Response to Professor Lally's Analysis

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Introduction

I have been asked to:

(1) Give my view on Professor Lally's paper titled "The Risk Free Rate and Present Value Principle" dated 22 August 2012 (hereafter, L1), in which he states that any estimate of the risk-free rate that is not estimated on the most recently available data violates this principle.

(2) State whether, in my opinion, the present value principle prohibits the use of a long run average as a proxy for the risk free rate.

(3) Respond to Professor Lally's criticism (in his report "The cost of equity and the market risk premium", 25 July 2012, hereafter L2) of a key conclusion of Mason, Miles and Wright's (2003) report for Smithers & Co, commissioned by a consortium of UK regulators, on the stability of the real cost of equity capital (hereafter MMW)

Please note that I have also been asked to comment, in a separate report, on a comparison between UK regulatory practice and the AER's methodology. In both reports I shall refer to that report as W1, and this report as W2. Since the content of both reports overlaps in various places I shall at various points in this report, in the interests of brevity, refer directly to more detailed discussion in W1.

Expert Witness Status

I have read, understood and complied with the guidance on expert witnesses in Practice Note CM7.

I am a Professor of Economics at Birkbeck College, University of London. I have been a full-time academic since 1991, holding academic positions at the University of Cambridge and at Birkbeck. I previously worked at the Bank of England; and alongside working as an academic have maintained regular links with the private sector, most notably with Smithers & Co Ltd, advisers to the fund management industry. My academic work involves both teaching and research: I have published regularly in respected journals, specialising in macroeconomics and finance. I have carried out two major studies relating to the cost of capital for regulated industries, both commissioned by UK regulators (see Mason, Miles & Wright, "A Study in to Certain Aspects of the Cost of Capital for Regulated Utilities in the U.K." (February 2003), and Baskaya, Hori, Mason, Satchell and Wright, "Report on the

Cost of Capital provided to Ofgem" (September 2006)), both of which have been widely quoted in subsequent discussions of the cost of capital. Additionally I have acted as a consultant to Ofgem on estimation of CAPM betas, and as an expert witness to the UK Competition Appeal Tribunal.

I have been assisted in preparing this report by my colleague Kenjiro Hori, Lecturer in Economics at Birkbeck, who was a co-author on the second of the reports cited above.

My Curriculum Vitae is appended to this document.

Key Conclusions

i. On Item (1), Professor Lally's analysis is theoretically correct, but *only* given his key assumption, that the income stream of the regulated monopoly is risk-free. When this assumption does not hold (which in all practical instances it does not), the appropriate discount rate in his analysis must – as he acknowledges – contain an additional risk premium. Thus the present value principle is only operational in practice if we make assumptions about the overall cost of equity of the regulated company: i.e., the sum of the risk-free rate and a risk premium. In contrast to the risk-free rate, the overall cost of equity is not directly observable. As a result the practical application of the present value principle is crucially dependent on what assumptions are made about this crucial magnitude: it is emphatically *not* simply dependent on a market-based measure of the risk-free rate.

ii. Professor Lally's approach to estimating the risk-free rate is largely consistent with the approach advocated in MMW, which I continue to believe to be appropriate. Thus I have no objections to his approach to measurement of the risk-free rate *per se*. However this issue cannot be separated from the use to which any such estimate is put.

iii. As highlighted in point i), above, any operational approach to the present value approach requires an estimate of the overall cost of equity capital. In W1, I strongly advocate the approach applied in the UK by Ofgem and the Competition Commission, of assuming that the real market cost of equity is constant. In this report I argue that, for lack of any demonstrably superior information, the assumed figure should be based on realised real stock market returns. I argue that that this assumption has a sound basis, both in the data *and* in terms of the overall rationale of cost of capital regulation. In response to Item (3), I do not believe that the criticisms raised by Professor Lally do anything to undermine this case.

iv. A consequence of my preferred approach is that, combined with a market-based measure of risk-free rates (which, as noted in point ii) above, I do not object to in principle), it *necessarily* implies that, by construction, the assumed MRP moves point for point, with opposite sign, with the risk-free rate. But my preferred approach also implies that, for a firm with β close to one, the implied estimate of the MRP does not *matter* very much.

