

1           **PRESENTATION BY LECG ON BEHALF OF NGC, POWERCO & VECTOR**

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3 **CHAIR:**     Okay, I'd like to reconvene this session of the  
4           Conference on the Commission's Draft Gas Pipelines Inquiry  
5           report, and we are going to continue now -- I guess it's  
6           not just Powerco, but NGC and Vector, and Powerco are  
7           presenting this material and we have LECG here to present  
8           on your behalf.

9           So, I'd ask you to make any introductory comments that  
10          you might have. I might just say that the aim is to break  
11          at around 3.15; we might go a bit longer if we need to for  
12          afternoon tea.     So, with that, please with your  
13          introduction whenever you're ready.

14 **DR HODGSON:** Hello. I'm Paul Hodgson from NGC, my role here is  
15          simply to introduce Professors Tony van Zijl and Glen  
16          Boyle from LECG who have prepared a WACC report on behalf  
17          of ourselves, Powerco and Vector, and I'll pass over to  
18          them. I'm sure they are known to the Commission.

19 **CHAIR:**     Thank you.

20 **PROF VAN ZIJL:** Thank you. At the outset, thank you for the  
21          opportunity to come here on behalf of the three companies  
22          to hopefully amplify the paper that was presented to the  
23          Commission and answer any questions that members of the  
24          Commission and staff may have.

25          What we propose to do is to start off with a brief  
26          introduction and then use the balance of the time for  
27          questions. I'll start the ball rolling with 10 minutes or  
28          so on the issue of WACC itself in terms of the estimation  
29          problems, and then Glen will follow on with a similar  
30          introduction on the issue of the margin over WACC.

31          We've distributed hard copies of our overheads, so --

1 **CHAIR:** Yes, we've got them, thank you.

2 **PROF VAN ZIJL:** Firstly on the issue of the model: The  
3 weighted average cost of capital can of course be defined  
4 in a number of ways depending on the definition of  
5 cashflows, and the definition that the Commission has  
6 adopted is one that we agree with.

7 The capital asset pricing model also comes in a number  
8 of different versions and the model adopted by the  
9 Commission is the post-tax form of the CAPM, and we agree  
10 with that choice but as a starting point.

11 If we take the two statements together, the definition  
12 of the weighted average cost of capital and the security  
13 market line equation provided by the post-tax form of the  
14 CAPM, then those two statements together imply a third  
15 statement for the weighted average cost of capital, which  
16 is quite a useful way of restating the initial statement  
17 in the sense that it makes clear just what is at stake in  
18 determining the weighted average cost of capital.

19 If we look along the third equation, we'll see the  
20 various parameters, the risk-free rate, the corporate tax  
21 rate and asset beta, the tax adjusted market risk premium,  
22 the debt margin,  $D$ , again the corporate tax rate, and  
23 finally leverage, the proportion of debt in the capital  
24 structure.

25 Well, in that list there are six parameters and none  
26 of those is not in any serious dispute, namely the  
27 corporate tax rate, but on each of the other parameters we  
28 take a view different from the view taken by the  
29 Commission. What I propose to do now is just to make  
30 brief comments on each of those five parameters where the  
31 views do differ.

1 First of all on asset beta, and the sequence in which  
2 I'll deal with these is the sequence in which we discuss  
3 the parameters in our paper.

4 Asset beta is very very difficult to estimate.  
5 Obviously, if we had a significant number of relevant  
6 companies listed in New Zealand we could do appropriate  
7 regressions and hence form estimates of the asset beta,  
8 but we don't have that sort of data available. We  
9 therefore need to look at other countries in terms of  
10 giving us some guidance as to what that might be, but  
11 whatever number we come up with, one kind of sanity check  
12 on it all is to say, does this actually make any sense in  
13 relation to the average asset beta for all companies?

14 Well, beta of course by definition is such that the  
15 average across all companies is 1 for equity beta. If we  
16 use the transformation formula applicable to the post-tax  
17 form of the CAPM, that implies an average asset beta of  
18 around 0.7 to 0.8 depending on one's estimate of the  
19 degree of leverage, and 0.8 is the number that you end up  
20 with if you use an estimate of leverage of around 20%.  
21 0.7 is the number you end up with if you assume that  
22 leverage is around 30%.

23 Well, that of itself is by no means settled, just what  
24 is the average leverage in the market, but we end up with  
25 an asset beta of around 0.7 to 0.8.

26 Well, if that's the average asset beta in the economy,  
27 then we can then from there on sort of say, well, the  
28 companies we're looking at, is our subjective estimate  
29 that these companies are riskier or less risky in a  
30 systematic risk sense. Well, I think most would agree  
31 that companies such as those we're focussing on here are

1 less risky in a systematic risk sense, so the asset beta  
2 is probably a kind of ceiling, but just where you end up  
3 below that, there is great room for debate, and I guess  
4 our overall position is that the sort of number that the  
5 Commission came up with is not far away from the sort of  
6 number that we would regard as appropriate. In terms of  
7 the point estimates, there's a difference of only 0.05  
8 between the Commission's estimate and the estimate  
9 provided by LECG, but what we do provide at some length is  
10 a commentary describing a number of technical reasons as  
11 to why we in fact should feel a low degree of confidence  
12 in those point estimates.

13 Now, I should mention in passing that yesterday the  
14 Commission distributed a paper by Professor Lally to do  
15 with the data that was used in the estimation of asset  
16 beta, specifically the data provided by prove Aswath  
17 Damodaran from the Stern School of Business in New York on  
18 his website, and I've reworked the numbers and my estimate  
19 of the numbers is that the original estimate is in fact  
20 still quite close to the estimate implied by the numbers  
21 that are currently on the website.

22 Now, I've at lunchtime informally discussed this with  
23 Professor Lally and that caused him to rush back to his  
24 office and check out his own calculations, and it seems  
25 that between the time that he did his revised figuring and  
26 last night when I did my check on his numbers, it seems  
27 that the website has changed, and so, it's possible that  
28 the discrepancy that Professor Lally discovered between  
29 his original estimate and the subsequent estimate which  
30 formed the basis for the paper distributed yesterday may  
31 in fact no longer be a substantive one. But we'll need to

1 check that out later.

2 **CHAIR:** Okay, thank you.

3 **PROF VAN ZIJL:** And I've probably already gone for 15 minutes.

4 **CHAIR:** They might change the website again by the time you go  
5 back to check it. I'm glad to hear we're not the only one  
6 that occasionally has to update figures.

7 **PROF VAN ZIJL:** I guess, if anything, it sort of indicates the  
8 sea of uncertainty that you are dealing with, because  
9 clearly the base from which you estimate these things is  
10 not a constant one.

11 The tax adjusted market risk premium: The Commission  
12 considers a number of different approaches. Of those  
13 approaches the one that we have preference for is one that  
14 is based on a long series of relevant data, and while  
15 there is a reasonable series of data available for  
16 New Zealand, our view is that the data from before the  
17 mid-80s is not really reflective of the sort of economy  
18 that we currently inhabit and, therefore, if we want a  
19 relevant set of data we probably need to look toward the  
20 US. On the basis of data for the US, in particular the  
21 data that we describe in our paper, we end up with an  
22 estimate for the tax adjusted market risk premium, taking  
23 into account the tax adjustment, slightly higher than the  
24 Commission's estimate with a range of around 8.5% to 9.5%.

