

The Logic and Economics underlying the use of a 75% Rule in a Regulatory Environment

Professor Bruce D. Grundy 25/3/2014

I. Introduction

1. A 75% Rule is a regulatory rule whereby each individual parameter estimate used in the determination of the cost of capital is set at a level different from the expected value of the parameter. The selected level is such that, assuming that all other parameters are measured correctly, then only 25% of the time is the use of the selected parameter estimate associated with an underestimate of the cost of capital. This note considers four issues. Section II explains why it is optimal to employ such a rule even when investment has already occurred. Section III sets out a further reason to employ such a rule when the level of investment is not fixed, but is a choice to be made by regulated firms. Section IV explains the need for time consistency in employing a 75% rule and shows why that the further reason also applies to existing investments. Section V discusses how a regulator might go about selecting the optimal rule to employ; i.e., how a regulator might go about choosing between a 75% rule and an 80% rule.

II. The Rationale for a 75% Rule when Investment is Fixed

1. A regulated business faces risks for which it is not explicitly compensated. One such risk is that technological advances in substitute products can have the effect that the market for the regulated business's product shrinks dramatically and its assets become stranded. When a regulators' estimate of future profits assigns no probability to stranding risk, the regulators' estimate of future profits overstates the true expected

profit and a regulated business cannot expect to earn a normal return unless the regulatory building blocks somehow compensate for that risk elsewhere. One way of doing so is to set the allowed rate of return above the cost of capital.

2. A second such risk arises whenever a regulated entity faces the risk of a natural disaster (e.g. an earthquake) that is not recognized in the regulator's estimate of future profits. Again, the regulator's overestimate of future profits can be offset by an adjustment that sets the allowed rate of return above the cost of capital.
3. One can think of a 75% rule as a fudge factor to recognize the existence of stranding risk and disaster risk. A better approach would be to estimate the expected cost associated with stranding and natural disasters and compensate for what is in effect the cost borne by the regulated firm in self-insuring against such risks.
4. A further rationale for a 75% rule is as way of recognizing the existence of the bias induced by the regulatory underestimation of expected operating costs. The estimate of future profits used by a regulator will exceed the true value of a regulated business's expected future profits. This occurs whenever demand is uncertain and marginal cost is increasing.
5. The regulator's calculation of the cost of producing the expected quantity demanded at the allowed price is an underestimate of the true expected cost of producing the quantity demanded at the allowed price. To see this, suppose a regulated company is has invested the amount I and assume for simplicity that the investment will generate profits in perpetuity. Assume that the quantity demanded is a random function of the price of the form $\tilde{q}(p) = \tilde{a} + \tilde{b}p$, where $\tilde{q}(p)$ is the random quantity demanded given a price of p and \tilde{a} and \tilde{b} are random parameters. A tilde, $\tilde{\cdot}$, above a parameter denotes that parameter is random. In this case the intercept and the slope of the

demand function are random variables. The quantity demanded is decreasing in price and hence the slope parameter \tilde{b} of the demand function is negative.

6. The expected quantity demanded at a price of \hat{p} is

$$E\{\tilde{q}(p)|p = \hat{p}\} = E\{\tilde{a} + \tilde{b}\hat{p}\} = E\{\tilde{a}\} + E\{\tilde{b}\}\hat{p}.$$

7. The cost of producing q units is a random function $\tilde{c}(q) = \tilde{x} + \tilde{y}q + \tilde{z}q^2$ where \tilde{x} , \tilde{y} and \tilde{z} are random parameters. The cost function is such that the marginal cost of production, $\frac{d\tilde{c}(q)}{dq} = \tilde{y} + 2\tilde{z}q$, is increasing in the quantity produced; i.e.,

$$\frac{d(d\tilde{c}(q)/dq)}{dq} = \frac{d^2\tilde{c}(q)}{dq^2} = 2\tilde{z} > 0.$$

8. A regulator sets the allowed price for the company's product by assuming that the actual quantity demanded is equal to the quantity expected to be demanded at the allowed price. The expected cost of producing a quantity equal to the quantity that is expected to be sold at a price of \hat{p} is given by $E\{\tilde{c}(q)|q = E\{\tilde{q}(\hat{p})\}$.

