



FINAL REPORT

**Response to ACCC supplementary  
submission (No.72) on international WACC  
decisions**

**Submission to the Productivity Commission Review of the  
Gas Access Regime**

PREPARED FOR  
REGULATED INFRASTRUCTURE FORUM

MARCH 2004

© Network Economics Consulting Group Pty Ltd 2004

This work is copyright. The *Copyright Act 1968* permits fair dealing for study, research, news reporting, criticism or review. Selected passages, tables or charts may be reproduced for such purposes provided acknowledgment of the source is included. Permission must be obtained from Jane Thorn on (02) 9965 4100. Please cite report number 0001.0771.

For information on this report, please contact:

Henry Ergas

Phone (02) 6232 6522

Email [h.ergas@necg.com.au](mailto:h.ergas@necg.com.au)

### Network Economics Consulting Group offices

#### CANBERRA

Level 1, 29 Jardine Street  
Kingston ACT 2604  
Australia

Phone (+61 2) 6232 6522

Fax (+61 2) 6232 6188

#### SYDNEY

Level 7, 90 Mount Street  
North Sydney NSW 2060  
Australia

Phone (+61 2) 9965 4100

Fax (+61 2) 9954 4284

#### MELBOURNE

Level 50, 120 Collins Street  
Melbourne VIC 3000  
Australia

Phone (+61 3) 9655 1600

Fax (+61 3) 9655 1616

#### INTERNET

[www.necg.com.au](http://www.necg.com.au)

#### EMAIL

[contactus@necg.com.au](mailto:contactus@necg.com.au)

Network Economics Consulting Group Pty Ltd is incorporated in Victoria

ABN 72 006 819 969

ACN 007 083 570

## Contents

<b>Executive Summary</b>	<b>4</b>
<b>1 Introduction</b>	<b>7</b>
<b>2 Methodological concerns of the ACCC</b>	<b>11</b>
2.1 Total returns	11
2.1.1 Relevant theory of interest rates and exchange rates	11
2.1.2 Empirical evidence of interest rate parity	13
2.1.3 Progression of research	13
2.1.4 Recent empirical research	15
2.1.5 UIP as a predictive model	20
2.1.6 Currency risk	21
2.1.7 Total returns — a summary	22
2.2 Market risk premium	24
2.2.1 Application of an international version of the MRP	24
2.2.2 Assumptions adopted by NECG in adjusting for market risk	25
2.2.3 Adoption of a 6% MRP in Australia	27
2.3 Lags in the risk free rate	28
2.4 Incentive properties of the Code	29
2.5 Summary	29
<b>3 Evidence that returns are higher than required by investors</b>	<b>31</b>
3.1 ACG-BHP Billiton report	31
3.1.1 Limitations in the approach adopted	33
3.1.2 Issues with application of the methodology	34
3.2 Moody's report	34
3.3 Other claims on investment	37
3.4 Summary	38
<b>4 Availability of domestic comparators</b>	<b>39</b>
<b>5 Concluding thoughts</b>	<b>43</b>

## Executive Summary

The key theme on rates of return in the Commission's draft report is the inherent uncertainty over the WACC. NECG agrees that uncertainty and subjectivity are key underlying features of the WACC debate. However, there remains a need for regulators to approve or determine WACCs, including under the Gas Code.

The ACCC's response to NECG's September 2003 submission to the Commission primarily focuses on the methodological details of NECG's analysis of international returns, where it draws a different conclusion as to the relative generosity of regulated returns in Australia. The ACCC's response goes beyond methodological considerations, claiming there is limited evidence of wider regulatory risk in Australia and that regulatory returns are most likely higher than required by investors. In addition, the ACCC claims that uncertainty over the WACC is reducing due to the greater presence of domestic comparators, which is resulting in greater objectivity in regulation.

We dispute all these claims.

The ACCC criticises the methodology employed in the NECG study from a number of angles. The two key arguments are that: the appropriate comparator should be total returns, not the margin of the WACC over the risk free rate; and the approach to "adjusting" for market risk is arbitrary and overstates "the" adjustment that is necessary (if any).

The ACCC argues that a pre-requisite for the margin of the WACC above the risk free rate to be an appropriate comparator is that uncovered interest parity (UIP) holds. It then states that UIP has been discredited by empirical research. However, recent empirical research is more supportive of UIP and its importance in understanding the relationship of international interest rates and exchange rates. Even if empirical research was not supportive of UIP, it is still the most appropriate assumption for ex ante considerations of interest rates and exchange rates. This is because it provides the most meaningful representation of the long-term relationship and because there is no better approach on an ex-ante basis. By contrast, the ACCC's preference for total returns is a more restrictive measure. It assumes that investors expect the real exchange rate to remain constant and that there is no country risk premia embedded in risk free rates. The measure, therefore, cannot accommodate changes to country risk premia over time. The limitations of these assumptions support abstracting from risk free rates.

The ACCC has also provided no credible evidence that our approach to adjusting for market risk is flawed. The ACCC notes that if markets are fully integrated returns can be compared using the ICAPM. However, applying the ICAPM requires consideration of exchange rate differentials. Evidence suggests the ICAPM has limited predictive power.

In practice no regulator, including the ACCC, has indicated that it has seriously considered applying this methodology. .

The ACCC reports the findings of recent studies by the Allen Consulting Group (ACG) and Moody's Investors Services to support its claim that regulatory WACCs are higher than required by investors. ACG consider the ratio of the market value to regulatory value for a number of infrastructure businesses, arguing that the presence of values above one provides support for the view that regulatory returns are not hampering investment. However, there are many reasons why the ratio may be above one. In any case, the ratio is inherently unstable over time. The assumptions adopted by ACG in applying the approach cast further doubt on the validity of the results. Moody's argue that the environment facing investors in Australia is more 'benign' than in the UK. However, the analysis is selective and in any case applies only to debt holders, when the key area of contention is the appropriate return to equity holders.

The ACCC argues that uncertainty over beta can be reduced through application of a mechanistic approach to determining its value from those of listed comparators. However, the measure it proposes is based on data that has little if any statistical value; is subject to gaming; and requires an ad hoc application of a confidence interval. Given the inherent need for judgement in determining a beta, relying on such a mechanistic approach is dangerous and will introduce a false sense of confidence. This can only increase regulatory risk, contrary to the claims of the ACCC.

The ACCC, by claiming that uncertainty can be eliminated from a parameter that is inherently uncertain, is being unrealistic if not misleading.. The Australian Competition Tribunal was highly critical of a similar practice in relation to the risk free rate in its GasNet decision, arguing that the ACCC had failed to apply the CAPM and reflect the underlying uncertainty of the regulatory environment.

The Tribunal's findings in its GasNet and Moomba to Adelaide decisions show that review procedures have an important role in finding practical solutions to the uncertainty surrounding the WACC. However, review decision by themselves will not advance the WACC debate as far as is necessary to significantly reduce uncertainty or enable it to be best managed.

The Gas Code contains an important feature that reflects the uncertainty associated with the WACC, namely the requirement for applicants to propose a WACC and for the regulator to assess whether this is consistent with the Code. This reflects the fact that a wide range of values for the WACC may meet the Code requirements and that there is no single point estimate that is clearly superior, in respect of those requirements. However, the effectiveness of this provision could be enhanced if there were a wide-ranging review of the WACC to be applied for Australian regulated businesses. This review could

recommend the values of particular parameters, such as the market risk premium, and suggest the appropriate approach to estimating other contentious parameters such as the risk free rate, gamma and beta. Any review should also recommend a regulatory approach to dealing with flaws in models such as the CAPM, an area where debate has progressed slowly. We consider the Commission would be well placed to conduct such a review.

While it may not be necessary to bind any regulator or business to the results of this review, the results could act as a benchmark against which best regulatory practice could evolve. This could minimise uncertainty over the application of the WACC and ultimately result in a more efficient use of regulatory resources.

## 1 Introduction

The Network Economics Consulting Group (NECG) welcomes the opportunity to respond to the Draft Report of the Productivity Commission's public inquiry, Review of the Gas Access Regime.<sup>1</sup>

This response focuses on the ex-ante regulatory rate of return.<sup>2</sup> In doing so, it draws on NECG's earlier submission to the Productivity Commission ("Commission") on international rates of return<sup>3</sup> and the response provided by the Australian Competition & Consumer Commission (ACCC) to this report.<sup>4</sup>

The following major Australian organisations have supported production of this paper:

AGL

Energy Networks Association

Energex

QR Network Access

Telstra Corporation

These parties represent infrastructure providers across a number of sectors in addition to the gas sector. All of these providers, operating under a wide range of access regimes, are keen to ensure that a best practice framework for the weighted average cost of capital (WACC) is developed for Australian regulation, with this framework acknowledging the impact of the interaction of the WACC with the wider regulatory framework.

### **Inherent uncertainty over WACC**

The key theme on rates of return in the Commission's draft report is the inherent uncertainty over the WACC. The Commission notes:<sup>5</sup>

---

<sup>1</sup> Productivity Commission 2003, Review of the Gas Access Regime, Draft Report, Canberra. ["Commission Draft Report"]

<sup>2</sup> This is considered in section 7.5 of the Commission's Draft Report.

<sup>3</sup> International comparison of WACC decisions", NECG submission to the Productivity Commission Review of the Gas Access Regime, September 2003.

<sup>4</sup> Australian Competition and Consumer Commission, Supplementary Submission to the Productivity Commission Review of the Gas Access Regime, 24 November 2003 ["ACCC-submission No.72"]

<sup>5</sup> Commission Draft Report, pp236-237.

This debate highlights the fact that regulatory rates of return are set on the basis of many assumptions. Such assumptions are used because regulation is applied in a world of uncertainty. This uncertainty cannot be removed by requesting more information from service providers, or by hiring consultants to undertake studies.

*There is disagreement among technical experts about how regulatory rates of return (WACC) in Australia compare to those in other countries. This illustrates the inevitable imprecision and subjectivity that occurs when regulators are required to approve reference tariffs. [emphasis in original document]*

NECG agrees that uncertainty and subjectivity are key underlying features of the WACC debate. The inherent uncertainty over the WACC was a key factor behind two key conclusions of our September 2003 submission. These were that an independent review of the WACC would assist in minimising uncertainty for investors, and that regulatory frameworks can provide greater certainty on the approach the regulator should adopt for the WACC.

These conclusions reflect the reality that there remains a need for regulators to approve or determine WACCs under the Gas Code and other regulatory instruments. In the case of the Gas Code this applies even if price monitoring is introduced for some gas infrastructure, as proposed in the Commission's Draft Report.

### **ACCC submission to the Productivity Commission**

The ACCC's response to the Commission primarily focuses on the methodological details of NECG's analysis of international returns, where it draws a different conclusion as to the relative generosity of regulated returns in Australia. However, the response goes beyond methodological considerations. Some key themes emerge that are in contrast with the findings in the Commission's draft report.

One theme is that there is limited evidence of wider regulatory risk in Australia:<sup>6</sup>

Consequently, in view of current investment levels and the conclusions of the ACG study it would be fair to conclude that the current regulatory environment is conducive to efficient and effective investment going into the future. Further, there is no reason to believe that the returns permitted by Australian regulators will lead to infrastructure failure. On this basis there is no reason for adjusting the current framework for determining the cost of capital as suggested by NECG.