25 The risk-free rate we also differ on for a variety of  
26 reasons, one of which is simply that the practice is one  
27 of matching financing with the duration of assets.  
28 Another is that, if we take the argument presented by  
29 Professor Lally, then one can look at that and say, well,  
30 really ultimately it boils down to this; if an entity  
31 makes an investment decision on the basis of a set of

1 cashflows appearing over a long period, then essentially  
2 should that risk-free rate implicit in such an estimate,  
3 or assessment rather, should that reflect a series of  
4 estimates based on short-term rates or long-term rates?  
5 My own hunch is that, probably a series of long-term rates  
6 is going to be a better estimator of that original  
7 estimate of the required risk-free rate.

8 The third point, and perhaps I think an extremely  
9 telling one, is that there needs to be consistency in  
10 terms of application of the models. The model has just  
11 one risk-free rate in it, it doesn't have a number of  
12 risk-free rates, and if one therefore uses the long-term  
13 risk-free rate in estimation of the tax adjusted market  
14 risk premium, then consistency demands that it should also  
15 be used at the front end of the security market line  
16 equation, and that's just a straight out mathematical  
17 requirement.

18 The last two points are points of perhaps less  
19 significance, namely leverage and the debt premium. While  
20 we have theories in finance dealing with optimal capital  
21 structure, those theories aren't developed to the point  
22 where we can use those theories to determine in any  
23 practical situation what the optimal capital structure is,  
24 and so, practice tends to be one of inferring optimality  
25 from observed choice, and in this case the Commission has  
26 suggested a leverage level of around 40%. For the  
27 companies concerned, it would seem more appropriate to  
28 choose a leverage level of around 55 to 65%.

29 In terms of the debt premium, in my view this is a  
30 simple empirical issue, that it either is a certain number  
31 or it's not. The Commission suggests 1.2%, but in terms

1 of the three companies again concerned, a more appropriate  
2 estimate seems to be 1.7%.

3 Now, I did say that both of these issues are of less  
4 significance in the sense that, if you departed from the  
5 two estimates made by the Commission to the two estimates  
6 that we suggest, then there is really a difference of only  
7 around 0.35%. So, in numerical terms it's not a big  
8 issue, but of course when you translate that into numbers  
9 of dollars for the companies, of course, it's not an  
10 insignificant issue.

11 There isn't the same sort of difficulty and  
12 uncertainty in estimation of these parameters as there is  
13 in respect of the first three that we dealt with.

14 Finally, in terms of what I wanted to make reference  
15 to, the issue of compensation for uncertainty. A number  
16 of times in the Commission's report there is reference to  
17 uncertainty being compensated for by the fact that the  
18 Commission uses a domestic version of the CAPM rather than  
19 the international version of the CAPM. Our view is that  
20 application of an international model has by no means  
21 certain and predictable outcomes and, therefore, it's not  
22 justified to say that, use of a domestic model provides  
23 certain compensation.

24 So, over to Glen.

25 **PROF BOYLE:** Thanks Tony. This is the first time I've appeared  
26 here since my move to Wellington a few months ago, and I  
27 have to say, walking along the Terrace today, I felt like  
28 I was back in Dunedin. So, if I can make a suggestion for  
29 future hearings, it's that, possibly the weather is  
30 something that could well do with being regulated.

31 Anyway, the use of cost of --

1 **CHAIR:** We might have about the same degree of luck, I don't  
2 know.

3 **MS BATES:** Or certainty.

4 **CHAIR:** Or certainty, yes.

5 **PROF BOYLE:** The degrees of uncertainty concerning vital  
6 parameters are probably about the same.

7 Cost of capital: The estimation of use of cost of  
8 capital in the process that we're interested in. There's  
9 three steps in the process that are outlined in Martin's  
10 paper, Jerry talked about it this morning, and Tony's just  
11 gone through some of them now. First step, estimate the  
12 cost of equity capital using the capital asset pricing  
13 model. Second step, observe a debt premium or cost of  
14 debt, combine that with the cost of equity into some  
15 overall cost of capital, what we call the WACC. The third  
16 step is, take that WACC and compare it with ex-post  
17 realised returns to see if excess returns, excess profits  
18 are being made. If they are, it's an indication of market  
19 power.

20 I'm going to comment on each of those three steps very  
21 briefly I hope, because -- I'll start my watch going --  
22 because I'm not going to say anything new, I've said it  
23 all before, I'm just going to confirm what I've said  
24 before and hopefully in parts clarify some of what I've  
25 said before. [**Pause**].

26 So, the first step, estimate the cost of equity using  
27 the CAPM. I don't think I can find an academic who  
28 doesn't regard the CAPM now as anything other than a  
29 parable. That is, in making very clear one very important  
30 point, it overlooks a whole host of other important  
31 points. Now, admittedly some of the rejection of the CAPM

1 is philosophical in the sense that a number of people  
2 simply reject the underlying rational investor construct  
3 that makes up the CAPM. I'm not one of those, and I don't  
4 believe most people are, most academics are. Instead, we  
5 have come to sort of have very doubtful feelings about the  
6 CAPM simply because it doesn't work.

7 The one risk factor in the CAPM, beta, risk, simply  
8 seems unable to explain variation in average returns  
9 across firms, but if it can't do that it's not really  
10 doing very much at all. So, while the CAPM has proved  
11 very valuable to finance academics and finance  
12 practitioners in illustrating the difference between  
13 systematic risks, price risks and other sorts of risks,  
14 it's simply incomplete and it simply proved unable to do  
15 the job we asked of it. So for that reason, basically  
16 most, if not all academics, simply don't believe in it any  
17 more, and if academics don't believe in it then one has to  
18 ask, well, what value can it be in a process like this?

19 Now, the difficulty is, of course, that we don't have  
20 a viable alternative. Alternative theoretical models that  
21 have been developed seem to suffer from much the same  
22 problems, they don't work very well either, while  
23 empirical models that do seem to work better do so without  
24 having any theoretical basis, in other words, we don't  
25 understand why they work better.

26 So, it might be said therefore, and I have some  
27 sympathy for this view, that the CAPM is still the best  
28 game in town in the sense that there's no obvious  
29 alternative, but the point I'd like to stress is that it  
30 should really be considered solely as a starting point,  
31 not an end point. That the degree of error contained in

1 CAPM estimates is potentially very large indeed. So,  
2 placing any great weight on a single point estimate, or  
3 even a fairly narrow range of estimates, is brave.

4 Second point regarding step 2 of the process. Even if  
5 the CAPM does work perfectly, great model for coming up  
6 with expected returns, the use we then put it to,  
7 calculating the weighted average cost of capital, isn't a  
8 complete measure of the true cost of capital for  
9 investment.

10 Basically what the WACC tries to do is apply the  
11 insights of the CAPM, that only market risk matters, to  
12 physical investments (building a new pipeline or  
13 whatever). The trouble with that is that physical  
14 investments aren't quite like -- aren't exactly the same  
15 as financial market investments, and pretending that they  
16 are, while it's fine and, for most purposes, can run into  
17 difficulties. Because let's think about what can happen  
18 when a firm makes some sort of physical investment; things  
19 can go well or things can go badly. Now, that's just the  
20 risks of doing business, and to that extent, to the extent  
21 that those risks impact simply on that investment,  
22 investment in the pipeline, that's captured within the  
23 WACC. No problem there at all.

24 The difficulty comes in, in that, if things go badly,  
25 the adverse effects aren't confined necessarily to that  
26 investment alone. What can also happen, frequently does  
27 happen, is that it adversely affects the firm's other or  
28 existing assets or projects as well. If a particular  
29 investment does badly, and does badly enough, then the  
30 firm suffers losses and finds itself in a weakened  
31 financial position. What does that do? Well, that's

1 going to raise its cost of future funding; as a result,  
2 some of the firm's existing activities may have to be  
3 curtailed or abandoned entirely because they're not  
4 profitable any more, the firm can't afford to undertake  
5 them any more. Once there's a smell of financial weakness  
6 floating around, then firm stakeholders, customers,  
7 suppliers and the like can become weary of dealing with  
8 the firm; that also has an adverse effect on the other  
9 projects of the firm that were already going.

