.102	0.02	0.036
1958 - 2008	51	0.059	0.032	-0.005	0.123	0.07	0.034
1980 - 2008	29	0.054	0.043	-0.034	0.142	0.22	0.028
1988 - 2008	21	0.044	0.041	-0.040	0.129	0.29	0.025
1883 - 2011	129	0.061	0.015	0.032	0.090	0.00	0.047
1937 - 2011	75	0.057	0.023	0.011	0.102	0.02	0.037
1958 - 2011	54	0.061	0.031	-0.001	0.122	0.05	0.035
1980 - 2011	32	0.057	0.040	-0.025	0.139	0.17	0.031
1988 - 2011	24	0.049	0.038	-0.030	0.128	0.21	0.030
<i>Note: Refer to report for data sources and variable definitions</i>							
<i>Estimates in Bold are significant at the 5% level using a 2-tailed test.</i>							

TABLE 3							
Historical Equity Risk Premium 1883 - 2011							
Assumed Value of Imputation Credits				0.50			
Relative to 10 year Bonds							
Period	Years	AM	SE	95% Confidence Interval		p-value	GM
				Low	High		
1883 - 2008	126	0.061	0.015	0.032	0.090	0.00	0.047
1937 - 2008	72	0.056	0.023	0.010	0.103	0.02	0.037
1958 - 2008	51	0.061	0.032	-0.004	0.125	0.06	0.035
1980 - 2008	29	0.056	0.043	-0.032	0.144	0.20	0.030
1988 - 2008	21	0.047	0.041	-0.038	0.131	0.26	0.028
1883 - 2011	129	0.061	0.015	0.033	0.090	0.00	0.048
1937 - 2011	75	0.057	0.023	0.012	0.103	0.01	0.038
1958 - 2011	54	0.062	0.031	0.000	0.124	0.05	0.037
1980 - 2011	32	0.059	0.040	-0.023	0.141	0.15	0.033
1988 - 2011	24	0.052	0.038	-0.028	0.131	0.19	0.033
<i>Note: Refer to report for data sources and variable definitions</i>							
<i>Estimates in Bold are significant at the 5% level using a 2-tailed test.</i>							