Regulator's Estimate of Expected Profit: $E\{\tilde{q}(\hat{p})\}\hat{p} - E\{\tilde{c}(q)|q = E\{\tilde{q}(\hat{p})\}$.

9. The regulator's estimate of expected profits is an overestimate of the true value of the expected profit given the allowed price. Because the cost of production is a convex function of the quantity produced and the quantity sold at a price of \hat{p} is random, the regulator's estimate of expected profit will be *greater* than the true value of the expected profit at a price of \hat{p} . The true value of the expected profit given the allowed price is

True Value of Expected Profit: $E\{\tilde{q}(\hat{p})\}\hat{p} - E\{\tilde{c}(\tilde{q}(\hat{p}))\}$.

10. Let \hat{k} denote an unbiased estimate of the true value of the cost of capital. Suppose the regulator does not employ a 75% rule and sets the allowed return equal to an unbiased estimate of the true value of the cost of capital. The regulator will set the allowed price equal to p^* where p^* solves

$$E\{\tilde{q}(p^*)\} p^* - E\{\tilde{c}(E\{\tilde{q}(p^*)\})\} = \hat{k}I.$$

$$E\left\{\left(\tilde{a} + \tilde{b}p^*\right) p^* - \left(E\{\tilde{x}\} + E\{\tilde{y}\} \left[E\left\{\left(\tilde{a} + \tilde{b}p^*\right)\right]\right] + E\{z\} \left[E\left\{\left(\tilde{a} + \tilde{b}p^*\right)\right\}^2\right]\right)\right\} = \hat{k}I. \quad (1)$$

11. At the allowed price of p^* the true value of the expected profit is actually

$$E\{\tilde{q}(p^*)\} p^* - E\{\tilde{c}(\tilde{q}(p^*))\} =$$

$$E\left\{\left(\tilde{a} - \tilde{b}p^*\right) p^* - \left(E\{\tilde{x}\} + E\{\tilde{y}\} E\left\{\left(\tilde{a} - \tilde{b}p^*\right)\right\} + E\{z\} E\left\{\left(\tilde{a} - \tilde{b}p^*\right)^2\right\}\right)\right\}.$$

12. Given (1), the *true* value of the expected profit can be rewritten as

$$\hat{k}I + E\{z\} \left[E\left\{\left(\tilde{a} - \tilde{b}p^*\right)\right\}^2 - E\{z\} E\left\{\left(\tilde{a} - \tilde{b}p^*\right)^2\right\} \right]$$

$$= \hat{k}I + E\{z\} \left[\left[E\{\tilde{a}\} \right]^2 - E\{\tilde{a}^2\} + \left(\left[E\{\tilde{b}\} \right]^2 - E\{\tilde{b}^2\} \right) [p^*]^2 \right]$$

$$= \hat{k}I - E\{z\} \left[Var(\tilde{a}) + Var(\tilde{b}) [p^*]^2 \right],$$

which is less than $\hat{k}I$; i.e., less than the regulator's estimate of the expected profit.

The true value is less than the regulator's estimate whenever (i) $E\{z\}$ is positive; i.e., whenever the firm faces an increasing marginal costs of production, and (ii) the firm faces a random demand for its product; i.e., $Var(\tilde{a})$ and/or $Var(\tilde{b})$ are positive.

13. In practice the quantity demanded is random and the marginal operating cost is an increasing function of quantity. Therefore, it is natural to set the allowed rate of return above an unbiased estimate of the cost of capital and one can think of a 75% rule as an attempt to offset the upward bias in the regulatory estimate of expected profits due

to increasing marginal operating costs as well as the regulatory failure to recognize stranding and disaster risk.