10 The net effect of all of that is to lower the expected  
11 cashflows, expected profits of those other projects, and  
12 that of course lowers their value now. This is an example  
13 of what I call an indirect cost of investment, but there  
14 are other types as well. When a firm makes a particular  
15 investment, it uses up some of its resources, human  
16 capital and the like; those then aren't available to use  
17 in the future on other projects. In other words, firms  
18 gives up some of its growth options.

19 Also, if a firm makes a particular investment now,  
20 then it can't turn around and make that same investment  
21 again in the future, if it turns out that it would have  
22 been better to have waited and make it in the future.  
23 That's an example of the timing option, what we call the  
24 timing option. Both of those are also examples of  
25 indirect costs.

26 That changes the vital calculation of what makes an  
27 investment commercially viable. I promise, this is the  
28 one equation in my talk. For those of you who can't see  
29 the board, this is the equation in the middle of the Fact  
30 2 slide.

31 So, the first term on the left-hand side, this is what

1 we're concerned with when a firm makes an investment, the  
2 change in the value of the firm, the difference between  
3 after and before. That's going to be equal to the sum of  
4 two things. The first term here, V project is the value  
5 of the investment's expected future cashflows discounted  
6 at the WACC. So, this term here is what we call the NPV  
7 of the project. The second term here are the indirect  
8 costs I've just been talking about; the difference before  
9 and after in the value of the firm's existing assets or  
10 projects.

11 The Commission's approach to assessing what makes an  
12 investment commercially viable seems to focus solely on  
13 this term here [**indicates**], the net present value. In  
14 other words, the second term. These indirect costs seem  
15 largely to be ignored, and yet as I explained, these  
16 indirect costs are pervasive because the things that give  
17 rise to them, market frictions and growth options, are  
18 pervasive in investments. So, it's rather hard to see how  
19 they can just be assumed away.

20 If I understand the Commission's arguments correctly -  
21 - and perhaps I'm just being dense, and if I am I know  
22 Martin will soon tell me -- there seems to be two  
23 arguments here. In the case of some of these indirect  
24 costs the Commission says, yes, these exist but you  
25 haven't quantified them so we're going to set them equal  
26 to zero. Well, zero is a number, but it's pretty clearly  
27 a lower bound as well.

28 The second argument which I really don't understand  
29 says that, no, these indirect costs don't exist at all for  
30 the purposes of identifying excess profits, because  
31 they're not injections of capital, they're not injections

1 of new capital. Now, I find this really puzzling, and  
2 perhaps I'm just not understanding the point that's being  
3 made, but I think of it this way: Suppose I'm an apartment  
4 owner, I have two apartments that I rent out, sit right  
5 next to each other, they're both two bedroom apartments,  
6 and I realise that I could get more money out of one of  
7 them by turning one of them into a three bedroom  
8 apartment. So, I figure out, well, is this worth it? I  
9 find out the cost of adding this extra bedroom on one of  
10 the apartments is \$50,000, but in doing so I block off the  
11 sun to the second apartment, or perhaps there's some other  
12 modification to the second apartment that I can now no  
13 longer make as a result of putting on this third bedroom  
14 on the first apartment, and I work out that the present  
15 value of not being able to do either of those things is  
16 \$40,000.

17 If I understand the Commission's argument correctly,  
18 it seems to be saying that the only relevant cost that I  
19 should consider in determining whether to go ahead or not  
20 with this renovation is the \$50,000 direct costs; that is,  
21 the cheque that I actually write out, but not the \$40,000  
22 indirect costs, even though that's coming out of my  
23 pocket, it will reduce the amount of rent that I can  
24 extract on the second apartment.

25 Well, that's one view, but I'm not too sure that many  
26 DIY renovators would share that view. That's my 10  
27 minutes, I better hurry up and finish.

28 So, indirect costs, they don't involve the firm  
29 writing out a cheque, but they never come out of  
30 shareholders' pockets and are, therefore, a real cost of  
31 investment.

1           Very quickly, even if the CAPM is a perfectly good  
2 model of expected returns and indirect costs are zero so  
3 that the WACC accurately measures the total expected  
4 return on any physical investment, there is still major  
5 difficulties when it comes to using it for the purposes of  
6 identifying excess profits in returns, and this simply  
7 comes about from the obvious observation that the WACC is  
8 an expected rate of return, whereas all we can observe are  
9 actual rates of return. At any point in time actual rates  
10 of return can be above what was expected or below what was  
11 expected, and so therefore it's very difficult to try and  
12 infer anything about excess returns from a small number of  
13 observations on actual returns.

14           In a paper that Graham Guthrie and I have written  
15 specifically on this topic, we point out that the noise  
16 associated with any estimate of excess returns from actual  
17 returns is likely to be very high indeed. So that, in  
18 other words, in order to be able to say that a particular  
19 return or returns over a series of years is excessive, it  
20 would need to be a long way above WACC; not just a little  
21 bit, but a long way.

22           Okay, so just to finish up: These three, what I called  
23 "facts" together seem to imply, to me anyway, that in  
24 terms of trying to identify excess profits we need to  
25 allow for a considerable margin over and above the best  
26 estimate of WACC that we can come up with.

27           Now it's true, I'm afraid, that we can't tell you  
28 exactly what this margin should be. We do have some work  
29 ongoing on this, but as I'm sure you can appreciate, it's  
30 a devilishly complicated job, and what we have available -  
31 - what we've done so far isn't yet fit for public

1 consumption. What we do know, however, is that this  
2 margin isn't zero. Don't know what it is, but it isn't  
3 zero.

4 Now, in that respect I think the use of the 75th  
5 percentile certainly is a step in the right direction, and  
6 I sympathise with your explanation of how that was arrived  
7 at this morning, Paula, I couldn't come up with any better  
8 way of doing it myself, so that sounds perfectly  
9 reasonable to me.

10 The one thing I'd say though is that, as Jerry pointed  
11 out this morning, it's arguable whether that fairly small  
12 step would even compensate for just the uncertainty about  
13 the CAPM parameters, and if that's true, it's certainly  
14 not compensating for these other issues that I've raised  
15 as well.

16 So, as I say, I think it's a step in the right  
17 direction. What I'm not convinced of though is that it's  
18 got all the way there.

19 **CHAIR:** Thank you for both presentations, and I'll leave the  
20 technical issues to other experts, but I -- and I know  
21 I've put this to both of you before, but as a regulator  
22 when I look around the world and I see every other  
23 regulator in the world dealing with these same issues, I  
24 just don't see them picking them up, and yet they are  
25 being advised, as we are, and still stand back and ask  
26 myself, why is that?

27 Why is it, when we look at what we decide and we look  
28 at what other regulators decide, we look like we have  
29 wider ranges and we settle on a higher part of the range  
30 and we generally -- and so, I just stand back from it and  
31 I say, if these things are so obvious and so

1 straightforward, why does this Commission not seem to be  
2 more out of line, or out of line at all, or out of line in  
3 a different direction than what we tend to seem to be out  
4 of line with, which we seem to be more conservative, I  
5 would suggest, in favour of companies than other  
6 regulators.

7 So, I'm always puzzled by this, and as academics -- I  
8 mean, you must see this, you look at what happens in other  
9 jurisdictions as well, and I just don't see some of these  
10 points being picked up, and I'm just curious about your  
11 thoughts on that.