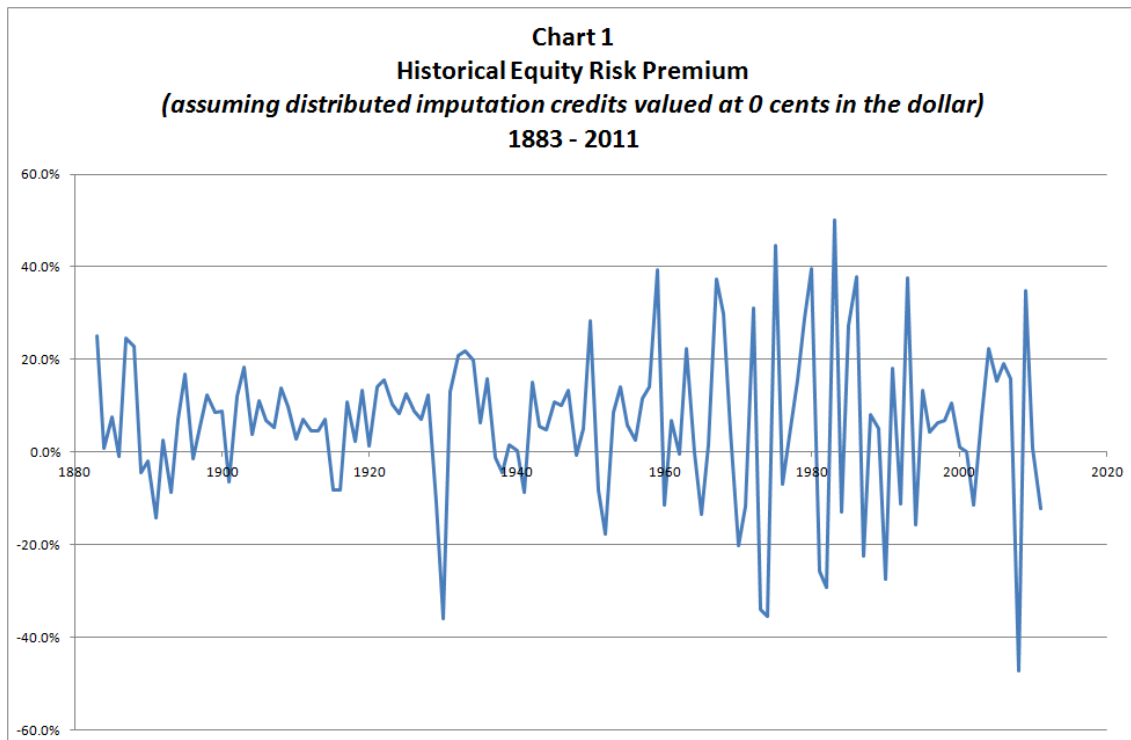
TABLE 4							
Historical Equity Risk Premium 1883 - 2011							
Assumed Value of Imputation Credits		0.65					
Relative to 10 year Bonds							
Period	Years	AM	SE	95% Confidence Interval		p-value	GM
				Low	High		
1883 - 2008	126	0.061	0.015	0.032	0.091	0.00	0.048
1937 - 2008	72	0.057	0.023	0.010	0.104	0.02	0.037
1958 - 2008	51	0.062	0.032	-0.002	0.126	0.06	0.036
1980 - 2008	29	0.058	0.043	-0.030	0.146	0.19	0.031
1988 - 2008	21	0.050	0.041	-0.035	0.134	0.24	0.031
1883 - 2011	129	0.062	0.015	0.033	0.091	0.00	0.048
1937 - 2011	75	0.058	0.023	0.013	0.104	0.01	0.039
1958 - 2011	54	0.063	0.031	0.001	0.125	0.05	0.038
1980 - 2011	32	0.061	0.040	-0.021	0.143	0.14	0.035
1988 - 2011	24	0.054	0.038	-0.025	0.134	0.17	0.035
<i>Note: Refer to report for data sources and variable definitions</i>							
<i>Estimates in Bold are significant at the 5% level using a 2-tailed test.</i>							

TABLE 5							
Historical Equity Risk Premium 1883 - 2011							
Assumed Value of Imputation Credits		1.00					
Relative to 10 year Bonds							
Period	Years	AM	SE	95% Confidence Interval		p-value	GM
				Low	High		
1883 - 2008	126	0.062	0.015	0.033	0.092	0.00	0.049
1937 - 2008	72	0.059	0.023	0.012	0.106	0.01	0.039
1958 - 2008	51	0.064	0.032	0.000	0.128	0.05	0.038
1980 - 2008	29	0.063	0.043	-0.025	0.151	0.16	0.036
1988 - 2008	21	0.056	0.041	-0.029	0.141	0.19	0.037
1883 - 2011	129	0.063	0.015	0.034	0.092	0.00	0.049
1937 - 2011	75	0.060	0.023	0.015	0.106	0.01	0.041
1958 - 2011	54	0.066	0.031	0.004	0.128	0.04	0.040
1980 - 2011	32	0.066	0.040	-0.017	0.148	0.12	0.040
1988 - 2011	24	0.060	0.039	-0.020	0.140	0.13	0.042
<i>Note: Refer to report for data sources and variable definitions</i>							
<i>Estimates in Bold are significant at the 5% level using a 2-tailed test.</i>							

Over the period 1883–2011 and relative to 10 year bonds, the grossed-up equity risk premium has averaged 6.1% p.a., 6.1% p.a., 6.2% p.a. and 6.3% p.a. assuming distributed imputation credits are valued at 35 cents, 50 cents, 65 cents and 100 cents in the dollar respectively (all of which are statistically significant at the 5% level).

Over the period 1958–2011, which is a period of relatively good data quality, and relative to 10 year bonds, the grossed-up equity risk premium has averaged 6.1% p.a., 6.2% p.a., 6.3% p.a. and 6.6% p.a. assuming distributed imputation credits are valued at 35 cents, 50 cents, 65 cents and 100 cents in the dollar respectively (again, all of which are statistically significant at the 5% level).