v. Professor Lally, in contrast, is generally supportive (albeit with some qualifications) of the AER's methodology of assuming a constant market risk premium (MRP), based on historic averaging of realised excess returns. As discussed in W1, when

combined with a market-related estimate of the risk-free rate, this has led to sharp falls in the implied assumption on the real market cost of equity. Such falls clearly matter a great deal to regulated companies. The implied behaviour of expected returns is also entirely out of line with the evidence from the academic literature on the econometric predictability of returns.

vi. For a firm with β sufficiently close to unity, the appropriate discount rate to be applied in the present value model *is* the real market cost of equity. My preferred approach, as advocated under point iii) above, is to assume this is constant, and estimate it using historic average realised real market returns. By construction, the historic average real market return is the sum of the historic average risk-free rate and the historic average realised *excess* market return, i.e., the AER's preferred estimate of the MRP. Thus my preferred approach to the market cost of equity could in principle be *viewed* as combining the AER's MRP estimate with an historic average risk-free rate, and thus, in response to Item (2), the latter assumption could in principle be consistent with the present value approach.

vii. I would argue, however that the more crucial point this brings out is that the MRP and risk-free rate assumptions need to be mutually consistent, and that the primary focus should be on the (quantitatively crucial) real cost of equity.

Detailed Discussion

Of necessity, at points the analysis of this report is in places somewhat technical, and relates to several key conceptual issues; additionally, the arguments analysed relating to Items (1) to (3) must be dealt with in a common framework. At various points I shall refer to more detailed analysis both in my companion report (W1) and the original analysis in MMW.

a) The Present Value Principle

The Present Value principle, as presented by Professor Lally in L1, states that "the present value of the regulated firm's revenue stream should match the present value of its expenditure stream, plus or minus any efficiency incentive rewards or penalties." The principle is applied to a single-period risk free regulated firm, and by the argument of no arbitrage for an investor who can either invest in the firm or in a risk free asset, Professor Lally argues that it "*demonstrates* that the risk free rate that should be used is that prevailing at the beginning of the regulatory period" (L1, p.7, our emphasis).

The conclusion Professor Lally draws is uncontentious, and is consistent with a standard textbook treatment, *given* his key assumptions that the return to the regulated company is risk-free, in a single period model. However, quite clearly, this assumption is violated in all actual regulation problems. Professor Lally himself notes (L1, Footnote 1) that "If there is uncertainty about revenues or opex, this leads to a risk premium being added to the discount rate…" This is again uncontentious: the standard finance approach would be either to apply an appropriately risk-adjusted discount rate, or equivalently (as in, eg, Marshall, Yawitz and Greenberg, 1981, as cited by L1) to use the risk-free rate to discount the expected income *less* an adjustment for systematic risk (usually referred to as "certainty-equivalent valuation").

However, Lally's footnote continues " ….this does not otherwise affect the analysis." Here, Lally is on much more contentious grounds: the treatment of the equity (or market) risk premium is *crucial* to his approach, just as it has been to Ofgem's and just as in the treatment of Mason, Miles & Wright (2003, hereafter MMW). The crucial differences arise out of the method by which the risk premium is estimated. This in turn cannot be separated from the way that the cost of equity capital is estimated.

b) Estimation Strategies

As forward-looking constructs, both the cost of equity capital and the risk premium element (i.e., the gap between the cost of equity capital and the risk-free rate) are inherently unobservable. The crucial issue, therefore is one of *estimation*, not measurement. Thus my response to Professor Lally's use of the present value principle in L1 cannot be separated from the issues raised on the risk premium in L2.

Implicitly, the reasoning in L1 appears to be predicated on the assumption of a constant risk premium (this is not entirely evident, since L1 refers to the risk premium only in footnotes, in which Professor Lally repeats the claim that his conclusions are unaltered). If we took this to be the case, then the logic would indeed follow through: the assumed discount rate (and hence the assumed equity cost of capital) would simply follow the risk-free rate up and down.