12 **PROF VAN ZIJL:** I mentioned that in the case of optimal  
13 capital structure, the best one can do is to probably  
14 infer optimality from observed practice. That's an  
15 analogy that we shouldn't apply to regulation.

16 I don't know what the explanation is for the  
17 difference that you are referring to. It could well be  
18 that it's simply to do with the fact that regulation of  
19 the kind that's being entertained now is still something  
20 relatively new to New Zealand, whereas it's been going on  
21 in the United States for example for many many years and  
22 started off in an environment of a lot less knowledge of  
23 finance than is currently the case, and institutionally  
24 these things become pretty sticky in terms of shifting it.

25 **CHAIR:** But, I mean, even in those contexts, presumably they  
26 rely on expert academic advice, and yet we don't see -- we  
27 haven't seen significant shifts in the attitude towards  
28 some of these issues.

29 So, I find it puzzling, and of course we have to weigh  
30 it up, and New Zealand certainly never hesitated to go in  
31 a different direction if we thought that was appropriate,

1 but it does make me a little curious why it is.

2 I mean, I can listen, you know, look at the formula  
3 and see what you're saying about where we put our focus  
4 and what we haven't directly addressed, and it seems  
5 reasonable; but then I still stand back and I think, well,  
6 how far do you take it in making adjustments, and why do  
7 we seem to always make more adjustments than anyone else  
8 when they presumably know a lot more about it because  
9 they've been doing it for a lot longer? I always find it  
10 a little bit perplexing, but I'll leave that for now and  
11 just ask Commissioner Stevens if you have questions? [**No**  
12 **questions**]

13 We'll open the questions for Professor Lally, and  
14 while I said at the beginning of the session today we  
15 don't allow questions coming back the other way, I will  
16 tolerate a certain amount of it just for the sake of  
17 discussion and debate, because I don't think Professor  
18 Lally particularly minds, and it would be quite useful for  
19 the Commission, but if I need to intervene, I will, which  
20 I have had to do in the past. We'll keep an eye on how  
21 this goes, thank you. Professor Lally.

22 **DR LALLY:** Glen, Tony, since the precedent of informality over  
23 names and titles has been established by you, I probably  
24 sound a bit more stuffy if I reverted to the earlier  
25 model, so we'll stay with our given names.

26 Firstly, let me start with the subject of asset betas,  
27 and you have in the LECG submission referred to the  
28 Campbell paper, which I've read with some interest. I'm  
29 left at the end of the Campbell paper wondering about how  
30 much error there was in the estimates that they wound up  
31 with in respect of what was driving betas, how much of it

1 was coming out of the cashflows and how much of it was  
2 coming out of stochastic changes in discount rates. It  
3 seems to me that there would be an enormous amount of  
4 estimation error involved there. The paper presents the  
5 results from things that go into a black box, but one  
6 can't really see what's going on inside the black box.

7 But, I don't really want to focus on that, I just want  
8 to see, in so far as one put a great deal of weight on the  
9 Campbell paper, what the practical implications would be.

10 At the moment what's been done in trying to estimate  
11 the asset betas of these gas pipeline businesses is to  
12 look to other firms in the same industry, or a similar  
13 industry, and to make some allowances for regulatory  
14 differences. In my own paper they are the two key things  
15 that are driving the beta estimate.

16 I'm wondering, if you place any great weight on the  
17 Campbell paper, whether you would diverge from that  
18 process? Even the Campbell paper seems to make it clear  
19 that there are big differences in betas across industries,  
20 so you'd want to look at the industry, and I presume you  
21 would both agree that regulation matters.

22 So, in practical terms, what does the Campbell paper  
23 suggest we should do differently to what we're doing at  
24 the moment?

25 **PROF VAN ZIJL:** One of the interesting things I think about  
26 that line of research, and it's still a relatively new  
27 line of research in the sense that there's been very  
28 little built on the original paper by Campbell in May, but  
29 the interesting there I think there is too, to take the  
30 key focus away from, is looking at simple correlations of  
31 cashflows to saying that in actual fact some of the

1 variation could also be due to changes in expected  
2 returns.

3 I think in that regard a very interesting paper is the  
4 paper by Cornell where he uses the example of companies  
5 engaged in research and development with fairly long  
6 duration of the investments concerned, and that, while one  
7 might observe a very low degree of correlation in terms of  
8 cashflows, nevertheless such investments do tend to have  
9 high betas, and the betas are not easily explained on the  
10 basis of cashflows.

11 So, it provides a kind of interesting line of research  
12 in terms of trying to explain such anomalies. The role of  
13 reference to that in our paper is really just to  
14 illustrate that the sort of things that we've tended to  
15 look at, namely the correlations only, is perhaps only  
16 part of the total picture and that now, here is just  
17 another source of uncertainty in terms of what sorts of  
18 numbers we ought to hang on our estimates of beta.

19 **DR LALLY:** Thanks for that.

20 **PROF BOYLE:** Very briefly, the point being, Martin, that we  
21 didn't make any adjustment ourselves for that. It was  
22 more simply a matter of pointing out that, well, if you  
23 start with an asset beta estimated in a particular way and  
24 then make some adjustments for other factors, then if that  
25 list of other factors is incomplete because it ignores  
26 some of the determinants of asset betas, then that to us  
27 simply expands the confidence intervals associated with  
28 our estimates of asset betas. Not necessarily that the  
29 estimate any one of us came up with was wrong, simply  
30 that, by ignoring certain things it must add to the  
31 uncertainty concerning the precision of that estimate.

1 That's the point, I think, is the only point we were  
2 trying to make.

3 **DR LALLY:** Okay, that's fine, thanks for that clarification.

4 Turning to the market risk premium. I have included  
5 long-run historical data from New Zealand in the data that  
6 I draw upon to try and estimate the MRP, and you're not  
7 sympathetic to that dataset because prior to 1985 the  
8 risk-free rates were not market-determined, they were  
9 restrained by regulation.

10 What I'd like to put to you is that, if those  
11 regulatory constraints were not present, the risk-free  
12 rate would presumably have been higher and, therefore, the  
13 estimate of the MRP from the historical data would  
14 presumably have been lower. So, the numbers that Alastair  
15 Marsden and I are generating through this technology could  
16 be seen to be biased upwards as a result of this concern  
17 you're raising?

18 **PROF BOYLE:** One thing I'd say to that is that, on the face of  
19 it that sounds plausible, but I think if you have -- even  
20 if it's just one in this case, the short-term interest  
21 rate portion of the financial sector regulated, that's  
22 going to have consequence in other markets as well, i.e.  
23 The stock market.

24 So, I don't think you can assume that the average  
25 return on the stock market would have been the same in the  
26 absence of that regulation either. So, it's not simply a  
27 matter of saying, well, the interest rate would have been  
28 higher and, therefore, the premium lower.

29 **PROF VAN ZIJL:** I think you also have the issue, Martin, that  
30 it's not necessarily the case that the risk-free rate  
31 would have been higher than. It was set by regulation,

1 many of the large financial institutions were forced to  
2 put a certain proportion of their assets into Government  
3 stock. You know, it had very little to do with supply and  
4 demand in the market.

5 **DR LALLY:** Yes, but insofar as the regulations were not  
6 present, the risk-free rate would presumably have been  
7 higher?

8 **PROF VAN ZIJL:** Who knows, in the sense that, you know, it  
9 depends on the proportion of the market that might have  
10 even wanted to invest in such a security.