III. A Further Rationale for a 75% Rule when Investment is Not Fixed

1. Suppose that because of standing risk, disaster risk, and the effect of demand uncertainty and increasing marginal costs, the allowed rate of return is set at a level above an unbiased estimate of the cost of capital. The regulator can then set an allowed price with the property that the true expected return is an unbiased estimate of the cost of capital. This does *not* mean that potential investors will be willing to invest the amount I in the regulated business. Rather, it means that if it were compulsory to invest the amount I in the regulated business then on average investors would earn the cost of capital.
2. In general, potential investors are not required to invest in regulated businesses.¹ Potential investors will only invest when the true expected return from doing so is greater than or equal to the cost of capital. Thus, if (i) the regulated price is set at a level such that the expected value of the true rate of the return that investors will earn on their investment is equal to an unbiased estimate of investors' true required return, and (ii) uncertainty is symmetric, then only 50% of the time will the expected value of the rate of the return that investors will earn on their investment exceed investors' true required return. In the other 50% of cases investors' true required return will exceed the regulator's unbiased estimate of investors' required return and investors will not be willing to invest.

¹ Moreover, even if compulsory investment might be able to be elicited from some investors in some circumstances, relying heavily on such a mechanism in those circumstances would likely increase the promised return demanded by investors before making future investments that might lead to further compulsory investments.

3. If a regulator wanted to be certain that investment would always take place, the regulator would have to allow a price such that the expected value of the rate of return that investors will actually earn on their investment was equal to the maximum possible value of investors' required return. Note that given standing risk, disaster risk, and the effect of demand uncertainty and increasing marginal costs, investment could only be guaranteed if a *greater than* 100% rule were used.

IV. Time Consistency and the 75% Rule

1. When an investment has already been made, a regulator might reason that it is sufficient to set the allowed price at a level such that the true expected return in the future is an unbiased estimate of the regulated firm's cost of capital. Such reasoning is not consistent with using a Percent Rule so as to actually achieve the desired likelihood of investment. Investors will anticipate the future downward revision in the estimated cost of capital and will therefore be less willing to initially invest.
2. Switching from a 75% rule will accomplish a one-time redistribution of wealth away from the owners of the regulated business. And doing so will simultaneously diminish the regulator's credibility with future investors and therefore diminish the regulator's ability to achieve their goals in their future regulatory endeavours.

V. What % Rule Should a Regulator Employ?

1. To answer this question the regulator must first explicitly determine the loss function they are seeking to minimise. The regulator must determine the rate at which they are willing to trade off the economic loss associated with underinvestment in

infrastructure against any economic loss associated with greater than normal returns to investors in regulated businesses.

2. Given the uncertainty in demand and cost parameters and the estimation error in the parameters used to operationalize the capital asset pricing model, a regulator can use a bootstrap technique to determine the likelihood that a profit-maximizing regulated business will find it optimal to invest given a 75% rule.² A bootstrap approach would estimate the probability of investing by repeated sampling of the parameters from the empirical distribution of the observed data and asking whether the net present value is positive in each simulation. The percentage of simulations with positive NPV's will give the likelihood that a profit-maximizing regulated business would elect to invest under a 75% rule.
3. Similarly, the regulator could determine the likelihood that a profit-maximizing regulated business would elect to invest under an 80% rule, etc. The regulator would then have to determine what risk of underinvestment they were willing to bear and select the % rule that is optimal given their loss function.
4. Trying to solve the problem analytically is very difficult because an analytical solution requires an explicit determination of the multivariate distribution of the set of parameters describing the demand and cost functions as well as the parameters of the asset pricing model that determine the regulator's estimate of the cost of capital.³ It is difficult to have an intuitive sense of the analytical probability that investment will

² For an introduction to the bootstrap technique see Efron, Bradley and R.J. Tibshirani, 1994, "An Introduction to the Bootstrap" (Chapman & Hall/CRC Monographs on Statistics & Applied Probability).