A plot of the annual series of historical equity risk premium from 1883 to 2011 appears in Chart 1 and the time series of annual returns on stocks and bonds appears in Appendix 1.



REFERENCES

Brailsford, T.J., J.C. Handley and K. Maheswaran, 2008, Re-examination of the Historical Equity Risk Premium in Australia, *Accounting and Finance*, 48, 73–97.

Brailsford, T.J., J.C. Handley and K. Maheswaran, 2012, The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data, *Accounting and Finance*, 52, 237-247.

Handley, J.C., 2011, An Estimate of the Historical Equity Risk Premium for the Period 1883 to 2010, Report prepared for the Australian Energy Regulator, 25 January.

APPENDIX 1 – Time Series of Annual Returns

Year	Stock Accumulation Index	Stock Price Index	Bonds
1883	0.290	0.219	0.038
1884	0.044	-0.017	0.037
1885	0.113	0.047	0.038
1886	0.029	-0.036	0.038
1887	0.282	0.206	0.036
1888	0.262	0.195	0.034
1889	-0.011	-0.068	0.034
1890	0.014	-0.048	0.035
1891	-0.104	-0.159	0.038
1892	0.063	-0.007	0.038
1893	-0.049	-0.113	0.038
1894	0.106	0.029	0.035
1895	0.201	0.126	0.033
1896	0.017	-0.037	0.032
1897	0.085	0.030	0.030
1898	0.155	0.097	0.033
1899	0.121	0.067	0.035
1900	0.122	0.070	0.033
1901	-0.032	-0.079	0.033
1902	0.156	0.098	0.035
1903	0.219	0.159	0.036
1904	0.075	0.022	0.037
1905	0.146	0.095	0.035
1906	0.102	0.058	0.035
1907	0.088	0.046	0.035
1908	0.173	0.126	0.035
1909	0.135	0.090	0.036
1910	0.067	0.025	0.038
1911	0.107	0.062	0.038
1912	0.086	0.036	0.039
1913	0.089	0.038	0.043
1914	0.114	0.059	0.043
1915	-0.035	-0.083	0.046
1916	-0.034	-0.084	0.049
1917	0.155	0.095	0.047
1918	0.075	0.019	0.050
1919	0.187	0.126	0.054
1920	0.081	0.025	0.067
1921	0.199	0.126	0.059
1922	0.213	0.148	0.057
1923	0.162	0.102	0.059
1924	0.137	0.076	0.054
1925	0.177	0.114	0.052
1926	0.141	0.082	0.053
1927	0.124	0.065	0.054
1928	0.177	0.115	0.053
1929	-0.053	-0.101	0.056
1930	-0.296	-0.339	0.065
1931	0.177	0.113	0.047
1932	0.248	0.199	0.039
1933	0.256	0.211	0.036
1934	0.232	0.191	0.033
1935	0.101	0.062	0.037
1936	0.198	0.154	0.040
1937	0.024	-0.017	0.037
1938	-0.005	-0.051	0.039
1939	0.053	0.002	0.038
1940	0.035	-0.017	0.031
1941	-0.055	-0.101	0.033
1942	0.184	0.124	0.032
1943	0.089	0.045	0.032
1944	0.080	0.036	0.032
1945	0.141	0.096	0.033
1946	0.133	0.092	0.032
1947	0.166	0.127	0.032
1948	0.024	-0.011	0.031
1949	0.081	0.040	0.031
1950	0.314	0.267	0.032
1951	-0.046	-0.083	0.038
1952	-0.133	-0.175	0.045
1953	0.130	0.077	0.044
1954	0.186	0.131	0.045
1955	0.103	0.047	0.045
1956	0.077	0.017	0.051
1957	0.167	0.105	0.050