On the basis of this evidence, the ACCC concludes that regulatory returns are most likely higher than required by investors:<sup>7</sup>

---

<sup>6</sup> ACCC, submission No.72, pages vi-vii.

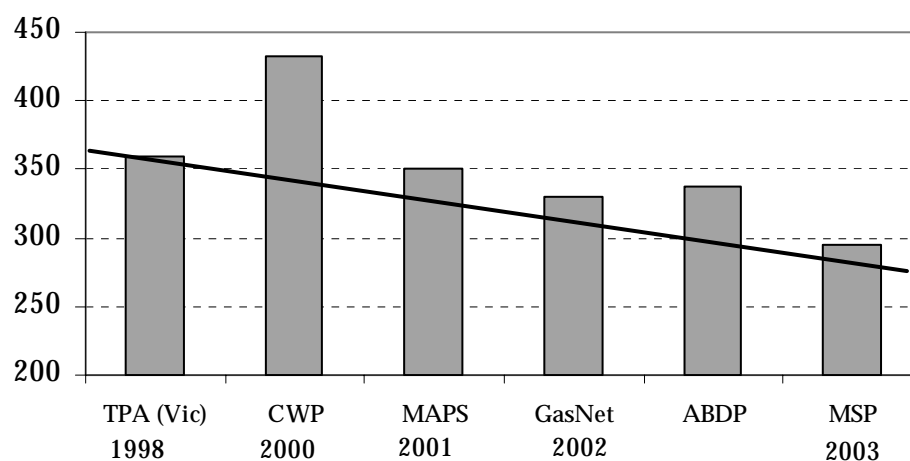
<sup>7</sup> ACCC, Submission No.72, page viii.



There is no evidence that returns provided by Australian gas regulators are a disincentive to efficient investment going into the future. Rather, there is credible evidence to suggest that regulatory returns in Australia are actually higher than those required by investors.

The WACC provided by the ACCC in gas transmission decisions has reduced in recent years – as shown in Chart 1. The ACCC’s statement implies that it considers further reductions are justified.

**Chart 1 Margin of vanilla WACC over risk free rate adopted by ACCC in gas transmission decisions**



Another theme of the ACCC submission is that uncertainty over the WACC – a key cost of service parameter — is reducing due to the greater presence of domestic comparators, which is resulting in greater objectivity in regulation:<sup>8</sup>

However, the ACCC is currently placing an increasing emphasis on direct observation of market parameters as the information base expands. Such an approach is consistent with greater objectivity and independence of regulation.

### **Purpose of this paper**

Notwithstanding the Commission’s view that “uncertainty cannot be removed by requesting more studies” we wish to respond to the detailed comments made by the ACCC for two key reasons:

- There is a continued need for regulators to determine or approve WACCs. While comparative analysis can provide a useful input in determining the appropriateness of

<sup>8</sup> ACCC, Submission No.72, page v.

allowances in general – a point accepted by the ACCC in the past – incorrect or selective use of such comparisons can create further regulatory risk; and

- The claims made by the ACCC are at odds with the findings of the Commission’s draft report. As a result, these views require consideration as part of the Commission’s current processes.

### **Structure of paper**

The remainder of this paper is set out as follows:

- In section 2 we assess the ACCC’s comments in relation to the methodological approach adopted by NECG;
- In section 3 we consider the ACCC’s evidence that regulatory returns are currently higher than required;
- In section 4 we assess whether the “greater availability of domestic comparators” allows for “greater objectivity and independence of regulation”; and
- In section 5 we set out our conclusions, drawing on the implications of decisions of the Australian Competition Tribunal that have taken place since drafting of the Commission’s draft report.

## 2 Methodological concerns of the ACCC

The ACCC is critical of the methodological approach adopted by NECG in a number of key areas including:

- Adopting the margin of the vanilla WACC over the risk free rate as the key form of comparison rather than total returns;
- Ad hoc adjustments to the market risk premium in other countries;
- Failure to adequately account for interest rate lags in the US and Canada; and
- Failure to adequately reflect the incentive nature of regulation in Australia.

### 2.1 Total returns

A key point of difference between NECG's approach and the ACCC's position is with respect to the appropriate comparator for regulated decisions. We used the vanilla WACC net of the risk free rate. The ACCC has supported the measurement used by NERA in its 2001 report for the ACCC, which uses total returns. In its Supplementary Submission, it offers a defence of the NERA approach and attempts to discredit the approach used by NECG.

In our opinion, the issue of how to measure returns for making international comparisons is a significant issue, and one where NERA and the ACCC are incorrect. In this section we will provide a more comprehensive discussion of the issue. We believe it is quite clear that the approach we use of deducting the risk free rate from the vanilla WACC is the correct approach.

#### 2.1.1 Relevant theory of interest rates and exchange rates

In comparing returns there is a basic premise that one should compare like with like. The difficulty with comparing returns across countries is that a country's returns are stated in the domestic currency. If the price of a certain CD was \$16 in the U.S. and \$20 in Australia, this does not imply that the CD was cheaper in the U.S. as the prices are in different currencies. An adjustment for the currency differences would need to be made to determine which was the lower price.

The comparison of rates of returns across countries and currencies has a similar difficulty, and similarly it is necessary to adjust for currencies. Two-year government bonds in Australia currently yield 5.3%, while two-year government bonds in the U.S. yield 1.7%.<sup>9</sup>

---

<sup>9</sup> Note this example is illustrative. In our analysis we referenced decisions against 10 year bond rates.

Of course, the return on Australian bonds is to be received in Australian dollars while the return on U.S. bonds is to be received in U.S. dollars. Clearly it would be wrong to say that the difference in rates means that the Australian government bonds give a higher return. It is incorrect to compare rates of return across countries without making adjustment for expectations of changes in exchange rates.<sup>10</sup>

A fundamental principle in economics is the law of one price. From that principle, the relationship between inflation and exchange rates is reflected in purchasing power parity. The relationship between interest rates and exchange rates is reflected in the interest rate parity condition.<sup>11</sup>

The interest rate parity condition says that in equilibrium the domestic interest rate ( $i^D$ ) will equal the foreign interest rate ( $i^F$ ) minus the expected appreciation of the domestic currency. The formula for interest rate parity as an approximation is:

$$(1) \quad i^D = i^F - \frac{E_{t+1}^e - E_t}{E_t}$$

The interest rate parity condition is an arbitrage statement. If the relationship above does not hold, then there are arbitrage opportunities. The action of arbitrageurs should drive interest rates to where, in equilibrium, they conform to the condition.<sup>12</sup>

Clearly it would be inappropriate and misleading to make a comparison between the two interest rates without also considering the expected changes in exchange rates.

The ACCC agrees with the above discussion (p. 9) of the theory of international interest rates.

The expected relationship between nominal exchange rates and interest rate differentials (absent a risk premium for exchange rate risk) is known as uncovered interest parity (UIP), which posits that interest rates should only diverge where there is an expectation of a movement in exchange rates.

<sup>10</sup> Another comparison where an adjustment for the risk free rate is necessary to avoid distortions is when returns are compared across time. To compare WACCs from 1994-96 with WACCs from 2001-03 without correcting for the substantial differences in the risk free rate would result in substantial distortion. Whereas the 10-year government bond rate averaged 9.2%, 8.2% and 8.2% for 1994 through 1996, it had dropped to averages of 5.6%, 5.9% and 5.3% for 2001 through 2003.

<sup>11</sup> Discussions of law of one price, purchasing power parity and interest rate parity condition can be found in virtually any textbook on investments and financial markets. For example, see F. Mishkin and S. Eakins, "Financial Markets and Institutions" (4<sup>th</sup> ed), 2002, Reading, Massachusetts: Addison-Wesley and G. Alexander, W. Sharpe and J. Bailey, "Fundamentals of Investments" (3<sup>rd</sup> ed), 2001, Upper Saddle River, New Jersey: Prentice Hall.

<sup>12</sup> It is important that interest rate parity is an arbitrage condition. This requires that the two interest rate securities are of equal risk. We will return to the issue of differing risk below.

The ACCC also agrees with our approach to comparing interest rates across countries (p. 8).

In perfectly integrated world capital markets, NECG's adjustment for differences in interest rates between countries would be correct, as any difference in rates would reflect a combination of expected exchange rate movements and compensation for exchange rate risk.

Although the ACCC frames its statement in terms of "perfectly integrated world capital markets", it could simply say that NECG's adjustment is correct if the interest rate parity condition holds (i.e., there is uncovered interest parity).

### 2.1.2 Empirical evidence of interest rate parity

After conceding that the NECG approach is correct if the interest rate parity condition holds, the ACCC then maintains that the condition does not hold (pp. 8–9).

However, it is less clear that investors would actually require higher *total returns* in countries that have higher domestic interest rates. ... However, the ability for economic theory to link exchange rate movements and interest rate differentials is poor. ... However, not only is UIP overwhelmingly rejected in empirical tests, but exchange rates tend to move in a counter direction to that predicted by UIP ...

This is the crux of the ACCC's defence of using total returns. Although they agree that the theory is correct, they assert that the empirical evidence "overwhelmingly" rejects the theory.

We disagree with the ACCC's analysis on four points:

- the current empirical evidence does not support that exchange rates move in the opposite direction to that predicted by UIP;
- the current empirical evidence supports UIP as important in explaining exchange rate movements, but indicates that there are other factors that are also relevant;
- even if the empirical (ex post) evidence was not consistent with the theory, the theory would be the best approach to ex ante statements about international interest rate comparisons; and
- currency/country risk is not constant across all countries but is reflected in interest rates.

### 2.1.3 Progression of research

The lack of explanatory power of UIP has been labelled the "Forward Premium Puzzle." The literature over the past decade and particularly the past five years has moved to improve the empirical techniques, countries and sample periods used to test UIP, and to try

to understand the earlier results. The ACCC presents this quote from a book by Obstfeld and Rogoff.<sup>13</sup>

The undeniable difficulties that international economists encounter in empirically explaining nominal exchange rate movements is an embarrassment, but one shared with virtually any other field that seeks to explain asset price data.

Whilst this statement conveys that empirical research of nominal exchange rate movements has generally failed to confirm UIP, it also acknowledges that this is the typical experience in empirical research. This is reflective of the progression of knowledge and the interaction of theory and empirical research.

Theory develops a simple and economically elegant theory to explain complex relationships. However, the theory depends upon a range of assumptions, at least some of which are not met in the “real” world. Early research is inevitably basic and intended to document the relationship between the theory and the markets. The research question is – does the theory explain practice? Empirical research then finds that the theory is not fully descriptive of the real world. Researchers then move on to more sophisticated research methods, more robust research designs, expanded samples and time periods. Furthermore, researchers begin to ask a different question – why doesn’t the theory explain practice? Put another way, what are the other factors that influence asset pricing in markets that are assumed away or ignored in the theory?