³ The distribution used in the bootstrap approach is the empirical observed distribution of the parameters.

incur under a 75% rule. For example, consider a simple setting with just two unknown parameters x and y and suppose that an estimator of the cost of capital is given by the sum of x and y . Suppose also that one has implemented a 75% rule by adding together two estimators \hat{x} and \hat{y} each with the property that there is only a 25% chance that the true value of the parameter actually exceeds the estimator of the parameter. Thus there is a 25% chance that the true value of x actually exceeds \hat{x} and a 25% chance that the true value of y actually exceeds \hat{y} .

5. What is the probability that the true value of the sum $x + y$ actually exceeds the sum of the estimators $\hat{x} + \hat{y}$? One might guess that the probability is quite low and equal to $0.25 \times 0.25 = 6.25\%$. The actual probability that $x + y > \hat{x} + \hat{y}$ depends on the multivariate distribution of x and y . Suppose x and y are independent and normally distributed. Suppose also that the two variables have identical variances. In that event, the probability that the true value of $x + y > \hat{x} + \hat{y}$ is 17%. The risk that firms will not invest is 17%, not 6.25%.

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Education

PhD, Finance, Graduate School of Business, University of Chicago. 1992.

Specialisations:

Finance and Economics. Beta Gamma Sigma. Dissertation: "Preferreds and Taxes."
Committee: Merton Miller (Chairman), George Constantinides, Douglas Diamond.

B. Com. Honours (1st Class), University of Queensland. 1977.

Academic Positions

Professor of Finance, University of Melbourne 2005-2013.

Ian Potter Professor, Melbourne Business School, 2000-2005.

Professor of Finance, University of Melbourne, 1998-1999.

Andrew Heyer Term Assistant Professor of Finance, Wharton School, University of Pennsylvania, 1991-1998.

Assistant Professor of Finance, GSB, Stanford University, 1985-1990.

Visiting Positions:

Visiting Professor, London Business School, Fall 2013.

Visiting Professor, Wharton School, University of Pennsylvania, Fall 2005, Fall 2006,
Fall 2007.

Visiting Professor, Singapore Management University, Fall 2005.

Visiting Professor, University of Chicago, Winter 2003.

Metzler Bank Professor, Johann Wolfgang Goethe-Universität Frankfurt am Main,
Summer 1998.

Visiting Professor, Macquarie University, Summer 1994.

Publications

"Why are conversion-forcing call announcements associated with negative wealth effects?" 2014, *Journal of Corporate Finance*, 24, 149-157. Co-authors: Chris Veld, Patrick Verwijmeren, Yuriy Zabolotnyuk.

"Stock returns and the Miller-Modigliani valuation formula: Revisiting the Fama-French analysis," 2013, *Journal of Financial Economics*, 110(2), 347-357. Co-authors: Gil Aharoni and Qi Zeng.

"Convertibles and hedge funds as distributors of equity exposure," 2012, *Review of Financial Studies* 25(10), 3077-3112. Co-authors: Stephen Brown, Craig Lewis and Patrick Verwijmeren.

"Do option markets undo restrictions on short sales? Evidence from the 2008 short-sale ban," 2012, *Journal of Financial Economics* 106(2), pp. 331-348. Co-authors: Bryan Lim and Patrick Verwijmeren.