Year	Stock Accumulation Index	Stock Price Index	Bonds
1958	0.189	0.129	0.049
1959	0.443	0.381	0.048
1960	-0.062	-0.099	0.053
1961	0.116	0.066	0.049
1962	0.042	-0.001	0.047
1963	0.266	0.216	0.043
1964	0.044	0.005	0.048
1965	-0.082	-0.121	0.052
1966	0.067	0.021	0.050
1967	0.425	0.369	0.051
1968	0.348	0.307	0.049
1969	0.101	0.069	0.056
1970	-0.137	-0.167	0.064
1971	-0.061	-0.098	0.057
1972	0.364	0.318	0.053
1973	-0.258	-0.287	0.081
1974	-0.262	-0.309	0.092
1975	0.546	0.454	0.100
1976	0.036	-0.020	0.104
1977	0.132	0.066	0.095
1978	0.243	0.176	0.088
1979	0.390	0.320	0.101
1980	0.523	0.458	0.126
1981	-0.108	-0.144	0.150
1982	-0.153	-0.197	0.140
1983	0.637	0.566	0.135
1984	0.005	-0.037	0.134
1985	0.421	0.364	0.149
1986	0.511	0.457	0.134
1987	-0.096	-0.121	0.129
1988	0.211	0.161	0.130
1989	0.179	0.113	0.129
1990	-0.153	-0.201	0.121
1991	0.275	0.222	0.094
1992	-0.022	-0.060	0.089
1993	0.442	0.391	0.067
1994	-0.058	-0.092	0.100
1995	0.215	0.165	0.082
1996	0.117	0.072	0.074
1997	0.124	0.079	0.061
1998	0.119	0.077	0.050
1999	0.176	0.135	0.070
2000	0.065	0.029	0.055
2001	0.061	0.026	0.060
2002	-0.062	-0.096	0.052
2003	0.134	0.087	0.056
2004	0.278	0.228	0.053
2005	0.206	0.157	0.052
2006	0.249	0.198	0.059
2007	0.223	0.179	0.063
2008	-0.433	-0.458	0.040
2009	0.404	0.341	0.057
2010	0.064	0.022	0.055
2011	-0.085	-0.124	0.037

APPENDIX 2 – Copy of Resume

Dr John C. Handley

April 2012

1. QUALIFICATIONS

BCom, BMath *Newcastle*, MCom (Hons) *Melbourne*, PhD *Melbourne*

EMPLOYMENT HISTORY

<i>Period</i>	<i>Organisation</i>	<i>Position</i>
Jul 1993 to date	University of Melbourne Melbourne	Associate Professor of Finance (since July 2005)
May 2008 to Jan 2012*	Stern School of Business NYU New York	Visiting Associate Professor of Finance (Summer 2008, Fall 2009, Summer and Fall 2011)
Aug 1988 to Jul 1993	SBC Australia (<i>Now UBS</i>) Sydney and Melbourne	Corporate Finance Executive
Nov 1985 to Aug 1988	Coopers & Lybrand (<i>Now Pricewaterhousecoopers</i>) Newcastle	Audit Senior

* I will again be visiting NYU Stern during Summer Semester 2012.

2. RESEARCH

Research Focus: Corporate finance, derivative security pricing, corporate finance applications of derivative security pricing

Recent Scholarly Publications

- Brown, C.A., J.C. Handley and K. Palmer, "A Closer Look at Barrier Exchange Options". *Journal of Futures Markets*, forthcoming.
- Brailsford, T.J., J.C. Handley and K. Maheswaran, 2012. "The Historical Equity Risk Premium in Australia: Post-GFC and 128 Years of Data". *Accounting and Finance*, 52, 237-247.
- Handley, J.C., 2008. "Dividend Policy: Reconciling DD with MM". *Journal of Financial Economics*, 87, 528-531.
- Handley, J.C. and K. Maheswaran, 2008. "A Measure of the Efficacy of the Australian Imputation Tax System". *Economic Record*, 84, 82-94.
- Brailsford, T.J., J.C. Handley and K. Maheswaran, 2008. "Re-examination of the Historical Equity Risk Premium in Australia". *Accounting and Finance*, 48, 73-97.
- Handley, J.C., 2005. "On the Upper Bound of a Call Option". *Review of Derivatives Research*, 8, 85-95.

Case Studies

- Tufano, P. and J.C. Handley, 1999. "General Property Trust". Harvard Business School case study 299-098, HBS Publishing.