Research of the Capital Asset Pricing Model (CAPM), for example, has followed this standard progression. The CAPM has not stood up well in empirical testing, and we now have a more robust understanding of asset pricing than provided by the CAPM. Research has shown that factors such as liquidity, transactions costs and default risk are important. There have even been results showing a negative relationship between systematic risk and returns during some time periods rather than the positive relationship predicted by the theory. Yet the CAPM is still the accepted model of asset pricing, and beta (systematic risk) is still used in estimating equity cost of capital, including by the ACCC.

If the theoretical CAPM performs so poorly in empirical tests, why is it used in practice? The answer is (at least) two-fold. The model may not do well ex post, but it is still a rational model for ex ante predictions. Also, although it has its weaknesses, the model is currently the best model available, at least for practical applications.

If at any point in this progression of research, a superior model is developed or the theoretical model is deemed to be too deficient to guide thinking in the area, it will be discarded. There is an abundance of ongoing research interest in UIP, and it is the

---

<sup>13</sup> The quote appears on p9 of the ACCC report and is from M. Obstfeld and K. Rogoff, *Foundations of International Macroeconomics*, 1996, MIT Press: Cambridge, Massachusetts, p625.

standard explanation of the relationship between interest rates and exchange rates in textbooks in finance and economics. UIP is still the prevailing view of financial economists of international interest rates and exchange rates, to capture underlying fundamentals such as inflation differentials.

#### 2.1.4 Recent empirical research

In support of its assertion that “UIP is overwhelmingly rejected” the ACCC provides two citations, both of which are now dated. We agree that the weight of empirical evidence until about the mid-1990s was not consistent with UIP. However, the literature on interest rate parity has progressed both theoretically and empirically since then.

The recent UIP research has produced somewhat mixed results. There are some studies that have shown little support for UIP. However, in our extensive review of the literature, we find more studies that provide support for UIP being relevant. Recent research has used more robust methodologies, different currencies and different time periods. Perhaps more importantly, the research has investigated explanations for the empirical weakness of UIP.

Perhaps a good place to begin this review is with an article that is not supportive of UIP but which does contradict the position taken by the ACCC — that the empirical evidence indicates the relationship between interest rate differentials and exchange rate movements is actually negative and opposite of what is predicted by UIP. Jones finds that the forward rates of industrialised countries are unambiguously biased predictors of future spot rates.<sup>14</sup> Spot rates invariably depreciate (appreciate) in the predicted direction but by less than implied by the forward discount (premium). As noted by Jones: “The forward premium puzzle is not a pervasive phenomenon.” As found by Jones, the more recent empirical research certainly does not support the position that there is a negative relationship (as asserted by the ACCC).

A common theme in the recent research is that the earlier research of UIP was based upon short-term bonds and the rejection of UIP does not hold for longer-term bonds. Alexius<sup>15</sup> noted the limitation of earlier tests of UIP, having almost exclusively relied on data on short-term interest rates. Using longer term data the results are favourable to UIP. Dreger and Schumacher<sup>16</sup> examined the validity of real interest parity as a long-run condition for

---

<sup>14</sup> B. Jones, 2003, “Violations of Uncovered Interest Parity: Are They Pervasive, and are They a Money Tree”, Macquarie University Working Paper.

<sup>15</sup> A. Alexius, 2001, “Uncovered Interest Parity Revisited”, *Review of International Economics*, v9(3), 505-17.

<sup>16</sup> C. Dreger and C. Schumacher, 2003, “Are Real Interest Rates Cointegrated? Further Evidence Based on Panel Econometric Methods”, *Swiss Journal of Economics and Statistics*, v139(1), 41-53.

the G7 countries. They found mixed evidence in support of UIP. Berk and Knot<sup>17</sup> focused on UIP in the short and medium run using survey-based exchange rate expectations. They analysed the major world currencies over the period 1985–98 and found that the validity of the UIP relation increases with the term of the investment, thereby supporting the theoretical notions developed in the literature.

Chinn and Meredith have collaborated on a series of research projects addressing the efficacy of UIP. In one paper they used long-maturity bonds for the U.S., Germany, Japan and Canada to test UIP.<sup>18</sup> They found the direction of the relationship was positive and close to the predictions. In an earlier paper they used long-horizon data for the G-7 countries and found stronger support for UIP. They noted the substantial differences between results using short-term data and longer-term data. The short-term data is impacted by risk premium shocks in the form of endogenous monetary policy<sup>19</sup>. With longer-term bonds, exchange rates are driven by fundamentals, “leading to a relationship between interest rates and exchange rates that is more consistent with UIP.”<sup>20</sup>

This characteristic of the empirical research is very important to the issue at hand – the correct measurement of international returns. The returns being evaluated are for regulated infrastructure companies, which are inherently long-term investments. The maturities that are relevant are long-term maturities, generally ten years. In our view, the research cited above, demonstrating the accuracy of UIP with long-term bonds, is sufficient to support the validity of the UIP for this purpose.

As was mentioned in the last article above, the activities of central banks in implementing their monetary policies have a substantial impact on exchange rates and interest rates. It is not surprising that monetary policy shocks would create research design challenges in empirical research on UIP. Recent research has addressed this issue.

Mark and Moh<sup>21</sup> find that departures from UIP are a result of sporadic central bank intervention. In an even more recent paper, Mark and Moh<sup>22</sup> develop analytical and

---

<sup>17</sup> J. Berk and K. Knot, 2001, “The Term Structure of UIP: Evidence from Survey Data”, *Applied Economics Letters*, v8(7), 459-62.

<sup>18</sup> M. Chinn and G. Meredith, 2002, “Testing Uncovered Interest Parity at Short and Long Horizons during the Post-Bretton Woods Era”, UCSC Center for International Economics Working Paper.

<sup>19</sup> We will return to the issues of risk premia and monetary policy below.

<sup>20</sup> G. Meredith and M. Chinn, 1998, “Long-Horizon Uncovered Interest Rate Parity”, NBER Working Paper No. W6797.

<sup>21</sup> N. Mark and Y. Moh, 2002, “Continuous-Time Market Dynamics, ARCH Effects, and the Forward Premium Anomaly”, Ohio State University Working Paper.

<sup>22</sup> N. Mark and Y. Moh, 2003, “Official Interventions and Occasional Violations of Uncovered Interest Parity in the Dollar-DM Market”, NBER Working Paper No. W9948.



empirical support for departures from UIP being a result of unanticipated central bank interventions in the foreign exchange market. Anker<sup>23</sup> investigates whether optimizing policy behaviour can account for the observed regime-dependence of UIP evidence. He finds that the trade-off between interest rate and exchange rate stability may explain the apparent failure of UIP. Also, consideration of monetary policy reactions can explain why deviations from UIP differ systematically by the exchange rate regime.

Early empirical research on the effects of monetary policy found evidence of several anomalies, such as the "liquidity", "price", "exchange rate" and "forward discount bias" puzzles. Kim and Roubini<sup>24</sup> develop an approach that provides a solution to these empirical anomalies in an open economy. Their empirical findings are that the effects of non-US G-7 monetary policy shocks on exchange rates and other macroeconomic variables are consistent with the predictions of a broad set of theoretical models including UIP. The evidence is consistent with significant, but transitory, real effects of monetary shocks. They find that "the exchange rate initially appreciates in response to a monetary contraction; but after a few months, the exchange rate depreciates over time in accordance with the UIP condition." Kinkos<sup>25</sup> investigates discrete central bank interventions and finds that rational forecast errors are possible. A test of UIP, based on the cross-equation restrictions on a Markov switching process, suggests that the parity relationship cannot be rejected for three European currencies and the US dollar.

It is clear from the recent research that the unanticipated interventions of central banks in implementing their monetary policies have had an impact on exchange rates and interest rates. Earlier research did not incorporate this possibility in its research designs, resulting in data misinterpretation. When the shocks introduced by central banks are accommodated in the research, UIP is supported.

The failure to incorporate monetary shocks in earlier research is a case of an "omitted variable". This is a ubiquitous issue in empirical research. An additional important issue in understanding and testing UIP is the impact of risk premia and its role as an omitted variable.

As was mentioned above, UIP is based upon arbitrage conditions, which implies that the riskiness of the currencies being studied are the same. Since this will not generally be the

---

<sup>23</sup> P. Anker, 1999, "Uncovered Interest Parity, Monetary Policy and Time-Varying Risk Premia", *Journal of International Money and Finance*, v18(6), 835-51.

<sup>24</sup> S. Kim and N. Roubini, 2000, "Exchange Rate Anomalies in the Industrial Countries: A Solution with a Structural VAR Approach", *Journal of Monetary Economics*, v45(3), 561-86.

<sup>25</sup> D. Kinkos, 2002, "Discrete Policy Interventions and Rational Forecast Errors in Foreign Exchange Markets: The Uncovered Interest Parity Hypothesis Revisited", *International Journal of Finance and Economics*, v7(4), 327-38.

case, it is expected that UIP will not fully explain the relationship of interest rates and exchange rates. Our understanding of this has increased as a result of recent research.

Chaboud and Wright<sup>26</sup> find that “The failure of uncovered interest parity can be ascribed to the existence of a risk premium. The size of this risk premium may shrink to zero over sufficiently small intervals of time.” Their results are consistently more supportive of UIP over short windows of intra-daily data. Richter<sup>27</sup> uses time-varying models to examine the changing stability of the relationship between British, German and U.S. interest rates following the ERM crisis of 1992–93. He finds that UIP did not hold during this crisis, but that the risk premium plays a crucial role in the result.

Bleaney and Laxton<sup>28</sup> find that real exchange rates move in the direction predicted by real interest rate differentials, and that previous negative results are probably attributable to errors in estimating inflation expectations.

Meredith and Ma<sup>29</sup> generate results based on a set of theoretical models. All of their results are consistent with UIP being a biased predictor of short-term exchange rate movements. The bias decreases, however, as the time horizon of the exchange rate change lengthens. This is consistent with the time horizon issue discussed above. Another common feature of their models is that the true reduced-form equation for exchange rate changes contains variables other than the interest rate differential, “providing a justification for ‘eclectic’ relationships for forecasting exchange rates. The results, however, remain consistent with using uncovered interest parity as a building block for structural models.”

We agree with Meredith and Ma’s conclusion that UIP is important for understanding and predicting the relationship between interest rates and exchange rates. Basically what they are saying is that UIP is an important theory, but that the relationships in the “real” world are more complex. Other factors such as monetary shocks and risk premia impact on the relationships. This assessment of UIP is not at all surprising and has parallels in most all other theories in financial economics, including the CAPM. However, there is a fundamental difference between explaining the relationships *ex post* and predicting the relationship *ex ante*. By definition, unanticipated monetary shocks cannot be predicted

---

<sup>26</sup> A. Chaboud and J. Wright, 2003, “Uncovered Interest Parity: It Works, But Not For Long”, Federal Reserve Board International Finance Discussion Paper No. 752.

<sup>27</sup> M. Richter, 2002, “On the Efficiency of Capital Markets ? A Dynamic Analysis of the Term Structure of Interest Rates in Britain”, Copenhagen Business School Working Paper.

<sup>28</sup> M. Bleaney and D. Laxton, 2003, “Real Interest Rates and Real Exchange Rates: Evidence from Indexed Bonds”, Manchester School, v71(1), 65-77.