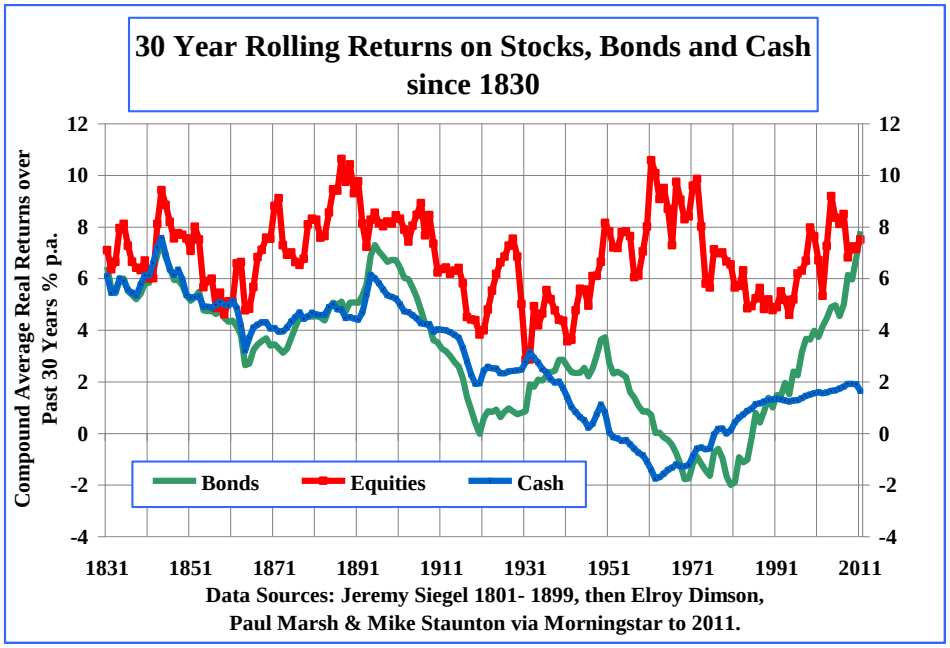
The alternative treatment originally proposed by MMW (p49) (and, as shown in my companion report, W1, subsequently largely followed in UK regulators' treatment of the cost of capital) is to assume a constant real market cost of equity. I examine the basis for this assumption below; but it should be evident that a necessary implication of this approach is that the implied estimate of the MRP must move up and down with the real risk-free rate over the relevant investment horizon.

It should be stressed from the outset that, as made clear in MMW, this is an *estimation strategy*, given the inherent unobservability of the true cost of equity and the true MRP. This strategy does not rely on the assumption that the expected real equity return actually *is* constant, and hence that the market premium and the real risk-free rate are perfectly negatively correlated; it simply reflects MMW's conclusion that this was the best way to exploit available data, in the particular context of monopoly regulation.

We can highlight the differences in approach by examining the contrast between two simple estimation strategies:[1]

Strategy 1: Assume market risk premium is constant (implicit in L1)
Strategy 2: Assume expected real equity return is constant (explicit assumption in MMW)

The chart below[2] shows realised real returns on equities, long-dated government bonds, and "cash" (i.e., short-dated government bills) over more than 200 years' worth of data. It shows rolling 30 year returns to eliminate the impact of short-run volatility.[3] The chart illustrates the key problems faced by both estimation strategies, and the contrast between them.



c) Estimating the cost of corporate equity

[1] I consider below whether other alternatives may also be available
[2] An updated version of MMW's Figure 2.4.
[3] Returns on all assets include both income and capital appreciation: thus the very strong returns on bonds in the recent past are explained primarily by capital gains, as yields have fallen.

If we focus on the real market return in the first instance, this is proxied in the chart by the real return on a diversified portfolio of US stocks (MMW also examined evidence from other markets – see Section g) below).