- “Investor sentiment, executive compensation, and corporate investment,” 2010, *Journal of Banking & Finance* 34, pp. 2439-2449. Co-author: Michael Li.
- “Disclosure, hidden charges and indexed pensions,” 2005, *Agenda: A Journal of Policy Analysis and Reform*, 12(1), pp. 33-46. Co-authors: Diana Beal and Sarath Delpachitra.
- “Stock market volatility in a heterogeneous information economy,” 2002, *Journal of Financial and Quantitative Analysis* 37(1), pp. 1-27. Co-author: Youngsoo Kim.
- “Momentum: Fact or factor? Momentum investing when returns have a factor structure,” 2001, *Review of Financial Studies* 14(1), pp. 29-78. Co-author: Spencer Martin.
- “Merton H. Miller: His contribution to financial economics,” 2001, *Journal of Finance* 56(4), pp. 1183-1206.
- “Generalized properties of option prices,” 1996, *Journal of Finance* 51(5), pp. 1573-1610. Co-authors: Yaacov Bergman and Zvi Wiener.
- “Option prices and the underlying asset’s return distribution,” 1991, *Journal of Finance* 46(3), pp. 1045-1070.
- “Changing risk, changing risk premiums, and dividend yield effects,” 1990, *Journal of Business* 63(1), pp. 51-70. Co-authors: Nai-fu Chen and Robert F. Stambaugh.
- “Optimal investment with stock repurchase and financing as signals,” 1989, *Review of Financial Studies* 2(4), pp. 445-465. Co-author: George Constantinides.
- “Trade and the revelation of information through prices and direct disclosure,” 1989, *Review of Financial Studies* 2(4), pp. 495-526. Co-author: Maureen McNichols.
- “Call and conversation of convertible corporate bonds: theory and evidence,” 1986, *The Analysis of Security Prices* 31, pp. 35-70. Co-author: George Constantinides.
- “The behavior of stock prices around ex-dividend dates,” 1983, *The Analysis of Security Prices* 28, pp. 83-114.

Edited Volumes

- Selected Works of Merton Miller: A Celebration of Markets. Vol I Finance*, 2002
(University of Chicago Press, Chicago, Ill).
- Selected Works of Merton Miller: A Celebration of Markets. Vol II Economics*, 2002
(University of Chicago Press, Chicago, Ill).

Other Publications

- “Hedge Fund Involvement in Convertible Securities,” 2013, *Journal of Applied Corporate Finance* 25(4), 60-73. Co-authors: Stephen J. Brown, Craig M. Lewis and Patrick Verwijmeren
- “An analysis of shareholder ownership patterns for Australian firms,” forthcoming in *In The Black CPA Australia Magazine*. Co-authors: Dean Hamlon and Sean Pinder
- “Stock return predictability in rational markets,” 2007, *Insights: Melbourne Economics & Commerce* Volume 1 April.
- “Real options analysis and investment appraisal: the opportunities and challenges,” 2006, *Insights: Melbourne Economics & Commerce* Volume 4 November.
- “Book Review: *Pricing and hedging of derivative securities* by Lars Tyge Nielsen,” 2000, *Journal of Financial Research* 23, pp. 391-394.

Working Papers

“Disappearing call delay and dividend-protected convertible bonds,” Co-author: Patrick Verwijmeren.

“Charitable fund raising: Matching grants or seed money,” Co-author: Ning Gong.

“Can socially responsible firms survive competition? An analysis of corporate employee matching grants,” Co-author: Ning Gong.

“Differential information and derivatives pricing,” Co-author: Qi Zeng.

Work in Progress

“Option microstructure and the smile,” Co-authors: Bryan Lim and Patrick Verwijmeren

“A market clearing explanation of the profitability of momentum strategies,” Co-authors: Wei Li, Qi Zeng and Zhe Zhang

“Hoteling, OPEC and the term structure of expected future oil prices,” Co-author: Richard Heaney.

“Valuation of crude oil and gas reserves,” Co-author Richard Heaney.

“An analysis of shareholder ownership patterns for Australian firms,” Co-authors: Dean Hamlon and Sean Pinder

Awards

2012 FIRN Best Policy Paper Prize

2012 Third Annual Financial Markets & Corporate Governance Research Prize

2010 Deakin University Quantitative Finance/Risk Management/Derivatives/Corporate Governance Conference Research Prize

1998 Geewax-Terker Research Prize

1994-95 Batterymarch Fellowship

2009, 2010, 2011 Faculty of Business and Economics Teaching Excellence Prize

2006, 2008 Faculty of Economics and Commerce Teaching Award

1994 Wharton Hauck Teaching Prize

1993 Outstanding Teaching Award (Wharton)

Grants

CPA Research Grant, “Links between Australia's taxation system and investment in Australian listed companies by different classes of resident and non-resident investors,” 2012-2013, joint with Sean Pinder and Dean Hamlon. \$40,000.