<sup>29</sup> G. Meredith and Y. Ma, 2002, “The Forward Premium Puzzle Revisited”, International Monetary Fund Policy Working Paper: WP/02/28.

and therefore are not relevant to ex ante applications of UIP. We will return to the important issue of ex post versus ex ante in the next section.

There is one final stream of research that is relevant to whether UIP is a useful theory, and whether the ACCC is justified in relying on earlier research. Earlier research relied heavily on data from the 1980s. We now realise that this period was peculiar and not reliable for evaluating the usefulness of UIP in predicting the interest rate/exchange rate relationship.

Flood, Rose and Andrew<sup>30</sup> test for UIP using daily data from the 1990s for 23 developing and developed countries. They find that UIP works better in the 1990s than in previous eras. They note: “The slope coefficient from a regression of exchange rate changes on interest differentials yields a positive coefficient (which is sometimes insignificantly different from unity).” Lothian and Wu<sup>31</sup> argue that the previously observed failures of UIP are a coincidence of two empirical artefacts: the unique sample period of the 1980s; and the noise induced by small UIP deviations. They control for these by constructing a time series that spans two centuries and by running regressions conditional on large deviations from UIP. They find that UIP is supported over the whole sample period and is only not supported when the sample is dominated by the data of the 1980s. They believe the results during the 1980s are mainly the result of a failure of expectations to adjust quickly to the regime changes in monetary policy that took place in both the UK and the US.

The status of UIP in financial economics is summarised in the following quote from a prominent textbook on financial markets at the end of its section on interest rates, exchange rates and UIP:<sup>32</sup>

**RECAP:** financial market participants compare expected rates of return on instruments denominated in different currencies. The expected nominal rate of return on a foreign investment is the foreign interest rate, plus the change in the exchange rate, less an adjustment for risk from the uncertainty of the future exchange rate. The expected real return includes an adjustment factor for expected inflation in both countries. In equilibrium, interest rates adjust so that after adjustments have been made for expected inflation and exchange rate risk, returns are equalized across countries.

The weight of empirical evidence is now supportive of UIP with the qualification that there are additional factors that explain international interest rates. The evidence most

---

<sup>30</sup> R. Flood, A. Rose and K. Andrew, 2002, “Uncovered Interest Parity in Crisis”, IMF Staff Papers, v49(2), 252-66.

<sup>31</sup> J. Lothian and L. Wu, 2003, “Uncovered Interest Rate Parity Over the Past Two Centuries”, Washington University – St Louis Working Paper.

<sup>32</sup> M. Burton, R. Nesiba and R. Lombra, “An Introduction to Financial Markets and Institutions”, 2003, South-Western: Mason, Ohio, p300.

strongly supports UIP when tested for longer-term bonds, which is the relevant maturity for assessments of regulatory WACC settings. The weight of evidence no longer supports the position expressed by the ACCC (p. 9) that “exchange rates tend to move in a counter direction to that predicted by UIP”. In our view, UIP is supported, and it provides solid justification for the approach of subtracting the risk free rate from the vanilla WACC before making international comparisons.

### **2.1.5 UIP as a predictive model**

The section above provides extensive support for UIP and its importance in understanding and predicting the relationship between international interest rates and exchange rates. We also noted that some factors that are important to explaining ex post behaviour of interest rates and exchange rates are not useful in making ex ante statements about the relationship. Factors such as monetary shocks are by definition not predictable, and therefore cannot be incorporated in an ex ante model.

More generally, there is a fundamental difference between ex post and ex ante use of a theory such as UIP. As we know from all the research related to the CAPM, identifying a factor that is significant in explaining ex post results does not mean that the factor is useful in building an ex ante model. An example with the CAPM is that we know from empirical research that size is useful in explaining historical equity security returns. However, we have no accepted theoretical basis for understanding why this is so. Furthermore, we generally believe that size is merely a proxy for other factors that have not been incorporated in the analysis. Most practitioners and all regulators in Australia use the CAPM. Then, in some cases, the relevance of other factors that are not captured by the CAPM is considered. A good example of such a factor is the asymmetric risk faced by infrastructure providers. The CAPM assumes there are no such risks, so it is important to consider ways of incorporating a reward for the unavoidable and undiversifiable asymmetric risks faced by the regulated companies.

Similar to the case with the CAPM, it is likely that there are factors that are important for understanding the relationship between interest rates and exchange rates in addition to UIP. Exactly what those factors are and how they might be introduced into an ex ante application is unclear. The only factor that has been well identified by empirical research as being relevant is a risk premium. We do not, however, have a good understanding of the risk premia impact on the relationship, and there are no models that have gained widespread support in practice. We believe it is appropriate to continue to apply UIP in understanding the relationship between interest rates and exchange rates

### 2.1.6 Currency risk

The ACCC argues that total returns is the most appropriate comparator on the basis that its key assumption – namely that investors expect real exchange rates to remain constant – is “more reasonable”. However, an equally restrictive assumption is the requirement for there to be no country risk premia embedded in risk free rates of the sample countries.

It hardly seems contentious to state that interest rates in a country are impacted by the perceived risk of the debt securities that are specific to the country. A broad look at country risk can be found in *Euromoney*, which publishes one of the most prominent evaluations of country risk. The objective of the ratings is to capture the risk related to investment in a country. The latest ranking is in the September 2003 issue. Moodys and Standard and Poors both provide country ratings. In addition, there are numerous commercial providers of country risk assessments, such as those provided by the PRS Group,<sup>33</sup> Professor Campbell R. Harvey at Duke University,<sup>34</sup> and Professors Allen Huang and Thayer Watkins at San Jose University.<sup>35</sup> Professors Huang and Watkins estimate Australia’s country risk premium at 0.65% over the benchmark of the United States.

The risk free rate in a country will include an amount that reflects the country-specific risk of its sovereign debt. The country risk premium will vary across countries. Therefore, a comparison of total returns, such as used by NERA and supported by the ACCC, will be distorted by the country risk premia among the countries used. Total returns will not accurately reflect the impact of regulatory decisions on returns to the regulated company.

For example, as was cited above, the country risk premium for Australia has been estimated as 0.65% relative to the US. If regulators in the US and Australia were completely in agreement on the risk faced by a regulated activity and the model to be used to reflect that risk in allowed returns, the total return for the Australian company would be higher than that allowed for the US company by the difference in the country risk premium of 0.65% that would be embedded in the risk free rate. The total returns approach would make it appear that the regulators in Australia were overly rewarding the regulated companies, when in fact that would not be the case. The NECG approach would correctly indicate that the two regulators were equally compensating the regulated companies.

In addition to the relevance of UIP, the approach used by NECG of deducting the risk free rate from the vanilla WACC ensures that differentials in country risk premia do not distort the international comparisons.

---

<sup>33</sup> <http://www.prsgroup.com/icrg/icrg.html>

<sup>34</sup> [http://www.duke.edu/~charvey/Country\\_risk/couindex.htm](http://www.duke.edu/~charvey/Country_risk/couindex.htm)

<sup>35</sup> <http://www2.sjsu.edu/faculty/watkins/econ202/risk.htm> and <http://www2.sjsu.edu/faculty/watkins/countryrisk.htm> respectively

An additional problem with total returns is that interest rates vary over time and can be volatile. Therefore simply comparing an Australian decision in 2003 with an Australian decision in 1998 under the total returns approach can produce misleading results if the decisions are based on materially different values for the risk free rate.

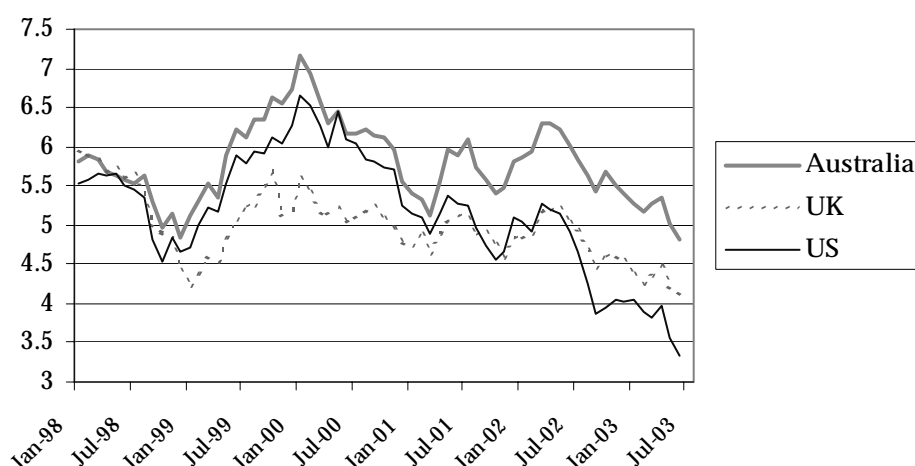
**2.1.7 Total returns — a summary**

By arguing that the comparison should be on the basis of total returns or vanilla WACCs, the ACCC proposes comparing rates of return of different currencies with no consideration of the different currencies in which the rates are denominated. This was a key flaw of the report commissioned by the ACCC from NERA.

NECG has compared the vanilla WACC less the risk free rate, both in the same currency. The vanilla WACC was chosen as it is frequently applied by regulators and can be derived for most other decisions on a comparable basis. By focusing on the premium over the risk free rate, the analysis abstracts from irrelevant issues such as exchange rate expectations and country risk premium, which will be reflected in the risk free rates. Our approach is consistent with the practice of regulators who determine WACCs from prevailing domestic interest rates.

Most of the countries used in NECG’s analysis had lower risk free rates than in Australia. Chart 2 shows the risk free rates in Australia, UK and US for 1998–2003, the period in which the decisions were taken.

**Chart 2 Yield on nominal Government bonds with 10-year maturity — Australia, US, UK 1998–2003**



**Data source:** Data from Reserve Bank of Australia, Federal Reserve Bank and Bank of England.

Looking at total returns in this period clearly provides a comparison that is less favourable to the returns in Australia, other things being equal.

However, if the comparisons had involved countries where the risk free rates were higher than in Australia, using total returns would have provided stronger support for regulated returns in Australia being comparatively low. For example, the risk free rate in New Zealand has recently been higher than the risk free rate in Australia by about 55 basis points.<sup>36</sup> If comparisons were made of total returns between Australia and New Zealand, we would expect to find a bias to higher returns in New Zealand that was attributable to expectations on movements in exchange rates. The approach used by NECG eliminates this bias. If we were to compare total returns in Australia with total returns in Brazil, we would find the bias even larger as the difference between expectations of movements in exchange rates, and hence the difference in risk free rates is about 3.5%. At the other extreme, the risk free rate in Japan is currently lower than in Australia by about 4.5%. If the rates were directly comparable, then all fixed interest investors would want to hold bonds of the Brazilian government. Of course, that is not the case.

To compare regulated returns across these three countries without correcting for the differences that are embedded in the risk free rate is clearly inappropriate. The issue raised by the ACCC of whether or not international markets are fully integrated is peripheral to whether returns should be measured with or without the risk free rate. What is relevant is what factors are embedded in the risk free rates of countries, how those factors differ across countries and how the returns used for comparison can reflect the actions of regulators.