A simple decomposition of the market return, R_{mt}, which must identically be true, is given by

$$R_{mt+1} = E_t R_{mt+1} + \varepsilon_{t+1}$$

where $\varepsilon_{t+1} = R_{mt+1} - E_t R_{mt+1}$ is an expectational error. The motivation for using long-period averages as estimates of expected returns (and hence the cost of equity) is the assumption that over sufficiently long periods, expectational errors will average out to zero, so that the long-term average *realised* return will at least approximately equal the long-term average *expected* return.

MMW's argument was that, as the chart shows, in the case of the market return, there appears to be strong evidence of stability of the mean realised return. The implication is that the expected return – which in turn is the cost of equity capital - must also have had a stable mean. If we are going to assume something is constant, this is a *minimal* requirement.[4]

d) Estimating the Market Risk Premium

Professor Lally's preferred approach in L1 appears to be to assume that the MRP is constant, and is thus consistent with the AER's approach. In L2 he acknowledges the possibility of other approaches to estimating MRP (for example the dividend growth model) but concludes that this would not alter the picture very much.

As noted above a minimal requirement for any assumption that some magnitude is constant is that it should have a stable mean. Yet referring again to the chart above, it is evident that, as discussed at some length in MMW, there is distinctly less evidence that either the real short-term risk-free rate (proxied in the chart by the return on "cash": ie, short term bills) or the real return on long-dated bonds has a stable mean. Since the mean MRP is the difference between the (stable) mean market return and (depending on the approach) either the cash or the bond return, it is evident that assuming a stable mean for the MRP is deeply problematic. MMW showed that similar problems arise using data from a wide range of markets.

These problems have been accentuated in the recent past. At the time that MMW's original report was produced, in 2003, a very common assumption was that the "equilibrium" real risk-free rate was around 2-3%; indeed this assumption was made (for lack of a better one) in MMW. However, MMW also noted that this figure, which arguably came to the fore due to the widespread use of the "Taylor Rule", had little basis in data, except in the then relatively recent past (essentially the period from the mid-1980s onwards – the period in which the original Taylor Rule was calibrated to match US data); in earlier periods in the 20th Century

[4] MMW Chapter 2 provide alternative estimates of confidence intervals for the long-term mean of US returns. If the return is assumed to be serially uncorrelated these are quite wide, but any element of (negative) serial correlation in returns (often referred to as "mean reversion" of stock prices) reduces the degree of uncertainty around point estimates quite markedly. Based on returns data alone MMW report (Table 2.2) a 90% confidence interval for (non-overlapping) 30 year (log) returns of roughly 5% to7¾ %. Using multivariate econometric estimation (MMW Table 2.4) the range of uncertainty is even narrower.

the real risk-free rate was typically considerably lower. Since the financial crisis, real rates have fallen to extremely low levels, indeed have been negative in many countries, on the basis of reasonable forecasts of inflation. Thus recent events accentuate the difficulties in estimating any stable mean level of real risk-free rates.

Given the contrasting stability of the real market return, and hence of the *expected* market return, noted above, the direct implication is that there is a corresponding difficulty in estimating a stable mean for the MRP. If the MRP does not have a stable mean over time, the use of a sample mean of the realised excess return on stocks as an estimate of the true MRP at any given point in time, as employed by the AER, and broadly supported by Professor Lally, is deeply flawed. I shall argue below (see Section (g)) that, when combined with a market-based measure of risk-free rates, this flaw is compounded.

e) Justifying the assumption of a constant market cost of equity

Thus far I have simply demonstrated that there is considerably more justification for assuming that the real market cost of equity has a stable mean, compared to the same assumption for the MRP.

It should be stressed that this does not of itself imply that cost of equity capital is actually *constant*. Indeed, as also summarised in MMW, there is a large body of academic literature that analyses the predictability of stock returns. It is frequently claimed that stock returns have a predictable component, and that the predictability of *actual* returns reflects variation over time in *expected* returns.[5] Such claims remain controversial. However, one aspect of the literature which is *un*controversial is that, to the extent that there *is* any variation over time in expected returns, such variations must be relatively small.[6] Thus, if the cost of equity capital does vary over time, it does not vary by very much; and the continuing controversy in the academic literature demonstrates that the statistical significance of this variation is, at best, marginal. Furthermore, I argue below that, to the extent that there *is* predictable variation in expected returns, this further undermines the case for the AER's proposed methodology of assuming a constant MRP.