11 **PROF BOYLE:** You mean, given the intent of the regulation was  
12 to keep interest rates low, and so therefore it was a  
13 lower bound in that sense? Well, yeah, you would hope  
14 that was what happened if that was the intent, but as Tony  
15 points out, it may not have been.

16 **DR LALLY:** Okay. Turning to how you might estimate the market  
17 risk premium.

18 Glen, you've suggested as far as equations 8 and 9 in  
19 your submission are concerned, that -- and I quote from  
20 page 11 of your paper that:

21 "Any sensible application of the CAPM should use a  
22 value for the market risk premium that is explicitly  
23 consistent with the CAPM pricing process."

24 So, that's page 11, end of the second paragraph.

25 **PROF BOYLE:** Yep.

26 **DR LALLY:** And that implies that one should be using either  
27 equation 8 or 9 or possibly both. But, by contrast, the  
28 MRP estimates that you do favour are not in fact drawn  
29 from equations 8 and 9, they are in fact drawn from  
30 historical averaging of the Ibbotson kind across a large  
31 number of markets.

1 **PROF BOYLE:** Quite right. I didn't say we did it. I said  
2 that, if one were going to try and apply the CAPM  
3 sensibly, then you should use equations 8 or 9. But the  
4 trouble is, what that illustrates again is a the huge  
5 uncertainty surrounding the CAPM estimates because, if you  
6 do use either of those equations -- as I think I pointed  
7 out last time -- you get either very small numbers or very  
8 large numbers, and that's the difficulty you run into.

9 So, as soon as you start trying to do it properly,  
10 then you get numbers that don't seem to make any sense.  
11 On the other hand, if you undertake an ad hoc process,  
12 then you do seem to get numbers that -- well, maybe we  
13 just got used to them, but they do seem to sort of not be  
14 completely out of kilter.

15 **DR LALLY:** Okay. You have presented equations 8 and 9, and my  
16 earlier response was to say that these two equations are  
17 not consistent, you can't have both of them simultaneously  
18 operating, and your response is to say, yes, you can  
19 providing aggregate consumption equals the stock market  
20 return plus a constant.

21 I take it you'd agree that aggregate consumption is  
22 not related to stock market returns in that fashion?

23 **PROF BOYLE:** That's consumption growth, incidentally.

24 **DR LALLY:** Sure.

25 **PROF BOYLE:** Umm, would I accept that? Hmm, I don't know.

26 **DR LALLY:** Well, the volatility in aggregate consumption  
27 growth is considerably larger than the volatility in stock  
28 market returns.

29 **PROF BOYLE:** Oh, sure, but you can add in an extra error term  
30 under that linear specification that's uncorrelated with  
31 the return on the market and that could match up the

1 variances. So, I don't see that that's necessarily a  
2 problem at all.

3 In any event, the only point I was trying to get  
4 across was that 8 and 9 are not mutually exclusive. In  
5 fact, one is nested within the other.

6 **DR LALLY:** That's an issue we'll come back to if we have time.

7 Turning to the risk-free rate, so this is page 12.  
8 The way that I've formally approached this is to try and  
9 demonstrate that, if you use a risk-free rate that differs  
10 from the regulatory cycle, then the present value of the  
11 cashflows that arise will not match the initial  
12 investment. But I also presented a simple example in  
13 which, if you used an interest rate different from that  
14 matching the regulatory cycle, you could get, as I put it,  
15 "double-counting".

16 You've chosen to respond to that simple example rather  
17 than to the more formal present value analysis, and in  
18 responding to that simple example in the second  
19 bulletpoint on page 12 you say:

20 "Over time on average there will be as many upside as  
21 downside periods, unless of course the expectation is that  
22 interest rates will continue to rise in future or will  
23 remain constant after an initial period of rising."

24 Now, given those sort of caveats that you are  
25 mentioning there, and the second one is by no means an  
26 inconceivable possibility, why on earth would you want to  
27 continue using a risk-free rate that exposes you to that  
28 sort of problem? Why not eliminate the problem all  
29 together of these overs and unders by using a risk-free  
30 rate that matches the regulatory cycle?

31 **PROF VAN ZIJL:** I think fundamentally, Martin, the problem

1 that we have here is that, your argument for using the  
2 rate based on the regulatory period makes a certain number  
3 of assumptions, and in particular in terms of expectations  
4 being met.

5 Now, my view I think, and it's not necessarily Glen's  
6 view, is that when making a long-term investment you make  
7 certain estimates of future values for the relevant  
8 variables, and one of those would be a rate of return of  
9 which part is going to be the risk-free rate.

10 Now, if you do what you suggest, then we would have a  
11 succession of short-term rates proxying for that expected  
12 rate that the investor would have looked towards in terms  
13 of making the original investment decision. If, on the  
14 other hand, you do what has traditionally been done in  
15 regulation, which is to reset the rates at whatever the  
16 regulatory period is, but then they're always long-term  
17 rates. Well, the difference between what you're proposing  
18 and what has traditionally been done really is averaging a  
19 succession of short-term rates versus averaging a  
20 succession of long-term rates, and given that you are in  
21 fact looking towards achievement of a long-term rate in  
22 terms of the initial decision, what seems to me to be more  
23 appropriate on an intuitive basis is to look towards the  
24 averaging of the long-term rates.

25 Other than that, you've got this mathematical problem  
26 that we are actually dealing with a model, and there are  
27 difficulties in estimating the model, but at the very  
28 least we should demand consistency.

29 **DR LALLY:** I'll come to that, if we can just leave that aside  
30 for the moment.

31 But, coming back to my question, I'm quoting from this

1 LECG report which acknowledges that there are overs and  
2 unders and says that, "on average it will wash out  
3 unless", and then mentions these caveats which are not  
4 inconceivable.

5 Given that those caveats are not inconceivable and you  
6 have an overs and unders problem, why would you want to  
7 use a risk-free rate that exposes you to these very  
8 problems you concede exist?

9 **PROF VAN ZIJL:** I think the specific response was more to your  
10 example which suggested that, indeed, you were going to  
11 get double-counting, but you were going to get that  
12 consistently, whereas the response given is saying, well,  
13 in actual fact it may be lower, in which case you're not  
14 going to get the double-counting.

15 **DR LALLY:** I don't doubt that, but if there are sometimes  
16 overs and sometimes unders and they may not wash out, as  
17 stated by you, why would you want to use a methodology  
18 that produces overs or unders and they may not wash out?

19 **PROF VAN ZIJL:** But that goes back to the starting point that,  
20 is in fact your argument for a short-term rate in fact a  
21 valid one? Because, you ultimately run into the problem  
22 that you have this inconsistency if you accept that  
23 argument.

24 **DR LALLY:** But your use of the words "under-recovery", and  
25 they are your own words, implies there's something wrong  
26 with your method. They're your words, under-recovery, not  
27 mine.

28 **PROF VAN ZIJL:** Yeah, I think we've just got different  
29 understandings about that.

30 **DR LALLY:** Okay, I'm happy to leave it there and move on.

31 The debt premium: You favour a figure of 1.7 rather

1 than the 1.2. I get the 1.2 by actually citing some  
2 market data trades. You don't seem to me to be citing any  
3 market data to support 1.7.

4 **PROF VAN ZIJL:** Our basis for the 1.7 is information provided  
5 to us by the three companies.

6 **DR LALLY:** And is this traded data?

7 **PROF VAN ZIJL:** Not all of it, no.

8 **DR LALLY:** And you would accept that the companies have an  
9 incentive to -- how do I put this gently -- talk the  
10 number up?

11 **PROF VAN ZIJL:** One could assume that was the case, but  
12 nevertheless, if the companies are prepared to state this  
13 in public, then I would have to assume that they have a  
14 proper basis for making such a statement.