The ACCC's defence of the total risk approach depends entirely on the view that UIP has been discredited by empirical research and its implicit assumption that there are no differential country risk premia for the countries analysed. As was quoted in section 2.1.1, the ACCC acknowledges that if UIP is accepted, then the NECG approach is correct.

In the preceding sections we have shown the following:

- Recent empirical research supports UIP and its importance in understanding the relationship of international interest rates and exchange rates;
- Even if empirical research was not supportive of UIP, it is still the most appropriate assumption for ex ante considerations of interest rates and exchange rates; and
- Aside from consideration of UIP and exchange rate expectations, the existence of differential country risk premia supports abstracting from the risk free rates.

A direct comparison of total returns as favoured by the ACCC is inappropriate. Total returns reflect exogenous influences such as country risk premia and exchange rate expectations. The approach used by NECG abstracts from those irrelevant factors.

---

<sup>36</sup> This is based upon data for January 2002 through January 2004 and holds for maturities of 2, 5 or 10 years. Data is available on the websites of the respective Reserve Banks.

## 2.2 Market risk premium

The ACCC makes three key criticisms of the approach taken to the market risk premium.

First, the ACCC argues that consistent with the view that total returns is the appropriate comparator, then the correct market risk premium to apply is an international version of the MRP:<sup>37</sup>

The NECG analysis fails to recognise that if world financial markets are perfectly integrated then the MRP does not vary across countries, rather the correct MRP to apply is a single world financial market MRP.

Second, notwithstanding the first criticism, the ACCC claims that NECG's approach to adjusting for different market risk is based on unsubstantiated assertions:<sup>38</sup>

There is a lack of empirical evidence to support NECG's arbitrary 'first principles' assumptions adopted to adjust market risk premiums.

Third, the ACCC claims that NECG has erred in referencing decisions to a MRP of 6% — the value it adopts for standardising the MRP – given this overstates the true market risk premium in Australia:<sup>39</sup>

[The] assumption of an Australian market risk premium of 6 per cent is at odds with the views of many informed Australian market participants and commentators who believe the actual MRP for Australia is less than the figure commonly adopted in regulatory decisions.

We consider each of these in turn.

### 2.2.1 Application of an international version of the MRP

In a world of “perfectly” integrated financial markets, the ACCC argues that the most appropriate model to determine the cost of equity capital for a firm is the international version of the CAPM (ICAPM).

In the ICAPM the return on equity for a (domestic) firm will be referenced to a world risk free rate and a world MRP, with the beta derived from relating returns to a stock to those of a composite world market index.

Use of the ICAPM raises a similar problem to the analysis of total returns – that is the need to incorporate exchange rate relationships. In addition, there are numerous other practical issues in its application, such as the interest rate to adopt, the market against

---

<sup>37</sup> ACCC, Submission No.72, page v.

<sup>38</sup> ACCC, Submission No.72, page vii.

<sup>39</sup> ACCC, Submission No.72, page 11.



which beta should be assessed and the determination of a single world financial market MRP.

There is no evidence that the ICAPM has superior predictive powers to a domestic version of the CAPM. For example, Koedijk et al<sup>40</sup> investigate to what extent international and domestic asset pricing models lead to different estimates of the cost of capital for an individual firm. They find that “even though the ICAPM is theoretically preferable to the domestic CAPM, a firm’s beta calculated using the domestic CAPM does not necessarily provide a worse estimate of the cost of capital.”

It is not surprising that all international regulators that use the CAPM adopt a domestic version of the CAPM. For the purpose of comparative analysis considering returns on any other basis would add significant complexity. As with its introducing the issue of whether or not international financial markets are perfectly integrated, the introduction of the ICAPM seems also to be peripheral to the issues in our report or in the ACCC’s response to our report. The ACCC and other regulators use the domestic CAPM. As far as we are aware, no regulator has ever seriously proposed doing otherwise.

### **2.2.2 Assumptions adopted by NEEG in adjusting for market risk**

Given the necessity to reference the international comparisons to domestic factors, there is a need to account for the fact that the underlying market risk varies across countries.

In our report we compared the allowances that would have applied had all overseas regulators assumed the same market risk in their countries as Australian regulators assume for Australia. The ACCC argue this approach is “arbitrary”.

The ACCC fails to note that results were provided on two bases: unadjusted and adjusted for market risk. In a number of sectors the Australian allowances compare unfavourably to those in other countries even before an adjustment is applied. For example, in the telecommunications, rail and water sectors both the vanilla WACC margin and asset betas provided have been substantially lower than in comparable countries. In other sectors, such as airports, electricity distribution and gas distribution, there is no evidence of overly generous allowances when measured as a margin over the risk free rate, even before adjustment for differences in market risk.

The key factor in adjusting for market risk is estimating relativities between markets. While there may be many estimates of market risk applying in a particular country, there is

---

<sup>40</sup> Koedijk, Kool, Schotman and van Dijk [K. Koedijk, C. Kool, P. Schotman and M. van Dijk, 2001, “The Cost of Capital in International Financial Markets: Local or Global,” Working Paper No. 3062, Centre for Economic Policy Research].

much less data on relativities between countries derived using a consistent methodology. Given this limitation we relied on the following evidence:

- historical estimates of MRP based on a comparable methodology and timeframe;
- estimates of MRP based on regressing a particular market index on a composite world market index;
- regulatory statements; and
- first principles.

Even leaving aside our consideration of first principles – the only area where any degree of judgement on our part was introduced — all other evidence is consistent with the proposition that market risk is higher in Australia than the other countries in the study. The difference in MRP between the country in question and Australia, based on the evidence considered, is set out in Table 1:

**Table 1 Difference in MRP to Australia – Evidence considered**

	Dimson, Marsh Staunton		Global market index (Harvey)		Regulatory precedent (most typical)	
	MRP	Difference to Australia	MRP	Difference to Australia	MRP	Difference to Australia
Australia	7.9%	-	7.0%	-	6.0%	-
Canada	5.7%	-2.2%	5.2%	-1.8%	5.0%	-1.0%
France	6.7%	-1.2%	3.5%	-3.5%	NA	-
Ireland	4.5%	-3.4%	NA	-	5.5%	-0.5%
Netherlands	6.4%	-1.5%	5.1%	-1.9%	5.5%	-0.5%
New Zealand	NA	-	NA	-	5.5%	-0.5%
UK	5.5%	-2.4%	6.9%	-0.1%	3.5%	-2.5%
US	6.7%	-1.2%	4.9%	-2.1%	NA	-
World average	5.5%	-2.4%	5.0%	-2.0%	NA	-

Source: E. Dimson, P. Marsh, M. Staunton, *Triumph of the Optimists: 101 Years of Global Investment Returns*, Princeton University Press, 2002. C. Harvey, *The World Price of Covariance Risk*, *Journal of Finance*, vol 46(1), 1991, pp 111–157. In deriving estimates of MRP from Harvey's findings we assumed a composite world MRP of 5.0%.

While this is a limited sample, there is reasonable consistency between the results. The differentials appear plausible when first principles are considered. For example, there is good reason to expect market risk to be higher in Australia than the US or UK, given the greater diversification and size of the latter markets.

The decision to reference overseas decisions off a revised MRP of 6% was made for a number of reasons: simplicity, consistency with other evidence on comparative market risk, and to remove a key area of judgement from the analysis. Although the ACCC has criticised our approach, it has neither provided an alternative adjustment approach nor evidence to contradict the adjustments we have made.

### 2.2.3 Adoption of a 6% MRP in Australia

An additional criticism made by the ACCC is that referencing decisions in relation to a common MRP of 6% will understate the generosity of Australian decisions as 6% overstates the appropriate MRP in Australia.

This criticism is largely irrelevant given that the results show what would have happened had overseas regulators adopted the same MRP as Australian regulators. In addition, although we used 6% as the common MRP, the adjusted results and comparisons would be similar if we had referenced Australian and other decisions to other MRP values.

The ACCC's statement that it believes the MRP to be less than 6% — and potentially 3% — is a clear example of unnecessary regulatory risk being introduced by a regulator. On one hand the ACCC has applied a MRP of 6% for all its final decisions, which is consistent with the vast majority of regulatory practice in Australia. However, at the same time it has often argued that its stance is generous based on its choice of information.

The evidence put forward by the ACCC to support a MRP of 3% is highly selective and not credible. The ACCC refers to a survey of brokers undertaken by Mercer Investment Consulting,<sup>41</sup> which came up with a range of 3% to 6% for the MRP. The ACCC fails to note that surveys are necessarily subjective. The results of surveys reflect a number of factors such as the nature of the participants in the survey; the biases the participants may have with respect to the issue being surveyed; and the time horizon the participants may consider. The participants in the Mercer survey (sharebrokers) clearly have a bias, which at the time of the survey would likely have been downward. Reliance on surveys to determine the MRP can only increase uncertainty and regulatory risk.

Claiming that the MRP is less than 6% is inconsistent with the views of the ACCC's own advisor, Associate Professor Martin Lally, who supports a value of 6% for the MRP. Lally notes:<sup>42</sup>

To summarise this review of evidence on the market risk premium in the Officer CAPM, the estimates are .07 from historical averaging of the Ibbotson type, .056 from historical averaging of the Siegel type, .07 from the Merton methodology, and .040–.057 from the forward-looking approach. If a point estimate for the last approach is .048, then the average across these four approaches is .061. In addition various other methodologies have been alluded to, for which Australian results are not available but which have generated low values in the markets to which they have been employed. All

---

<sup>41</sup> Mercer Investment Consulting, Victorian Essential Services Commission Australian Equity Risk Premium, 1 July 2002.

<sup>42</sup> M. Lally, The Cost of Capital under Dividend Imputation, a report for the ACCC, June 2002, p34.

of this suggests that the ACCC's currently employed estimate of .06 is reasonable, and no change is recommended.

The ACCC also ignores other evidence on the MRP. Historical data and the results of benchmarking the MRP in Australia in relation to other markets support a range of 6–8%. The historical estimates of Lally in the quote above are consistent with a value of 7% for the MRP. Although the ACCC has repeatedly stated an inclination to lowering the MRP from 6%, it has not presented a credible case for doing so. In our opinion, if the MRP is to be adjusted, the case is stronger for an increase to 7%.

### 2.3 Lags in the risk free rate

Notwithstanding its view that the risk free rate is irrelevant to any comparison, the ACCC notes that the margin of the vanilla WACC over the risk free rate in the US varies over time due to lags between changes in interest rates feeding into the regulators' WACC. The ACCC notes that for some decisions in the late 1990s the margin is comparable to some Australian decisions.

In the US the allowed return on equity has remained remarkably invariant to changes in interest rates, while in some Canadian jurisdictions there are mechanistic processes that minimise the short-term impact of changes in interest rates on the business.

For the period studied, interest rates were only similar in Australia and the US in mid-1998 and the early months of 2000. The ACCC's assertion that results are comparable when interest rates were similar only applies to one decision in one sector – a May 2000 decision by the Utah Public Utilities Commission applying to Pacificorp. Many other decisions show a different story.<sup>43</sup>

In any case, the presence of regulatory lags does not invalidate the fact that these lags have provided US firms with rates of return that are significantly more favourable in relation to US domestic interest rates than has been the case in Australia.