But it should also be recalled that it is not ultimately the *cost* of equity capital for regulated companies that regulators should be interested in, but the *return* on capital of *un*regulated companies, since the fundamental objective of regulation is to attempt to ensure that regulated monopolies earn returns comparable to those earned in the unregulated sector.

The standard practice of focussing on the measurement of the cost of equity takes as given the assumption (albeit only rarely made explicit) that, in equilibrium, at least, the return on equity capital for unregulated companies will be equated to its cost. In Professor Lally's simplified model of L1, in which the regulated monopoly makes a risk-free return, the assumption that the cost and return will be equalised by arbitrage at any point in time is quite reasonable; but as soon as risk enters the picture, it becomes far less evident that the

[5] For an up-to-date overview of this issue, see, for example, John Cochrane (2011), "Discount Factors", *Journal of Finance*, Vol LXVI (4), pp 1047-1108

[6] For example, estimates in Cochrane (*op cit*), Table 1, show that the standard deviation of expected returns, based on his forecasting regression, is 5.46%, roughly one quarter of the standard deviation of *actual* stock returns. Given the abundant evidence of small-sample biases (which Cochrane acknowledges) in estimated coefficients in regressions of this type, this is almost certainly an upper bound.

equalisation will hold except in a long-term equilibrium, and hence in terms of long-period averages. Thus even if the cost of equity capital *does* vary over time we would not necessarily expect any such time variation to be matched by time variation in the competitive *return* on equity capital. Indeed, as a particularly relevant counter-example, in W1, I argue that there is strong evidence from both corporate saving and investment that unregulated companies in Australia are currently almost certainly earning returns well *above* their perceived cost of capital. Only as a result of the process of investment would we expect the return on capital of unregulated companies to be brought back into line with the cost.

Thus I would continue to advocate the arguments put forward (in considerably more detail) in MMW, and implemented in practice by UK regulators, that the best we can do, at least in the current state of economic knowledge, and given available data, is to use the long-term average value of the *realised* market return on equities as a proxy for both the long-term average cost of, and return on, equity capital to corporations.

f) Implications of Strategy 2 (real market cost of equity assumed constant) for the MRP

The analysis of the previous section points clearly to Strategy 2 above, which assumes a constant real cost of equity as a measurement strategy. As a direct result, since we *can* observe the risk-free rate, for any given observable figure for the risk-free rate, the implied estimate of the MRP *must* move point-for-point, with opposite sign.

But it also implies that, at least in terms of the market cost of equity, a third measurement strategy, say, Strategy 3, with an identical result would be arrived at by simply assuming that *both* the MRP and the risk-free rate were equal to their historic averages. The difference between Strategies 2 and 3 in terms of the assumed cost of equity capital for regulated companies only arises to the extent that β differs from one.

g) Implications of Strategy 1 (MRP assumed constant) for the real market cost of equity

As discussed in Section f), Strategy 2, the assumption of a constant market cost of equity, must imply that the implied estimate of the MRP moves point for point in the opposite direction to the risk-free rate. In contrast, Strategy 1 (the AER's preferred approach) which I argued in Section e) is flawed in statistical terms, compounds this flaw in its implications for the market cost of equity. Strategy 1 implies this must be constructed by adding an assumed constant MRP to a current market based measure of risk-free rates. The implied estimate of the market cost of equity (ie the expected market return) must therefore move point for point up and down with the risk-free rate. Given standard assumptions on the behaviour of central banks, it must therefore be implicitly assumed to move pro-cyclically.