Faculty of Business and Economics Strategic Initiative Grant, “Neuro-Finance,” 2012-2015, joint with Carsten Murawski. \$600,000.

Australian Research Grants Council Discovery Grant, “Three Decades of Financial Distress and Corporate Restructuring in Australia” 2008-10, joint with Paul Kofman and Howard Chan. \$104,537

Australian Research Grants Council Discovery Grant, “Storage and the Hoteling Valuation Principle: Understanding the Dynamics of the Oil Industry” 2007-09, joint with Richard Heaney. \$345,000

National Science Foundation Grant, “Call and conversion of convertible bonds” 1985-1987, joint with George Constantinides. US\$300,000

Professional Society Activities

Founding Member: FIRN

Fellow: Australian Society of Certified Practicing Accountants.

Member: SIRCA Research Committee

Member: American Economic Association, American Finance Association, American Mathematical Society, European Finance Association, Asian Finance Association, Western Finance Association.

Doctoral Colloquium Fellow: AFAANZ 2003 Colloquium, 2005 Colloquium.

Doctoral Consortium Fellow: AFAANZ 2004 Consortium

Doctorial Consortium Fellow: Asian Finance Association 2005

Doctorial Consortium Fellow: FMA Asia 2010

Australian Society of CPA's 1999 Research Lecture

FIRN Doctoral Tutorial Discussant: 2005-07.

FIRN Local Convener: 2006-2010.

FIRN Governing Council: 2011-2012.

Managing Editor:

International Review of Finance, 2004-2008

Associate Editor:

Journal of Finance, 2000-2003

Journal of Financial Research, 1999-2006

Accounting and Finance, 1999-2002.

Journal of Financial and Quantitative Analysis, 1992-1996.

Review of Financial Studies, 1988-1994.

International Review of Finance, 2008-present

Editorial Board:

Accounting and Finance, 2002-present

Business Research, 2007-present

Insights: The Faculty of Economics & Commerce, 2007-2010.

Ad Hoc Referee:

Agenda, *American Economic Review*, *Australian Economic Review*, *Australian Journal of Management*, *Accounting and Finance*, *European Economic Review*, *European Journal of Finance*, *Financial Management*, *Financial Review*, *Journal of Accounting Research*, *Journal of Business*, *Journal of Business and Economic Statistics*, *Journal of Corporate Finance*, *Journal of Finance*, *Journal of Financial Economics*, *Journal of Financial Intermediation*, *Journal of Financial Services Research*, *Journal of Political Economy*, *Journal of Public Economics*, *Management Science*, *Mathematical Finance*, *Review of Accounting Studies*, *Review of Quantitative Finance and Accounting*, *Review of Financial Studies*, *Quarterly Journal of Economics*

Program Committee:

Australasian Banking & Finance Conference: 2010, 2011, 2012, 2013
American Economic Association Meetings: 1998
American Finance Association Meetings: 2001
ASU Sonoran Winter Finance Conference: 2012, 2013, 2014
Asian Finance Association Meetings: 2004, 2005, 2006, 2009, 2012
Asian FMA Meetings: 2009, 2010
Finance Down Under Conference: 2009, 2010, 2011, 2012, 2013, 2014
European Finance Association Meetings: 2000, 2001, 2002, 2005, 2010, 2011, 2012, 2013
European Financial Management Association Meetings: 1999
Indiana University Symposium on Design of Securities and Markets: 1993
Journal of Accounting Research Annual Conference: 2002, 2003
Western Finance Association Meetings: 1990, 1991, 1994, 1995, 1997, 1998, 2004, 2007, 2008, 2009, 2010, 2011, 2012, 2013, 2014
Review of Accounting Studies Annual Conference: 2004, 2005
Singapore International Conference on Finance: 2009, 2010
Society for Financial Econometrics: 2010
Financial Intermediation Research Society: 2010, 2011.