---

<sup>43</sup> For example, the sample also includes the following decision in mid 1998 and early 2000 (vanilla WACC margins in brackets): Federal Energy Regulatory Commission, Transco (electricity transmission), March 2000 (4.47%); Vermont Public Utilities Commission, NET (telco), April 2000 (4.00%); Utah Public Utilities Commission, Gunnison (telco), July 2000 (4.00%). In addition, in 1998 the Federal Communications Commission determined the return on equity of 11.25% to apply for telecommunications cost modelling, which based on the gearing assumed provided a vanilla WACC margin of 5.25% on prevailing bond rates.

## 2.4 Incentive properties of the Code

The ACCC argues that the study does not take account of the “incentive nature of Australian utility regulation”.

We dispute this assertion. The report notes that the ability of regulated companies to earn more (or less) than the WACC is typically higher where a firm is subject to either a price cap or a revenue yield form of price control. This is the case for many Australian regulatory businesses. However, we also note the ability in other jurisdictions for firms to earn more than the WACC. This is the case in the UK. It is also the case in the US and Canada, where regulators have traditionally applied strict rate of return regulation but are now including performance-based incentives.

## 2.5 Summary

In our opinion, the ACCC’s critique of the methodology employed in the NECG study does not stand up to close scrutiny. The ACCC has not demonstrated the assumptions adopted by NECG are inappropriate. It also has not demonstrated that an alternative approach would provide fundamentally different conclusions and be preferable.

The ACCC argues that the appropriate comparator should be total returns, based on the view that UIP has been discredited by empirical research and its implicit assumption that there are no differential country risk premia for the countries analysed. However, recent empirical research supports UIP and its importance in understanding the relationship of international interest rates and exchange rates. Even if empirical research was not supportive of UIP, it is still the most appropriate assumption for ex ante considerations of interest rates and exchange rates. Aside from consideration of UIP and exchange rate expectations, the existence of differential country risk premia supports abstracting from risk free rates.

The ACCC has also provided no credible evidence that our approach to adjusting for market risk is flawed. The ACCC raises the idea that in an integrated market, returns can be compared using the ICAPM. However, such an approach requires consideration of exchange rate differentials. In addition, studies do not show that the ICAPM has a better predictive power than the domestic version of the CAPM. We are not aware of any regulator in the world that has attempted to apply the ICAPM. In practice the ACCC has not seriously considered applying this methodology.

The fact that in the US, regulatory decisions are not closely aligned to changes in the risk free rate does not invalidate the fact that US regulatory decisions have provided large allowances above the prevailing risk free rate. US and Canadian jurisdictions are increasingly providing opportunities for businesses to earn more than the regulatory rate

determined WACC. While Australian entities operating under high-powered incentives such as price caps are able to earn more than the WACC, Australia does not have a monopoly on such incentives.

### 3 Evidence that returns are higher than required by investors

The ACCC implies that regulatory returns in Australia are higher than required by investors where it notes:<sup>44</sup>

There is no evidence that returns provided by Australian gas regulators are a disincentive to efficient investment going into the future. Rather, there is credible evidence to suggest that regulatory returns in Australia are actually higher than those required by investors. On this basis there is no reason for adjusting the current framework for determining the cost of capital as suggested by NECG.

The ACCC cites two main pieces of evidence to justify this claim. These include:

- Research undertaken by the Allen Consulting Group (ACG) provided to the Commission as part of the BHP Billiton submission;<sup>45</sup> and
- A special research report released by Moody's Investors Service, comparing the outlook for debt holders in energy utilities in Australia and the UK.<sup>46</sup>

These are considered in turn, followed by consideration of other claims on investment:

#### 3.1 ACG-BHP Billiton report

ACG estimated the ratio of market value to 'regulatory value' for a selected group of private network businesses operating in the Australian gas and electricity industries. The market value has been taken either from share market prices or the prices paid for assets in transactions. The ACCC notes that a ratio of one "implies that investors believe that the earning potential of the asset equates to the risk adjusted return required to hold the asset".<sup>47</sup> ACG's key finding was that the ratio of market value to regulatory value was generally above one, with the ratio being 1.4 to 1.6 in "recent years":<sup>48</sup>

Of the transactions or listed entities covered, the only ones for which the market-to-regulatory value was close to unity were for United Energy and AlintaGas, but only if a high value for their retail activities is assumed. At the other end of the scale, a number of businesses have paid either close to – or in excess of – twice of the regulatory value.

<sup>44</sup> ACCC, Submission No.72, page viii.

<sup>45</sup> The Allen Consulting Group, Review of the Gas Code: Report on Economic Issues, Report to BHP Billiton, August 2003. Included as Appendix to BHP Billiton, Initial Submission to the Productivity Commission Review of National of Gas Code, September 2003.

<sup>46</sup> Moody's Investors Service, Special Comment, Regulatory Differences Justify Higher Rating For Australian Gas And Electricity T&D Companies Over UK Counterparts, August 2003.

<sup>47</sup> ACCC, Submission No.72, page v.

<sup>48</sup> Allen Consulting Group, Op cit, page 59.

Included in this set are all of the Victorian gas distributors, which were sold after an access arrangement had been approved by an independent regulator. However, in more recent times, the observed market-to-regulatory values have appeared to have ranged between about 1.4 times and 1.6 times.

In its report ACG infers that its results show that investors are earning sufficient returns on existing assets and new investment:<sup>49</sup>

Rather, the evidence demonstrates that investors expect returns on their regulated assets that exceed—and exceed by a margin—the returns required to attract and retain capital in the industry.

And:<sup>50</sup>

Provided that the relationship described above holds for new assets in the same proportion to existing assets—which seems a reasonable assumption—then, far from deterring investment, the rewards available for investing in the regulated services exceed those required.

ACG's key conclusion is that regulators are unlikely to be understating the cost of capital.<sup>51</sup>

The observation of a large wedge between the market value of an asset and its regulatory value makes it highly unlikely that regulators could be understating the cost of capital associated with the regulated activities of the relevant business.

The ACCC accepts these conclusions where it states:

Consequently, in view of current investment levels and the conclusions of the ACG study it would be fair to conclude that the current regulatory environment is conducive to efficient and effective investment going into the future. Further, there is no reason to believe that the returns permitted by Australian regulators will lead to infrastructure failure.<sup>52</sup>

We do not propose to undertake a full critique in this report. However, the measure considered by ACG has a number of basic limitations, which render its use for policy purposes, as extremely dangerous at best. In addition, the assumptions adopted by ACG in applying the approach casts further doubt on the validity of the results.

We consider these in turn.

---

<sup>49</sup> Allen Consulting Group, Op cit, page 60.

<sup>50</sup> Allen Consulting Group, Op cit, page 60..

<sup>51</sup> Allen Consulting Group, Op cit, page 61.

<sup>52</sup> ACCC, Submission No.72, page 5.



### 3.1.1 Limitations in the approach adopted

ACG (and the ACCC) fail to recognise that there are a number of reasons why investors may value a firm at greater than its regulatory asset value.

Regulators adopt a range of asset valuation approaches. In particular, they may value an asset at below the depreciated optimised replacement cost (DORC), as was the case with the Western Australian regulator, Offgar, on the Dampier-Bunbury pipeline and the ACCC with respect to the Moomba to Sydney pipeline. In addition, the DORC value itself may be subject to dispute, as was the case on the Moomba to Adelaide pipeline. Given the wide range of approaches and uncertainty in applying any particular methodology, investors may value the long term earning potential of an asset on a different basis to that actually applied by the regulator. For example, investors may anticipate that a DORC value will become the most appropriate in valuing longer-term cash flows, even though prices are not currently set on that basis. Investors may also consider it possible that the long-term regulatory environment will change in a way that removes current perceived deficiencies. Recent cases where rulings on appeal have rejected some of the most onerous ACCC positions have given some justification for such optimism.

Investors will value the potential to reap economies of scope in unregulated markets, even if opportunities are not present exactly at the time of purchase. Being in the business may create a real option for future investment outside the regulated entity.

In the case of gas transmission pipelines or other assets with foundation contracts, long-term contracts may provide value to investors over and above the regulatory value of the asset. Note that in these cases the role of the regulatory asset base is primarily to determine incremental or marginal revenues, not average revenues for the pipeline as a whole.

A ratio of the market value to “regulatory value” of one does not imply that the same ratio on marginal investment is one. An average ratio of more than one does not necessarily mean that the conditions for future investments are favourable as implied by the ACG analysis. In addition, for risky investments one would expect this ratio to be greater than one to the extent that a survivorship bias is present.

Market valuations of any asset are highly volatile. Any estimate of the ratio of market value to regulated value will vary over time. Not only can the value of a stock fluctuate regardless of movements in the overall market, but the market index can vary such that there are periods when the ratio of market value to replacement cost for the market as a whole is above one and periods when it is below one.<sup>53</sup>

---

<sup>53</sup> Some empirical results for the Australian economy shows the ratio of market value to replacement cost oscillating between 0.5 and 1.7 between 1966 and 1990. In 1990-91 the ratio

Finally, there are other reasons why investors may value a firm at greater than its regulated value, such as where there are tax benefits or favourable tariff rulings that apply to the purchasers. These factors were present in Victorian and South Australian privatisations of gas and electricity network businesses.

### 3.1.2 Issues with application of the methodology

In addition to the conceptual flaws in the measure chosen, the ACG analysis contains a number of sampling and application errors. These include that:

- The sample chosen is selective and biased. ACG ignore the experience of the Australian Pipeline Trust and Epic Energy, the entities that have been subject to the most contentious regulatory decisions in recent years;
- While ACG have provided a wide range for the value of the retail business, it is not obvious that their ‘upper bound’ figure represents a true ‘upper bound’. In practice energy retailers are rarely sold as a stand-alone entity. Retailers increasingly integrate with generators to manage risk and have typically been sold with distributors. The value placed on a stand-alone retailer will vary depending on the ability to find a buyer with an upstream hedging opportunity. If such a buyer exists it is likely they will have significant bargaining power, resulting in a sale price lower than the sellers valuation;
- ACG ignores the presence of significant unregulated assets held by businesses. For example, in the case of GasNet, unregulated assets including metering equipment and an LNG facility were included in the sale; and
- ACG arbitrarily removes Alinta from its sample to provide a range of 1.4 to 1.6. ACG’s own estimates provide a ratio between 0.8 and 1.0 at four points in time. In addition, the market value of Alinta includes an unregulated LPG contract, a point noted by ACG.

In our opinion the ACG Report cited by the ACCC does not provide an adequate basis for any conclusion regarding whether or not the regulatory returns in Australia are higher than required by investors.

## 3.2 Moody’s report

In its review of the UK and Australian energy sectors, Moody’s argue that regulatory differences allow it to rate Australian energy businesses higher than the UK counterparts. It notes:<sup>54</sup>

---

was estimated at around 1.3. In previous asset booms such as during the 1980’s the economy wide ratio was estimated to have increased from below 1 to a maximum of 1.5 and a similar trend may be expected to have occurred during the 1990’s.