15 **DR LALLY:** Then, what's wrong with the market data I've  
16 presented, which is yielding much lower numbers?

17 Is there something wrong with it?

18 **PROF VAN ZIJL:** All I can say to that, Martin, is maybe your  
19 data comes from a different period or is not relevant to  
20 the circumstances of the companies. This is what the  
21 companies say are their actual costs at the current time.

22 **CHAIR:** Can I just clarify: Has the Commission had access to  
23 that data and what the source of it was?

24 **MR HODSON:** In the case of NGC, we supplied that with our  
25 submission; there's a cost of debt memo which is based on  
26 our historic data and how we derived that, and it's all  
27 public domain and is also in a form which we believe can  
28 be recreated by the Commission.

29 **DR LALLY:** Yes, but are these market trades?

30 **MR HODSON:** This looks at the cost of debt for NGC from 1992  
31 through to the present day. I mean, that's a cost of debt

1 for this company.

2 **DR LALLY:** Okay.

3 Lastly, if I can turn to this timing option issue.  
4 You have presented an example relating to apartments, and  
5 it wasn't clear to me whether that example was meant to  
6 relate to market frictions or to the timing issue. If the  
7 apartment example was meant to relate to market frictions,  
8 then your example is perfectly reasonable and I have no  
9 difficulty with it.

10 In terms of the timing option issue, my response to  
11 your earlier line of argument was to say, well, let's take  
12 an example and let's see how this timing issue would work,  
13 and that example appears on the top of page 63 of my  
14 paper. What I was hoping was that, if there's something  
15 wrong with my reasoning in that example, you would tear it  
16 apart, but you haven't in the latest submissions responded  
17 to that example beyond merely making the general comment  
18 that I make no allowance for existing capital. The  
19 example, of course, is of a newly created firm to try and  
20 extract out any other complication to focus on purely the  
21 timing option.

22 Now, having looked at my example, what do you think is  
23 wrong with it, if anything?

24 **PROF BOYLE:** Good question. What I wrote down at the time was  
25 "simply ignores the option value". Let me see. So, I  
26 think what you're saying is, that there's direct costs of  
27 \$10 million and a timing option worth \$10 million, and  
28 taking the timing option into account, the firm would only  
29 invest at a hurdle rate of 20% rather than the WACC of  
30 10%, and then you say finally, "if the firm invests at  
31 this point the excess profits would be \$1 million per

1 year."

2 And what I'm saying is, that is simply not an excess  
3 profit. Because, the \$10 million -- extra \$10 million  
4 that's been given up in order to take this investment is a  
5 cost of investment. It's true, it's not a direct capital  
6 injection, it's not something that the firm has written a  
7 cheque for, but nevertheless it's come out of the pockets  
8 of the security holders of that firm, and so, it is a cost  
9 of investment.

10 So, I'm not sure whether that really -- so, I guess  
11 what I'm saying is, I think your example simply overlooks  
12 the point. It assumes away the whole issue.

13 **DR LALLY:** Right, so you're saying --

14 **PROF BOYLE:** So, I disagree with the last sentence, in other  
15 words.

16 **DR LALLY:** Okay. So, you're happy with everything up to the  
17 last sentence, but it's the last sentence, in particular  
18 the words "the excess profits would be \$1 million per  
19 year"?

20 **PROF BOYLE:** That's right, whereas I would say, those profits  
21 are simply compensation for the capital that's been given  
22 up to take on that investment.

23 **DR LALLY:** Okay. So, if you had \$10 million to invest, in  
24 this hypothetical situation, and you held off investing  
25 until the net cashflow was \$2 million per year,  
26 perpetuity, 20% rate of return, you're saying that that  
27 20% rate of return would be just fair compensation for  
28 what had been put in or given up?

29 **PROF BOYLE:** Yes, because I'd be giving up \$10 million of  
30 something that I'd already paid for, so the true cost  
31 would be \$20 million, not \$10 million.

1 I would agree with you if -- well, in this case we're  
2 talking about timing, flexibility, but flexibility of any  
3 kind was synonymous with or equivalent to market power,  
4 but that's simply not the case.

5 It's true that in the literature there have been cases  
6 identified where timing flexibility is significantly  
7 reduced by competition, but equally there are plenty of  
8 other cases where that's simply not the case at all, that  
9 competitive firms -- sorry, flexibility is just as  
10 valuable for competitive firms as it is for firms with  
11 market power. In fact, it may be even more valuable  
12 because after all, competitive firms are floating much  
13 more on a thin margin, so flexibility and the ability to  
14 time things right, exactly right, are even more important  
15 for competitive firms than they are for firms with market  
16 power.

17 So, that's really why I don't agree with you, Martin.  
18 There seems to be some underlying presumption that timing  
19 flexibility equates to market power, but I simply don't  
20 believe that's the case.

21 **DR LALLY:** Okay, so just to push this example a little  
22 further. Where you put in \$10 million, you hold off until  
23 the net cashflows are \$2 million a year, and then you jump  
24 in. That if a regulator -- you're saying there's no  
25 excess profits here, so if a regulator were to come in and  
26 take the \$2 million a year you're earning and subtract \$2  
27 out of it, that would remove any incentive for someone to  
28 enter into this kind of a situation; to put up \$10 million  
29 and subsequently earn \$2 million a year minus \$2?  
30 \$2 million is the bare minimum that you'd be prepared to  
31 accept to justify putting your \$10 million in in the first

1 place?

2 **PROF BOYLE:** I've sort of lost track of the numbers a bit  
3 here, but I think I get the general picture.

4 What we're talking about here is the situation where  
5 the firm holds the rights to a project, and as a result  
6 that flexibility means it has a sort of insurance claim on  
7 the project. In other words, by waiting it can avoid  
8 potentially bad outcomes, and that insurance is valuable.

9 Once you actually go ahead and invest in the project,  
10 you don't have that insurance any more, it's gone, and if  
11 that insurance is something that the firm's providers of  
12 capital have paid for, and it disappears, then that's a  
13 cost of investment.

14 And so, in terms of that question you asked me, the  
15 answer is, yes.

16 **DR LALLY:** Okay. I'm not sure I can pursue it any further,  
17 and I realise that we've reached our time limit, so thanks  
18 very much.

19 **CHAIR:** If there are further questions, we'll take the time,  
20 Martin.

21 **MS BEGG:** Can I ask a variant of the same question, because  
22 this timing options thing puzzles me a bit too.

23 The question I have is along the lines of, if you  
24 undertake an investment, and sure you may use up an option  
25 by doing that, but surely investment itself creates a  
26 whole lot of options for the future as well, and should  
27 they not also be taken into account in this assessment,  
28 your equation that you have there?

29 Just to give you an example; suppose you're a gas  
30 exploration company and you decide to obtain an  
31 exploration permit and to explore. You use up an option

1 by choosing to go ahead and get that permit, but having  
2 done the exploration you now have a whole lot of  
3 information about where it might be useful to drill and  
4 you can -- you have timing options about when you do that.  
5 Surely then, that that investment not only used up a  
6 timing option, but it created a whole lot of new ones  
7 which have created value for your company.

8 If you say that you should take account of the using  
9 up of these options in assessing your investment, as you  
10 do there, surely the creation of these options should also  
11 be taken into account, and given that these companies have  
12 value above the cash that's been put in by investors, it  
13 would suggest that on balance investments create options  
14 rather than destroying them, which leads me to suggest  
15 that you should have a negative margin on WACC rather than  
16 a positive one, if you want to do it through WACC or the  
17 adjustment could be through your cashflows.