Quite apart from the implied adverse impact on regulated companies (see W1 for a discussion of this issue) this implied pattern of expected market returns is entirely out of line with the results of Cochrane (cited above) and many others on the predictability of returns. The predictability literature almost invariably finds that the same indicators that predict real returns, also predict *excess* returns, if anything more strongly. In W1 I cite evidence that predicted excess returns (i.e., econometric estimates of risk premia) have historically tended to be counter-cyclical. The implication of the predictability literature is therefore that, to the extent that the expected market return does change, it typically moves *counter*-cyclically,

rather than pro-cyclically as Strategy 1, AER and Professor Lally's preferred method, implicitly assumes.[7]

h) MMW in relation to Siegel

Professor Lally is partly correct in noting that the assumption of a stable real cost of equity advocated here and in MMW is in part derived from the work of Siegel (1992,1999), who first identified the remarkable stability of the real return on US stock portfolios. However the analysis of MMW also draws on other sources, most notably the dataset of Dimson, Marsh & Staunton (2001), who have produced return series (since updated to more recent years) for a wide range of international markets since 1900. MMW note, in particular, that Siegel's US return series almost certainly display an element of "survivor bias", and hence may overstate true expected returns.

Professor Lally also disputes the arguments based on Siegel's (and implicitly other) data (L2, P8) since they relate to real rather than nominal returns. It is not clear what point he is making here. Real economic decisions should be made in terms of real magnitudes. This means that any expected real return, whether on a financial or real investment, must be made conditional upon some expectation of inflation. While we can proxy such expectations quite well (particularly in an era in which the central bank explicitly targets the inflation rate), inflation expectations are, admittedly, not directly observable. However, any calculation of a *premium* is unaffected by inflationary expectations, since in logic the same expectation must appear in all expected returns, and hence must cancel out in any premium calculation.

Expert witness declaration

I have made all the inquiries that I believe are desirable and appropriate. No matters of significance that I regard as relevant have, to my knowledge, been withheld from the Court.

[7] Despite the evidence, summarised in W1, of risk aversion being counter-cyclical, this need not imply that the expected market return has actually increased in the current global recession, which has been rather unusual to the extent that commonly used stock market valuation indicators (such as the price-dividends or price-earnings ratios) have remained fairly high , despite the global downturn.

STEPHEN WRIGHT: CURRICULUM VITAE

Name:	Stephen Hurst Wright	
Nationality:	UK	
E-Mail	s.wright@bbk.ac.uk	
University Education:	1983-1986	Mature student at Clare College, Cambridge (1st Class Honours, Parts 1 and 2, Economics Tripos; Adam Smith Prize)
Employment:	October 2001 to date	Department of Economics, Birkbeck College, University of London (Lecturer from October 2001, Senior Lecturer from October 2005; Reader from October 2006, Professor from October 2011)
	October 1991 to September 2001	Faculty of Economics and Politics, University of Cambridge (Senior Teaching Associate from October1991; Assistant Director of Research from October 1995; Senior Research associate from October 2000)
	October 1986 to August 1991	Staff Economist, Bank of England. From 1990 to 1991 I led the team responsible for the Bank's macroeconomic modelling and forecasting activities.
Consultancy	January 2000 to April 2004	Director, Smithers & Co, Ltd
	1991-1999; 2004 to date	Part-time consultant, Smithers & Co, Ltd

Research Interests

Theoretical and empirical investigations of key macroeconomic and financial relationships, with a particular focus on stock market valuation and rates of return.

Research Awards

In reverse chronological order

1. Project on the Indian Growth Turnaround (with Chetan Ghate, Indian Statistical Institute) commissioned by the Policy and Planning Research Unit, Planning Commission, Government of India, March 2007 - March 2009 (240,000 Rupees)

2. Project on the cost of capital for regulated industry in the UK, commissioned by Ofgem, (with Robin Mason, Ken Hori and Meltem Baskaya, Birkbeck, and Stephen Satchell, Cambridge), completed September 2006, (£40,000)

3. Project on the cost of capital commissioned by a consortium of UK regulators (with Robin Mason, University of Southampton, and David Miles, Imperial College), completed February 2003, (£35,000)

4. DAE Consultancy Project on Cyclical Indicators and Monthly GDP, awarded jointly by Central Statistical Office and H M Treasury, completed February 1995, (with Martin Weale and Richard Smith) (c. £40,000) (The methodology developed led to the regular production of monthly GDP figures by the National Institute of Economic and Social Research, and to a publication in the *Economic Journal* (see below))