<sup>54</sup> Moody’s Investors Service, Op cit, page 1.

Differences in regulatory philosophy between Australia and the UK mean that Moody's on average rates Australian gas and electricity transmission and distribution (T&D) companies one notch above those of their UK peers, even though both parties may have approximately the same level of debt coverage measures

The first point that can be noted about the Moody's report is that it has been written from a debt-holder's perspective, and hence says little, if anything, about equity. To date, regulators have ensured that firms are able to meet debt obligations, even in the most contentious regulatory decisions. Offgar's determination on the Dampier to Bunbury pipeline is a case in point. While Offgar determined an asset base for the pipeline that was considerably less than the DORC value proposed by Epic, the value provided was sufficient to allow Epic to meet its obligations to debt holders. All residual risk was placed on equity holders.<sup>55</sup>

Second, notwithstanding this qualification, we question some claims made by Moody's.

The key evidence provided to justify the relatively 'benign' nature of the Australian regulatory environment is Ofgem's 1999 decision on the UK electricity businesses, which resulted in greater reductions in distribution revenue than was anticipated by the market<sup>56</sup>:

In December 1999, the UK regulator — the Office of Gas and Electricity Market (OFGEM) — delivered its Distribution Price Control Review on the businesses of regional electricity companies (RECs). In its review, OFGEM reduced the average tariff prices — or Po cuts — of Moody's rated RECs by between 19% and 33%. The extent of the price cuts surprised many market participants.

Moody's placed the ratings of 9 distribution companies on review following OFGEM's action. Of these, 6 were confirmed when they showed they could cut costs to minimise the strain on net cash flows. The ratings of three were downgraded — two of these were part of multi-utility groups, which suffered electricity and water reviews, and one was a pure electricity company.

By contrast, Moody's notes that regulators in Australia have not been as aggressive in cutting the tariffs of the country's transmission and distribution companies, citing the Office of the Regulator General electricity decision of 2000.

We believe it is dangerous to draw conclusions out of a simple comparison of a few "Po" decisions. There is no reason to believe the starting position or future outlook for the firms in question to be identical. This is especially the case where they operate in different markets.

---

<sup>55</sup> Note that in any case the higher MRP on equity in Australia should make regulation relatively less risk for debt holders.

<sup>56</sup> Moodys, Op cit, page 2.

Moody's also bases support for its claim of a "benign regulatory environment" on the ability of regulated Australian firms to increase gearing above the levels set by the regulator in Australia and thereby reduce their cost of capital. The contention that regulated Australian firms are able to increase their leverage beyond that set by the regulator is of no direct consequence. If the regulator sets leverage at what it considers optimal, then it is clearly possible for firms to obtain higher levels of debt. The difficulty is with Moody's contention that firms will reduce their cost of capital by increasing their debt above the level set by the regulator. This assertion is unjustified.

Modigliani and Miller's (M&M) original propositions on capital structure<sup>57</sup> state that a firm's cost of capital is unaffected by changes in capital structure. Although the theory of capital structure has advanced since the original M&M, the irrelevance of debt levels is still widely held, particularly in a country like Australia where there is a dividend imputation tax system. Therefore, Moody's contention that increasing a firm's gearing level will lead to a decrease in the firm's cost of capital is not supported.

Furthermore, even if M&M's leverage irrelevance does not hold and there is an optimal capital structure, Moody's contention is unlikely to be valid. It is generally the objective of a regulator to set the gearing level for a firm at its optimal gearing level. If there is an optimal capital structure and if the regulator has set gearing at the optimum, then any other gearing level will lead to a higher cost of capital than what is allowed by the regulator. Therefore, Moody's contention is again refuted.

It is possible that the regulator has not succeeded in setting the gearing level at the optimal level. If there is an optimal capital structure and if the gearing level is set too low, then increasing the firm's actual level to the optimum should decrease the firm's cost of capital. However, it is not clear why regulators would be systematically under-estimating the optimal capital structure of firms. It is certainly not established that such is the case.

There is a further problem with Moody's analysis. It does not state why the same ability to decrease the cost of capital would not be present in the UK, something that is surprising given some UK water businesses have increased gearing substantially. Gearing levels determined by the respective regulators are broadly similar. Ofgem has adopted gearing between 50% and 62.5% in energy decisions, while all Australian regulators adopt gearing of 60%. It seems that Moody's has applied its analysis selectively.

Notwithstanding its claims — which we dispute — Moody's concludes that the longer-term outlook for debt holders in Australian utilities is less favourable.<sup>58</sup>

---

<sup>57</sup> F. Modigliani and M. Miller, 1958, "The Cost of Capital, Corporation Finance and the Theory of Investments", *American Economic Review*, v48(3), 261-297.

<sup>58</sup> Moody's, Op cit, page 4.

Over the longer term, they [the network businesses] must adopt more prudent financial policies in readiness for the potential for regulatory thinking to evolve, especially from 2010. These companies may find that their present financial profiles could prove unsustainable with the emergence of new regimes and that their current ratings could — as a consequence — come under pressure.

Even if Moody's conclusion regarding gearing and cost of capital was valid, it apparently does not expect the advantage to Australian energy companies to persist.

### 3.3 Other claims on investment

The ACCC argues that the proposition that returns are too low is contradicted by the presence of significant infrastructure investment in Australia.

We acknowledge that there has been significant investment in the gas and electricity sectors over the past five years. However, this factor does not necessarily imply that returns are sufficient.

First, firms have service obligations under their operating licences that require them to invest to meet increasing demand. In the electricity sector more than 80% of investment has been for reliability purposes and to meet load growth.<sup>59</sup> Not only is this non-discretionary investment, but it is also primarily within-state investment, and hence not directly enhancing the national market.

Second, much investment that has taken place in the gas sector has been in non-regulated assets. Since 1996, new pipelines that are not regulated under the Gas Code have accounted for investment of over \$2billion. In this period the only major new regulated asset has been the \$30 million Central West Pipeline, a point noted in the Australian Pipeline Industry Association (APIA) submission to the Commission.<sup>60</sup>

Investment in new transmission pipelines of well over \$2 billion accounts for the vast majority of pipeline investment since 1996. Of the seven pipelines completed since 1996, only the \$30 million CWP (a relatively minor pipeline that proceeded on the basis of direct Government financial assistance) is regulated under the Gas Access Regime. That is, less than 2% by value of new investment in transmission pipelines since the introduction of the Gas Access Regime is actually regulated under the Gas Access Regime, and arguably the investment decision in relation to the covered pipeline was affected by Government assistance. Moreover, where investment faced the threat of

---

<sup>59</sup> Presentation of Gordon Jardine, CEO Powerlink to Energy Users Association of Australia Annual Conference, 18 September 2003.

<sup>60</sup> Australian Pipeline Industry Association, Supplementary Submission to the Productivity Commission Review of the Gas Access Regime, December 2003, page 14.

regulation (as with the Goldfields pipeline), measures were taken to insure the pipeline owners against potential detriments.

### **3.4 Summary**

We dispute that either the ACG Report or the Moody's Report provides justification for the ACCC's claim that regulatory returns in Australia are higher than required by investors. The ratio of market value to regulatory value cited by ACG is not robust. We also dispute the findings of Moody's Investor Services. Even leaving aside our criticisms, the paper only applies to debt holders, when the key contentions relate to returns to equity holders. In any case, the higher MRP in Australia should make regulation less risky for debt-holders.

While there is evidence of significant investment, particularly in the energy sector over recent years, this does not contradict the view that regulatory returns have been too low. Much investment has been driven by licence obligations – a key driver in the electricity sector, while in the gas sector the majority of investment has been in pipelines that are not regulated under the Gas Code.

## 4 Availability of domestic comparators

The ACCC downplays the significance of international comparisons where it notes the greater presence of domestic comparators, which it claims permits greater objectivity and independence in regulation:<sup>61</sup>

However, the ACCC is currently placing an increasing emphasis on direct observation of market parameters as the information base expands. Such an approach is consistent with greater objectivity and independence of regulation.

This statement is inconsistent with the ACCC's own claims and practice. If the total returns provided in international regulatory decisions are a relevant form of comparison then international comparators are at least as equally valid as domestic ones – and potentially more so given the larger sample involved.

In its discussion paper on the Draft Regulatory Principles for the regulation of transmission revenues,<sup>62</sup> the ACCC set out how it proposes to take “increasing emphasis on direct observation”. In this paper, the ACCC notes that it proposes to base the beta value for a regulated firm on the upper confidence interval for beta values of comparator companies listed on the Australian Stock Exchange. The proposed process involves:

- calculating beta values for comparable companies using quarterly data issued by the Australian Graduate School of Management (AGSM)
- for a sample of these firms, estimating the mean, standard deviation and confidence interval(s); and
- adopting the upper confidence limit as the basis of determining the beta value.

The ACCC considers this is a superior approach to its current practice of adopting an equity beta of one for electricity transmission businesses:<sup>63</sup>

In this regard the Commission considers that maintaining a benchmarked equity beta of one for TNSPs ignores current available market evidence that points to a lower equity beta for TNSPs. This would also be consistent with the Commission's approach in calculating forward looking estimates of other parameters based on latest market evidence. In order to minimise risk that the equity beta does adequately compensate the TNSPs the Commission propose to adopt the approach of incorporating an upper confidence interval to calculate a proxy for equity beta. This approach will also provide the TNSP with the potential for increased returns as the equity beta may be above one in

---

<sup>61</sup> ACCC, Submission No.72, page v.

<sup>62</sup> Australian Competition and Consumer Commission, Discussion Paper 2003 Review of the Draft Statement of Principles for the Regulation of Transmission Revenues, August 2003.

<sup>63</sup> Australian Competition and Consumer Commission, op cit, page x.

certain circumstances, depending on the constructed confidence interval. These returns will however be linked to general market conditions.

Such an approach is flawed and will create additional regulatory uncertainty for a number of reasons.

First, the beta estimates that the ACCC proposes to rely upon have poor statistical properties. Table 2 sets out the standard error, t-statistic and R-squared value of the latest AGSM estimates of beta for the core companies listed by the ACCC. The table also includes the asset beta derived using the ACCC approach to de-levering:<sup>64</sup>

**Table 2 AGSM estimates of beta – September 2003**

	Raw equity beta	Standard error	T-statistic	R-squared	Asset beta (ACCC approach)
Alinta Gas	0.33	0.65	0.51	0.03	0.17
Australian Gas & Light	-0.07	0.58	0.12	0.00	-0.03
Australian Pipeline Trust	0.35	0.48	0.73	0.06	0.12
Envestra	0.28	0.50	0.56	0.03	0.06

**Source:** AGSM Risk Management Service, September 2003. United Energy is not included in this list as it is now de-listed from the ASX.

All statistical estimates are extremely poor:

- the t-statistics are all less than 0.75.<sup>65</sup> In general, a t-statistic of less than 2 suggests that the beta estimate has such a high level of variability that considerable caution is required in drawing statistical inferences from these values;
- the R-squared values are either zero or close to zero in all cases. The R-squared measures the proportion of the variability of the returns to the equity of the company that is explained by the returns to the equity market. In general, statistical relationships exhibiting an R-squared value of less than 0.20 should be treated with extreme caution.