18 I must be missing something, but...

19 **PROF BOYLE:** Two questions there, if I get you right, Sue.

20 First, are there other options that are created as opposed  
21 to destroyed by the active investment?

22 **MS BEGG:** Yep.

23 **PROF BOYLE:** Secondly, should those not be incorporated in the  
24 sort of indirect cost adjustment that I've been talking  
25 about?

26 **MS BEGG:** Yes.

27 **PROF BOYLE:** Very quickly, my answers are "maybe", and "yes".

28 That is, sure, if there are such growth options  
29 created by the active investment, then absolutely they  
30 should be incorporated; they would lower the hurdle for  
31 investment. It's not clear to me though that there are

1 any in this case. I've done a bit of questioning of two  
2 gas firms, NGC and Powerco, and we haven't been able to  
3 identify anything obvious from this. For those sort of  
4 options, you do have to be able to identify them. The  
5 thing about the timing option, that almost always exist;  
6 that's pervasive. Whereas, other expansion options or  
7 abandonment or something like that, those are project-  
8 specific options and so they need to be explicitly  
9 identified, but if they can be, then yes, you're right.

10 **MS BEGG:** It seems to me that the options that the companies  
11 hold at the moment must have been created through  
12 investment. To a large extent they have invested in some  
13 assets and now they have options to go ahead and do  
14 further investment.

15 **PROF BOYLE:** That doesn't mean that, while their past  
16 investments may have created options, it doesn't  
17 necessarily follow that future ones --

18 **MS BEGG:** That future ones will.

19 **PROF BOYLE:** -- will have the same effect.

20 **MS BEGG:** But generally, I would have thought that anything  
21 that you change, changes your options and may well create  
22 options.

23 Anyway, you are suggesting that it would be  
24 consistent, and these things should be taken into account?

25 **PROF BOYLE:** Yes.

26 **MS BEGG:** I had another question which was on the time period  
27 for the risk-free rate, which is suggested here that --  
28 you state in this report that:

29 "Standard finance practices to match as closely as  
30 possible with duration of the risk-free rate to the life-  
31 span of an investment".

1           It seems to me -- I have never fully understood why a  
2 company would choose to be exposed to a 10 year interest  
3 rate when it can -- you know, it may have a number of  
4 reasons why its cashflows are affected by real interest  
5 rate shocks, it may prefer to adjust its exposure for  
6 those sorts of things. NGC itself produced a useful note  
7 which was referred to earlier [**indicates**] about the  
8 approach it takes, and it says it manages liquidity and  
9 refinancing risk separate from its interest rate exposure.

10 **CHAIR:** This isn't confidential, is it?

11 **MS BEGG:** No, this was the note that was released.

12           The comment there is that -- NGC comments that -- I  
13 can understand why, for refinancing you might want a long-  
14 term, because your assets are long-term, but the thing I  
15 don't follow is why you would want the exposure to the  
16 long-term interest rate.

17           I found that interesting because NGC says, although  
18 they have long-term rates, they use swaps to target a  
19 duration of up to 5 years for interest rate hedging  
20 purposes, and say that that's typical for other energy  
21 sector companies.

22           I take from that, that they are targeting a 5 year  
23 exposure, and I just wondered -- it says up to, and later  
24 says they're targeting a 5 year, so I'm not quite clear  
25 which of those it is, but is that consistent with your  
26 suggestion that the longest term rate you can find is the  
27 one that you should be using?

28 **MR HODSON:** If I could just make a comment with regard to that  
29 memo; that was prepared by our current Treasury staff and  
30 that practice has been in place for the last couple of  
31 years. If you look at the historic information for us,

1 before we were actually floated we put in 10 year  
2 financing in terms of debt, so I guess it's one of these  
3 things that, currently the company operates that way, but  
4 historically we haven't, so I'll then let the experts get  
5 back to it.

6 **MS BEGG:** I had an additional -- I just note on your historic  
7 debt profile that some of the numbers that relate there  
8 were for capital notes and the like, but did have some  
9 equity type characteristics, and so your margins may be  
10 high because of that, so I'm not sure that the numbers are  
11 necessarily a good representation of the margin we should  
12 be applying to the risk-free rate. So, that's another  
13 point.

14 **MR HODSON:** Yes, some of the historic ones do, but I think  
15 that's -- you know, I guess there may be a correction for  
16 that, but whether that's a correction all the way to 1.2  
17 is another question.

18 **MS BEGG:** Looking at your recent numbers, they're less than  
19 1%; the margins are drastically different if you take  
20 those numbers out. It may be something to look at.

21 **CHAIR:** Can we come back, Sue, to the question you put, which  
22 I think you put to the professors, whether knowing what  
23 you now know about what the current NGC practice is, does  
24 it have any impact on the view you took with respect to  
25 what was the relevant timeframe?

26 **PROF VAN ZIJL:** The statement made in the paper just reflects  
27 the sort of conventional wisdom of matching the term of  
28 financing with the term of investment, and of course there  
29 are many horror stories of firms that were doing very well  
30 but decided to invest long and borrow short, and of course  
31 it leaves you very exposed; if there are changes in

1 markets that you hadn't anticipated, in particular in  
2 terms of the ability to refinance, when in fact, you know,  
3 you're committed to the assets that you've got, difficulty  
4 in terms of quitting those assets.

5 **MS BEGG:** But NGC's [inaudible] in having the, say, 10 year  
6 financing and using swaps to get the different exposures.

7 **PROF VAN ZIJL:** Well, New Zealand, of course, is an unusual  
8 market too in the sense of the term of the financing, it  
9 tends to be shorter than you find in more mature markets  
10 in terms of the availability of securities. But, I don't  
11 know what the underlying motivation is for NGC's current  
12 practice, but it could just be that it reflects their  
13 perception of odd quirks in the yield curve; I don't know.

14 **DR LALLY:** The timing option question, in principle, in your  
15 earlier submissions was similar to the issue of firm  
16 resource constraints, and you argue for a margin being  
17 added to WACC in that situation as well.

18 As in the timing option case, I presented a trivial  
19 example, and again, you haven't in your latest submissions  
20 given any direct response to that trivial example, so I  
21 wonder if I could just take you to it on page 65, second  
22 paragraph. It says there, a firm's just been established,  
23 and it's confronted by two desirable projects, both cost  
24 \$10 million to undertake -- the direct costs as you put  
25 it. Both have a traditionally defined WACC of 10% and  
26 both are expected to generate net cashflows of \$3 million  
27 per year forever; the classic perpetuity. And, of course,  
28 the present value of each project is \$30 million. You put  
29 in \$10 million, the present value of either project will  
30 be \$30 million, but you can't undertake both projects,  
31 it's one or the other.

1 I've suggested there that in each case whichever  
2 project you will undertake you will be not only  
3 sacrificing the \$20 million on the other project, NPV, but  
4 that \$20 million NPV is the present value of excess  
5 profits.

6 Are you saying, in that trivial example, that there  
7 are no excess profits here?

8 **PROF BOYLE:** No, I'm not saying that at all because you've  
9 defined them as such. You have set up two projects in  
10 this example where you say \$20 million is the value of  
11 each project, is "excess profits", quote unquote, so you  
12 have set the example up with excess profits.

13 **DR LALLY:** No, no, let me go back a bit. The example is set  
14 up by saying, each project involves a direct investment of  
15 \$10 million and each project will generate expected  
16 cashflows of \$3 million per year indefinitely, and the  
17 traditionally defined WACC is 10%. So, do you agree that  
18 the present value of the cashflow is \$30 million in each  
19 case?

20 **PROF BOYLE:** Uh-huh, yep.