5. University of Cambridge Department of Economics (DAE) Consultancy Project on Measurement of Output of Financial Services, awarded by Central Statistical Office April 1992, completed April 1993 (with Martin Weale and Iain Begg) (c. £40,000)

Outside Activities

I have had a long-standing connection with Smithers & Co, a highly respected research company that provides economics-based advice on international asset allocation to over 100 clients based mainly in Boston, London, New York and Tokyo. My work with them has been regularly cited in the *Economist*, the *Financial Times*, *Barron's*, etc, and has also received considerably attention in the academic world (particularly since the publication of *Valuing Wall Street* (see below), co-authored with Andrew Smithers). While my contributions to their research have been more infrequent in recent years, I still produce occasional reports, and also, with Andrew Smithers, run regular teaching sessions for fund managers on the fundamentals of stock market valuation

In recent years I have provided advice and research to, *inter alia*, the Civil Aviation Authority, Ofgem, NERA Economic Consultants and Frontier Economics. This has been mainly on issues related to the cost of capital for regulated industries , following on from my 2003 study, co-authored with Robin Mason and David Miles. In August 2006 I was again lead investigator on a major research project for Ofgem, with Robin Mason, Ken Hori (Birkbeck) and Steve Satchell (Cambridge and Birkbeck). Both of these studies are widely cited in discussions of cost of capital regulation.

I teach a regular two day course on finance to government economists at H M Treasury. This has recently been adopted as an official course by the Government Economic Service, and is taught under the aegis of the National School of Government.

Teaching and Administrative Responsibilities at Birkbeck

I am Director of the Graduate Diploma Programmes in Economics and in Finance. These are primarily intended as preparatory programmes for students hoping to proceed to one of our MScs, who do not have prior training in economics or finance. On successful completion of the programme (taken over one or two years), our students (all of whom are part-time) can compete with those who have done economics in a full-time undergraduate degree. Given that we have around 120 students on all of our Diploma programmes this means that we are producing as many good-quality students as emerge from many respected UK undergraduate programmes. As well as proceeding on to our own MScs, our best students also go on to respected MSc programmes elsewhere (in recent years we have sent students to Cambridge, LSE, Imperial, Oxford, etc).

My recent teaching at Birkbeck:

- Microeconomics (Graduate Diplomas in Economics and in Finance);
- Introduction to Mathematical Finance (Graduate Diplomas in Finance and in Financial Engineering).
- Macroeconomics(Graduate Diploma in Economics)
- Introduction to Finance (MSc Finance/MSc Financial Engineering)

Stephen Wright: Research Output (all categories in reverse chronological order)

A Publications in Refereed Journals

1. "The "V-Factor": Distribution, Timing and Correlates of the Great Indian Growth Turnaround" (with Chetan Ghate) *Journal of Development Economics*, vol. 99 (2012) pp 58–67

2. "Invertible and Non-Invertible Information Sets in Linear Rational Expectations Models" (with Brad Baxter and Liam Graham), *Journal of Economic Dynamics and Control*, vol. 35(3) (2011) pages 295-311

3. "Information, Heterogeneity and Market Incompleteness" (with Liam Graham) *Journal of Monetary Economics*, 57 (2010) 164–174

4. "Miller & Modigliani, Predictive Return Regressions and Cointegration" (with Piergiorgio Alessandri and Donald Robertson), *Oxford Bulletin of Economics and Statistics*, 70, 2 (2008) pp 181-207

5. "Nominal Debt Dynamics and Monetary Policy" (with Liam Graham), *Berkeley Papers in Macroeconomics* (Contributions to Macroeconomics) January 2007.

6. "Permanent *vs* Transitory Components and Economic Fundamentals" (with Tony Garratt and Donald Robertson) *Journal of Applied Econometrics* May/June 2006 21 (4) 521-542

7. "Dividends, Total Cashflows to Shareholders and Predictive Return Regressions" (with Donald Robertson) *Review of Economics and Statistics* February 2006, Vol. 88, No. 1: 91-99

8. "Modelling nominal debt contracts and fixed rate debt" (with Liam Graham) *Economics Letters* Vol 88 No 1, July 2005.