Reviewer:

Chair External Review Committee, ANU School of Business Department of Finance, Applied Statistics & Actuarial Science: 2010
Research Grants Council of Hong Kong: 1997, 2000, 2004, 2005, 2008, 2009
National Science Foundation Proposals: 1990, 1991, 1994, 1997
Australian Research Council: 1994, 1995, 2007
Social Sciences and Humanities Research Council of Canada: 1993 and 1994
Australian Accounting Research Foundation Exposure Draft on Director and Executive Disclosures
Singapore Management University Quantitative Finance Programme: 2003 through 2010
External Reviewer, Accounting & Finance Department, Monash University: 2002

Discussant:

Accounting & Finance Association of Australia and New Zealand Meetings: 2006, 2007
American Finance Association Meetings: 1986-900, 1994-95, 2006
Annual Conference on Financial Economics and Accounting: 1992 and 1996
ANU Summer Camp: 2008, 2009, 2010, 2011, 2012
Asia-Pacific Finance Association Meetings: 1999
Asian Finance Association Meetings: 2004, 2005, 2006, 2009
Asian FMA Meetings: 2010

European Finance Association Meetings: 1995, 2002, 2005, 2010, 2011, 2012
Fifth Annual Texas Finance Festival: 2003
Finance Down Under: 2011, 2012, 2013
FIRN Research Day: 2010
FIRN Annual Conference, The Art of Finance, Hobart: 2012
Paul Woolley Centre on Capital Market Dysfunctionality Conference: 2008, 2009, 2011
Simulation Based & Finite Sample Inference in Finance Conference: 2003
Singapore International Conference on Finance: 2008, 2009
Western Finance Association Meetings: 1993 and 1997
SIRCA Young Researcher Workshop 2012

Session Chair:

Accounting & Finance Association of Australia and New Zealand Meetings: 2003, 2004, 2005
Asian Finance Association Meetings: 2004, 2005, 2006, 2009
Asian FMA Meetings: 2010
Australasian Banking & Finance Conference: 2003, 2011
American Finance Association Meetings: 2001
European Finance Association Meetings: 2002, 2005, 2010, 2012
Western Finance Association Meetings: 1995

Keynote Speaker:

16th Malaysian Finance Association Annual Conference: 2014
La Trobe University Conference on Financial Markets and Corporate Governance: 2012
Asian FMA Meetings: 2010
Accounting & Finance Association of Australia and New Zealand Meetings: 2003
Australasian Banking & Finance Conference: 2002

Conference Organization:

The Dollars and Sense of Bank Consolidation: MBS Conference 2002
Risk Management and Pricing for Financial Institutions: Lessons from the Closed-End Fund Industry: Wharton Financial Institutions Centre Conference 1995
Finance Down Under Conference: 2007, 2008, 2009, 2010, 2011, 2012
FIRN Asset Pricing Group Meetings: 2013

Conference Presentations:

Australian Conference of Economists: 2006
Asian Finance Association Meetings: 2004, 2005 and 2006
Asian FMA Meetings: 2010
Australasian Q-group: 1999, 2004
Finance Down Under: 2010

HKUST Annual Finance Symposium: 2004
Third National Symposium on Financial Mathematics: 2004
AGSM Finance and Accounting Camp: 1996, 1997 and 1999
American Finance Association Meetings: 1986, 1989, 1990, 1996, 1997, 1998
NBER Summer Institute: 1998
Annual Conference in Financial Economics and Accounting: 1995 and 1996
American Mathematical Society Meetings: 1996
European Finance Association Meetings: 1995, 2002, 2005, 2010, 2012
NBER Financial Risk Assessment and Management Conference: 1995
N.J.C.R.F.S. Conference in Security Design and Innovations in Financing: 1993
Western Finance Association Meetings: 1984, 1989, 1993, 2010
Sixth Annual Conference MSMESB: 1991
Australasian Banking and Finance Conference: 1989, 2007, 2011
ZEW Centre for European Economic Research, Mannheim: Conference on the
Economics of Charitable Fundraising: 2009