The importance of these considerations is that in pooling the estimates for the purpose of determining a composite mean and confidence interval, the ACCC will not be pooling independent observations. The four estimates of the asset beta above have a mean of 0.08 and an upper 95% confidence interval of 0.14. If this asset beta were adopted for electricity and gas transmission businesses the margin above the risk free rate for the vanilla WACC would be approximately **halved**. While use of upper confidence intervals makes intuitive sense for policy purposes given the uncertainty involved in parameters and the asymmetric consequence of errors, it makes no sense when the approach used to

<sup>64</sup> This involves use of the Monkhouse formula. The raw equity beta values have not been adjusted using the Blume or other adjustment factors

<sup>65</sup> The t-statistic is a measure of the statistical significance of the relationship between the returns to the equity of the company and the returns to the equity market (i.e., the equity beta).



generate such values is neither relevant to the task at hand nor provides statistically significant results.

All recent AGSM quarterly estimates exhibit similar statistical deficiencies.

Second, even if this problem could be overcome, the approach of pooling estimates is open to gaming and abuse by both regulated entities and the regulator alike. For example, inclusion of a few firms with a high beta could result in a high confidence interval, while by contrast if a low beta is sought, a large number of firms with a low beta can be included in a sample. Given the limited number of listed comparators, debate will inevitably focus on the comparability of firms to the regulated business in question. This can only increase regulatory risk.

Third, we expect a strong relationship between regulatory decisions and beta values, further compromising the independence of the estimates. For example, if a regulator were to set prices too low – or at an extreme case based on marginal cost – the subsequent reduced volatility in free cash flows will result in a very low beta value. However, the resulting cost of capital will not be sufficient to attract capital investment.

Finally, even if a mechanistic formula can be determined, the choice of the appropriate level of confidence to apply is inevitably ad hoc. The ACCC has not indicated the level of confidence it considers appropriate to the determination of the beta estimate.

Given the inherent need for judgement in determining a beta, relying on such a mechanistic approach is dangerous and will introduce a false sense of confidence. While considering such information may have some value – provided problems with data quality can be overcome – use of such a mechanistic approach to actually set beta values can only increase regulatory risk, contrary to the claims of the ACCC.

If the approach is inappropriate for the gas and electricity sectors, which at least contains a few listed companies, it is clearly inappropriate for other sectors regulated by the ACCC such as airports, rail, and telecommunications, where there are few if any domestic comparators available undertaking similar business activities.

Therefore, it is not surprising that the ACCC's own advisor, Kevin Davis recently recommended that an international comparison of beta values was necessary given limited comparators in Australia:<sup>66</sup>

Standard practice for estimating an equity beta is based on estimating the equity beta for a portfolio of comparator firms.... Ideally the comparison would involve firms whose

---

<sup>66</sup> Kevin Davis, Report on "Risk Free Interest Rate and Equity and Debt Beta Determination in the WACC." Prepared for the ACCC, August 2003, p19

stocks trade in the same capital market as the target firm, since this would provide a measure of systematic risk relative to the relevant market portfolio.

In practice, this is often not feasible, and betas are calculated for comparator firms operating in other countries and using the market portfolio of that country. It is then assumed that the systematic risk characteristics observed in that country are similar to those which would apply here. Although this approach, and assumptions involved, can be debated, there is no obvious preferable alternative, unless there is a significant portfolio of comparator stocks trading in the local market.

While there is a small group of comparator firms now trading in the Australian market, the size of that group does not seem sufficient to currently justify its use as the sole input for reliable beta estimation...

## 5 Concluding thoughts

All economic regulators in Australia have to approve or determine rates of return for regulated businesses. As the WACC is inherently uncertain this task is difficult. Differences in interpretation of the appropriate WACC for a particular business are inevitable.

A key aim of NECG's analysis of international regulated returns was to gain a broad understanding of whether investors in Australian infrastructure companies were receiving ex-ante returns comparable to investors in regulatory infrastructure overseas. This is an important driver in attracting investment into Australian regulated businesses in the long run. Our results showed that WACC allowances in Australia are not generous in international terms, and certainly not excessively so.

Of course, any form of comparative analysis such as ours is only as good as its assumptions. The ACCC claims that some of these assumptions are not valid. However, the ACCC's critique provides no reasons to change the assumptions of the study, nor does it demonstrate that an alternative approach would provide fundamentally different conclusions and be preferable.

The inconsistency and flaws in many of the arguments raised by the ACCC – for example in its proposed approach to beta — suggests it has not reached a clear position on the WACC despite applying it in regulatory decisions for over six years.

The selective interpretation of evidence, such as data on market risk premium and market value to regulatory value, creates significant regulatory risk for investors. Attempts to reduce regulatory risk through mechanistic approaches to variables, such as beta, will be counterproductive when the methodology has no meaningful economic, statistical or intuitive foundation. The ACCC, by claiming that uncertainty can be eliminated from a parameter that is inherently uncertain, is being unrealistic if not misleading.

In other cases the ACCC has created uncertainty through introducing complexity. The ACCC's approach to the risk free rate in the WACC is a case in point, where it has based the bond maturity on the length of the regulatory period. This has been contrary to standard commercial and economic practice to align bond maturity to the life of assets or the longest dated traded bond. The Australian Competition Tribunal was highly critical of such practice, overturning the ACCC's position in its recent decision on GasNet.<sup>67</sup> The Tribunal noted that the ACCC's practice was inconsistent with the mathematical logic

---

<sup>67</sup> Australian Competition Tribunal, Application by GasNet Australia (Operations) Pty Ltd [2003] ACompT 6

underlying the CAPM formula, and as such the ACCC was not even applying the CAPM as required under the Code. It stated<sup>68</sup>:

The ACCC erred in concluding that it was open to it to apply the CAPM in other than the conventional way to produce an outcome which it believed better achieved the objectives of s 8.1. In truth and reality, the use of different values for a risk free rate in the working out of a Rate of Return by the CAPM formula is neither true to the formula nor a conventional use of the CAPM. It is the use of another model based on the CAPM with adjustments made on a pragmatic basis to achieve an outcome which reflects an attempt to modify the model to one which operates by reference to the regulatory period of five years. The CAPM is not a model, which is intended to operate in this way. The timescales are dictated by the relevant underlying facts in each case and for present purposes those include the life of the assets and the term of the investment.

### **Appropriate Way forward**

Regulatory and judicial reviews provide important avenues through by which the approach to WACC can be advanced. The GasNet decision, and the Tribunal's decision on the Moomba to Adelaide Pipeline System (MAPS)<sup>69</sup> have provided a number of findings that provide important precedents for the WACC.

In its GasNet decision, the Tribunal argued that the ACCC had failed to take full account of the uncertainties and tensions associated with the WACC, and should have ensured its considerations were focused on determining, in respect of the rate of return, whether "GasNet had used the [CAPM] model correctly"<sup>70</sup> and not on second guessing the best interpretation of that model. A key implication of this statement is the acceptance that a wide range of values for the WACC may meet the Code requirements and that there is no single point estimate that is clearly superior, in respect of those requirements, than others. Preventing the applicant from choosing from these outcomes increases regulatory risk.

In the case of the Moomba to Adelaide Pipeline System (MAPS) the Tribunal was critical of the ACCC's decision to determine the cost of line pipe based on the lowest internationally available price at a particular point in time. In this decision the Tribunal also noted the uncertainty over the values to be adopted, and also highlighted the asymmetric consequences of the errors associated with adopting the lowest possible value:

For planning purposes, however, this price cannot be known with any certainty and a prudent operator would likely find it to be commercially unwise to plan a pipeline project based on the lowest known line pipe cost, or even the average line pipe cost of

---

<sup>68</sup> Ibid, paragraph 47.

<sup>69</sup> Australian Competition Tribunal, Application by Epic Energy South Australia Pty Ltd [2003] ACompT 5

<sup>70</sup> Ibid, paragraph 45.

suppliers in the lowest-cost producing country. The risk here is highly asymmetric, all on the upside. Thus a prudent operator, in the absence of perfect information, would factor into its estimates the expected value of line pipe costs, based on its estimation of the range of likely future prices and the assessed probability of occurrence of each possible price.

In the absence of knowledge of such a probability distribution at the planning stage, an operator might therefore obtain some indicative estimates based on less-than full information being available, compared with a specific tender to job specifications, and take either a simple arithmetic average, a modified arithmetic average, or the median of these prices as the indicative planning parameter value. It would be a highly risky commercial action to take the lowest figure found in any such non-detailed price-seeking activity.<sup>71</sup>

In the case of estimating the cost of line pipe the Tribunal determined that a median or mean value was an appropriate response to the uncertainty. This was because such an approach was consistent with business planning. This does not necessarily imply that a plausible mid range value is appropriate for the WACC. In the case of line pipe, prices can be observed and form a basis for predicting future prices. In the case of the market risk premium and other variables in the WACC values cannot be observed or predicted with confidence. This factor alone implies a precautionary approach. The asymmetric consequences of regulatory error – a point noted in the Commission’s review of the national access regime – further emphasises the need to avoid picking the lowest possible parameter value.

Regulatory and judicial review, while providing important precedents, will not by itself advance the WACC debate sufficiently to significantly reduce uncertainty or enable it to be best managed.

Significant regulatory resources are devoted on a frequent basis to estimating the appropriate value of market specific WACC parameters such as the MRP. In the last six months alone we are aware of at least nine regulatory decisions or statements by Australian regulators setting out a position on the MRP. Given similar debates are repeated at each of these decisions, and importantly do not directly relate to the underlying business being regulated, this is not an efficient use of regulatory resources.

The uncertainty associated with the multitude of decisions can be reduced through a wide-ranging review of the WACC. This review could recommend the values of particular parameters, such as the market risk premium, and suggest the appropriate approach to estimating other contentious parameters such as the risk free rate, gamma and beta. Any review should also recommend a regulatory approach to dealing with flaws in models such

---

<sup>71</sup> Ibid, paragraphs 63-64.

as the CAPM, an area where debate has progressed slowly. We consider the Commission would be well placed to conduct such a review.

While it may not be necessary to bind any regulator or business to the results of this review, the results could act as a benchmark against which best regulatory practice could evolve. Any regulator or business wishing to depart from the agreed findings of the review would need to clearly justify the grounds for doing so and the benefits created.

The Gas Code currently contains features that reflect the uncertainty over the WACC. The fact that the role of the regulator is to consider whether a proposed WACC is consistent with the Code, and not directly determine its own WACC, is an important feature. This reflects that a range of parameter values may be consistent with the underlying theory of the WACC and that there is no single point estimate that is clearly superior, in respect of those requirements, than others. This point was highlighted in the Tribunal's GasNet decision. Such an approach should be maintained in any revision to the Code. However, the effectiveness of such a provision can be enhanced through a wide-ranging review of the WACC as it can help minimise the uncertainty over what actually is consistent with the Code.



[www.onecog.com.au](http://www.onecog.com.au)