Work in Progress

- Brown, C.A., J.C. Handley and A. Lamba. "A Direct Test of Market Timing"
- Brown, C.A., J.C. Handley and A. Lamba. "Share Buybacks and Information Asymmetry – Winners and Losers"
- Brown, C.A., J.C. Handley and K. Palmer. "Partial Differential Equations for Asian Option Prices".
- Brown, C.A., J.C. Handley and K. Palmer. "Lookback Options: Binomial Pricing and Convergence".

3. TEACHING

Teaching Focus: Financial Management, Corporate Finance, Derivatives, Investments

Awards

- 2010 Dean's Certificate of Excellent Graduate/Postgraduate Teaching.
- 2009 Dean's Certificate of Excellent Undergraduate and Postgraduate Teaching.
- 2008 Dean's Certificate for Excellence in Graduate Teaching.
- 2007 Dean's Certificate for Excellence in Undergraduate and Postgraduate Teaching.
- 2006 Dean's Certificate of Excellent Undergraduate and Postgraduate Teaching.
- 2005 Dean's Certificate of Excellent Undergraduate and Postgraduate Teaching.
- 2004 Dean's Certificate of Excellent Undergraduate Teaching.
- 2003 Dean's Individual Award for Excellence in Teaching in the Faculty of Economics and Commerce.

4. ADMINISTRATION AND LEADERSHIP

- Academic Director, Master of Applied Finance Program, 2012—.
- Deputy Head (Academic Programs), Department of Finance, 2009—.
- Coordinator, PhD Program in Finance, 2009.
- Academic Director, Master of Applied Finance Program, 2006—2008.
- Coordinator, Honours Program in Finance, 2001—2003.
- Chair, 2003 Review Committee of the Honours Program in Finance at the University of Melbourne
- Chair, 2002 Review Committee of the Undergraduate Program in Finance at the University of Melbourne

5. CONSULTING EXPERIENCE and ENGAGEMENT AND CONTRIBUTION TO THE PROFESSION

I have provided expert advice on various financial matters to the Australian Accounting Standards Board, Australian Competition and Consumer Commission, Commonwealth Bank of Australia, Australian Energy Regulator, KPMG Corporate Finance and the New Zealand Commerce Commission, including the following recent engagements:

- 2011, Consultant to the Australian Energy Regulator in relation to certain proceedings before the Australian Competition Tribunal, February.

- 2011, Consultant to the Australian Energy Regulator on matters dealing with the gas access arrangements of APT Allgas and Envestra in Queensland and South Australia for the period 2011 to 2016, January.
- 2010, Consultant to the Australian Energy Regulator on matters dealing with the AER Electricity Distribution Determinations for Queensland and South Australia for 2010-2015, Victoria for 2011-2015 and Gas Distribution Decisions for New South Wales and the Australian Capital territory for 2010-2015, March–May, September-October
- 2009, Consultant to the Australian Energy Regulator on matters dealing with the AER Electricity Distribution Determinations for Queensland and South Australia for 2010-2015, October.
- 2009, Consultant to the Australian Energy Regulator on matters dealing with The AER Review of Proposed Debt and Equity Raising Costs and the Weighted Average Cost of Capital for the 2009–14 Regulatory Control Period, April.
- 2009, Consultant to the Australian Energy Regulator on matters dealing with The AER Review of the Weighted Average Cost of Capital for Electricity Distribution and Transmission, March/April.
- 2009, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the years ending 30 June 2005 and 2006, June.
- 2008, Consultant to the Australian Energy Regulator on matters dealing with The AER Review of the Weighted Average Cost of Capital for Electricity Distribution and Transmission, November.
- 2008, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the years ending 30 June 2004 and 2005, April.
- 2008, Presentation to the ACCC / AER on the Weighted Average Cost of Capital of Regulated Firms, February.
- 2007, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the year ending 30 June 2004, March.
- 2006, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the year ending 30 June 2004, May.
- 2005, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the year ending 30 June 2003, February.
- 2003, Consultant to the New Zealand Commerce Commission on matters dealing with the Telecommunications Service Obligations (TSO) Determination for the period ending 30 June 2002, June.

6. CONTACT DETAILS

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