9. "An Indicator of Monthly GDP and an Early Estimate of Quarterly GDP Growth" (with James Mitchell, Richard Smith, Martin Weale and Eduardo Salazar), *Economic Journal* 115 (501) February 2005

10. "Measures of Stock Market Value and Returns for the US Nonfinancial Corporate Sector, 1900-2002" *Review of Income and Wealth*, 50 (4) pp 561-584 (December 2004)

11. "Monetary Stabilisation with Nominal Asymmetries" *Economic Journal* January 2004

12. "Stock Markets and Central Bankers: The Economic Consequences of Alan Greenspan (with Andrew Smithers) *World Economics*, Vol 3 No 1, January 2002.

13. "Monetary Policy, Nominal Interest Rates and Long-Horizon Inflation Uncertainty" *Scottish Journal of Political Economy*, Vol. 40, No. 1, February 2002

14. "The Effects of Uncertainty on Optimal Consumption", (with Robin Mason) *Journal of Economic Dynamics and Control* 25 (2001) 185-212

15. "A Monthly Indicator of GDP" (with Eduardo Salazar, Richard Smith & Martin Weale) National Institute of Economic and Social Research *Economic Review* No. 161, July 1997

16. "Financial Intermediation Services Indirectly Measured: Estimates for France and the UK based on the Approach adopted in the 1993 SNA" (with Iain Begg, Jacques Bournay, Martin Weale) *Review of Income and Wealth*, Series 42, No. 4, December 1996

17. "How to make money in the bond market: international evidence of inefficiency, and what it suggests about the way markets view monetary policy" *The Manchester School* Vol LXIII, June 1995

18. "Measuring the contribution of financial institutions to Gross Domestic Product". *Economic Trends* no. 475, May 1993, pp 146-157, (with Martin Weale and Iain Begg)

19. "Equilibrium Real Exchange Rates" *The Manchester School*, Vol LX, June 1992, pp 63-84

B Books

20. *Valuing Wall Street* (with Andrew Smithers) McGraw-Hill, May 2000 ISBN 0-07-135461-1

C Other Publications

21. "India's Growth Turnaround" (with Chetan Ghate and Tatiana Fic), in *The Concise Oxford Companion to Economics in India*, Oxford University Press, February 2010

22. "Report on the Cost of Capital" (with Robin Mason, Meltem Baskaya, Ken Hori and Steve Satchell), September 2006 (http://www.ofgem.gov.uk)

23. "Beta Estimates and Bond Spread Analysis" September 2005 (http://www.ofgem.gov.uk)

24. "Beta Estimates", March 2004 (http://www.ofgem.gov.uk)

25. "Stock Market Valuation" (with Andrew Smithers), *Practical Investor's Journal* March 2004

26. "A Study into Certain Aspects of the Cost of Capital for Regulated Industries in the UK" (with Robin Mason and David Miles), February 2003 (http://www.oftel.gov.uk/publications)

D. Under Review

27. "The Predictive Space: If **x** predicts *y* what does *y* tell us about **x**? (with Donald Robertson, University of Cambridge) October 2012, submitted to *Journal of Econometrics*

28. "Labour's Record on Financial Regulation" (with Arup Daripa and Sandeep Kapur, Birkbeck) October 2012, to be published in *Oxford Review of Economic Policy*, January 2013

29. "Why was the participation of Indian states in the Growth Turnaround so patchy? Some evidence based on robustness analysis" (with Chetan Ghate, Indian Statistical Institute, Delhi) September 2012, submitted to *Economic and Political Weekly*

E Academic Papers in Progress

30. "Non-Uniqueness of Deep Parameters and Shocks in Estimated DSGE Models: a Health Warning" September 2012

31. "Stambaugh Correlations, Monkey Econometricians and Redundant Predictors" (with Donald Robertson, University of Cambridge), August 2011

32. "The Limits to Stock Return Predictability" (with Donald Robertson) September 2009

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