Seminar Presentations:

Australian Graduate School of Management, Australian National University, Bond University, Boston College, Carnegie-Mellon University, Central Queensland University, Chinese University of Hong Kong, Columbia University, Commodity Futures Trading Commission, Cornell University, Dartmouth College, Deakin University, Duke University, Fields Institute for Research in Mathematical Sciences, Erasmus School of Economics, Hong Kong University of Science and Technology, Humboldt University, Indian School of Business, Insead, La Trobe University, London Business School, London School of Economics, Macquarie University, Massey University, Melbourne Business School, MIT, Monash University, National University of Singapore, New York University, Northwestern University, NUS Risk Management Institute, Odense University, Ohio State University, Queen's University, Queensland University of Technology, Rutgers University, Singapore Management University, Stanford University, Tilburg University, University of Aarhus, University of Adelaide, University of Alberta, University of British Columbia, University of California Berkley, University of California Irvine, University of California Los Angeles, University of Chicago, University of Frankfurt am Main, University of Houston, University of Illinois Champaign, University of Oregon, University of Maryland, University of Melbourne, University of Michigan, University of Minnesota, University of New South Wales, University of North Carolina Chapel Hill, University of Queensland, University of South Australia, University of Sydney, University of Technology Sydney, University of Vienna, University of Western Australia, University of Washington in St Louis, Vanderbilt University, Victoria University Wellington, Washington University, Yale University

Manuscript Reviewer:

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Teaching Experience

Derivatives-related courses: Honours, Masters and PhD courses on options, futures, swaps, mortgage-backed securities and exotics.

Corporate Finance-related courses: Honours, Masters and PhD courses on capital budgeting, mergers and acquisitions, corporate taxation, agency problems, information asymmetries, and security design.

Corporate Governance: MBA course

Real Options and Resource Projects: Undergraduate and MBA courses

Financial Management: Executive MBA course

Executive Education:

ABN Amro, Australian Graduate School of Management, KPMG, Liechtenstein Global Trust, Melbourne Business School, PaperLinx, PWC, Susquehanna Investment Group, Telstra Risk Management and Assurance, Turkish Capital Markets Board, Wharton School Pension Funds and Money Management Program

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Administrative Positions

University of Melbourne

Cost Containment Committee: 2007.
Business@Melbourne Coordinating Committee: 2007-2008.
Melbourne Business School Committee: 2006-2011.
Academic Structures Working Group: 2008-2009.

University of Melbourne, Faculty of Business & Economics:

Acting Dean and Deputy Dean, Faculty of Business & Economics: 2006-2008.
Head, Department of Finance: 2010-2012.
Deputy Head, Department of Finance: 2008-2010.
FEC Advisory Board: 2007-2008.
Convener Melbourne Derivatives Research Group: 2006-2010.
Finance Seminar Convener: 2007-2009.
FIRN Local Coordinator: 2006-2011.
PhD Coordinator, Department of Finance: 2007, 2009-2011.
Accounting and Finance Department Committee: 1999.
Research and Research Training Committee: 1999, 2007, 2009-2011.
International Committee: 2009.
SSPL Committee: 2009.
Academic Promotions Committee: 2009-2011.

University of Melbourne, Melbourne Business School:

Director Ian Potter Centre for Financial Studies: 2000-2005
Academic Planning and Development Committee: 2002-2005.
Curriculum Committee: 2002-2005.

The Wharton School:

Convener Corporate Finance Workshop: 1995-1997.
Wharton Fellows Fund Oversight Committee: 1993-1997.
Recruiting Committee: 1995-1996.
Finance Seminar Convener: 1992-1994.

Stanford Graduate School of Business:

Finance Seminar Convener: 1988-1990.
Deans Advisory Committee: 1986-1988.