21 **DR LALLY:** So, how would you describe that difference between  
22 the \$30 million present value of future cashflows and the  
23 \$10 million put up?

24 **PROF BOYLE:** If this is ex ante, that's a return in excess of  
25 the cost of capital; that's an excess profit, but that's  
26 got nothing to do with my argument. Why don't you change  
27 the net cashflows to \$1 million per year?

28 **DR LALLY:** Right, the reason why I've constructed this example  
29 is because you have said, whenever a firm is faced with a  
30 foregone opportunity it has to be compensated for that  
31 through WACC by a regulator, and in this trivial example

1 where there are two projects the firm can only take one of  
2 them, and if it does undertake one project it sacrifices  
3 \$20 million NPV from the other one. That seems to me to  
4 be a foregone opportunity, and it seems to me your general  
5 argument is, foregone opportunities must be compensated  
6 for by regulators through WACC.

7 **PROF BOYLE:** Yes, this comes back to the point I was making  
8 earlier, that you seem to be associating timing options  
9 and growth options with market power, as in this example  
10 where there's \$20 million of excess profits. That's not  
11 the point I'm making at all. The point I'm making is  
12 that, there are -- what am I trying to say here -- there  
13 are foregone opportunities that can occur regardless of  
14 whether the firm is competitive or has market power.

15 Now, in this particular example you've constructed, it  
16 has market power, that's absolutely right, but we could  
17 tweak the example very easily, as I suggested, whereby the  
18 projects would not have any excess profits and then your  
19 example would be quite right, it would be illustrating  
20 exactly what I've been saying.

21 **DR LALLY:** Okay. Well then, I must be misunderstanding what  
22 you were saying. I understood your argument to be that,  
23 if a firm had a limitation such as managerial talent that  
24 prevented it from undertaking all of the prospectively  
25 desirable projects, then the WACC applied by a regulator  
26 had to make some allowance for that fact; that the  
27 managerial talent could only be applied to some, but not  
28 all, of the prospective projects open to the firm.

29 **PROF BOYLE:** No, what I said was that a competitive firm, if  
30 in the act of investing, has to sacrifice some growth  
31 options. Then, in order to make that active investment,

1 it will require compensation for those foregone growth  
2 options.

3 **DR LALLY:** Okay, so the key words are "a competitive firm"?

4 **PROF BOYLE:** Absolutely.

5 **DR LALLY:** And, if it isn't competitive, then there wouldn't  
6 be any justification for adding on a margin?

7 **PROF BOYLE:** Not a noncompetitive margin, no.

8 The point is, is that even a competitive firm can  
9 require an expected return in excess of the cost of  
10 capital. Now, obviously it's true that that will also  
11 apply to noncompetitive firms, but that's not the point  
12 I'm making. What I'm saying is that you can't simply say  
13 that the required hurdle rate for a competitive firm is  
14 WACC. What I'm saying is that, there are these other  
15 factors, foregone options, market frictions etc, that  
16 cause the required rate of return, the hurdle rate for  
17 even a competitive firm to exceed WACC.

18 Now, constructing an example whereby a firm has market  
19 power by construction doesn't change that story.

20 **DR LALLY:** Okay. I understand your position better now, but  
21 as a suggestion it would have been better in your latest  
22 responses if you had responded to those particular  
23 examples and said, "These examples are wrong because they  
24 are assuming da-da-da da-da". That's good, we've got some  
25 clarification there.

26 Can I just finally take you back to equations 8 and 9.  
27 You said to me, in response to my comment that the only  
28 circumstance question equations 8 and 9 will reconcile is  
29 when consumption equals a constant plus stock market  
30 return, and you said, no, just adding on an error term on  
31 the end can equalise the variances.

1           So, you're saying now that, in order for equations 8  
2           and 9 to be consistent, the relationship between  
3           consumption growth and stock market return has to be a  
4           constant plus market return plus a mean zero error term?

5 **PROF BOYLE:** That's right, and in fact that is the implicit,  
6           although really made explicit, assumption of the standard  
7           CAPM; that consumption growth is a linear function of the  
8           returns on the market.

9 **DR LALLY:** Right. Well, I'm glad you used the word  
10          "implicit". If one pulls out any of the papers that are  
11          alleged to be single period CAPMs, such statements do not  
12          generally appear there. But the consequence is that, if  
13          you regressed consumption growth on stock market returns,  
14          the slope coefficient would be 1 in this structure,  
15          wouldn't it?

16 **PROF BOYLE:** The way I've written it, yes.

17 **DR LALLY:** Do you think, if you went out and ran the  
18          regression, that would be the case?

19 **PROF BOYLE:** I'm just trying to think -- and I'm not getting  
20          very far on thinking, so I won't say "yes" or "no" to  
21          that, but...

22 **DR LALLY:** That's fine, but if --

23 **PROF BOYLE:** What I will say though is that I don't think  
24          that's helping your case very much, Martin, because the  
25          more general model is equation 9, and what I'm saying is,  
26          in fact one can justify the more restrictive standard CAPM  
27          on the basis of that more general model if, and probably  
28          only if, consumption growth is a linear function of market  
29          returns.

30 **DR LALLY:** Okay, that's fine, but you could also justify the  
31          single period CAPM by saying that investors act

1 myopically, they act as if -- when the end of the period  
2 is realised, they're going to act as if they sell up and  
3 spend it all; there's no re-investment, they act  
4 myopically.

5 **PROF BOYLE:** Well, yes, but that's really the same thing.  
6 That's like saying that all consumption -- sorry, all  
7 wealth is consumed. In other words, the return on  
8 everything you get back is a return you immediately spend,  
9 which is just the linear specification that I've outlined  
10 there, so that's just another way of saying the same  
11 thing. It sounds different, but it's the same thing.  
12 That's why I say, you can get to 8 and 9 if, and only if,  
13 that linear specification holds.

14 **DR LALLY:** Okay. Thanks very much.

15 **CHAIR:** Okay, I think I anticipated that we might go over on  
16 that session. I'll just make sure no-one has any further  
17 questions. **[No questions]**.

18 I'd like to now thank the three companies, NGC,  
19 Powerco and Vector for making this evidence and submission  
20 available to us, and thank both professors for being  
21 available. I know that you've appeared before us a number  
22 of times and I think the Commission is really pleased to  
23 have your expertise on these matters.

24 I did want to say to you, I noted also with Professor  
25 Bowman that some of the material wasn't gone over that  
26 we've discussed in past submissions, but whatever is in  
27 the draft at this stage, the Commission has an open mind  
28 to all of the submissions that are made.

29 So, I've seen in the past on occasions where people  
30 think, because they see something in draft they don't  
31 pursue it in cross-submissions if they feel strongly about

1 it; I would just like to encourage you to continue to do  
2 that because the Commission will consider all submissions  
3 and drafts that, they're drafts, and we can see in many  
4 decisions large shifts between time. So, I just make that  
5 point now because of a comment that Professor Bowman made,  
6 but I think it's relevant to all participants to keep in  
7 mind that the draft shouldn't be taken as a foregone  
8 conclusion about what the final position will be.

9 So, we are very grateful to you for the expertise that  
10 you bring to the issue and the submissions that you have  
11 made, so thank you once again.

12 We're going to break now and we'll reconvene at 3.45  
13 with Contact Energy who I believe is here in the back.  
14 Yes, okay, thank you. It looks likely that we'll be going  
15 till 5 o'clock today, so if anyone needs to know that to  
16 make arrangements, we'll plan on that at this point. So,  
17 thank you once again.

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20 **Adjournment taken from 3.25 pm to 3.48 pm**

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